Health Care in the Rural South

Problems, Opportunities, Challenges

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Health Care in the Rural South

Problems, Opportunities, Challenges

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1995
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**Advisor**

Verner G. Hurt, Director
Mississippi Agricultural and Forestry Experiment Station
Preface

This *Proceedings* consists of a series of papers presented by speakers at a conference in Nashville, Tennessee, February, 1994. The conference was hosted by the Southern Region Information Exchange Group 53, a group of research and extension professionals from states in the South who deal with an array of issues in rural economic development. The 1994 conference dealt with issues facing rural communities in the provision for medical services.

The paper written by Joseph Obidiagwu and Jeffrey Alwang dealt with the problem of providing access to health care in rural Virginia, particularly with respect to issues relating to the provision for primary care. The authors summarize some of the health service problems faced by residents of rural Virginia. Important problems cited include large numbers of working poor who may not have health insurance, low population densities, and an aging population. In addition, significant numbers of rural hospitals in Virginia have been failing in the past 15 years. The authors argue that health services can make a substantial contribution to rural economic development, and illustrate the impacts on rural communities of adequate access to medical facilities.

The authors then develop an econometric model to investigate the determinants of the physician-to-population ratio. They found that income, population densities, proportions of the population that is elderly, and even the number of golf courses were important variables in determining the physician/population ratio. The authors argue that the major determinants of primary physician adequacy are outside the control of rural communities.

Paul Siegel, in his discussion of the Obidiagwu and Alwang paper, suggests that their modeling effort was not very conclusive from a statistical perspective, nor very encouraging for those who must deal with issues in rural health care policy. Siegel argues that a broader analysis is needed, and that new approaches for the delivery of medical services may be necessary. Examples cited include mobile services, improved transportation services to regional clinics for routine medical care, and applications of new technologies involving computers, electronic transmission, and video, to bring the services of the regional clinic to remote areas at reasonable cost. Other possibilities include reorganization of services to incorporate more mid-level paraprofessionals. Economic development efforts aimed at increasing incomes of rural households will ultimately lead to a higher proportion of insured.

The average age of the population in most rural areas is steadily rising. As the population ages, an increasing need exists for the services that a nursing home can provide. Hu and Bradford discuss their research in South Carolina dealing with the provision for nursing home care. They discuss the differences in how private pay versus public pay patients are handled within the system. In general, there is good access to nursing homes for patients who have sufficient resources to pay their own way. Nursing homes are required by law to take a portion of public pay patients, and meet a minimum requirement in terms of public patient days. Beyond the minimum, nursing home administrators have economic incentive to attract private pay patients, since these patients pay higher rates, and generate more revenue. They argue that urban nursing homes frequently have a higher proportion of private pay patients and, as a result, the quality of nursing home care may be better in urban than in rural areas.

They develop an econometric model to investigate the factors that influence the shares of various cost categories within nursing homes. These categories include (1) Nursing; (2) Dietary; (3) Administration; (4) Maintenance; and (5) Utilities. They found few differences in costs shares between rural and urban nursing homes. Nursing costs account for approximately 40 percent of total costs, both in South Carolina and nationwide. Rural nursing homes tended to be small in size, with few private pay patients in rural nursing homes. They question whether the quality of care in many of these homes is as good as that can be obtained in homes located in suburban and urban areas.
In their discussion of the Hu and Bradford paper, Mulkey and Closer argue that nursing home size and location should conform to a type of central place hierarchy, with nursing homes in rural areas likely to be smaller and further apart, but less likely to offer specialized services. Those in urban areas would tend to be larger, on average, and have access to more specialized services. They argue that one of the costs those who live in rural areas must pay is travel costs, not only for nursing home care, but for increased access to a whole range of goods and services. They note that nursing homes are highly regulated, and it would be unlikely that a nursing home, even one located in a sparsely populated rural area, could long remain in operation if care were substandard. It may be that more seriously ill patients could not be admitted to many rural nursing homes, but the rural nursing home still may be providing important services to the residents who do not need the specialized care. They question the conclusion that rural nursing homes may be providing inferior care to those who do not need highly specialized care. With nursing homes representing 20 percent of total costs, these costs are likely heavily dependent on prevailing wage rates in the area. These wage rates are likely lower in most rural than in urban areas.

Deaton describes the issues she confronts in attempting to manage the provision for health care services for older Missouri residents. She argues that Missouri is not atypical of most states in that the average age of the population has been rising continuously, and the highest proportion of the elderly are located in rural areas. She argues that graduate residents are moving to rural areas. Many areas of Missouri now compete with the elderly, and some rural communities are particularly important in rural areas. The need for rural areas is for a variety of services for the elderly. Schools to permit the elderly to maintain independent living to the maximum extent possible. Some of the services regarded as generally available to the urban elderly are frequently limited or unavailable in rural areas. Examples include public transportation services and ready access to primary care physicians.

The most rapidly expanding age cohort consists of those over 85. Nearly any service option that permits a degree of independent living for the elderly is less expensive than long-term nursing home care. She argues that rural communities often have fewer resources to develop specific plans for dealing with the specific needs of these elderly residents. The elderly will be attracted to local communities that can provide the necessary services at a reasonable cost.

In his discussion of Deaton's paper, Hughes argues that rural Missouri has some advantages over many other states in that the rural areas in Missouri tend to be comparatively densely populated. He believes that improved telecommunications technology will be important in upgrading the quality of health care services for the rural elderly. He raises issues about measuring the cost effectiveness of the various services and solutions that a rural community might employ. Some ideas and strategies are low-cost, help a large number of elderly residents, and are simple to implement. Others are higher-cost, helpful to a more limited number of elderly residents, and economically less cost effective.

David L. Debertin and Gerald A. Doeken, editors

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Access to Health Care in Rural Virginia:
A County-level Analysis of Primary Care Services

Joseph Obidiegwu and Jeffrey Alwang*

Health care has been in the forefront of public debate since the election of Harris Wofford to the United States Senate in 1991. In rural America, a health care crisis has brewed quietly for decades and the mix of problems faced in rural communities is reaching a boiling point as policymakers focus on reform of the entire health care system.

The national debate revolves around two critical issues: Insurers and the persistent upward spiral in health care costs. Most reform proposals contain provisions to address each of these problems, and President Clinton indicates that he will veto any plan that does not ensure universal insurance coverage, and make some effort to control costs. Rural areas suffer from these same problems, but are more generally faced with the problem of inadequate access to health care services. Inadequate access in rural areas is manifested in a number of ways including startling rates of hospital closure, less comprehensive insurance coverage for rural residents, high travel costs and out-of-pocket expenses for health care, and health care personnel shortages.

This paper examines some of these access issues with a focus on the determinants of adequacy of primary care physician supply in rural Virginia. The intent is to summarize some of the health-service problems rural communities face, and to inform rural Virginia counties about the kinds of adjustments they can make to attract and retain primary care physicians.

Access to Health Care in Rural America

Access is a result of the interaction between the supply of and demand for services. Factors affecting health care demand include income, health insurance, demographics, and the price of the services including costs of travel and out-of-pocket expenses. The supply side includes factors affecting the supply of physicians and other health service providers into an area. Access refers to the outcome of the demand/supply interaction, or the price and quantity of medical service transactions in a given area or conducted by the residents of a particular area. People have a certain demand for health care, and depending on where they live and other factors, they face a given supply of services. Access varies by demographic, social, and economic grouping (demand factors), but also by location (supply factors). People in areas without service providers have, ceteris paribus, less access than people in areas with service providers.

The factors affecting access vary widely from urban to rural areas. Rural areas are characterized by large numbers of working poor and occupations found in rural areas are generally more hazardous. Low population densities and high travel times between population centers make rural services costly to deliver and obtain. Rural populations are steadily aging and retirement in rural areas is growing. These factors all make access to medical services in rural areas a serious problem. Issues such as insurance coverage and

*Joseph Obidiegwu is a former graduate student, and Jeffrey Alwang is an associate professor in the Department of Agricultural and Applied Economics, Virginia Polytechnic Institute and State University, Blacksburg, VA.
service infrastructure (fewer hospitals and public and private medical practices) compound the problem.

Despite the dramatic differences in economic and social conditions in urban, suburban, and rural America, approximately equal proportions of people in each area have access to health insurance. In 1991, about 85 percent of the people who resided in metro areas and 84 percent in non-metro areas were covered by health insurance. These equal numbers are misleading because rural residents are less likely to have employer-provided coverage and more likely to have other private coverage (Freemont, 1993). Also, because rural workers are more likely to be employed on an hourly basis in part-time and service-related jobs, they are less likely to receive permission to visit doctors or paid time off for sickneces. These factors lead to higher out-of-pocket expenses for health insurance and health costs for rural residents.

Rural hospitals failed in alarming numbers over the past 15 years. Relative oversupply of rural hospital beds, low occupancy rates, high dependence on federal and state financial support, and policies that discriminated against rural hospitals combined to place many rural hospitals under financial stress. During the 1980s, 10 percent of all rural hospitals failed, and up to 25 percent of those remaining risk closure. Based on a national average expenditure of 13 percent of GNP for health services, between $77 and $54 million is spent annually by residents of these counties on health care services. While not all of these dollars could be captured locally, several millions of dollars in health care expenditures leak out of each county. As spending on other items, particularly retail spending, tends to "follow" medical expenditures, inadequate levels of health service personnel can be associated with large leakages from the local economy. Based on average visits to rural primary care physicians (Hicks and Glenn), between 46 and 100 percent of local primary care needs are unmet in the counties.

In addition to economic activity, the presence of a physician or a health service provider in a rural area can provide local leadership. Doctors tend to be highly educated, well informed, and concerned about community well-being. Access in Virginia

Virginia policymakers are aware of the problem of access to health services in rural areas and have adopted measures to address it. Reforms have been instituted over time to help increase access. The Virginia Medical Scholarship Program (VMSP) began in 1942, and provides a stipend to medical school students who practice in underserved areas. VMSP has many critics, but the program, when combined with National Health Service Corps (NHSC) scholarships, can provide relief for incentives for physicians to locate in underserved areas.

The VMSP was expanded in the early 1970s and additional incentives were provided to Virginia's medical colleges to admit students who are likely to practice in rural areas. In addition to medical school admissions, the state actively supported the creation of a state-wide Area Health Education Center (AHEC) and a State Office of Rural Health. State government has also supported the certification of 3 rural health clinics (RHCs) and over 30 CHCs to help extend access to medical services in rural areas.

Despite these efforts, the distribution of primary care physicians changed very little between 1970 and 1989. These distributions are shown in figures 1 and 2. The figures reveal several things. First, a large percentage of rural counties are underserved in the sense that they have small numbers of primary care physicians per capita. Depending on the purpose of the designation fewer than 1 doctor per 3,000 people or 1 doctor per 2,500 people in a county means that the county is underserved. Second, there has been very little change in the geographical distribution of primary care physicians in the 20 years. Third, there tends to be a clustering of underservice; frequently several contiguous counties are characterized as underserved.

In Virginia, state-supported efforts to increase the supply of medical services in rural areas will continue to revolve around policies toward admissions in the state medical schools and support for programs (such as RHCs and CHCs) that extend services to underserved areas without placing large claims on the state's budget. Some health care professionals question the efficacy of state support for RHCs and CHCs, claiming that since population densities are low in rural areas, the presence of publicly-supported health services weakens the patient base of private providers. They argue that state policy should be confined to efforts to increase the supply of private providers likely to practice in rural areas and boosting effective demand for services through insurance schemes.

