

Differences in Medicare Service Use in the Last Six Months of Life among Rural and Urban Dual – Eligible Beneficiaries

Key Findings

- For two facility-based services, hospital and SNF, admission during the last months of life was equally common among rural and urban dual eligible (DE) decedents, even those with Alzheimer's disease. Rural DE beneficiaries were more likely than urban decedents to have used two outpatient services (physician and clinic visits).
- Home health service use was lower among all rural than all urban DE beneficiaries (21.5% versus 24.7%, $p < 0.001$). Among DE persons with Alzheimer's disease, however, home health use did not differ significantly by residence (13.9% rural versus 16.2% urban), suggesting that differences in overall use may stem from differences in diagnostic profiles.
- Medicare-funded hospice use was lower among rural than urban DE beneficiaries (42.7% versus 45.1%, $p < 0.001$), even within decedents with Alzheimer's disease (47.6% versus 55.1%, $p < 0.001$). This gap may indicate a shortage of available services.

Background

Individuals with health insurance coverage from both Medicare and Medicaid are generally characterized as dual-eligible (DE) beneficiaries. These beneficiaries include low-income persons age 65 and older and younger adults who qualified for Medicare when they became disabled. Dual-eligible beneficiaries are often considered a medically at-risk population.¹ They are institutionalized at higher rates (>16%) than Medicare-only (MO) beneficiaries (2%).² These individuals often report lower health status and have more chronic conditions than Medicare-only beneficiaries. They are of particular interest to policymakers as previous research has shown higher service utilization rates among dual-eligible beneficiaries, particularly among outpatient services, inpatient hospital services, and long-term care.³ These higher utilization rates and subsequent higher costs are of particular concern with end-of-life care.

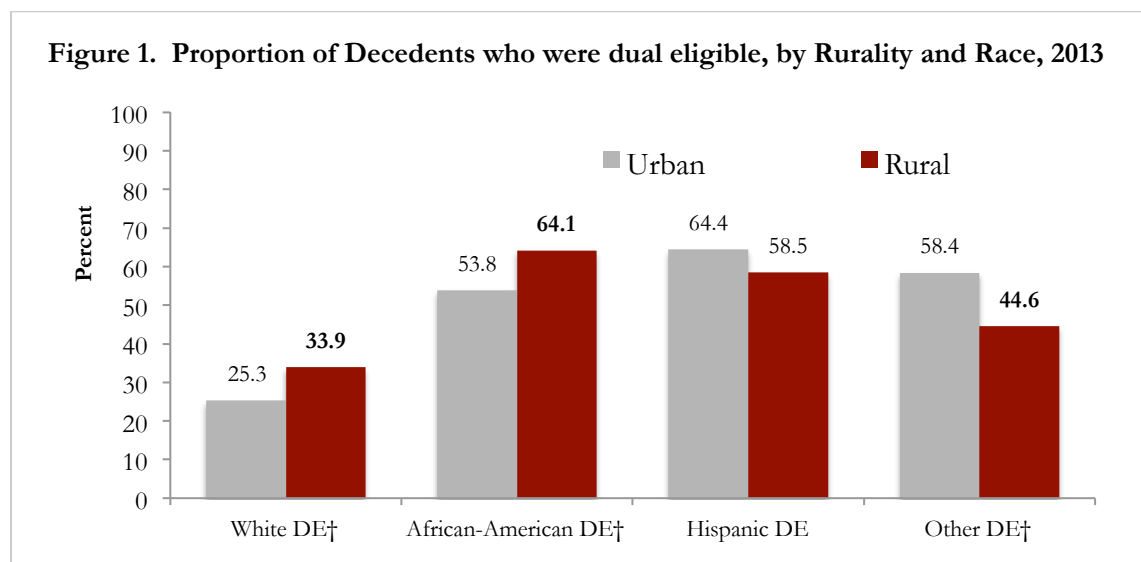
Rural beneficiaries are more likely to be dual eligible than are urban beneficiaries.⁴ Given the unique challenges facing the dual eligible population and the more limited health care infrastructure in rural America, the pattern of end of life spending may differ for rural decedents. In this brief, we compare rural and urban dual-eligible beneficiaries to Medicare-only beneficiaries in their service utilization in the last six months of life. Within rural beneficiaries, we further explore differences associated with race/ethnicity. Details on the persons in the last six months of life included in the study are provided in the next section, followed by separate sections on different types of health services. Technical details regarding the population studied and the analytic approach are provided in an appendix.

Population Studied

We analyzed data on all beneficiaries who were eligible for Medicare for the entire year 2013 and who died between July 1 and December 31, 2013. We excluded beneficiaries who died before July 1, 2013 so that we could study the utilization patterns for a full six months before death. Of the 2.6 million people in the five percent Medicare claims data, 1.5% died during these months. We excluded beneficiaries who were missing information for residence, race/ethnicity, age or sex, as well as those who had no utilization in the last year of life, as reported in the cost and use Research Identifiable Files. Given that even sudden death is likely to be associated with a medical claim, it was assumed that files with no utilization may contain data errors (see Appendix). Finally, we examined only fee-for-service utilization and excluded beneficiaries with Medicare Advantage. Our final sample size was 39,544 beneficiaries.

Dual-eligible (DE) beneficiaries were defined as those who had between 1 and 12 months of dual-eligibility in 2013. Dual-eligible beneficiaries were more likely to be included in the decedent group than Medicare-only (MO) beneficiaries (2.5% versus 1.3%, p -value <0.05). Rurality was defined based on county of residence using Urban Influence Codes (see Technical Notes).

