Emergency Department Use by the Rural Elderly

by
Denise M. Lishner, M.S.W.
Roger A. Rosenblatt, M.D., M.P.H.
Laura-Mae Baldwin, M.D., M.P.H.
L. Gary Hart, Ph.D.

RURAL HEALTH RESEARCH CENTER

University of Washington
School of Medicine
Department of Family Medicine
ABOUT THE CENTER

The WWAMI Rural Health Research Center (RHRC) is one of five centers supported by the Federal Office of Rural Health Policy, a component of the Health Resources and Services Administration of the Public Health Service. The major focus of the WWAMI RHRC is to perform policy-oriented research on issues related to rural health care. Specific interests of the Center include investigations into trends in health personnel in rural America, investigation of the changing patterns of obstetric and neonatal care in rural areas, and the impact of the restructuring of health care on rural provider availability, clinical performance, and outcomes.

The WWAMI Rural Health Research Center is based in the Department of Family Medicine at the University of Washington School of Medicine, and has close working relationships with the Programs for Healthy Communities (PHC) and the other health science schools at the University, as well as with other major universities in the five WWAMI states: Washington, Wyoming, Alaska, Montana, and Idaho. The University of Washington has over 25 years of experience as part of a decentralized educational research and service consortium involving the WWAMI states, and the activities of the Rural Health Research Center are particularly focused on the needs and challenges in these states. The WWAMI RHRC also works closely with the associated Area Health Education Centers.

The Rural Health Working Paper Series is a means of distributing pre-publication articles and other working papers to colleagues in the field. Your comments on these papers are welcome, and should be addressed directly to the authors. Questions about the WWAMI Rural Health Research Center should be addressed to:

L. Gary Hart, PhD, Principal Investigator and Director
Roger A. Rosenblatt, MD, MPH, Co-Principal Investigator
Denise Lishner, MSW, Associate Director/Editor
WWAMI Rural Health Research Center
Department of Family Medicine
School of Medicine
University of Washington
Box 354696
Seattle, WA 98195-4696
E-mail: wamirhrc@fammed.washington.edu
WWW: http://www.fammed.washington.edu/wamirhrc/

The WWAMI Rural Health Research Center is supported by the Federal Office of Rural Health Policy Health Resources and Services Administration, Public Health Service (grant #CSURC0001-03, $504,678, 100%).

ABOUT THE AUTHORS

Denise M. Lishner, MSW, is Associate Director for Administration at the WWAMI Rural Health Research Center, University of Washington School of Medicine.

Roger A. Rosenblatt, MD, MPH, is a Professor and the Vice Chair in the Department of Family Medicine, University of Washington School of Medicine.

Laura-Mae Baldwin, MD, MPH, is an Associate Professor in the Department of Family Medicine, University of Washington School of Medicine.

L. Gary Hart, PhD, is Director of the WWAMI Rural Health Research Center and Professor in the Department of Family Medicine, University of Washington School of Medicine.
Emergency Department Use by the Rural Elderly

Denise M. Lishner, M.S.W.
Roger A. Rosenblatt, M.D., M.P.H.
Laura-Mae Baldwin, M.D., M.P.H.
L. Gary Hart, Ph.D.

November 1998
Abstract

**Background:** The rural elderly represent a sicker and potentially more vulnerable component of the rural population. Because of the shortage of providers and hospitals in rural areas, it is possible that this segment of the population has a different pattern of emergency department (ED) utilization than the urban elderly. This study uses Medicare encounter data to compare the rate of ED use in rural and urban areas of Washington State and explores the diagnoses and severity of the conditions that cause the rural elderly to use emergency departments.

**Methods:** The Health Care Financing Administration's National Claims File was used to identify all services provided to Medicare beneficiaries in Washington State in 1994. Patients were assigned to one of three mutually exclusive groups on the basis of the county of their usual residence: urban, adjacent rural, or remote rural. Emergency department visits were identified using the place-of-service codes in these files, and the diagnostic codes associated with these visits were analyzed. The potential severity of these visits was determined using a method developed by Selby and extended for use in this elderly population. The specialty of the physicians providing emergency department services came from the American Board of Medical Specialties, the American Medical Association, and HCFA's own physician identification system.

**Results:** The rural elderly living in counties remote from urban areas are about 13 percent less likely to visit the emergency department than their urban counterparts, a difference that persists even after controlling for potentially confounding variables. The causes of emergency department use by the elderly do not vary meaningfully by location; cardiovascular disease, cerebrovascular disease, and respiratory problems represent the most frequent diagnoses encountered. Most emergency department visits by this group are for conditions that seem appropriate for this setting.

