Rural and Urban Differentials in Medicare Home Health Use

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This article addresses whether the use of Medicare home health services differs systematically for rural and urban beneficiaries. It draws on Medicare data bases from 1983, 1985, and 1987, including the Health Insurance Skeleton Write-Off (HISKEW) files and the Home Health Agency (HHA) 40-percent Bill Skeleton files. It presents background information on rural and urban beneficiaries and contrasts the use rates, visit levels and profiles, episodes of home health use, and primary diagnoses in rural and urban areas. The results point to higher home health use rates in urban areas and to a narrowing of the urban-rural use differential from 1983 to 1987. Rural home health users receive on average three more visits than their urban counterparts, with many more skilled nursing and home health aide visits. However, rural enrollees are much less likely than urban enrollees to receive medical social service or therapeutic visits, even after controlling for primary diagnosis. These findings point to the need for further analysis to understand the consequences of these differences.

INTRODUCTION

There has been growing concern that rural residents are confronted with more limited access to health services than their urban counterparts (Coward and Cutler, 1989). Much publicized rural hospital closings have heightened that concern. Access to home health services may be a particular problem for rural residents because longer travel times may raise service delivery costs above payment levels, and restrict the provision of services in rural areas. With the implementation of the prospective payment system (PPS) for hospital payment, access to post-acute services such as home health and nursing home care has become even more critical for Medicare beneficiaries. This article addresses whether there are systematic differences between rural and urban Medicare beneficiaries in Medicare home health service use.

The Medicare home health benefit covers six different types of visits to Medicare enrollees who meet the eligibility requirements. The visit categories are skilled nursing; home health aide; physical, speech, and occupational therapy; and medical social services. Eligibility requirements include being homebound, being under the care of a physician, and requiring skilled nursing care, speech therapy, or physical therapy services on a part-time or intermittent basis. Under the home health benefit, enrollees are not responsible for making any copayment. Medicare-certified HHAs are paid on the basis of allowable costs up to a ceiling level for each different type of visit.

Medicare home health expenditures have been rising in the last decade, both

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in absolute terms and as a share of overall Medicare outlays. By 1989, Medicare outlays on home health care reached over 2.1 billion dollars (Lazenby and Letsch, 1990). High growth in Medicare home health use has been attributed to legislative changes which permitted greater involvement of proprietary firms, broadened eligibility requirements and service coverage, and to the introduction of the PPS which gave hospitals an incentive to make maximum use of post-acute home health and nursing home care to reduce length of stay (Bishop and Karon, 1988; Leader, 1986; Balinsky and Starkman, 1987; Kenney, 1991a).

Although the home health benefit has been receiving increasing attention in recent years (Swan and Benjamin, 1990; Kenney and Dubay, 1992; Kenney, 1991a; Benjamin, 1986; Bishop and Karon, 1988), very little attention has been given to establishing whether service use differs in rural and urban areas. One previous study examined the availability of home health services in rural and urban areas, and found that rural counties were less likely than urban counties to have HHAs, and that rural agencies tended to be smaller and offer a narrower mix of services than their urban counterparts (Kenney, 1990). This study explores the patterns of home health service use in rural and urban areas in the 1980s, and examines how these patterns have shifted from 1983 to 1987.

Observed levels of service use in rural and urban areas result from the interaction of the supply and demand for services. Demand is likely to depend on the need and ability of enrollees to qualify for home health services and on the availability of substitute services. Supply is likely to depend on the difference between Medicare payment levels and the costs of providing services. Although a full assessment of the underlying determinants of home health use in rural and urban areas is beyond the scope of this article, the following section contains a discussion of potential service needs in rural and urban areas. Supply issues are also identified that may have a bearing on the service utilization patterns that are observed.

Following a brief discussion of the characteristics of rural and urban enrollees, the use rates and visit levels in urban areas are compared with those in rural areas. In subsequent sections, the composition of visits and episodes of home health use are contrasted in rural and urban areas. In the final section, the findings are summarized and policy implications are developed. Background information on rural and urban enrollees has been drawn from the 1987 HISKEW file which contains demographic and enrollment information for all persons eligible for Medicare in the calendar year. This information includes age, race, sex, and place of residence at the midyear point of June 30. The home health use variables have been developed from 1983, 1985, and 1987 HHA 40-percent Bill Skeleton files.

BACKGROUND ON RURAL AND URBAN ENROLLEES

Overall, 27 percent of all Medicare enrollees lived in non-metropolitan areas in 1987. (Residential location in a metropolitan statistical area [MSA] is treated as urban. The terms urban and metropolitan, and rural and non-metropolitan are used

NOTE: Background tables that support the information provided in this section appear in Kenney (1991b).

interchangeably.) Rural Medicare enrollees constitute the majority of the Medicare population in 17 States. These States are concentrated in a few regions of the country. No State in the Middle Atlantic or East North Central region has a rural majority, whereas more than one-half of the States in the West North Central and Mountain regions have Medicare populations that are more than 50-percent rural. More than three-fourths of the enrollees in Vermont, Idaho, Mississippi, Montana, and South Dakota live in rural areas. This picture changes when analyzing the distribution of the rural Medicare population across States. The largest numbers of rural enrollees live in Texas, Missouri, and North Carolina, each with more than 400,000 rural beneficiaries; Texas has the largest rural Medicare population, at more than one-half of a million enrollees. The 10 States with the highest numbers of rural enrollees account for 41 percent of all rural beneficiaries (Kenney, 1991b).

