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Original Study - Brief Report

# Changes in Long-Term Care Markets: Assisted Living Capacity and the Prevalence of Nursing Home Residents With Dementia From 2019 to 2023



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## ABSTRACT

**Keywords:**  
Assisted living capacity  
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**Objectives:** To evaluate how changes in assisted living (AL) capacity influence the prevalence of nursing home (NH) residents with dementia.

**Design:** This is a panel study. We used state AL licensing data for 2019, 2021, and 2023, linked with NH data from [LTCFocus.org](http://LTCFocus.org). The outcome was the percentage of residents with a dementia diagnosis in each NH. The main exposure variable was the number of AL beds within a 15-mile radius of a given NH.

**Setting and Participants:** 11,030 NHs in the contiguous United States operating in 2019, 2021, and 2023 with data on residents' dementia diagnoses.

**Methods:** We used linear probability models with year and facility fixed effects to examine the relationship between changes in AL capacity and memory care AL capacity and the percentage of NH residents with dementia, adjusting for market and time-varying NH characteristics.

**Results:** On average, dementia prevalence in NHs decreased from 50.8% (SD = 14.6) of residents to 44.6% (SD = 14.6) over the study period. Within markets, total AL beds increased averagely from 2897.8 to 3202.2 between 2019 and 2023; the average number of memory care beds increased from 993.3 to 1222.0. In the adjusted model, a 100-bed increase in AL capacity corresponded with a 0.1 (SE = 0.02)–percentage point reduction in the prevalence of NH residents with dementia ( $P < .001$ ). A 100-bed increase in memory care AL capacity was associated with a lower, but not statistically significant, share of NH residents with dementia ( $\beta = -0.02$ , SE = 0.02;  $P = .2$ ).

**Conclusions and Implications:** Findings suggest that increased AL capacity—but not memory care—may postpone entry or divert NH placement among people living with dementia. Future research should explore how AL expansion affects health outcomes, care quality, and lived experiences for individuals with dementia.

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Approximately 6.9 million Americans aged  $\geq 65$  years currently live with Alzheimer disease and related dementias (ADRD), with projections reaching 13.8 million by 2060.<sup>1</sup> The economic impact of

ADRD on older adults is high, particularly concerning medical and long-term care expenses.<sup>2,3</sup> Nursing home (NH) and assisted living (AL) communities are the 2 main residential long-term care settings in the United States, together serving over 2 million residents in 2022.<sup>4</sup> In a recent study, almost 35,000 ALs were identified in 2023, and the capacity of ALs in the United States could accommodate more than 1.3 million residents.<sup>5</sup> AL is a rapidly expanding segment of the long-term care (LTC) system in the United States, offering an alternative to NH care for some older adults, including those with

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ADRD.<sup>6-8</sup> Although the definition of AL varies across states, it is generally defined as a regulated residential care facility for 4 or more residents, providing room and board, at least 2 daily meals, 24-hour supervision, and assistance with activities of daily living for primarily older adult residents.<sup>6</sup>

Prior research suggests that changes in AL capacity can influence NHs' composition and performance.<sup>9-11</sup> For example, one study found that increases in AL capacity were associated with reductions in the population of residents in NHs with low care needs.<sup>9</sup> Another study observed that increases in AL capacity were associated with fewer private pay–financed days in NHs.<sup>10</sup> In addition, another study found a negative relationship between AL capacity and NHs' financial performance.<sup>11</sup>

AL plays an important role in the delivery of LTC, especially for older adults living with dementia. It is estimated that more than 40% of AL residents have an ADRD diagnosis, and more than 70% have some form of cognitive impairment.<sup>4,12</sup> In addition, in 2020, approximately one-third of ALs reported specializing in dementia services—either exclusively serving individuals with ADRD or offering dedicated units, wings, or floors (referred to as “memory care”)—compared with only 13% of nursing homes.<sup>4</sup> However, it remains unclear whether access to AL, including specialized memory care, influences the care setting of older adults with ADRD. To address this question, this study investigates how changes in AL capacity and memory care AL capacity within a designated market (15-mile radius of an NH) affect the prevalence of NH residents with dementia.