**Conclusions:** Although elderly people living in remote rural counties use emergency department facilities slightly less than their counterparts living either in or closer to cities, the differences are not great. Given the similarity of the diagnostic conditions that cause emergency department use, and the relative infrequency of inappropriate use, it seems reasonable to conclude that rural emergency departments play a similar role in the health care system as urban emergency departments. It is therefore important that rural hospitals and health care providers anticipate the same spectrum of disease and have the capacity to provide care for elderly patients with a wide variety of problems. The penetration of emergency room physicians into rural emergency departments suggests that emergency departments are becoming more standardized and homogenous with time.
Background and Relevant Literature

Rural residents often have limited access to local health care providers and hospitals, which may affect their use of essential health services. This is exacerbated for the elderly, whose illnesses inevitably become more frequent and severe and for whom travel to distant hospitals and facilities is a serious burden. Previous research has consistently demonstrated lower use of ambulatory care services for rural compared to urban elderly, largely as a result of access and supply problems (Centers for Disease Control and Prevention, 1993; Dor & Holahan, 1990; Himes & Rutrough, 1994; Offner et al., 1992; Piette & Moos, 1996). However, few studies have examined whether this same pattern applies for emergency care.

One-quarter of Americans who reside in rural areas experience unique barriers in obtaining emergency care (Rutledge et al., 1992). The closure of many rural hospitals in recent years has diminished local access to hospital care and emergency departments (EDs) (U.S. Congress, 1989). Despite the fact that the need for emergent care is similar across urban and rural areas, the level of emergency services is not equally available due to the low volume of emergent events in rural towns, difficulties in maintaining technically intensive emergency departments, and the lack of specialized training among generalists needed to manage some types of emergent patients.

The elderly comprise an increasing proportion of emergency department users due to growth of the aging population, and the higher rates of illnesses and poorer general health status of the elderly (McCusker et al., 1997). Overall, studies have shown that the elderly are more likely to arrive at the ED with life-threatening or urgent medical problems, are more likely to require tests and high-technology intervention, and are more frequently hospitalized and have longer ED stays than nonelderly patients (Campbell et al., 1998; Hamdy et al., 1997). However, few such studies have examined use of the ED by the rural elderly (Hamdy et al., 1997; Morrisey et al., 1995). Thus there is little knowledge about the reasons for and nature of ED visits by elderly rural residents, the appropriateness of use, and how this use compares to that of the urban elderly.

The emergency department provides a key component of rural health care, yet there is scant literature describing the nature of emergency care provided by rural hospitals (Bross et al., 1991; Morrisey et al., 1996). Bross and colleagues (1991) found that users of rural EDs in Mississippi had diagnoses similar to those in urban EDs. Rural EDs were busiest when physicians' offices were closed. Hamdy and colleagues (1997) reviewed records of patients seeking care in the EDs of three rural hospitals in Tennessee. The most common reasons for ED visits by elderly individuals in this study were falls/injuries (18.7%), cardiac illness (18.1%), infection
(15.5%), and arteriosclerosis/heart disease (10.8%). Their results suggested lower use of ED services by elderly rural residents than would be expected given their number in the general population. The authors suggest that greater use of the ED by rural elderly patients during the weekend may reflect the lack of available primary care providers during that time.

While studies indicate that the elderly are less likely than some other groups to use the ED when other sources of care would better address their needs (Buesching et al., 1985; Campbell et al., 1998), it is not known whether barriers to health care services in rural areas result in inappropriate use of the ED by the rural elderly. Concerns have been raised about the appropriateness of use of the ED in light of the growing number of elderly and their tendency to utilize health services with greater frequency than younger patients (Hamdy et al., 1997), as well as the rapidly increasing costs of health care (Ettenger et al., 1987; Young et al., 1996). It could be argued that the elderly living in small isolated towns may be more likely than the urban elderly to use the ED inappropriately for nonemergent conditions, since there are fewer primary care physicians available in their local area and few options when sickness occurs in the evenings or on weekends. On the other hand, those residing in remote rural areas may only use emergency department facilities for extremely urgent conditions since travel to a distant facility would be required and might be put off for less serious medical problems.

Few studies differentiate patterns of emergency department use among rural residents by a town's degree of geographic isolation from a larger rural or urban area (Dansky et al., 1998). In a comparison of ambulatory visits made by rural versus urban Medicare beneficiaries in Washington State, Hart and colleagues (in press) showed that visit patterns varied by the degree of rurality, with those residing in small remote locations having fewer provider visits and fewer visits to specialists than those in larger rural towns or those adjacent to cities. When they used services, the elderly living in small remote places were more likely to travel to larger rural centers for specialty care while their visits to generalists took place largely in their local area. This suggests that ED utilization patterns may also differ substantially within rural areas depending on local characteristics. It is not clear whether the elderly in rural places far from cities or neighboring towns have adequate access to ED services and whether their use of such services is appropriate when compared to use patterns in those other locations.

This study examines the hypothesis that patterns of emergency department use vary by degree of rurality and distance from an urban center, with residents of remote rural areas having fewer ED visits than those in cities or in towns that are contiguous to cities. We further hypothesize that since remote rural elderly
residents must travel further to obtain emergency services, their ED visits would be for more emergent reasons.