Given the narrow range of plausible state interventions, the role of the community in promoting access to health care for its citizens takes center stage. There is a trend in the state toward assigning to the community a paramount role in the solution of such problems. Community involvement in rural hospital planning and management is a widespread cause of the failure of these hospitals (Amundson). Likewise, given the primary responsibility of each community for its own economic development, the attraction and retention of adequate medical service providers should principally be a concern of rural leadership.

Information exists for rural communities on the recruitment and retention of primary care physicians, but relatively little is known about how certain community controllable characteristics affect the ability to attract and retain primary care physicians. Virtually nothing is known about how the provision of public health services (particularly CHCs) affects the viability of private practices. This study provides some information about these questions for rural counties in Virginia.

Objectives

The study has three objectives:

1) To examine the determinants of primary care physician numbers and retention in rural counties.

2) To see if the presence of a community health center in a county deters physician locations.

3) To provide information to counties to assist them in recruiting and retaining physicians.

Methods/Model

Objectives 1 and 2 are achieved by using a simple model of the determinants of the numbers of primary care physicians in a county. The model helps examine equilibrium behavior in the market for these physicians in rural counties. The number of primary care physicians is the result of the interaction between the local demand for services and the supply of services.
Table 1. Income and Health Expenditures in Three Virginia Counties, 1990

<table>
<thead>
<tr>
<th>Item</th>
<th>Accomack County</th>
<th>Craig County</th>
<th>Russell County</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>31,703</td>
<td>4,372</td>
<td>28,667</td>
</tr>
<tr>
<td>Personal Disposable Income (X/Capita)</td>
<td>13,066</td>
<td>12,459</td>
<td>10,444</td>
</tr>
<tr>
<td>Total Health Care Expenditures ($Million)</td>
<td>53.8</td>
<td>71.4</td>
<td>38.9</td>
</tr>
<tr>
<td>Primary Care Physicians</td>
<td>9.5</td>
<td>0.0</td>
<td>7.0</td>
</tr>
<tr>
<td>Total Encounters (w/Primary Care)</td>
<td>104,620</td>
<td>14,428</td>
<td>94,601</td>
</tr>
<tr>
<td>Total Med Locally</td>
<td>56,050</td>
<td>0.0</td>
<td>41,300</td>
</tr>
<tr>
<td>Percent Uninsured</td>
<td>46.4</td>
<td>100.0</td>
<td>56.3</td>
</tr>
</tbody>
</table>

*Derived by multiplying disposable income by .13.

1 Actual number of private primary care physicians.

2 Based on 3.5 primary care encounters per person per year in rural areas (See Hicks and Glenn).

3 Based on an average of 9000 encounters per rural primary care physician per year (See Hicks and Glenn).

Figure 1. Primary Care Physician-Population Ratios for Rural Virginia, 1970

Figure 2. Primary Care Physician-Population Ratios for Rural Virginia, 1989

Health Care in the Rural South

Demand for primary care services may be expressed as:

\[ D = d(P, \text{CHC}, Z_o) \]  \hspace{1cm} (1)

where \( P \) is the price of services in the area, \( \text{CHC} \) is the number of competing public sector providers in the area (number of community health centers), and \( Z_o \) is a vector of exogenous determinants of demand (income, demographics, etc.).

Supply of private primary care services may be expressed:

\[ S = s(P, Z) \]  \hspace{1cm} (2)

where \( Z \) is a vector of exogenous variables affecting supply. These variables include, among other things, the amenities in a community and local factors influencing the ability to succeed professionally such as financial returns to private practice.

The third critical component affecting the outcome is a structural equation representing the number of CHCs in an area:

\[ \text{CHC} = f(S, Z_{CHC}) \]  \hspace{1cm} (3)

where \( Z_{CHC} \) is a vector of variables affecting the existence of a CHC. These variables include the poverty rate, percent population black, percent elderly, and local expenditures on health and welfare.

In equilibrium, equations 1 and 2 can be combined and the number of primary care physicians be expressed as a function of the variables affecting the supply and demand of their services. The following empirical model results:

\[ \text{PPR} = f(P, \text{CHC}, Z_o, Z) \]  \hspace{1cm} (4)

\[ \text{CHC} = f(\text{PPR}, Z_{CHC}) \] \hspace{1cm} (5)

where PPR is the private primary care physician to population ratio. Equations 4 and 5 constitute a system of simultaneous equations since the dependent variable in each is an independent variable in the other equation.

Data and Variable Definitions

Data were assembled from primary and secondary sources for rural Virginia counties for the years 1980 and 1989. The years were chosen because they roughly correspond to census years. The primary variables, PPR—the private physician population ratio—and CHC, were collected respectively, by the Medical College of Virginia Department of Family Practice (MCV), and the Virginia Primary Care Association. The MCV has tracked primary care physicians since before 1970, and their data base reflects active primary care physicians6. PPR is created by dividing the number of active private physicians by the county population.

Because political boundaries (counties) were used, care had to be taken to ensure that counties that are contiguous to urban areas were not included in the analysis. The reason for their exclusion is that it is impossible using the data to separate place of practice from place of residence, and in many instances physicians reside in rural bedroom communities while practicing in urban or suburban settings. Following the deletion of such counties, 69 rural counties remained, leaving 138 data points.

The variables used in the model are described and their sample statistics presented in table 2.

Estimation and Results

The theoretical model calls for simultaneous estimation. A couple of estimation issues arise: Testing for model misspecification in a simultaneous systems context, and verifying the validity of the theoretical model. To begin, an OLS regression of equation 4 is estimated. The theory suggests that the OLS estimates will be biased, but OLS estimates provide a point of departure. These estimates are presented in table 3. The model in table 3 is statistically adequate; normality, homoskedasticity and functional form tests were all conducted. The data were stacked, so that none of the pooled properties of the data were exploited. A dummy variable was included for the 1980 observation, the comparison year is 1989.
### Table 2. Variable Definitions and Data

<table>
<thead>
<tr>
<th>Variable Block</th>
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<th>Description</th>
<th>Source</th>
<th>Mean</th>
<th>Standard Deviation</th>
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<tr>
<td>Z₁</td>
<td>INCOME</td>
<td>Real per capita income</td>
<td>Vast</td>
<td>14.498</td>
<td>2274.4</td>
</tr>
<tr>
<td></td>
<td>PCT65</td>
<td>Percent over 65 in county</td>
<td>Census</td>
<td>13.6</td>
<td>3.7</td>
</tr>
<tr>
<td></td>
<td>HPBR*</td>
<td>Hospital beds per capita</td>
<td>VHA</td>
<td>8.5</td>
<td>20.4</td>
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<tr>
<td></td>
<td>PERMIL</td>
<td>Population density</td>
<td>Census</td>
<td>55.2</td>
<td>41.5</td>
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<td>Z₂</td>
<td>PTAX</td>
<td>Property tax rate</td>
<td>Vast</td>
<td>47.6</td>
<td>14.2</td>
</tr>
<tr>
<td></td>
<td>PPEUDUC</td>
<td>Local expenditures on public schools per pupil</td>
<td>Vast</td>
<td>1091.4</td>
<td>712.8</td>
</tr>
<tr>
<td></td>
<td>PREC</td>
<td>Local per capita expenditures on exemption</td>
<td>Census</td>
<td>10.1</td>
<td>10.4</td>
</tr>
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<td></td>
<td>AMENITIES</td>
<td>Number of golf holes per capita</td>
<td>Recreation</td>
<td>4.0*</td>
<td>12.1*</td>
</tr>
<tr>
<td>Z₃</td>
<td>POV</td>
<td>Poverty rate in county</td>
<td>Census</td>
<td>11.5</td>
<td>4.4</td>
</tr>
<tr>
<td></td>
<td>PCT85</td>
<td>Percent black in county</td>
<td>Census</td>
<td>21.4</td>
<td>17.8</td>
</tr>
<tr>
<td></td>
<td>IWEL</td>
<td>Health &amp; welfare expenditures per capita</td>
<td>Vast</td>
<td>39.4</td>
<td>21.8</td>
</tr>
<tr>
<td></td>
<td>PPR</td>
<td>Primary care physicians/county population</td>
<td>MCV</td>
<td>3.3*</td>
<td>2.2*</td>
</tr>
<tr>
<td></td>
<td>CHC</td>
<td></td>
<td>PCA</td>
<td>0.6</td>
<td>0.8</td>
</tr>
</tbody>
</table>

*Source: Vast in the Virginia Statistical Abstract, VHA in the Virginia Hospital Association, Recreation is from a variety of sources, PCA in the Virginia Primary Care Association.

### Table 3. OLS Estimates of Physician Population Ratio Equation*

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Parameter Estimate (t-statistic)</th>
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<tr>
<td>Intercept</td>
<td>-15.84 (0.65)</td>
</tr>
<tr>
<td>CHIC</td>
<td>-0.013 (-0.32)</td>
</tr>
<tr>
<td>LINCOME</td>
<td>0.076 (0.32)</td>
</tr>
<tr>
<td>LPERMIL</td>
<td>0.103 (0.78)</td>
</tr>
<tr>
<td>LLP EDUC</td>
<td>0.540 (3.90)</td>
</tr>
<tr>
<td>LPCT65</td>
<td>-0.009 (0.32)</td>
</tr>
<tr>
<td>LPTAX</td>
<td>0.391 (0.60)</td>
</tr>
<tr>
<td>HPBR*</td>
<td>8.735 (2.84)</td>
</tr>
<tr>
<td>AMENITIES</td>
<td>-0.089 (2.76)</td>
</tr>
<tr>
<td>LPREM</td>
<td>0.151 (1.67)</td>
</tr>
<tr>
<td>DUM80</td>
<td>0.136</td>
</tr>
<tr>
<td>N</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

*coefficients = actual * 1,000.

The parameter estimates shown in table 3 are roughly consistent with expectations. Higher incomes, population densities, proportions of elderly in the population, and the number of golf holes per population were all positively associated with the primary care physician to population ratio. These variables are all positively associated with the physician's ability to earn money or with the amenities in a county, and thus should be positively associated with numbers of physicians. Higher property taxes (PTAX), local educational expenditures (PPEUDUC) and hospital beds per population (HPBR) had no significant effect on the outcome. The signs of the variables were consistent with expectations, but the estimates were not significantly different from zero.

The sign of the CHC variable indicates that the presence of a CHC has a negative (although statistically insignificant) impact on the number of private primary care physicians per person. This result provides evidence that weakly supports the contention that publicly-supplied health care services compete with private practices and thus erode the patient base in rural Virginia. The critical point to remember, however, is that a low physician population ratio is one of four criteria needed to designate a county as an MUA, and thus become eligible for the federally-funded CHC program. It may be that counties with CHCs because they have low PPRs; thus to assign causality (i.e., to conclude that CHCs compete with private practices and erode their viability) is premature. The structural model in equations 4 and 5 incorporates feedback between the two variables (CHC and PPR), and thus, simultaneous estimation is needed.

### Health Care in the Rural South

The reduced form system used to test the system assumptions includes a double log specification of the PPR equation and a single log equation with CHC as the dependent variable. The estimates of the reduced forms are presented in table 4. Using these results, tests of normality, homoskedasticity, and functional form are conducted. The p-values for the single equation and system tests are shown in table 5. Some problems exist in the CHC equation (the single equation RESET functional form test has a small p-value), and different functional forms did not "solve" the specification problem. Because the system test did not indicate problems with the functional form, and because only one of the two single-equation tests did, the specification was retained.

Following the identification of a statistically adequate reduced form, the structural model that corresponds to the reduced form system is estimated. The three-stage least squares (3SLS) estimates of the system in equations 4 and 5 are presented in table 6. Each equation is obviously overidentified as 3 exogenous variables are deleted from the PPR equation and 7 are deleted from the CHC equation.

