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Basic Data file

November 11, 1980

MEMORANDUM

TO: Persons with an interest in Minnesota health professions supply data and Minnesota health planning*

FROM: Paul S. Higgins, Associate Director for Evaluation P.S.H.
Frances P. Lawrenz, Research Associate FL

SUBJECT: The enclosed report, "Recent Changes in the Supply and Distribution of Physicians, Dentists, and Registered Nurses in Minnesota: A Compilation of Available Data"

The enclosed report on the supply and distribution of health professionals in Minnesota was prepared by us in the University of Minnesota Area Health Education Center (AHEC) as our response to a federal requirement that AHEC programs assess the need for, and supply of, health professionals in the areas they serve. The Minnesota AHEC Program since 1972 has improved health care in rural (and, to some extent, urban) Minnesota, largely by providing about 1,700 health professional students and resident physicians with training opportunities designed to encourage their later practice in rural (or inner-city) areas.

This report represents a synthesis (and in some cases, reanalysis) of publicly available data from professional organizations, the Minnesota Health Department, State licensing boards, the State Demographer, the University of Minnesota's Center for Health Services Research, and federal data sources. In general, the data are organized both by Minnesota counties and also by Health Services Areas.

We are happy to share our report with you, in the hope the data presented herein will be of practical value to health planners, teachers of health professionals, and professional and licensing organizations. Readers may use or publish these data freely; acknowledgement of this report (the U of M AHEC Report on Minnesota Health Professions Supply) as the secondary source of these data would, however, be appreciated.

We want to take this opportunity to thank those of you supplying data for this report.

Please feel free to phone us if you have questions or comments concerning this report; or if you know of others who would like a copy.

* Memo and enclosure to:

Calvin Jackson, Project Officer,
Health Resources Administration

Anita Maldon, Contracting Officer,
Health Resources Administration

Minnesota State Health Planning
and Development Agency

Minnesota State Demographer

Minnesota Department of Health,
Division of Manpower

Council of Health Sciences
Deans and Directors, University of Minnesota

Minnesota AHEC Program
Advisory Board

Evaluation Advisory Committee for the
Minnesota AHEC Program

Center for Health Services Research,
University of Minnesota

Minnesota Higher Education Coordinating Board

Minnesota Board of Medical Examiners

Minnesota Board of Dentistry

Minnesota Board of Nursing

Minnesota Medical Association

Minnesota Dental Association

Minnesota Nurses Association

and others

Recent Changes in the Supply and Distribution of Physicians, Dentists, and Registered Nurses in Minnesota: A Compilation of Available Data

Paul S. Higgins and Frances P. Lawrenz
University of Minnesota
Area Health Education Center

A Report Pursuant to the Previously Submitted
Plan for Evaluation of the 08 Year Minnesota AHEC Program
(Deliverable #8 under Contract No. HRA 232-80-0005)

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Recent Changes in the Supply and Distribution of Physicians, Dentists, and Registered Nurses in Minnesota: A Compilation of Available Data

Abstract

1970-1980 changes in the supply and distribution of physicians, dentists, and registered nurses in Minnesota are the main subject of this report, prepared by the federally funded University of Minnesota Area Health Education Center (UofM AHEC). Data from this report will be used by the UofM AHEC to plan clinical training rotations and other educational experiences for health sciences students and resident physicians, that encourage their later professional practice in rural and underserved Minnesota areas. This report also may be useful to others involved in health services planning. In addition to data on numbers of professionals, the report presents additional demographic data relevant to assessing Minnesota's health care needs; e.g., county and regional populations, birth rates, infant mortality, etc.

In Minnesota, from 1970 to 1977, the number of active, non-federal physicians increased 26%, from about 5,400 to about 6,900; and the number of licensed registered nurses increased 42%, from about 22,000 to about 31,000. (The actual full-time-equivalent supply of licensed registered nurses working in Minnesota may be only about 20,000, however.) The supply of licensed dentists remained at about 2,700 in both 1973 and 1979; however, in 38 counties the number of licensed dentists decreased.

During the 1970's the Minnesota population increased 7%, to reach 4.1 million by 1980. The population to provider ratio for active non-federal physicians improved 17% in Minnesota and 13% for the U.S.

(to reach a similar 581:1 and 635:1, respectively, in 1977). Minnesota's 1979 population to licensed dentist ratio of 1518:1 was more favorable than the corresponding U.S. ratio of 1919:1. The Minnesota population to dentist ratio worsened by 6% during the period 1973-1979, while the U.S. ratio improved by 10%. There was an approximate 25% improvement in Minnesota's population to licensed registered nurse ratio from the early 1970's to 1977 (from about 170:1 to 128:1). The corresponding national improvement was 17% (from 263:1 in 1972 to 219:1 in 1977).

Analyses of Minnesota population to provider ratios both among Health Service Areas (HSAs), and between metropolitan areas (Standard Metropolitan Statistical Areas) and non-metropolitan (rural) areas, lead to the same general conclusions: improvements in population to physician and population to registered nurse ratios; some worsening in the population to dentist ratio; and a disparity in per capita supplies of these professions favoring metropolitan over rural areas. This disparity between metropolitan and rural areas actually seems to have increased during the decade of the 1970's.

Several rural counties in Minnesota, in addition to those on the official federal list, may be eligible for designation as primary medical care shortage areas. HSA 1(Agassiz), in northwestern Minnesota, had during the 1970's the poorest overall per capita supplies of physicians, dentists, and registered nurses.

This paper also provides data on changes in the supply of selected physician specialties in Minnesota from 1973 to 1977. Primary care physicians (active, non-federal physicians in family and general practice, internal medicine, pediatrics, and obstetrics/gynecology) increased 20% (from 2,768

to 3,311). Among these four specialties, the specialty of internal medicine showed the largest increase--both in absolute and proportional terms--from 966 to 1,250, or 29%. Family or general practice and internal medicine represented 80% of the Minnesota primary care specialists as of 1977. Each of these two specialties accounted for about 40% of the 3,311 primary care physicians. Two specialties outside the primary care arena--general surgery and psychiatry--increased 10% and 21%, respectively, during this period. In 1977, Minnesota had 591 active, non-federal general surgeons and 272 active, non-federal psychiatrists.

Since there are many factors--in addition to per capita supplies of health professionals--affecting accessibility to health care, caution must be exercised in using data from this report for health planning.

Recent Changes in the Supply and Distribution of Physicians, Dentists, and Registered Nurses in Minnesota: A Compilation of Available Data

What changes in the supply and distribution of physicians, dentists, and registered nurses occurred in Minnesota during the approximate period, 1970-1980? This report--which represents a compilation of existing health manpower data--provides some answers to this question.

The University of Minnesota Area Health Education Center (UofM AHEC) has arranged for the preparation of this report. The UofM AHEC needs the data in this report to continue planning training programs for health professional students and resident physicians--training programs designed to encourage later practice by these students and physicians in underserved rural or inner-city areas of Minnesota.[1]

The UofM AHEC administers a federally funded Statewide AHEC Program that since 1972 has provided over 1,500 students and physicians--representing 11 health professional fields--with training rotations and other educational experiences that took place largely outside the Twin Cities metropolitan area. The purpose of the national AHEC effort--operating in Minnesota and 19 other states--is to improve the supply, distribution, and training of health professionals.

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[1] Since the data presented in this report may be of general value to health professionals and planners, the UofM AHEC is pleased to share this report with all interested parties. Readers may use or publish these data freely; acknowledgement of this report (the UofM AHEC Report on Minnesota Health Professions Supply) as the secondary source of these data would, however, be appreciated.