Methods

This paper describes the emergency department utilization patterns of Washington State residents aged 65 and over who were Medicare beneficiaries in 1994 and did not belong to a capitated health plan. Data for this study come from the Health Care Financing Administration's (HCFA) National Claims History File, an administrative data set that contains diagnostic, therapeutic, and fiscal information about services provided to Medicare Part B beneficiaries that were submitted to Medicare for payment. This is supplemented by information in the Medicare Beneficiary or Denominator file, which contains demographic information about patients enrolled in Medicare, and the Unique Provider Identification Number Directory, which allowed linkage to the American Board of Medical Specialties (ABMS) database and American Medical Association (AMA) Masterfile, both of which contain specialty information about the physicians who provided services to Medicare patients.

Encounters and Diagnoses

The 1994 Medicare Part B file for Washington State includes over 15 million line items, each representing a discrete billable service provided to a Medicare beneficiary. A physician encounter is defined as all the line items provided on an outpatient basis to an individual patient by a single physician on a given date. Emergency department visits are defined using the specific place-of-service code for visits that occurred in that setting. Each physician encounter includes at least one line item with a valid ICD-9-CM code. When there were multiple line items per face-to-face encounter, we selected an index diagnosis from the line item containing the evaluation and management code. When this code was not available we selected the index diagnosis from the line item that had the highest charge.

Determining Physician Specialty

To assign a specialty to each physician in the study, we relied on three different sources: ABMS certifications, the primary self-designated specialty contained in the AMA Masterfile, and the specialty recorded by HCFA. Wherever possible we determined specialty by using the ABMS certification. We assigned the
AMA specialty in cases where a physician had certificates in multiple conflicting specialties or no certificates. We assigned the HCFA specialty when the AMA and ABMS specialties were missing. For purposes of this analysis, we grouped physicians as emergency room physicians, family physicians, general internists, general practitioners, and “other” specialties. We also determined whether or not each patient had a single doctor whom that patient saw for the majority of his or her outpatient visits during the year, and identified that as the patient’s principal care physician.

Adjustment for Case Mix

We adjusted for case mix by using the Ambulatory Care Group (ACG) system, a method that uses outpatient diagnoses to sort patients into mutually exclusive groups with similar illness severity. Each ICD-9 diagnosis is mapped onto an exclusive Ambulatory Diagnostic Group (ADG), and each patient is assigned to an Ambulatory Care Group (ACG) based on the number and type of ADGs, combined with age and gender (Johns Hopkins University, 1997). ADGs, age, and gender were used as control variables in logistic regressions to model independent effects of physician-patient relationships on emergency department use. We were able to assign ADGs to 99.9 percent of all patients in the study.

Level of Severity

To assign a relative level of severity to the presenting condition of each emergency department patient, we used the method developed by Selby and colleagues (1996). In their system, each diagnosis is assigned to one of the following mutually exclusive categories: those visits that were always an emergency, those that were often an emergency, those that were sometimes an emergency, and those that were often not an emergency. We expanded this system to include diagnoses not included in the Selby study. Two observers independently assigned a severity level to every diagnosis attached to at least ten emergency department visits during the study year. Any inconsistencies were resolved by discussion; in cases where consensus could not be reached, the diagnosis in question was assigned to the highest of the plausible severity scores.

Geographic Definitions

To assign geographic identifiers to patients, we used a ZIP code system of designating rural and urban areas based on the Washington State Department of
Health’s generalist Health Service Areas (HSAs). All ZIP codes are assigned to the nearest generalist care center. ZIP codes and their populations assigned to rural centers were designated rural. HSAs that were functionally contiguous with urban HSAs were designated as “adjacent” and those that were not as “remote.” Thus in the analyses the areas and population of Washington are divided into three geographic types of areas: 1) remote rural, 2) adjacent rural, and 3) urban.

The geographic definitions were applied to the residential location of the beneficiaries and places where ED visits occurred using ZIP codes from the Part B line items. Because approximately 3.5 percent of beneficiaries had visit records in more than one ZIP code area, a variable was created that assigned each beneficiary to one and only one geographic residence. In some cases where a beneficiary had no valid Part B residence ZIP code, the residence ZIP code from the denominator file was employed.

It should be emphasized that, except for a single analysis, our geographic classification scheme was not based on community size. Thus remote rural areas include some communities that are relatively large in size.

**Analyses and Statistics Used to Present the Data**

The statistical significance of differences across our study groups was tested using standard t-tests and chi-square tests. We created a series of logistic regressions, in which the dichotomous dependent variable was the presence or absence of one or more ED visits during the year, to test the effect of rural/urban residence on the likelihood of having an emergency department visit. We controlled for total visits, Medicaid coverage, having a generalist or specialist as a principal-care physician, admission to a nursing home, hospitalization during the study year, and case mix (age, sex, ADGs).

