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Analyzing The Adequacy Of Health Services In Rural Areas

By Robert Hoppe and Steven Levy*

Introduction

RURAL MINNESOTANS are often concerned about the adequacy of their health care services. Often, rural areas have fewer doctors and dentists per capita than do urban areas. Another problem can be the distances between health care facilities and isolated farms and villages. This issue of *Minnesota Agricultural Economist* presents no ready answers to rural health care problems. Since needs differ, health service problems and solutions also differ from one area to another.

Co-authors Robert Hoppe (seated) and Steven Levy analyze the adequacy of health care in Development Region Six East and tell how you can analyze health care for your development region or community.

However, we can suggest how an area's health care services can be analyzed. We can do this so anyone can analyze his own community's services. First, you need an inventory of existing health care services in your area. This can be collected cheaply by using published data and data already collected by state agencies or professional groups. There is no need to collect the data yourself for each village or city in your area.

To show what can be done with existing medical and dental statistics, we have analyzed health service statistics in Development Region Six East. This region consists of Kandiyohi, McLeod, Meeker, and Renville Counties. First, we will consider the locations of health care personnel and facilities in Region Six East. Then we will compare the numbers of personnel and facilities in Region Six East to the numbers for the whole state and the nation. As the discussion continues, we will point out our sources of information. The same sources have information about other areas in Minnesota. Similar analyses could easily be performed for other areas.

*Research specialist and research assistant, respectively, in the Department of Agricultural and Applied Economics. The authors thank H. Mead Cavert, M.D., for his suggestions in the preparation of earlier drafts of this paper. However, the authors assume full responsibility.

Figure 1. Municipalities and highways in Development Region Six East.

