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Nathan Paluso MPH
University of Southern Maine, Muskie School of Public Service, Maine Rural Health Research Center,

Zachariah Croll
University of Southern Maine, Muskie School of Public Service, Maine Rural Health Research Center

Deborah Thayer MBA
University of Southern Maine

Jean A. Talbot PhD, MPH
University of Southern Maine, Muskie School of Public Service, Maine Rural Health Research Center

Andrew F. Coburn PhD
University of Southern Maine, Muskie School of Public Service, Maine Rural Health Research Center

Maine Rural Health Research Center

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Nathan Paluso, MPH, Zachariah Croll, BA, Deborah Thayer, MBA, Jean Talbot, PhD, Andrew Coburn, PhD

BACKGROUND

The aging of the baby boom generation is projected to dramatically increase the population aged 65 and older in the coming decades. In particular, those aged 85 and older (the 'oldest old') are expanding at a faster rate than any other age group and by 2050 are expected to make up 4.5 percent of the population, compared to 1.9 percent in 2012.[1,2] This growth will challenge the ability of the nation's health and social support systems to meet the health and long-term services and supports (LTSS) needs of the oldest old.[3] Faster growth in the percentage of older people in rural than in urban areas is likely to challenge many rural communities.[4] As shown in Table 1, the percentage of the population aged 65 and older in 2016 is higher in rural than urban areas (18.4 versus 14.5 percent). However, the percentage aged 85 and older is comparable in rural and urban areas.

Table 1. Rural and Urban 65+ and 85+ Population, Percentages and Estimates

	Urban		Rural	
Age	Percent	Estimated N	Percent	Estimated N
65+	14.5	38,027,287	18.4	11,200,146
85+	2.0	5,245,143	1.8	1,095,666

Source: U.S. Census Bureau, 2016 American Community Survey 1-Year Estimates

Compared to those aged 65-74 and 75-84, people aged 85 and older (85+) are significantly more likely to experience poorer health status[5] and have more chronic illnesses,[6] cognitive impairments,[6,7] and functional limitations in activities of daily living (ADLs).[6-8] A recent longitudinal, cohort study of adults aged 85+ in Oregon found that rural participants had a significantly higher burden of disease, mean number of medications, and rate of disease accumulation than urban participants.[9] Along with this increased burden of disease and functional disability, people aged 85+ experience a disproportionate healthcare cost burden. The Centers for Medicare & Medicaid Services estimated that in 2012, per capita personal health care spending and out-of-pocket spending for Medicare beneficiaries aged 85+ was nearly double the average per capita spending for beneficiaries aged 65-84; total medical spending per capita for

*LTSS includes both medical and social support services (e.g., skilled nursing, personal care assistance, homemaker services). They can be delivered in a range of settings including nursing facilities, residential care facilities, individuals' homes, and other community settings. In this brief, we focus on LTSS provided in nursing homes and residential care facilities.

Key Findings

Rural and urban Medicare beneficiaries aged 85 and over (85+) differed on many characteristics associated with the use of long-term services and supports (LTSS).*

Compared to their urban peers, rural Medicare beneficiaries aged 85+ were more likely to:

- live alone;
- be non-Hispanic and White;
- have less than a high school education;
- have Medicaid or self-purchased private insurance;
- not have Medicare Advantage or employer-sponsored insurance for supplemental coverage; and
- have severe or complete impairment in activities of daily living.

Household income, health status, cognitive impairment, and rates of chronic conditions did not differ among rural and urban beneficiaries aged 85+.

Rural beneficiaries aged 85+ were more likely than their urban counterparts to live in private homes in the community or in nursing homes.

Rural beneficiaries aged 85+ were less likely than their urban peers to live in assisted living or other residential care settings with services.

Compared to their urban peers, a greater proportion of rural beneficiaries aged 85+ reported having a medical visit, outpatient visit, or institutional admission and fewer reported having an inpatient admission or dental visit.

Among users of healthcare services, rural beneficiaries aged 85+ reported lower use of medical and dental visits and higher use of outpatient visits and prescription medications than their urban counterparts.