To test the validity of the structural model, the (over)identifying restrictions are tested (retaining LPOV as the single instrument for PPR and LINCOME, LPERMIL, and AMENITIES as the instruments for the CHC variable). Basmann tests (Basmann, 1960) fail to reject the overidentifying restrictions. These restrictions provide the bridge between the structural and reduced form models. Failure to reject the overidentifying restrictions indicates that the structural model is itself statistically valid. The following discussion refers to the structural estimates.

For the PPR equation, some substantial changes appear when comparing the OLS estimates (table 3) with the structural estimates in table 6.
Table 4. Results from Estimation of Reduced Form

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>LPPR</th>
<th>CHC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-18.422</td>
<td>5.78</td>
</tr>
<tr>
<td>LIN</td>
<td>0.767</td>
<td>0.01</td>
</tr>
<tr>
<td>LPPR</td>
<td>-0.051</td>
<td>0.439</td>
</tr>
<tr>
<td>LPERMIIL</td>
<td>0.197</td>
<td>0.011</td>
</tr>
<tr>
<td>LPREDUC</td>
<td>0.072</td>
<td>0.055</td>
</tr>
<tr>
<td>LPCO</td>
<td>0.306</td>
<td>0.411</td>
</tr>
<tr>
<td>HPR*</td>
<td>0.622</td>
<td>0.09</td>
</tr>
<tr>
<td>AMENITIES</td>
<td>16.719</td>
<td>0.97</td>
</tr>
<tr>
<td>LPKREC</td>
<td>-0.111</td>
<td>0.05</td>
</tr>
<tr>
<td>LPPOD</td>
<td>0.074</td>
<td>0.51</td>
</tr>
<tr>
<td>LHJ</td>
<td>0.139</td>
<td>0.111</td>
</tr>
<tr>
<td>LPCFT</td>
<td>-0.019</td>
<td>0.035</td>
</tr>
<tr>
<td>DADD</td>
<td>0.133</td>
<td>0.231</td>
</tr>
<tr>
<td>N</td>
<td>138</td>
<td></td>
</tr>
</tbody>
</table>

R²: .318 .318

* coefficient = actual * 10,000.
* statistics in parentheses.

Table 5. Results from the Misspecification Tests of the Reduced Form

<table>
<thead>
<tr>
<th>Test</th>
<th>LPPR (double log)</th>
<th>CHC (log linear)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normality</td>
<td>.0437</td>
<td>.0487</td>
</tr>
<tr>
<td>Bern-Jaeger</td>
<td>.1546</td>
<td>.0452</td>
</tr>
<tr>
<td>D’Agostino-Pearson</td>
<td>.1543</td>
<td>.0680</td>
</tr>
<tr>
<td>Homoskedasticity</td>
<td>.5209</td>
<td>.2072</td>
</tr>
<tr>
<td>RESET2</td>
<td>.3675</td>
<td>.2282</td>
</tr>
<tr>
<td>Functional Form</td>
<td>.0117</td>
<td>.0554</td>
</tr>
<tr>
<td>KG2</td>
<td>.7530</td>
<td>.5443</td>
</tr>
<tr>
<td>Multivariate Normality</td>
<td>.1117</td>
<td>.0554</td>
</tr>
<tr>
<td>D’Agostino-Pearson</td>
<td>.0110</td>
<td>.0093</td>
</tr>
</tbody>
</table>

The results provide evidence that there is significant endogeneity of the CHC variable in the PPR equation. Specifically, the CHC variable goes from having an insignificant negative sign to a strongly significant positive sign. The negative effect of CHC in the OLS PPR (table 3) equation is attributable to the fact that low PPR counties are also those counties that are more likely to have CHCs. This negative association is highlighted in the estimate of the PPR coefficient in the CHC equation in the second column in table 6. When this endogeneity is "controlled for," the positive effects of CHC on private physician numbers emerge. The endogeneity of the CHC variable also creates a downward bias in the estimates of the parameters of the (log) income and population density variables (LINCOME and LPERMIIL, respectively). These variables have significant positive impacts on PPR, with a one percent increase in county income per capita being associated with a 0.9 percent increase in the PPR. Higher percentages of elderly residents are also associated with more primary care physicians.

Among the directly community-controllable variables, the number of golf courses per person in the county (AMENITIES) has a strong positive impact on PPR, while local expenditures on parks and recreation (LPKREC) have a negative effect. The AMENITIES results are as expected. The negative sign on LPKREC might be attributed to the fact that in cases where state or federal expenditures for recreation are high (usually due to the presence of a national or state park or recreation area), local expenditures tend to be low. Thus, local expenditures tend to be a proxy for poorer recreational amenities in rural counties.

The PPR is unaffected by educational expenditures per pupil, i.e., the local property tax rate, or the number of hospital beds. None of these results were expected, with the most surprising being the lack of significant relationship between the hospital bed variable and the outcome. The result implies that primary care physicians are not attracted to hospitals in rural Virginia. This result runs against common wisdom and previous findings, and should be investigated more closely.

The results for the structural equation for CHCs in rural Virginia are as expected. A higher PPR is associated with fewer CHCs. Counties with higher proportions of black residents are also less likely to have CHCs. Higher poverty rates lead to larger numbers of CHCs.

Summary and Implications

The statistical results do not provide a source of optimism for rural counties. The major determinants of primary care physician adequacy are largely out of the control of communities and increasing adequacy through changes in semi-controllable variables is a slow process. For example, if an average rural community wanted to attract one physician by increasing, say, the number of people over 65, it would have to attract 900 elderly, increasing the proportion of elderly in the general population from 13.6 to 18.2 percent. Such an increase would obviously be difficult to achieve and an effort to attract this large number of people over 65 would have to be based on criteria other than a desire to increase the number of local physicians. On the other hand, the regression results support the idea that an increase in the number of retirees will benefit rural counties by increasing access to primary care health services.

The results show that "trickle down" recruitment of physicians, i.e., relying on income growth to make rural areas more attractive, is an extremely slow process. The mean rural county needs a 16.5 percent increase in real per capita income to attract one additional primary care physician.

The study identified three policy changes that a rural county can make to enable it to attract more primary care physicians. First, the establishment of a CHC will not only increase access to primary care, it will increase the number of private primary care physicians serving in a county. As a methodological note, the positive effect of CHCs on physician adequacy was masked when a misspecified model was estimated (compare the OLS and the 3SLS results). CHCs and PPR are clearly simultaneously determined.

Second, lowering expenditures on parks and recreation will increase the likelihood of primary care physician location in an area. The discussion of model results above, however, provides some reason to view this
result with suspicion. Recreation expenditures may be correlated with some other unobserved factor. Third, private amenities such as golf courses tend to make rural areas more attractive to health care professionals.

Anecdotal information not reported here (see Obidiegwu) indicates that rural communities have a greater ability to attract and retain physicians than the statistical analysis indicates. Counties interested in improving access have numerous resources that they can tap, including information from the State Office of Rural Health, Cooperative Extension, and the Departments of Family Practice at the medical schools. In addition to information resources, financial resources for recruitment are available through cooperative agreements with the federal government and also through private grantors. Physician recruitment can be an idiosyncratic process, and the model employed in this study does not adequately capture these idiosyncrasies. Information on county recruiting efforts and a larger data base (with a longer time series) is needed to model some of these idiosyncrasies.

References

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Table 6. SLS Estimates of Structural Model\textsuperscript{a}

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Log (PPI)</th>
<th>CHC</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERCEPT</td>
<td>-8.780 (4.35)</td>
<td>-7.908 (2.38)</td>
</tr>
<tr>
<td>LOG (PPI)</td>
<td>-0.500 (1.75)</td>
<td>-0.560 (1.75)</td>
</tr>
<tr>
<td>CHC\textsuperscript{b}</td>
<td>0.183 (2.20)</td>
<td>---</td>
</tr>
<tr>
<td>LINC\textsuperscript{c}</td>
<td>0.931 (2.22)</td>
<td>---</td>
</tr>
<tr>
<td>LPEDUC\textsuperscript{d}</td>
<td>0.200 (2.53)</td>
<td>---</td>
</tr>
<tr>
<td>LPTAX\textsuperscript{e}</td>
<td>0.452 (2.75)</td>
<td>0.246 (0.85)</td>
</tr>
<tr>
<td>LPTAX\textsuperscript{f}</td>
<td>-0.113 (0.71)</td>
<td>---</td>
</tr>
<tr>
<td>HPBB\textsuperscript{g}</td>
<td>0.399 (0.05)</td>
<td>---</td>
</tr>
<tr>
<td>AMEN\textsuperscript{h}</td>
<td>0.354 (2.82)</td>
<td>---</td>
</tr>
<tr>
<td>LKREC\textsuperscript{i}</td>
<td>-0.120 (0.52)</td>
<td>---</td>
</tr>
<tr>
<td>DUM\textsuperscript{j}</td>
<td>0.095 (0.90)</td>
<td>0.892 (4.47)</td>
</tr>
<tr>
<td>LNOV\textsuperscript{k}</td>
<td>---</td>
<td>0.361 (1.61)</td>
</tr>
<tr>
<td>LHW\textsuperscript{l}</td>
<td>---</td>
<td>-0.081 (0.20)</td>
</tr>
<tr>
<td>LPTCB\textsuperscript{m}</td>
<td>---</td>
<td>138</td>
</tr>
<tr>
<td>N \textsuperscript{n}</td>
<td>345</td>
<td></td>
</tr>
</tbody>
</table>

\textsuperscript{a} Multiple regression analysis.
\textsuperscript{b} Fixed coefficient \textit{c} 10.000.
\textsuperscript{c} Standard errors in parentheses.

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Health Care in the Rural South


Endnotes
1. The Medicare Prospective Payment System (PPS), instituted in 1984 reimbursed rural hospitals 36 percent less than urban hospitals for the same diagnosis related group. This disparity in payment was widely attributed to be a cause of the flurry of rural hospital failures in 1985-1988. In reaction to these failures, the federal government agreed in the late 1980s to phase out the PPS differential over time.

2. Medically underserved area (MUA) is a federal designation used to establish eligibility for a community health center (CHC) and other federally-supported programs; it is a weighted score including infant mortality rates, the percentage of population over 65, the poverty rate, and the physician to population ratio. Health personnel shortage area (HPSA) is also a federal designation made on the basis of personnel to population ratios and the available health resources in an area.
Access to Health Care in Rural Areas: A Need to Broaden the Analysis

Paul B. Siegel

Introduction

Health care is one of the most important issues of the 1990s, for governments, firms, and individuals residing in both urban and rural areas (Graboyes, 1993). Health care problems in rural areas are well documented (e.g., Miller, 1982; Ahearn and Fryer, 1985; Garland, 1989; Muller, et al., 1989; Doeksen et al., 1990; Siesinger, 1990; Deberin 1991a; Trevis, 1994).

Relative to urban areas, health care service in rural areas has been negatively impacted by low population densities, high proportion of poor, elderly and less educated, high proportion of self-employed farmers, higher propensity for accidents and need for emergency care (from farming and recreation), and low diagnostic-related group (DRG) ceilings for health services. Health care problems in rural areas are manifested by a shortage of doctors and other health care providers, hospital closings, high costs of health care in remote areas, poorer insurance coverage, and the inability of many poor rural residents to pay for needed health services.

