Admission Severity and Mortality Rates Among Rural and Urban Nursing Facility Residents with Dementia

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Among Rural and Urban Nursing
Facility Residents with Dementia

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EXECUTIVE SUMMARY

The Policy Question

Limited access to home-based care and higher use of nursing facility services in rural communities are frequently cited as challenges to the development and delivery of long term care services in rural areas (Coburn and Bolda, 1999; Coward and Cutler, 1989). One specific challenge is meeting the needs of persons with dementia by offering alternatives to nursing facility level of care. Although there has been a growing array of community-based and in-home service options for persons with this condition, dementia continues to pose a significant risk for early nursing home admission.

The purpose of this study was to assess whether the potentially higher utilization of nursing facility services in rural communities (Shaunghessey, 1994) can be attributed to differences in use patterns by older adults with dementia. Specifically, we sought to answer the question of whether rural nursing facility residents with dementia are less impaired at the time of their admission to a nursing facility than urban residents with dementia. A parallel question concerned the comparison of rural versus urban mortality rates. If rural residents with dementia enter the nursing facility earlier than their urban counterparts, does it follow that they, as a group, experience lower mortality rates and therefore longer stays in nursing facilities?

Study Methods

This study used the Minimum Data Set + (MDS+) assessment data for residents of nursing facilities in four states participating in the Health Care Financing Administration's Medicare and Medicaid Multistate Nursing Facility Case-Mix Payment and Quality Demonstration (Kansas, Maine, Mississippi, and South Dakota)[1]. MDS+ information includes: residential history, medical symptoms, diagnoses, medications, treatments, cognitive and physical functioning, and behavior, mood, and involvement indicators. We used resident data from nursing facilities in the four states from calendar years 1994 and 1995, excluding Medicare only nursing facilities in Kansas whose participation was voluntary and inconsistent. Our final sample included 14,450 nursing facility residents with a diagnosis of dementia. These data were linked with the Area Resource file and facility information from the states to obtain information on facility and area characteristics.

Bivariate analyses were conducted to compare the characteristics of residents in rural and urban areas at admission and multivariate Poisson regression models were estimated to

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[1] Although New York was the fifth state participating in HCFA's Medicare and Medicaid Multistate Nursing Facility Case-Mix Payment and Quality Demonstration, we did not use New York's assessment data because it consisted of skilled nursing facilities only.

evaluate the effect of rural residence on mortality, controlling for state and resident characteristics at baseline (admission), and time since admission.

Summary of Results

Study results indicate that rural NF residents were less cognitively impaired and exhibited fewer behavior and mood problems at admission than their urban counterparts. They were slightly more physically impaired than urban NF residents although, on average, NF residents in both rural and urban areas did not need extensive assistance with activities of daily living. Despite their physical impairment, rural residents appeared more socially active and physically active in their customary routines than urban residents. Regarding their medical condition, rural residents had a higher prevalence of arteriosclerotic heart disease, congestive heart failure, cerebrovascular accident (stroke), and diabetes. However, fewer than 20 percent of the rural population had such conditions. Our findings indicate that rural nursing facility residents with dementia may be experiencing lower mortality rates and therefore longer stays in nursing facilities compared to urban residents with dementia. The marginal statistical significance detected ($p=.049$), however, suggests the need for further research in this area.

Discussion and Policy Implications

These findings suggest that caregiver and/or community support may not be sufficient to enable rural persons to remain in the community as long as urban individuals. Additionally, expectations and/or preferences for use of nursing facility care and different understandings of options, availability of specialty support services, and provider (physician) knowledge of options may be factors influencing admission decision differences in rural and urban areas.

State and federal long term care program and policy development can benefit by concerted attention to the specific needs of rural long term care consumers with dementias. This analysis provides evidence of the potential for greater reductions in the dependence on nursing facilities for long term care in rural areas. By simply achieving nursing facility utilization patterns that more closely resemble those of urban nursing facilities, nursing facility use in rural areas can be reduced. In addition, individuals with early-stage dementias who are served in rural facilities may receive more appropriate assistance through home and community-based or non-medical residential long term care services. Consumer objectives and long term care policy goals can be enhanced through the development of *rural* long term care services targeted to meet the needs of individuals with dementia, and their family or other informal caregivers.

Research is needed to determine differences in access to and supply of in-home and out-of-home respite and service options for rural residents with dementia and their families. Such research can help inform and direct rural communities' dementia needs assessments and federal and state program and policy development activities.

Rural dementia respite centers, adult day programs and in-home respite services, like those funded through the Administration on Aging's Alzheimer's Demonstration Program, are the types of long term care development activity that require greater support and sustained funding. Examples of other projects include dementia care educational efforts targeted to rural physicians and primary care case management payment incentives for improved "management" for rural patients with dementia and their family caregivers.

Given the recent introduction of a federally funded caregiver support program, more careful attention to rural caregivers of persons with dementia may be forthcoming. State policymakers administering these resources would be well advised to consider multiple models for caregiver support with specific attention to support in their more rural communities. As these resources and programs mature and program evaluations are underway, evaluators will be able to further explore whether rural caregivers, when offered support, react (accept/reject assistance) differently than urban caregivers.