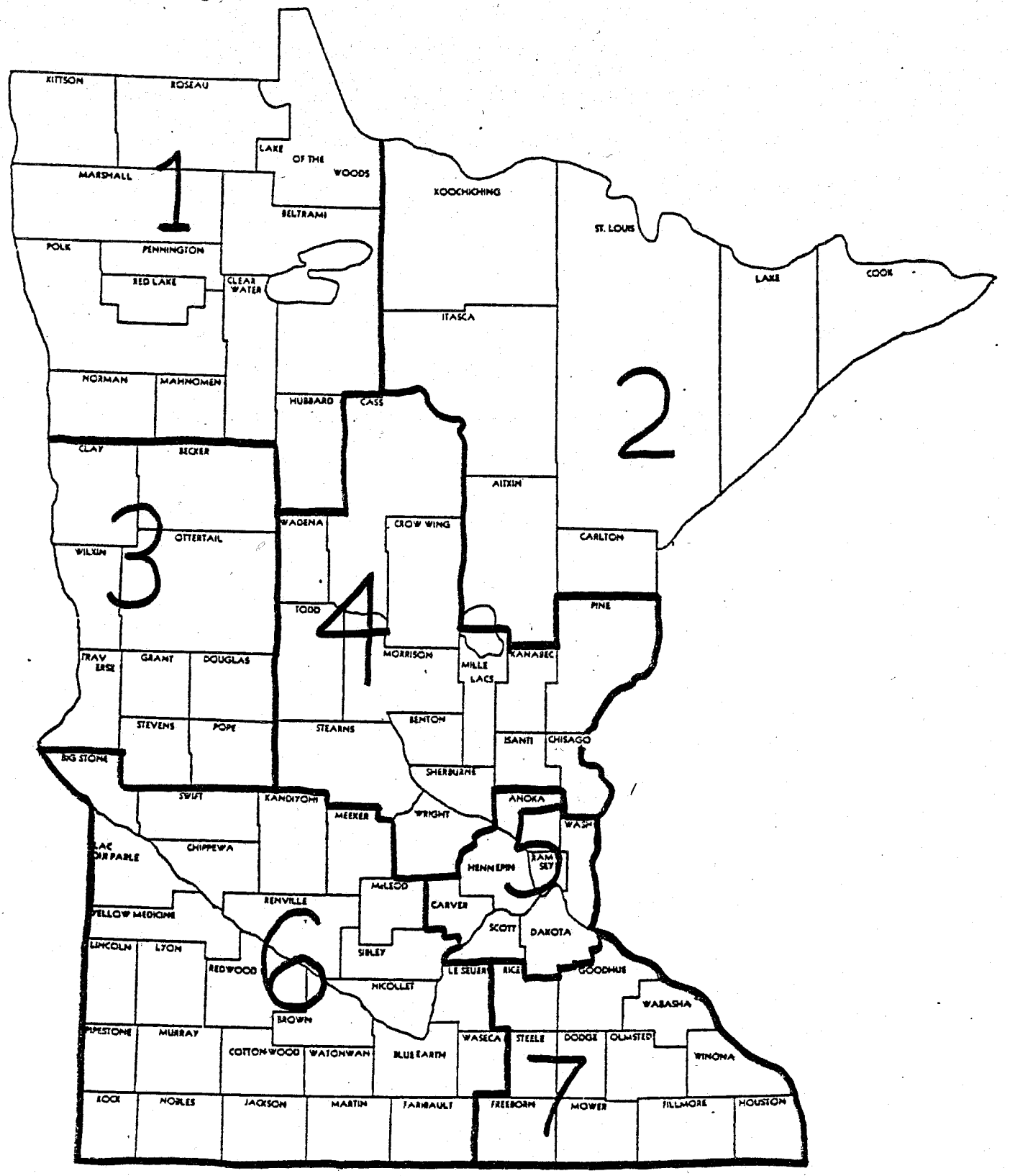
Both nationally and in Minnesota, the AHEC effort emphasizes the professions of medicine, dentistry, and registered nursing. This report focuses on changes in the supply and distribution of professionals in these three fields in Minnesota since the approximate start of the Minnesota AHEC program. The approximate time period covered is 1970-1980, with the dates of specific manpower statistics used dependent on the availability of data.

Each type of health manpower data is presented separately by county, by Health Service Area (HSA; Minnesota portions only, for interstate HSA's), and as a total State statistic. Total U.S. statistics for each data category are also presented, if available.

Minnesota includes all or part of seven Health Service Areas (HSAs), designated under the provisions of the federal health planning law (P.L. 96-79) as the geographic basis for regional health systems planning. Three of these are interstate HSAs, including portions of states other than Minnesota: HSA 1, called the Agassiz HSA, includes portions of North Dakota and northwestern Minnesota; HSA 2, Western Lake Superior, includes portions of northwestern Wisconsin and northeastern Minnesota; and HSA 3, Min-Dak, includes portions of eastern North Dakota and West-Central Minnesota.

This report presents data only for the Minnesota portions of interstate HSAs. Depicted in Figure 1 are the Minnesota portions of these interstate HSAs, as well as the remaining four HSAs that lie wholly within Minnesota--HSA 4, Central Minnesota; HSA 5, Metropolitan (Twin Cities area); HSA 6, not officially labeled, but including Southwestern Minnesota; and HSA 7, Southeastern Minnesota.

Figure 1: Minnesota Health Service Areas



1. Agassiz Health Service Area
2. Western Lake Superior Health Service Area
3. Min-Dak Health Service Area
4. Central Minnesota Health Service Area
5. Metropolitan Health Service Area
6. Minnesota Health Service Area Six
7. Southeastern Minnesota Health Service Area

The various types of data in this report are presented so as to show changes--changes in the number of health care providers; in the overall population; in ratios of health care providers to population; and for physicians, in the numbers of specialists in different categories.

This report also identifies current and potential health manpower shortage areas.

The report is organized into the following major sections: (a) Background; (b) Health Care Provider and Population Information; (c) Population to Health Care Provider Ratios; (d) Primary Medical Care Shortage Areas, and (e) Physician Specialty Choice, and (f) The Need for Caution in Using These Data for Health Planning.

Background

An AHEC program goal is to encourage health care personnel to practice in underserved areas. Knowledge of the number and location of health care personnel is essential for the planning of appropriate intervention techniques. Areas with potential health care shortages must be identified before programs to alleviate these shortages can be implemented. This year the UofM AHEC has tried to identify sources of health personnel information, and to organize that information into a form that could provide a basis for program planning. Although there are limitations involved in using only existing data sources, the UofM AHEC does not have the time, money, or staff to conduct its own independent health professions supply assessments.

The information in this report was obtained from several sources, including: the Minnesota Department of Health; the American Medical Association (AMA); Minnesota licensing boards for medicine, dentistry, and nursing; the medical, dental and nursing schools at the UofM; the American Nurses Association (ANA); the UofM Center for Health Services Research; the Minnesota State Demographer's Office; and the federal Bureau of Health Professions (formerly the Bureau of Health Manpower).

As one might expect, data from different sources or from different years were not always comparable; for example, different definitions, categories, or methods of collection were employed by State, federal, and private agencies and organizations. Fortunately, however, the data that were, or could be made, comparable provide a sketch of health personnel distribution patterns.