Below is a typical observation about the rural health care situation:

"To summarize, the inability to pay for services is the major barrier to health care. The poor and those with no or limited health insurance are less likely to receive care. The small size of rural communities and their distance from urban centers are other barriers, with residents of smaller places having less access to doctors and hospitals than residents of larger places. When persons live in rural areas and are poor and uninsured, they are at triple jeopardy (Siesinger, 1991, p.147)"

An Analysis of Access to Health Care in Rural Virginia

The paper by Obidiegwu and Alwang (O&A) describes health care problems in rural areas in terms of "inadequate access to health care services." The term inadequate (or poor) access to health care service is often used to characterize the problems faced by rural residents. To lump rural health care problems into an issue of poor access, however, masks the demand and supply sources of the problems.

Thus, O&A point out that "access refers to the outcome of the demand/supply interaction." More specifically they explain that, "Access varies by demographic, social, and economic grouping (demand factors), and also by location (supply factors). People in areas without [health] service providers have, ceterus paribus, less access than people in areas with [health] service providers."

The distinction between demand and supply factors is critical to understanding rural health care problems, and the search for possible solutions. How does the inability to pay for health services interact with the lack of physicians and other health service providers? Uncovering the demand and supply components of the rural health care problem can help in the design of programs.

Some studies have pointed to the inability to pay for health services as a major factor contributing to inadequate access (e.g., Miller, 1982; Siesinger, 1985). Attention, however, is usually

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focused on supply factors. Following in this tradition, O&A claim that: "Possibly the most visible manifestation of inadequate access is the large number of rural communities without adequate health care providers and associated services." As such, they focus attention on determinants of location decisions by physicians.

In fact, most government-sponsored programs designed to improve rural health care have been based on the assumption that an increased supply of health care services (physicians, health care centers and hospitals, etc.) will lead to better health status of rural residents. These programs assume, at least implicitly, that there is a close functional relationship between residents’ health status and the amount of available medical care. However, there is a lack of empirical evidence for such a relationship (Miller, 1982).

The paper by O&A investigates the determinants of location decisions by physicians. Other studies have dealt with this issue (see Arean and Fryer, 1985). The major contribution of the paper by O&A is to examine how the provision of public health services (notably community health centers, or CHCs) in a county affects physician locations. CHCs are an example of a government program that increases the supply of health care services to rural residents. As such, counties with low per capita of primary care physicians receive assistance. Citing concerns of some health care professionals, O&A test the hypothesis that the presence of publicly-supported health services weakens the patient base of private providers, and thereby discourages physician locations.

Using a system of simultaneous equations, where the private physician ratio, or PPR, is a function of the existence of a CHC and other variables, and the existence of a CHC is a function of the PPR and other variables, O&A find that publicly-supported CHCs do not necessarily compete with private practices and do not necessarily discourage physician locations. O&A show that different results are found when independent equations are used instead of a system of simultaneous equations. As O&A point out, establishment of a CHC will not only increase access to primary care, it may even increase the number of private physicians serving in a county.

O&A also attempt to examine general determinants of physician location decisions in order to provide information that may assist counties in their physician recruitment efforts. The results of their modelling efforts were not very conclusive (from a statistical perspective), or encouraging from a policy perspective. In the words of O&A, "The statistical results do not provide a source of optimism for rural counties." However, O&A conclude by advising the reader that, "Accidental information not reported here (see Obidiegwu, 1992) indicates that rural communities have a greater ability to attract and retain physicians than the statistical analysis indicates...Physician recruitment can be an idiosyncratic process, and the model employed in this study does not adequately capture these idiosyncrasies." This conclusion leaves the reader in a state of confusion and anticipation. Maybe the authors can let us in on some of these secrets?

Concluding Remarks

The paper by Obidiegwu and Alwang (O&A) is a positive contribution to the literature on rural health care. There is a need, however, to broaden the analysis if the objective is to provide information on the kinds of policies that may lead to improved health care for rural residents.

There are several ways to achieve the objective of improved health care services for rural residents (Miller, 1982). Providers of health care services can be encouraged to locate in rural communities. This has been the primary emphasis of government programs to date. Alternatively, the problem can be defined as one of transportation with emphasis being placed on reducing the cost of taking users to the service. Yet another alternative would be to make the services mobile and bring appropriate preventive and curative health care to the users on a regular basis. The potential impact of new technologies (e.g., computer, electronic transmission, video) may improve the accessibility of health care services in rural areas.

Some have suggested restructuring the rural health care system to incorporate more midlevel practitioners (e.g., midwives, nurse practitioners, emergency medical technicians). These midlevel practitioners would be widely dispersed and serve as an initial point of patient contact either for resolution of problems or for referral to more highly trained health care providers in regional medical centers (Miller, 1982). However, improvements in the availability of health care services will not guarantee improvements in affordability. Improvements in health insurance coverage and lower cost premiums for self-employed farmers may improve affordability of health care. Economic development efforts that raise incomes of rural households should also improve the affordability of health care.

The types of policies needed to address the availability (supply) and the affordability (demand) of rural health care services need to both be investigated. As O&A point out, there is a narrow range of local government interventions to improve health care services. "Medical care is not directly controlled by any level of government, unlike many other components of an area's infrastructure such as education, roads, or water systems (Arean and Fryer, 1985, p. 7)." Thus, more attention must be given to the appropriate types of interventions that should take place at different levels of government—local, county, state, or national.

To conclude, it is critical to analyze the economic, social, political, and institutional milieu that impact (both positively and negatively) the availability and affordability of health care services. The intended and unintended policy distortions that affect the availability and affordability of health care services are numerous.

References


Endnotes

1. Unfortunately the paper by O&A does not compare its model, variables, data, or results with previous studies.

2. If CHCs provide subsidized medical services, then they arguably also deal with demand-related problems too.

3. Using independent equations it may be concluded that the existence of a CHC in a county does compete with private practices and does discourage physician locations.

4. In general, self-employed farmers do not have good health insurance coverage (Trevis, 1994).

Issues Confronting Missouri in Developing Health Care Services for Older Adults

Anne Deaton*

In this paper, I want to discuss three concepts: (1) factors that make Missouri a good microcosm for understanding what is happening in rural and urban areas with regard to the delivery of health care services, especially to the elderly; (2) urgent health care issues for rural Missourians, especially to the elderly; and (3) grass roots activity that can energize local communities to take action that can make a difference and to use this as an example of public policy designed to improve health care, and, at the same time, contain costs. By way of introduction, I want to begin by explaining the vantage point from which I write. Missouri is, I believe, on the cutting edge with regard to pressing innovative and concerted efforts to meet the needs of seniors with regard to health care. And now, Missouri is joining the list of states that are working diligently to put together a state health insurance proposal that will secure a waiver from the federal Medicaid program to develop our own program to meet the needs, not only of those in poverty, but also for the working poor and the uninsured.

Missouri and Elders

Missouri’s policies and programs are designed to enable the elderly and disabled to live at home or in a residential care facility and to avoid premature institutionalization or to eliminate entirely the need to seek institutionalization. I will discuss in greater detail about this program known as “Missouri Care options” later in my presentation. Missouri’s home care and protective service programs are delivered through the case management provided by over 250 social workers located across Missouri contracts with 120 private sector in-home providers state wide, and through our states 10 Area Agencies on Aging that carry out the mandates of the Older Americans Act at the local level.

With this background on my position, you understand why I naturally come at health care from the perspective of the needs of the elderly. However, I am persuaded that many of the issues and barriers to wellness promotion, preventative health care and medical care for acute and chronic illnesses, both physical and mental, that frustrate delivery of comprehensive and case-managed services to seniors also overlap with problems identified in providing services to other age groups and special populations - this is especially true for delivery of services in the rural areas of Missouri.

I believe the "graying of Missouri" and its consequences for health care mirrors the "graying of the U.S." in both its rural and urban areas. Statistics illustrate that Missouri is a good microcosm of what

*Anne Deaton is Deputy Director of Alternative Services in Missouri’s Division of Aging.
is going on in the nation. Missouri is in the top 10 states with an elderly population with 14 percent or more of persons 65 or older constituting its total population in 1990. Missouri’s 60+ population, comprised of 945,000 seniors, ranks 9th in the nation. Approximately 9.2 percent of elderly population over 60 in minority. Missouri has two major metropolitan areas, St. Louis and Kansas City, that have high populations of seniors. Both cities grapple with the full range of inner-city socioeconomic problems faced by major cities across the country. And, ironically, in these cities, which are home to some outstanding medical schools, hospitals, and clinics, many elderly are afraid to leave the home for fear of losing access to better health care, to shop or socialize because they fear being victims of street crime. One senior was recently shot just outside the senior center in St. Louis which she attended.

Still, Missouri is largely a rural state and therefore a bellwether state in terms of analyzing migration patterns among the elderly and problems associated with delivering health care services. There are 717,681 Missourians 65 years and older and 43 percent of them reside in rural areas. Some rural counties have had an increase in numbers of elderly primarily due to the in-migration of retirees from outside the state. These people are looking for low-cost living, and a low-crime, quality community in terms of recreational and social amenities and a moderate climate. Springfield, Missouri, and surrounding counties in the Lake-of-the-Ozarks area are prime examples of what researchers have labeled as "naturally occurring retirement communities," in contrast to the planned, age-segregated communities like Arizona’s "Sun City" and Florida’s numerous mobile home communities.

Indeed, communities in Missouri are currently competing to attract the young-old and early retirees in the 55-65 age range. The Chamber of Commerce in my home community of Columbia, which has organized a task force to develop a marketing plan and recruit seniors, is typical of many other communities in Missouri and across the country. Those communities are eager to benefit from the economic boost these retirees can bring to the community due to their discretionary income and savings. Moreover, this "young-old" population is typically civic-minded and offers a skilled pool of volunteer and part-time labor. The communities are less prepared to meet the needs of those persons as they age in place in terms of public transportation, emergency health care services, geriatric care, housing options, that is, environments that are barrier-free, and work opportunities (volunteer or paid) that encourage productivity and meaningful social involvement.

Research is yet to be done in Missouri to determine whether the migration patterns in Missouri will follow the developmental perspective posited by Dr. Litwak, a sociologist at Columbia University’s School of Public Health and Dr. Charles Longino, a sociologist at the University of Miami (1987). Their research indicated that there are kinds of moves tend to occur with the aging in modern society: one when they retire, a second when they experience moderate forms of disability, and a third when they have a major form of chronic disability. But even communities for which Litwak and Longino’s migration patterns do not hold will be faced with supplying all the previously-mentioned needs for a growing population of older citizens who will age in place with their communities and require a multitude of services.

Obviously, the growing population in northern Missouri rural counties poses an entirely different picture in terms of an increasing population of seniors. Here, the older population is in-migration of younger adults, increased life expectancy and a low birth rate. Services of all kinds, especially health care, are diminishing in northern Missouri and other rural areas sharing similar problems. These statements are most relevant to thepressing needs in these counties and their hundreds of counterparts across rural America.

It is true that today’s elders, rural or urban, are overall healthier, more active, better educated and more knowledgeable than their counterparts of a generation ago. But increased life expectancy inevitably involves sensory decline and chronic ailments -- especially for Missouri’s fastest growing age group, the 85 years and older, who already number 85,000. Elders who are coping with sensory impairment, frailty and illness, are at risk of inadequate health and mental health care if they reside in rural areas. The highest risk factor is that there is a critical shortage of primary health care providers and virtually no out-patient mental care.

Researchers Ray Howard and Gary Lee (1985) summarized some additional harsh realities that are closely linked with inadequate health care for rural elders.

1. On average, the income of the rural elderly is consistently lower than that of their urban counterparts and a much higher proportion of the rural than the urban elderly have incomes below the poverty level. Prescription drugs, hospital deductibles, co-payments, and medi-gap insurance premiums are prohibitively expensive for many low-income elderly.