Medicare beneficiaries aged 85+ was $18,104, compared to $9,864 for the 65-84 age group.[10] In addition, those aged 85+ are more likely to have 4+ healthcare transitions in the last 6 months of life.[11]

Overall, people aged 85+ who live alone are more likely to be female and to have lower incomes than those living with families.[12] With their increased age, the oldest old are at greater risk of being widowed, living alone, and experiencing poverty, characteristics that are more prevalent among those aged 85+ in rural areas.[5] Living alone is also a strong predictor of nursing home use, as are the presence of functional limitations and cognitive impairment.[13] Given that risk factors for nursing home placement cluster together among the oldest old, it is not surprising that people in this age group have significantly higher nursing home admission rates compared with other older adults.[7]

Rural-urban differences in demographic, socioeconomic, and health characteristics of those aged 65+ have implications for how families and individuals access and use LTSS. There is a lack of recent research, however, that considers whether the rural oldest old differ from their urban counterparts with respect to their health and functional status, their healthcare and LTSS utilization patterns, and their rates of living alone. This study addresses this knowledge gap by profiling rural and urban Medicare beneficiaries aged 85+ with respect to their demographic and socioeconomic characteristics, the residential settings in which they live, their health and functional status, and their healthcare use.

APPROACH

Study Aims

This study used nationally representative survey data on Medicare beneficiaries to examine whether and how those aged 85+ differ with respect to their:

1. Demographic, socioeconomic, health, and functional status characteristics known or hypothesized to predict LTSS use

2. Residence in the community, in residential care settings with services, and long-term nursing homes

3. Patterns of healthcare use.

Data Source

The study used data from the Cost and Use files of the 2007-2011 Medicare Current Beneficiary Survey (MCBS), an ongoing panel survey designed and sponsored by the Centers for Medicare & Medicaid Services (CMS).[14] This survey is designed to represent the entire Medicare beneficiary population, regardless of whether they live in the community or in other settings. The Cost and Use file for each year represents all individuals who were enrolled in Medicare at any point within the given year. It combines survey reported data with Medicare claims and administrative data from CMS.

Variables

Beneficiary Characteristics. We examine demographic and socioeconomic characteristics and measures of health and functional status, including ADL impairment. Adapted from the work of Stineman et al., our measure of ADL impairment is defined as follows: (a) none; (b) mild ADL impairment is a difficulty with only walking or getting in/out of bed/chairs; (c) moderate ADL impairment is a difficulty with dressing or bathing, not with eating or toileting; (d) severe ADL impairment is a difficulty with eating or toileting and the sum of limitations is less than six; and (e) complete impairment is a difficulty with all six activities: walking, getting in/out of bed/chairs, dressing, bathing, eating, and toileting.[15] In our analysis, these are collapsed into three categories: none, mild or moderate, and severe or complete.

Residential Setting. Using a method adapted from the work of Degenholtz and colleagues,[16] we constructed a three-level variable that classified Medicare beneficiaries as living in one of three types of residences: (a) private home in the community; (b) formal residential care settings such as assisted living or supported housing where residents may be receiving a variety of supportive services (e.g., meal preparation, cleaning, medication assistance) (referred to below as 'residential care with services')[†] or (c) long-term care at a nursing home level of intensity.[‡] Note that in this study, facilities designated as nursing homes are long-term care facilities; this category does not include skilled nursing facilities.

[†] Residential settings in this category consisted primarily of assisted living facilities. Facilities were also assigned to this category if they were described as retirement communities, senior citizens' housing, continuing care communities, stages living communities, retirement apartments, church-provided housing, personal or residential care homes, board and care homes, domiciliary care facilities, rest/retirement homes, or adult/group homes.

[‡] Residential settings in this category consisted primarily of nursing homes. Facilities were also placed in this category if they were described as long-term hospitals, mental health centers, facilities for the developmentally disabled, or rehabilitation facilities.

Healthcare Use: MCBS respondents are asked about the number of healthcare use "events" they experienced in the last year. The reported number of events is then adjusted based on a review of Medicare claims. The types of healthcare events include: medical visits (including medical doctor and practitioner visits, diagnostic and surgical services, and durable medical equipment and supplies), outpatient visits (including hospital-based outpatient clinics and emergency room use without inpatient admission), inpatient admissions, prescription medications (Medicare Advantage and stand-alone Part D plans), dental visits, and institutional admissions (including short-term institutional stays such as skilled nursing facility or rehabilitation hospital stays), home health care, and hospice.