Health Care Provider and Population Information

The numbers of physicians, dentists, and registered nurses during the period 1970-1980 for each Minnesota HSA (that is, HSAs wholly within Minnesota,and Minnesota portions of interstate HSA's) and county are presented in Tables 1 and 2 along with totals for Minnesota and the U.S.. Data are presented for the three years, for which data were available, closest to the beginning, middle, and end of the 1970's decade.

Physician data were obtained from AMA publications and are the numbers of active non-federal physicians. The AMA, which maintains biographical data on both members and nonmembers, assigns geographic location on the basis of professional mailing addresses, and classifies physicians as inactive if they report themselves to be retired, semi-retired, permanently disabled, temporarily not in practice, or not active for "other reasons."

Federal physicians are those employed by the military, the Veterans Administration (VA), the U.S. Public Health Service (USPHS) or other federal agencies. According to a HEW funded study of the 1975 AMA data, (Characteristics of Physicians: Minnesota), there were 312 federal physicians involved in patient care in Minnesota: 53 in the military, 215 in the VA, 28 in the USPHS, and 16 in other federal service. Minnesota has no large military hospitals, but it does have military installations in the Twin Cities, at Camp Ripley, and in Duluth. There are two VA hospitals: one in Minneapolis and one in St. Cloud. There is also a VA hospital in Fargo, N.D., which adjoins the Minnesota City of Moorhead. The Indian Health Service has two hospitals in Minnesota: one at Cass Lake in Cass County, and one at Red Lake in Beltrami County.

Table 1

Numbers of Health Care Providers
for the State and the Health Service Areas

	Health Service Area	Active Non-Federal Physicians[a]			Licensed Dentists[b]			Licensed Nurses[c]		
		1970	1975	1977	1973	1975	1979	1970	1972	1977
1.	Agassiz	77	93	100	66	60	68	535	566	726
2.	W. Lake Superior	328	380	430	223	205	236	1665	1734	2204
3.	Min-Dak	111	120	134	107	92	106	800	837	1041
4.	Central	224	255	284	196	181	219	1637	1684	2475
5.	Metropolitan	2958	3700	3997	1529	1386	1528	12146	13436	17518
6.	Southwestern[g]	345	372	390	314	268	284	2456	2416	3021
7.	Southeastern	1377	1495	1516	272	240	241	2652	2965	3996
	State	5420	6415	6851	2707	2432	2682	21891	23638	30981
	U.S.	278,855[d]	309,410[d]	340,603[d]	95680[e] (1970)	106,740[e]	112,720[e] (1977)		794,979[f]	988,050[f]

a. "Distribution of Physicians in the US, 1970, 1975 and 1977" American Medical Association
b. Minnesota State Board of Dentistry.
c. "Nurse power in Minnesota 1970" Northlands Regional Medical Program Inc./"The Nations Nurses, 1972 Inventory of Registered Nurses" American Nurses Association/"Health Manpower Statistics/Nurses"Minn. Health Manpower Information Systems. In this and all succeeding tables the term "licensed nurse" means licensed registered nurse.
d. "Health United States/1979" DHEW.
e. "Dental Manpower Factbook" DHEW.
f. "1977 National Sample Survey of RN's" U.S. Department of Commerce.
g. HSA 6 has not yet been given a geographic or mnemonic label. The label "Southwestern," however, seems to fairly represent this 27-county area, and will be used to label HSA 6 throughout this report.

Table 2

Numbers of Health Care Providers
for Minnesota Counties

County	HSA	Number of Active Non-Federal Physicians[a]			Number of Licensed Dentists[b]			Number of Licensed Nurses[c]		
		1970	1975	1977	1973	1975	1979	1970	1972	1977
Aitkin	2	4	6	6	4	3	4	41	39	52
Anoka	5	39	72	97	51	84	103	189	589	1058
Becker	3	14	19	23	13	10	13	85	98	123
Beltrami	1	15	24	25	17	16	16	101	124	167
Benton	4	7	7	7	3	4	4	77	62	151
Big Stone	6	7	5	5	7	5	5	46	55	51
Blue Earth	6	54	65	70	37	35	38	339	347	360
Brown	6	23	22	21	22	14	15	154	172	169
Carlton	2	17	20	19	15	16	18	132	135	195
Carver	5	20	32	30	17	17	18	108	124	203
Cass	4	5	4	3	8	5	7	56	52	75
Chippewa	6	10	9	9	6	5	5	60	51	70
Chisago	4	9	7	10	11	12	14	91	94	194
Clay	3	18	17	17	22	24	27	136	144	203
Clearwater	1	4	4	3	4	2	2	17	23	22
Cook	2	2	5	4	2	3	2	21	21	25
Cottonwood	6	9	8	7	6	5	6	69	85	92
Crow Wing	4	29	31	42	21	21	23	139	166	208
Dakota	5	51	83	79	65	77	107	499	507	1557
Dodge	7	5	2	5	4	4	5	49	28	95
Douglas	3	18	22	27	17	13	16	122	121	162
Faribault	6	10	17	15	13	12	11	98	99	126
Fillmore	7	9	11	9	12	9	11	99	65	128
Freeborn	7	31	31	32	18	19	20	221	213	261
Goodhue	7	26	32	30	29	24	26	214	198	292
Grant	3	3	2	2	5	5	4	27	29	32
Hennepin	5	2053	2529	2706	909	799	859	7178	8077	9247
Houston	7	4	4	6	7	7	8	57	58	71
Hubbard	1	7	6	9	5	4	5	30	47	67
Isanti	4	17	17	16	8	8	9	58	94	110
Itasca	2	26	25	33	18	18	23	152	152	205
Jackson	6	7	6	8	7	5	4	59	62	68
Kanabec	4	5	6	7	6	4	5	36	36	62
Kandiyohi	6	40	46	56	24	24	29	150	165	246
Kittson	1	3	4	3	5	4	4	31	31	37
Koochiching	2	6	9	11	10	10	13	56	57	84
Lac Qui Parle	6	5	7	4	6	6	6	48	40	46
Lake	2	5	10	11	8	6	7	47	51	73
Lake of the Woods	1	2	2	3	2	1	1	18	22	19
LeSueur	6	11	14	17	20	12	13	109	62	127
Lincoln	6	5	5	5	3	3	4	42	53	52
Lyon	6	13	16	19	16	14	12	98	116	144
McLeod	6	19	18	21	18	18	21	111	110	153
Mahnomen	1	2	2	2	1	1	2	11	18	17
Marshall	1	2	1	3	1	1	3	47	29	52

Table 2 (cont.)

