Changes in Number and Location of Health Practitioners In a 20-County Rural Area of Missouri

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THE MALDISTRIBUTION OF PHYSICIANS that adversely affects rural areas is a persistent problem in the delivery of health services. Several studies have documented the negative relationship between indices of ruralism and the physician to population ratios *(1–4)*. Less information is available concerning changes in availability of health practitioners in rural areas *(5, 6)*, and little is known about changes within clearly delineated rural areas. Such changes are dealt with in this study of 20 rural counties in Missouri.

The 20 Counties as a Field Laboratory

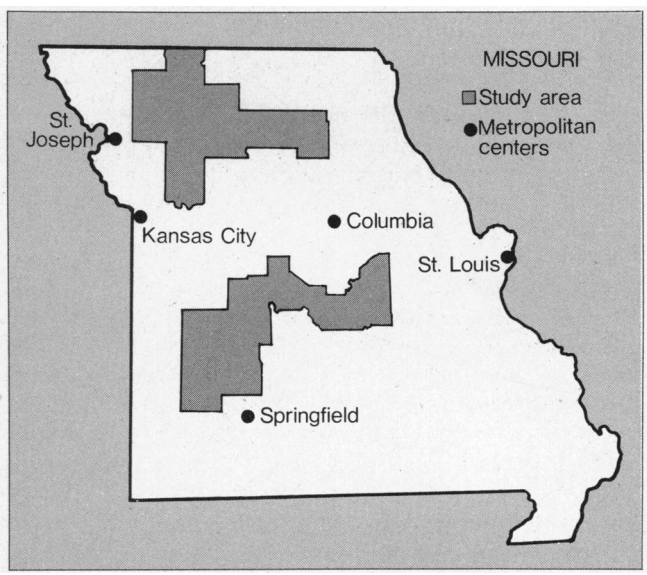
The 20 counties have been the site for observations of health manpower and consumer health behavior for more than 25 years. The counties were originally selected by Jehlik and McNamara for a study of morbidity among a rural population, with special emphasis on the relationship of distance to the use of health services *(7,8)*. Subsequent field surveys, made in 1954, 1958, 1965, and 1973, dealt with the numbers and locations of selected health personnel and facilities *(9–11)*. In addition, the 20-county area was the site of a detailed personal-interview study of backgrounds, career decisions, and community orientations of medical doctors and osteopaths *(12)*.

The various studies in the 20 counties have familiarized us with this area, and we consider it to be a field laboratory for observing the rural health situation. In particular, the long-term observations have made it possible to detect trends in numbers and locations of health personnel within a familiar setting.

The study area consists of two sets of 10 contiguous counties, one set is north and the other south of the Missouri River (see map). In both sets of counties, agriculture is the principal industry. In the northern counties, however, agriculture is more commercialized. The southern counties, in the area often referred to as the Ozarks, have developed some tourist activities and some attraction for retired people.

Typical of the Midwest, commercial and professional services in the area are provided in trade centers, most of which are incorporated places. In the following discussion, "place" refers to centers of commercial and professional services. While centers such as St. Louis, Kansas City, Springfield, St. Joseph, and Columbia provide health services (as well as other services) to people in the 20 counties, the area's characteristics remain primarily rural. Within the study area, no place is as large as 10,000 population, although 10 places (7 in the north and 3 in the south) met the census criteria of urban (2,500 or larger) in 1970. All of the places, however, are primarily service centers for a rural hinterland population.

Sites of 20 rural counties in Missouri that were studied for changes in number and location of health practitioners.



Continuing a long-term trend, the population of the 20 counties declined by about 10 percent from 1950 to 1960. From 1960 to 1970, however, the decline was only 1 percent, as shown in the following table:

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Year	Population	
	Number	Percent
1950	240,843	.....
1960	216,992	.....
1970	214,207	.....
Change, 1950–60	−23,921	−9.9
Change, 1960–70	−2,715	−1.3
Change, 1950–70	−26,636	−11.1

Characteristic of rural areas, the larger trade centers tended to show greater population increases than the counties as a whole. When we tabulated population changes for the 20 trade centers representing the largest place in each county, population increases were recorded for both decades as follows:

Year	Population	
	Number	Percent
1950	54,093	.....
1960	56,803	.....
1970	60,755	.....
Change, 1950–60	2,710	+5.0
Change, 1960–70	3,952	+6.9
Change, 1950–70	6,662	+12.3

Another demographic characteristic of interest is the relatively large number of persons age 65 and over—a result of selective out-migration and, especially in the southern counties, some in-migration of retired people (table 1).