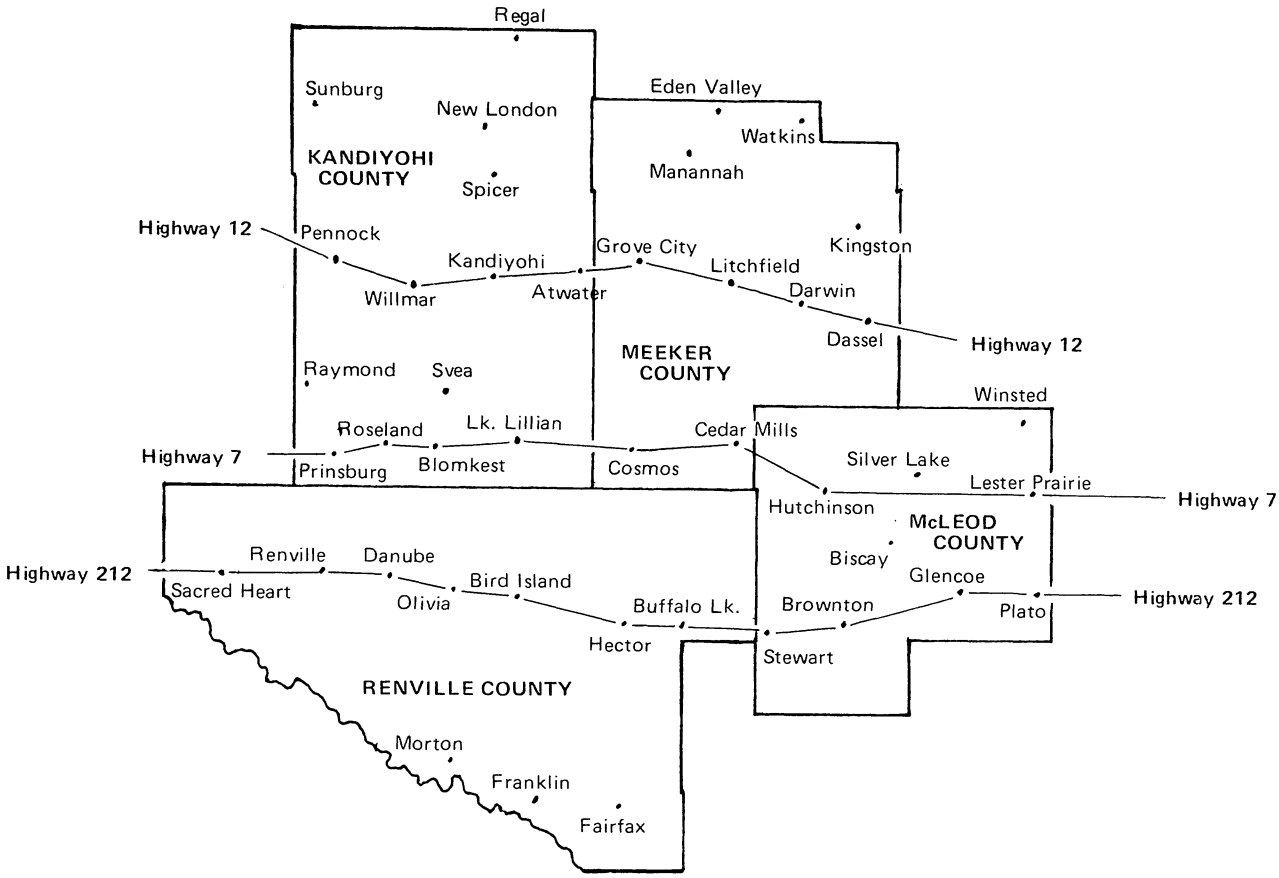
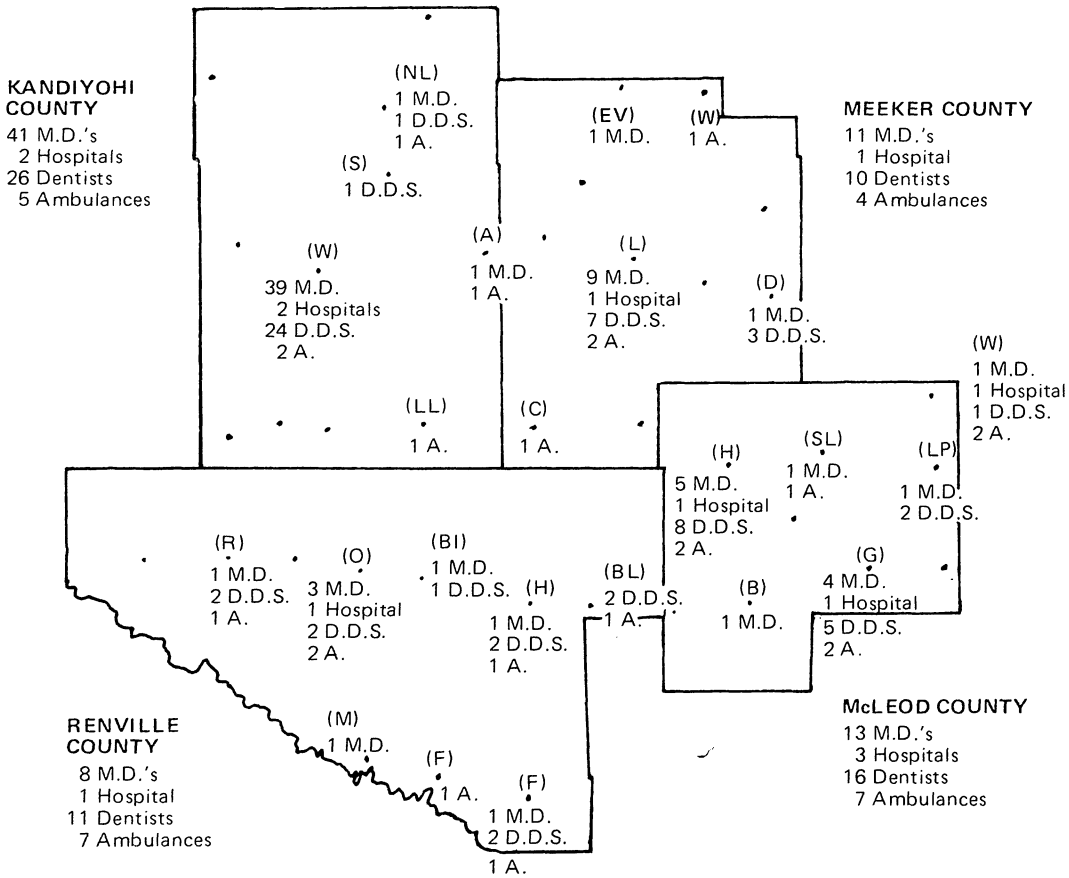


