

The Correlates of Health Services
In the State of Ohio

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Introduction

The task of providing adequate health care for the American people has been and continues to be a difficult problem to resolve. One problem of major concern has been the cost of medical care. The American people have been allocating increasingly larger portions of the Gross National Product for medical care over time which is probably a function of several factors such as increasing costs of medical care and more extensive purchase of health related services. Cooper's [1971] findings revealed that in the fiscal year 1970 the American people allocated 67.2 billion dollars for medical care which was an increase of 7 billion dollars over the preceding year. The total medical expenditure in 1970 constituted about 7 percent of the Gross National Product while the comparable figure in 1960 was 5.3 percent. The ever increasing costs of health care are documented in Table 1. The data suggest that the rising allocation of funds is not solely a function of population growth since per capita expenditures for health care more than doubled in the last decade.

While the increasing cost of medical care is of significant concern for professional and layman alike, an even more critical issue presents

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itself in the form of availability of medical services to all people. A question of paramount importance in this research effort is whether or not people have access to medical doctors and hospital facilities in their local communities.

Table 1
Health Costs in the U.S. From 1929-1970

Fiscal Year	Health Expenditures		Percent of G.N.P.
	Total (In Billion of Dollars)	Per Capita	
1929	3.6	29	3.6
1935	2.8	22	4.1
1940	3.9	29	4.1
1945	7.9	56	3.7
1950	12.0	78	4.6
1955	17.4	104	4.6
1960	25.9	142	5.2
1965	39.0	198	5.9
1970	67.2	324	7.0

Source: Barbara S. Cooper, "The Who, What, Where of Medical Care Spending," Paper presented at The National Agricultural Outlook Conference, Washington, D.C., February 1971, p. 2.

Literature Review

The magnitude of the rural health problem has been carefully documented by the National Advisory Commission on Rural Poverty [1967:59-74] which discovered that severe health problems existed among the lower classes in rural areas of the nation. The Commission reported overwhelming evidence that health problems existed among the rural poor. It was further

noted that there was severe inequity and discrimination against the rural poor in terms of accessibility to medical and dental and other health services when compared with other segments of the American society. The Rural Poverty Commission provided insight into the broad scope of the medical problems of rural people when it observed the following: (1) rural residents tend to have much higher rates of disabling accidents than urban residents (especially farm machinery-related accidents); (2) rural residents average fewer physician visits per person per year than urban residents; (3) a lower percentage of rural people have hospital insurance than urban people; (4) rural areas of the nation have fewer medical specialists than urban areas; (5) and the medical facilities in rural areas are often smaller and less equipped with medical technology than the urban hospitals.

Hady and Bird [1970] recognized the relative inferiority of rural health services in comparison to urban health systems when they noted that rural hospitals are often quite small and have limited equipment. Another factor observed was that rural areas tended to exhibit a maldistribution of health professionals, which contributed to the inequitable distribution of health services in rural and urban areas.

A study by Doherty [1971], primarily concerned with the utilization of health facilities in Michigan revealed that rural residents were being adequately served at a relatively low cost. Doherty compared the demand for hospital beds with availability of hospital bed space and concluded that the rural areas were being adequately served. This particular study appears to be an exception to the overwhelming evidence which supports the position that health services in rural areas are quite inadequate.

Hassinger and McNamara [1971] offer considerable empirical evidence that rural areas are not being adequately served with health care. They present data from the National Health Survey and the findings of several public agencies such as the Public Health Service which demonstrate the need for much more extensive health care among rural residents. They observe that farmers had a higher rate of chronic health limitations which affected their ability to perform their work roles more than any other occupational group. Other segments of their article revealed the following: (1) rural residents are examined by medical specialists much less frequently than urban residents; (2) rural residents utilize hospitals at approximately the same percentage as their urban counterpart (this suggests that rural residents are traveling greater distances than urban dwellers to urban hospitals since other studies suggest there are fewer hospitals in rural areas); (3) urban areas have increased the number of available medical doctors while isolated rural areas have continued to experience a decline in the number of available physicians; and (4) rural people value scientific medical care in a manner quite similar to their urban counterpart. This information strongly suggests that while the need for medical services is great within rural areas of the nation the provision of the services is less than adequate.