Of the 39,544 beneficiaries in our sample who died, 32.3% (12,777) were dual eligible (DE) for Medicaid and Medicare, while 26,767 were Medicare-Only (MO) beneficiaries. The DE proportion was higher for rural residents (36.5%) than for urban residents (31.1%, p -value <0.05). Reflecting the distribution of income in the U.S., DE status was more common among beneficiaries of minority race/ethnicity status than among white beneficiaries; this was true for the population as a whole and within both rural and urban residents. Among white and African American beneficiaries, DE beneficiaries constituted a greater proportion of decedents in rural counties than in urban areas; Hispanic decedents did not differ statistically by residence. Among “other” groups, the proportion of DE beneficiaries was higher in urban than in rural counties (Figure 1, below).



In addition, DE beneficiaries were more likely to be female (66.4%) than were MO beneficiaries (58.4%). DE beneficiaries in the sample were more likely to have Alzheimer’s disease than MO beneficiaries (24.5% versus 14.8%, p -value <0.05). DE beneficiaries were also more likely to have end-stage renal disease (5.4%) than MO beneficiaries (3.0%, p -value <0.05). Comparisons of the health care utilization of DE and MO decedents are presented in the sections below.

Health Care Utilization

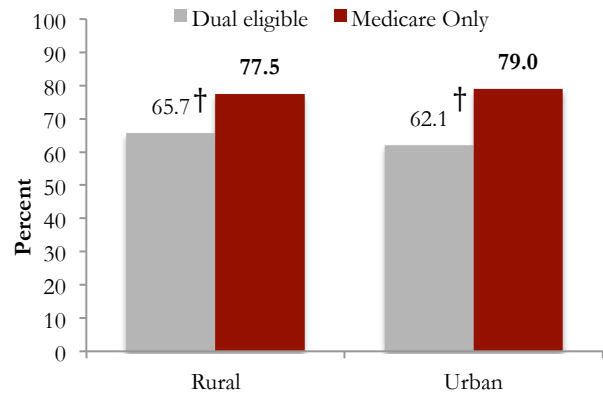
Physician Visits

During their last six months of life, 63.0% of all DE beneficiaries studied had at least one physician visit, defined as a visit to an office setting, rather than a hospital outpatient department.* This proportion was higher among rural (65.7%) versus urban DE residents (62.1%, $p < 0.001$). Within both rural and urban decedents, MO beneficiaries were more likely to have had a physician visit than DE beneficiaries ($p < 0.05$; See Figure 2).

Rural only

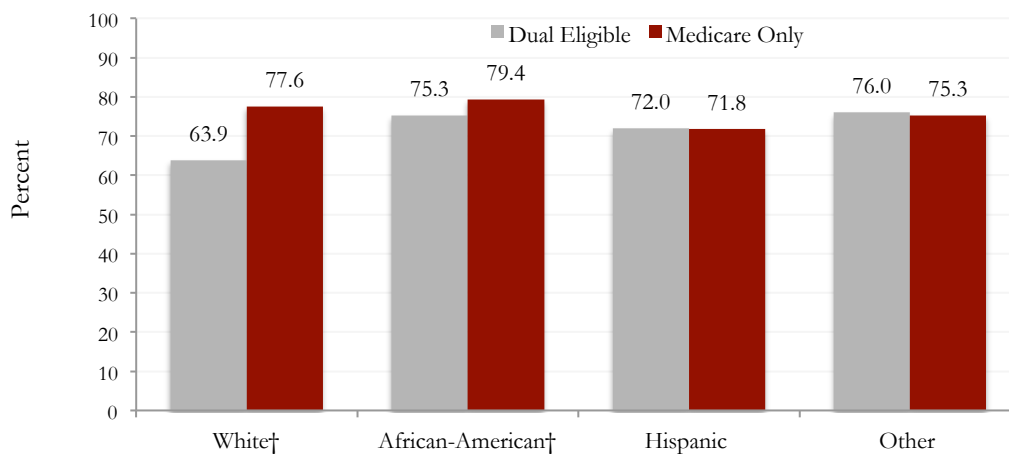
Within rural beneficiaries, white and African American DE decedents were less likely to have had a physician visit during the last six months of life than were their MO counterparts, paralleling the general pattern (Figure 3). No significant differences were noted among rural decedents in other race/ethnicity groups. African American and Other DE decedents were more likely than white beneficiaries to have had a physician visit during the last six months of life ($p = .001$ and $p = .0419$, respectively); Hispanics did not differ. There were no differences associated with race/ethnicity among rural MO decedents.

Figure 2: Proportion of Medicare Beneficiaries with Physician Service Use during the Last Six Months of Life, by Dual Eligibility and Rurality, 2013



Bold indicates significant differences between DE and MO beneficiaries. † indicates rural significantly different from

Figure 3: Proportion of Rural DE Medicare Beneficiaries with Physician Service Use during the Last Six Months of Life, by Race/Ethnicity, 2013†



† Differences between DE and MO beneficiaries are significant at $p < 0.05$ for white and African-American decedents. Differences associated with eligibility within Hispanic and “other” race/ethnicity groups were not statistically significant.

*Physician visits were defined by the number of evaluation and management services in a physician office setting, using HCPCS codes 99201, 99202, 99203, 99204, 99205, 99211, 99212, 99213, 99214, and 99215. This category includes private physician offices, rural health clinics and federally qualified health centers, assuming they were not hospital owned and billing as hospital outpatient departments.