2. The rural elderly occupy a disproportionate share of the nation’s and state’s hospitals and long term care institutions.

3. The rural elderly exhibit a larger number of health problems that tend to be more severe in comparison with the urban elderly. As a result, a larger percentage of them retire for health reasons. However, the researcher’s argue that this does not necessarily transfer into lower life expectancies.

4. The health and mental health impairments of many elders are not readily treated in rural areas; indeed, rural health and human services are less abundant, less accessible, and more costly to deliver than in urban areas.

5. Public transportation is more necessary for, but less available to, the rural elderly.

6. Studies of the kin relationships of the elderly do not indicate that they are significantly stronger in rural society.

Many of today’s rural elders had expected to rely on family members for assistance with activities of daily living or even full-time caregiving. Today, more and more of these younger family members have migrated out of the region; adults who remain often commute to jobs outside the community; and many farm-families are seeking off-farm employment. (U.S. Census Bureau).

Consequently, there are fewer homes of adult children in which elders can stay all day in the company of a family member, and there are fewer persons available to check on an elder who resides in his or her own home.

Issues and Concerns

I will expand on a few of the problems just identified. I will also suggest some possible action steps. However, I believe that the overriding action that is needed is some sort of national health insurance that covers Americans of all ages and all incomes and which includes long-term care.

Issues arising from hospital closings serving rural areas may not be as critical in rural Missouri as it is in the rest of the nation. According to the Missouri Department of Health, the total number of hospitals in Missouri remained remarkably stable during the 1980s. While some hospitals have permanently closed, others have opened. The net result is that Missouri had one more hospital in the 1988 reporting period than it had in 1980. Consequently, I will not address the issue of hospital closings, although it is a serious issue for many rural states.

The special needs of the rural minority elderly are difficult to address because of their lower population density in the majority of rural Missouri counties, with the exception the Southeast sector of Missouri commonly known as the Bootheel. Dr. Delores Davis-Penn, a State Extension Specialist in Gerontology at Lincoln university, cites the lack of primary health care physicians and health care agencies that will accept third party reimbursement (Medicaid) as a fundamental problem for many poor African-Americans living in the Bootheel. This is especially true for African-American women living alone. Almost 80 percent of these women in the Bootheel live in abject poverty and are totally dependent on monthly supplemental security income of less than 400 dollars a month. Furthermore, illiteracy rates (this region of Missouri has the highest illiteracy rates in the nation -- over 30 percent) increase the difficulty and cost of implementing educational intervention programs to modify lifestyle behavior and diets.
With regard to special populations of seniors who have difficulties speaking and understanding English, some effort is being made in Kansas City to address their needs through the development of multi-lingual print materials. However, in many areas of the U.S., overcoming the language barrier in relation to facilitating health care and outreach in general to these seniors is a serious issue and must be taken into account in identifying problems associated with access, cost and quality of care. In fact, the Older Americans Act mandates that Area Agencies on Aging, whose service area includes a high proportion of seniors with language problems, must employ multi-lingual staff and multi-lingual materials that can be read by the predominant non-English speaking population.

I have tried to illustrate why I believe the socioeconomic demographics relating to a rural populations and rural dynamics in Missouri reflect, to a greater or lesser extent, what is happening across the United States. Consequentially, I believe that actions we have taken in Missouri have implications for other states. Two programs launched in Missouri illustrate how Missouri is aggressively dealing with health care issues and devoting specific attention to rural or elderly health care needs.

Missouri's State-wide, Rural Health, Interactive Satellite Seminars

The first program is Missouri's Rural Health Satellite Seminars. There have been two of these. I have had the exciting challenge of chairing the state-wide planning committee which organized the first state-wide seminar which was held in October of 1990. The satellite seminar and the one which followed in September, 1992, were co-sponsored by the University of Missouri Extension System and the W.R. Kellogg Foundation.

Through interactive satellite, this grass-roots seminar linked together community health providers, community leaders and lay health consumers. In the 1990 seminar, almost 10,000 persons from 81 counties at 71 downlink sites came to discuss health care and wellness promotion for persons of all ages in their local communities and to learn about innovative solutions implemented in other rural areas. Over half of the counties involved subsequently took some local action with regard to improving their health care, from something as simple as developing directories, to forming community task forces to address local issues, to planning and implementing educational programs in concert with University Extension, to more complicated and intense efforts involved in passing a mill tax earmarked for elderly health needs in a county which had only one physician (who was over 70 years old). It is very significant to note that all participating counties ranked the health care needs of the elderly high on their list of concerns. A follow-up satellite seminar was held on September 24, 1993 to share the progress that has been made and to give the counties another opportunity to learn from one another and to interact with health professionals in several key areas.

The local community and county level committees that formed to deal with the logistics of arranging the location for down-linking the seminar and developing the local meeting agenda (including gathering health statistics and sociodemographics relative to that community) gave birth in many communities to a social infrastructure that University Extension has drawn upon on several occasions to generate grass-roots dialogue and action. One of these occasions was another interactive satellite seminar entitled "Aging Populations and Aging Infrastructures" held in July of 1992. This seminar was sponsored by the USDA Extension Service and the National Association of County Commissioners. I believe that this type of community development and educational activity combined with a town hall public forum can be most effective, and serves as a catalyst for community action and involvement.

Issues Affecting the Availability of Health Care in Rural Areas

I believe that several issues are important to Missouri in solving its health care problems. Many of these issues were underscored in the feedback University extension received from the discussions that occurred at the local level during the satellite seminars. Some of these issues were identified in the course of my participation with a state-wide rural elderly task force which was comprised of health care professionals. The group was actually a spin-off of professionals who had been involved in the state-wide planning committee for the satellite seminar and who were particularly interested in the elderly. Missouri's Division of Aging has implemented a plan to both improve home and community care for seniors and contain escalating long-term care costs in the state.

(1) Lack of Primary care physicians and nurses and other allied health professionals with generic care training.

Rural areas that have experienced a decline in the number of younger adults and families living, working and consuming goods in rural areas hold few attractions for members of the medical community who fear there is not a sufficient population or economic base to reimburse their current services and cover their past educational debts. Moreover, outmigration may also have further undermined the quality of life in the community in terms of social and cultural opportunities, educational opportunities for children, housing options, and employment opportunities for spouses. These conditions negatively affect efforts to recruit and retain health care professionals in underserved rural areas.

The shortage of rural physicians has reached a crisis stage. Most rural physicians are over 55, and many are near retirement. Worth county, for example, is served by a physician in his 70s. Many rural counties are without even one physician. Action steps include increasing the opportunities for students in medicine, nursing, and allied health professions to intern in rural areas; and establishing area health education centers within rural regions in order to make continuing education of health care professionals available. These centers should include training in geriatric assessment and care.

Rural communities should build on the knowledge that physicians who grew up in rural areas are most likely to return to rural areas to practice. Internship programs, for example, might be used to introduce high school students in rural areas to a range of medical careers. Scholarship support and mentoring programs may also be important. Another idea might be to offer health care training for rural residents who are seeking mid-career changes, and for women entering the work force for the first time.

It may be necessary to offer financial incentives. One possibility is low-interest loans to help establish a practice and pay the malpractice insurance premiums, not for all doctors, but also for the physician's assistants and nurse-practitioners who are willing to work in underserved rural areas. Another option is to offer financial incentives to establish group practices that address the life-span needs of community members. Group practices offer many advantages including on-site collegial support for diagnosis and treatment, peer education, alleviation of physician burnout by making backups available, and reduction in operating expenses due to joint sharing of office space, equipment, and secretarial support.

(2) Lack of non-institutional, home and community-based long term options and services

Rural elders share in common with their urban counterparts the desire to remain in their own home and be as independent as possible. However, the rural elderly lack the range of community support services increasingly available to the elderly in urban areas. These services include adult day care, a service virtually non-existent in rural Missouri. The need here is great since adult day care normally costs substantially less than nursing home custodial care and hospitalization. According to a study, 43 percent of Medicaid recipients in Missouri's nursing homes may have been able to receive care in less restrictive care settings such as adult day care. Other examples include respite care, home health care, home chore and companion services and gatekeeper programs that use community systems such as mail carriers and utility workers to monitor the well-being of elders living in their own homes and apartments. Still other possibilities include adult foster-home programs, assisted living housing arrangements, telephone reassurance and hotlines.

These services are needed to strengthen and maintain the support systems of family and friends who otherwise might be forced to prematurely seek institutional care for older persons. As previously mentioned, due to the increase in off-farm
employment and the increase in dual-career families means there are fewer members of the traditional support system for a dependent older to call upon during the day. Adult day care would greatly enable families to balance work and eldercare obligations.

These services are also critical because DRG regulations (that is, diagnostic related groupings that set limits on reimbursements to doctors and hospitals) have tended to send elders home from a hospital "quick and sicker." Family members may be unprepared to deliver the level of care needed. Without in-home health care services to assist the caregiver, there is an increased probability of institutionalizing an elder in a nursing home.

Action steps include expanded reimbursement under Medicare and Medicaid for in-home health services and adult day care, and educating the public with respect to the full range of long-term care options.

(3) The Need for emergency medical services (EMS) for dealing with bath injury and illness

While enhanced EMS capabilities would benefit rural residents of all ages, it is important to note that the average age of Missouri farmers is 55 years and occupational hazards are greater in farming than any other industry in the country.

Possible action steps include supplying fully equipped modern ambulances and trained crews that can stabilize critically ill or injured patients at the scene. In rural areas, money spent on upgrading emergency medical services may be better spent than on upgrading a typical emergency room in a rural hospital.

Access to Health Care by the Rural Elders

Key components of the "access" issue are:

(1) awareness of services and eligibility requirements; (2) transportation; and (3) cost of services. Each component is an integral component of effective access. The aging network is so fragmented that consumers as well as professionals are confused about where to turn for general and specific information about services.

A constant refrain among older residents is "Who should I call for different kinds of help that I or my spouse might need?" Medicaid benefits or determine if I qualify for Medicaid?" Likewise, adult children ask "Who do I call to learn what services are available for my parents of see if they qualify?" or they ask: "What help is available for the caregiver? Do I call the: The Area Agency on Aging? The County Office on Aging? The Senior Center? The Department of Family Services? The county public health department if there exists one? The doctor's office?"

For example, elders and their caregivers often do not realize that programs sponsored by the Area Agencies on Aging are opened to all older persons over 65, regardless of income. They often do not attend congregate meals at nutrition sites because they believe congregate meals and meal-on-wheels programs are only for poverty-level persons. The stigma of welfare bars many needy elders from participating in these programs.

Action steps include the development of a large-print directory of all age-related services for every county that could be inserted in every phone book. Another possibility includes the creation of a "one-stop shopping," 800 number within the Area Agencies on Aging for two levels of information and referral: 1 & 2--that is, simple I & R, when the individual is capable of taking the next step on his or her own; and enhanced I & R, when someone needs to assist the elder or caregiver in exploring service options or when the individual appears to be a candidate for case management.

An excellent approach might be to design a single-entry approach for entry into the aging network for health and socioeconomic assistance or improve the current multiple entry system by using standardized assessment and screening forms across agencies. It might be an option to fund a case management approach to health care that is based on individual health care service plan that prescribes, monitors, adjusts, and evaluates the health care and social services to an elder in a comprehensive manner. Area Agencies on Aging are likely units within the aging network to provide case management. Additional interagency communication, cooperation and coordination of services in order to implement a case management approach might also prove effective. Still another policy option is to greatly expand the aging network's ability to publicize that programs, develop peer education programs and increase public education using channels such as multi-media outlets. County Cooperative Extension, Rural Electric Cooperatives, churches, community groups and places of employment.