Field Procedures

A series of field observations of health manpower were made in the area in 1954, 1958, 1965, and 1973. The general procedure was to obtain information from knowledgeable informants about health personnel and facilities in each county. As a rule, we talked with enough informants in each county to get a complete inventory of the personnel and facilities we had selected for observation. In 1954, informants included physicians, newspaper editors, county agricultural extension personnel, and county officials; in subsequent years the informants were not confined to these categories. For each survey after 1954, the previous survey provided a data baseline against which change of personnel could be assessed. In addition, the professional directories were used in preparation of working lists, to confirm mobility of personnel, and to determine ages of personnel—which informants could only estimate.

Field observations have several advantages over exclusive reliance on directories of professional societies for limited areas of the kind we studied. These advantages include currency, accuracy, and ability to observe special situations that otherwise would be undetected; for example, three physicians were located in the 1973 survey who maintained residences and practices outside the 20-county area (and were so reported in the directories) but who also maintained offices within the area and manned them on a scheduled, part-time basis. Another refinement made possible by field observations was detection of personnel who were retired or in limited practice but not so reported in the directories. In support of the accuracy of this methodology, it should be pointed out that each of the 20 low-population counties had only a few trade centers in which any kind of professional services were provided. In these rural counties health practitioners are highly visible, and our informants either knew the practitioners' locations or were in a network of persons who had such information. As we sat in the office of a county official, it was common for him to check an item of information by means of a telephone call to someone in the community or to suggest that we see a certain well-informed person. In general, we have confidence in the reliability of the data.

Practitioners in the Area

For this study, we obtained the number and location of the practices of medical doctors, osteopathic doctors, dentists, and chiropractors, as well as the location and number of general hospital beds. In this paper, we focus on comparisons of data for 1965 and 1973, but we also look at some of the longer-range trends. Because in the first survey (1954) data were not collected for dentists and chiropractors, time comparisons for these practitioners can be extended back only to 1958.

Medical care in the area is provided by private physicians typically in solo practice, but sometimes in limited groups. With few exceptions, the physicians are in general practice. Most physicians are staff members of local hospitals, which constitute the principal health facilities outside of physicians' offices. In Missouri, especially in the rural areas, a relatively large proportion of the practicing physicians are osteopaths. They practice in the community in a manner virtually indistinguishable from that of the MDs. Dentists in the area are in general practice and, typical of the profession, they maintain solo practices. Finally, chiropractors in the area are the most prominent practitioners

Table 1. Population 65 and over in 20 counties of rural Missouri, 1950, 1960, 1970

Population	Total, 20 counties			10 northern counties			10 southern counties		
	1950	1960	1970	1950	1960	1970	1950	1960	1970
Total	240,843	219,922	214,207	137,180	123,308	117,736	103,663	93,614	96,471
Number 65 and over	35,615	39,004	40,985	21,392	23,164	22,985	14,223	15,840	18,000
Percent 65 and over	14.8	18.0	19.1	15.6	18.8	19.5	13.7	16.9	18.7

Table 2. Changes in numbers of selected health personnel in 20 counties of rural Missouri, 1965–73

Status	Medical doctors		Osteopaths		Dentists		Chiropractors	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
In practice, 1965	74		83		65		39	
Separated, 1965–73	22		41		19		13	
Moved	10	45	12	29	3	16	7	54
Deceased	9	41	13	32	10	53	0	
Retired	3	14	16	39	6	32	6	46
Additions, 1965–73	14		13		12		16	
Net loss or gain	−8		−28		−7		+3	
In practice, 1973	66		55		58		48	

who offer alternatives to MDs and DOs. The chiropractors also are typically in solo office practice, although there are several partnership and group arrangements in the area. From 1965 to 1973, there had been a decrease in the numbers of each type of practitioner except chiropractors (table 2).

Medical doctors. In 1973, 66 MDs were practicing in the area—as opposed to 74 in 1965. Three counties had no MDs in 1973 compared with two counties in 1965. The net loss of 8 MDs from 1965 to 1973 resulted from 22 separations and 14 additions. A majority of the separations resulted from death or retirement—migration from the area (and continued practice) was also a significant factor (table 2). The pattern of separations and additions between 1965 and 1973 was similar to that reported for 1954–58 and 1958–65 *(10,11)*; for each of these periods, separations exceeded additions and the attritions of time (death and retirement) accounted for more losses than did migration. From 1954 to 1973, the loss amounted to one-third of the MDs—from 100 to 66 (table 3).