## Methods

### Data Sources

We conducted a panel study<sup>13</sup> that followed a fixed cohort of NH markets in the United States observed from 2019 and 2021 to 2023. Data were obtained from 2 primary sources: A national directory of ALs, which provided capacity and memory care licensure information, and the publicly available Long-Term Care Focus (LTCFocus.org) facility-level data set, which contains comprehensive information about NHs, including resident characteristics and facility features.<sup>14</sup> Our team assembled the national directory of ALs for 2019 to 2023 by reviewing publicly accessible records from AL state licensing agencies.<sup>15</sup> The AL capacity information is available nationally; however, AL memory care licensure information in all 3 study years was available in only 29 states (Alabama, Arkansas, Colorado, Florida, Idaho, Illinois, Indiana, Iowa, Maine, Massachusetts, Michigan, Mississippi, Montana, Nebraska, Nevada, New Jersey, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, Texas, Vermont, Virginia, Wisconsin, and Wyoming). To be included in the LTCFocus.org facility-level data, NHs had to have at least 10 residents with ADRD for public reporting eligibility because of data use requirements.

### Sample

The study sample included 11,030 NH markets. We defined a market as the AL communities and competing NHs within a 15-mile radius, following the approach of Cornell et al<sup>9</sup> (2021) and evidence that older adults are less likely to travel outside of a 15-mile radius to seek care.<sup>16</sup> The markets were composed using the buffer function of ArcGIS. To be included in the sample, NHs had to be operating in the contiguous United States in 2019, 2021, and 2023. We excluded markets from Connecticut and Minnesota because of unavailable information during the study period. We also exclude every NH market crossing borders into Connecticut and Minnesota. For analysis exploring changes in memory care AL capacity, we limited our

sample to NHs in the 29 states with memory care licensure data and excluded all NH markets crossing the borders (N = 7517).

### Variables

The primary outcome variable was measured at the NH level as the percentage of NH residents with dementia. This variable was specified in the LTCFocus.org data as the percentage of NH residents present on the first Thursday in April who have an ADRD diagnosis on the closest Minimum Data Set (MDS) 3.0 assessment. The main independent variable was the number of AL beds within a 15-mile radius of each NH, representing AL capacity. For the memory care analysis, the main independent variable was the number of AL beds in memory care–licensed ALs within each nursing home's 15-mile radius. We included 2 categories of covariates: (1) market-level characteristics included the total number of other NH beds within the market and the number of beds in NHs with dementia special care units; (2) facility-level characteristics included payer mix (percentage of Medicare residents; percentage of Medicaid residents), facility size (total number of beds), occupancy rate, ownership structure (chain membership vs not), and profit status (for-profit vs non-profit).

### Analyses

We used linear probability models (LPMs)<sup>9,17,18</sup> with year and NH fixed effects to examine the relationship between changes in AL capacity and the percentage of NH residents with dementia. LPMs allow for straightforward inclusion of facility fixed effects, which control for all time-invariant, unobserved characteristics of each facility (eg, baseline staffing levels, geographic location, or organizational culture). Year fixed effects were included to account for broad, secular trends that affect all facilities equally in a given year. The adjusted model accounts for market and time-varying NH characteristics. The unadjusted and adjusted model specifications were expressed as follows:

#### Model 1:

$$Y_{it} = \beta_0 + \beta_1 AL\_Beds\_Within\_Market_{it} + \alpha_i + \gamma_t + \varepsilon_{it}$$

#### Model 2:

$$Y_{it} = \beta_0 + \beta_1 AL\_Beds\_Within\_Market_{it} + \beta_2 Facility\_Size_{it} + \beta_3 Occupancy_{it} + \beta_4 Chain\_Membership_{it} + \beta_5 For\_Profit_{it} + \beta_6 Medicaid\%_{it} + \beta_7 Medicare\%_{it} + \beta_8 Other\_NH\_Beds_{it} + \beta_9 Other\_Dementia\_NH\_Beds_{it} + \alpha_i + \gamma_t + \varepsilon_{it}$$