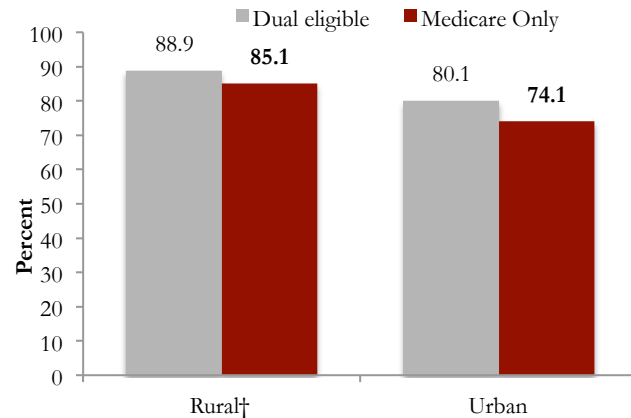
Outpatient Clinic Visit

During their last six months of life, 82.3% of all DE beneficiaries had at least one outpatient visit.* This proportion was higher among rural (88.9%) versus urban dual eligible residents (80.1%, $p < 0.001$). DE decedents were more likely than MO beneficiaries to have received an outpatient visit in both rural and urban counties ($p < 0.05$; See Figure 4).

Rural only

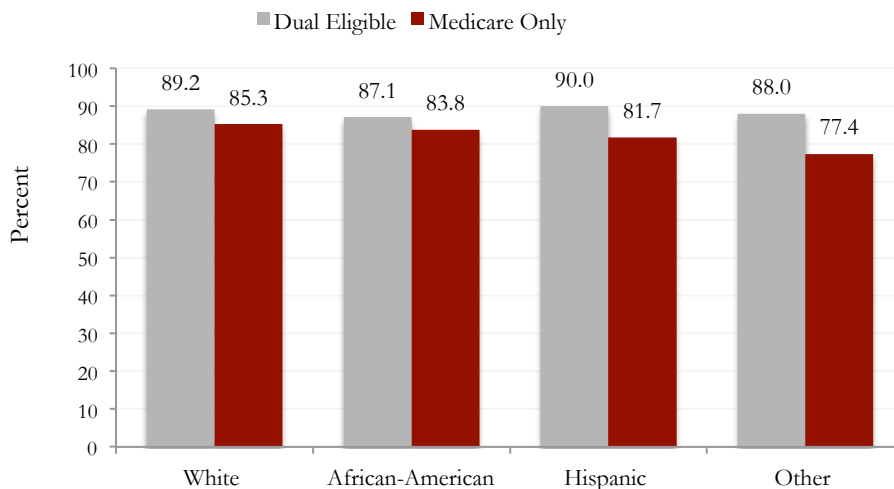
Within rural beneficiaries, DE decedents were significantly more likely to have visited an outpatient clinic during the last six months of life than were MO decedents within every race/ethnicity category (Figure 5). Within DE beneficiaries, African American and Other decedents were less likely to have had a clinic visit than their white peers ($p < 0.001$ for both comparisons), while Hispanics did not differ. Among MO rural residents, persons of Other race/ethnicity were less likely than white decedents to have had a clinic visit ($p = 0.0483$); other groups did not differ.

Figure 4: Proportion of Medicare Beneficiaries with Outpatient Service Use during the Last Six Months of Life, by Dual Eligibility and Rurality, 2013



Bold indicates significant differences between DE and MO beneficiaries. † indicates rural significantly different from urban.

Figure 5: Proportion of Rural DE Medicare Beneficiaries with Outpatient Service Use during the Last Six Months of Life, by Race/Ethnicity, 2013†



† Differences between DE and MO beneficiaries are significant at $p < 0.05$ for all decedents.

*Outpatient visits were defined as a visit to a hospital outpatient department (bill type 85 or 13), outpatient dialysis facility (bill type 72), and other Part B institutional services (bill type 12, 22, 23, 74, 75, 76, 34, 14, 83). Bill type is a combination variable designed by RESDAC, the Research Data Assistant Center, combining facility type and type of service.

Inpatient Hospitalization

Overall, 62.0% of DE beneficiaries who died had an inpatient stay in their last six months of life. There was no significant difference in the proportion of inpatient hospitalizations between rural (61.9%) and urban DE residents (62.1%). Within residence, MO beneficiaries were more likely than DE persons to have been hospitalized ($p < 0.05$; See Figure 6).

Rural only

Within rural beneficiaries, white DE decedents were less likely than their MO peers to have been hospitalized during the last six months of life (Figure 7, below). However, rural African American DE decedents were more likely to have used inpatient services during the last six months of life than were their MO counterparts (Figure 7). African American DE decedents were markedly more likely to have been hospitalized at least once than were white decedents ($p = < 0.001$); differences between white and African American MO individuals were not significant. There were too few observations to allow comparison of hospitalization among decedents of other race/ethnicity categories.