As in urban areas, rural residents with dementia and their informal caregivers will benefit from increased information about dementia and advice for caregiving designed to address the specific concerns of rural caregivers. Research on the benefits of information distributed in a manner titrated to the individual needs of caregivers at different stages of acceptance/readiness may be particularly well suited for extension to specifically rural concerns (Gwyther and Ballard, forthcoming). On a related front, encouraging family caregivers to accept respite support, either in their own homes or through adult day programs or short-term residential respite assistance, continues to be of paramount importance. Based on our findings, specific initiatives supporting the development of respite services in rural areas appear to be warranted. Finally, if policy goals for more appropriate use of rural nursing facilities are to be achieved, services like respite care may be appropriate for adults in the early stages of dementia rather than "premature" nursing facility admission and long-stay care.

INTRODUCTION

Limited access to home-based care and higher use of nursing facility services in rural communities are frequently cited as challenges to the development and delivery of long term care services in rural areas (Coburn and Bolda, 1999; Coward and Cutler, 1989). One specific challenge is meeting the needs of persons with dementia by offering alternatives to nursing facility level of care. Although there has been a growing array of community-based and in-home service options for persons with this condition, dementia continues to pose a significant risk for early nursing home admission.

At the time of this research, we found no published literature on whether or how rural residence affects patterns of nursing facility admission for older persons with Alzheimer's disease and other dementias (referred to hereafter as dementia). The literature on urban-rural differences in health service utilization by persons with dementia is scant, at best. Among older adults with dementia who live in rural areas, there is evidence that fewer in-home and community based resources are available (Shope, et al. 1993) and findings are mixed regarding use of formal care services. Russell (1991) reports that rural families coping with dementia are less likely to use formal services, while McCabe et al. (1995) suggests rural families use proportionately more services. The differences between these studies appear to rest with the definition of formal services. Older adults in rural areas are more likely to be married and less likely to live alone than their urban counterparts, conditions that are known to increase the likelihood of informal care support (Coburn and Bolda, 1999; Boax and Hu, 1997; Russell, 1991). Nonetheless, others report that urban caregivers receive more support from family members than do rural caregivers (Wood and Parham, 1990). Given the limited availability of specialized dementia care service options for persons in rural areas, rural residents with dementia may be "prematurely" admitted to a nursing facility in the absence of other alternatives.

The purpose of this study was to assess whether the potentially higher utilization of nursing facility services in rural communities (Shaunghessey, 1994) can be attributed to differences in use patterns by older adults with dementia. Specifically, we sought to answer the question of whether rural nursing facility residents with dementia are less impaired at the time of their admission to a nursing facility than urban residents with dementia. A parallel question concerned the comparison of rural versus urban mortality rates. If rural residents with dementia enter the nursing facility earlier than their urban counterparts, does it follow that they, as a group, experience lower mortality rates and therefore longer stays in nursing facilities? While

researchers and policy analysts have speculated about such effects (Green, 1984), and there are anecdotal reports of earlier admission of older adults with dementia to nursing facilities in rural communities, we are unaware of studies documenting such patterns.

In order to address these questions, we compared urban-rural characteristics, including cognitive functioning and other characteristics of residents, at the time of admission to a nursing facility. In addition, we evaluated the effect of rural vs. urban residence on mortality rates to consider differences in the time from admission to death.

METHODS

Data Sources

This study used the Minimum Data Set + (MDS+) assessment data for residents of nursing facilities in four states participating in the Health Care Financing Administration's Medicare and Medicaid Multistate Nursing Facility Case-Mix Payment and Quality Demonstration (Kansas, Maine, Mississippi, and South Dakota)[2]. The MDS+ contains more than 300 items describing the demographic, clinical, and functional status of residents. Nursing facility staff assess residents upon admission and subsequently on a quarterly basis or upon a significant change in status. Extensive information is collected including residential history, medical symptoms, diagnoses, medications, treatments, cognitive and physical functioning, and behavior, mood, and involvement indicators.

We used MDS+ data from nursing facilities (n=806) from calendar years 1994 and 1995, excluding Medicare only nursing facilities in Kansas whose participation was voluntary and inconsistent. Facility level data were obtained directly from the four states and linked to the MDS+ file using the state facility identification number. We used the Bureau of Health Profession's Area Resource File (ARF) to construct measures of demographic and supply characteristics to categorize residence at the county level, including metropolitan/nonmetropolitan services area (1995 data), and to define the ratio of nursing home beds (1991 data) per 1,000 persons age 65 and older for each county (1990 data).

Sample Identification

The study sample included residents with a diagnosis of dementia or Alzheimer's disease on their initial admission assessment in 1994 or 1995. In the 1994 admission assessment file, 29.5 percent of residents had a diagnosis of dementia, and 26.6 percent had a

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dementia diagnosis in the 1995 admission assessment file. The first (earliest) admission assessment was selected for residents who had more than one admission assessment over the two-year period. Discharge information was obtained from each resident's last assessment in the MDS+ file up to December 31, 1995. Residents whose date of death was on or before their admission date were excluded from the sample (n=85) as were residents who died or were discharged on the same day as their admission assessment (n=130). In addition, we excluded residents assigned to the rehabilitation case mix group (n=2,367) since they likely represent a post-acute, short stay population whose inclusion might have distorted our analysis of long stay nursing facility care. Residents who were younger than 40 years of age or for whom we had no age data were also excluded (n=112). This strategy yielded a sample of 14,450 residents distributed as follows:

Table 1: Sample Size by State

State	Residents	Percent of Sample
Kansas	5,580	38.6%
Maine	2,726	18.9%
Mississippi	4,574	31.7%
South Dakota	1,570	10.9%
Total	**14,450**	**100%**

Age ranged from 40 to 111 years and nearly two-thirds of the sample were female. The majority were Caucasian (88.5%), with African-American residents comprising 9.7%, and Asian, Hispanic, and American Indian/Alaska Native residents comprising less than two percent of the sample.