County		Number of Active Non-Federal Physicians[a]			Number of Licensed Dentists[b]			Number of Licensed Nurses[c]		
		1970	1975	1977	1973	1975	1979	1970	1972	1977
Martin	6	16	22	20	19	16	18	108	108	143
Meeker	6	13	10	12	10	9	10	87	80	95
Mille Lacs	4	13	12	13	9	8	12	83	68	117
Morrison	4	17	17	18	10	12	14	136	111	173
Mower	7	34	37	37	31	26	25	200	201	269
Murray	6	4	4	3	4	3	3	53	42	53
Nicollet	6	18	16	16	11	11	9	123	125	166
Nobles	6	19	20	23	8	8	8	118	129	146
Norman	1	3	3	3	1	2	3	29	24	31
Olmsted	7	1176	1284	1288	88	79	74	1203	1557	2048
Otter Tail	3	42	46	47	30	23	30	236	248	295
Pennington	1	11	16	20	8	7	7	69	79	88
Pine	4	4	6	3	7	6	8	74	41	85
Pipestone	6	8	7	6	9	9	8	55	53	63
Polk	1	21	21	22	16	16	17	134	120	164
Pope	3	6	4	5	6	6	6	48	45	62
Ramsey	5	752	917	1015	435	343	360	3586	3659	4336
Red Lake	1	2	3	1	3	3	3	11	15	15
Redwood	6	7	6	5	10	8	11	79	70	105
Renville	6	8	9	8	11	7	9	82	56	99
Rice	7	28	29	32	24	23	22	237	249	267
Rock	6	5	7	7	5	4	5	38	53	50
Roseau	1	5	7	6	3	3	5	37	34	47
St. Louis	2	268	305	346	166	149	169	1216	1279	1570
Scott	5	15	21	20	21	22	21	233	207	259
Sherburne	4	4	8	5	4	6	8	48	56	142
Sibley	6	4	5	4	7	6	5	53	42	67
Stearns	4	78	95	114	70	65	76	602	674	767
Steele	7	18	21	24	17	17	18	129	139	186
Stevens	3	5	4	5	5	5	4	66	56	72
Swift	6	8	6	8	8	7	6	63	58	78
Todd	4	12	13	10	9	8	9	64	65	94
Traverse	3	2	2	2	2	2	2	18	24	31
Wabasha	7	10	12	13	12	10	10	101	74	145
Wadena	4	9	10	10	7	5	5	48	42	86
Waseca	6	8	8	9	10	10	9	85	70	120
Washington	5	28	46	50	31	44	60	353	273	858
Watonwan	6	5	5	4	5	5	6	59	51	66
Wilkin	3	3	4	6	7	4	4	62	72	61
Winona	7	36	32	40	30	22	22	142	183	234
Wright	4	15	22	26	23	17	25	125	123	213
Yellow Medicine	6	9	9	8	12	7	8	70	62	66

a. "Distribution of Physicians in the US, 1970, 1975 and 1977" American Medical Association.
b. Minnesota State Board of Dentistry.
c. "Nurse power in Minnesota 1970" Northlands Regional Medical Program Inc./"The Nations Nurses, 1972 Inventory of Registered Nurses" American Nurses Association/"Health Manpower Statistics/Nurses"Minn. Health Manpower Information Systems.
d. "Health United States/1979" DHEW.
e. "Dental Manpower Factbook" DHEW .
f. "1977 National Sample Survey of RN's" U.S. Department of Commerce.

In addition, most of the other reservations have access to a physician or a clinic. As of June 1979, 10 physicians and one administrative officer were employed by the Indian Health Service: 4 in Cass Lake, 4 in Red Lake, and 2 at the White Earth Health Center. The following Northern Minnesota Counties contain at least a portion of an Indian reservation: Becker, Beltrami, Carlton, Cass, Clearwater, Cook, Itasca, Koochiching, Lake of the Woods, Mahnomen, Roseau, and St. Louis. Federal physicians may also be employed by the federal correctional facility at Sandstone.

The dentist information and the 1970 and 1977 registered nurse information were obtained from State licensing boards and include all licensed practitioners. The number of actual health care providers, therefore, should be considered as somewhat lower than the numbers shown because licensing board data include inactive practitioners. According to a 1977 survey by the Minnesota Department of Health's Manpower Division, 80% of licensed Minnesota dentists surveyed (54% of the total licensed group provided usable answers) and 75% of the registered nurses surveyed (85% of the licensees answered) are active in their profession in a Minnesota location.

The 1972 registered nurse information was obtained from the ANA and, although the definitions used suggest these 1972 data are comparable with the 1970 and 1977 data, caution should be exercised in making any comparisons. Complete reference citations are included in the bibliography.

HSA, county, Minnesota, and U.S. population data for 1970, 1975, and 1980 were obtained from publications of the Minnesota State Demographer's office and the U.S. Bureau of the Census.

During the 1970's, the supplies of physicians and registered nurses in Minnesota increased substantially, while the supply of dentists remained unchanged. From 1970 to 1977, the number of active, non-federal physicians in Minnesota increased 26%, from about 5,400 to about 6,900. The number of licensed, registered nurses increased 42% from about 22,000 to about 31,000. The supply of dentists remained at about 2,700 in both 1973 and 1979 (with an apparent decline in 1975 to about 2,400).

The HSAs follow the State trends, with all seven experiencing an increase in the number of physicians and registered nurses, but with four experiencing (generally small) decreases in the number of dentists. The increases in physicians ranged from 10% in HSA 7 (Southeastern) to 35% in HSA 5 (Metropolitan). While the increases in registered nurses ranged from 23% in HSA 6 (Southwestern) to 51% in HSA 4(Central) and in HSA 7 (Southeastern). The largest decrease in dentists was 11% in HSA 7 (Southeastern).

During the 1970's, HSA 5 (Metropolitan), which includes the Twin Cities, contained half (48- 49%) of the Minnesota population, and also contained proportions ranging from 55% to 58% of all of Minnesota's active non-federal physicians, licensed dentists, and licensed registered nurses. (See Tables 1 and 3.)

The second-ranking HSA for physicians and nurses was HSA 7 (Southeastern), which includes Rochester, home of the Mayo Clinic. For dentists, the secondhighest ranking went to HSA 6 (Southwestern), which was also the second most populous HSA throughout the 1970's. The two least populous HSAs--HSA 1 (Agassiz) and HSA 3 (Min-Dak)--were also the

Table 3

Population[a] for the State and the Health Service Areas (in 1000's)

Health Service Area	1970	1975	1980
1. Agassiz	149.2	156.5	166.6
2. W. Lake Superior	329.6	330.7	349.5
3. Min-Dak	185.4	191.2	199.8
4. Central	363.5	410.6	449.2
5. Metropolitan	1874.6	1912.5	1962.7
6. Southwest	519.2	524.6	532.3
7. Southeast	384.5	395.1	410.5
State	3,806.1	3,921.0	4,070.6
U.S.[b]	203,304.8	213,030.0	224,066.0

a. "Revised Population Projections for Minnesota Counties" Office of State Demographer.

b. County and City Data Book, 1977 no. 003-024-01464-5.

least well supplied during the 1970's with the three health professions here under study. HSAs 2 (Western Lake Superior) and 7 (Southeastern) ranked higher in supplies of physicians than their population rankings would have suggested. Physicians have apparently found Duluth (in HSA 2) and the Mayo Clinic (HSA 7) attractive places to work.

County supplies of physicians, dentists, and nurses during the 1970's are presented in Table 2. About two-thirds (69%) of the counties experienced an increase or no change in the number of physicians during this period. Of the 21 counties showing a decrease in physicians from 1970 to 1977, 12 were in HSA 6 (Southwestern), and the other counties were in HSAs 1 (Agassiz), 3 (Min-Dak), and 4 (Central). All of these decreases were small; i.e., 1 or 2 physicians.

Only three counties experienced a decrease in the number of licensed registered nurses.

The number of licensed dentists, however, declined from 1973 to 1979 in 38 counties; and in Hennepin and Ramsey counties, this decrease was substantial (50 and 75, respectively). During the 1970's, dentists in HSA 5 seem to have followed the population movement toward the Twin Cities suburbs, for the overall HSA 5 supply of dentists did not change.

Although no HSA's declined in population from 1970 to 1980, Table 3 shows that HSA 6 had the smallest population increase during the 1970's. Table 4 shows that eight counties in HSA 6 lost population during the 1970's.