Figure 6: Proportion of Medicare Beneficiaries with Inpatient Service Use during the Last Six Months of Life, by Dual Eligibility and Rurality, 2013

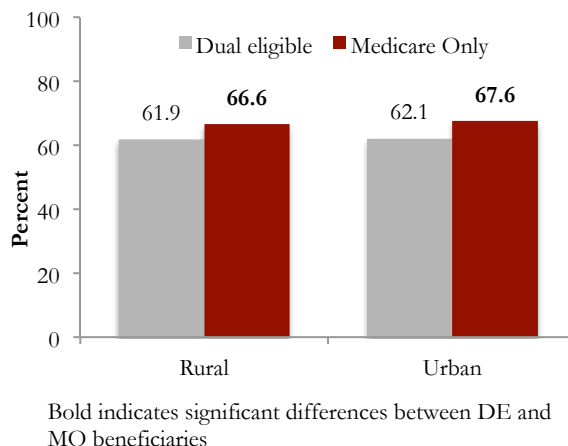
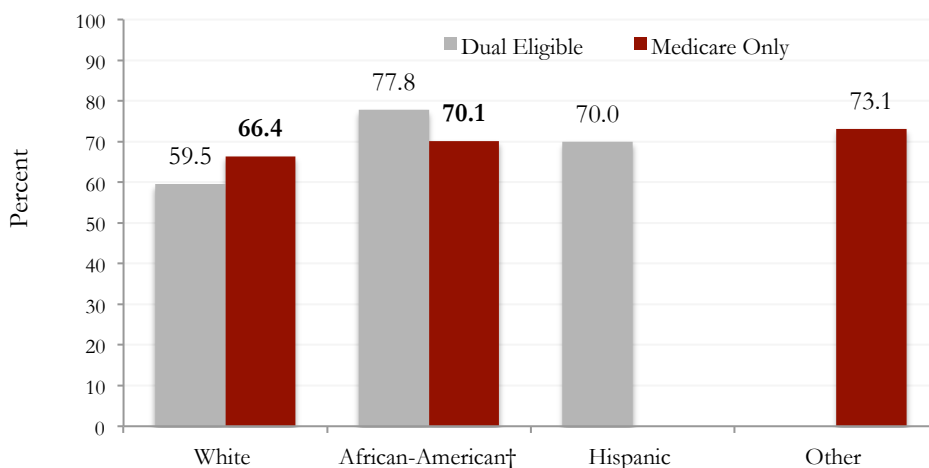


Figure 7: Proportion of Rural DE Medicare Beneficiaries with Inpatient Service Use during the Last Six Months of Life, by Race/Ethnicity, 2013†



† Differences between DE and MO beneficiaries are significant at $p < 0.05$ for white and African American decedents. Differences associated with eligibility state within other race/ethnicity groups were not statistically significant. Categories with fewer than 50 decedents were not reported.

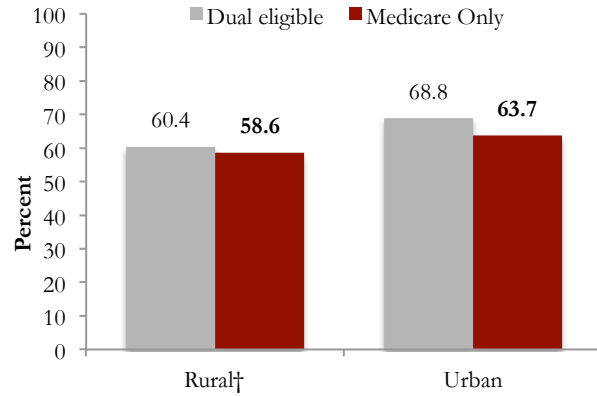
Service Utilization – Ambulance

Two thirds (66.7%) of all DE beneficiaries had at least one ambulance transport during the last six months of life. This proportion was lower among rural (60.4%) than urban DE beneficiaries (68.8%, $p < 0.001$). Within both rural and urban residents, DE beneficiaries were more likely than their MO equivalents to have used ambulance services ($p < 0.05$; See Figure 8).

Rural only

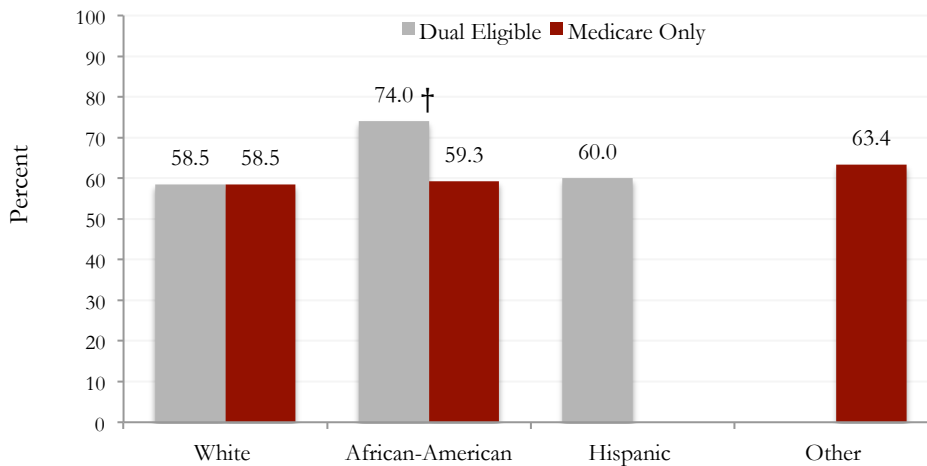
Within white rural beneficiaries, ambulance use did not differ between DE and MO insured individuals (Figure 9). African-American DE decedents, however, were markedly more likely to have used ambulance services during the last six months of life than were African American MO decedents (74.0% versus 59.3%, $p < 0.05$) or white DE decedents (74.0% versus 58.5%; $p < 0.001$). Lack of personal transport may influence the high rate of ambulance use among rural African American DE beneficiaries. While rural households are generally more likely than urban households to own cars, persistent poverty, high-minority counties are likely to have a high proportion of carless households.⁵ These counties house a substantial proportion of all rural African American residents.

