Locational and Population Factors in Health Care-Seeking Behavior in Savannah, Georgia

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The use of regular sources of health care by a sample of residents of Chatham County, Georgia was examined through an analysis of the interactions among distance, sociodemographic, locational, and activity-space factors. Health care facilities were concentrated near downtown Savannah. Distance from home to regular source of care was a relatively more important factor for inner-city residents than for suburban or urban fringe residents. There were no clear differences by race, sex, age, occupation, or length of stay at present residence in the relative importance of distance. Strong associations were found between distance-to-care measures and measures of daily-activity spaces. Urban ecological structure appeared to play a more important role in health care-seeking behavior than did the personal characteristics of individuals in this small metropolitan area.

Health planners are vitally interested in examining the behavior of populations that are seeking health care. One approach to the study of this behavior is through spatial analysis. Spatial-analytic studies have focused on the relative location of and distance between consumers and providers, characteristics of these two groups, urban ecological structure, and the daily-activity spaces of consumers (Shannon, Bashshur, and Metzner 1969). Each of these factors has been shown to be of importance to people's accessibility to and utilization of health care resources. Of more interest is how the interaction of two or more of these factors influences health care-seeking behavior. Furthermore,

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these factors will interact to affect health care-seeking behavior in different ways in different settings. The purpose of this article is to examine the roles of relative location, distance, population characteristics, daily-activity spaces, and interactions among them, as they pertain to regular sources of health care in a particular setting, Chatham County, Georgia, where the city of Savannah (1980 population, 141,390) is located.

Many health care studies (Weiss, Greenlick, and Jones 1971; Fuller 1974; McGuirk and Porell 1984; Shannon, Skinner, and Bashshur 1973) have shown distance and the distance decay effect to be of importance in consumer-provider contacts. Distance is only one of many factors involved, however. A wide range of studies have shown that distance interacts with other variables in contacts with physicians, hospitals, and other health care resources. Demographic and socioeconomic characteristics like age, sex, and occupation may affect travel distance (Haynes and Bentham 1982). In addition, distance behavior often depends on people's perceptions of disease itself (Girt 1973) and how it is diagnosed and treated (Mayer 1983). Transportation availability, and costs and facility characteristics also interact with distance (Joseph and Phillips 1984) in affecting people's use of health care.

Another consideration in consumer-provider access interaction is the relative location of these two groups (Weiss, Greenlick, and Jones 1971). Areas of residence of different types of people within cities and locations of service provision have been studied by urban geographers, city planners, and others. Simulations have shown that the spatial structure of urban areas is a significant factor in determining inequalities in access to services (McLafferty 1982). In many American cities, the percentage of the population that is black decreases and household income increases in step with movement from the central city to the suburbs. Also in many cities, hospitals and physicians tend to cluster in downtown areas, although they may also be found (especially in larger places) in suburban areas. These conditions hold for Savannah. Bashshur, Shannon, and Metzner (1971, 75) state that "[t]he historically central location of hospitals now produces distance problems for both ghetto blacks and suburban whites." In particular, although inner-city blacks are often close to health care resources, they may find difficulties in using them because of such problems as discrimination, inability to pay, and lack of transportation. Suburban whites, on the other hand, may have to travel longer distances to care.

People's degree of mobility—their daily-activity movements—also play a part in health-seeking behavior. The activity spaces of urban

residents have been studied by several researchers (Horton and Reynolds 1971; Dangschat, Friedrichs, and Kiehl 1982; Wolpert 1965). For example, Shannon and Spurlock (1976) compared the activity spaces and travel patterns of 243 families living in Congress Heights, a community in Washington, D.C. They showed that different subgroups of this community carried out activities within different "ecological containers," exposing them to different health hazards or "environmental risk cells." They also found that for some subgroups little overlap appeared between daily-activity spaces and activity spaces related to health services. In a study in Flint, Michigan, Cromley and Shannon (1986) used the activity-space concept to analyze the movement patterns of a sample of independently living elderly people. After dividing the sample into several groups based on similarities among individual activity spaces, they summarized each group's aggregate activity space with standard deviational ellipses and suggested that ambulatory facilities should be located within these spaces.

One of the interesting questions that arises from health care studies that deal with distance is its *relative* importance. This can be measured in at least two ways. First, the contribution of distance to accessibility or utilization can be contrasted to other variables (for example, by using multiple regression and correlation techniques). One might conclude that distance is very important in its own right (McGuirk and Porell 1984); not as important as other variables (Weiss, Greenlick and Jones 1971); a surrogate for other variables (Shannon, Bashshur, and Metzner 1969); or a factor largely ignored or "overridden" in the case, say, of a very severe illness (Mering et al. 1976).