The distribution of the Medicare population by human resource profile code (HRPC) county group is shown in Table 1. This permits an assessment of the variability within urban areas that relates to population size, and of the variability

Table 1

Percent Distribution of Medicare Population, by Human Resource Profile Code (HRPC): 1987

HRPC Code	Percent Distribution
Total	100.00
Metropolitan Counties	
Large Core: Central counties of metropolitan statistical areas (MSAs) with populations of 1 million or more	26.64
Large Fringe: Fringe counties of MSAs with populations of 1 million or more	15.03
Medium: Counties in MSAs with populations of 250,000 to 1 million	21.83
Small: Counties in MSAs with populations of fewer than 250,000	9.17
Non-Metropolitan Counties	
Urban Adjacent: Non-metropolitan counties with an urban population of 20,000 or more, adjacent to an MSA	5.22
Urban Non-Adjacent: Non-metropolitan counties with urban population of 20,000 or more, not adjacent to an MSA	3.62
Less Urban Adjacent: Non-metropolitan counties with an urban population of fewer than 20,000, adjacent to an MSA	7.52
Less Urban Non-Adjacent: Non-metropolitan counties with an urban population of fewer than 20,000, not adjacent to an MSA	7.82
Thinly Populated Adjacent: Completely rural counties, adjacent to an MSA	1.21
Thinly Populated Non-Adjacent: Completely rural counties, not adjacent to an MSA	2.21

NOTE: Metropolitan areas were defined as of 1983, using 1980 census data, and adjacency requires that a rural county share a boundary with an MSA and that at least 2 percent of its employed labor force commute to the MSA.

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the 1987 Health Insurance Skeleton Write-Off files.

within rural areas that reflects the degree of isolation and population density. In the HRPC county classification scheme, counties are classified into nine categories. Metropolitan counties (i.e., in MSAs) are designated by 4 codes, 2 for core and fringe counties in MSAs with 1 million or more population, 1 for counties in medium size MSAs (with populations between 250,000 and 1 million), and 1 for counties in small MSAs (with populations of less than 250,000). Non-metropolitan (or rural) counties are categorized by the size of their urban population and by whether the county is adjacent to a metropolitan area.

Enrollees who live in large MSAs account for more than 40 percent of all Medicare enrollees and 57 percent of those who live in urban areas. The bulk of rural enrollees live in the less urbanized rural counties. Although only 3.42 percent of rural enrollees live in the thinly populated, outlying rural counties, rural enrollees living in these areas numbered more than 1 million in 1987.

Rural enrollees tend to be older than their urban counterparts and are more likely to be male and white. According to data from the 1987 HISKEW files, roughly 10 percent of all Medicare enrollees are under 65 years of age, 50 percent of rural enrollees are between 65-74 years of age, and 40 percent are 75 years of age or over. Among urban enrollees, 10 percent are under 65 years of age, 52 percent are between 65-74 years of age, and 38 percent are 75 years of age or over. Overall, females constitute 56 percent of the rural and 58 percent of the urban enrollees; 89 percent of the rural and 86 percent of the urban enrollees are of the white race. Medicare enrollees in rural areas are more likely to be aged and enrolled through the renal program and less likely to be enrolled as disabled than urban enrollees. According to 1987 data, hospital discharge rates are higher and mean length of stay is lower for enrollees in rural compared with urban areas.

Estimates from 1987 suggest that the non-institutionalized elderly in rural areas experience more functional limitations than their urban counterparts (Leon and Lair, 1990). This could be related to the fact that rural enrollees are older than their urban counterparts. Fully 23 percent of the rural elderly experience at least one activity of daily living (ADL) or instrumental activity of daily living (IADL) limitation, compared with 16.5 percent in the largest MSAs and 19.1 percent in the other MSAs. Almost 14 percent of the rural elderly experienced at least one ADL limitation compared with 9 percent in the largest MSAs, and 11 percent in the other MSAs.

Functional limitations, together with the other underlying factors described here, are likely to influence the need for and use of Medicare home health services. Past studies have shown that females tend to have higher home health use rates than males and, with the exception of the Medicare population under 65 years of age, that the propensity to use services increases with age (Ruther and Helbing, 1988). All other enrollees have a higher likelihood of using home health services than white enrollees, and the aged are more likely to use services than are the disabled (Neu, Harrison, and Heilbrunn, 1989; Ruther and Helbing, 1988). Hospital service use has been shown to be an important determinant of home health use (Kenney and Dubay, 1992; Kenney, 1991a). These studies indicate that areas with higher proportions of enrollees

discharged from hospitals and shorter lengths of stay appear to have higher proportions of beneficiaries using home health services.

Because rural enrollees tend to be older, experience more functional limitations, and have greater likelihood of hospitalization, this should increase their need for home health services over that of their urban counterparts. However, rural enrollees are less likely to be female and non-white than their urban counterparts, which should lower rural use of services. Therefore, there are no a priori expectations regarding whether underlying need for services is higher or lower in rural than in urban areas.

USERS PER ENROLLEE

Estimates of the proportion of beneficiaries who use home health services and the average number of visits received per home health user are presented in the next three tables. The first row in Table 2 contains estimated home health use rates per 1,000 enrollees for 1983 and 1987. These estimates exclude the enrollees who participate in HMO risk plans from the denominator. (For a discussion of this issue, see the Technical Note at the end of this article). Medicare enrollees in urban areas were 13.7 percent more likely to use home health services than those in rural areas in 1987, with an urban use rate of 50.6 per 1,000 enrollees and a rural rate of 44.5. In 1983, the use rate in urban areas was 23 percent higher than that in rural areas—45.7 per 1,000 versus 37.1 per 1,000. The enrollee numbers for 1983 have been projected backwards using the county-level enrollee figures from 1985, 1986, and 1987 and assuming that annual growth rates from 1983 to 1985 were the same as those prevailing from 1985 to 1987. Although the proportion of enrollees using home health services rose from 1983 to 1987 in both rural and urban areas, use rates grew faster in rural areas, bringing the urban and rural levels closer together.