Study Variables

Dependent Variable: The dependent variable used in the multivariate models was the length of stay calculated from the time of admission to the event of death. For residents discharged for reasons other than death, length of stay was censored at the discharge date or December 31, 1995, which ever came first. Residents with no discharge were censored at December 31, 1995.

Independent Variables: Resident characteristics used in the analysis included MDS+ items and calculated scores relating to physical functioning, cognitive status, behavioral problems, mood, medical condition (including specific diagnoses), social interaction, treatments, and therapies. The resident characteristics are listed and described in Appendix A. Categorical

variables with more than two values were converted to dichotomous variables or sets of dummy variables were created.

Resource Utilization Groups (RUGs)

Several key variables were derived from the Resource Utilization Groups (RUG-III) classification system. These included dummy variables for membership in each of the major RUG groups derived from the single RUG group variable in the HCFA files.

The major RUG groups and types of residents assigned to them are:

- Rehabilitation: persons receiving intensive rehabilitation therapy

- Extensive Service: persons receiving parenteral feeding, suctioning, tracheostomy care, or on a ventilator or respirator and having substantial ADL impairments

- Special Care: persons with other major medical conditions having substantial ADL impairments

- Clinically Complex: persons with moderate medical needs for a variety of conditions.

- Impaired Cognition: persons with cognitive impairment and some ADL impairment. Cognitive impairment is measured using the Cognitive Performance Scale (see detailed description below). A CPS score of 3 or greater indicates cognitive impairment for this RUG group classification.

- Behavior Problems: persons displaying daily behavior problems with some ADL impairment

- Physical Functions: persons not meeting any of the criteria for higher level groups

- Unclassified: not classifiable due to missing or invalid information

RUG groups are hierarchical, which means that individuals are tested for each group in order and assigned to the highest group for which they qualify. Each individual assessment contained a variable representing the RUG subgroup to which the resident was assigned based on the data from that assessment.

Resident Functional Characteristics

The Cognitive Performance Scale (CPS), based on MDS+ items, was used to measure cognitive functioning (Morris, Fries, Mehr, et.al., 1994). The scale measures cognitive functioning on a seven-point scale where higher scores identify poorer cognitive performance. The CPS uses five MDS+ items to determine level of impairment: a comatose condition, decision-making skills, self performance in eating, making oneself understood, and short-term

memory to construct a hierarchical seven point scale. The seven levels of impairment include: 0) no impairment, 1) borderline, 2) mild, 3) moderate, 4) moderately severe, 5) severe, and 6) very severe cognitive impairment. At the bivariate level, we grouped the CPS score into three categories with 0 to 2 indicating no impairment to mild impairment, 3 indicating moderate impairment, and 4 to 6 indicating more severe impairment. In the multivariate models, we used a dichotomous grouping of the CPS score, with 0 to 3 indicating no impairment to moderate impairment and 4 to 6 indicating severe impairment.

Although all residents in the sample had an admission diagnosis of either Alzheimer's disease or dementia, 5.2 percent (n=754) had a CPS of '0' indicating no cognitive impairment. This discrepancy may be due to diagnoses made at early stages of dementia or Alzheimer's disease, where the items used to calculate CPS show little to no impairment.

A summary activity of daily living (ADL) score variable was calculated as the sum of the self performance score for 6 individual ADL items (dressing, locomotion, transfer, bed mobility, toilet use, and eating) each of which has a range of 0 (least impaired) to 4. For all 6 ADL items, values of '8' ("Did not occur.") for self-performance were set to missing and not used in calculating the mean score for individual ADLs or for the ADL score.

Rural Residence and Supply

A rural indicator variable was created for each assessment using the metropolitan/ nonmetropolitan status of the county where the nursing facility is located. The nursing facility bed supply ratio (nursing home beds/1000 persons age 65 and older) was also linked to each assessment at the county level and used in the multivariate analysis.

Observation Period

Time since admission was divided into twelve 2-month intervals ranging from 0 to 11 to create a variable called period. To consider potential differences in mortality rates over time, the period variable was squared (period^2) and cubed (period^3) for purposes of statistical analysis.

Data Analysis

Bivariate analyses were conducted to compare the characteristics of residents with dementia in rural and urban areas at admission. Overall means and frequencies for rural and urban residents were calculated using t-tests and chi-square statistics to analyze rural-urban differences. The findings discussed below are significant at a 99% confidence level (p≤.01) unless otherwise indicated.

Multivariate Poisson regression models were estimated to evaluate the effect of rural residence on mortality, controlling for state and resident characteristics at baseline (admission), and time since admission. We chose Poisson regression over proportional hazards regression because it permitted us to plot and assess the actual rates of groups (i.e. rural vs. urban) whereas proportional hazards regression estimates only rate ratios. Additionally, with Poisson regression, we were able to include time as an independent variable in the model, permitting exploration of changes in the mortality rate over time and the confounding effects of time on the independent variables. We assessed and ruled out multicollinearity in the models. Specifically, we assessed the presence of collinearity between the two variables related to cognitive impairment in the final model: the dichotomous variable for CPS (1=CPS score of 4-6, 0=CPS score less than 4) and the RUG classification *impaired cognition* (1=yes, 0=no). No correlation was observed between these two variables (Pearson's $r = -0.09$, $p=.001$). In fact, a cross-tabulation of the two variables showed that of those not having a RUG classification of *impaired cognition*, 26.5% had a CPS score of 2, 30.2% had a CPS score of 3, and 35.9% had a CPS score ranging from 4 to 6. It is likely that these individuals were classified in a higher RUG group requiring greater resource utilization.