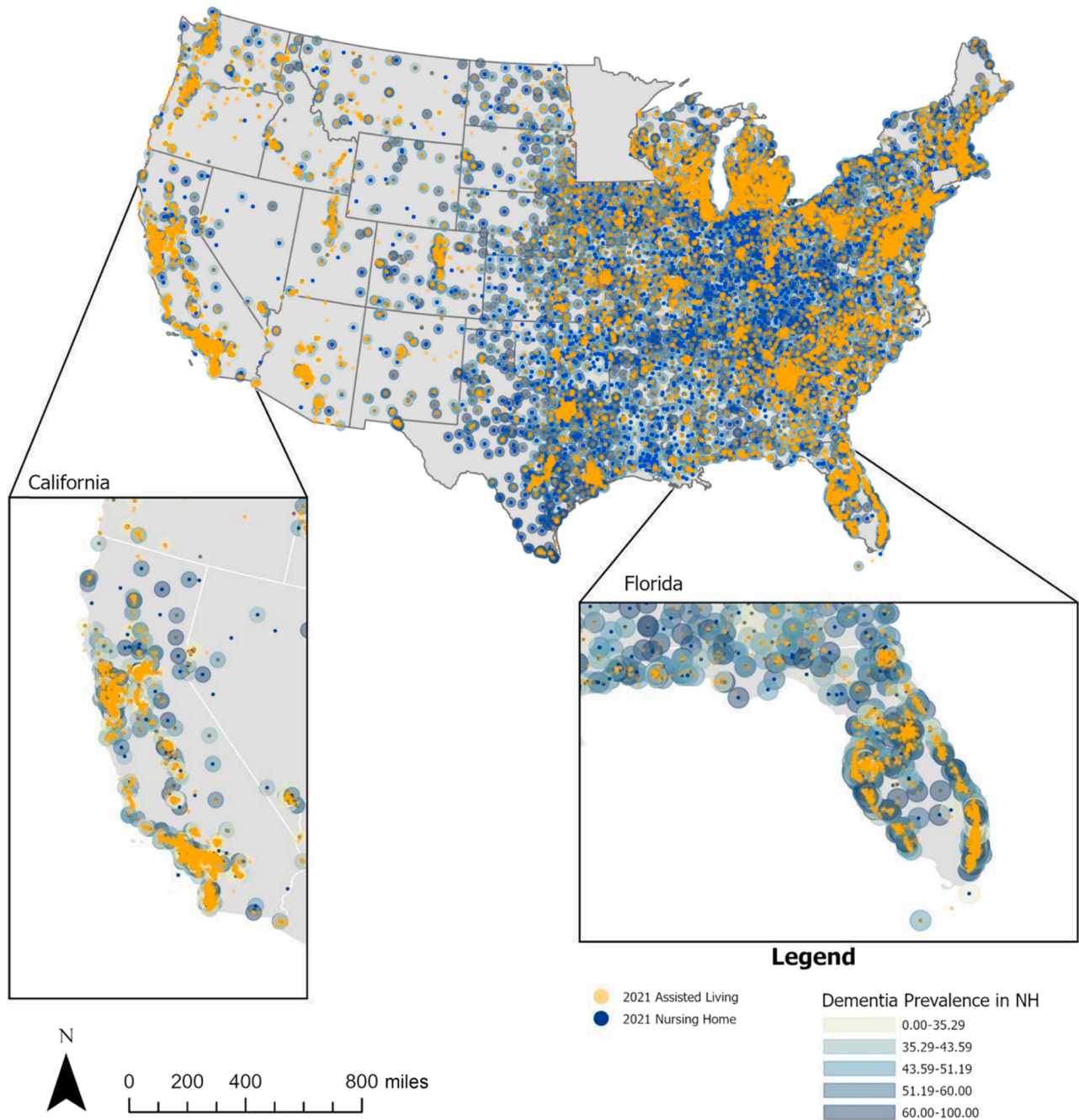
where  $i$  indexes NHs and  $t$  indexes year.  $\alpha_i$  represents facility fixed effects,  $\gamma_t$  represents year fixed effects, and  $\varepsilon_{it}$  represents the error term. R (R Foundation for Statistical Computing) and Stata (StataCorp LLC) were used, with statistical significance set at  $P < .05$ .

For the memory care analysis, we repeated the analysis described above but limited to the sample of LTC markets in states with licensure data whose market borders did not cross into states without memory care licensure data.  $\beta_1$  would be the capacity of AL with memory care instead. As sensitivity analyses, we (1) created markets based on aggregated county-level data and replicated our analyses, and (2) replicated analysis for all ALs using beta regression models.

## Results

### All ALs

Figure 1 depicts the geographic distribution of NH and ALs across the United States in 2021, with dementia prevalence in NHs categorized into quintiles. We observed a decrease in the prevalence of



**Fig. 1.** 2021 nursing home (NH) dementia prevalence and assisted living (AL) distribution. This map illustrates the distribution of NH markets and AL communities across the contiguous United States in 2021 (Connecticut and Minnesota were excluded because of unavailable information during the study period). NH markets are defined as a 15-mile radius surrounding each NH in circles. Each NH market is shaded in light green to light blue according to the dementia prevalence in the centered NH (blue dot), categorized into quintiles, ranging from 0% to 100%. AL communities are displayed as orange dots. Insets highlight detailed views of California and Florida, 2 states with high concentrations of long-term care facilities. Data sources include [LTCFocus.org](https://www.ltcfocus.org) and state AL licensing records.

dementia in NHs from 50.8% (SD = 14.6) in 2019 to 44.6% (SD = 14.6) in 2023 (Table 1). NH occupancy rates also declined from 82.0% (SD = 13.4) to 76.6% (SD = 15.7). Other NH characteristics remained relatively stable during this period. At the market level, significant changes were observed in the competitive landscape: AL bed capacity increased from 2897.8 (SD = 3764.5) to 3202.2 (SD = 4112.2) beds, on average, per market area. In addition, the number of beds in NHs with dementia special care units decreased from an average of 545.4 (SD = 877.2) in 2019 to 414.0 (SD = 651.0) beds in 2023.