A study by Phillips and Pugh [1970] added further insight into the medical needs of rural people when they demonstrated that the rural farm population of the State of Ohio did not emphasize preventive health practices to the same extent as the rural nonfarm population. The authors suggest that a partial explanation of the difference was that rural farm people had less access to medical personnel and facilities which affected their preventive health practices. The authors suggest that a concerted effort

should be made to attract professional personnel to rural areas and to educate the rural residents about preventive health practices. While these recommendations have merit, it is apparent that under existing circumstances rural areas have been unsuccessful in attracting medical personnel.

Hassinger [1971] has observed that efforts to achieve redistribution of medical professionals to the rural areas have quite often met with failure and that the status quo is seldom maintained in rural communities. Hassinger attributes part of the difficulty of attracting and keeping medical doctors and dentists in rural areas to the increasing need for elaborate medical and dental facilities. Sophisticated equipment is needed which is often only available in large hospitals and clinics. The need for formal and informal peer group interaction with other medical professionals is a contributing factor to the concentration of medical doctors near urban centers. Peer interaction is facilitated by close proximity with other professionals in the discipline and the opportunities for professional exchange is less frequently available in dispersed rural areas.

Other research which has demonstrated the need for more extensive rural health care facilities has been conducted by Lotspiech and Napier [1968] and Napier [1972] which noted a maldistribution of medical and dental staff in the rural economically deprived areas of West Virginia. These research reports suggest that the need for medical services was great in the rural economically deprived counties while provision of the services was less than adequate compared with the more urban counties of the state.

Theory Formation

The literature review clearly demonstrates that many professionals involved in the analysis of rural health care agree that inequalities exist

between urban and rural segments of the society. Numerous articles have suggested that medical doctors are disproportionately concentrated in urban areas due to the access to medical facilities, professional interaction and social activities of the urban communities. More numerous social amenities are located in the urban communities which are attractive to the medical professional and his family. Consistent with this position one of the hypotheses tested was stated as follows: The ratio of potential clients per available physician is inversely related to population size.

It was assumed that medical professionals are economically rational people and desire to locate in areas of affluence so that adequate compensation for their efforts can be expected. In addition, it was reasoned that areas of affluence would have better services such as good schools, adequate police and fire protection and other amenities available to the medical doctor and his family which would be added incentives for locating in an affluent area. Consistent with this sequence of logic the following hypothesis was formulated for testing: As the per capita income levels increase there is a corresponding decrease in the ratio of potential clients per physician.

Since medical specialists such as heart surgeons or obstetricians serve a particular clientele, it should follow that they require a larger population base to support their specialized medical activities. The data presented in Table 2 supports the position that the population requirements for specialists is much greater than for general practitioners.

In addition to the larger population base needed for specialized medical care, specialists often require sophisticated technology to adequately perform their designated function. Therefore, it is often necessary that such physicians locate near large urban centers which have well

Table 2

Population Required to Support
Selected Medical Specialists

Specialty	Population Required
Allergy	25,000
Anesthesiology	15,000
Cardiovascular Disease	100,000
Dermatology	50,000
General Practice, Full-time	2,000
General Surgery	10,000
Internal Medicine	5,000
Neurological Surgery	100,000
Neurology	75,000
Obstetrics and Gynecology	11,000
Ophthalmology	20,000
Orthopedic Surgery	30,000
Otolaryngology	25,000
Pathology	20,000
Pediatrics	10,000
Plastic Surgery	50,000
Psychiatry	10,000
Radiology	15,000
Thoracic Surgery	100,000
Urology	30,000

Source: Medical Economics, October 30, 1967, p. 67.

equipped medical facilities. Rural or less populated areas have neither the population base nor the facilities to sustain many types of specialists. Since general practitioners have lower facility and population base requirements relative to medical specialists, it was hypothesized that: As population per county increases the proportion of general practitioners of the total number of practicing physicians will decrease.