RESULTS

Rural-Urban Differences in Resident Characteristics at Admission

Significant differences in rural and urban resident characteristics at admission are shown in Table 2 (additional detail included in Appendix B). The nursing facility populations in both rural and urban areas appeared similar in their case-mix composition with few significant differences. The majority of residents in urban and rural areas were classified under the clinically complex (30.9%), cognitive (29.3%), and physical (27.5%) resource utilization groups (RUG groups). Smaller percentages of the population were classified under the special care (8.4%), extensive (1.6%), and behavior (1.3%) groups. The rural-urban difference in the proportion of residents in the extensive RUG group was significant with rural residents having a higher percentage in these groups. Rural residents were slightly older at admission (less than 1 year) and less likely to believe they were capable of improvement.

Table 2: Significant Rural-Urban Differences in Resident Characteristics at Admission

	RURAL (n=9,522)	URBAN (n=4,925)		RURAL (n=9,522)	URBAN (n=4,925)
RUG Groups:	percent:		**Medical:**	percent:	
Extensive	1.8	1.2 *	Capable of improvement	9.0	10.3 *
Special Care	8.8	7.7 **	Arteriosclerotic heart disease	15.1	13.3 *
			Congestive heart failure	19.4	16.2 *
Cognitive:			Peripheral vascular disease	4.8	6.7 *
Short term memory	84.1	85.8 *	Cerebrovascular accident	14.9	13.4 **
Daily decision making	71.3	73.7 *	Diabetes	15.0	13.7 **
			Terminal prognosis	0.7	1.3 *
Behavior:			Seizure disorder	4.4	5.6 *
Behavior problems (any)	37.6	42.2*	Balance	46.0	44.2 *
Resists care	23.0	24.9**	Contractures	20.8	15.7 *
Mood:			**Treatments and Special Care:**		
Verbal distress	18.4	19.8 **	Parenteral IV	1.1	0.6 *
Withdrawal from self care	10.0	11.1 **	IV medication	5.4	3.3 *
Depression diagnosis	10.9	14.3 *	Intake/Output	22.1	20.3 **
Antidepressants	15.3	17.2 *	Restraints	17.7	15.1 *
ADLs (requires assistance):			**Scores:**	mean:	
Locomotion (self performance)	53.4	49.1 *	Age	82.0	81.1 *
Transfer (self performance)	56.2	53.2 *	Cognitive performance scale (CPS)	3.15	3.22**
Bed mobility (self performance)	40.3	38.1**	ADL Score (6 ADLs)	10.7	10.4 **
			Locomotion (self performance)	1.72	1.60*
Social and Customary Routine:			Transfer (self performance)	1.74	1.63 *
Daily contact with relatives	74.3	66.9 *	Bed mobility (self performance)	1.26	1.17 *
Goes out 1+ days	36.8	33.6 *	Number of medications	5.43	5.23 *
Moves independently indoors	65.6	61.7 *	Wandering	0.38	0.43 *

* = p ≤ .01, ** = p ≤ .05.

Significant differences were observed in cognitive impairment between rural and urban residents at admission. Rural residents were less likely to have short-term memory problems and problems with daily decision-making. Rural residents had a slightly lower mean CPS score compared to urban residents, although the difference only was statistically significant at p=.02. Additionally, a significantly higher percentage of rural residents scored in the lower ranges of the CPS scale (0-2) compared to urban residents (Table 3).   Rural-urban differences in the higher CPS ranges were not significant.

Table 3: Rural-Urban Comparison of Cognitive Performance Scale Scores at Admission

	CPS 0-2*	CPS 3	CPS 4-6
Rural	30.19%	37.26%	32.56%
Urban	27.96%	38.10%	33.94%

* Chi square p ≤.01

On the behavior and mood measures, rural residents were significantly less likely to exhibit problem behaviors (p=.01), resist care (p=.03), withdraw from care (p=.03), and verbally express distress (p=.04). Rural residents also were significantly less likely to be diagnosed with depression or to receive antidepressant medication.

Most rural and urban NF residents in our study group only required limited assistance with activities of daily living (dressing, locomotion, transfer, bed mobility, toileting, and eating). On a scale of 0 (independent) to 4 (totally dependent), the average ADL score ranged from 1.3 to 2.3. Overall, rural residents were slightly more physically impaired than their urban counterparts. Rural residents also were significantly more likely to experience restriction of full range of motion (contractures), to have problems with balance, and to have restraints imposed upon them.

Despite their physical limitations, rural residents appeared more physically and socially active than residents in urban areas. Prior to admission, rural residents were significantly more likely to have had daily contact with relatives and/or close friends, gone out one or more days per week, and moved independently indoors.

The prevalence of peripheral vascular disease, terminal prognosis, and seizure disorder was higher among urban residents. For rural residents, a higher prevalence of arteriosclerotic heart disease, congestive heart failure, cerebrovascular accident (stroke) (p=.013), and diabetes (p=.033) was observed. Rural residents were also more likely to receive IV medication and intake/output monitoring.

Rural Residence and Mortality Rates

We constructed multiple regression models using Poisson regression to evaluate the effect of rural residence on mortality rates. Table 4 presents the estimates of the final regression model.