Table 2 presents the results of the fixed effects LPM analyses examining the relationship between AL capacity and the percentage of

NH residents with dementia, including both unadjusted and adjusted results. For every increase in AL capacity (per 100 AL beds within a market), the prevalence of NH residents with dementia decreased by 0.1 percentage points for the adjusted model (95% CI: -0.1, -0.0;  $P < .001$ ), same as the unadjusted model ( $\beta = -0.1$ , 95% CI: -0.1, -0.0;  $P < .001$ ).

#### Memory Care ALs

For our analysis limited to LTC markets in states with memory care licensure data (Supplementary Figure 1), we observed that the average prevalence of dementia in NHs decreased from 51.6% (SD =

**Table 1**  
Nursing Home Characteristics in 2019 and 2021 (N = 11,030)

Characteristic	2019	2021	2023
% residents with dementia, mean (SD)	50.80 (14.57)	48.67 (14.52)	44.64 (14.55)
% residents with Medicaid primary payer, mean (SD)	62.11 (20.68)	62.15 (20.63)	62.51 (20.64)
% residents with Medicare primary payer, mean (SD)	11.71 (9.40)	12.20 (10.15)	11.75 (10.87)
Total beds, mean (SD)	117.79 (59.56)	117.35 (58.37)	117.21 (58.07)
Occupancy rate %, mean (SD)	81.98 (13.41)	75.20 (15.54)	76.63 (15.74)
Part of a chain, n (%)	6572 (60)	6506 (59)	6487 (59)
For-profit, n (%)	8010 (73)	8038 (73)	8183 (74)
No. of AL beds in the market, mean (SD)	2897.82 (3764.47)	3103.72 (4059.41)	3202.21 (4112.20)
No. of other NH beds in the market, mean (SD)	3982.58 (6827.66)	3965.50 (6737.80)	3951.00 (6776.73)
No. of other NH beds with dementia special care unit in the market, mean (SD)	545.38 (877.20)	558.78 (835.06)	414.03 (650.95)

The sample includes every NH market in the contiguous United States excluding Minnesota and Connecticut, and any market crossing the Minnesota and Connecticut borders. Market: 15-mile radius of an NH.

14.2) to 45.6% (SD = 14.3) ( $P < .001$ ) between 2019 and 2023 (Supplementary Table 1). At the market level, the capacity of ALs with memory care increased from an average of 993.3 (SD = 1331.5) in 2019 to 1222.0 (SD = 1575.2) beds in 2023 per market ( $P < .001$ ). In adjusted analyses, we did not observe a statistically significant association between increases in memory care supply and the prevalence of NH residents with dementia (Supplementary Table 2).

### Sensitivity Analyses

For sensitivity analyses, we used counties as market boundaries for all AL beds (Supplementary Figure 2, Supplementary Table 3) and memory care AL beds (Supplementary Figure 3, Supplementary Table 4). For every increase in AL capacity (per 100 AL beds within a county), the prevalence of NH residents with dementia decreased

significantly by 0.1 percentage points in the adjusted model (95% CI:  $-0.2, -0.0$ ;  $P < .001$ ). We also observed a significant but small association between 100 memory care AL beds increase and the prevalence of NH residents with dementia ( $\beta = -0.1$ , 95% CI:  $-0.1, -0.0$ ;  $P < .05$ ). We also used beta regression models to replicate Table 2 (Supplementary Table 5), which generated similar results from LPMs ( $\beta = -0.1$ , 95% CI:  $-0.1, -0.1$ ;  $P < .001$ ).

### Discussion

Our study reveals important insights into the relationship between AL capacity and NH dementia prevalence. The primary finding demonstrates that increasing AL capacity within a 15-mile radius of the average NH is associated with a small decreasing prevalence of NH residents with dementia. Specifically, a 100-bed increase in AL capacity corresponded with a small but statistically significant 0.1–percentage point reduction in NH dementia prevalence after controlling for market and facility characteristics. We acknowledge that this is a small association. Nonetheless, we interpret this association as an early signal of the potential influence of AL capacity on dementia prevalence in NHs. Further research is needed to quantify the real-world impacts of AL expansion in terms of cost savings, and quality of life benefits from postponing or preventing NH admissions among people living with dementia.