Osteopathic doctors. Missouri has the highest osteopath to population ratio of any State in the nation, and osteopaths, compared with MDs, are more concentrated in nonmetropolitan areas of the State. For example, whereas osteopaths constitute 16 percent of the active physicians in the State, they account for almost two-fifths in its nonmetropolitan areas *(13)*. The relatively large number of osteopaths in Missouri is accounted for by the presence of two of the nation's seven schools of osteopathy, and the relatively large proportion of osteopaths in rural areas has several bases. One basis is that the osteopathic college at Kirksville, Mo., emphasizes family and rural practice and has pioneered in establishing rural clinics as training sites for its students. Furthermore, until recently, osteopaths were not likely to specialize and thus were not as likely as MDs to be directed away from rural locations. Finally, osteopaths have had more limited practice opportunities than MDs, a situation which has changed substantially in the past 10 years. Especially among older physicians, limitation of opportunities may have directed osteopaths toward rural locations.

In 1965, osteopaths outnumbered MDs by 83 to 74 (table 2). However, between 1965 and 1973 the situation had changed so that MDs were more numerous by 66 to 55. The loss of osteopaths from 1965 to 1973 was the most precipitous of any of the practitioners considered. The net loss of 28 osteopaths resulted from 41 separations and 13 additions. The nature of the losses appeared to be somewhat different in the 1965–73 period than in earlier periods. In the most recent period, more than two-thirds of the losses occurred as a result of death and retirement, whereas in earlier periods (1954–58 and 1958–65), more than half of the losses resulted from movement from the area. The severe loss of osteopaths can be accounted for in part by a cohort of physicians who had grown old and in part by the expansion of opportunities for practice which competed with rural practice in attracting new physicians.

Dentists. The number of dentists in the area continued to decline gradually from 78 in 1954 to 77 in 1958, 65 in 1965, and 58 in 1973. From 1965 to 1973, a net loss of 7 dentists resulted from 19 separations and 12 additions

Table 3. Number of practitioners in 20 counties of rural Missouri, in selected years

Year	Medical doctors		Osteopaths		Dentists		Chiropractors	
	Number	Percent of 1954	Number	Percent of 1954	Number	Percent of 1954	Number	Percent of 1954
1954	100	100	87	100	78	100	31	100
1958	85	85	82	94	77	99	36	116
1965	74	74	83	95	65	83	39	126
1973	66	66	55	63	58	74	42	135

(table 2). Of all the practitioners, dentists were least likely to be geographically mobile. Almost all the losses (16 of 19) were due to retirement or death.

Chiropractors. Among the practitioners selected for this study, only the chiropractors showed an increase in number from 1965 to 1973. While the increase was small, it was consistent over a longer period—from 31 in 1954 to 36 in 1958, 39 in 1965, and 42 in 1973 (table 3). During the 1965–73 period, 13 separations and 16 additions occurred (table 2).

Also, more losses of chiropractors resulted from migration than from death or retirement than among the other practitioners. The greater migration of chiropractors may indicate that they use rural practice as a steppingstone in a geographically mobile career pattern. We can speculate that the increase in number of chiropractors in this rural area stems from a process of succession in which erosion of medical and osteopathic physicians results in need for personal health services, and the more limited opportunities of chiropractors makes rural locations relatively attractive to them.

Age and Extent of Practice

Age of practitioners is not only an indicator of capacity to carry on a full-time practice, but also an indicator of the future supply of practitioners. The relatively high proportion of elderly physicians is apparent in the large number of deaths and retirements observed from 1965 to 1973. Since a substantial proportion of the health practitioners were over 65 years old, it would be of interest to have more detailed information on the effects of age on practice. Except for an indication of whether a full- or part-time practice is maintained, information on the effects of age is not available from the present survey. In a previous study, however, we found that elderly physicians had a disproportionately large number of elderly patients *(14)*.

Medical doctors. Based on the ages of MDs in practice in 1973, we should expect attrition due to retirement and death to continue at least at its present high level. Looking back to 1954, we see that the proportion of younger MDs (under 35) was lower in 1973 than at any time since 1954. The proportion of older MDs (65 years and over), however, was somewhat greater in 1954 than in 1973 (table 4).

