

A COMPARISON OF SELECTED CARDIOVASCULAR DEATH RATES IN ALABAMA  
BY COUNTY OF RESIDENCE AND COUNTY OF OCCURRENCE:  
IMPLICATIONS FOR RURAL HEALTH PLANNING

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Geographic variations in the availability of basic medical services often force the seriously ill to seek treatment outside their area of residence. This is especially true for residents of rural areas and small towns that are medically underserved. Distance and travel difficulties thus serve as a barrier to adequate treatment. These problems are especially severe for the elderly who are often disabled and less adaptive to change. If treatment is delayed then the consequences become progressively more serious. There is also the added stress for family members who may be forced to drive long distances.

In the final stages of a life-threatening illness all afflicted persons would be forced to go someplace where treatment services are available. At this point death would probably occur in an institutional setting far from home.

We have made an exploratory study of differences between death rates for people 65 and over by place of residence and place of occurrence in Alabama for selected cardiovascular diseases. We expected that death rates by residence would be higher than death rates by occurrence for the elderly in: 1) counties that are medically underserved and 2) rural counties. In carrying out the study we calculated death rates per 100,000 population 65 and over by county of residence and county of occurrence for all cardiovascular diseases, myocardial infarction, and all cerebrovascular diseases. These diseases were chosen because they require specialized treatment and occur frequently. Differences between the two death rates were calculated and the differences mapped in each county.

We also classified the state's counties into rural-urban categories and calculated two indicators of medical services for each county. Rural-urban categorization was accomplished by dividing Alabama counties into metropolitan, small urban, and rural categories according to population in 1970. Metropolitan counties were those containing a city of 50,000 or more population, small urban counties were those with a city of 10,000 to 49,999 population, while rural counties did not have a city of 10,000 or more population. Medical services indicators were the number of physicians and general practitioners per 100,000 population 65 and over for each county in 1975. The counties were divided into five groups according to the number of physicians per 100,000 population 65 and over. The groups range from 131.1-163.8 physicians per 100,000 (Group 1) to 0.0-32.8 (Group 5). For general practitioners the 10 counties with the lowest number per 100,000 elderly were compared to the 10 counties with the highest number.

### Results

With respect to medical services, counties with the lowest general practitioner rates have much higher cardiovascular disease death rates by residence than by occurrence while in four of the 10 counties with the highest G.P. rates death rates by occurrence were highest (see Table 1). In the remaining six counties the differences between death rates by residence and occurrence were considerably smaller than in the low G.P. rate counties. For myocardial infarction differences were even more pronounced. In the 10 counties with the lowest G.P. rates there were an average of 222.8 more deaths per 100,000 elderly by residence than by occurrence in 1971-73. In the 10 counties with the high-

est G.P. rate there was an average of 50.5 more deaths per 100,000 by occurrence than by residence.

Table 2 shows mean differences in death rates from all cardiovascular diseases and myocardial infarction for counties grouped by number of physicians per 100,000 population 65 and over. Here differences are even more striking. In counties with the highest physician rates (Groups 1 and 2) death rates by occurrence were far above those by residence, e.g., an average difference of 473.3 per 100,000 for all cardiovascular diseases for the two counties in Group 1 (see Table 2). At the other extreme there were an average of 1020.9 more deaths per 100,000 by residence than by occurrence during the study period in the 21 counties of Group 5.

Figures 2 through 4 show those counties where death rates by occurrence exceed those by residence and the approximate degree of excess. The maps suggest that there are regional centers to which seriously ill elderly people travel to and die in. Thus medical facilities in Tuscaloosa County act as a magnet for those seriously afflicted with cardiovascular diseases from the nearby poor, predominantly rural and medically underserved counties. Houston County serves the same purpose in Southeast Alabama.

When differences between death rates by residence and occurrence are compared for the metropolitan, small urban, and rural counties, the results were also as expected (see Table 3).

In the metro counties there were an average of 380 more cardiovascular deaths per 100,000 elderly by occurrence than by residence in 1971-73; in small urban counties there were an average of 89 more deaths per 100,000 by residence than occurrence; in the rural counties the excess of deaths by residence over occurrence increased to an average of 789. In 5 of 6 metro counties there was a higher cardiovascular death rate by occurrence than residence; in only 4 of 23 small urban counties and one of 38 rural counties was this true.

The exceptional rural and small urban counties were also exceptional in being among the top 10 counties in number of general practitioners or physicians per 100,000. One (Macon County) is the site of a VA hospital; another (Houston County) is one of the state's fastest growing counties.

### Discussion

These data show that many of Alabama's elderly are dying outside

their county of residence, in a limited number of counties. This raises several questions: Would they be dying of these diseases if treatment services were available closer to home? Before dying were they forced to frequently travel back and forth? Does this place an unfair and costly burden on those counties where adequate treatment is available? Does this pattern hold true for other chronic diseases like cancer?

If the answer to these questions is yes, what then can be done? Obviously better services need to be developed but this would be costly and perhaps impossible for many counties. Is it feasible to think in terms of regional centers (for treatment of chronic diseases) that are strategically located to minimize travel distance from surrounding counties? Should certain rural hospitals be converted into short term intensive and ambulatory care centers?