Use rates for 1987 are given in Table 3 for the rural and urban areas of each State. Urban use rates were highest in Mississippi, Missouri, Vermont, Pennsylvania, and Tennessee, whereas the highest rural use rates were found in Mississippi, Tennessee, Connecticut, Pennsylvania, and Vermont. Thus, there appears to be considerable overlap between the States with very high home health use in urban areas and those with high rural rates. The States with the lowest use rates in urban areas also tend to have low rates in rural areas—very low use levels are observed in both the rural and urban

Table 2

Home Health Service Use, by Residential Location: 1983 and 1987

	1983			1987		
Variable	Total	Rural	Urban	Total	Rural	Urban
Home Health Use Rate	43.3	37.1	45.7	48.9	44.5	50.6
Visits per User	24.9	24.5	25.0	23.4	25.8	22.6
Total Charges per User	1,134.9	1,044.8	1,162.0	1,363.0	1,414.3	1,346.0

NOTE: Use rates are calculated as the ratio of home health users per 1,000 Medicare enrollees. For 1983, the use rates are calculated with the inclusion of the health maintenance organization (HMO) members in the denominator. For 1987, the denominator includes only 40 percent of the HMO members because 60 percent of them had risk contracts so that their home health use would not appear in the Home Health Agency 40-percent Bill Skeleton files.

SOURCES: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the 1983 and 1987 Health Insurance Skeleton Write-Off files and the Home Health Agency 40-percent Bill Skeleton files.

Table 3

Home Health Service Use, by State and Residential Location: 1987

State	Home Health Use Rate per 1,000 Enrollees		Average Number of Visits per User	
	Urban	Rural	Urban	Rural
Alabama	55.5	53.6	33.4	36.3
Alaska	32.3	18.7	22.9	17.1
Arizona	23.2	13.3	18.6	17.1
Arkansas	35.1	36.5	27.4	25.5
California	55.6	52.2	18.3	18.7
Colorado	48.7	27.0	23.6	18.1
Connecticut	57.2	77.6	25.5	22.0
Delaware	53.8	45.1	29.7	25.7
District of Columbia	47.6	NA	20.2	NA
Florida	65.6	43.4	25.8	23.0
Georgia	42.1	40.7	31.0	32.6
Hawaii	25.7	33.1	18.3	14.8
Idaho	33.5	37.1	13.5	19.1
Illinois	51.8	42.6	20.6	20.6
Indiana	36.0	33.2	20.1	21.4
Iowa	32.5	22.5	19.7	18.4
Kansas	43.5	20.1	23.5	23.8
Kentucky	36.1	46.6	24.2	29.2
Louisiana	53.4	60.5	31.2	29.5
Maine	35.1	37.7	18.0	21.0
Maryland	52.0	42.7	21.8	19.3
Massachusetts	56.6	43.4	21.9	18.7
Michigan	51.2	42.1	19.9	19.9
Minnesota	28.0	18.1	15.8	15.7
Mississippi	71.3	81.2	41.1	42.6
Missouri	70.7	58.5	23.0	24.1
Montana	35.9	40.7	15.9	29.4
Nebraska	37.3	36.4	19.3	19.5
Nevada	41.1	35.5	25.6	20.5
New Hampshire	45.5	52.0	18.6	17.9
New Jersey	46.3	NA	18.7	NA
New Mexico	47.0	32.2	18.6	16.8
New York	43.4	44.9	18.6	16.7
North Carolina	42.6	47.4	27.8	25.5
North Dakota	34.6	25.8	24.0	19.7
Ohio	42.6	40.0	18.5	17.3
Oklahoma	39.8	41.5	22.7	21.2
Oregon	45.8	41.1	18.0	18.2
Pennsylvania	68.5	73.3	23.9	26.4
Rhode Island	50.9	NA	23.8	NA
South Carolina	43.9	44.6	25.1	24.1
South Dakota	19.1	23.1	16.1	18.4
Tennessee	66.3	81.5	39.8	46.3
Texas	45.9	49.9	25.0	25.0
Utah	42.1	64.9	31.5	39.5
Vermont	69.9	68.6	32.7	23.0
Virginia	42.0	41.4	24.6	25.2
Washington	45.2	45.6	18.9	18.7
West Virginia	38.0	39.4	22.6	21.4
Wisconsin	40.5	31.6	18.3	16.8
Wyoming	38.2	25.6	27.6	17.0

NOTES: The denominator excludes the Medicare enrollees who participate in the health maintenance organization risk plans. Residential location in a metropolitan statistical area is considered urban. NA is not applicable.

SOURCES: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the 1987 Health Insurance Skeleton Write-Off files and the Home Health Agency 40-percent Bill Skeleton files.

areas of South Dakota, Arizona, Alaska, Minnesota, and Iowa.

Use rates are higher in urban areas than in rural areas in 58 percent of the States and lower in the remaining States. In some States, the divergence between the rural and urban use rates is relatively large; in Connecticut and Utah, rural use levels appear to be between 1.3 and 1.5 times as large as those in urban areas, whereas in Kansas, Arizona, Colorado, and Alaska, urban use rates are between 1.7 and 2.1 times as high as those in rural areas. There appears to be a regional pattern to the States with higher use of home health services in rural compared with urban areas. On average, rural enrollees in the East South Central and Middle Atlantic regions were more likely to use Medicare home health services than their urban counterparts. It may be that there is a higher need or greater availability of home health services in the rural areas of these regions compared with the corresponding urban areas.

VISITS AND CHARGES PER USER

In 1987, the average number of visits received per user was higher in rural areas than in urban areas—25.8 versus 22.6—a difference of 3 visits per user on average (Table 2). Overall, the average number of visits received by home health users declined by one and one-half from 1983 to 1987. Many factors were changing during this period that could have been responsible for the decline in the average number of visits received by home health users. First, interpretation of coverage requirements narrowed in 1984, making it more difficult for heavy-care beneficiaries with intensive service needs to qualify for Medicare home health services. Second, an increasing share of claims were denied during the period, perhaps leading to greater conservatism in drawing up treatment plans.