Table 4

Populations[a] for Minnesota Counties (in 1000's)

County	HSA	1970	1975	1980
Aitkin	2	11.4	12.4	13.6
Anoka	5	154.7	185.4	209.8
Becker	3	24.4	26.6	28.6
Beltrami	1	26.4	29.2	31.7
Benton	4	20.8	23.0	24.0
Big Stone	6	7.9	7.9	7.6
Blue Earth	6	52.3	51.6	52.4
Brown	6	28.9	29.7	29.3
Carlton	2	28.1	28.6	30.6
Carver	5	28.3	33.5	37.3
Cass	4	17.3	19.5	21.8
Chippewa	6	15.1	15.4	16.1
Chisago	4	17.5	21.9	25.3
Clay	3	46.6	46.6	49.3
Clearwater	1	8.0	8.7	9.3
Cook	2	3.4	3.7	4.4
Cottonwood	6	14.9	15.2	15.7
Crow Wing	4	34.8	38.7	41.3
Dakota	5	139.8	169.3	202.2
Dodge	7	13.0	13.4	13.4
Douglas	3	22.9	24.9	26.8
Faribault	6	20.9	20.2	19.6
Fillmore	7	21.9	21.9	21.7
Freeborn	7	38.1	36.7	37.4
Goodhue	7	34.8	37.6	39.9
Grant	3	7.5	7.4	7.5
Hennepin	5	960.1	921.0	899.4
Houston	7	17.6	17.9	18.4
Hubbard	1	10.6	12.2	13.6
Isanti	4	16.6	19.9	21.7
Itasca	2	35.5	38.3	43.8
Jackson	6	14.4	14.6	14.2
Kanabec	4	9.8	11.3	11.8
Kandiyohi	6	30.5	32.5	34.9
Kittson	1	6.9	6.8	6.9
Koochiching	2	17.1	17.5	18.0
Lac Qui Parle	6	11.2	11.2	11.2
Lake	2	13.4	13.6	14.6
Lk of the Wds	1	4.0	4.3	4.2
LeSueur	6	21.3	22.3	22.2
Lincoln	6	8.1	8.3	8.3
Lyon	6	24.3	24.7	25.6
McLeod	6	27.7	29.0	30.5
Mahnomen	1	5.6	5.8	5.8
Marshall	1	13.1	13.2	13.7
Martin	6	24.3	25.0	25.2
Meeker	6	18.4	18.7	20.7
Mille Lacs	4	15.7	17.9	19.4
Morrison	4	26.9	27.7	28.4
Mower	7	43.9	43.5	42.6
Murray	6	12.5	11.8	12.5
Nicollet	6	24.5	24.6	25.6
Nobles	6	23.2	23.1	23.4
Norman	1	10.0	9.4	10.2
Olmsted	7	84.1	88.4	95.8
Otter Tail	3	46.1	48.5	50.3
Pennington	1	13.3	14.5	15.6
Pine	4	16.8	18.5	19.7
Pipestone	6	12.8	12.0	11.7
Polk	1	34.4	35.1	37.3
Pope	3	11.1	11.0	11.5
Ramsey	5	476.3	460.3	450.1
Red Lake	1	5.4	5.3	5.2
Redwood	6	20.0	19.6	19.4
Renville	6	21.1	20.9	21.4
Rice	7	41.6	43.5	46.2
Rock	6	11.3	11.4	11.4
Roseau	1	11.6	12.2	13.1
St. Louis	2	220.7	216.6	224.5
Scott	5	32.4	39.6	44.6
Sherburne	4	18.3	25.6	32.1
Sibley	6	15.8	15.7	15.7
Stearns	4	95.4	102.3	109.6
Steele	7	26.9	28.7	30.1
Stevens	3	11.2	11.2	11.0
Swift	6	13.2	13.3	13.2
Todd	4	22.1	23.3	25.0
Traverse	3	6.3	6.1	6.0
Wabasha	7	17.2	18.4	19.4
Wadena	4	12.4	13.3	13.9
Waseca	6	16.7	17.8	18.3
Washington	5	83.0	103.4	119.3
Watonwan	6	13.3	12.6	12.1
Wilkin	3	9.4	8.9	8.8
Winona	7	44.4	45.1	45.6
Wright	4	38.9	47.7	55.2
Yellow Medicine	6	14.5	14.2	14.1

a. Note: data on this table are from "Revised Population Projections for Minnesota Counties" Office of the State Demographer

Population to Health Care Provider Ratios

State and HSA Ratios

During the 1970's the Minnesota population increased 7% to reach 4.1 million in 1980. Also during the 1970's, population to provider ratios for physicians and registered nurses decreased (improved) in the U.S., in Minnesota, and in each of the seven Minnesota HSA's. (See Table 5.)

On the average, therefore, physicians and nurses had to care for fewer different patients as the decade progressed. The population to dentist ratios, on the other hand, increased for the State and for six of the seven HSAs.

For active, non-federal physicians, the population to provider ratios for Minnesota and the U.S. were very similar both in 1970 (702:1 and 726:1, respectively) and in 1977 (581:1 and 635:1). The Minnesota ratio therefore improved 17%--and the U.S. ratio, 13%--during this period.

Population to physician ratios also improved in each of the HSAs. Both in 1970 and 1977 the ratios for HSA 5 (Metropolitan, which includes the Twin Cities) and HSA 7 (Southeastern, which includes Rochester's Mayo Clinic) were markedly more favorable than those for other HSAs. HSA ratios ranged from 279:1 to 1938:1 in 1970; and from 264:1 to 1608:1 in 1977. The ranking among HSAs in population to physician ratio changed little from 1970 to 1977. The poorest (per capita) supplied HSA for both years was HSA 1 (Agassiz) in northwestern Minnesota, which had ratios three times higher than those of the Twin Cities area.

For licensed dentists, Minnesota's population to provider ratio was more favorable than the U.S. ratio, both in 1973 (1437:1 vs. 2125:1, respectively) and in 1979 (1518:1 vs. 1919:1). The Minnesota ratio

Table 5

Population to Health Care Provider Ratios
for the State and the Health Service Areas

Health Service Area	Population[a] per Non Federal Physician[b]			Population[a] per[c] Licensed Dentist			Population[a] per[d] Licensed Nurse		
	1970	1975	1977	1973	1975	1979	1970	1972	1977
1. Agassiz	1938	1683	1608	2367	2608	2450	279	276	221
2. W. Lake Superior	1005	870	791	1482	1613	1481	198	191	154
3. Min-Dak	1670	1593	1457	1778	2078	1885	232	227	188
4. Central	1623	1610	1498	2015	2269	2051	222	235	172
5. Metropolitan	634	517	483	1242	1380	1284	154	141	110
6. Southwest	1505	1410	1348	1669	1957	1874	211	217	174
7. Southeast	279	264	264	1452	1646	1703	145	133	100
State	702	611	581	1437	1612	1518	174	165	128
U.S.	726[e]	689[e]	635[e]	2125[f]	1996[f]	1919(77)[f]		263[g]	219[g]

Note. In this table, and in Tables 6 and 7, the denominator 1 is omitted from all population to health care provider ratios; e.g., 1938=1938:1. Also, in Tables 5 and 6, 1979 population per licensed dentist ratios were computed using 1980 population projections (Minnesota State Planning Agency, Office of State Demographer, May 1979), since 1979 population estimates were unavailable. In the same tables, 1972 population per licensed (registered) nurse ratios were computed using 1973 population estimates (same author, July 1979). For every other population to provider ratio in Tables 5-7, the population and provider data were same-year counts or estimates.