Figure 2. Locations of medical and dental services in Development Region Six East.



Locations of health services

Locations of doctors, dentists, hospitals, and ambulances can be important in rural areas. Large segments of the population may not be close to health services. This could be fatal in emergencies.

Sources of information

Much data is available on the locations of health care facilities and personnel. The locations of physicians by municipalities are given in *Physicians in Minnesota's 87 Counties* published in June 1973 by Northland's Regional Medical Program. This publication was the source used in our analysis. It gives the name, address, specialities, and type of practice of each physician. It also distinguishes between active and retired doctors. Unfortunately, the publication is not updated frequently. However, each year in July the journal *Minnesota Medicine* publishes a list of members of the Minnesota State Medical Association. This listing gives the names and addresses of the members in each county medical society.

We found the locations of the region's hospitals in the American Hospital Association's *AHA Guide to the Health Care Field*. The guide is published annually. The *American Dental Directory* provided the locations of dentists by city. This directory is also published yearly.

Another good source of health care statistics is the Minnesota Department of Health. The locations of ambulance services used in this report were compiled by the Department of Health. The department's data were obtained from the 74-75 applications for licenses to operate an ambulance service. In a recent report for the state legislature, the Health Statistics Unit of the department listed the numbers of licensed practical nurses, registered nurses, hospital and rest home beds, licensed physicians, and dentists in each county.

Six East: an example

As an example of how you can use all this data, the locations of doctors, dentists, hospitals, and ambulances in Region Six East are summarized on two maps. The first map (figure 1) shows municipalities and some highways in Six East. To avoid cluttering, this information is not given on the other map. Figure 2 shows locations of physicians providing direct patient care as well as the hospitals, dentists, and ambulance services. Note that Kandiyohi County has 11 small towns without a physician, despite the fact that the county has 41 doctors. Similarly, Meeker County has seven municipalities without physicians. Renville and McLeod Counties together have seven villages without physicians. All the counties have at least one hospital. However, only McLeod County has hospitals in more than one city. Just as with physicians, dentists are not distributed evenly throughout Region Six East.

Some patterns in the distribution of medical and dental facilities are apparent from the maps. Look at the area in the center of the region from Cedar Mills westward. This large area is generally blank on figure 2, except for two ambulance services. Also, there are blank areas along the western and northern margins of the region. Most facilities are concentrated along U.S. Highway 12, U.S. Highway 212, and the eastern portion of U.S. Highway 7. Access to health facilities may be a problem in areas not close to these highways.

On the other hand, concentration of facilities in a few towns is not necessarily bad. Such concentration could conceivably improve health care by encouraging specialization. Lack of medical and dental facilities in a village or area need not be a problem if adequate transportation and public health nursing services exist. Those most affected by distances to medical and dental services would be poor people, people who do not drive or own cars, and people needing emergency care. According to Shannon and Dever, "In a recent series of hearings . . ., it was concluded that most of the rural poor know where to get health care; the real difficulty is getting there."[1] The transportation problem may be alleviated somewhat by the nearness of villages to medical facilities close to Six East, but outside the region. For instance, New Ulm, Redwood Falls, Paynesville, and Granite Falls are located on or near the regional boundaries. Benson and St. Cloud are farther away, but are still within 25 miles of Region Six East.