The findings indicate that nursing facility residents with dementia who live in rural counties had an 8.1 percent lower risk of mortality compared to urban NF residents, adjusting for the effects of state residence, NF bed supply, resident characteristics, and the confounding effects of time (Rate Ratio: 0.919, Confidence Interval: 0.846 - 0.999, p=0.049). While not meeting the stringent criteria of statistical significance at p ≤.01, this finding is marginally significant at p ≤.05. Interactions between rural residence and other resident characteristic and demographic variables were explored and found to be non-significant.

Table 4: Poisson Model: Mortality Rate Ratios

Independent Variables	Rate Ratio	95% Confidence Interval	Significance (p)
Age	1.034	1.029 - 1.039	0.001
Rural NF residence	0.919	0.846 - 0.999	0.049
Period	0.490	0.450 - 0.532	0.001
Period^2 (period squared)	1.111	1.085 - 1.139	0.001
Period^3 (period cubed)	0.995	0.993 - 0.997	0.001
Peripheral vascular disease	1.440	1.246 - 1.663	0.001
Terminal prognosis	6.385	5.121 - 7.960	0.001
Congestive heart failure	1.539	1.409 - 1.681	0.001
Female	0.580	0.536 - 0.627	0.001
Cognitive impairment (CPS 4-6)	1.769	1.602 - 1.954	0.001
Interaction: Cognitive impairment * period	0.911	0.883 - 0.940	0.001
RUG: Behavior	1.000	referent	0.001
RUG: Special Care	2.438	2.150 - 2.765	0.001
RUG: Clinically Complex	1.249	1.134 - 1.376	0.001
RUG: Extensive	3.196	2.542 - 4.019	0.001
RUG: Cognitive	0.644	0.575 - 0.721	0.001
RUG: Unclassified	0.750	0.440 - 1.276	0.288
Nursing Beds/1,000 65+	1.000	0.998 - 1.001	0.530
Kansas	1.000	referent	0.001
Maine	1.959	1.758 - 2.183	0.001
Mississippi	1.371	1.225 - 1.535	0.001
South Dakota	1.672	1.455 - 1.923	0.001

Other Predictors of Mortality

Overall, mortality rates decreased from admission over the course of the NF stay. And, as observed by the significant interaction between period and cognitive impairment, the mortality rate varied in a non-linear pattern over time (period) depending on the level of cognitive impairment measured at time of admission.

Female gender, a RUG classification in the cognitive group, and time carried a decreased risk in mortality. Factors associated with an increased mortality rate included age, state of residence, and diagnoses of peripheral vascular disease, congestive heart failure, and terminal prognosis. Residents classified in the special care, clinically complex, and extensive case mix groups all had a significantly greater risk of death compared to those in the (referent) behavior group.

Limitations

There are limitations to this study. First, the data used are relatively old (1994 and 1995). Changing federal and state long term care programs and policies introduced in the past five years may well have altered the dynamic observed in this analysis. Second, these data are from four states and represent a convenience sample that is not representative of urban and rural nursing facility residents throughout the country. Third, the residents in our sample resided in nursing facilities participating in a federal demonstration project designed to change the financial incentives in nursing facility reimbursement policies. These changing incentives are recognized as influencing facility admission and discharge policies and there is some evidence that the impact of these shifting incentives were different for urban and rural nursing facility residents in these demonstration states (Bolda, Keith and Coburn, forthcoming). Finally, simply controlling for state of residence may be insufficient to fully appreciate differences in access to services for persons with dementia who live in rural areas. Specifically, differences in access to services in areas with more or less dispersed population are not addressed. Additional research is needed to confirm these findings. Such research, incorporating data to control for access to and supply of various home and community based long term care services will be needed to more fully explore the differential dynamics of nursing facility use by urban and rural residents with dementia.

SUMMARY AND DISCUSSION

Rural Residence as a Risk Factor for Early Admission to Nursing Facilities

The purpose of this study was to assess whether and to what extent some of the potentially "excess" utilization of nursing facility resources in rural communities can be attributed to differences in use patterns by older adults with dementia. We sought to answer two questions:

1) Are rural nursing facility residents with dementia less impaired at admission than urban residents with dementia?

2) Do rural nursing facility residents with dementia experience lower mortality rates and therefore longer stays in nursing facilities compared to urban residents with dementia?

In response to the first research question, results from our analyses indicate that rural NF residents with dementia were less cognitively impaired and exhibited fewer behavior and mood problems than their urban counterparts at admission. They were slightly more physically impaired than urban NF residents although, on average, NF residents in both rural and urban

areas did not need extensive assistance with activities of daily living.   Despite their physical impairment, rural residents appeared more socially active and physically active in their customary routines than urban residents. Regarding their medical condition, rural residents had a higher prevalence of arteriosclerotic heart disease, congestive heart failure, cerebrovascular accident (stroke), and diabetes. However, fewer than 20 percent of the rural population had such conditions.

In response to the second research question, our findings support the expectation that rural nursing facility residents with dementia may experience lower mortality rates and therefore longer stays in nursing facilities compared to urban residents with dementia. The marginal statistical significance detected, however, suggests the need for further research in this area based on a larger sample.

These findings may suggest that caregiver and/or community support may not be sufficient to enable rural persons to remain in the community as long as urban individuals. Additionally, expectations and/or preferences for use of nursing facility care and different understandings of options, availability of specialty support services, and provider (physician) knowledge of options may be factors influencing admission decision differences in rural and urban areas.