The national trend masks movements in different directions in rural and urban areas. Visits per user increased in rural areas by about 1.3 visits, but decreased by about 2.4 visits in urban areas. Rural home health users received fewer visits than their urban counterparts in 1983; the reverse was true in 1987. Other analysis showed that PPS which was introduced after 1983 led to an increase in the average number of visits received by home health users (Kenney, 1991a). The patterns observed from 1983 to 1987 of large increases in visits per user in rural areas suggest that the PPS may have had stronger effects on home health use in rural areas. Furthermore, during that time period, service capacity grew more in rural than in urban areas, perhaps serving as a catalyst for, or a response to, growth in service demand.

The patterns in visits per user observed in 1987 may not correspond to those that prevail at the present time. Since the period of this analysis, significant changes have been introduced in the home health benefit which seem to be associated with increases in the average number of visits provided per user (Kenney and Moon, 1993). Clarifications to the coverage and eligibility guidelines were implemented in July 1989 as a consequence of the *Duggan vs. Bowen* lawsuit. These changes may have played out differently in rural and urban areas, making it necessary to reassess these patterns.

Table 3 contains the average number of visits per user by State and residential location. Roughly 40 percent of the States have average visits per user levels in ur-

ban areas that exceed those in rural areas. For both rural and urban areas, the highest levels appear to be in Mississippi and Tennessee while the lowest levels appear to be in Idaho, Minnesota, and Montana for urban areas and Minnesota and Hawaii for rural areas.

Total charges per user were also higher in rural than in urban areas in 1987, but were lower in 1983 (Table 2). A large part of this reversal is likely because of increases in the average number of visits in rural areas and concomitant decreases in urban areas. Overall, the total number of visits per enrollee grew by 26.3 percent in rural areas, whereas it stagnated in urban areas. Visits per enrollee increased in rural areas because of increases in both the proportion of enrollees using the home health benefit and the average number of visits per user. The absence of growth in urban areas is a consequence of the offsetting increases in users per 1,000 enrollees and decreases in visits per user.

USE BY COUNTY GROUP

Table 4 gives the use rates and mean visit levels for each HRPC county group. Within metropolitan areas, the use rate patterns for both 1983 and 1987 point to higher use rates in larger metropolitan areas. Use rates appear to be around 25 percent higher in the largest MSAs than in the smallest MSAs. Within rural areas, there appears to be much less variability in use rates, as the use rates were within a narrow band in both 1983 and 1987.

Analysis of the relative availability of home health services in rural and urban areas revealed that fewer than 40 percent of the thinly populated or completely rural counties had a home health agency in 1987 compared with almost 70 percent for all counties in 1987 (Kenney, 1990). With seemingly less access to services, enrollees in these counties might be expected to have low home health use rates. Their use rates, although lower than those observed in all but the smallest metropolitan areas, were comparable with if not somewhat higher than those in other rural areas in 1987. The enrollees in these thinly populated counties may have access to services through agencies in neighboring

Table 4

Home Health Service Use, by Human Resource Profile Code (HRPC): 1983 and 1987

	Users per 1,000 Enrollees		Visits per User	
HRPC	1987	1983	1987	1983
Metropolitan				
Large Core	55.0	49.5	21.5	24.8
Large Fringe	52.4	47.9	21.4	25.0
Medium	47.7	43.0	24.4	25.2
Small	42.6	36.9	24.0	25.0
Non-Metropolitan				
Urban Adjacent	43.8	38.9	22.9	24.1
Urban Non-Adjacent	44.3	38.3	26.1	26.9
Less Urban Adjacent	45.2	36.1	25.8	24.0
Less Urban Non-Adjacent	44.4	36.9	26.9	24.3
Thinly Populated Adjacent	45.7	36.4	27.2	24.6
Thinly Populated Non-Adjacent	44.8	37.3	27.3	24.6

NOTES: Use rates are calculated as the ratio of home health users per 1,000 Medicare enrollees. For 1983, the use rates are calculated with the inclusion of the health maintenance organization (HMO) members in the denominator. For 1987, the denominator includes only 40 percent of the HMO members because 60 percent of them had risk contracts so that their home health use would not appear in the Home Health Agency 40-percent Bill Skeleton files.

SOURCES: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the 1983 and 1987 Health Insurance Skeleton Write-Off files and the Home Health Agency 40-percent Bill Skeleton files.

counties. Also noticeable is that use rates in these thinly populated counties grew more from 1983 to 1987 than those in the urbanized rural counties. This increase in use may be linked to the significant increases during the period in the number of these counties that contain at least one home health agency and the large increases in hospital-based rural agencies (Kenney, 1990).

The average number of visits received per user appears to be lower in the large metropolitan areas than in the small and medium size MSAs. For 1987, as the county becomes more rural, the average number of visits seems to be higher, but no distinct pattern emerged for 1983.

EPISODES OF HOME HEALTH USE

To gain insight about the intensity and duration of the time with which home health users receive services, episodes of home health use were constructed from the 1985 HHA 40-percent Bill Skeleton files. The "from" and "through" dates on the bills were used to approximate service dates. When 2 consecutive home health visits were separated by more than 60 days, the visits were considered to be part of 2 separate episodes of home health use. Episodes are analyzed with respect to their duration, the intensity with which home health users receive visits during the period of service, and the profile of visits that are received.

Table 5 gives the distributions of episode duration and visit intensity for all rural and urban episodes. (Subsequent analysis gives separate consideration to fully completed episodes and to those that could have continued after or begun before 1985). Duration is defined as the number of weeks during which visits were provided during the course of an episode, and intensity as the average number of visits received per week.

Rural episodes of care appear to be consistently longer in duration than urban episodes. One-fourth of all urban episodes last less than 3 weeks, while one-half last 6.3 weeks or more; in rural areas, one-fourth of the episodes last less than 3.6 weeks, while one-half last 8 weeks or more. At the same time, urban episodes tend to be more visit-intensive, with the least intensive one-fourth of the urban episodes involving 1.3 visits or fewer and the most intensive involving 3.9 visits or more, compared with fewer than 1 visit per week among the least intensive rural episodes and more than 3.2 for the most intensive rural episodes.