The transportation problem may also be alleviated by a network of ambulances. The region is apparently well-covered by ambulance service. No area is further than 25 miles from ambulance service, which means any area could be reached by ambulance within 30 minutes. Whether this time is too great hinges on many variables, including the types of emergencies and how much communities can afford for service. It is difficult to ascertain the effectiveness of an ambulance system. One major problem with a volunteer ambulance staff may be a high attrition rate. A community could have provisions for an ambulance service, but not enough volunteers to staff it 24 hours a day. Such information is difficult to glean from secondary data. The Minnesota Department of Health is currently instituting a new data collection service which will greatly help gauge the effectiveness of each ambulance service.

Ratios

Regional ratios

Although locations of medical and dental personnel and facilities may be interesting, comparing populations to the numbers of doctors, dentists, and hospitals may give a better idea of the availability of medical and dental services. The simplest comparisons are probably the number of people per doctor, dentist, and hospital bed.

As an example, we have recorded the ratios for Region Six East in table 1. The ratios for Kandiyohi County do not include the doctors giving their addresses as the state hospital or the beds in the state hospital. The state hospital serves a larger area than only Kandiyohi County or Region Six East. People per physician ranges from about 830 in Kandiyohi to 2,600 in Renville County. People per dentist ranges from about 1,220 to 1,890 for the same counties. People per bed ranges from 122 for McLeod County to 533 for Renville County.

Data sources for the ratios in table 1 are the same as those discussed earlier for physician locations. The only additional information is the number of hospital beds from the *Hospital Directory* and population estimates from the Bureau of the Census *Current Population Reports*.

[1]Gary W. Shannon and G. E. Alan Dever, *Health Care Delivery: Spacial Perspectives*, McGraw-Hill Book Company, New York, 1974, p. 57.

Table 1. Medical and dental statistics for Region Six East, excluding doctors and beds associated with Willmar State Hospital

County	Population estimates	Numbers of Physicians	Numbers of dentists	Numbers of hospital beds	People per physician	People per dentist	People per hospital bed
Kandiyohi	31,700	38	26	102	834	1,219	311
McLeod	28,400	13	16	232	2,185	1,775	122
Meeker	18,000	11	10	91	1,636	1,800	198
Renville	20,800	8	11	39	2,600	1,891	533
Total for 6E	98,900	70	63	464	1,413	1,570	213

NOTE: The numbers of practicing physicians are from **Physicians in Minnesota's 87 Counties**, June 1973. Numbers of dentists are from **1973 American Dental Directory**. The numbers of hospital beds are from the **1973 AHA Guide to the Health Care Field.** Population estimates are from the Census Bureau's **Current Population Reports.**

Again, similar data is available for other areas in Minnesota. The same ratios could be calculated for other counties.

The meaning of the ratios

It would be convenient to examine ratios like those in table 1 to make definitive statements on the adequacy or quality of health services in a rural area. Unfortunately, it is difficult to evaluate local medical and dental services through these ratios when there are apparently no generally accepted ideal ratio sizes. For instance, there seems to be no generally accepted ideal people-per-doctor ratio. However, ratios of 847, 800, 752, and 606 people per non-specialized physician have been suggested as norms.[2] Even if all the physicians in Six East were non-specialized, only Kandiyohi County would have a ratio anywhere near these recommendations.