The preceding hypothesis was predicated upon the contention that rural health facilities were fewer in number and smaller in size than urban facilities. It was reasoned that size and number of facilities were contributing factors to the hypothesized maldistribution of medical per-

sonnel. This logic was subjected to analysis by the following hypothesis: The number of hospitals is positively correlated with population size. To gain further insight into the qualitative aspects of the rural-urban hospital issue, the following hypothesis was formulated for testing: The ratio of the number of people per available hospital bed is negatively correlated with county population. If the rural counties have small hospitals relative to urban areas and if the bed space per population available in rural counties is disproportionately less than the bed space per population in the urban counties, then one would hypothesize that quality of health facilities would be correspondingly different. The rationale for this position is that the probability is greater that larger hospitals would provide more extensive medical care. For example, the probability is much greater that a large hospital will provide certain speciality care as opposed to a small rural hospital. The hypothesis for testing was as follows: As population increases there is a corresponding increase in the size of hospitals. If the size of facilities is a contributing factor to the hypothesized maldistribution of medical doctors and if facilities are relative lacking, then the availability of medical personnel should be affected. The hypothesis tested was: As hospital size increases the ratio of potential clients per medical doctor decreases. This was based upon the position that medical doctors are concentrated near quality medical facilities.

Percent migration and median age of the population were added to the theoretical model as possible predictive factors of medical personnel and facilities. It was reasoned that geographical areas experiencing outmigration would have significantly fewer medical doctors and medical facilities per population than areas experiencing population growth. The magnitude and

direction of the migration should provide an indicator of the socio-economic growth potential of the area. If a county is experiencing population growth the probability for attracting medical professionals should be greater than counties which are stagnate or declining. The hypothesis formulated for testing was as follows: In-migration will be negatively correlated with the ratio of potential clients per available medical doctor and positively correlated with the medical facilities factors.

Median age was included as a variable to evaluate distribution of medical facilities and professionals in terms of the medical needs of the aged. Cooper [1971:4-5] discovered that age was positively correlated with allocation of resources for health care. A summary of her findings is presented in Table 3.

Table 3
Allocation of Resources for Medical
Care by Age Groups in 1969

Age Groups	Percentage of Total Population	Percentage of Expenditures For Health Care
65 and Over	9.5	25.7
19-64 Years	53.9	58.3
Less Than 19 Years	36.7	16.0

Source: Barbara S. Cooper, The Who, What, and Where of Medical Care Spending, 1971 National Agricultural Outlook Conference, Washington, D.C., p. 4.

While the need for medical care increases with age, the potential for an area to fulfill the needs may decrease as the median age of the population increases. The median age of a county should be inversely cor-

related with socio-economic viability. As the socio-economic viability of an area decreases impetus is added for outmigration of young, active people which would increase the proportion of immobile elderly. The potential for attracting medical personnel into the declining area should become correspondingly more difficult. The hypothesis for testing this sequence of logic was: As the median age of the population increases the ratio of potential clients per physician will increase.

Methodology

The data relative to medical facilities and distribution of practicing physicians was derived from a publication of the American Medical Association [AMA] entitled "Distribution of Physicians in the United States, 1970" [Haug, Robach and Martin: 1971]. The publication contains a wealth of information regarding distribution of physicians, number of hospital beds, number of available beds, type of practice of active medical doctors and other valuable information on a regional, state, county and urban area basis. Since the AMA statistics were presented on a county basis, the county was selected as the means of differentiating population groups.

Only those physicians involved in public patient care were included in the analysis and the total number of active medical doctors per county was entered as an independent variable.² All practicing physicians as of December 1970 were categorized into "general practice" and "other practicing physician" groups. The other practicing physician group was com-

²Doctors of osteopathy were not included in the analysis even though many areas of the state of Ohio are served by this medical group.

posed of medical specialists, surgical specialists, other specialities and hospital based practice. The rationale for the combining of the various subcategories together into the "other practicing physicians"³ category was that they tended to form a specialized patient care activity group. The total number of general practitioners was divided by total number of available medical doctors in the county and the product multiplied by 100 to determine the proportion of general practitioners of the total doctors in the county. The percentage figure was employed as a variable. The calculation of percentage of general practitioners was as follows:

$$\frac{\text{Total Number of General Practitioners in the County}}{\text{Total Number of MD's in the County}} \times 100 = \text{Percentage of General Practitioners}$$

The resident population divided by the number of available hospital beds provided the means of operationalizing the variable termed "ratio of potential clients per available hospital bed." The calculation for this variable was as follows:

$$\frac{\text{Resident County Population}}{\text{Number of Available Hospital Beds in the County}} = \text{Ratio of Potential Clients Per Hospital Bed}^4$$

The number of hospitals in the counties was entered as an independent variable to test the hypothesis that urban counties would have more numerous hospitals.⁵ The hospital size variable was calculated by dividing the

³Hereafter the term "specialists" will be used to refer to "other practicing physicians."