The second way to look at the relative importance of distance (the way used in this article) is to compare the health care sources actually contacted with all available alternatives. The notion of an intervening opportunity is important here (Morrill and Earickson 1968). If a person goes to the closest service possible, then distance is a relatively important factor for that person. If, on the other hand, a person bypasses intervening opportunities, then distance is not as important. A few studies have examined the relative importance of distance from this perspective. In a situation where there were three clinics to choose from, Weiss, Greenlick, and Jones (1971) found that as the distance from residence to nearest clinic increased, proportions of visits to the nearest clinic decreased—and that the percentage of visits to the nearest clinic declined with the age of the patient. In a study in Cleveland it was found that whites traveled longer distances to hospitals than blacks, but that the proportion of whites going to the

nearest hospital was twice that of blacks (Bashshur, Shannon, and Metzner 1971). On average, blacks lived less than one mile from a hospital, but three-fourths of them traveled beyond the second-nearest hospital. Many people also traveled beyond the second-nearest hospital for religious reasons; this was true for 90 percent of the Jews studied, one-half of the Catholics, and two-thirds of the Protestants. Similar findings came out of an earlier study in Chicago (Morrill, Earickson, and Rees 1970), where many blacks avoided white physicians and white physicians abandoned black neighborhoods. Again, religious preferences took people beyond intervening opportunities. Spatial choice models are also based on a consideration of possible alternatives. A good example is the spatial demand model used by McGuirk and Porell (1984) in Allegheny County (site of Pittsburgh), Pennsylvania. They found (p. 84) that "distance and time factors strongly influence hospital choice, even in metropolitan areas where alternatives are widely available, and that their effects vary across service classifications and hospitals."

All of the foregoing factors, interacting to influence health-seeking behavior, led us to ask certain questions about our research into regular sources of care in Savannah. For example, would McLafferty's statement (1982, 353) that "[t]he very fact that high-income groups often live in low-density, peripheral areas suggests that distance and travel costs influence their activity patterns less than those of low-income groups," extend to Chatham County and historic Savannah? What other relationships among accessibility factors would be considered important in this unique setting?

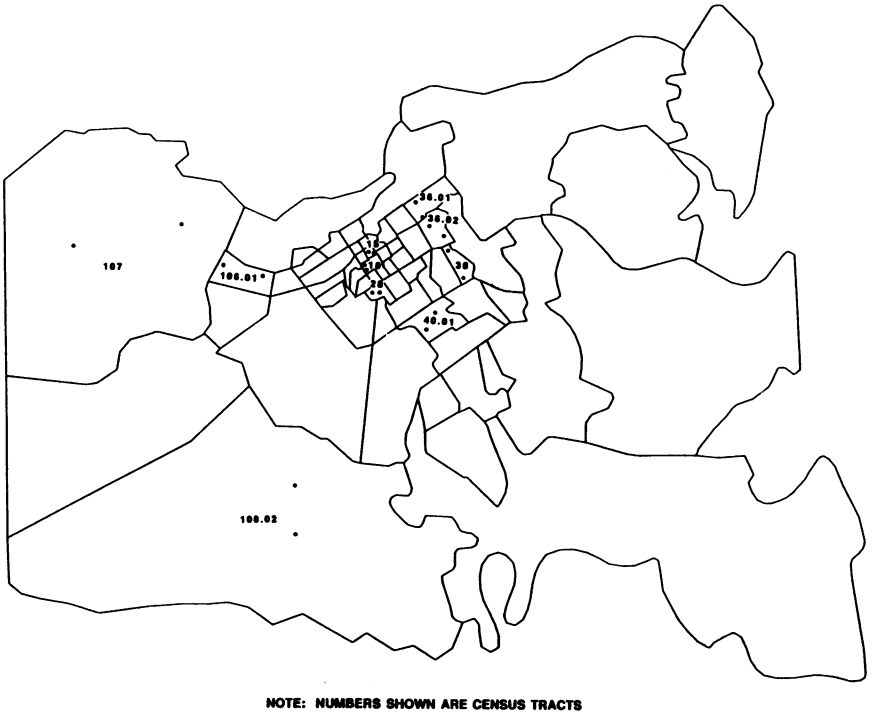
METHODOLOGY

POPULATION SAMPLE AND DATA COLLECTION

The Savannah research focused on the effect of different environments on cardiovascular disease (CVD), and the study population was sampled accordingly. There were two principal considerations in selecting census tracts for study. The first was to stratify the choice of tracts by inner city, suburban, urban fringe, and planned industrial satellite in order to include the full range of environments. The second was to select tracts with high or low levels of CVD which were either well or poorly predicted by population and housing characteristics.

Data were available from the Savannah Community Cardiovascu-

Figure 1: Location of Survey Clusters in Chatham County, Georgia



lar Council (CCC) on two indicators of CVD, blood pressures of all high school seniors from 1979 to 1982, and stroke mortality in the entire Chatham County population from 1978 to 1982. Census data for 1980 on socioeconomic and housing characteristics of the populations in the 62 census tracts of Chatham County were used in factor and discriminant analyses to determine their accuracy in predicting blood pressure and strokes in each tract. Ten census tracts were chosen for study (Figure 1).