**Results**

In 1994, 354,782 Medicare beneficiaries obtained all of their medical care within Washington State, had at least one outpatient visit, could be assigned to a known address, and were alive at the end of the study year. At least one emergency department visit was made by 64,093 beneficiaries, or 19.5 percent of the study population. A total of 105,647 emergency department visits were made in that time period, just under four percent of the 2,736,194 outpatient physician visits. Almost two-thirds (61.9%) of the emergency department visits involved female patients, and
the mean age of beneficiaries seen in the emergency department was 76.7. The mean age of emergency department visitors was almost identical across the three types of geographic areas. Even though urban ED patients were statistically older, the differences have little clinical impact. Interestingly, a greater percentage of the emergency department visits were made by women in urban (63%) than in remote rural (58.7%) and adjacent rural (59.1%) locales.

We examined these rates by the type of geographic area in which Medicare patients resided. The mean number of emergency department visits per person during the study year was slightly but significantly lower (0.26) in remote rural compared to adjacent rural (0.30) and urban (0.30) locations (Table 1). While the percentage of patients with one or more emergency department visits was virtually the same for adjacent rural versus urban locations (19.9% versus 19.7%), it was significantly lower for remote rural residents (17.6%). Emergency department visits accounted for a slightly higher proportion of all ambulatory visits in remote rural areas (4.2%) than adjacent rural (3.6%) or urban (3.8%) areas. This reflects the fact that urban beneficiaries make substantially more ambulatory care visits than their counterparts, and thus ED visits are a larger proportion of all ambulatory care visits for rural residents.

As seen in Figure 1, the rate of emergency department visits varies greatly for the elderly population depending upon age and rural/urban residence. The ED visit rate for the group as a whole increased dramatically with each age category, from 214.9 per 1,000 patient-years for those ages 65-69 to 515.9 for those 85 and above. The ED visit rate is lowest for remote rural residents in all age groups and highest for adjacent rural residents in all but two age groups, where the highest rate is for urban residents.

Table 2 presents the emergency department diagnoses of elderly Medicare patients in Washington State during the study period. Looking at all ED visits among the study population overall in 1994, the five most frequent diagnoses were chest pain (4.2%), CHF (2.9%), abdominal pain (2.8%), pneumonia (2.3%), and syncope (2.3%).

There was little variation in the ranking of the top five diagnoses across geographic areas. Cardiac-related complaints, specifically chest pain, congestive heart failure, atrial fibrillation, unstable angina, and angina pectoris, account for 12 percent of the ED diagnoses. Problems related to the respiratory system (e.g., pneumonia, respiratory distress, bronchitis) and cerebrovascular system (e.g., syncope, dizziness, TIA, CVA) are also major reasons for ED visits among the elderly across all three geographic areas, each accounting for about six percent of ED visits.
We examined the relative urgency of emergency department visits by geographic location using Selby’s diagnosis-based system to assign levels of severity of presenting conditions. As shown in Table 3, 31 percent of the study population making emergency department visits in 1994 were classified in the “almost always an emergency” category, 28 percent in the “often an emergency” group, 25 percent in the “sometimes an emergency” group, and 16 percent in the “rarely an emergency” category. There was little difference across geographic groups in the proportion of ED visits that were classified into these four levels of severity.

We tested the effect of residence on emergency department use by performing a logistic regression (Table 4). Results demonstrated that while location has some effect on ED use, it is minor compared to some of the other factors that were examined. Those living in remote rural areas were significantly less likely to visit the ED, all other things being equal, while those residing in adjacent rural areas were more likely to do so. However, residence was not as important a factor in ED utilization as was having a regular physician or being on Medicaid.

As one would expect, a substantial number of rural patients did not use or have local emergency departments; 6.6 percent of emergency department visits made by remote rural elderly—and 19.6 percent of visits made by the elderly living in adjacent rural areas—actually occurred in urban emergency department settings. In addition, 7.4 percent of remote elderly ED visits were in adjacent rural EDs, and 4.0 percent of the ED visits of adjacent rural elderly were in remote rural EDs. Overall, while 98 percent of the emergency department visits of the urban elderly occurred in urban emergency departments, 86 percent of rural elderly received their emergency department care in rural emergency departments.

If we examine only those patients whose residence and place of emergency department service were concordant, we can see that the specialty of the physician providing that care differed systematically across settings. Table 5 demonstrates that, of the emergency department visits by patients in the overall sample, three-quarters of the physicians handling those visits were emergency room physicians, nine percent were family physicians, seven percent were internists, two percent were general practitioners, and seven percent represented other disciplines.

More visits to urban emergency departments were handled by emergency medicine specialists (80%) than in adjacent rural (50.4%) and remote rural (67.6%) locations. As expected, higher proportions of emergency department visits in remote rural and adjacent rural areas were handled by general practitioners and family physicians than those in urban areas. However, more ED visits were handled by family practitioners in adjacent rural (27.4%) than in remote rural (17.5%) areas. A higher proportion of physicians from other specialties accounted
for emergency department visits in adjacent rural areas compared to the other locations. Internal medicine doctors represented approximately the same proportion of emergency department visits in each of the three locales.