a. "Revised Population Projections for Minnesota Counties" (for 1970 & 1975) "Population estimates for Minnesota Counties, 1978" (for 1973 & 1977) Office of State Demographer.
b. "Distribution of Physicians in the US, 1970, 1975, and 1977" American Medical Association.
c. Minnesota State Board of Dentistry.
d. "Nurse power in Minnesota 1970" Northlands Regional Medical Program Inc./"The Nations Nurses, 1972 Inventory of Registered Nurses" American Nurses Association/"Health Manpower Statistics/Nurses" Minn. Health Manpower Information Systems.
e. "Health United States/1979" DHEW; Bureau of Census population figures.
f. "Dental Manpower Factbook" DHEW.
g. "1977 National Sample Survey of RN's" U.S. Department of Commerce.

worsened slightly (by 6%) during this period, however, while the U.S. ratio improved (by 10%). Six of the seven Minnesota HSAs also experienced a worsening in the per capita supply of dentists during this period, with HSAs 7 (Southeastern) and 6 (Southwestern) sharing the greatest per capita supply changes (17% and 12%, respectively). As in the case of population to physician ratios, HSA 1(Agassiz) had the poorest population to dentist ratios during the 1970's. These northwestern Minnesota ratios were about twice as high as those of the best (per capita) supplied area, HSA 5 (Metropolitan Twin Cities).

For licensed registered nurses, the population to provider ratios in 1977 ranged from about 100:1 in HSA's 7 and 5 to somewhat over 200:1 in HSA 1. Overall, there was an approximate 25% improvement in the population to nurse ratio in Minnesota from the early 1970's to 1977; the corresponding national improvement was 17% (from 263:1 in 1972 to 219:1 in 1977).

The portrait of favorable population to nurse ratios, and an improvement in these ratios, painted in official Minnesota Health Department statistics concerning licensed nurses may be misleadingly sanguine. A 1977 survey of Minnesota-licensed nurses conducted by the Health Department's Manpower Division suggests that the actual full-time-equivalent (FTE) supply of licensed registered nurses working in Minnesota is only about two-thirds of this potential supply; that is, the total number licensed to practice in Minnesota. The survey suggests that of the 31,000 Minnesota-licensed, registered nurses as of 1977, (a) about three-fourths (23,000) actually worked as nurses in Minnesota and (b) about two-thirds (16,000) of these 23,000 worked 30 or more hours per week.

To estimate the total 1977 FTE supply of licensed registered nurses working in Minnesota, one might assume that the 16,000 nurses working 30 hours or more a week actually worked an average of 35 hours per week. If the remaining 7,000 nurses were employed an average of 15 hours per week, then the total FTE supply of licensed registered nurses working in Minnesota in 1977 was 20,000, not 31,000.

Some observers of the nursing manpower scene feel that the supply of licensed registered nurses may be adequate, but that the labor force participation of such nurses may be inadequate to meet Minnesota's health care needs. The current working conditions and terms of employment under which registered nurses are employed in Minnesota apparently constitute an effective demand situation in which many available Minnesota registered nurse positions remain unfilled.[2]

In summary, the State ratios for physicians, dentists, and nurses are more favorable than the U.S. ratios. However, many of the individual Minnesota HSA ratios are less favorable than U.S. ratios. Minnesota may have an adequate number of physicians, dentists, and registered nurses, but these professions may not be equitably distributed. The same three HSAs 2, 5, and 7 (West Lake Superior, Metropolitan, and Southeastern), consistently have had the most favorable population to physician, dentist, and registered nurse ratios. These three areas also contain the three largest metropolitan areas in Minnesota (Duluth, Twin Cities, and Rochester). It therefore appears that the metropolitan area

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[2] The adequacy of supply and demand for RN nurses in Minnesota is an issue of considerable complexity and current debate. The authors do not have data on nursing demand or unfilled positions that would illuminate this debate; but suggest that interested parties contact the Minnesota Nurses Association for further information and data relevant to this issue.

population is better supplied per capita with health care professionals than the more rural populations. This suggestion is further supported by the fact that HSA 1 (Agassiz), one of the least populous areas of Minnesota, also had the least favorable population to physician, dentist, and registered nurse ratios among the seven HSAs. All of the ratios for this HSA indicated higher patient loads than the U.S. as a whole.

SMSA Ratios

As of 1972 Minnesota included all or part of four federally designated Standard Metropolitan Statistical Areas (SMSAs): Minneapolis-St.Paul; the Duluth portion of the Duluth-Superior SMSA; Rochester; and the Moorhead portion of the Fargo-Moorhead SMSA. Each SMSA includes counties containing a city--or twin cities--having 50,000 or more people. As noted in the previous paragraph, HSAs 2,5, and 7--which have the consistently most favorable population to provider ratios--include the Minnesota portions of the Duluth-Superior, Minneapolis-St. Paul, and Rochester SMSAs.

As of 1972 Minnesota counties included in the four SMSAs were Anoka, Clay, Dakota, Hennepin, Olmsted, Ramsey, St. Louis, and Washington.

The following discussion compares population to provider ratios of these 8 SMSA Minnesota counties with the ratios of the 79 non-SMSA counties.

From 1970 to 1977, the population to provider ratios for active, non-federal physicians improved both in SMSA counties (changed 20%, from 494:1 to 396:1) and in non-SMSA counties (changed 11%, from 1584:1 to 1409:1). The approximate 3-3.5:1 disparity in population to physician ratios favoring the SMSA counties did not, however, decline over this period.

From 1973 to 1979 the population to provider ratios for licensed dentists remained approximately constant in SMSA counties (1236:1 vs. 1279:1) but worsened by 9% in non-SMSA counties (changed from 1816:1 to 1972:1).

From 1970 to 1977 the population to provider ratios for licensed registered nurses improved both in SMSA counties (changed 30%, from 151:1 to 106:1) and in non-SMSA counties (changed 19 %, from 216:1 to 175:1).

In short, analyses of 1970's Minnesota population to provider ratios, both among HSAs, and between SMSA and non-SMSA regions, lead to the same general conclusions: improvement in population to physician and population to registered nurse ratios; some worsening in the population to dentist ratio; and a disparity in per capita supplies of these professions favoring metropolitan over rural areas. This disparity actually seems to have increased during the decade of the 1970's.

County Ratios

Table 6 presents the population to health care provider ratios for each county. The changes shown here for a given county are sometimes quite different from those for that county's HSA (or for that State).

Grouping may mask individual differences, and the area-wide picture may be quite the opposite of the local county one.

Thirty-one counties experienced an increase (worsening) in their population to active, non-federal physician ratios. Most of the increases were small (under 500), but those in Clearwater, Cottonwood, Grant, Lac Qui Parle, Murray, Redwood, Sherburne, Todd--and especially those in Cass, Pine, and Red Lake counties--were substantial. (See Figure 2.)