Three tracts, 15, 18, and 28, were in the inner city (98 people, 23.5 percent of the respondents); four tracts, 36.01, 36.02, 38, and 40.01, were suburban (198 people, 47.5 percent); and two tracts, 107 and 108.02, were in the urban fringe (87 people, 20.9 percent). The tenth tract, 106.01, was essentially comprised of Garden City (34 people, 8.2 percent), a World War II-era planned industrial/port satellite community within a metropolitan area. Its distance from Savannah's

Table 1: Characteristics of the Sample Population

Category	*Subgroups*	*Number*	*Percent*
Race	Whites	239	57.3
	Blacks	178	42.7
Sex	Males	191	45.8
	Females	226	54.2
Age	12-24	102	24.5
	25-44	134	32.1
	45-64	122	29.3
	65-84	59	14.2
Occupation	Professional	31	7.4
	Managerial	30	7.2
	Clerks/Sales	47	11.3
	Skilled labor	44	10.6
	Unskilled labor	21	5.0
	Domestics	22	5.3
	Housewives	106	25.4
	Others*	116	27.8

*Students, retired, unemployed.

central business district (CBD) indicates that it is suburban, but its socioeconomic and housing characteristics suggest that it belongs to the inner-city category.

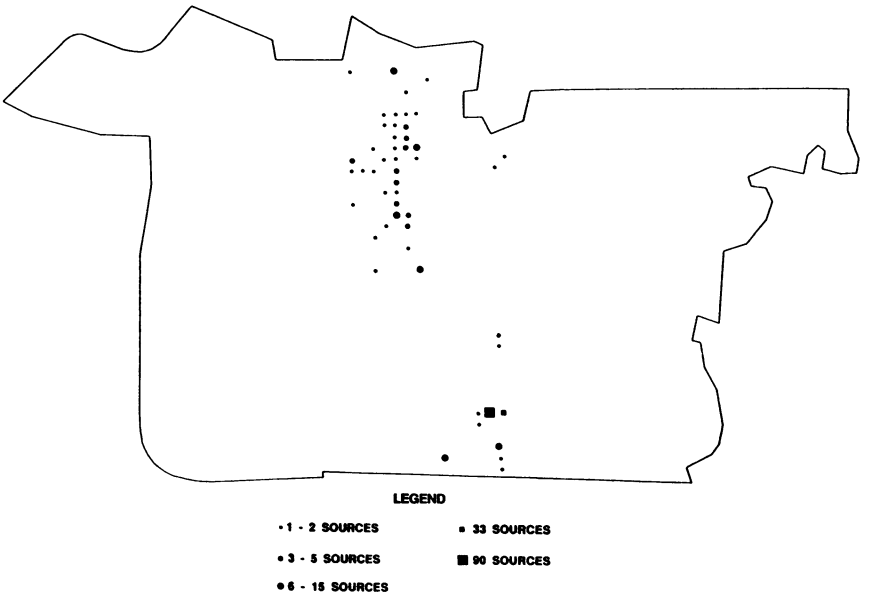
Within each census tract, two blocks were chosen at random; these formed the core of 20 sample clusters of 10 households each. Interviews were conducted over a six-week period in the summer of 1984, with a total of 417 respondents in the 200 households. Each person in each household who was 12 years old or older was interviewed. The data for this study come from these interviews.

Although certain population subgroups tended to live in some zones rather than others (for example, few blacks lived in urban fringe tracts), each of the four zones contained a mixture of races, sexes, ages, and occupations. Data on race, sex, age, and occupation are shown in Table 1. The amount of time respondents had lived at their present address was also recorded. (Mean time at current residence was 14.4 years.)

ACTIVITY SPACES AND RELATIVE DISTANCE INDEX

Respondents were asked where they went for their regular source of care. Out of a total sample of 417 people, 321 reported the name of a specific physician, clinic, or hospital emergency room. The locations of all regular health care sites reported were recorded (Figure 2). All

Figure 2: Location of Regular Sources of Care for Survey Respondents in Savannah, Georgia



respondents were also asked the number of times during a month they had gone to work or school, had shopped for food or clothing, had attended church, had traveled to places for leisure activities, or had eaten out in restaurants. The amount of time people had spent at home was also noted. The locations of all activity sites were recorded, and activity frequencies—or duration in the case of work, school, and stays at home—were used as weights at each location. Locations and weights were then used together to construct two centrographic measures—the weighted mean center of activity spaces, and the size of standard deviational ellipses (SDEs) (Yuill 1971)—for each of the 20 study clusters. These same measures were also calculated to summarize the locations of regular sources of care. The SDE provides a two-dimensional graphic summary of spatial data points that is analogous to the standard deviation for one-dimensional data distributions.

A relative-distance index was calculated for individuals and groups (see Appendix for an explanation of this measure). In practice, the value of the index ranges from a negative number (-2 to -3) to a maximum of 1. A relatively large index indicates that distance is relatively important (Hightower 1965).

Three more distance variables were developed for each cluster: the Manhattan metric distance from home to the weighted mean center of all regular sources of care, the distance from home to the weighted mean center of activity spaces, and distance from activity-space center to the center of care.