One possible reason emergency room physicians were so prevalent even in remote rural areas is that remote rural areas differ greatly in size. In Washington State, remote rural areas include both relatively large rural referral centers with full-time emergency department staff and much smaller towns where emergency department coverage is handled by local generalists. In rural places with fewer than 100 hospital beds, family physicians were more likely to see elderly patients in the ED than emergency room physicians (not tabled). In the aggregate, however, these smaller places accounted for only 3.8 percent of all the emergency department visits for the study sample in the state.

Discussion

Impact of Residential Location on Use of the Emergency Department

This study’s findings support our hypothesis that elderly persons living in remote rural areas use fewer emergency department services. The percentage of patients with one or more emergency department visits was lowest for remote rural residents, and the emergency department visit rate was consistently lower for remote rural beneficiaries of all age groups when compared to their adjacent rural and urban counterparts. This lower rate of emergency department use persists even after controlling for confounding factors through logistic regression.

The pattern is somewhat different for rural people living in areas adjacent to cities. Their unadjusted rate of emergency department visits is the same as that for the urban elderly. After adjustment, the emergency department visit rate is significantly higher for people living in these adjacent areas.

The pattern of use of the ED among the rural elderly appears to parallel their use of other medical services, even after controlling for overall medical care use. Hart and colleagues (in press) found that Washington State Medicare beneficiaries living in small remote areas received disproportionately fewer physician visits than those residing in other areas. Dansky and colleagues (1998) used data from the 1991 Medicare Current Beneficiary Survey to identify differences in hospital days, home health visits and physician office visits across five geographic groups. They found
that there was less use of physician office visits and hospital care, but greater use of home health care, skilled nursing facilities, and other alternative methods of providing services in “completely” rural areas (defined as nonmetropolitan counties with fewer than 2,500 population). Residents in urban categories (large metropolitan core, large metropolitan fringe, and medium metropolitan) tended to have more inpatient days and office visits than residents in nonmetropolitan urbanized and completely rural categories. They further noted that rural residents tend to be older and to have more functional limitations than urban residents, which may contribute to their greater use of home health use. Those living in large remote areas closely approximated residents of urban areas in their physician visit patterns, while those in small and large adjacent areas fell somewhere in-between.

It appears from our study that rural residents who live near urban areas more closely resemble their urban neighbors rather than remote rural counterparts in use of the ED. This suggests that relative distance and isolation from health care facilities impedes access and affects utilization more than rural residence per se.

**Emergency Department Diagnoses by Residential Location**

Another finding of this study was that diagnoses for Washington State Medicare beneficiaries presenting at the emergency department in 1994 were remarkably similar across the three types of geographic locations in which they resided. This is consistent with work by Bross et al. (1991) showing that rural and urban ED users were seen for the same kinds of diagnoses. These findings support the suggestion by Bross et al. that rural emergency departments need the same capacity to deal with the same range of urgent problems that bring urban residents to the ED.

**Inappropriateness of Use of the Emergency Department by Residential Location**

This study also demonstrated that there was no greater urgency of problems among remote rural as compared to adjacent rural or urban Medicare beneficiaries, refuting one of our hypotheses. Nor does it appear that the rural elderly use the ED as a substitute for primary care more than the urban elderly. Despite a higher rate of emergency department use among the elderly compared to the population as a whole, only about 16 percent of Medicare beneficiaries across the three geographic areas made visits designated as “rarely an emergency.” This confirms findings by others (Campbell et al., 1998) that inappropriate use of the emergency department is less prevalent among the elderly compared to other population groups. In a
retrospective ED chart review of a random sampling of family practice patients in an academic health center, they found that patients age 64 and older had appropriate visits 89 percent of the time, significantly more often than the other age groups. By contrast, Selby’s study in an HMO found a much higher rate of probably inappropriate ED use among a younger population (Selby et al., 1996). This finding is not surprising, as emergent conditions are more likely to occur with age. In addition, the elderly are relatively well insured and have access to care in nonhospital settings.

**Physician Staffing of Emergency Departments by Location**

The literature suggests that there is a persistent deficit of specialists in rural locations. Thus it is interesting to note that most emergency department visits, even in remote rural locales, were staffed by emergency room physicians. This differs from findings by McGirr and colleagues (1998), who surveyed 20 rural hospital-based emergency departments in West Virginia in counties with populations of less than 30,000 and found that the majority of physicians staffing them were neither residency trained nor board certified in emergency medicine. In that study, only 7.5 percent of full-time and 4 percent of part-time emergency physicians were residency trained in emergency medicine. Half of full-time emergency physicians were board certified in a primary care specialty, and only 12 percent of full-time emergency physicians were board certified in emergency medicine.

Not surprisingly, this study showed that more general practitioners and family physicians handled emergency department visits in rural than urban areas. However, fewer family physicians staffed ED visits in remote than adjacent rural areas. A likely explanation for these findings is that some rural areas that are “remote” in terms of distance are relatively large in size and have EDs staffed by emergency room physicians. When we separated out rural areas by their size, we found that more family practitioners and fewer emergency physicians handled ED visits in small than in large remote rural areas. Several relatively large rural communities in Washington State, while far from urban areas, are large enough to sustain fairly sophisticated hospitals and facilities with the capacity to staff emergency department specialists.