Yet, health care may not be grossly inadequate in areas having high people-per-doctor ratios. Ratios can be misleading. In fact, there may not even be a "simple relationship between the number of physicians per capita and the health of the population in a developed county."[3] Some European nations having fewer doctors per capita than does the U.S. are believed to have better health than do U.S. citizens. There even seems to be a fall in the rank of the U.S. compared to other developed countries. The U.S. even seems to fall in rank in the control of infant mortality, in problems connected to old age, and in deaths caused by sundry diseases.[4]

Even comparing ratios among geographic areas may be difficult. For instance, a predominantly rural area may have a higher people-per-physician ratio than does a nearby metropolitan area. Claiming that the rural area has worse health care than does the metropolitan area could be misleading. The rural area may frequently send people to the metropolitan area for specialized medical services. The health services available to the rural area would be greater than its ratio would indicate. An area may make up for a lack of physicians by increasing paramedical personnel. Midwives, medical technologists, and medical laboratory technicians are concentrated in the southern and southeastern portions of the United States, while registered nurses are concentrated in the midwestern and western states.[5] Such personnel could help provide some health services where there are local shortages of physicians.

State and national ratios

It is a good idea to remember that the ratios do have shortcomings when applying them to rural areas. Despite these shortcomings, comparing regional county ratios to state or national ratios may prove valuable. Large discrepancies could indicate serious problems. Ideally when comparing a nonmetropolitan area like Region Six East to the whole state, highly specialized services available at places like Rochester and the Twin Cities should not be included in calculating the state ratios. People from all over the state, the nation, and the world may be referred to these facilities. Health services for an area need not all be located within the area. Omission of the highly specialized services from state ratios merely recognizes this fact. Inclusion would only inflate the state ratio relative to the regions' ratios. Unfortunately, identifying which services should be omitted is rather difficult. Thus in this paper, no attempt is made to adjust the state ratios along these lines. This should be remembered when regional and state ratios are being discussed.

For the state as a whole, there is one doctor involved in patient care for every 779 people (table 2). However, an adjustment should be made other than the one in the preceding paragraph. The University of Minnesota and the Mayo Institutions of Rochester hire physicians who are involved in teaching, research, and studying as well as in patient care. In addition, these physicians serve large numbers of people who are not Minnesota residents. Nevertheless, they are counted fully in the number of physicians involved in patient care in Minnesota. Thus, the state ratio overstates the number of people per physician directly involved in serving Minnesotans. To compensate, H. Mead Cavert, M.D., of the University of Minnesota Medical School estimates that the equivalent of about 880 physicians should be subtracted from the total number of physicians involved in patient care.[6] With this adjustment, the Minnesota ratio increases to over 900.

[2]Shannon and Dever, p. 37.

[3]Mark S. Blumberg, *Trends and Projections of Physicians in the United States 1967-2002*, Carnegie Foundation for the Advancement of Teaching, Berkeley, Calif., 1971.

[4]Shannon and Dever, p. 1.

[5]Shannon and Dever, p. 42-44.

[6]H. Mead Cavert, M.D., "Projections of Future Need for Physicians in Minnesota," *Minnesota Medicine*, Vol. 56 (June 1973), p. 529.

Table 2. Medical and dental statistics for Minnesota and the United States.

	Minnesota	U.S.A.
Populations	3,896,000 (July 1, 1972)	208,971,000 (Dec., 1972)
		207,203,000 (Dec., 1971)
Numbers of physicians involved in patient care	5,000 (Dec. 31, 1972)	269,095 (Dec. 31, 1972)
Numbers of dentists	2,408 (1972)	104,000 (1971)
Numbers of hospital beds	21,913 (Dec. 1, 1972)	883,192 (Dec. 1, 1972)
People per physician	779 (1972)	777 (1972)
People per dentist	1,618 (1972)	1,992 (1971)
People per hospital bed	178 (1972)	237 (1972)

NOTE: Numbers of physicians and hospital beds is from **Distribution of Physicians in the U.S.,** Vol. 1. The number of dentists is from the **1973 American Dental Directory** and the Minnesota Dental Association membership list. Population figures are from **Current Population Reports.**

In Region Six East, only Kandiyohi County has a population-doctor ratio close to the state's. The other counties and the region have ratios substantially higher than the state's. Turning to the other ratios, there is one dentist for every 1,618 people in Minnesota. While Kandiyohi actually has fewer people per dentist than does the state as a whole, the rest of Six East has more people per dentist. McLeod County has fewer people per bed than the state average. Kandiyohi County has substantially more people per bed than the state. Renville has many more people per bed than the state average. Finally, the region as a whole has slightly more people per bed than does the state.