RESULTS

DISTANCE TO CARE FOR POPULATION SUBGROUPS

Summary figures for the actual distances of various subgroups from their regular-care destinations are shown in Table 2. Hospitals and doctors are concentrated or clustered in two sections of Savannah. One cluster converges around the CBD (107 sources); and the other, located southeast of the CBD, centers on the two largest hospitals, Memorial and Candler (Figure 2). Forty-seven sources (14.6 percent of the total) were outside the city of Savannah but still in Chatham County. The location of these three clusters is a major reason why there is an increasing average actual distance from care as one moves from inner-city to suburban to Garden City to urban-fringe residential zones (Table 2). Blacks are closer to care than whites, partly because most blacks live in inner-city areas, and outer areas are populated mostly by whites. There is no difference between males and females in actual distance to care. Among the three lower age groups, a slight declining trend is shown in distance to regular care source. The oldest group was substantially closer to care. Actual distance to care for those in different occupations reflects the scatter of people with different job skills throughout the area.

Table 2 shows details of the values used to calculate the relative-distance index for regular care for various population subgroups (see Appendix for an explanation of the different distance measures). The average actual distance traveled for each subgroup has already been discussed. It is informative to examine minimum distances and hypothetical distances to determine if they followed the same trends among population subgroups as actual distances. In many cases (such as race), trends are the same but with some interesting anomalies (the minimum distance for suburban and Garden City subgroups, for example). All subgroups traveled substantially farther than the minimum distance for care. Actual and hypothetical distances were usually quite similar.

The last column, Index, shows the relative importance of the distance factor for the different groups of people. The absolute value of

Table 2: Relative-Distance Index for Regular Care for Population Subgroups

Group	N	*Actual Distance (Miles)*	*Minimum Distance (Miles)*	*Hypothetical Distance (Miles)*	*Index*
Zone					
Inner city	83	2.4	0.3	2.8	0.16
Suburban	155	3.8	1.5	4.0	0.06
Garden City	27	6.7	0.9	8.3	0.22
Urban fringe	56	13.7	4.4	14.0	0.03
Race					
White	173	6.8	2.2	7.2	0.09
Black	148	3.9	1.0	4.1	0.09
Sex					
Male	132	5.3	1.7	5.7	0.09
Female	189	5.5	1.6	5.8	0.09
Age					
12-24	68	6.1	2.0	5.9	-0.05
25-44	97	5.7	2.0	6.2	0.13
45-64	105	5.5	1.6	5.8	0.08
65-84	51	4.0	0.8	4.8	0.21
Occupation					
Professional	23	6.1	2.0	7.5	0.24
Managerial	24	5.1	1.6	5.7	0.15
Clerk	38	6.5	2.2	6.5	0.00
Skilled	26	5.2	2.0	5.3	0.03
Unskilled	16	6.6	2.6	7.5	0.19
Domestic	19	3.3	0.9	3.5	0.08
Housewife	88	5.5	1.5	5.7	0.05
Total	321	5.4	1.6	5.8	0.09

I is not large for any group; that is, there are no very large positive or negative values. For only one subgroup, the 12-24 year olds, was *I* found to be negative—that is, with actual distance greater than hypothetical distance.

The distance factor was more important for inner-city and Garden City residents than it was for suburban and urban-fringe people. There were no differences by race or sex in the distance index. Among age groups, the oldest respondents held distance to be most important; the 25-44 age group considered it next in importance; 45-64 year olds were next; the youngest group considered distance least important. The clearest differences in concern about distance to health care appeared among the occupational subgroups. In order of the decreasing importance distance held for them were professionals, unskilled

Table 3: Relative-Distance Index for Regular Care for Sample Population Clusters

Cluster	*Index*	*Cluster*	*Index*
15-1	-0.11	38-1	0.26
15-2	0.13	38-2	0.31
18-1	0.34	40.01-1	0.20
18-2	0.15	40.01-2	0.34
28-1	0.12	106.01-1	0.43
28-2	0.25	106.01-2	0.02
36.01-1	-0.09	107-1	0.02
36.01-2	-0.08	107-2	0.01
36.02-1	-0.05	108.02-1	0.05
36.02-2	-0.20	108.02-2	0.14

workers, managers, domestics, housewives, skilled workers, and clerks.

The findings just discussed require further elaboration and explanation. For example, it is somewhat surprising, given their relative locations and different socioeconomic status, to find that blacks and whites had a similar relative-distance index. This result can be illuminated by examining the relative-distance index comparisons among individuals and among household-survey clusters.

As one would expect, there is a great deal of variation in the index among the 321 individuals who had a regular source of care. In fact, I for individuals ranged from -2.48 to 1.00. The individual with the largest negative index lived 11.5 miles from his regular source of care, but the closest available facility was only 2.2 miles away and the hypothetical distance was 4.9 miles. For the six people with an index of 1.00, actual and minimum distances were the same.

Sample clusters comprised perhaps the most interesting level of analysis for the distance index (Table 3). Differences were striking. The clusters for which distance was most important were, in decreasing order, whites in Garden City (106.01-1), blacks in inner-city cluster 18-1 and whites in suburban cluster 40.01-2, whites in suburban cluster 38-2, whites in suburban cluster 40.01-2, blacks in suburban cluster 38-1, and blacks in inner-city cluster 28-2. Distance was least important for whites in suburban cluster 36.02-2, whites in inner-city cluster 15-1, whites in suburban cluster 36.01-1, and blacks in suburban cluster 36.01-2.