**Limitations**

Several limitations should be considered in interpreting the findings from this study. First, this study was restricted to elderly Medicare beneficiaries in
Washington State who were not members of capitated managed care plans. Patterns of emergency department use may vary by region of the country, and may differ for those who are younger, enrolled in HMOs, or uninsured.

Second, we were not able to determine the impact of exact distance to the local ED on utilization patterns. It was beyond the scope of this study to determine distances traveled by patients in our sample to obtain local or out-of-area emergency services. The study also did not classify rural areas by their size except for one analysis, so in most cases we were not able to distinguish between small remote and large remote areas.

In designating physician specialty, we relied most heavily on ABMS data, although we employed AMA and HCFA data when information was otherwise unavailable. In a few cases, attributions may not have been accurate since some physicians may have been practicing in a discipline other than the one in which they were formally certified.

Finally, our ability to determine the appropriateness of each emergency department visit was limited by the inexact nature of the severity rating scale used, although this instrument has been validated in other settings.

**Conclusions and Policy Implications**

This study provides a picture of emergency department use among Medicare beneficiaries from three different types of geographic areas in Washington State. It extends the findings of Hart et al. (in press) by demonstrating that lower use of ED services parallels lower use of ambulatory care services by those in isolated rural areas when compared to their counterparts. As with the Hart study of outpatient care, this was not the case for the rural elderly residing in places that are near urban areas; their ED visit patterns more closely resembled those of the urban elderly. Moreover, this study demonstrated that beneficiaries from remote rural areas show up at the ED with the same types of emergent conditions as their adjacent rural and urban counterparts.

The rate of emergency department use among the elderly is relatively high since emergent problems increase dramatically with age, as depicted dramatically in this study. Since the rural population is disproportionately elderly, ED services are a critical and nondiscretionary component of the local health care system. Furthermore, it is clear from the findings concerning the nature of presenting conditions among our sample that local ED facilities must be fully capable of dealing
with the same range of emergency conditions as in urban settings. The fact that the remote rural elderly have fewer ED visits should not obscure the fact that they have similar emergent conditions as their counterparts, but rather should highlight the importance of improved local access to this critical component of the health care system.

The increasing use of emergency room physicians in rural emergency departments in Washington State suggests that standardization of emergency care is occurring in this part of the country. Although this was neither a study of the process nor the outcome of care, the similarity of patterns across different kinds of locations is more notable than the differences across places. The fact that the dwindling number of small rural hospitals has not as yet moved entirely to emergency departments staffed by physicians specialized in this type of care may reflect the continuing financial vulnerability of this group of institutions. As we have shown in previous work, professional emergency room coverage is extremely costly and may just not be an economic possibility for rural hospitals with relatively few beds.

Given this scenario, it becomes very important for the smallest and most remote emergency departments to develop the ability to triage, resuscitate, stabilize, and transport the most critically ill patients that present to the emergency department. It is clear that the types of problems do not differ much across geographic categories and that the elderly, at least, rarely use emergency departments for frivolous reasons. It is intriguing to note that having a regular physician does seem to reduce the use of emergency rooms by the elderly, and to the extent that rural areas are able to foster these relationships, they may be avert ing emergency room visits. But rural location, per se, does not seem to have a major impact on the way in which the elderly population uses emergency departments.
References


Table 1: Emergency Department Use of Elderly Medicare Patients in Washington State, 1994, by Residence Location

<table>
<thead>
<tr>
<th>Variable</th>
<th>Remote Rural</th>
<th>Adjacent Rural</th>
<th>Urban</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td>48,156</td>
<td>56,065</td>
<td>250,561</td>
<td>354,782</td>
</tr>
<tr>
<td>Number of ED visits</td>
<td>12,676</td>
<td>17,049</td>
<td>75,922</td>
<td>105,647</td>
</tr>
<tr>
<td>Mean age of ED patients</td>
<td>76.3</td>
<td>76.4</td>
<td>76.9</td>
<td>76.7</td>
</tr>
<tr>
<td>Percentage of ED visits made by women</td>
<td>58.7</td>
<td>59.1</td>
<td>63.0</td>
<td>61.9</td>
</tr>
<tr>
<td>ED visits per person per year</td>
<td>0.26</td>
<td>0.30</td>
<td>0.30</td>
<td>0.30</td>
</tr>
<tr>
<td>Percentage of patients with ≥ 1 ED visit</td>
<td>17.6</td>
<td>19.9</td>
<td>19.7</td>
<td>19.5</td>
</tr>
</tbody>
</table>

* p < 0.05  
** p < 0.01  
Statistical significance using t-tests and chi-square tests as appropriate.
Table 2: Most Common Emergency Department Diagnoses (percent of total) of Elderly Medicare Patients, Washington State, 1994, by Residence Location