Conclusions and Policy Implications

State and federal long term care program and policy development can benefit by concerted attention to the specific needs of rural long term care consumers with dementias. This analysis provides evidence of the potential for greater reductions in the dependence on nursing facilities for long term care in rural areas. By simply achieving nursing facility utilization patterns that more closely resemble those of urban nursing facilities, nursing facility use in rural areas can be reduced. In addition, individuals with early-stage dementias who are served in rural facilities may receive more appropriate assistance through home and community based or non-medical residential long term care services. Individual consumers' and long term care policy goals can be enhanced through the development of *rural* long term care services targeted to meet the needs of individuals with dementia, and their family or other informal caregivers.

Research is needed to determine differences in access to and supply of in-home and out-of-home respite and service options for rural residents with dementia and their families. Such research can help inform and direct rural communities' dementia needs assessments, and federal and state program and policy development activities.

Rural dementia respite centers, adult day programs and in-home respite services, like those funded through Administration on Aging's Alzheimer's Demonstration Program, are the

types of long term care development activity that require greater support and sustained funding. Examples of other projects include dementia care educational efforts targeted to rural physicians and primary care case management payment incentives for improved "management" for rural patients with dementia and their family caregivers.

Given the recent introduction of a federally funded caregiver support program, more careful attention to rural caregivers of persons with dementia may be forthcoming. State policymakers administering these resources would be well advised to consider multiple models for caregiver support with specific attention to support in their more rural communities. As these resources and programs mature and program evaluations are underway, evaluators will be able to further explore whether rural caregivers, when offered support, react (accept/reject assistance) differently than urban caregivers.

As in urban areas, rural residents with dementia and their informal caregivers will likely benefit from increased information about dementia and advice for caregiving designed to address the specific concerns of rural caregivers. Research on the benefits of information distributed in a manner titrated to the individual needs of caregivers at different stages of acceptance/readiness may be particularly well suited for extension to specifically rural concerns (Gwyther and Ballard, forthcoming). On a related front, encouraging family caregivers to accept respite support, either in their own homes or through adult day programs or short-term residential respite assistance, continues to be of paramount importance. Based on our findings, specific initiatives supporting the development of respite services in rural areas appear to be warranted. Finally, if policy goals for more appropriate use of rural nursing facilities are to be achieved, services like respite care may be appropriate for adults in the early stages of dementia rather than "premature" admission and long-stay care.

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APPENDIX A

Variable List and Definitions

APPENDIX A: VARIABLE LIST AND DEFINITIONS

VARIABLE NAME	Variable Definition
General	
Length of stay	Number of years since initial assessment date to the most current assessment date, discharge date, or date of death.
Period	Length of stay divided into twelve 2-month intervals beginning with period 0 (months 0-2) and ending with period 11 (months 22-24)
Age	Resident's age as January 1, 1994
Capable of improvement	The resident's judgement of whether their ability to perform activities of daily living (ADLs) was likely to improve [1=Yes, 0=No]
Discharge planned	Assessor's expectation of whether the resident was likely to be discharged within 90 days [1=Yes, 0=No]
Rural	Type of county in which resident's facility is located [1=rural, 0=urban] based on Metropolitan/Non-metropolitan services areas (MSAs).
Nursing home beds/1000 65+	Number of nursing home beds per 1,000 people aged 65 and older per county
RUG Groups	
Rehabilitation	Persons receiving intensive rehabilitation therapy
Extensive service	Persons receiving parenteral feeding, suctioning, tracheostomy care, or on a ventilator or respirator and having substantial ADL impairments
Special care	Persons with other major medical conditions having substantial ADL impairments
Clinically complex	Persons with moderate medical needs for a variety of conditions.
Impaired cognition	Persons with cognitive impairment and some ADL impairment. Cognitive impairment is measured using the Cognitive Performance Scale (see detailed description below). A CPS score of 3 or greater indicates cognitive impairment for this RUG group classification.
Behavior problems	Persons displaying daily behavior problems who have some ADL impairment
Physical functions	Persons not meeting any of the criteria for higher level groups
Unclassified	Persons not classified in any of the above RUG groupings
Physical	
Individual ADLs	Resident's level of self performance for individual ADLs during last 7 days, from 0 (independent) to 4 (total dependence or not performed). Dichotomous variables were also created [1=limited assistance, extensive assistance, or total dependence, 0=independent or needing supervision]
* bed mobility	
* transfer	
* locomotion	
* dressing	
* eating	
* toileting	
ADL Score	Sum of resident self-performance scores [0-4] for six activities of basic living (bed mobility, transfer, locomotion, dressing, eating, and toileting) [range: 0-24]
Goes out 1+ days	Resident usually went out one or more days a week prior to admission [1=Yes, 0=No]
Moves independently indoors	Resident able to move independently indoors prior to admission [1=Yes, 0=No]
Cognitive	
Cognitive performance scale (CPS)	The CPS classifies residents into seven cognitive performance levels based on 5 MDS items [Morris, Fries, Mehr et al., 1994] with values ranging from 0 (cognitively intact) to 6 (most impaired). The MDS items include: daily decision making, making oneself understood, short-term memory, self performance in eating, and whether or not the resident is comatose.