Transportation for Elders

Many elders cannot drive or afford to have others drive them. It is not atypical for older patients to drive 50 miles or more to see a doctor. Even when subsidized bus service exists, the bus time schedule might not coincide with an elder's schedule. Office visits or may require the older person to be gone far longer than their own office visit necessities. Most elders prefer a family member or friend to transport them, but, as we have repeatedly noted, fewer and fewer members of the traditional support system are available. If the threat of personal liability were removed (as it is under the Good Samaritan legislation in Missouri for persons who transport people in an emergency crisis situation), there would likely be an increase in the number of community volunteers who would provide transportation. A reduction in the liability threat for non-profit, charitable groups and public agencies would also encourage these groups to share transportation vehicles and to organize and coordinate transportation services and provide training that would educate drivers to the special needs of elders. Low-cost liability insurance would likely encourage a small scale entrepreneurial response to transportation needs. Enterprise (adults in rural areas including older persons themselves) might represent a labor pool for a small-scale transportation service. A final consideration is to install emergency phone 911 number systems where ever they do not currently exist.

Reference


Endnote

Comments in this paper are derived from my experiences in the following positions: (1) State Extension Specialist in Social Gerontology for the Cooperative Extension System of the University of Missouri for the last three years. In that capacity, I am an adult educator, a researcher, an advisor to community groups working on aging issues, and a liaison between agencies within the aging network and the unique resources represented by the Cooperative Extension System. (2) State Project Director for a new community-based educational program for seniors entitled Senior Series The W.K.Kellogg foundation funded the development of Senior Series materials and their dissemination nationwide through the Cooperative Extension System as a means of providing information to help senior adults improve the quality of their physical and mental health, strengthen their independence and provide opportunities that allow them to continue living in their home communities.

Under a $100,000 contract with the Missouri Department of Social Services and its Division of Aging and all ten Missouri Area Agencies on Aging, Senior Series educational programs are being implemented in over 20 sites across the state. Over three-quarters of the projects are in rural Missouri and utilize Senior Centers. It is important to note that (1) Senior Series is a project being implemented through interagency cooperation at the local, regional and state level with each agency inputting resources that reflect their comparative strengths; and (2) that older persons are integrally part of the planning committees for these projects and help choose projects which most correspond to local needs as they perceive them. And their choice of project supports findings from studies which show that older persons have a high interest in acquiring health-related information and improving their lifestyles. They are very interested in Senior Series materials addressing (i) self-care (i.e., increasing knowledge about nutrition, medication side effects, and the causes and coping strategies for incontinence); (2) peer-education (seniors outreaching to seniors)
as a mechanism for disseminating information about caregiving, health care consumerism, stress, and legal issues; and (3) intergenerational activities.

I am also co-chair of the newly organized Rural Elderly Health Task Force. Task force members are working to identify priority health issues for Missouri’s Office of Rural Health, to promote relevant research and to be an information resource to communities that request assistance in addressing the health needs of their older residents. The task force was organized within the Missouri Rural Health Coalition Initiative (MRHC)—a networking and advocacy group comprised of representatives from a wide range of public and private health care organizations and educational institutions including the University of Missouri.

Issues Confronting Missouri in Developing Health Care Services for Older Adults: Discussion

David W. Hughes

Anita Deaton has provided an interesting and thought-provoking paper concerning the provision of health care services to the rural elderly in Missouri. My discussion will contain two major sections with the first section serving as a direct discussion of her paper. In that section, the implicit premise is accepted that providing in-place health care for the rural elderly is a social goal worthy of committing at least some additional resources. The second section is a brief discussion of the basic controversy underlying the provision of in-place health care services in many rural areas.

Deaton makes a strong case for using Missouri as a microcosm for studying the delivery of health care services especially for the rural elderly. In this regard, she points out that a large number of elderly live in the state. These individuals are a mixture of in-migrants and in-place retirees residing in both rural and urban communities. A more explicit age group delineation of the rural population in Missouri would have reinforced this point.

A more important omission was made in not noting the difference in population density between rural Missouri and other rural areas. Rural Missouri is more densely populated than many rural areas in the Rocky Mountain and High Plain States among others (U.S. Department of Commerce, 1993). Strategies that provide health care to rural elderly in Missouri either may need modification or may not be applicable to an area such as western North Dakota.

The second major set of topics in her paper was urgent health care issues for the rural elderly. A very good job has been done of summarizing the health care needs of the rural elderly and the problems encountered in meeting those needs. Reriterating, one can state that problems in providing rural health care have two basic underlying causes. The first cause is the demand side problem of relatively low incomes of many elderly people. The second cause is the problem of supplying goods and services to sparsely populated rural areas. The lack of threshold demand in a central place theory context and the resulting inability to obtain economies of scale are chronic problems in adequately providing a number of public and private services in rural areas.

The third major set of topics in her paper was state government backed grass roots efforts aimed at providing health care needs for elderly people in rural areas. The satellite seminar she discussed is an important first step in developing social and, in some cases, physical infrastructure for generating dialogue and action. Exchange of information speeds the diffusion and the adoption of new ideas and may facilitate cooperation between communities in delivering health care.

The paper has little additional discussion on the role of telecommunications, however. The only exception was installing an emergency phone 911 system in all rural areas. The lack of discussion of telecommunications based solutions is partly a reflection of the relatively dense population of rural Missouri in comparison to other rural places. One suspects that the same type of grass roots planning in a state such as Montana would have presented more telecommunications based solutions.

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A greater emphasis on telecommunications would have raised some broader issues. One major concern is the need to integrate telecommunications into discussions about health care and other public services. It is important that critical needs in the provision of rural public services such as health care are fully considered in the development of the information highway. The highway may fail to help solve problems in rural communities if it is implemented without explicitly accounting for that role.

For economists and others, concerns about the costs of different service delivery programs are tantamount. A related concern is the necessity of expanding public support for rural health care. A number of inexpensive or even cost-saving solutions are included in her paper such as large print directories for age-related services. The best example was the successful effort of state government in Missouri to expand Medicare and Medicaid reimbursement coverage to include in-home health services. This change has precluded the premature outflow of many elderly into nursing homes, thereby enhancing their quality of life and saving substantial amounts of public funds. Such solutions beg the question of whether proper rural health care delivery is simply a matter of mastering the political will to apply current programs in a more efficient and effective manner. Alternatively, can the "crisis" only be met through substantial increases in public support? Unfortunately, even if health care needs can be met through reallocation of existing funding, Public Choice Theory and the current debate over a national health care policy suggest that the necessary reforms may not be forthcoming.

References


Deaton, Anne. "Issues Confronting Missouri in Developing Health Care Services for Older Adults." (This issue).


The debate over subsidized in-place rural health care as a merit good is well summarized in a debate between Deberzin and Hite appearing in Choices 1991 (Deberzin 1991a, Deberzin 1991b, Hite 1991). Hite implicitly argues that in-place rural health care is not a merit good. He states that we can not afford to develop a health care policy in which the quality of care is not affected by where one lives. Deberzin implicitly claims that in-place health care is a merit good in arguing that the quality of health care should not be a function of location. He further points out that with modern technology, health care needs in remote rural areas can be met fairly inexpensively, a point that Hite would dispute.

As a society, we need to determine whether merit goods exist and if so, is in-place health care such a good. If the answer to both questions is yes, the issues become how to efficiently provide in-place health care given our political system and determining the level of subsidy for its provision.
A Comparative Analysis of Nursing Home Care and Costs in South Carolina Rural and Urban Areas

Wei Yu and Garnett L. Bradford

Differences in the extent and quality of nursing homes are between rural and urban areas in South Carolina as investigated in this paper. The paper will provide information for policymakers who must consider the impact of policies on the services of nursing home care to rural areas supplied by the nursing home industry. Under the current system, most nursing home care is paid by state and federal governments through the Medicare and Medicaid programs. Furthermore, the increase of new nursing beds is strictly controlled by state governments so that the expenditure for nursing home care will match the budget. Thus, the supply for nursing home care mainly depends on reimbursement rates, and the demand for nursing home care is not subject to price. So, demand for nursing home beds for public patients cannot be matched by the supply and long waiting periods become inevitable. In such a setting, important factors such as quality of facilities and closeness to patients' family (a demand side variable) may not be accounted for by the supply side.

Quality of services is the most important factor to patients. In South Carolina, private-pay patients accounted for about one third of total patient days (Yu and McKown, 1992). Since the rates charged for private patients are not controlled, there is no shortage of nursing beds for private-pay patients. Under the state regulation, however, each nursing home has to meet a minimum level of public patient days. Beyond the minimum level of public patient days, home managers have incentive to attract private-pay patients because private patients pay higher rates and require less paper work than public patients. Market competition will force some homes to improve their quality if there is a potential demand for private-pay nursing beds within their local areas. According to the 1990 Census of Population and Housing, the per capita income in South Carolina urban area is $15,243 and in rural area is $12,808 in 1989 dollars. This suggests that urban areas may have a higher percentage of private-pay patients, and the quality of nursing homes may be better in urban areas.

Closeness to patients' home is another important factor the patients desire. The life of a patient will be much better if he or she can stay with familiar people and can see their family members very often. Under the current system, the licenses are granted to each county according to the aged population. The number of beds in rural nursing homes are affected by the economies of scale. Therefore, the number of nursing homes will be fewer in rural counties than that in urban counties. If this hypothesis is true, we should expect that rural patients will travel longer to get into a nursing home.

Another potential difference between rural and urban areas is the factor markets. Different prices of inputs will lead to different services. On the other hand, factor markets of the nursing home industry are not affected by the rural-urban division, costs differential may not be observed between rural and urban areas. In the nursing home industry, the cost of nurses and nursing aides account for about half of the total costs. Therefore, wage differentials across local labor markets may be reflected into cost structure and affect nursing home services. Since the number of nurses and nursing aides are required by regulation for a certain number of beds, there may not be any differences across area if each

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nursing home keeps their staffing level at the minimum.

In this paper, we examine the potential differences in quality, locations, and cost structure of nursing homes between rural and urban areas in South Carolina. We divide the empirical research into two parts: (1) a comparative rural-urban analysis on size, skill level, general quality, and distribution of patients' home locations; (2) the cost structure analysis. In the cost structure analysis, a translog cost function is defined and a system of equations is derived to represent the shares of major individual operating costs. Regression estimates are compared between rural and urban nursing homes. Finally, the research results are summarized and some policy related issues are discussed.

The research results show that there are no significant differences in the size, skill level, and structure of operating costs between rural and urban nursing homes. However, the results suggest that rural areas have more homes with lower quality. The results also suggest that rural homes have more patients from remote areas, while urban homes have a higher percentage of patients from their own counties. On average, rural patients have to travel longer distances to get into a nursing home.

The Data

The data used in this research come from two sources. The cost data are provided by the State Human and Health Services Finance Commission. The home locations of patients are from the Joint Annual Report of Nursing Care Facilities provided by the Office of Cooperative Health Statistics, the Division of Research and Statistical Services, State Budget Control Board. The study covers a four-year period, 1988 through 1991. All the regression models are based on single year data; pooling across years would not be valid because parameters may change when the reimbursement policy changes from year to year. Hospital based homes were excluded from the analysis because many patients in those homes require intensive medical service which varies widely across patients. Therefore, most of the hospital based homes have much higher costs, which may be due to more hospital related services. Also homes with budget numbers (those which do not have actual cost data) were excluded. A few homes are excluded because these homes do not have data in both data sources. The resultant number of homes (observations) in the regression analysis by years is:

- 1988: 95 homes.
- 1989: 88 homes.
- 1990: 93 homes.