If these were done then we would need more and better information. We would need, for example, to know about flows over time of specific population subgroups to treatment areas. We would need maps of morbidity to pinpoint areas of endemic disease prevalence.

Obviously this calls for more sophisticated cartographic analyses such as flow maps for each county indicating the direction and size of flow for each disease. With Cathode ray tubes "movies" could be made showing the same flows and changes in rates thru time.

The new DIDS (domestic information display system) will permit bivariate analyses of morbidity flows by demographic or socio-economic variables or even road networks. This system could also show mortality differentials like those displayed here and cross them with more sophisticated indices of health care services. What we have shown here is a bare beginning.

TABLE 1

Mean Differences in 1971-73 Death Rates by Residence and Occurrence\* for Selected Cardiovascular Diseases in the Ten Alabama Counties With the Lowest and Highest General Practitioner Rate (1969)\*\*.

	<u>Death Rate Differentials</u>			
	<u>G.P. Rate</u>	<u>All Cardiovascular</u>	<u>Myocardial Infarction</u>	<u>All Cerebrovascular</u>
Ten Lowest Counties (Group mean)	126.6	-766.4	-222.8	-271.1
Ten Highest Counties (Group mean)	356.4	-191.0	50.5	25.5

\*If the death rate by residence is higher than by occurrence this is indicated by a negative figure; a positive figure means the reverse.

\*\*All rates are per 100,000 population 65 and over. Death rates represent averages for 1971-73. Ten counties with the lowest G.P. rates were: Talladega, Coosa, Calhoun, Blount, Conecuh, Sumter, Lauderdale, Hale, Lowndes, and Dallas. Ten highest were: Escambia, Madison, Marshall, Tallapoosa, Barbour, Morgan, Clarke, Covington, Lee, and Lamar.

Source: All rates were calculated from vital statistics compiled by the National Center for Health Statistics.

TABLE 2

Differences in 1971-73 Death Rates by Residence and Occurrence\* for Selected Cardiovascular Diseases  
In Alabama Counties Grouped by Number of Physicians per 100,000 Population (1975)\*\*

	<u>All Cardiovascular</u>	<u>Myocardial Infarction</u>
<u>Group 1</u> (131.1 - 163.8 physicians per 100,000)		
Group mean	473.3	103.6
<u>Group 2</u> (98.3 - 131.1 physicians per 100,000)		
Group mean	313.2	84.6
<u>Group 3</u> (65.5 - 98.3 physicians per 100,000)		
Group mean	-0.8	59.5
<u>Group 4</u> (32.8 - 65.5 physicians per 100,000)		
Group mean	-525.2	-137.3
<u>Group 5</u> (0.0 - 32.8 physicians per 100,000)		
Group mean	-1020.9	-263.2

\*If the death rate by residence is higher than by occurrence this is indicated by a negative figure; a positive number means the reverse.

\*\*Death rates are per 100,000 population 65 and over. Counties in Group 1 include Houston and Jefferson; Group 2 includes Etowah, Lauderdale, Mobile, Montgomery, Morgan, and Tuscaloosa; Group 3 covers Calhoun, Colbert, Covington, Dallas, Lee, Macon, Madison, Perry, and Tallapoosa; Group 4 includes Baldwin, Barbour, Bibb, Bullock, Butler, Chambers, Clarke, Clay, Coffee, Cullman, Elmore, Escambia, Fayette, Franklin, Greene, Jackson, Lamar, Limestone, Marengo, Marion, Marshall, Monroe, Pike, Randolph, Russell, Shelby, Sumter, Talladega, and Walker; Group 5 is comprised of Autauga, Blount, Cherokee, Chilton, Choctaw, Cleburne, Conecuh, Coosa, Crenshaw, Dale, DeKalb, Geneva, Hale, Henry, Lawrence, Lowndes, Pickens, St. Clair, Washington, Wilcox, and Winston.

Source: All rates were calculated from vital statistics compiled by the National Center for Health Statistics.

TABLE 3

Differences in 1971-73 Death Rates\* by Residence and by Occurrence for Selected Cardiovascular Diseases in Metropolitan, Small Urban, and Rural Counties of Alabama\*\*

	<u>Death Rate Differentials</u>	
	<u>All Cardiovascular Diseases</u>	<u>Myocardial Infarction</u>
Metro group mean	380.3	76.4
Small urban group mean	-88.7	-48.4
Rural group mean	-789.3	-212.7

\*If the death rate by residence is higher than by occurrence, this is indicated by a negative figure; a positive figure means the reverse.

\*\*All rates are per 100,000 population 65 and over and represent averages for 1971-73.