Seven of the MDs were reported to be in part-time practice in the area. Six of the seven had limited practices due to age or health, or both, while one was counted as part time for the area because he devoted part of his time to a practice in the area and part to a practice outside the area.

Osteopathic doctors. From 1954 to 1973, a definite change occurred in the age structure of osteopaths in the area (table 4). In 1954, 16 percent were under 35 years old and 5 percent were 65 or over; in 1973, 7 percent were under 35 years and 13 percent were 65 or over. In 1973, the proportions of MDs and DOs in the youngest age category were about equal, although MDs were still more heavily concentrated in the oldest age category. The patterns of age and additions and separations suggest that osteopaths are approaching the experience for MDs.

Relatively few osteopaths were available to residents of the area on only a part-time basis. Two limited their practice because of age and two devoted part time to practices within the area and part time to practices outside the area.

Dentists. The age structure of dentists had not changed much since 1958—about 1 in 4 were 65 years or older. Only two dentists were reported as having a part-time practice, both because of age.

Chiropractors. Because we were unable to verify ages of chiropractors to our satisfaction, from directories or other sources, we have not included an age analysis for them.

Location of Practitioners

Service patterns in rural areas are undergoing changes. The general trend is for all services (economic, professional, and institutional) of smaller places to become more simple and at the same time for a few relatively-complete service centers to emerge. This process has resulted, in the first instance, in a population decline in the smallest places—in some cases, to the point of their extinction. At the same time, a few places that are strategically located tend toward dominance of a larger service area. In the Midwest, county seats often (but not necessarily) become the dominant center of the county, and as the process continues a center may emerge which dominates a multicounty hinterland. Evidence of the concentration of people and services in fewer places is that although the population declined by 11 percent from 1950 to 1970—mostly in the 1950–60 decade—in the 20 places

Table 4. Percentages of practitioners in 20 counties of rural Missouri in selected years, by age groups

Age group (years)	1954	1958	1965	1973
Medical doctors				
Under 35	16	16	11	8
35–64	48	58	70	63
65 and over	35	26	19	26
Not available	1			3
Osteopaths				
Under 35	16	13	11	7
35–64	79	80	73	78
65 and over	5	7	16	13
Not available				2
Dentists				
Under 35		13	15	14
35–64		65	57	60
65 and over		22	28	24
Not available				2

NOTE: Age information not available for chiropractors.

Table 5. Percentages of practitioners, by size of place (center of commercial and professional services) in 20 counties of rural Missouri

Size of place	Medical doctors		Osteopaths		Dentists		Chiropractors	
	1965 (N=74)	1973 (N=66)	1965 (N=81)	1973 (N=55)	1965 (N=65)	1973 (N=58)	1965 (N=39)	1973 (N=42)
Under 500	5.4	4.5	19.8	14.7	1.5	.....	7.7	2.4
500–999	9.5	10.6	19.8	18.1	15.4	10.3	5.1	7.1
1,000–2,499	29.7	24.2	19.8	27.3	32.3	29.3	25.6	26.2
2,500 and over	55.4	60.6	40.7	40.0	50.8	60.3	61.6	64.3

representing the largest centers in the counties the population increased by 12 percent, as shown earlier in this paper. We can assume that health services would be part of this trend of concentration.

Although only 10 places in the area had a population of 2,500 or more, more than 60 percent of the MDs, dentists, and chiropractors were located in these places; from 85 to 90 percent were located in places of 1,000 population or more (table 5). For osteopaths, the pattern was somewhat different—40 percent were in places of 2,500 or more population and 67 percent in places of 1,000 or more population. Thus, one-third of the osteopaths in the area practiced in towns of less than 1,000 population.

Another way to determine the concentration of practitioners within the area is by the number of practitioners in the largest place in each county. The percentages of practitioners located in the 20 places which represented the largest place in each county in selected years (each county was allocated 1 place) were as follows:

Practitioners	*1954*	*1958*	*1965*	*1973*
Medical doctors	63	75	77	80
Osteopaths	44	52	55	56
Dentists		71	78	83
Chiropractors		73	72	83

These percentages show that most of the practitioners were located in the 20 places in 1973. Also, since 1954 there has been a gradual concentration of MDs and DOs in the larger places. The same situation holds for dentists and chiropractors, although the timespan is not as long.