⁴The population of the county was assumed to have one hospital bed even if no hospital bed existed.

⁵Only hospitals involved in public patient care were included in the analysis.

number of available beds by the number of hospitals. The mean number of available hospital beds per hospital within the county was used as the indicator of hospital size. The calculation for hospital size variable was as follows:

$$\frac{\text{Number of Available Hospital Beds in the County}}{\text{Number of Hospitals in the County}} = \text{Hospital Size}$$

Per capita income per county as of 1969 was utilized as the income indicator [Haug, et. al., 1971:256-259]. Data compiled from the 1970 Census [Thomas:1972] was used to operationalize two variables termed "total population" and "migration." The total county population in 1970 for each of the 88 Ohio counties was used as the population indicator and the estimated percentage change in population due to migration between 1960-1970 was utilized as the migration variable. The age variable was operationalized in terms of median age of the county population which was provided by the 1970 Census [Census:1971].

The dependent variable was denoted as the ratio of potential clients per active medical doctor. The variable was operationalized by dividing total county population by the number of practicing physicians as follows:

$$\frac{\text{Total County Population}}{\text{Total Number of Practicing Physicians in the County}} = \text{Ratio of Potential Clients Per Available Physician}$$

Data from the 88 counties for the State of Ohio was collected for each of the above mentioned variables and subjected to multiple correlation and step-wise regression analysis. The ratio of potential clients per available practicing medical doctor was designated as the dependent variable.

Correlation Findings

The correlational findings are presented in Table 4 and reveal that population size was negatively correlated with the ratio of potential clients per available medical doctor. The correlation (zero order r) between population and the dependent variable was -0.3337 which basically supports the theoretical hypothesis that counties with large populations tended to have lower ratios of potential clients per available physician.

Percent migration was not strongly correlated with the ratio of potential clients per available physician but was in the direction posited in the theory. The correlation was -0.1490 which indicates that counties which were experiencing in-migration had a slightly more favorable ratio of potential clients per medical doctor compared to counties experiencing out-migration.

The correlation between total number of medical doctors and the ratio of potential clients to physician was in the hypothesized direction but the magnitude of the correlation was much lower than anticipated. The correlation was -0.2884 which means that counties with more medical doctors have a lower potential patient per medical doctor ratio. Since the highly populated counties had a numerical advantage in terms of available medical doctors, this correlation suggests that some less populated counties had comparable ratios of people per available physician compared with the more highly populous counties.

The correlation between the percentage of general practitioners and the ratio of potential clients per available doctor was 0.6467 . When this finding is combined with the correlation findings for percentage of general practitioners and population (-0.4924) and with the correlational finding

Table 4

Correlation Matrix for Medical Service in the State of Ohio

	Population	Migration	Total Medical Doctors	Percent General Practitioners	Per Capita Income	Number of Hospitals	Median Age	Hospital Size	Ratio of People Per Hospital Bed	Ratio of People Per Medical Doctor
Population	1.0									
Migration	0.0765	1.0								
Total Medical Doctors	0.9799**	0.0020	1.0							
Percent General Practitioners	-0.4924**	-0.2918*	-0.4124**	1.0						
Per Capita Income	0.5831**	0.5268**	0.5014**	-0.6182**	1.0					
Number of Hospitals	0.9414**	0.0042	0.9571**	-0.4626**	0.5317**	1.0				
Median Age	-0.0286	-0.6358**	0.0248	0.1453	-0.3609**	0.0063	1.0			
Hospital Size	0.5444**	0.1459	0.4414**	-0.7200**	0.5636**	0.4210**	-0.0009	1.0		
Ratio of People Per Hospital Bed	-0.0712	0.1085	-0.0795	0.2999*	-0.1248	-0.1775	-0.2069	-0.3005*	1.0	
Ratio of People Per Medical Doctor	-0.3337*	-0.1490	-0.2884*	0.6467**	-0.5170**	-0.3946**	0.0598	-0.5565**	0.5042**	1.0

*Sig. at the .01 level with 1 and 86 degrees of freedom.