Minnesota's urban medical and dental services may be more plentiful than those of the nation as a whole. This could make Minnesota rural ratios look worse than they actually are. Therefore, Six East's and Minnesota's ratios are compared with those for the United States (table 2). Minnesota has fewer people per dentist than does the nation. No county in Six East has more people per dentist than does the nation. The people-per-bed ratio is noticeably higher for the U.S. than for Minnesota. Only Renville County has a people-per-bed ratio substantially higher than the nation's. The unadjusted Minnesota and the U.S. people-per-physician ratios are reasonably close to one another.

Summary and conclusions

What can be concluded from the discussion so far? Actually, there are two sets of conclusions. We have presented information about Region Six East. A number of ideas emerge from this information that are pertinent to that region. At the same time, we can make some observations on the applicability of the procedure described for other areas.

Conclusions for Region Six East

Several points are apparent in the case of Six East. One is the high number of people per doctor in the region as compared to the state and the nation. Only Kandiyohi County has as few people per doctor as does the state or the nation. Also evident is the relatively large number of people per hospital bed in Renville County. Three counties have more people per dentist than does the state.

However, we should be hesitant to claim that medical and dental services are grossly inadequate in the region. Willmar, with its concentration of doctors and dentists, can serve people from other areas. Although three of the counties have more people per dentist than does the state, all the counties have fewer people per dentist than does the nation. Also, health services often do not respect regional boundaries. People from Region Six East are free to seek specialized help from medical and dental centers in neighboring regions and in more urbanized areas. Finally, it would be interesting to compare Region Six East to other nonmetropolitan regions in Minnesota and in other states. Such comparisons would give another perspective.

From the maps, it appears that distances between towns with concentrations of medical and dental facilities may be a problem. Easier transportation arrangements may be desirable for patients from areas with no medical or dental facilities, with no special treatment capabilities, or with overworked medical and dental personnel. For instance, there may be problems getting people from the area along the western portion of U.S. Highway 7 to health services elsewhere. Providing all citizens of the region with access to doctors, dentists, and hospitals may require carefully planned coordination among the people of Six East and their neighbors in other regions. Perhaps meetings of citizens in each county in Region Six East could be held to enumerate health problems. At later meetings, medical and dental personnel in the region could study the problems pointed out by the citizens and could discuss possible programs to solve them.

A final warning is necessary about the data presented for Region Six East. Years covered by the data do not always coincide. We used recent Census Bureau estimates for population figures. Three 1973 directories are used for the locations of doctors, dentists, and hospitals in the region. A 1972 publication was used for the number of doctors and hospital beds in the state and nation. The number of dentists in the state was from the membership list of the Minnesota Dental Association. In addition, lists and directories of members of professional associations may omit active personnel who are not members of the associations. Directories and lists may not be as up-to-date or as accurate as desired. The data in this article was the best available in fall 1974. The exception is the ambulance data which was collected in early 1975. Nevertheless, the numbers presented here should give a general picture of selected medical and dental services in Region Six East.

Applicability for other areas

As mentioned earlier, all rural areas are different and are likely to

have different health care problems. The conclusions just presented for Region Six East are not likely to hold true for all rural areas in the state. However, the data sources cited can easily be used to study the same issues in other counties.

We found most of the sources of data at the Biomedical Library of the University of Minnesota. Some of the sources are rather specialized and may be available only at large city or regional libraries. People from some rural areas may have to write the appropriate professional groups and state agencies or order the information through their own libraries. Local professional people may have copies of some of the sources cited. Even so, the use of these data sources should still reduce costs for local or regional groups wishing to analyze health care facilities. This could especially be true when collecting firsthand information would require travel among a large number of small towns.

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John J. Waelti . . . . . Editor

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