The resultant number of homes (observations) in the patients' home location analysis is:

- 1988: 95 homes.
- 1990: 94 homes.

Comparison between Rural and Urban Areas

Home Size

Since the number of nursing stations required for each home differs according to its size, most homes try to maximize the number of beds for each nursing station. Therefore, home size is affected by the regulations. In this research, the nursing homes are separated into four groups: N <44, 44 ≤ N <88, 88 ≤ N <132, and N ≥ 132, where N is the number of beds. This division is consistent with regulations for nursing stations. The percentages of nursing homes in each size-group are shown in figure 1, for both rural and urban nursing homes, from 1988 through 1991. This figure indicates that rural homes have higher percentage in the size between 88 and 132 beds, but urban homes have greater percentage in the size larger than 132. This distribution is consistent with the fact that rural areas have lower population densities. However, it does not mean that rural patients can find a nursing home as easy as urban patients.

Skilled Patient Days

Patients in nursing homes are classified into two levels according to their health's status: patients requiring skilled nursing care and patients requiring intermediate care. The proportion of skilled patient days are stable over time because nursing home managers are reluctant to adjust their staffing level to match the changes in service intensity (Yu and Bradford, 1993). Therefore, the proportion of skilled patient days can be used to approximate the staffing level of a nursing home.
Distributions of the proportion of skilled patient days in rural and urban homes from 1988 to 1991 are presented in Figure 2. This figure does not reveal any consistent difference between rural and urban homes.

Quality

The quality of a nursing home includes the qualities of services and facilities. In general, it is difficult to measure the general quality of a nursing home. Prior research has used several measures to reflect the quality of services (Feldstein 1993, pp. 511-545), which are based on the purpose of analysis. In this paper, the proportion of private-pay patient days are used as a proxy of general quality. In South Carolina, there is no waiting time for private-pay patients. Therefore, private-pay patients have the opportunity to choose a home with better quality. Consequently, the homes with better quality should have higher percentages of private-pay patient days. Figure 3 shows the distribution of private-pay patient days for rural and urban homes from 1988 through 1991. There is a consistent pattern over the four-year period: the urban areas have more homes with higher private-pay patients.

It may be argued that urban location is one of the factors attracting the private-pay patients. This argument, however, is limited because the activities for nursing home patients are mostly restricted within the facility. The quality of facility and services are very important factors for choosing a nursing home. Hence, the distribution implies that the general quality is lower on average in rural nursing homes. This is consistent with the per capita income differentials between rural and urban areas. High per capita income, urban areas tend to have a higher percentage of private-pay patients. Therefore, urban homes have local advantages to attract private-pay patients by improving their quality of services.

Patients' Home Locations

Closeness to the patients' family and relatives is one of the important factors used by elderly people to choose a nursing home. Because of the regulation to distribute licenses and the economies of scale, it is possible that fewer nursing homes are located in rural counties. Earlier study showed that economies of scale does not exit in the cost of dietary and administration (Yu and Bradford, 1993) but not significant in other cost categories. Since the number of nursing beds in each county is distributed by the state government according to its aged population, economies of scale are the major reason to determine whether there will be several small nursing homes or a large home. Therefore, it is informative to examine whether rural areas have the same level of nursing home services as that in urban areas. This information is revealed by looking at some distributions related to patients' home locations in both areas.

Figure 4 shows the distribution of nursing homes with respect to the proportion of patients from the local county where the nursing home is located. About 60 percent of urban homes have more than 80 percent of their patients from their own county. On the other hand, only about 20 percent of rural homes have more than 80 percent of their patients from their own county. It is clear that on the average, nursing homes in rural areas have more patients from outside counties.

Though it is possible that some patients' homes may be closer to a nursing home in an adjacent county than the homes located within their own county, such a big difference should be significant. In order to obtain further information, a set of local areas are defined, which includes the local county and all of its adjacent counties. Sometimes, a county is very close to the home's local county, but they are not adjacent on border. In this case, that county also is included in the local area. We graphed the distribution of nursing homes with respect to the patients from the local areas defined as above in Figure 5. The difference of the distribution about patients' home locations between rural and urban areas is largely reduced. Still, urban areas have slightly more homes that have more patients from local areas. This implies that more rural homes have higher percentage of patients from remote areas (outside the adjacent counties).

The same point can be examined from another aspect. Table 1 summarizes the distribution of total rural and urban patients with respect to their home location. For 1988, 1990, and 1991, about 37 percent of rural patients stayed in a nursing home that was outside of their home county, but only about 22 percent of urban patients stayed in a nursing home that was outside their home county.
Figure 4. Distribution of Nursing Homes with Respect to Proportion of Local Patients

Figure 5. Distribution of Nursing Homes with Respect to Proportion of Patients from Local and Adjacent Counties
Though the adjacent counties are included, rural patients have a higher percentage (about 11 percent) than urban homes (about 8 percent) of stay in a home that was outside the adjacent counties. This differential is even larger for 1989. The reason for such a large difference in 1989 is not clear. It may be caused by errors in filling out the form, or some changes in regulation. But, the evidence from the other three years consistently indicates that more rural patients have to travel farther to get into a nursing home. This evidence is consistent with earlier analysis in that the number of homes in rural areas is smaller due to the economies of scale.

Structure of Operating Costs

Model

Most of the prior research on nursing home costs focuses on average total cost or total cost and its determinants. To study the determinants of the nursing home cost function, we concentrate on the cost of each input factor and their determinants. Total operating costs are divided into five factors, which is consistent with the reimbursement categories. The five factors include nursing, dietary, administration, maintenance, and utility. The share of each cost category is then regressed against the key variables (a "seemingly unrelated regression" methodology) and a dummy variable is included to reflect any differences between rural and urban homes (Yu and Bradford, 1993).

Capital related expenses are not included for a variety of reasons. From the point of view of economic theory, the accounting cost of capital is unlikely to reflect the opportunity cost of capital. In addition, capital related expenses usually are not associated with short-run services. Those costs are determined by historical construction costs, age of facility, method of financing, and type of ownership. As a result, the cost vector contains five elements: nursing, dietary, maintenance, administration, and utility.

To analyze the variation of operating costs, the natural way is to establish a operating cost function. The existence of a cost function, however, must be based on assumptions concerning the behavior of firms. Therefore, the cost function depends on what the home's owners or operators intend to do and what their constraints are. To estimate a cost function for the nursing home industry, several problems have to be addressed.

First, the outputs of nursing homes are not well defined. The number of patient days does not have the same characteristics of outputs. Different levels of care require different intensity of services, which have different costs. Some researchers have tried to characterize a detailed functional status of patients (Schlenker et al., 1984 and Schneider et al., 1988). Research along this line has provided a great deal of information about the determinants of nursing home operating costs. But it is difficult for policymakers to use the detailed information as a reference for several reasons. In many states, reimbursement rates are only set up for two categories: intermediate care facilities and skilled patient care facilities (ICF and SNF), to identify differentials in service intensity. Therefore, home operators are facing only two output prices. In order to minimize cost, home operators tend to allocate resources to keep the average cost of services to different patients at the matching level for output prices. In this study, two outputs (ICF patient days and SNF patient days) are used to approximate outputs of a nursing home.

Second, the quality of services is not reflected by patient days. Measuring quality is one of the difficulties in estimating a cost function. Since the quality of services is directly related to costs, a factor reflecting quality of a nursing home must be included into the estimating equation. Service quality has been approximated by several ways in prior research. Some researchers have used outside ranking, or percentage of private patient as a measure of quality of services. Others were using number of nursing hours to measure quality (such as McKay, 1987). In this study, the quality of services is measured as a function of the number of beds per nurse and per nursing aides given the same proportion of SNF patient days.

The State Department of Environmental and Health Control (DHEC) in South Carolina has a minimum requirement of the nurses and nursing aides hired in a nursing home. For every 44 beds, one licensed nurse is required for each shift — 11 beds per nursing aide for the first shift, 15 beds for the second shift, and 22 beds for the third shift. As SNF patients require more services, the quality of services would be different even for the same number of beds per nurse and per aide if the proportion of SNF patients days differ. Having considered above conditions, the Index $I_q$ is used to approximate the quality:

$$I_q = \frac{1}{2} \left( I_{nur} + I_{aide} \right)$$

where

$$I_{nur} = \frac{N_{nur}}{K N_{nur}}$$

$$I_{aide} = \frac{N_{aide}}{3 K N_{aide}}$$

and

$$N_{nur} = N_{nur} + 2 N_{aide}$$

$$N_{aide} = N_{aide} + 2 N_{nur}$$

$N_{nur}$ — number of licensed beds,

$N_{nur}$ — number of full time licensed nurses hired,

$N_{nur}$ — number of part time licensed nurses hired,

$N_{aide}$ — number of full time aides hired,

$N_{aide}$ — number of part time aides hired,

$N_{bed}$ — number of beds per nurse per shift required by DHEC,

$N_{bed}$ — average number of beds per aide per shift required by DHEC,

$K$ — a factor reflects the proportion of SNF patient days, which is determined as follows:

If the proportion of SNF patient days are greater than or equal to 0 but less than 0.1, $k=1$, and if the proportion of SNF patient days are greater than or equal to 0.1 but less than 0.2, $k=0.2$, ..., if the proportion of SNF days are greater or equal to 0.9, $k=1$.
Correct specification of the cost function is difficult for nursing homes. Since the nursing home industry is regulated by government, the number of patient days for Medicaid and Medicare patients is determined by the government. Hence, the managerially driven strategy faced by nursing home operators is to minimize costs given the output levels and prices. A home operator will minimize the cost subject to

\[ C = \sum_{i=1}^{k} P_i X_i \]  

(2)

\[ \text{h}(t) = \text{another term} \leq 0, \]  

(3)

where \( N_i \) represents the number of SNF patient days, \( N_p \) is the number of ICF patient days, and \( I_0 \) is the index reflecting the quality of services.

To avoid prior restrictions on the operating cost function, a translog function is employed in this study to model the operating costs of a nursing home. A translog cost function is

\[ \ln C = \alpha_0 + \alpha_1 \ln X_1 + \alpha_2 \ln X_2 + \alpha_3 \ln P_1 + \frac{\alpha_4}{2} \ln X_1^2 + \frac{\alpha_5}{2} \ln X_2^2 + \frac{\alpha_6}{2} \ln P_1^2 + \frac{\alpha_7}{2} \ln X_1 \ln X_2 + \frac{\alpha_8}{2} \ln X_1 \ln P_1 + \frac{\alpha_9}{2} \ln X_2 \ln P_1 + \frac{\alpha_{10}}{2} \ln X_1 \ln X_2 \]  

(4)

Using Shepherd's Lemma, the cost shares in each factor can be obtained as follows:

\[ \frac{\partial \ln C}{\partial \ln P_i} = \frac{P_i}{C} + \sum_{j=1}^{k} \gamma_{ij} \ln P_j \]  

(5)

where \( i = 1, 2, \ldots, k \).

The quality index \( I_0 \) is added to both per diem cost and cost function analyses as an output factor. It can be shown that the quality index is only a linear term when it is added into the translog cost function as an output factor.

Assume that the prices of inputs are the same within urban and rural areas. The relative input price differential can be reflected by a dummy variable. The urban area is defined by population density (Henry and Bao et al., 1993). Starting from the center of each city, it is classified as rural area once the population density drops below 50 persons per square kilometer.

The last factor concerned in this study is the ownership. Managers in nonprofit homes do not have the incentive to maximize profit but they still need to minimize costs because the resources are limited. Therefore, the managers in nonprofit homes may have different goals to achieve by minimizing costs. Consequently, the cost function may differ between for-profit and nonprofit homes. In order to reflect the difference, a set of dummy variables is used to distinguish the cost differences in each factor and the differences of shares employed for nonprofit and for-profit homes.