Rurality. Beneficiaries were classified as urban if they lived in counties within Metropolitan Statistical Areas (MSAs), and as rural if they lived in non-MSA counties.[17]

Analysis

We pooled data across the five survey years. We tested for rural-urban differences using Chi-square and t-tests. Where differences are noted, statistical tests are significant at the $p < 0.05$ level or lower. Analyses were weighted to adjust for the complex MCBS survey design. To pool across survey years, we analyzed the data with strata and primary sampling unit assignments.[§]

FINDINGS

Characteristics of Medicare Beneficiaries Aged 85+ in Rural and Urban Areas

Appendix A details the demographic, socioeconomic, health, and functional status characteristics of rural and urban Medicare beneficiaries aged 85+. As noted, compared with their urban peers, rural beneficiaries were more likely to:

- Live alone (51.2 percent versus 46.0 percent)
- Be non-Hispanic and White (93.7 percent versus 86.0 percent)
- Have less than a high school education (40.8 percent versus 28.5 percent)
- Have Medicare only (7.9 percent versus 5.1 percent), Medicare plus self-purchased private insurance (Medigap) (25.2 percent versus 19.9 percent), or Medicare and Medicaid (dual eligibility) (28.3 percent versus 22.4 percent)
- Have severe or complete ADL impairment (26.6 percent versus 23.2 percent).

Rural and urban beneficiaries were similar on other characteristics, including household income, health status, cognitive impairment, and rates of chronic conditions (Appendix A).

Compared to peers living with others, Medicare beneficiaries aged 85+ living alone were more likely to be female, non-Hispanic and White, have no ADL or cognitive impairment, and report better health status. Compared to their urban peers, rural beneficiaries living alone were more likely to be non-Hispanic and White (95.8 percent versus 91.1 percent), earn less than 100 percent of the federal poverty level (FPL) (19.3 percent versus 13.3 percent), and have severe or complete ADL impairment (15.4 percent versus 10.1 percent). They were also more likely to have Medicare only (6.7 percent versus 3.7 percent), Medicare plus self-purchased private insurance (Medigap) (36.5 percent versus 29.5 percent), or Medicare and Medicaid (dual eligibility) (17.9 percent versus 10.9 percent) [data not shown].

Rural-Urban Differences in Residential Setting among Medicare Beneficiaries Aged 85+

As shown in Figure 1, rural Medicare beneficiaries aged 85+ were more likely than their urban counterparts to live in private homes in the community (76.0 percent versus 73.4 percent) or in long-term nursing homes (17.4 percent versus 11.9 percent). However, rural beneficiaries were less likely than their urban peers to live in residential care with services (6.7 percent versus 14.7 percent, respectively).

Rural-Urban Differences in Healthcare Use among Medicare Beneficiaries Aged 85+

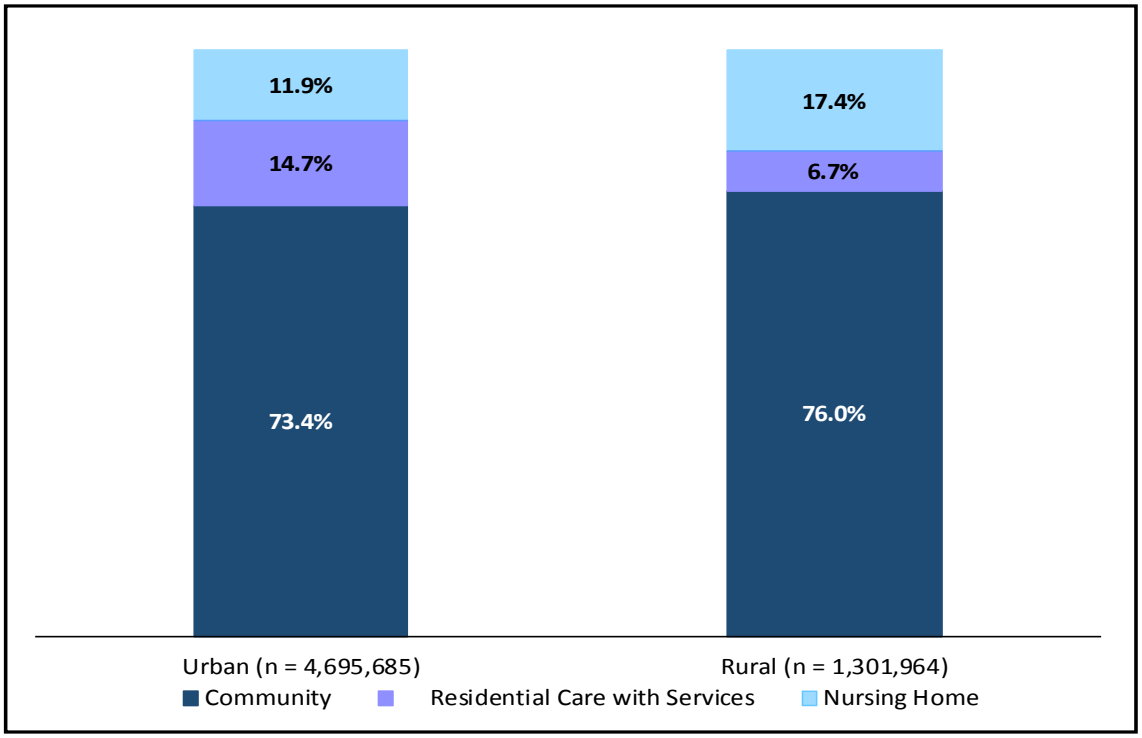
A greater proportion of rural Medicare beneficiaries aged 85+ reported having medical and outpatient visits and institutional admissions, and fewer reported having inpatient admissions and dental visits than their urban counterparts (Table 2). There were no significant differences in the percent of users for prescribed medications, home health visits, and hospice. Among users of healthcare services, rural beneficiaries reported lower rates of annual use for medical and dental visits, and higher rates of outpatient visits and prescription medication use than urban beneficiaries (Table 2). Reported rates of use were similar across rural and urban beneficiaries for other services, including inpatient and institutional admissions, home health, and hospice.