The process of gradual concentration seems to stem from failure to replace practitioners who are lost from the smaller places rather than internal migration within the area to larger places. Of the MDs who entered practice in the area from 1965 to 1973, 79 percent (11 of 14) located in the largest place in a county (table 6). The proportions of other practitioners entering practice in the area were also highly concentrated in the largest places—osteopaths, 77 percent (10 of 13); dentists, 92 percent (11 of 12); and chiropractors, 81 percent (13 of 16). At the same time, losses from these larger places were relatively less than gains—MDs, 73 percent (16 of 22); osteopaths, 56 percent (23 of 41); dentists, 79 percent (15 of 19); and chiropractors, 54 percent (7 of 13).

Hospitals

Hospitals are increasingly the physician's workshop. Although the number of physicians decreased from 1965 to 1973, the number of hospital beds increased while the number of hospitals decreased as follows:

Year	*Number of hospitals*	*Number of beds*
1958	15	441
1965	14	496
1973	13	612

A comparison of these figures with those in table 3 reveals that the opposite trends for physicians and hospital beds have prevailed from 1958 to 1973.

There was some, but by no means perfect, relationship between a county's having a hospital and the number of physicians (MDs and osteopaths) in the county. As shown in the following list, 1 county with 8 physicians and 3 counties with 6 physicians had no hospital beds, whereas all counties with 35 or more hospital beds had 4 or more physicians, and the 2 counties with 75 or more hospital beds had 10 or more physicians. Overall, however, it appeared that location of a hospital within a county was only one factor in accounting for the number of physicians in the county.

Number of beds and counties	*Number of physicians*
No beds	
3 counties	2
1 county	4
1 county	5
3 counties	6
1 county	8
15–34 beds	
1 county	2
1 county	9
35–54 beds	
1 county	4
1 county	5
1 county	6
1 county	10 or more
55–74 beds	
2 counties	4
1 county	6
75 or more beds	
2 counties	10 or more

Table 6. Losses and gains of practitioners from the largest place in each of the 20 counties, 1965–73

Loss and gain	Medical doctors	Osteopaths	Dentists	Chiropractors
Loss				
Total number	22	41	19	13
Number from largest place	16	23	15	7
Percent from largest place	73	56	79	54
Gain				
Total number	14	13	12	16
Number in largest place	11	10	11	13
Percent in largest place	79	77	92	81

Discussion

The data from the 20-county rural area concretely indicate the changes that have taken place over two decades. With the exception of chiropractors, replacements of health practitioners have not equaled losses. This discrepancy is not due to a great exodus of practitioners from the area. In fact, the evidence points to low mobility among rural practitioners. The greater part of the net loss of practitioners results from death or retirement, and the age structure of practitioners in the area suggests that such attrition will not diminish soon. About one-fourth of the MDs and dentists practicing in the area were 65 years or over in 1973, and the overall trend is one of older ages among the osteopaths. Aside from the fact that older practitioners are approaching the end of professional service and can be expected to drop from the tally sheets, there is also the question of the quality of health care they provide to clients. A young dentist and an elderly one, for example, may have been trained 40 years apart—a period of great technical advances in dentistry. Furthermore, any negative disparities in quality of care by elderly practitioners may fall more heavily on older clients because there is some evidence that older practitioners have a disproportionately large number of elderly patients. For these reasons, the characteristics of the practices of elderly practitioners deserve more attention than they have received so far.

An intriguing finding of this research is the precipitous loss of osteopaths in the area from 1965 to 1973. In earlier periods, osteopaths either held their own or increased in number. The most important immediate cause of the loss was the older ages among the osteopaths and insufficient replacement of younger practitioners. Underlying this situation is a trend toward greater specialization by osteopaths which directs them away from rural practices. Also, greater general acceptance of osteopaths allows them a wider range of location opportunities.

Some persistent changes have also occurred in the distribution of practitioners within the area that resulted in a gradual concentration of practitioners in fewer and larger places within the area. The gradualness of this concentration results from the failure to replace practitioners who retire, die, or move from the smaller places (often after a long career in the same place) and the greater likelihood of new practitioners to enter practice in the larger places of the area. The concentration has not resulted to a great extent from movement of practitioners from small to large places within the area. The concentration of practitioners in relatively few places suggests a "natural regionalization" of services taking place within areas of relatively low density. As the process continues, we might expect more grouping of physicians and a situation which might encourage specialists to locate in the rural trade centers.

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