Table 6

Population to Health Care Provider
Ratios for Minnesota Counties

County	HSA	Population per Active Non Federal Physician[a][b]			Population per Licensed Dentist[a][c]			Population per Licensed Nurse[a][d]		
		1970	1975	1977	1973	1975	1979	1970	1972	1977
Aitkin	2	2850	2067	2183	3025	4133	3400	278	310	252
Anoka	5	3967	2575	1991	3439	2207	2037	819	298	183
Becker	3	1743	1400	1200	1985	2660	2200	287	263	224
Beltrami	1	1760	1217	1204	1694	1825	1981	261	232	180
Benton	4	2971	3286	3257	7300	5750	6000	270	353	151
Big Stone	6	1129	1580	1520	1129	1580	1520	172	144	149
Blue Earth	6	969	794	734	1384	1474	1379	154	148	143
Brown	6	1257	1350	1424	1355	2121	1953	188	173	177
Carlton	2	1653	1430	1547	1907	1788	1700	213	212	151
Carver	5	1415	1047	1157	1900	1971	2072	262	260	171
Cass	4	3460	4875	6867	2350	3900	3114	309	362	282
Chippewa	6	1510	1711	1722	2517	3080	3220	252	296	221
Chisago	4	1944	3129	2270	1855	1825	1807	192	217	117
Clay	3	2589	2741	2788	2132	1942	1826	343	326	233
Clearwater	1	2000	2175	2967	2150	4350	4650	471	374	405
Cook	2	1700	740	1050	1800	1233	2200	162	171	168
Cottonwood	6	1656	1900	2171	2483	3040	2617	216	175	165
Crow Wing	4	1200	1248	943	1810	1843	1796	250	229	190
Dakota	5	2741	2040	2325	2472	2199	1890	280	317	118
Dodge	7	2600	6700	2740	3350	3350	2680	265	479	144
Douglas	3	1272	1132	952	1435	1915	1675	188	202	159
Faribault	6	2090	1188	1320	1577	1683	1782	213	207	157
Fillmore	7	2433	1991	2422	1825	2433	1973	221	337	170
Freeborn	7	1229	1184	1156	2106	1932	1870	172	178	142
Goodhue	7	1338	1175	1277	1279	1567	1535	163	187	131
Grant	3	2500	3700	3800	1480	1480	1875	278	255	238
Hennepin	5	468	364	337	1025	1153	1047	134	115	99
Houston	7	4400	4475	3017	2543	2557	2300	309	307	255
Hubbard	1	1514	2033	1433	2360	3050	2720	353	251	193
Isanti	4	976	1171	1275	2425	2488	2411	286	206	185
Itasca	2	1365	1532	1252	2067	2128	1904	234	245	201
Jackson	6	2057	2433	1813	2043	2920	3550	244	231	213
Kanabec	4	1960	1883	1629	1833	2825	2360	272	306	184
Kandiyohi	6	763	707	598	1308	1354	1203	203	190	136
Kittson	1	2300	1700	2300	1400	1700	1725	223	226	186
Koochiching	2	2850	1944	1600	1740	1750	1385	305	305	210
Lac Qui Parle	6	2240	1600	2775	1867	1867	1867	233	280	241
Lake	2	2680	1360	1255	1675	2267	2086	285	263	189
Lake of the Woods	1	2000	2150	1400	2050	4300	4200	222	186	221
LeSueur	6	1936	1593	1294	1120	1858	1708	195	361	173
Lincoln	6	1620	1660	1660	2700	2767	2075	193	153	160
Lyon	6	1869	1544	1300	1581	1764	2133	248	218	172
McLeod	6	1458	1611	1390	1572	1611	1452	250	257	191
Mahnomen	1	2800	2900	2850	5700	5800	2900	509	317	335
Marshall	1	6550	13200	4467	13300	13200	4567	279	459	258

Table 6
(Cont.)

County		Population per Active Non Federal Physician[a][b]			Population per Licensed Dentist[a][c]			Population per Licensed Nurse[a][d]		
		1970	1975	1977	1973	1975	1979	1970	1972	1977
Martin	6	1519	1136	1250	1321	1563	1400	225	232	175
Meeker	6	1415	1870	1692	2010	2078	2070	211	251	214
Mille Lacs	4	1208	1492	1415	1889	2238	1617	189	250	157
Morrison	4	1582	1629	1561	2750	2308	2029	198	248	162
Mower	7	1291	1176	1157	1432	1673	1704	220	221	159
Murray	6	3125	2950	4067	2950	3933	4167	236	281	230
Nicollet	6	1361	1538	1575	2282	2236	2844	199	201	152
Nobles	6	1221	1155	996	2913	2888	2925	197	181	157
Norman	1	3333	3133	3233	9700	4700	3400	345	404	313
Olmsted	7	72	69	71	990	1119	1295	70	56	45
Otter Tail	3	1098	1054	1049	1590	2109	1677	195	192	167
Pennington	1	1209	906	750	1813	2071	2229	193	184	170
Pine	4	4200	3083	6333	2557	3083	2463	227	437	224
Pipestone	6	1600	1714	1967	1367	1333	1463	233	232	187
Polk	1	1638	1671	1636	2194	2194	2194	257	293	220
Pope	3	1850	2750	2280	1867	1833	1917	231	249	184
Ramsey	5	633	502	449	1075	1342	1250	133	128	105
Red Lake	1	2700	1767	5300	1800	1767	1733	491	360	353
Redwood	6	2857	3267	3940	1980	2450	1764	253	283	188
Renville	6	2638	2322	2638	1909	2986	2378	257	375	213
Rice	7	1486	1500	1381	1804	1891	2100	176	174	166
Rock	6	2260	1629	1600	2280	2850	2280	297	215	224
Roseau	1	2320	1743	2117	4067	4067	2620	314	359	270
St. Louis	2	824	710	638	1314	1454	1328	181	171	141
Scott	5	2160	1886	2085	1705	1800	2124	139	173	161
Sherburne	4	4575	3200	5660	5700	4267	4013	381	407	199
Sibley	6	3950	3140	3950	2314	2617	3140	298	386	236
Stearns	4	1223	1077	931	1426	1574	1442	158	148	138
Steele	7	1494	1367	1204	1653	1688	1672	209	202	155
Stevens	3	2240	2800	2260	2300	2240	2750	170	205	157
Swift	6	1650	2217	1663	1663	1900	2200	210	229	171
Todd	4	1842	1792	2400	2544	2913	2778	345	352	255
Traverse	3	3150	3050	3050	3050	3050	3000	350	254	197
Wabasha	7	1720	1533	1454	1508	1840	1940	170	245	130
Wadena	4	1378	1330	1390	1814	2660	2780	258	302	162
Waseca	6	2088	2225	2022	1700	1780	2033	196	243	152
Washington	5	2964	2248	2210	3074	2350	1988	235	349	129
Watonwan	6	2660	2520	3100	2660	2520	2017	225	261	188
Wilkin	3	3133	2225	1483	1314	2225	2200	152	128	146
Winona	7	1233	1409	1135	1527	2050	2073	313	250	194
Wright	4	2593	2168	1931	1952	2806	2208	311	365	236
Yellow Medicine	6	1611	1578	1763	1175	2029	1763	207	226	214