Figure 8: Proportion of Medicare Beneficiaries with Ambulance Service Use during the Last Six Months of Life, by Dual Eligibility and Rurality, 2013



Bold indicates significant differences between DE and MO beneficiaries. † indicates rural significantly different from urban.

Figure 9: Proportion of Rural DE Medicare Beneficiaries with Ambulance Service Use during the Last Six Months of Life, by Race/Ethnicity, 2013†



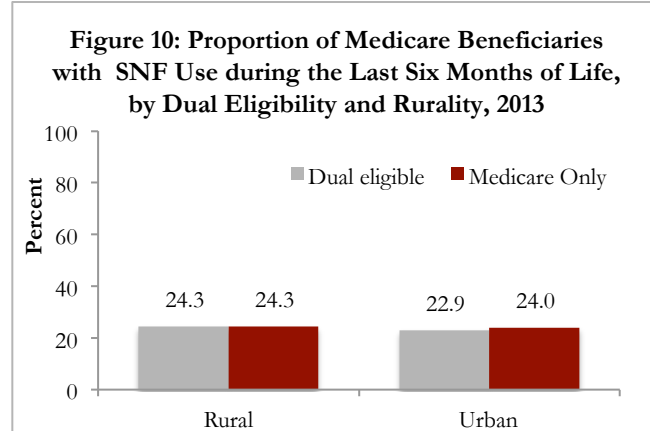
† Differences between DE and MO beneficiaries are significant at $p < 0.05$ for African-American decedents. Categories where $N < 50$ were not reported.

Service Utilization –Skilled Nursing Facility (SNF)

During the last six months of life, 23.3% of all dual-eligible beneficiaries had a Medicare-funded stay in a skilled nursing facility (SNF). There was no difference in the proportion of decedents with SNF stays between rural (24.3%) and urban dual-eligible residents (22.9%). Within residence, there were no significant differences between dual-eligible and Medicare-only beneficiaries ($p < 0.05$; See Figure 10).

Rural only

Paralleling findings for the population as a whole, there were no significant differences in SNF use between DE and MO rural residents. Rural white and African American decedents had similar SNF use (24.3% and 24.9%, respectively).



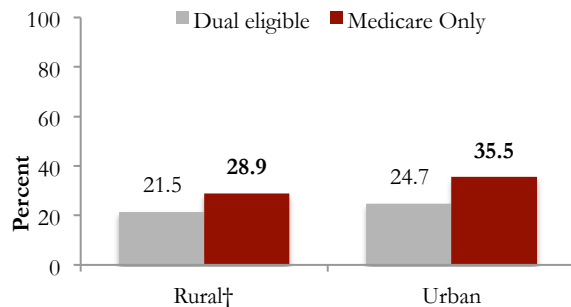
Home Health

A quarter (23.9%) of DE beneficiaries who died had a Medicare-funded home health visit in their last six months of life. This proportion was lower among rural (21.5%) versus urban DE residents (24.7%, $p < 0.001$). Among both urban and rural decedents, MO beneficiaries were more likely than DE beneficiaries to have received home health services ($p < 0.05$; See Figure 11).

Rural only

Within rural beneficiaries, both white and African American DE decedents were less likely to have had a home health visit during the last six months of life than were similar MO decedents (Figure 13). Specifically, 19.6% of rural white DE decedents, versus 28.6% of MO decedents, received Medicare-funded home health services. Similarly, 32.1% of rural African American DE decedents, versus 38.7% of their MO peers, received these services. Within both DE and MO decedents, African American beneficiaries were more likely to have received home health services than were white beneficiaries ($p = 0.001$ and $p = 0.002$, respectively). There were too few observations to allow examination of home health use among rural decedents of other race/ethnicity categories.

Figure 11: Proportion of Medicare Beneficiaries with Home Health Service Utilization during the Last Six Months of Life, by Dual Eligibility and Rurality, 2013



Bold indicates significant differences between DE and MO beneficiaries. † indicates rural significantly different from urban.

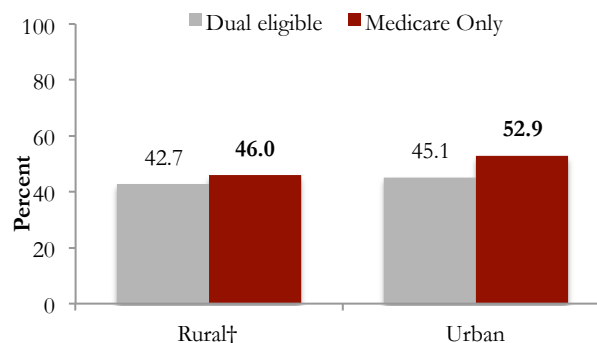
Service Utilization – Hospice

Across all DE beneficiaries, 44.5% utilized hospice services during their last six months of life. This proportion was lower among rural (42.7%) versus urban DE residents (45.1%, $p < 0.001$). A pattern of lower hospice use among DE than MO beneficiaries was present among both rural and urban decedents ($p < 0.05$; See Figure 12).

Rural only

Within rural beneficiaries, both white and African American DE decedents were less likely to have used Medicare-funded hospice services during the last six months of life than were their MO peers. Specifically, 44.1% of white rural DE decedents, versus 46.4% of similar MO decedents, used hospice services. Rates of use were significantly lower among rural DE African American decedents than among their white peers but showed a similar pattern, with 35.1% of DE decedents versus 39.7% of MO African American decedents using hospice services. Differences between white and African American decedents were significant among DE beneficiaries, but not among MO beneficiaries.