**Sig. at the .001 level with 1 and 86 degrees of freedom.

for total number of medical doctors and percentage of general practitioners (-0.4124), the relationship becomes more meaningful. These correlations strongly suggest that residents of less populous counties are more frequently served by general practitioners while the more populous counties are being served more often by medical specialists. The findings also suggest that the counties being served by a proportionately higher percentage of general practitioners tend to have a disadvantage in the number of physicians relative to the population to be served. These findings are consistent with the theory presented.

The per capita income findings were also supportive of the hypothesized model. The correlation between per capita income and potential client per available medical doctor was -0.5170 which demonstrated that higher per capita income populations possessed a disproportionate share of the available medical doctors. The hospital related variables were also correlated in the anticipated direction with the potential client per medical doctor variable. As the number of hospitals, and mean size of hospital increased there were corresponding decreases in the potential client per medical doctor ratio. As the ratio of potential clients per available hospital bed increased there was a corresponding increase in the ratio of people per available medical doctor (0.5042). These findings indicate that hospital facilities are related to the number of medical professionals which are available in the counties.

The median age variable proved to have a very low correlation with the ratio of potential clients per medical doctor (0.0598). Counties with older populations tended to have neither an advantage nor disadvantage relative to the counties with younger populations in terms of the ratio of people per available medical doctor.

In summary the correlational analysis basically validated the theoretical position presented with the exception of median age. The data strongly suggest that counties which are characterized by low per capita income, relatively few medical facilities, low population base, and experiencing out-migration tend to have fewer medical doctors and a higher proportion of general practitioners than counties with the opposite characteristics.

The findings presented in Table 4 also demonstrate that the hypotheses relative to the distribution of hospital facilities in the state tended to be supported but caution must be exercised¹ in the interpretation of the findings. While the more populous counties⁵ have more numerous and larger hospital facilities as demonstrated by the correlation of 0.9414 between population size and number of hospitals and a correlation of 0.5444 for population and hospital size, it should be noted that the more populous counties also have many more people to serve. The two hypotheses relative to number and size of hospital facilities appear to have been supported.

It is interesting to note that the correlation between the ratio of potential client per available hospital bed and population size was practically nonexistent (-0.0712). This finding tends to bring into question the commonly held position that residents of more rural counties in the state have less access to hospital beds than do their urban counterpart. The findings for the potential client per available hospital bed strongly suggests that many rural counties of the state have comparable hospital

⁵Hereafter the term "rural" will be used to refer to less populated counties. This was done for convenience in communication only and "rural" does not necessarily reflect population density (percentage urban population of total).

bed space per population as the more populous urban oriented counties. The hypothesis relative to ratio of potential clients per available hospital bed and population size must be rejected.

Regression Findings for the Ratio
Of People Per Available Medical Doctor

The ratio of potential clients per available medical doctor was designated as the dependent variable and subjected to step-wise regression analysis. The regression analysis revealed that the independent variables explained approximately 56 percent of the variance in the ratio of potential clients per available physician. The independent variables which were significant in the reduction of the variance in the dependent variable in order of entrance into the step-wise regression were: percentage of general practitioners of total medical doctors, the ratio of people per available hospital bed, per capita income, and hospital size. When all variables were entered the number of hospitals in the county was shown to be significant but during the regression analysis the addition of the variable did not significantly reduce the unexplained variance. This finding suggests that the number of hospitals was operating indirectly through another variable or variables (multi-collinearity was occurring among the independent variables). The t-value for per capita income became insignificant when all variables were entered in the analysis which suggests that the variance explained by this variable was being partially explained by late entering variables. Income was also apparently operating indirectly through other variables.