Limitations

The MCBS does not identify beneficiaries receiving home- and community-based services (HCBS)—

[§] For more information on study methods, please contact Jean Talbot, PhD at jean.talbot@maine.edu

Figure 1. Residential Setting Among Medicare Beneficiaries Aged 85+



Source: Medicare Beneficiary Survey, 2007-2011
Chi square test of rural-urban differences significant at p < 0.01

Medicaid or privately financed—in private homes. Our 'residential care with services' category included only those beneficiaries who may be receiving supportive services in facility-based settings. Additionally, the study used data from 2007 to 2011. Therefore, our analyses may not reflect current residential patterns or healthcare use, especially in view of new federal policies and programs expanding HCBS.[18]

DISCUSSION AND POLICY FINDINGS

With the percentage of elderly living in rural areas projected to grow faster than in urban areas, and with the 85+ age group growing more quickly than other age groups, it is important to understand the health status, demographic characteristics, and healthcare and LTSS use of the oldest old in rural America. Study findings indicate that rural beneficiaries aged 85+ were more likely to be non-Hispanic and White, have lower educational attainment, have Medicaid or self-purchased private insurance for supplemental coverage, and have severe or complete ADL impairment than their urban peers. Rural beneficiaries aged 85+ were also more likely to live alone compared to urban beneficiaries, mirroring findings of previous research.[5] Given that functional limitation and living alone[13] are risk factors for nursing home admission, these findings suggest rural older adults aged 85+ are likely to have both greater need and demand for healthcare and LTSS services.[19]

Mirroring other studies of the rural elderly, the current study's findings indicate that the rural oldest old are more likely to live alone in the community or in a long-term nursing home than their urban counterparts.[5,7] This pattern may reflect the greater abundance of nursing homes in rural compared to urban communities and/or more limited access to residential care and/or HCBS options in rural communities.[20] Additionally, rural Medicare beneficiaries aged 85+ had significantly more reported institutional admissions than did urban beneficiaries.

The rural-urban differences in healthcare use reported here also appear to reflect many of the known workforce and other challenges facing the rural healthcare delivery system. For example, the lower rates of dental and medical care provider visits among users of these services is consistent with known shortages of dental and primary care providers in rural areas.[21] Lower rates of dental visits may also be a reflection of Medicare's limited dental coverage. Rural beneficiaries are more likely to have Medicare only or self-purchased Medigap instead of Medicare Advantage or employer-sponsored insurance coverage, both of which may include better dental coverage. The lower rate of