Figure 12: Proportion of Medicare Beneficiaries with Hospice Utilization during the Last Six Months of Life, by Dual Eligibility and Rurality, 2013



Bold indicates significant differences between DE and MO beneficiaries. † indicates rural significantly different from urban.

High need beneficiaries: Persons with Alzheimer’s disease or dementia

As noted in the introductory section, Medicare beneficiaries who were also eligible for Medicaid differed from their MO peers in several ways. To allow more equal comparisons, we conducted an additional set of analyses restricted to decedents whose records indicated they suffered from Alzheimer’s disease or related dementias ($n = 8,024$ persons: 1,582 rural residents and 6,442 urban residents).

Rural DE beneficiaries with Alzheimer’s disease or dementia were less likely than their urban DE peers to have received physician services (92.4% versus 94.5%), but more likely to have received an outpatient clinic visit (88.4% versus 78.4%); no clear pattern of difference in ambulatory care use was evident. Rural DE beneficiaries were less likely to have used ambulance services (57.9% versus 66.1%). There were no differences between urban and rural DE decedents with regard to inpatient use, SNF stay, or home health use. Rural DE beneficiaries were less likely than urban residents to have used hospice services (rural DE, 47.6%, versus urban DE, 55.1%).

Comparing rural DE beneficiaries to rural MO beneficiaries with Alzheimer’s disease or dementia, only ambulance use did not differ based on eligibility status. Rural DE decedents were more likely than rural MO individuals to receive ambulatory care (physician or clinic visit), but less likely to have received Medicare-funded inpatient, SNF or home health services. These overall patterns were similar among urban DE and MO residents, with the discrepancy in home health use

being particularly large. While rates of hospice use were higher in the Alzheimer’s population than among other decedents, rural use still lagged behind urban use for both DE and MO beneficiaries.

Table 1. Service use among Medicare decedents with Alzheimer’s Disease, by residence and eligibility status, 2013.

| | Rural | | Urban | | Significant comparisons |
|-------------------------|-------------|-------------|---------------|---------------|-------------------------|
| | DE N=798 | MO N=784 | DE N=2,599 | MO N=3,843 | |
| Physician Visit | 92.4% | 89.3% | 94.5% | 91.9% | a), b), c) |
| Outpatient Clinic Visit | 88.4% | 82.5% | 78.4% | 70.5% | a), b), c) |
| Inpatient Stay | 55.0% | 61.7% | 56.4% | 62.9% | a), c) |
| Ambulance service | 57.9% | 61.9% | 66.1% | 68.4% | b), c) |
| SNF stay | 24.6% | 30.0% | 22.7% | 27.3% | a), c) |
| Home Health | 13.9% | 29.0% | 16.2% | 38.0% | a), c) |
| Hospice | 47.6% | 56.6% | 55.1% | 67.7% | a), b), c) |

a) Within residence, DE and MO beneficiaries differed significantly
b) Significant differences between rural and urban DE beneficiaries
c) Significant differences between rural and urban MO beneficiaries

Conclusions

Overall, rural DE decedents may experience some modest disparities during the last six months of life when compared to urban DE beneficiaries. Table 2 summarizes comparisons of service use within rural and urban decedents, both in total and restricted to persons with Alzheimer’s disease. For two facility-based services, hospital and SNF, any admission was equally common among rural and urban DE decedents, even those with Alzheimer’s disease. Home health service use differed in the general population of decedents, but when the population was restricted based on diagnosis, service use did not differ by residence. Differences within the total population of decedents may stem from differences in disease prevalence and associated care needs.

Table 2. Summary, Rural Compared to Urban* Service Use among Dual-Eligible Beneficiaries

| | All decedents | Alzheimer’s patients only |
|-------------------------|---------------|---------------------------|
| Physician Visit | > | > |
| Outpatient Clinic Visit | > | > |
| Inpatient Stay | = | = |
| Ambulance service | < | < |
| SNF stay | = | = |
| Home Health | < | = |
| Hospice | < | < |

*Marks illustrate the relationship between rural and urban rates: e.g., “>” indicates rural was higher than urban.

The principal potential rural disparity was Medicare-funded hospice use, which was lower among rural than urban beneficiaries even among decedents with Alzheimer’s disease. Lower hospice use found in this study parallels similar findings among Medicare beneficiaries with cancer, among whom hospice use was less common for rural residents.⁶ It is unlikely that Medicaid hospice benefits are replacing Medicare benefits for this service, as only a small proportion of hospice

patients (6.9%) are funded by Medicaid.⁷ Rural communities as a whole are less likely to have a hospice within 30 or 60 minutes travel time, which could affect both awareness of and use of the service.⁸ Considered not as a potential cost saving mechanism, but as a service that may benefit rural decedents and their families, low use of hospice by rural decedents may represent an unfavorable disparity.

Looking only within rural beneficiaries and comparing the MO and DE cohorts, DE rural beneficiaries were less likely to have experienced an inpatient stay, ambulance transport, home health, or hospice services (Table 3). Findings with regard to outpatient care were mixed, with physician visits being less common among DE than MO beneficiaries, while outpatient clinic visits more common among DE individuals. When the analysis was restricted to decedents who had a diagnosis of Alzheimer’s disease, use of both types of outpatient care was higher among DE than MO beneficiaries, but all other services were less likely or equally likely to have been recorded.