In our analysis focused on changes in AL memory care supply in 29 states that license memory care AL, we observed similar findings, although the results were not statistically significant. These results raise several considerations for future research, including the need to understand if and how memory care capacity may differentially influence care patterns for older adults with dementia in need of LTC. Importantly, almost 82.5% of AL residents pay privately for their care, compared with only 37.7% of residents in NHs.<sup>4</sup> The higher cost of memory care AL (25.4% above general AL<sup>19</sup>) may have thwarted its effect on NH placement, as many families may not afford market-rate memory care. Our findings also call for increased research to understand the differences and similarities between general AL and memory care AL in providing LTC to individuals with dementia and how they may differentially divert or delay nursing home placement as has been observed in prior research.<sup>20</sup>

### Limitations

Data constraints (ie, missing data for Connecticut and Minnesota, only including nursing homes with >10 residents with dementia that were continuously operating during the study period) potentially limit the generalizability, and we could not estimate the impact of the

**Table 2**  
Association Between Assisted Living Capacity and the Percentage of Nursing Home Residents With Dementia

	Unadjusted	Adjusted <sup>†</sup>
AL capacity within a market (100s)	-0.08*** (-0.11, -0.05)	-0.08*** (-0.11, -0.05)
Year: 2021 (COVID-19)	-1.97*** (-2.16, -1.78)	-2.16*** (-2.38, -1.95)
Year: 2023	-5.93*** (-6.17, -5.68)	-6.11*** (-6.36, -5.86)
NH total beds		-0.02* (-0.04, -0.00)
NH occupancy rate		-0.03*** (-0.05, -0.02)
NH part of a chain: yes		-0.07 (-0.41, 0.27)
NH run for profit: yes		0.07 (-0.53, 0.68)
NH % residents with Medicaid primary payer		0.03*** (0.02, 0.04)
NH % residents with Medicare primary payer		-0.06*** (-0.08, -0.04)
Market: other NH beds (100s)		0.07 (-0.02, 0.16)
Market: other NH beds with dementia special care unit (100s)		-0.01 (-0.04, 0.02)
Constant	54.55	54.30
Fraction of variance due to differences across NHs	0.76	0.77
Number of NHs	11,030	11,030

The sample includes every NH market in the contiguous United States excluding Minnesota and Connecticut, and any market crossing the Minnesota and Connecticut borders. Market: 15-mile radius of an NH.

\* $P < .05$ . \*\* $P < .01$ . \*\*\* $P < .001$ .

<sup>†</sup>Adjusted model includes facility and year fixed effects.

expanding AL capacity on NHs that were once opened or closed during this period, although the number of such NHs was small.

Although we include year fixed effects to account for national-level time trends, our models do not capture within-year variation, such as different waves of COVID-19, regional differences in pandemic severity, or evolving public health responses. Notably, we were unable to include 2020, a critical pandemic onset year, because of data limitations. As a result, our estimates may be subject to residual confounding by time-varying, unobserved factors, particularly those related to COVID-19. For example, pandemic-related constraints may have reduced admissions across all long-term care settings,<sup>21</sup> potentially influencing the observed associations in an unknown direction. Some studies reported delayed discharge of NH during COVID-19 because of ALS' unwillingness to take over NH residents<sup>22</sup> or hospitalization leading to prolonged stays in NH,<sup>23</sup> which could attenuate our study results. Because COVID-19 dramatically influenced the LTC sector during our study period, the results of this study may not be generalizable to other time periods. Nonetheless, we did observe a signal that increasing AL capacity was associated with reductions in the share of NH residents with dementia up and above the time trend that was influenced by the pandemic.

## Conclusions and Implications

The results indicate that increasing AL capacity is associated with a modest yet statistically significant reduction in the percentage of NH residents diagnosed with dementia. These findings imply that greater AL capacity might either delay or redirect the placement of certain individuals with dementia into NHs. Further research is necessary to determine whether expansions in the AL sector correlate with varying health outcomes, quality of care, and overall experiences for individuals living with dementia.

## Disclosure

Dr Jutkowitz reported grants from RGF Environmental Group outside the submitted work; is a cofounder and on the board of directors of Plans4Care Inc, a digital health company that provides personalized, on-demand dementia care; is a consultant to the Lewin Group under their CMS GUIDE contract; and is on the board of directors for PACE-RI. Other authors report no conflicts of interest.

## Supplementary Data

Supplementary data related to this article can be found online at <https://doi.org/10.1016/j.jamda.2025.106068>.

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