Although the reason for these patterns cannot be determined from this data, several explanations are possible. First, it may be that home health use in urban areas is more likely to be linked to an acute hospital stay so that it involves a large number of visits provided in a short period of time during recovery from an acute epi-

Table 5

Length and Visit Intensity of Home Health Episodes, by Residential Location: 1985

	Duration of Episode in Weeks		*Average Number of Visits per Week*	
Quartile	Rural	Urban	Rural	Urban
Lowest	<3.6	<3	<1	<1.3
Next to Lowest	3.6-8.0	3.0-6.3	1.0-1.9	1.3-2.3
Next to Highest	8.0-18.71	6.3-13.4	1.9-3.2	2.3-3.9
Highest	>18.71	>13.4	>3.2	>3.9

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the 1985 Home Health Agency 40-percent Bill Skeleton Files.

sode of care. The observed pattern could also reflect the fact that a higher proportion of the non-institutionalized rural elderly have functional limitations so that when rural beneficiaries qualify for Medicare home health services, they tend to need them over a longer period of time (Leon and Lair, 1990). Another explanation is that longer travel times in rural areas may result in the provision of fewer visits per week to rural clients, stretching treatment plans over more weeks.

Episodes were then divided into two categories: The first category, "completed" episodes, contains the fully completed episodes that began after March 1, 1985 and ended before November 1, 1985; the second category, "ongoing" episodes, contains episodes that could have continued into 1986 or begun before 1985. Table 6 shows the means and medians for the visit intensity and duration of completed and ongoing episodes in rural and urban areas.

Not surprisingly, the ongoing episodes are of a much longer duration than the completed ones in both rural and urban areas. They are also marked by lower visit intensity. For all combinations, the mean value exceeds the median which signifies that the underlying distributions are skewed to the right with a small percentage of episodes involving either very high visits per week, long durations, or both. The patterns previously presented are echoed here; controlling for whether an episode is completed or ongoing, rural episodes tend to last longer and entail fewer visits per week compared with urban episodes. Perhaps because they tend to be shorter, 53 percent of urban episodes were completed compared with 46 percent of the rural episodes.

Table 6

Completed and Ongoing Home Health Episodes, by Residential Location: 1985

	Rural Episodes		Urban Episodes	
Visit Intensity and Length	Completed	Ongoing	Completed	Ongoing
Visits per Week				
Median	1.88	1.30	2.24	1.59
Mean	2.33	1.75	2.76	2.03
Duration in Weeks				
Median	5.71	12.71	5.00	8.29
Mean	7.85	19.88	6.96	16.33

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the 1985 Home Health Agency 40-percent Bill Skeleton files.

Table 7

Profile of Completed Episodes, by Residential Location: 1985

	Rural			Urban		
Type of Visit	Mean	Standard Deviation	Percent with Visit	Mean	Standard Deviation	Percent with Visit
Total Visits	18.38	—	—	19.18	—	—
Skilled Nursing	10.37	12.19	94.0	9.52	12.43	91.0
Home Health Aide	5.54	13.17	36.8	5.46	11.63	39.3
Physical Therapy	1.96	5.85	21.0	3.18	7.45	33.0
Occupational Therapy	0.17	1.74	2.4	0.45	2.63	6.5
Speech Therapy	0.21	2.36	1.8	0.27	2.64	2.4
Medical Social Services	0.13	0.77	5.6	0.30	1.02	14.4

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the 1985 Home Health Agency 40-percent Bill Skeleton files.

The composition of visits received during an episode differs for rural and urban episodes of home health. Table 7 gives the values for the mean and standard deviation for each visit type and the proportion of episodes that include that type of visit. Completed rural episodes contain more skilled nursing and home health aide visits on average, but fewer physical, speech, and occupational therapy and medical social service visits than urban episodes. The coefficients of variation (i.e., the standard deviation divided by the mean) appear to be greater for rural episodes than for urban areas in each visit category. Also striking is the urban-rural differential in the proportion of episodes that contain a medical social service, physical, speech, or occupational therapy visit. Urban episodes are 2½ times as likely to include a medical social service or occupational therapy visit and 1½ times as likely to include a speech or physical therapy visit compared with rural episodes.

Almost 50 percent of rural episodes are comprised of skilled nursing visits alone and 75 percent are comprised solely of skilled nursing and home health aide visits. Among urban episodes, 39 percent include only skilled nursing visits and 57 percent include only skilled nursing or home health aide visits. Thus, urban episodes are characterized by a greater diversity of visits and are much more likely to include visits that involve medical social service or some type of therapy.

COMPOSITION OF VISITS

This section examines the composition of visits received by all home health users in rural and urban areas in 1987. Table 8 gives the mean level for each of the six visit categories. Rural beneficiaries receive 1.9 more skilled nursing visits per year and 2.7 more home health aide visits, and 1.4 fewer medical social service, physical, occupational, or speech therapy visits on average than do urban beneficiaries. It is possible that the greater abundance of home health aide visits in rural areas reflects the apparent higher functional impairment levels among the rural elderly population, and that skilled nursing visits may be substituting for the therapeutic and medical social services in rural areas.

Of the visits received in rural areas, 90 percent were skilled nursing or home health aide visits, whereas only 82 percent of those provided in urban areas were in those 2 categories. The mean number of occupational therapy and medical social service visits received by rural beneficiaries was less than 50 percent

Table 8

Mean Number of Visits Provided, by Residential Location: 1987

Type of Visit	Mean		Rural Mean Divided by Urban Mean
	Rural	Urban	
Total Visits	25.8	22.6	1.14
Skilled Nursing	13.39	11.49	1.17
Home Health Aide	9.83	7.12	1.38
Physical Therapy	2.02	2.93	0.69
Occupational Therapy	0.16	0.42	0.38
Speech Therapy	0.26	0.32	0.81
Medical Social Services	0.13	0.28	0.46

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the 1987 Home Health Agency 40-percent Bill Skeleton files.

that received in urban areas. For speech and physical therapy visits, the mean in rural areas was from 70 to 80 percent as large as the mean in urban areas.