The results discussed in the preceding two paragraphs indicate that individual differences and the location of a cluster of households may be more important in determining health-seeking behavior than

such population characteristics as race. The next part of the analysis concentrates on sample clusters.

DISTANCE, ACTIVITY SPACES, AND POPULATION CHARACTERISTICS FOR CLUSTERS

Spearman's rank-order correlations were computed among the following variables for clusters: the distance index, actual distance to care, distance from home to center of care, distance from home to center of activity space, distance of care center to activity-space center, size of cluster activity space, percent white, percent male, and mean age (Table 4). The distance measures involving home, care centers, and activity-space centers are highly positively correlated with each other and also with actual distance and activity-space size. It is clear that people living farther from health care (and downtown Savannah) travel greater distances both to medical and nonmedical activities, the latter of which are more "spread out." The relative-distance index is negatively correlated with these five variables, but only significantly so with the actual-distance variable. This indicates strongly that distance is a relatively unimportant factor for those who live farther from care.

A look at the scattergrams that plotted relative-distance index against the four distance variables reveals that the negative relationships held up well only for the 14 inner-city and suburban clusters. Whites in Garden City were an anomaly, with a very high index; this cluster is an outlier on all of the scattergrams. The remaining five clusters, blacks in Garden City and the four urban fringe clusters, display a slight positive correlation between index and the four distance variables. Removal of the Garden City and urban fringe clusters improved the correlation between index and actual distance considerably ($rs = -0.685$, $p = 0.007$), but changed the other index-distance correlations very little. The plot of index versus activity-space size showed no clear negative linear trend.

At the cluster level of analysis, race (measured as percent white) shows a significant positive correlation with actual distance, distance from home to care, and distance from home to activity-space center. Sex (percent male) is positively correlated with distance from home to activity-space center, ellipse size, and race. It is very likely that these results are an artifact of the location of the survey respondents. There were relatively high proportions of blacks and females in the inner city and relatively high proportions of whites and males farther out. In other words, the race and sex associations with distance and the index

Table 4: Spearman's Correlation Coefficients among Relative-Distance Index, Activity Distances, and Population Variables by Sample Population Clusters (p-values)

Variable	*Actual Distance*	*Home-Health Distance*	*Home-Activity Distance*	*Activity-Health Distance*	*Activity Ellipse Size*	*Percent White*	*Percent Male*	*Mean Age*
Distance index	-0.465 (0.039)	-0.300 (0.198)	-0.245 (0.300)	-0.202 (0.394)	-0.278 (0.237)	-0.071 (0.767)	-0.414 (0.069)	+0.209 (0.378)
Actual distance		+0.917 (0.000)	+0.821 (0.000)	+0.770 (0.000)	+0.698 (0.001)	+0.441 (0.052)	+0.292 (0.221)	+0.082 (0.731)
Home-health distance			+0.869 (0.000)	+0.877 (0.000)	+0.769 (0.000)	+0.514 (0.020)	+0.303 (0.194)	+0.153 (0.520)
Home-activity distance				+0.622 (0.003)	+0.896 (0.000)	+0.637 (0.003)	+0.438 (0.053)	+0.148 (0.533)
Activity-health distance					+0.532 (0.016)	+0.416 (0.068)	+0.049 (0.837)	+0.041 (0.865)
Activity ellipse size						+0.692 (0.001)	+0.548 (0.012)	+0.061 (0.799)
Percent white							+0.499 (0.025)	-0.183 (0.439)
Percent male								-0.286 (0.222)

Table 5: Relative-Distance Index for Population Subgroups by Residence Zone

	Residence Zone							
	Inner City		*Suburban*		*Garden City*		*Urban Fringe*	
Subgroup	N	*Index*	N	*Index*	N	*Index*	N	*Index*
Race								
White	9	-0.11	100	0.10	12	0.43	52	0.02
Black	47	0.20	82	-0.03	15	0.02	4	0.14
Sex								
Male	18	0.15	83	-0.02	9	0.34	22	0.08
Female	38	0.17	99	0.12	18	0.15	34	0.01
Age								
12-24	8	0.30	45	-0.18	2	0.00	13	-0.03
25-44	17	0.17	52	0.14	7	0.08	21	0.13
45-64	19	0.08	59	0.09	8	0.26	19	0.01
65-84	12	0.18	26	0.34	10	0.32	3	-0.14

found here may be a result of location with respect to the downtown area. The next question to test, then, was this: Within each zone, what happened to the relative-distance index when compared across population subgroups?

Table 5 shows the results of attempts to answer that question. Findings are inconsistent probably because, for one thing, some subgroups held few individuals. For whites in the inner city, all nine of them from a well-to-do block, distance was less important than it was for blacks in the inner city. In Garden City and the suburbs, distance was less important for blacks than for whites. Only four blacks had a regular source of care in the urban fringe clusters; distance was more important for them than for whites. There was no difference in index between males and females in the inner city. In the suburbs, distance was more important for females than for males; the reverse was true in Garden City and rural areas. Age patterns show considerable variation among the four zones. Occupation groups by zone were too small for meaningful analysis.