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>ICD</th>
<th>Remote Rural</th>
<th>Adjacent Rural</th>
<th>Urban</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest pain</td>
<td>78650</td>
<td>4.1</td>
<td>3.5</td>
<td>4.4</td>
<td>4.2</td>
</tr>
<tr>
<td>CHF</td>
<td>4280</td>
<td>3.2</td>
<td>3.1</td>
<td>2.8</td>
<td>2.9</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>7890</td>
<td>3.0</td>
<td>2.5</td>
<td>2.8</td>
<td>2.8</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>486</td>
<td>2.3</td>
<td>2.8</td>
<td>2.2</td>
<td>2.3</td>
</tr>
<tr>
<td>Syncope</td>
<td>7802</td>
<td>2.2</td>
<td>2.2</td>
<td>2.4</td>
<td>2.3</td>
</tr>
<tr>
<td>Respiratory distress</td>
<td>78609</td>
<td>1.3</td>
<td>1.1</td>
<td>2.0</td>
<td>1.8</td>
</tr>
<tr>
<td>Dizziness</td>
<td>7804</td>
<td>1.3</td>
<td>1.4</td>
<td>1.8</td>
<td>1.7</td>
</tr>
<tr>
<td>UTI</td>
<td>5990</td>
<td>1.8</td>
<td>1.5</td>
<td>1.5</td>
<td>1.6</td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>42731</td>
<td>1.5</td>
<td>1.4</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Epistaxis</td>
<td>7847</td>
<td>1.8</td>
<td>1.3</td>
<td>1.3</td>
<td>1.4</td>
</tr>
<tr>
<td>TIA</td>
<td>4359</td>
<td>1.3</td>
<td>1.5</td>
<td>1.3</td>
<td>1.3</td>
</tr>
<tr>
<td>Bronchitis</td>
<td>4660</td>
<td>1.2</td>
<td>1.2</td>
<td>1.0</td>
<td>1.1</td>
</tr>
<tr>
<td>CVA</td>
<td>436</td>
<td>1.3</td>
<td>0.9</td>
<td>1.1</td>
<td>1.1</td>
</tr>
<tr>
<td>Malaise</td>
<td>7807</td>
<td>0.8</td>
<td>1.0</td>
<td>1.1</td>
<td>2.0</td>
</tr>
<tr>
<td>Unstable angina</td>
<td>4111</td>
<td>1.2</td>
<td>1.3</td>
<td>1.0</td>
<td>1.1</td>
</tr>
<tr>
<td>Angina pectoris</td>
<td>4139</td>
<td>1.0</td>
<td>1.3</td>
<td>0.9</td>
<td>1.0</td>
</tr>
<tr>
<td>COPD</td>
<td>496</td>
<td>1.3</td>
<td>1.2</td>
<td>0.9</td>
<td>1.0</td>
</tr>
</tbody>
</table>
Table 3: Relative Urgency of Emergency Department Visits of Washington State Medicare Beneficiaries, 1994, by Residence Location

<table>
<thead>
<tr>
<th>Relative Diagnostic Urgency</th>
<th>Remote Rural</th>
<th>Adjacent Rural</th>
<th>Urban</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almost always an emergency</td>
<td>30.3</td>
<td>30.7</td>
<td>30.9</td>
<td>30.8</td>
</tr>
<tr>
<td>Often an emergency</td>
<td>27.9</td>
<td>27.7</td>
<td>28.3</td>
<td>28.1</td>
</tr>
<tr>
<td>Sometimes an emergency</td>
<td>25.6</td>
<td>26.3</td>
<td>25.0</td>
<td>25.3</td>
</tr>
<tr>
<td>Rarely an emergency</td>
<td>16.2</td>
<td>15.3</td>
<td>15.8</td>
<td>15.8</td>
</tr>
<tr>
<td>Total visits</td>
<td>12,407</td>
<td>16,782</td>
<td>74,848</td>
<td>104,037</td>
</tr>
</tbody>
</table>
Table 4: Effect of Rural Residence on Likelihood of Having an ED Visit (logistic regression)

<table>
<thead>
<tr>
<th>Variable of Interest:</th>
<th>Odds Ratios (95% confidence intervals)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All Patients (n = 354,782)</td>
</tr>
<tr>
<td>Remote rural residence</td>
<td>0.89 (0.87-0.92)</td>
</tr>
<tr>
<td>Adjacent rural residence</td>
<td>1.11 (1.08-1.14)</td>
</tr>
<tr>
<td>Excluded category = urban</td>
<td></td>
</tr>
</tbody>
</table>