The reasons for the more limited scope of services available in rural areas are discussed in more detail in the concluding section. Other analysis has shown that rural agencies are much less likely than urban agencies to make available medical social services and physical, speech, and occupational therapy services (Kenny, 1990). Another possible explanation for the higher urban use of auxiliary services is that urban home health users have different service needs than their rural counterparts. Cheh, Williams, and Goldberg (1989) found that hip and bone fracture cases were more likely to receive physical therapy visits, and that malignant neoplasm cases were more likely to entail medical social service visits. The next section examines the extent to which the rural-urban visit patterns reflects differences in rural and urban areas in the diagnostic patterns of home health users.

PRIMARY DIAGNOSES AND SERVICE USE

Table 9 gives the top 13 primary diagnosis categories for home health users in rural and urban areas. Together, these 13 groups account for 63 percent of all home health users. Malignant neoplasms constitute the single most important diagnosis, encompassing 10.08 percent and 10.81 percent of home health users in rural and urban areas respectively. The next two largest categories are cerebrovascular diseases and diabetes mellitus in rural areas, and bone and hip fractures and cerebrovascular diseases in urban areas.

Urban home health users are 26 percent more likely to be hip or bone fracture cases relative to their rural counterparts. The lower prevalence of hip and bone fracture cases among rural home health users could be a result of lower availability of therapeutic services in rural areas which leads to nursing home entry for these rural patients. Rural users are 35 percent more likely than their urban counterparts to have a primary diagnosis of diabetes mellitus or hypertension.

Table 9

Percent Distribution of Home Health Users, by Diagnosis and Residential Location: 1987

Diagnosis	Overall	Rural	Urban
		Percent	
Total	100.00	100.00	100.00
Malignant Neoplasm	10.62	10.08	10.81
Cerebrovascular Diseases	7.95	8.12	7.89
Diabetes Mellitus	6.14	7.61	5.67
Bone and Hip Fractures	8.11	6.81	8.57
Digestive System Diseases	5.52	5.08	5.61
Ischemic Heart Disease	5.36	4.83	5.55
Arthropathies	4.80	4.47	4.92
Heart Disease	3.35	3.63	3.25
Hypertension	2.92	3.60	2.68
Chronic Obstructive Pulmonary Disease	3.20	3.07	3.25
Chronic Ulcers of Skin	2.70	2.92	2.62
Incontinence	1.48	1.65	1.41
Urinary Tract Infections	1.25	1.51	1.16
Other	36.59	36.62	36.59

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the 1987 Home Health Agency 40-percent Bill Skeleton files.

Table 10

Average Number of Visits Received and the Percent of Users Receiving Services, by Type of Service and Location for Selected Diagnoses: 1987

Diagnosis	Total Mean	Skilled Nursing		Home Health Aide		Physical Therapy		Speech Therapy		Occupational Therapy		Medical Social Services	
		Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent	Mean	Percent
Malignant Neoplasms													
Urban	18.39	11.40	99.0	5.68	44.0	0.72	11.0	0.11	1.0	0.11	2.0	0.38	19.0
Rural	20.10	12.42	99.0	6.91	43.0	0.47	7.0	0.09	0.9	0.03	0.8	0.17	8.0
Bone and Hip Fracture													
Urban	20.29	5.21	61.0	6.00	44.0	8.36	85.0	0.05	0.5	0.45	9.0	0.20	11.0
Rural	21.07	6.63	69.0	7.26	44.0	6.89	70.0	0.04	0.5	0.13	3.0	0.07	4.0
Cerebrovascular Diseases													
Urban	29.44	8.81	82.0	8.37	42.0	6.68	64.0	2.74	21.0	2.52	28.0	0.31	16.0
Rural	32.23	10.81	85.0	11.87	45.0	6.00	51.0	2.10	15.0	1.20	12.0	0.21	6.0
Diabetes Mellitus													
Urban	22.69	15.15	99.0	5.71	26.0	1.30	15.0	0.10	0.9	0.17	3.0	0.25	13.0
Rural	26.63	16.43	99.0	8.98	28.9	0.94	9.0	0.08	0.6	0.07	1.0	0.11	5.0
Hypertension													
Urban	20.26	11.81	99.0	6.32	35.0	1.47	17.0	0.15	1.0	0.19	3.0	0.31	16.0
Rural	23.34	13.27	99.0	8.86	35.0	0.98	10.0	0.06	0.7	0.07	1.0	0.09	5.0

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the 1987 Home Health Agency 40-percent Bill Skeleton files.

The profiles of the services received by rural and urban beneficiaries with selected diagnoses are presented in Table 10. Even controlling for primary diagnosis, urban home health users are much more likely than rural users to receive therapeutic and medical social services. Urban hip and bone fracture and cerebrovascular cases are 1.25 times as likely to entail a physical therapy visit, 2 to 3 times as likely to entail an occupational therapy visit, and 2.6 times as likely to entail medical social services as rural cases. Urban home health users with malignant neoplasms are 2 times as likely and those with hypertension are 3 times as likely to receive a medical social service visit as their rural counterparts.

For these selected diagnoses, the urban-rural differential in home health aide visits seems to track fairly closely with the differential in the total number of visits received on average. It also appears that the lower use of therapeutic and medical social service visits in rural areas is counterbalanced by higher skilled nursing visit levels.

This analysis shows that differences in the primary diagnosis of urban and rural beneficiaries cannot explain the lower use of therapeutic and medical social services in rural areas. It is not clear whether these visit profiles reflect a variability between urban and rural areas in the need for these services within a diagnosis category, whether they are being provided through skilled nursing visits in rural areas, or whether rural home health users have an unmet need for these services. Furthermore, to the extent that these services are provided through skilled nursing visits, it is not known whether the service quality is comparable with that provided by trained therapists or social workers.