DISCUSSION

Any study of health care-seeking behavior must focus on some factors and omit others. For example, little mention was made here of the *type* of resources used for regular care (e.g., hospitals, physicians, clinics). This was not a serious problem, however, in the Savannah, Georgia

context, because 260 of the 321 sources of regular care (81.0 percent) were of one type—the offices of private physicians. Thirty-six sources (11.2 percent) were public clinics and 13 (4.0 percent) were hospital emergency rooms; the remaining 12 sources (3.7 percent) were reported as "other." An analysis could have been performed for physician's offices alone, but the numbers of other types of regular sources were too few to produce meaningful results. Concentration on distance and relative distance meant that other barriers to health care, such as social or psychological distance between providers and consumers, were not examined. Further, the Chatham County study dealt with the usual source of care rather than all sources contacted or the frequency of contacts made.

This research joins a group of studies that have shown distance to be an important factor in making contacts with health care resources, but only in relation to several other factors. In this study, distance—mainly through the use of a relative-distance index—was used as an exploratory tool to examine relationships among these factors.

In its agreement with other health care research (e.g., Weiss, Greenlick, and Jones 1971), the study of the location of most health care opportunities in Savannah goes a long way toward explaining the travel behavior of people seeking medical help. As in many cities, hospitals, clinics, and doctor's offices are concentrated in or near the downtown area. Unlike many cities, however, Savannah has few medical facilities in the suburbs. This configuration appears to have its advantages. Inner-city residents, usually poor and with less access to private transportation, are closer to potential sources of care. Distance should be comparatively important to them and, at least in travel to regular care, it is. Distance is of less importance to people living farther from the downtown areas, perhaps because they can more easily afford to travel. Further, it was mentioned earlier that the poor in inner-city areas might forgo intervening opportunities because of discrimination or inability to pay (Bashshur, Shannon, and Metzner 1971; Morrill, Earickson, and Rees 1970). That may still be the case in Savannah. The data show that inner-city people went relatively more often to clinics and hospitals than to private doctors. However, since all of the types of facilities are very close to the households of inner-city residents, the fact that they bypass intervening opportunities makes little difference in travel distance. On the other hand, if, as indicated, the more well-to-do residents living farther from downtown were bypassing relatively more of the intervening opportunities, it would seem that they often ignored possible suburban or urban-fringe facilities to concentrate instead on the cluster of downtown places. These findings

corroborate those of McLafferty (1982), mentioned at the close of the introductory section of this article.

At least four other considerations affect our interpretation of the relative difficulty between Savannah's inner-city and suburban-urban fringe people in overcoming distance to care. The first is that, although inner-city residents had shorter *distances* to travel, they might have taken a relatively long *time* to reach health care. Shannon, Skinner, and Bashshur (1973) found this to be true for visits to physicians and dentists in Cleveland, Ohio. They found a negative association between travel distance and travel time which could have been due to type of transportation used, waiting time for public transportation, the route traveled, and other factors. The second consideration has to do with multi-purpose trips. Comparison of activity spaces and health care-seeking spaces indicated some correspondence between the two. Thus, if people were in or near the sources of health care when at work or shopping, they could fairly easily include a health care visit in their daily round of activities. Perhaps this worked to the advantage of the more mobile suburbanites. Third, people who had lived in an area for a short time might have preferred to visit a doctor or clinic closer to their previous residence (Phillips 1979). Although our data could not be used to examine this point thoroughly, comparisons were made between the distance index and the length of time people had lived in their current residence. No significant associations were found between length of residence and index for all individuals considered together, across the 20 clusters, or within the four residence zones. The fourth point is simply that Savannah is a relatively small city—in population and square miles—and Chatham County is a relatively small metropolitan area. Most of the other studies cited in this article were carried out in larger places. Distance probably would not be as important a factor for Chatham County residents (even those on the urban fringe) as it would be for those living in a larger place.

An interesting finding in this study is that, although blacks were closer than whites to regular sources of care, there were no racial differences in relative-distance index. There were also no sex differences. The fact that both races and sexes (the latter more than the former) were represented to some degree in all parts of Chatham County accounts in part for this. There were differences between whites and blacks, males and females, in the four residential zones, but they tended to balance each other out.

It is important to note that many other studies—that did find population subgroup differences in access to care (e.g., Bashshur, Shannon, and Metzner 1971; Morrill, Earickson, and Rees 1970)—

were carried out before the full impact of the Medicare and Medicaid legislation of the 1960s had been measured. Indeed, some of these studies were partly responsible for the legislation itself. Reforms in health care may account somewhat for the lack of differences found between races, sexes, and ages in relation to distance to care in Chatham County in the 1980s. The lack of racial differences in the relative-distance index could be explained, at least in part, if it could be shown that Savannah, a city in the southern United States, was less segregated than other places where racial differences have affected accessibility. The evidence is mixed: a study of New Orleans, for example, showed that black domestics were often found to live in the same blocks as the whites they worked for (Lewis 1976). On the other hand, indexes of residential segregation for 109 selected cities, 1940–1970, showed that the southern cities sampled had populations more segregated than those of nonsouthern cities (Yeates and Garner 1980).

Distance was of least importance to the youngest age group studied (ages 12–24), partly because younger people made up greater proportions of the suburban and urban-fringe populations. Within zones, the association between age and index was mixed. (It should be noted that the need for health care and the type of health care sought differ by age group. Young people, for example, might be more willing than others to override distance to reach the health services they require.)