Table 3. Summary* Service Use by Rural Dual-Eligible versus Rural Medicare Only Beneficiaries

| | All decedents | Alzheimer’s patients only |
|-------------------------|---------------|---------------------------|
| Physician Visit | < | > |
| Outpatient Clinic Visit | > | > |
| Inpatient Stay | < | < |
| Ambulance service | < | = |
| SNF stay | = | < |
| Home Health | < | < |
| Hospice | < | < |

*Marks illustrate the relationship between DE and MO rates: e.g., “>” indicates DE was higher than MO.

Table 4 summarizes comparisons within rural residents based on race/ethnicity. Because of low numbers of observations for Hispanic decedents and persons of other race/ethnicity, only white and African American beneficiaries are compared. Within persons with MO insurance, there were no differences based on race in the use of any services except home health, which was more commonly used among African American than white decedents (38.7% versus 28.6%, $p > 0.001$). Among DE individuals, African American beneficiaries were more likely to have used physician, inpatient, ambulance and home health services, and less likely to have used hospice, than their white peers. These comparisons do not suggest that African American decedents experienced disparities in the services received during their last six months of life when compared to rural white beneficiaries.

Table 4. Summary Comparisons,* Service Use by Rural African American versus Rural White Beneficiaries

| | DE only | MO only |
|-------------------------|---------|---------|
| Physician Visit | > | = |
| Outpatient Clinic Visit | = | = |
| Inpatient Stay | > | = |
| Ambulance service | > | = |
| Home Health | > | > |
| Hospice | < | = |

*Marks illustrate the relationship between African American and White rates: e.g., “>” indicates African American was higher than White rate. No entry for SNF due to small number of observations for African American decedents.

Absent data on beneficiary preferences, and lacking information regarding services that may have been paid by Medicaid, it is difficult to confirm rural disparities in utilization of Medicare funded services among DE beneficiaries for any service except Medicare hospice, discussed above. Additional research is recommended to link facility use with facility availability, to ensure that differences between populations result from choice rather than from facility availability.

Appendix A. Technical Notes

Data Sources

Beneficiary data for the report were obtained from the 2013 Medicare Research Identifiable Files:

Beneficiary Master Summary File. The beneficiary master summary file contains beneficiary age, race, dual eligible status, and county of residence. These data were used to identify the rurality of the beneficiaries' residence, their demographic characteristics, and dual eligible status (Medicare only vs. Medicare and some Medicaid coverage).

Carrier Claims File. The carrier claims file contains all physician encounters and was used to identify these encounters with a place of service code indicating delivery in an office, clinic, or other ambulatory setting.

MEDPAR. The Medicare Provider Analysis and Review (MEDPAR) file contains data from claims for services provided to beneficiaries admitted to Medicare certified inpatient hospitals and skilled nursing facilities (SNF). The accumulation of claims from a beneficiary's date of admission to an inpatient hospital where the beneficiary has been discharged, or to a skilled nursing facility where the beneficiary may still be a patient, represents one stay. A stay record may represent one claim or multiple claims. We linked the 5% sample of Medicare administrative data from MEDPAR acute hospital claims data that can trace the path of care for each patient to multiple patient-level Medicare claims data, Medicare beneficiary summary data.

Home Health Claims File. This file contains records for the use of home health service, if any. Home health visits were aggregated per episode of care, not on a visit by visit basis, as this is how home health providers are reimbursed for services. These episodes were summed by beneficiary using the claim type codes indicating either an outpatient or inpatient based home health service delivery.

Outpatient Claims File. This file contains claims delivered in outpatient settings. We identified all encounters with a place of service code indicating delivery in clinical settings, including hospital departments, outpatient settings, clinics, freestanding centers, or rehabilitation centers.

Hospice Claims File. This file contains claims submitted by Hospice providers and was used to identify all encounters provided by a Hospice provider.

AHRF. The Area Health Resource File (AHRF) is a family of health data resource products drawn from an extensive county-level database assembled annually from over 50 sources. The AHRF data elements are in three categories: (a) healthcare professions; (b) hospitals and healthcare facilities, and (c) the Census, population data, and the environment. We linked data from the Area Resource File to generate rural/urban and regional characteristics in the sample.

Measures

Dual eligible status was defined as been dual eligible for anytime between one and twelve months. Rural residence was defined at the county level using Urban Influence Codes (UICs, divided into metropolitan (UICs 1, 2), and rural (all other codes). The population studied is characterized across multiple levels of rurality in Table A1 on the following page: Metropolitan (UICs 1, 2), Micropolitan (UICs 3, 5, 8), Small Adjacent (UICs 4, 6, 7), and Remote rural counties (UICs 9, 10, 11, & 12). Due to small sample sizes, particularly for non-white populations, analyses in the body of the brief are limited to the rural/urban distinction.