The regression equation is presented below in standardized beta form. The t-test values for each variable are presented in Table 5.

$$Y = 3367.8 + 0.5875 X_1 + 0.0430 X_2 + 0.2421 X_3 + 0.2909 X_4 - 0.2308 X_5 \\ - 0.7740 X_6 + 0.0259 X_7 - 0.2529 X_8 + 0.2366 X_9$$

Y = ratio of people per available medical doctor

X₁ = county population 1970

X₂ = percent migration 1960-1970

X₃ = total number of medical doctors per county 1970

X₄ = percentage of general practitioners of total available medical
doctors per county 1970

X₅ = county per capita income 1969

X₆ = number of hospitals in county 1970

X₇ = median age of county population 1970

X₈ = mean county hospital size 1970

X₉ = ratio of people per available hospital bed 1970.

Discussion of Findings and Conclusion

The correlation and regression findings basically validated the theoretical position posited in this research, however, population size was not the best predictor of availability of medical doctors. The most significant variable was the percentage of general practitioners of total medical doctors in the county which explained about 41 percent of the variance in the ratio of potential clients per medical doctor. Counties which had a higher proportion of general practitioners tended to have a higher ratio of potential clients to available medical doctors. Since population size was discovered to be inversely correlated with percent general practitioners (-0.4924), the conclusion is that less populated counties (rural) not only have a higher potential client to physician ratio but also are

Table 5

Regression t-test Values of Selected Independent Variables for Ratio of Potential Clients Per Available Medical Doctor

	t-test Value
County population	1.11*
Percent migration	0.39*
Total medical doctors	0.46*
Percent general practitioners	2.47**
Per capita income	1.85*
Number of hospitals	2.65***
Median age	0.27*
Hospital size	1.85*
Ratio of people per available bed	2.69***

A two-tailed test was employed to determine significance level.

*Not significant at the .05 level with 78 degrees of freedom.

**Significant at the .02 level with 78 degrees of freedom.

***Significant at the .01 level with 78 degrees of freedom.

served more frequently by general practitioners. In essence, the study revealed that rural counties had fewer medical doctors per population compared to the more populous counties and that the type of medical care being provided to rural people could be considerably different than the type of care being provided in the urban counties.

The facilities factors (number of hospitals and the ratio of potential clients per available hospital bed) were also significant in explaining

the ratio of potential clients per physician. These findings suggest that counties with fewer and smaller medical facilities were not being as well served in terms of medical personnel as those counties having elaborate medical facilities.

Caution must be exercised in the interpretation of these findings. Some may falsely conclude that more facilities will remedy the physician shortage in rural areas. The correlation between population size and number of available hospital beds per population should demonstrate the possible futility of such efforts. The study revealed that rural counties are already comparable to the urban counties in terms of hospital bed space.⁶ This finding should bring into question the simplistic answer of solving the need for physicians in rural areas by constructing more numerous small hospitals to increase bed space.

In summary, the findings suggest that a maldistribution of medical doctors exists between rural and urban counties relative to medical doctors but the magnitude of the differences were much less than expected.⁷

⁶Quality of hospital facilities was not addressed per se in this research. It was noted, however, that more populous counties had larger hospitals and if this is used as an indicator of quality then the rural hospital facilities may have a quality problem, even though, adequate bed space may be available for the small population. It was also noted that rural counties were relatively less frequently served by medical specialists compared with the urban counties which suggests that certain medical needs are perhaps not being met in the more rural counties.

⁷It should be noted that the maldistribution of professional staff between rural and urban areas is probably somewhat greater than the aggregate data suggests. When one considers that medical staff and health facilities are most often located in the larger towns of rural counties, many small rural towns are without resident physicians or hospital facilities. A zero order correlation coefficient was calculated for percent urban population (people in towns of 2,500 or larger) in the counties and the ratio of people per medical doctor. The correlation was 0.6353 which means that counties with more densely populated areas (urban) tended to have a relative advantage in terms of medical personnel.

The urban counties have numerically many more medical doctors and more numerous and larger hospitals but the populations to be served are correspondingly much larger. The findings also suggest that specialty care was probably less available in rural counties since medical specialists and the larger hospitals were more frequently located in urban counties. This means that residents of rural counties probably must commute to adjacent counties if specialty health care is required. The author must conclude that if there is a severe health problem in the less populated counties there is also a severe health problem in our more populous counties as well.