**Control Variables:**

<table>
<thead>
<tr>
<th></th>
<th>All Patients (n = 354,782)</th>
<th>Patients with 5 or More Outpatient Visits (n = 215,104)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total visits</td>
<td>1.02 (1.02-1.02)</td>
<td>1.02 (1.01-1.02)</td>
</tr>
<tr>
<td>Medicaid coverage</td>
<td>1.70 (1.65-1.76)</td>
<td>1.65 (1.58-1.71)</td>
</tr>
<tr>
<td>Having a generalist principal-care physician</td>
<td>0.47 (0.46-0.48)</td>
<td>0.59 (0.58-0.61)</td>
</tr>
<tr>
<td>Having a specialist principal-care physician</td>
<td>0.58 (0.57-0.60)</td>
<td>0.60 (0.58-0.62)</td>
</tr>
<tr>
<td>Admitted to nursing home during year</td>
<td>0.99 (0.99-0.99)</td>
<td>1.01 (1.00-1.01)</td>
</tr>
<tr>
<td>Hospitalized during year</td>
<td>1.18 (1.17-1.20)</td>
<td>1.18 (1.16-1.19)</td>
</tr>
</tbody>
</table>

**Case Mix Adjustment**

<table>
<thead>
<tr>
<th></th>
<th>All Patients (n = 354,782)</th>
<th>Patients with 5 or More Outpatient Visits (n = 215,104)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1.04 (1.03-1.04)</td>
<td>1.03 (1.03-1.04)</td>
</tr>
<tr>
<td>Female sex</td>
<td>0.98 (0.96-1.01)</td>
<td>1.01 (0.99-1.04)</td>
</tr>
<tr>
<td>ADGs</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

* 32 individual ADGs are entered as individual control variables, as specified by ACG case-mix adjustment system (Johns Hopkins University, 1997).
Table 5: Specialty of Physicians Handling Patient Visits in EDs for Washington State Medicare Beneficiaries, 1994, Where Residence Location and Emergency Department Location Are Concordant

<table>
<thead>
<tr>
<th>Physician Specialty</th>
<th>Remote Rural</th>
<th>Adjacent Rural</th>
<th>Urban</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency medicine</td>
<td>67.6</td>
<td>50.4</td>
<td>80.0</td>
<td>74.7</td>
</tr>
<tr>
<td>Family medicine</td>
<td>17.5</td>
<td>27.4</td>
<td>4.7</td>
<td>9.1</td>
</tr>
<tr>
<td>Internal medicine</td>
<td>8.0</td>
<td>6.6</td>
<td>7.1</td>
<td>7.2</td>
</tr>
<tr>
<td>General practice</td>
<td>3.6</td>
<td>5.3</td>
<td>1.6</td>
<td>2.3</td>
</tr>
<tr>
<td>Other</td>
<td>3.3</td>
<td>10.3</td>
<td>6.7</td>
<td>6.8</td>
</tr>
</tbody>
</table>

Totals do not always add up to 100 percent because of rounding errors.
Figure 1: Age and Emergency Department Visit Rates, by Rural-Urban Residence (number of ED visits per 1,000 person-years)
Previous WWAMI Rural Health Research Center Working Papers


5. Schleuning, Dianne; Rice, George; and Rosenblatt, Roger A. Addressing Barriers to Rural Perinatal Care: A Case Study of the Access to Maternity Care Committee in Washington State. October 1989.


9. Hart, L. Gary; Pirani, Michael; and Rosenblatt, Roger A. Causes and Consequences of Rural Small Hospital Closures from the Perspectives of Mayors. September 1990.


11. Amundson, Bruce A.; Hagopian, Amy; and Robertson, Deborah G. Implementing a Community-Based Approach to Strengthening Rural Health Services: The Community Health Services Development Model. February 1991.


32. Hart, L. Gary; Dobie, Sharon A.; Baldwin, Laura-Mae; Pirani, Michael J.; Fordyce, Meredith; Rosenblatt, Roger A. Rural and Urban Differences in Physician Resource Use for Low-Risk Obstetrics. March 1995.


34. Dobie, Sharon; Hart, L. Gary; Fordyce, Meredith; Andrilla, Holly; Rosenblatt, Roger A. Content of Obstetric Care for Rural, Medicaid, and Minority Women. June 1995.


38. Lishner, Denise M.; Richardson, Mary; Levine, Phyllis, Patrick Donald. Access to Primary Health Care Among Persons with Disabilities in Rural Areas: A Summary of the Literature. April 1996.


49. Baldwin, Laura-Mae; Hart, L. Gary; Rosenblatt, Roger A.; Fordyce, Meredith A. Hospital Peer Review and the National Practitioner Data Bank: Where Have All the Adverse Action Reports Gone? (forthcoming)

50. Morrill, Richard; Cromartie, John; Hart, L. Gary. A New National Rural and Urban Classification Based on Minor Civil Divisions. (forthcoming)

51. Hart, L. Gary; Rosenblatt, Roger A.; Lishner, Denise M.; Friedman, Harvey; Baldwin, Laura-Mae. Where Do Elderly Rural Residents Obtain their Physician Care? A Study of Medicare Patients in Washington State. (forthcoming)

52. Ellsbury, Kathleen E.; Doescher, Mark P.; Hart, L. Gary. The Production of Rural Female Generalists by U.S. Medical Schools. (forthcoming)