Table A1. Characteristics of Medicare beneficiaries who died between July 1, 2013 and December 31, 2013, by dual-eligibility.

| Characteristics | | Total (n=39,544) | | Duals (n=12,777) | | Medicare Only (n=26,767) | | p-value* |
|---|-------------------------------|------------------|------|------------------|------|--------------------------|------|----------|
| | | n | % | n | % | n | % | |
| Rurality | | | | | | | | <0.0001 |
| | Urban | 30674 | 77.6 | 9536 | 74.6 | 21138 | 79.0 | |
| | All Rural | 8870 | 22.4 | 3241 | 25.4 | 5629 | 21.0 | |
| | Micropolitan | 5018 | 12.7 | 1811 | 14.2 | 3207 | 12.0 | |
| | Small Adjacent | 2373 | 6.0 | 914 | 7.2 | 1459 | 5.5 | |
| | Remote | 1479 | 3.7 | 516 | 4.0 | 963 | 3.6 | |
| Sex | | | | | | | | 0.0568 |
| | Male | 16458 | 41.6 | 4291 | 33.6 | 12167 | 45.5 | |
| | Female | 23086 | 58.4 | 8486 | 66.4 | 14600 | 54.5 | |
| Age groups** | | | | | | | | <0.0001 |
| | <65 | 3683 | 9.3 | 2136 | 16.7 | 1547 | 5.8 | |
| | 65-74 | 7670 | 19.4 | 2247 | 17.6 | 5423 | 20.3 | |
| | 75-84 | 11925 | 30.2 | 3386 | 26.5 | 8539 | 31.9 | |
| | 85-94 | 13678 | 34.6 | 4054 | 31.7 | 9624 | 36.0 | |
| | >95 | 2588 | 6.5 | 954 | 7.5 | 1634 | 6.1 | |
| Race/Ethnicity | | | | | | | | <0.0001 |
| | White, NH | 33116 | 83.7 | 9063 | 70.9 | 24053 | 89.9 | |
| | African-American, NH | 3636 | 9.2 | 2015 | 15.8 | 1621 | 6.1 | |
| | Hispanic | 1693 | 4.3 | 1080 | 8.5 | 613 | 2.3 | |
| | Asian/Pacific Islander | 703 | 1.8 | 454 | 3.6 | 249 | 0.9 | |
| | American Indian/Alaska Native | 208 | 0.5 | 102 | 0.8 | 106 | 0.4 | |
| | Other | 188 | 0.5 | 63 | 0.5 | 125 | 0.5 | |
| Region | | | | | | | | <0.0001 |
| | Northeast | 7466 | 18.9 | 2569 | 20.1 | 4897 | 18.3 | |
| | Midwest | 9941 | 25.1 | 3045 | 23.8 | 6896 | 25.8 | |
| | South | 15667 | 39.6 | 5184 | 40.6 | 10483 | 39.2 | |
| | West | 6470 | 16.4 | 1979 | 15.5 | 4491 | 16.8 | |
| Chronic Conditions | | | | | | | | |
| | ESRD | 1492 | 3.8 | 685 | 5.4 | 807 | 3.0 | <0.0001 |
| | Alzheimer's Disease | 7090 | 17.9 | 3129 | 24.5 | 3961 | 14.8 | <0.0001 |
| *p-value indicates significant differences between dual eligibles and medicare only | | | | | | | | |
| **Age at beginning of reference year (January 1, 2013) | | | | | | | | |

Exclusions

We analyzed data on all beneficiaries who were eligible for Medicare for the entire year 2013 and who died between July 1 and December 31, 2013. Of the 2.6 million people in the five percent Medicare claims data, 1.5% died during these months. We excluded beneficiaries who were missing information for residence, race/ethnicity, age or sex, as well as those who had no utilization in the last year of life, as reported in the cost and use Research Identifiable Files (n=608). Given that even sudden death would be associated with a medical claim, it is assumed that files with no utilization may represent data errors. Finally, we examined only fee-for-service utilization and excluded beneficiaries with Medicare Advantage. Our final sample size was 39,544 beneficiaries.

Statistical Analysis

We used standard statistical analysis procedures to estimate frequencies and proportions for categorical variables. Bivariate analyses were carried out to detect statistical significance between variables using Chi-square. The significance level was defined as p-value <0.05.

References

- ¹ Young, K., Garfield, R., Musumeci, M.B., Clemans-Cope, L., and E. Lawton. *Medicaid's Role for Dual Eligible Beneficiaries*. The Kaiser Family Foundation Program on Medicare Policy, 2013.
- ² Coughlin, T.A., Waidmann, T.A., Phadera, L. Among dual eligibles, identifying the highest-cost individuals could help in crafting more targeted and effective responses. *Health Affairs*, 2012. 10-1377.
- ³ Shugarman, L.R., S.L. Decker, and A. Bercovitz, Demographic and Social Characteristics and Spending at the End of Life. *Journal of pain and symptom management*, 2009. 38(1): p. 15-26.
- ⁴ Bennett, K.B., Robertson, A., Probst, J. *Characteristics, Utilization Patterns, and Expenditures of Rural Dual Eligible Medicare Beneficiaries*. Rural Health Research Gateway, 2014.
- ⁵ U.S. Department of Agriculture, Economic Research Service. *Rural Transportation at a Glance*. Agriculture Information Bulletin Number 795, January 2005.
- ⁶ Wang H, Qiu F, Boilesen E, Nayar P, Lander L, Watkins K, Watanabe-Galloway S. Rural-Urban Differences in Costs of End-of-Life Care for Elderly Cancer Patients in the United States. *Journal of Rural Health*. 2015 Nov 20.
- ⁷ National Hospice and Palliative Care Organization. *Hospice Policy Compendium*. National Hospice and Palliative Care Organization, Alexandria, VA. 2016.
- ⁸ Carlson MD, Bradley EH, Du Q, Morrison RS. Geographic access to hospice in the United States. *Journal of Palliative Medicine*. 2010 Nov;13(11):1331-8.