Implications for Development

The major implication of this research for community development in rural areas is that perhaps less emphasis should be placed upon construction of hospital facilities which have limited bed space and relatively low level technology for specialty care. The data suggest that less populated counties in the state have adequate hospital bed space (compared with highly populated counties) given the population base to be served. Perhaps more emphasis should be placed upon larger more centralized multi-county hospital facilities to provide extensive health care programs. In this manner the probability of attracting medical personnel to the regional medical centers would be enhanced.

Research conducted by the Appalachian Regional Commission [Widner: 1972] revealed that multi-county units of interdependent out-patient clinics and large centralized hospital facilities (Wagon-wheel concept) were not only economically feasible but sociologically and politically advisable. The Commissions' recommendations relative to rural health organization, however, have not been received with great enthusiasm

since the program demands inter-community and multi-county cooperation for funding and administration. The necessity for close coordination and cooperation on the part of participating community groups has apparently been perceived negatively by many segments of our society. The resistance of many community groups toward the wagon wheel model suggests that considerable developmental efforts to change attitudes are essential to the implementation of regional health programs.

The research findings revealed that medical doctors, particularly specialists, tended to be more highly concentrated in counties with large and more numerous hospitals. While the relationships proved to be significant between the facilities factors and medical personnel this author will submit that the resolution of the rural health situation is not so simplistic as the creation of additional facilities. To increase the number of hospital beds in rural areas probably will not serve to resolve the health problems of non-metropolitan segments of the state. The problem of providing adequate health care to people is multi-variant in nature and will probably not be resolved with less than a comprehensive developmental effort on the part of rural counties to achieve equal status with the urban counties.

While many may bemoan the apparent trend for medical doctors to avoid locating in small rural hamlets, the end result of careful developmental efforts could be a much more extensive program for medical care for the rural counties of the state. In the short run, it is highly probable that many rural counties will remain relatively under staffed with resident physicians but the long-run solution of the rural medical care problem may be the development of delivery systems which will provide a more complete medical program at reasonable costs. This is assuming, of

course, that the causal factors of the health problems in rural areas are resource based rather than attitudinal in nature or related directly to the social environment of the particular areas.

It may be that students of rural health are seeking insight into the relative unequal distribution of medical doctors from resource related variables when the problem may be much more basic. It is conceivable that the social milieu of rural areas may not be attractive to medical doctors and regardless of what facilities or economic inducements are applied the problems may not be resolved given the existing means of delivery of health care. Perhaps medical schools should consider giving rural reared candidates preference in selection, if provision of medical staff to rural areas is considered to have priority. Individuals socialized in a rural farm situation should have a greater probability of returning to rural areas to practice than a person socialized in an urban environment. Another possibility would be the placement of recently graduated medical doctors in internship programs in rural areas in hopes that more would elect to remain in a rural practice. Perhaps negative sanction should be applied if recent medical school graduates locate their practice in areas of relative overabundance. Another alternative would be a rapid increase in the supply of medical doctors. Once urban areas become relatively oversupplied with medical doctors, it is highly probable that rural areas would become more attractive as possible areas for locating medical practices. Research into the feasibility of various alternative health care delivery systems is an important potential research area which should be explored further.

This author is suggesting that perhaps rural developers have been seeking simplistic answers to an extremely complicated developmental problem. Since the problem is multi-variant in nature, it will not lend itself

to simple answers, therefore, creativeness on the part of developers, laymen, politicians, community leaders and others will be required to resolve the problem.

The alternative possibilities for providing adequate health care for rural residents are numerous. Bible (1971:4-9) presents a concise review of numerous innovative attempts to resolve the rural health problem which range from use of paraprofessionals for certain medical functions to multi-county cooperation in the use and support of health services. Bible's review of the various alternative mechanisms for delivery of medical services suggests that the potential mechanism exists for resolving this perplexing problem. The task remains for professional developers and laymen alike to explore several possible alternatives, determine which alternative best suffices the particular need of the community group and then act to achieve the goal of adequate medical care for all.

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