Not too much can be concluded from this research about the importance of distance for people in various occupations; no clear trend was apparent from less- to more-skilled jobs. In sum, the Savannah study did not strongly corroborate those studies that have shown demographic and socioeconomic variables to be associated with distance to health care (e.g., Haynes and Bentham 1982). Our findings are more consonant with those of Dangschat, Friedrichs, and Kiehl (1982) who found that population characteristics did not influence activity-space variables. That is, individual differences appeared to override general sociodemographic group classifications in activities that included health-seeking behavior.

As expected from the work of Horton and Reynolds (1971), Wolpert (1965), Shannon and Spurlock (1976), Cromley and Shannon (1986), and others, it was important to consider the daily-activity spaces of people in relation to their health care travel. The distance people traveled to their daily activities, such as jobs and shopping, and the size of their activity spaces were both related to the distance they traveled to regular sources of health care. The downtown focus both of health care and of other activities and the greater effort made by people who lived farther from downtown to reach these areas were all of

importance here. Shannon, Bashshur, and Spurlock (1978) showed that in Washington, D.C., health-search spaces and daily-activity spaces showed varying degrees of correspondence for different groups. In Chatham County, inner-city spaces coincided more closely than did those of people living farther out, but even the suburban and urban-fringe spaces had a relatively close correspondence.

CONCLUSION

The main purpose of this article was to reexamine, in a unique setting, several of the factors that have been found to be associated with consumer-provider interactions in other health care studies. These factors include distance and relative distance to health care, differences among population subgroups in access to care, the relative locations of people and their sources of health care, and people's activity spaces. Findings from an examination of the interaction of these factors for individuals and various groups of people (based on population characteristics and geographic location) reveal several implications for health care planning. First, distance alone may have an important influence on accessibility since different subgroups of the population live at different distances from sources of health care. However, if one measures the relative distance to care (the distance people actually travel for care in relation to distances to all of the care site choices), these differences may become altered (as they did between age groups in this study) or may disappear (as they did between blacks and whites). It is clear that the distance variable should be treated with caution because it can be measured and interpreted in many different ways.

Second, the location of health care sources relative to the people who use them is important. Most of Savannah's health care facilities (hospitals, clinics, and physicians) are located either in the central business district or in a cluster somewhat southeast of the CBD. This means that people who live a greater distance from the center of Savannah have to travel farther for care. However, the relative-distance index showed that distance was of less importance to those who lived farther out, quite possibly because they could more easily afford travel than could inner-city people—who were closer to sources of health care. The planning implication here is the importance of maintaining health care facilities at close proximity to those people for whom distance holds a relatively important disadvantage.

Our work found, third, that differences among population subgroups (by race, sex, age, occupation, and length of residence) in

accessibility to health care as measured by relative distance were not as pronounced as those found in other studies. There were no race, sex, and length-of-residence differences; age and occupational differences followed no clear pattern. Clear patterns of population subgroup differences also were not found when residential location (inner city, suburbs, urban fringe, and industrial satellite) was controlled for. It was suggested that reforms in health care delivery might be partly responsible for this finding. Perhaps health care planners should focus less on population subgroup differences and more on other types of differences. For instance, the Savannah study found very large individual differences among members of various population subgroups. Significant differences were also found among the 20 survey clusters, suggesting that specific geographic locations are important in health care-seeking behavior. These results point to the need for health care studies to turn from an emphasis on investigating population aggregates toward more microlevel examinations of people's behavior and specific geographic locales within large areas.

A fourth implication of this study is that each urban setting has unique characteristics and health provision must thus be based on local situations. A basic property of Savannah's urban ecology is the strong focus on its downtown area; medical facilities and activities such as shopping are centered there. Savannah is also a relatively small city, which may make access to care somewhat easier than in other places and would tend to eliminate accessibility differentials among population subgroups. It is also possible that Savannah has a comparatively low level of segregation, thus reducing racial differences in access in particular.

Fifth, the Savannah study showed that knowledge about the daily-activity spaces of people provides a valuable indicator for examining health care-seeking behavior. The study revealed that Chatham County residents focus their trips to work, shopping, and other activities toward the same general area where health care facilities are located. If people tend to use health care facilities near the places where they work or shop, then their distance from home to health care is not a very good measure of accessibility. The activity spaces were larger for people who lived farther away from the city center, a circumstance that helped to overcome the friction of distance for them. Clearly, it is advantageous to site health care resources within or close to the orbits of people's daily rounds.

APPENDIX

RELATIVE-DISTANCE INDEX

Three distances were calculated for each individual who reported using a regular source of care: (1) the actual, Manhattan metric, distance from a person's residence to the facility used for care (called a for actual distance); (2) the distance to the closest care facility, out of all places used, from the person's residence (called m for minimum distance); and (3) the average distance from the person's residence to all facilities used (called h for hypothetical distance). An index, I, was calculated for each individual from the formula $I = 1 - [(a - m)/(h - m)]$.