Table 2. Healthcare Use, Urban and Rural Medicare Beneficiaries Aged 85+

Healthcare Event	Urban (n = 4,695,685)			Rural (n = 1,301,964)		
	Users (percent)	Mean # of events per user	95 percent CI	Users (percent)	Mean # of events per user	95 percent CI
Medical visits[a*†]	95.8	33.67	32.06-35.28	97.6	28.12	25.97-30.28
Outpatient visits[b*†]	70.1	5.95	5.50-6.41	82.7	8.01	6.81-9.21
Inpatient admissions[*]	27.5	1.65	1.59-1.70	23.8	1.75	1.66-1.84
Prescription medications[†]	82.7	41.81	40.40-43.22	80.5	46.96	43.66-50.26
Dental visits[*†]	36.2	2.63	2.52-2.73	26.6	2.20	2.08-2.31
Institutional admissions[c*]	12.2	2.41	2.31-2.52	14.8	2.50	2.26-2.74
Home health visits	30.7	121.6	112.28-130.91	29.4	136.54	123.44-149.63
Hospice	8.0	1.06	1.04-1.08	7.0	1.10	1.02-1.19

Source: Medicare Current Beneficiary Survey, 2007-2011
[*] Rural-urban differences in percent of healthcare event users significant at $p < 0.05$
[†] Rural-urban differences in mean number of healthcare events per user per year significant at $p < 0.05$
[a] Includes visits with medical doctors, practitioners, mental health professionals, therapists, nurses, and paramedics, diagnostic and surgical services, and provision of durable medical equipment.
[b] Includes visits at hospital-based outpatient clinics and emergency room use without inpatient admission.
[c] Other short-term care institutional stays (i.e. skilled nursing facility or rehabilitation hospital).

medical visits may also reflect the greater reliance in rural areas on hospital-based outpatient clinics as a source of primary and specialty care as reflected in the higher rates of use among rural outpatient care users.

As prior research has shown, the oldest old represent a highly vulnerable population with significant healthcare and LTSS needs. Older adults aged 85+ are highly susceptible to the high out-of-pocket costs and healthcare expenditures associated with nursing homes and other institutional services.[22] The greater proportion of rural individuals relying on nursing homes to meet their LTSS needs suggests they may experience this financial burden more acutely than do their urban counterparts. This reliance on nursing homes may partly be due to a scarcity of HCBS options in rural areas, one of the many weaknesses of rural LTSS infrastructure.[20,23-26] The growing evidence of increased cost-effectiveness[27] of HCBS suggests the importance of federal and state policies that support expanded access to and use of these services in rural communities.[28]

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Appendix A. Characteristics of Rural and Urban Medicare Beneficiaries Aged 85+

	Urban (percent) (n = 4,695,685)	Rural (percent) (n = 1,301,964)
Gender		
Male	33.6	31.8
Female	66.4	68.2
Race/Ethnicity**		
White	86.0	93.7
Black	7.8	5.1
Hispanic	3.2	0.4
Asian/Native American/Other	2.7	0.7
Unknown	0.3	0.1
Educational Attainment**		
Less than high school	28.5	40.8
High school or some college	55.1	49.9
Four year college degree or more	16.3	9.3
Income		
<200 percent FPL	39.2	40.7
≥200 percent FPL	60.8	59.3
Marital Status		
Married	28.5	28.0
Not married	71.5	72.0
Living Alone[a]*		
Alone	46.0	51.2
Not alone	54.0	48.9
Insurance Status**		
Medicare FFS only	5.1	7.9
Employer sponsored	35.1	33.2
Medicaid	19.9	25.2
Medigap/other private	22.4	28.3
Medicare Advantage	17.5	5.5
Overall Health Status		
Fair/poor	28.2	31.2
Good/very good/excellent	71.8	68.8
Chronic Conditions		
Diabetes		
Past or current history	18.9	17.6
No history	81.1	82.4
High blood pressure		
Past or current history	72.2	71.7
No history	27.8	28.3

Cancer		
Past or current history	39.2	35.6
No history	60.8	64.4
Stroke		
Past or current history	15.2	16.9
No history	84.8	83.1
Mental Illness		
Past or current history	17.8	17.7
No history	82.2	82.3
Cognitive Impairment		
Alzheimer's		
Past or current history	8.9	10.4
No history	91.1	89.6
Other dementia		
Past or current history	13.1	12.6
No history	86.9	87.4
ADL Impairment**		
None	41.7	42.3
Mild or moderate	35.1	31.1
Severe or complete	23.2	26.6

Source: Medicare Current Beneficiary Survey, 2007-2011
Chi-square test of rural-urban differences significant at *p <0.05, **p < 0.01
[a] Analysis for living alone included only elderly Medicare beneficiaries living in private homes in the community.

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For more information on this study, please contact Jean Talbot, PhD at jean.talbot@maine.edu