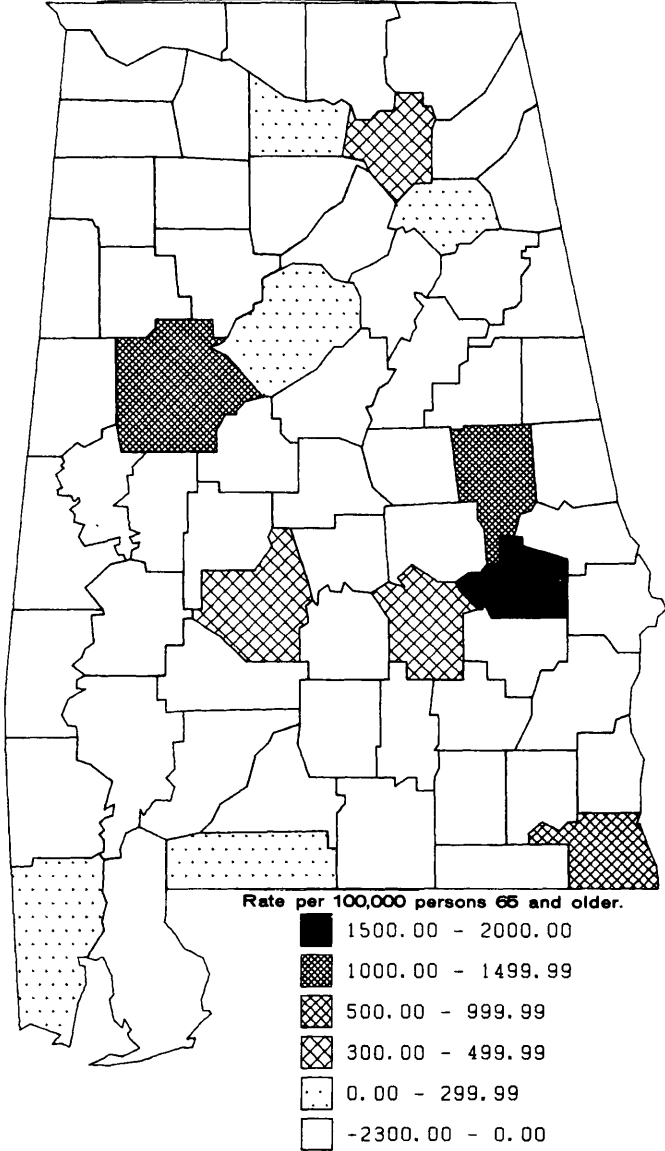
Source: All rates were calculated from vital statistics compiled by the National Center for Health Statistics.

FIGURE 1  
*County Reference Map*

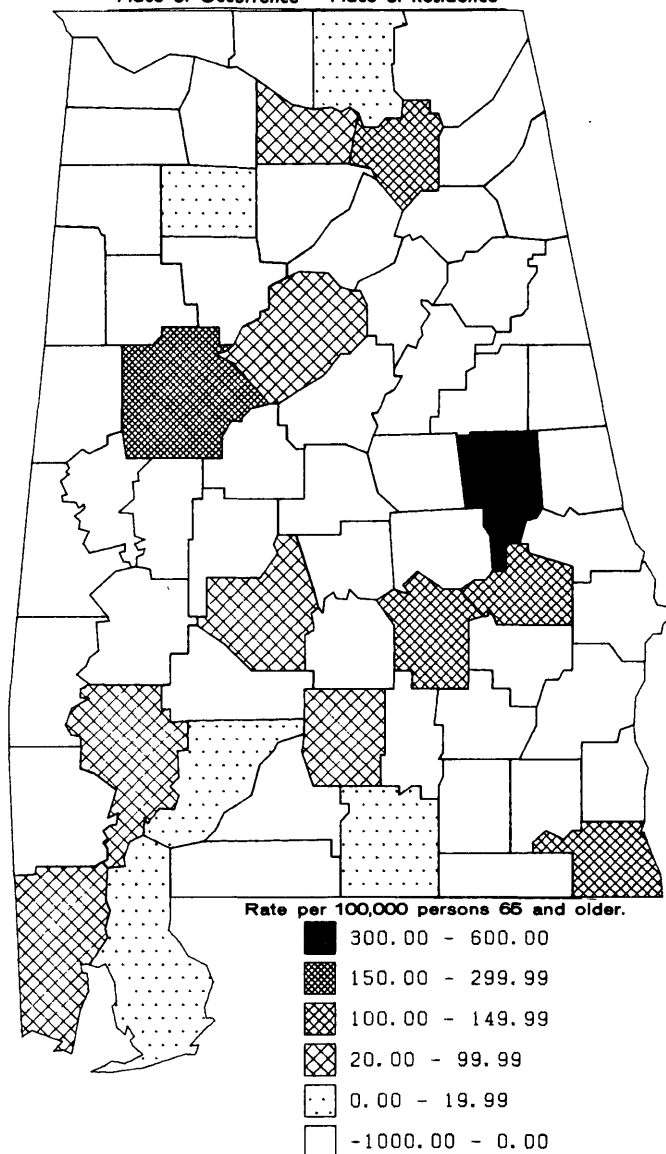


FIGURE 2

*All Cardiovascular Disease*  
*Place of Occurrence - Place of Residence*



**FIGURE 3**  
**Acute Myocardial Infarction**  
*Place of Occurrence - Place of Residence*



**FIGURE 4**  
**All Cerebrovascular Disease**  
*Place of Occurrence - Place of Residence*