Consider what different values of I would indicate. (1) If distance was a relatively important factor, then distance would be minimized and a would be as close to m as possible. If this were the case, I would be close to a value of 1. (2) If distance was a relatively unimportant factor, to the extent that a was larger than h, then I would be negative. (3) Between the extremes of (1) and (2) would be the case where a is close to h; here I would approach 0 and distance would be of medium importance.

The index can be modified slightly to allow for group comparisons. The values $d(a)$, $d(m)$, and $d(h)$ replace a, m, and h; all represent the average of the respective distances for the subgroup in question. The index then becomes: $I = 1 - \{[d(a) - d(m)]/[d(h) - d(m)]\}$.

REFERENCES

Bashshur, R. L., G. W. Shannon, and C. A. Metzner. "Some Ecological Differentials in the Use of Medical Services." *Health Services Research* 6(Spring 1971):61–75.

Cromley, E., and G. W. Shannon. "Locating Ambulatory Medical Care Facilities for the Elderly." *Health Services Research* 21(October 1986):499–514.

Dangschat, W. D., J. Friedrichs, and K. Kiehl. "Action Spaces of Urban Residents in an Empirical Study in the Region of Hamburg." *Environment and Planning A* 14, no. 9(1982):1155–74.

Fuller, G. "On the Spatial Diffusion of Fertility Decline: The Distance-to-Clinic Variable in a Chilean Community." *Economic Geography* 50, no. 4(1974):324–32.

Girt, J. L. "Distance to General Medical Practice and its Effect on Revealed Ill-Health in a Rural Environment." *Canadian Geographer* 17, no. 2(1973):154–66.

Haynes, R. M., and C. G. Bentham. "The Effects of Accessibility on General Practitioner Consultations, Out-Patient Attendances and In-Patient Admissions in Norfolk, England." *Social Science and Medicine* 16, no. 5(1982):561-69.

Hightower, H. C. "Recreation Activity Analysis: Towards a Spatial and Aspatial Methodology for Urban Planning." Ph.D. diss., Department of City and Regional Planning, University of North Carolina, Chapel Hill, 1965.

Horton, F. E., and D. R. Reynolds. "Effects of Urban Spatial Structure on Individual Behavior." *Economic Geography* 47, no. 1(1971):36-48.

Joseph, A. E., and D. R. Phillips. *Accessibility and Utilization: Geographical Perspectives on Health Care Delivery.* New York: Harper & Row, 1984.

Lewis, P. F. "New Orleans—The Making of an Urban Landscape." In *Contemporary Metropolitan America, Vol. 2,* edited by J. S. Adams, 97-217. Cambridge, MA: Ballinger, 1976.

Mayer, J. D. "The Distance Behavior of Hospital Patients: A Disaggregated Analysis." *Social Science and Medicine* 17, no. 12 (1983):819-27.

McGuirk, M. A., and F. W. Porell. "Spatial Patterns of Hospital Utilization: The Impact of Distance and Time." *Inquiry* 21, no. 1(1984):84-95.

McLafferty, S. "Urban Structure and Geographical Access to Public Services." *Annals of the Association of American Geographers* 72, no. 3(1982):347-54.

Mering, O. V., G. W. Shannon, W. Deal, and P. Fischer. "A Long Day's Journey to Health Care." *Human Organization* 35, no. 4 (1976):381-89.

Morrill, R. L., and R. J. Earickson. "Variation in the Character and Use of Chicago Area Hospitals." *Health Services Research* 3, no. 2(1968):224-38.

Morrill, R. L., R. J. Earickson, and P. Rees. "Factors Influencing Distance Traveled to Hospitals." *Economic Geography* 46, no. 2(1970):161-71.

Phillips, D. R. "Spatial Variations in Attendance at General Practitioner Services." *Social Science and Medicine* 13, no. 3(1979):169-81.

Shannon, G. W., and C. W. Spurlock. "Urban Ecological Containers, Environmental Risk Cells, and the Use of Medical Services." *Economic Geography* 52, no. 2(1976):171-80.

Shannon, G. W., R. L. Bashshur, and C. A. Metzner. "The Concept of Distance as a Factor in Accessibility and Utilization of Health Care." *Medical Care Review* 26, no. 2 (1969):143-61.

Shannon, G. W., R. L. Bashshur, and C. W. Spurlock. "The Search for Medical Care: An Explanation of Urban Black Behavior." *International Journal of Health Services* 8, no. 3(1978):519-30.

Shannon, G. W., J. L. Skinner, and R. L. Bashshur. "Time and Distance: The Journey for Medical Care." *International Journal of Health Services* 3, no. 2(1973):237-44.

Weiss, J. E., M. R. Greenlick, and J. F. Jones. "Determinants of Medical Care Utilization: The Impact of Spatial Factors." *Inquiry* 8, no. 1 (1971):50-57.

Wolpert, J. "Behavioral Aspects of the Decision to Migrate." *Papers of the Regional Science Association* 15(1965):159-69.

Yeates, M., and B. Garner. *The North American City.* New York: Harper & Row, 1980.

Yuill, R. S. "The Standard Deviational Ellipse: An Updated Tool for Spatial Description." *Geografiska Annaler* 53B(1971):28-39.