Approximating input prices by an urban dummy, adding the quality index as a factor of output and a dummy variable to distinguish the ownership, the cost shares of input factors are expressed by

\[ \frac{P_i}{C} = \alpha_0 + \sum_{j=1}^{k} \gamma_{ij} \ln P_j + \gamma_i \ln N_i + \gamma_0 \]  

(6)

where \( R_i \) (\( i = 1 \) for urban homes, \( j = 1 \) for rural homes) denotes regional dummy variables.

From the cost share equations, it is shown that given input prices, the shares of each factor employed in production depend only on \( N_i \), \( N_p \), and the quality index. Therefore, the vector consisting of individual cost categories is jointly determined by \( N_i \), \( N_p \), and the quality chosen by the home manager. Estimates of the coefficients in the system equations will reveal the structure of cost function and its differences between rural and urban areas.

Accounting for additive disturbances with a joint normal distribution, this model can be estimated as a multivariate regression system. Since disturbances across individual costs are likely to be correlated, a seemingly unrelated regression method (Zellner, 1962) is used. In this model, the explanatory variables are the same for each equation; the coefficients are estimated by OLS for each equation separately. Heteroscedasticity is tested by the method of White for each equation. The null hypothesis that there is no heteroscedasticity cannot be rejected at the five percent significance level.

**Results**

The estimated coefficients for the cost share equations are presented in table 2. This table includes four years' estimates for each individual factor. SNF_day and ICF_day denote the logarithms of SNF and ICF patient days respectively. Quality is the index calculated by equation (1). Ownership is a dummy variable; it equals to one for a for-profit home and zero for a nonprofit home. Urban is a dummy variable to reflect the potential input price differences between urban and rural input markets.

The share of nursing cost is positively related to the logarithm of skilled patient days which is consistent with the expectation. Skilled patients require more intensive nursing services. The adjustment, however, is not significantly large. The primary factor for the share of nursing cost is constant. The coefficients of the dummy variable for quality indicate some positive adjustment for 1988 and 1991, and are not statistically significant for the other two years.

The share of dietary cost is negatively related to the logarithm of skilled patient days for each of the four years. This implies that the level of dietary cost is not related to the proportion of skilled patients. When the skilled patient level is higher, total cost is higher because at least the nursing cost is higher. Therefore, a constant dietary cost will have less share in the homes with higher level of skilled patient days. The share of dietary cost also is negatively related to the quality index. This is similar to the skilled patient days. When more nurses and nursing aides are hired for each bed at given skilled patient level, the total cost will increase and the share of dietary cost will decrease.

The share of administration cost is negatively related to the logarithm of Intermediate Care patient days and is not statistically significant with other variables. Since the cost of administration includes salaries of managers and staff of record keeping, the regression results reflect that the homes with higher ICF days have lower administration cost on average.

The regression estimates also indicate that private owned nursing homes have a lower share of maintenance cost, which is consistent over the four-year period, and the share of utility cost is lower for private owned homes for 1988 and 1991. This evidence shows the incentive to minimize cost in private owned homes.

Overall, the regression analysis does not reveal any difference in the operating cost structure between rural and urban nursing homes, except for a positive coefficient with five percent significance level in the share of utility cost for 1988. Hence, it can be concluded that there is no clear cost differential between rural and urban homes. This conclusion, however, depends on the definition of rural and urban regions. An earlier study suggested that wages of nurses and nursing aides were different across the regions that were defined by a commuting center (Yu and Bradford, 1993). Since the nursing home industry is labor intensive, the local labor market should be the important factor to analyze the cost structure of this industry. This raises a question about how to define the rural and urban areas in research. If one tries to analyze the cost structure, the local labor market, instead of population density, should be considered. Because the labor force is mobile at least within a local area, a small wage differential will attract relocation within the local area. As a result, the urban local labor market is much larger than urban area defined by population density. On the other hand, patients' family and relatives will not relocate because of the nursing homes where the patients stay.

A policy related issue from above is that it may not be reasonable to use a unique definition of rural and urban areas for policy making. For instance, policies related to the cost structure, such as reimbursement rates for nursing homes in urban and rural areas, should be defined according to local labor market, or commuting area. For policies related to distribution of nursing homes, population...
Table 2. Estimated Coefficients of the Variables in Treating Cost Function for Shares of Rural and Urban Areas

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Significant at 0.05 level; Significant at 0.005 level; Significant at 0.01 level

density may be a good criterion to define rural and urban areas.

Conclusions

This study reveals that in South Carolina rural nursing homes tend to be small in size. During the 1988-1991 study period, rural homes had a higher percentage in the middle-size group between 44 and 88 beds). This is consistent with the distribution of population density. However, the evidence also supports the findings that more rural patients travel farther to get into a nursing home. This is consistent with the analysis that, due to the economies of scale, fewer nursing homes are located in rural areas. Results from the four-year period are very consistent, which suggests that there have not been improvements in recent years.

This study also indicates that, on average, rural homes have a lower percentage of private-pay patients, which implies that the general quality of rural homes is lower than it is in urban homes. Since there is no bias in the distribution of nursing homes with respect to the proportion of skilled patient days between rural and urban homes, the rate of Private-pay patient days is more likely to reflect the general quality of facilities. The higher quality in urban homes is likely the result of competition for private-pay patients in urban areas.

The cost structure analysis shows that there is no essential difference in operating costs between nursing homes in rural and urban areas. Results indicate that the share of nursing cost accounts for about 60 percent of total operating cost, which is consistent with the fact that the nursing home industry is labor intensive. This also suggests that the wage differentials in the labor markets may be the major factor which impacts the cost structure.

Earlier study, based on regions divided by commuting area, which is a good approximation for local labor market, did show a significant difference in the nursing costs among regions(Yu and Bradford, 1993).

The evidence from the analysis of cost structure raises a question about how best to define the rural and urban areas in policy related decisions. For cost related policies such as reimbursement rates, it may be more accurate to divide the urban and rural areas by commuting areas. For services related policies such as facility locations, population density would be a better criterion for dividing regions. Therefore, policymakers should relate the way of classifying rural and urban areas to the policies in order to achieve consistence between policies and results.

References


Endnotes

1. Costs that are out of the control of home managers are excluded such as legal, certificate, taxes and insurance, and therapy costs.

2. The variables associated with the functional status of a patient are more likely to be highly correlated. Therefore, the estimated coefficient for each variable may not be used as reference due to multicollinearity. Besides, the cost of collecting more detailed information for reimbursement may be too high.

3. Paul Feldstein (pp 523-535, 1992) has given a good literature review on the determinants of nursing home costs.

4. For a recent review of the literature on quality, see Mark Davis, 1991.

5. A fine will be imposed to a home if it provides less than 90 percent of the required patient days in South Carolina.

6. The test statistics of White test are available upon request.

7. It has been shown that the adjustment rate for reimbursement of the nursing cost is very close to the regression estimate in a model of cost analysis (Yu and Bradford, 1993).

8. The local labor market is defined such that the wage rates in the same area should be same.

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A Comparative Analysis of Nursing Home Care and Costs in Rural and Urban Areas: Discussion

David Mulkey and Rodney L. Clouser

The paper by Yu and Bradford addresses an issue of increasing importance to rural areas, mainly how to provide and finance long term health care in the face of decreasing tax bases and increasing numbers of elderly. Based on data from South Carolina, the paper offers comparisons of rural and urban nursing homes using measures such as size, type of facility (intermediate or skilled care), area served, and the distance which patients travel to receive care. The second part of the paper examines the cost structure of nursing homes by the share of cost accounted for by various components of the service. Included are the costs of nursing services, dietary services, administration, maintenance, and utilities.

With regard to the first part of the paper, the major shortcoming is the lack of any theoretical or conceptual framework to guide the analysis or to aid in interpretation of findings. As a result, some of the methodology and measurements employed appear to be ad hoc in nature, and the findings would be difficult to generalize beyond the analysis for South Carolina. It is particularly difficult to assess any policy implications of the results. Further, the absence of such a framework may actually lead to misinterpretation of some results.

It would appear that nursing home size and location should conform to some type of "central place hierarchy" or similar framework. One would expect rural areas with smaller and less dense populations to have smaller nursing home facilities, that those facilities would be further apart, and that they would likely offer intermediate care services as opposed to more specialized, skilled nursing services. Urban areas, on the other hand, would be expected to have similar but larger facilities, and they would also have more specialized facilities offering skilled nursing services to larger geographic areas. Finally, urban areas might have facilities connected to hospitals which offer the highest level of specialized care. Using this approach as a framework, several specific points can be made about the paper.

First, given the nature of population settlement, income differences between rural and urban areas, and expectations regarding the size and location of facilities, the use of private patient days as a measure of nursing home quality appears somewhat questionable. Convenience to family along with the expected location of skilled services in urban areas might offer a better explanation of the distribution of private patients. The same reasoning also suggests that there is little in the way of policy implication associated with the finding that rural residents travel further to obtain nursing home services. A part of the residential location choice made by rural residents is the acceptance of increased travel costs to obtain a wide range of services. Nursing home care would appear to be no different than other types of health care, shopping, or other services.

However, an important aspect of this discussion which the authors did not address is the economic development consequences for rural areas. Due to the fact that rural residents travel further for nursing home care, the nursing home facilities in rural areas drew a majority of their patients from outside the county in which they were located.

*Professors, Department of Food and Resource Economics, University of Florida, Gainesville, Florida.
This, plus the indication that most rural nursing home care is paid for by out of county sources, suggests that the establishment of nursing homes and perhaps other types of services for the elderly may offer a viable economic development strategy for rural areas.

The lack of an adequate conceptual framework is also troublesome regarding the cost analysis in the paper. First, the nursing home industry, as noted in the paper, is highly regulated in terms of staffing and services required for various types of facilities. Thus, the cost share results may reflect the regulatory requirements as much as cost differences arising from choices made by nursing home administrators. For example, the finding that nursing services represent a higher proportion of costs as skilled patient days increase is probably a given. This is partly due to the fact that such patients need higher service levels, but also partly to the fact that regulations require higher staffing levels in facilities handling skilled nursing care patients.

Also with regard to the cost analysis, it is not clear why the authors chose to omit nursing facilities which are connected to hospitals from the analysis. To be sure, as they note, such facilities are likely to have different, and higher costs. However, they may well offer more specialized services which would explain these differences. Further, from the viewpoint of small towns, the offering of nursing home care may well offer a way to keep hospitals open that might otherwise be forced to close.

Finally, beyond the economic development implications mentioned earlier, some suggestions for continuing this line of research appears appropriate. There are a range of social issues that remain to be addressed relative to long term care for the elderly. The subject of this paper, nursing home care, is but one aspect of this broader set of issues. Especially important is the range of alternatives to nursing home care (e.g. shared living arrangements, home health care, elderly day care, etc.), the costs of the alternatives, and the potential for providing such services in rural areas. Today's longer life expectancies, generally improved health, and budget concerns would seem to support an active research agenda. Such research could build on the work reported in this paper. The authors are to be commended for addressing a very important problem for rural areas and should be encouraged to expand their work to include the full range of elderly care questions facing rural areas.
The SRDC is one of four regional rural development centers in the nation. It coordinates cooperation between the Research (Experiment Station) and Extension (Cooperative Extension Service) staffs at land-grant institutions in the South to provide technical consultation, research, training, and evaluation services for rural development. For more information about SRDC activities and publications, write to the Director.

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