VARIABLE NAME	**Variable Definition**

Cognitive (continued)

Cognitive performance scale (CPS) (CONTINUED)	The specific characteristics of residents with scores of 1 to 6 are as follows: 1 = Borderline intact. Not severely impaired in daily decision making but having some trouble in at least one of the following areas: decision making, problems making oneself understood, or short-term memory. 2 = Mild impairment: Not severely impaired in daily decision making but having some trouble in at least two of the following areas: decision making, problems making oneself understood, or short-term memory. 3 = Moderate impairment: Not severely impaired in daily decision making but having some trouble in at least two of the following areas: decision making, problems making oneself understood, and short-term memory. ADDITIONALLY, the resident must either be moderately impaired in daily decision making OR be sometimes or never understood. 4 = Moderately severe impairment: Not severely impaired in daily decision making but having some trouble in at least two of the following areas: decision making, problems making oneself understood, and short-term memory. ADDITIONALLY, the resident must either be moderately impaired in daily decision making AND be sometimes or never understood. 5 = Severe impairment: Severely impaired in daily decision making (not comatose and not totally dependent in eating). 6 = Very severe impairment: Comatose or severely impaired in daily decision making and totally dependent in eating.
Cognitive impairment	Residents with scores of 4 or more on the CPS indicating moderately severe to very severe cognitive impairment.
Short term memory	Resident appears to recall after 5 minutes [0=Memory OK, 1=Memory problems]
Long term memory	Resident has long-term memory problem [1=Yes, 0=No]
Daily decision making	Level of impairment in resident's cognitive skills for daily decision making [1=moderately impaired or severely impaired, 0=independent (decisions consistent/reasonable) or modified independence]
Understanding	Level of impairment in resident's ability to understand others, ranging from 0 (understands) to 3 (rarely/never understands). A dichotomous variable was also created for 2x2 table [1=sometimes understands or rarely/never understands, 0 = understands or usually understands]
Understood	Level of impairment in resident's ability to make self understood, from 0 (understood) to 3 (rarely/never understood). Dichotomous variable was also created for 2x2 table [1=sometimes understood or rarely/never understood, 0=understood or usually understood]

VARIABLE NAME	Variable Definition
Behavior	
Individual behavior problems: (scale from 0 to 2)	Frequency with which the resident exhibits the specific behavior problem, from 0 (not exhibited in last 7 days) to 2 (behavior exhibited daily). Dichotomous behavior variables were also created for 2x2 tables indicating frequency with which resident exhibits the specific behavior problem [1 = behavior occurred daily or more frequently, 0=not exhibited in last 7 days or behavior occurred less than daily]
* wandering	
* verbally abusive	
* physically abusive	
* socially inappropriate behavior	
Daily behavior problem	Resident exhibits any of the four types of behavior problems daily [1=Yes, 0=No]
Resists care	Resident resists medications, ADL assistance, or eating [1=Yes, 0=No]
Mood/Depression	
Verbal distress	Resident verbally expressed feelings of distress, hopelessness, or anxiety during the last 30 days [1=Yes, 0=No]
Demonstrated signs of mental distress:	Resident demonstrated the specific sign during the last 30 days [1=Yes, 0=No]
* motor agitation	
* withdrawal from self care	
Psychiatric diagnoses:	Resident has the specific diagnosis indicated in the assessment [1=Yes, 0=No]
* Anxiety disorder	
* Depression	
Psychiatric medications:	Resident used the specific type of medication during the last 7 days [1=Yes, 0=No]
* Antipsychotics	
* Antianxiety drugs	
* Antidepressants	
Medical	
Diagnosis count	Number of listed diagnoses indicated on the resident's assessment [range: 0-31]
Medicine count	Number of medications the resident is currently receiving
Specific disease diagnoses:	The specific diagnosis was checked in the resident's assessment [1=Yes, 0=No]
* Arteriosclerotic heart disease	
* Cardiac disrhythmias	
* Congestive heart failure	
* Peripheral vascular disease	
* Other cardiovascular disease	
* Aphasia	
* Cerebrovascular accident (stroke)	
* Multiple sclerosis	
* Emphysema/asthma/COPD	
* Pneumonia	
* Cancer	
* Diabetes	
* Terminal prognosis	
* Seizure disorder	

Variable Name	Variable Definition
Medical (continued)	
* Urinary tract infection	Urinary tract infection in the last 30 days.
Balance	Resident is unable to balance while standing [1=Yes, 0=No]
Contractures	Resident has joint contractures [1=Yes, 0=No]
Bowel incontinence	Bowel incontinence [1=occasionally, frequently or always incontinent, 0=continent or usually continent]
Bladder incontinence	Bladder incontinence [1=occasionally, frequently or always incontinent, 0=continent or usually continent]
Falls	Resident fell during the past 180 days [1=Yes, 0=No]
Hip fracture	Resident had hip fracture during the past 180 days [1=Yes, 0=No]
Other fractures	Resident had fracture other than hip fracture in past 180 days [1=Yes, 0=No]
Pressure ulcers (1-2)	Resident had stage 1 or stage 2 pressure ulcers during the last 7 days [1=Yes, 0=No]
Pressure ulcers (3-4)	Resident had stage 3 or stage 4 pressure ulcers during the last 7 days [1=Yes, 0=No]
Social	
Daily contact with relatives	Resident had daily contact with relatives/close friends before admission [1=Yes, 0=No]
Pursues involvement	Resident pursues involvement in life of facility [1=Yes, 0=No]
Accepts invitations	Resident accepts invitations into most group activities [1=Yes, 0=No]
Treatments and Special Care:	
* IV meds	Resident received the specified treatment in the last 14 days [1=Yes, 0=No]
* Oxygen	Resident received the specified treatment in the last 14 days [1=Yes, 0=No]
* Intake/output	Resident received the specified treatment in the last 14 days [1=Yes, 0=No]
Parenteral/IV	Resident receives parenteral or IV feeding [1=Yes, 0=No]
Feeding tube	Resident is fed using a feeding tube [1=Yes, 0=No]
Injections	Received injection(s) in the last 7 days [1=Yes, 0=No]
Restraints used	Resident used one of the following during the last 7 days: bed rails, trunk restraint, limb restraint, chair preventing rising