CONCLUSIONS

This descriptive analysis has shown that the use of home health services differs significantly between rural and urban areas. The major findings are that:

- Urban home health use rates were 13.7 percent higher than rural levels in 1987.
- The gap between urban and rural use rates narrowed from 1983 to 1987.
- Home health use rates grew more from 1983 to 1987 in the thinly populated, outlying rural areas than in the urbanized rural areas.
- In 1987, rural home health users received three more visits on average than did urban users.
- The average number of visits received per user increased slightly in rural areas from 1983 to 1987, but decreased by more than 9 percent in urban areas.
- Rural home health users received 1.9 more skilled nursing visits, 2.7 more home health aide visits, and 1.4 fewer therapeutic or medical social service visits on average than did their urban counterparts in 1987.
- Rural episodes of home health use are consistently longer in duration but less visit-intensive than are urban episodes.
- Urban home health users are more likely to have a primary diagnosis of hip and bone fracture and less likely to be diabetes or hypertension cases than rural users.
- After controlling for primary diagnosis, urban home health users are still much more likely to receive therapeutic or medical social services than rural home health users.

This analysis leaves many unanswered questions. First, what lies behind the lower levels of home health use in rural areas? Does the rural-urban differential sig-

nify an access problem for rural Medicare beneficiaries? Or, instead, does it reflect greater availability of substitute services, such as nursing home care, or lower service need in rural areas? Analysis by Kenney (1993) shows that the gap between rural and urban use rates holds up even after controls for the availability of substitute services, such as nursing home care, and other factors have been introduced. Furthermore, it appears that urban and rural differences in home health supply factors can account for the majority of the gap in use. More attention should be given to understanding the implications of the lower rural use rates and to examining whether they persist to the present time period.

Second, what are the reasons for the very different visit patterns that prevail for home health users in rural and urban areas? How have these patterns changed since the coverage guidelines were changed in 1989? What explains the greater use of home health aide services among rural users? Is it related to greater functional impairment levels among the rural elderly? Instead, is it a consequence of differential access to caregivers in rural and urban areas? Recent analysis of the 1982 data indicates that living arrangement patterns do vary across residential location for the disabled elderly (Sangl, 1990). The proportion living alone is the same in both areas, but the rural elderly were much more likely to live with a spouse than to live with children or others. More analysis is needed to examine the interrelationships among caregiver arrangements, functional impairment, and home health aide use.

Third, what explains the lower use of therapeutic and medical social services among rural enrollees? Detailed analysis of the services provided to post-acute diabetes and hip fracture home health users found consistently lower provision of physical therapy services to rural compared with urban clients (Cheh, Phillips, and Buckley, 1990). Does this reflect different levels of service need or different access to these auxiliary services? Differences between rural and urban users in primary diagnoses cannot explain the very different patterns of service use. However, even within a diagnosis group, it is not known whether rural home health users are less likely than urban users to need physical, speech, or occupational therapy, or medical social services, or whether they and other rural beneficiaries have an unmet need for these services. Recent evidence suggests that cost considerations may pose a deterrent to the provision of a full range of services at small rural agencies. Bishop and Kenney (1992) show that fixed costs are substantially lower for rural agencies that offer only skilled nursing and home health aide services compared with those that also provide therapeutic and medical social services. In addition, more understanding is needed of the underlying staffing configuration in rural and urban areas. Is it difficult for rural agencies to recruit and retain specialists in these areas or are their caseloads too small to support them? These issues deserve attention in future research.

TECHNICAL NOTE

Effect of HMO Enrollees on Use Rates

One major issue that was encountered when calculating home health use rates was whether to include health maintenance organization (HMO) enrollees in

the denominator. Medicare HMO enrollees can participate in one of three different types of HMO or HMO-like arrangements: cost plans, risk plans, and health care prepayment plans (HCPPs). Medicare enrollee participation in HMOs increased dramatically during the 1980s and risk plans, which were almost non-existent before 1985, became important in certain areas. By 1987, enrollment in risk plans constituted approximately 60 percent of all Medicare enrollment in HMO or HMO-like arrangements.

The decision regarding how to incorporate the HMO enrollees in the denominator hinges on how the Medicare home health service use by Medicare HMO enrollees is billed. If the home health use of a Medicare HMO or HCPP enrollee were processed through the fiscal intermediaries, it would appear in the HHA 40-percent Bill Skeleton files. Given that their use is being captured in the numerator, the denominator should also then include those enrollees. According to an official at the Health Care Financing Administration, very little of the home health use of the risk-HMO enrollees should appear in the Medicare HHA 40-percent Bill Skeleton files, although use by those in cost and HCPP plans would appear in the Bill Skeleton files (Hogan, 1991).

Given that risk plans played a very small role in 1983, all of the home health use on the part of HMO enrollees in 1983 should show up in the HHA 40-percent Bill Skeleton files. Therefore, the use rates that are presented in the text for 1983 include all Medicare enrollees in the denominator. For 1987, use rates are based on a denominator that excludes the Medicare enrollees in risk plans. The number of Medicare enrollees in risk plans is estimated using information on the total number of enrollees in HMOs or HMO-like arrangements in the county and the State-level proportion of HMO enrollees who are in risk plans.

The inclusion or exclusion of HMO enrollees has had disproportionate effects on the estimated use rates for urban areas, especially in 1987. Table 11 shows the urban and rural use rates for 1983 and 1987 under alternative ways of treating the HMO enrollees. The estimates in the first row contain all Medicare enrollees in the denominator, and those in the second row correspond to the rates reported in the article that exclude the 60 percent of the HMO enrollees who are in risk plans. By including all Medicare enrollees in the use-rate calculation for 1987, urban use rates appear to be underestimated by 4.37 percent and rural use rates appear to be underestimated by only 1.38 percent. In 1983, inclusion or exclusion of the HMO enrollees from the denominator did not have a striking effect on use rates be-

Table 11

Alternate Home Health Use Rate Calculations, by Residential Location: 1983 and 1987

	1983		1987	
Home Health Use Rate Denominator	Rural	Urban	Rural	Urban
All Enrollees	[1]37.1	[1]45.7	43.6	48.0
Excludes HMO Enrollees in Risk Plans	—	—	[1]44.2	[1]50.1

[1]These correspond to the estimates presented in the text.