APPENDIX B

Expanded Table 2:
Rural-Urban Differences in Resident Characteristics at Admission

Expanded Table 2: Rural-Urban Differences in Resident Characteristics at Admission

	RURAL (n=9,522)	URBAN (n=4,925)	P		RURAL (n=9,522)	URBAN (n=4,925)	P
RUG Groups:	percent:			**Medical:**	percent:		
Rehabilitation	n/a	n/a	n/a	Capable of improvement	8.98	10.32	0.010
Extensive	1.83	1.20	0.004	Discharge planned	8.97	8.60	ns
Special Care	8.81	7.70	0.022	Arteriosclerotic heart disease	15.07	13.34	0.005
Clinically complex	30.60	31.47	ns	Cardiac dysrhythmias	9.44	9.69	ns
Cognitive impairments	28.83	30.25	ns	Congestive heart failure	19.44	16.17	0.001
Behavior problems	1.19	1.42	ns	Peripheral vascular disease	4.79	6.72	0.001
Physical	27.99	26.66	ns	Other cardiovascular	14.46	14.44	ns
				Cerebrovascular accident	14.90	13.38	0.013
Cognitive:				Emphysema/Asthma/COPD	11.88	12.37	ns
Short term memory	84.05	85.80	0.006	Cancer	7.95	8.25	ns
Long term memory	69.70	71.21	ns	Diabetes	15.01	13.69	0.033
Daily decision making	71.32	73.70	0.003	Terminal prognosis	0.74	1.32	0.001
Alzheimers Dx	30.03	31.55	ns	Seizure disorder	4.39	5.65	0.001
Other dementia Dx	73.75	72.81	ns	Urinary tract infection	11.77	10.79	ns
Ability to understand others	30.07	30.70	ns	Balance	45.99	44.25	0.048
Understood	23.62	24.08	ns	Contractures	20.80	15.72	0.001
Speech clarity	14.39	14.45	ns	Bowel continence	28.80	28.31	ns
				Bladder continence	33.68	33.38	ns
Behavior:				Falls	30.76	31.86	ns
Behavior problems (any)	37.61	42.23	0.001	Hip fracture	3.70	3.65	ns
Daily behavior problem	17.95	19.17	ns	Other fractures in last 180 days	3.57	3.45	ns
Wandering	13.52	14.62	ns	Pressure ulcers stage 1 or 2	11.55	11.46	ns
Verbally abusive	3.15	3.26	ns	Pressure ulcers stage 3 or 4	2.55	2.89	ns
Physically abusive	2.42	2.53	ns				
Socially inappropriate	6.26	6.78	ns	**Treatments and Special Care:**			
Resists care	22.97	24.87	0.011	Parenteral IV	1.12	0.64	0.006
				Feeding tube	3.79	3.90	ns
Mood:				Injections	17.09	15.90	ns
Verbal distress	18.37	19.82	0.036	IV Meds	5.39	3.30	0.001
Motor agitation	17.55	18.04	ns	Oxygen	4.96	4.97	ns
Withdrawal from self care	9.96	11.14	0.029	Intake/Output	22.11	20.26	0.011
Awakening with bad mood	3.79	4.44	ns	Restraints	17.74	15.12	0.001
Anxiety disorder diagnosis	4.86	5.30	ns				
Depression diagnosis	10.89	14.34	0.001	**Scores:**	mean:		
Antianxiety drugs	21.36	22.32	ns	Age	82.04	81.11	0.000
Antidepressants	15.30	17.25	0.003	ADL Score (6 ADLs)	10.71	10.36	0.014
Antipsychotics	25.30	26.55	ns	Dressing (self performance)	2.29	2.29	ns
				Locomotion (self performance)	1.72	1.60	0.000
ADLs (requires assistance)				Transfer (self performance)	1.74	1.63	0.000
Dressing (self performance)	75.86	74.45	0.066	Bed mobility (self performance)	1.26	1.17	0.001
Locomotion (self performance)	53.37	49.14	0.001	Toileting (self performance)	2.12	2.11	ns
Transfer (self performance)	56.24	53.22	0.001	Eating (self performance)	1.16	1.18	ns
Bed mobility (self performance)	40.27	38.07	0.011	Cognitive performance scale	3.15	3.22	0.023
Toileting (self performance)	67.09	66.34	ns	Making self understood	0.84	0.85	ns
Eating (self performance)	29.30	29.06	ns	Ability to understand others	1.02	1.00	ns
				Wandering	0.38	0.43	0.000
Social:				Verbal Abuse	0.16	0.17	ns
Daily contact with relatives	74.28	66.87	0.001	Physical Abuse	0.14	0.15	ns
Pursues involvement with family	14.61	13.41	ns	Socially Inappropriate	0.23	0.25	ns
Accepts invitations	28.26	27.36	ns	Number of diagnoses	3.70	3.73	ns
Goes out 1+ days	36.83	33.58	0.001	Number of medications	5.43	5.23	0.001
Moves independently indoors	65.55	61.69	0.001				

Note: ns indicates p>0.05.

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