NOTE: HMO is health maintenance organization.

SOURCES: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the 1983 and 1987 Health Insurance Skeleton Write-Off files and the Home Health Agency 40-percent Bill Skeleton files.

Table 12

Alternate Use Rate Estimates, by Residential Location and State: 1987

State	Urban		Rural	
	Rate 1	Rate 2	Rate 1	Rate 2
Mississippi	70.9	71.1	80.7	81.0
Missouri	68.9	70.3	58.1	58.4
Vermont	68.7	69.0	67.1	67.5
Pennsylvania	67.3	68.3	72.3	73.2
Tennessee	65.1	66.0	80.6	81.3
Florida	58.6	65.3	42.4	43.0
Connecticut	55.5	57.0	76.7	77.2
Alabama	55.0	55.3	53.3	53.5
Delaware	53.6	53.8	44.9	45.1
Louisiana	52.9	53.0	60.1	60.3
Massachusetts	51.5	55.6	41.6	42.7
Maryland	51.3	51.8	42.0	42.2
California	50.6	54.3	50.5	51.3
Illinois	49.4	51.5	41.8	42.5
Rhode Island	48.6	49.7	NA	NA
Michigan	48.3	50.8	41.4	42.0
District of Columbia	46.9	47.2	NA	NA
Texas	45.3	45.7	49.6	49.8
New Jersey	45.3	46.1	NA	NA
New Hampshire	44.5	44.9	51.1	51.3
Colorado	44.2	48.0	24.9	26.8
South Carolina	43.4	43.7	44.3	44.5
New York	42.1	42.8	44.4	44.6
North Carolina	42.1	42.3	47.1	47.3
Ohio	42.0	42.3	39.2	39.5
Georgia	41.8	42.0	40.4	40.5
Utah	41.7	41.9	64.1	64.4
Virginia	41.6	41.7	40.9	41.1
Washington	40.6	44.6	43.5	44.9
Wisconsin	40.0	40.4	31.2	31.5
Kansas	39.8	42.9	19.4	20.0
New Mexico	39.5	46.6	30.8	32.1
Oklahoma	38.7	39.7	40.9	41.2
Oregon	38.2	45.2	39.8	40.5
West Virginia	37.7	37.9	38.9	39.0
Wyoming	37.7	37.9	25.2	25.3
Kentucky	35.7	35.8	46.2	46.4
Montana	35.6	35.8	40.4	40.6
Nebraska	35.2	36.9	36.1	36.3
Arkansas	34.8	35.0	36.2	36.4
Indiana	34.6	35.7	32.3	32.9
Maine	34.5	34.6	36.9	37.0
Nevada	34.3	40.1	31.5	34.6
North Dakota	34.2	34.5	25.5	25.7
Idaho	33.1	33.2	36.2	36.3
Iowa	31.6	32.2	22.2	22.3
Alaska	31.2	31.3	18.2	18.3
Minnesota	20.4	27.6	16.2	17.9
Hawaii	20.3	25.5	25.8	32.6
Arizona	18.9	19.4	10.6	10.7
South Dakota	18.8	18.8	23.0	23.1

NOTES: Rate 1 includes Medicare health maintenance organization (HMO) enrollees in the denominator. Rate 2 excludes the HMO enrollees risk contracts from the denominator. Residential location in a metropolitan statistical area is considered urban. NA is not available.

SOURCE: Health Care Financing Administration, Bureau of Data Management and Strategy: Data from the 1987 Home Health Agency 40-percent Bill Skeleton files.

cause HMO enrollees constituted such a small share of all Medicare enrollees in that year.

Table 12 contains the two State-level use-rate estimates for rural and urban areas that are calculated with and without the HMO-risk enrollees in the denominator. Use rates in the urban areas of Hawaii, Minnesota, Nevada, New Mexico, and Oregon are most sensitive to how the HMO enrollees are treated. By including all of the HMO enrollees in the denominator, home health use rates in urban Minnesota and Hawaii would be underestimated by 35.3 and 25.6 percent respectively, whereas use rates in urban Nevada, New Mexico, and Oregon would be underestimated by approximately 17 percent. Of rural areas, only Hawaii appears to be affected by how HMO enrollees are treated. The use rate in rural Hawaii would be underestimated by 26 percent if all HMO enrollees are included in the denominator.

This analysis has demonstrated that comparisons across areas and over time will be affected by how home health use rates are calculated and, in particular, by which Medicare enrollee counts are used. By ignoring the fact that the Medicare home health use of enrollees in HMO risk plans would not appear in the HHA 40-percent Bill Skeleton files, a distorted picture can emerge.

First, since urban rates are more affected than rural rates, the gap between the rural and urban use rates appears to be smaller than it actually is. When all enrollees are included in the denominator, the urban use rate is 10.09 percent higher than the rural rate; but when the HMO risk enrollees are excluded from the denominator, the difference grows to 13.35 percent.

Second, because HMO risk enrollees played such a larger role in 1987 than in 1983, growth in the proportion of enrollees using home health services is underestimated when all enrollees are included in the denominator. This is especially true in urban areas where use rates appeared to grow by only 5 percent from 1983 to 1987 based on rates that include all enrollees, compared with an estimated growth rate of 9.6 percent based on rates that exclude the HMO risk enrollees from the denominator.

Third, the degree of underestimation is not uniform across States because of large across-State variation in the proportion of Medicare enrollees who are in risk plans. Although many States have relatively low enrollment in risk plans, States such as Minnesota and Hawaii, with high enrollment, have use rates that are severely underestimated. Therefore, making meaningful comparisons of home health use rates in different locations and States and over time will require an adjustment for enrollee participation in HMO risk plans.

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