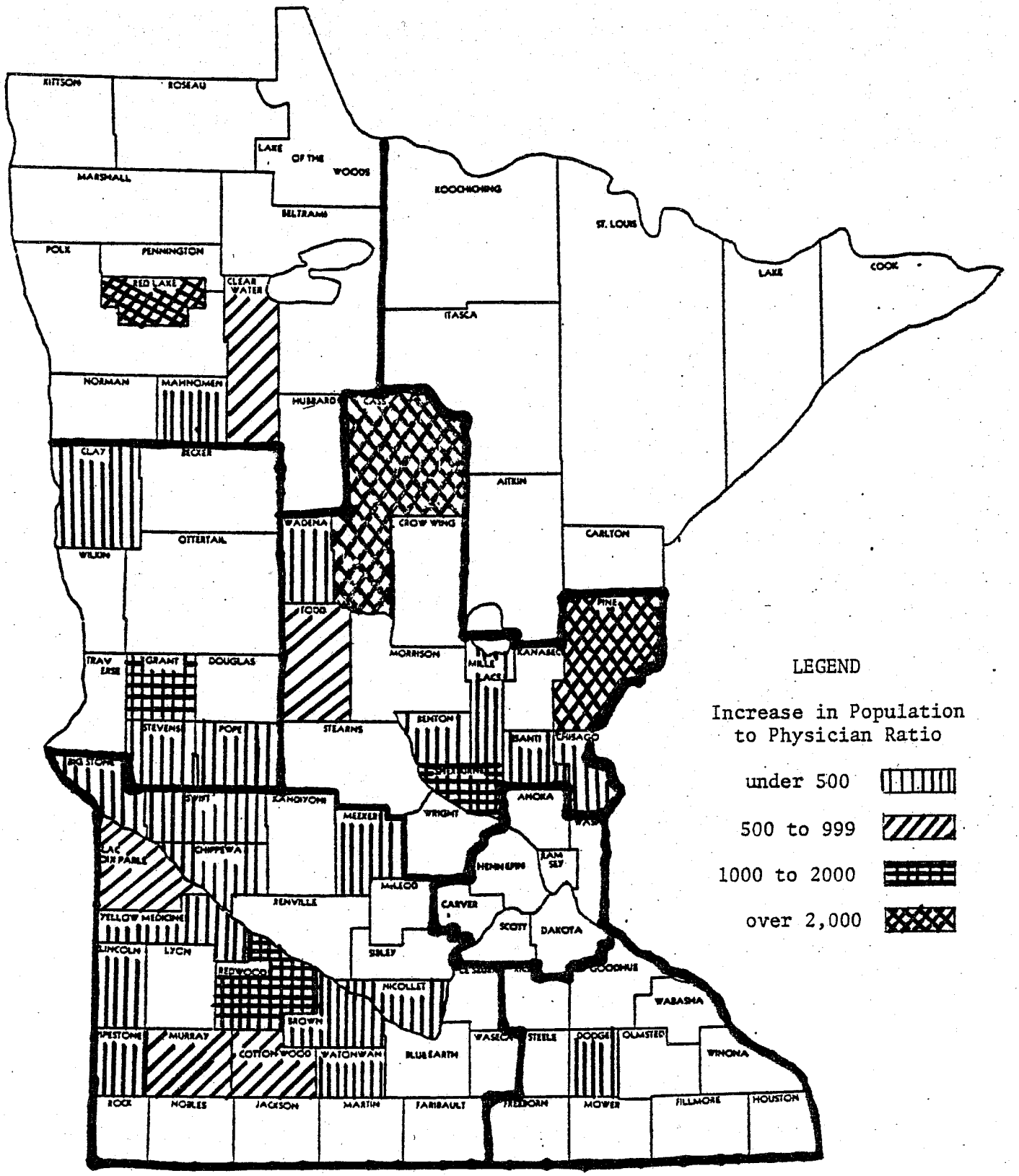
a. "Revised Population Projections for Minnesota Counties" (for 1970 & 1975) "Population estimates for Minnesota Counties, 1978" (for 1973 & 1977) Office of State Demographer.

b. "Distribution of Physicians in the US, 1970, 1975 and 1977" American Medical Association.

c. Minnesota State Board of Dentistry.

d. "Nurse power in Minnesota 1970" Northlands Regional Medical Program Inc./"The Nations Nurses, 1972 Inventory of Registered Nurses" American Nursing Association/"Health Manpower Statistics/Nurses" Minn. Health Manpower Information Systems.

Figure 2: Counties Experiencing an Increase in Population to Physician Ratios



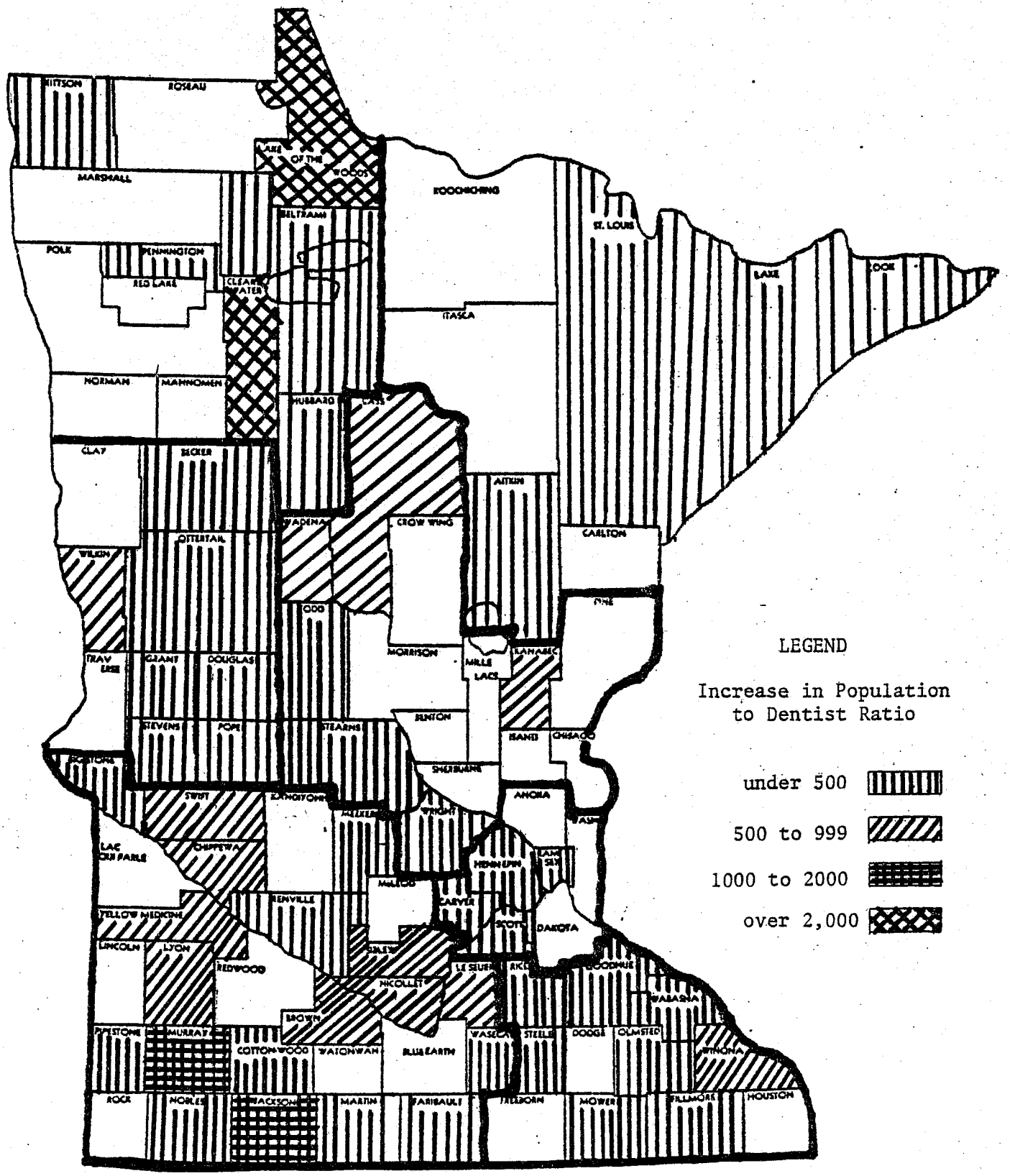
Among the 87 Minnesota counties, 14 had population to physician ratios of at least 3000:1 as of 1977. HSA 1 (Agassiz) in northwestern Minnesota had the following high-ratio counties: Marshall, Norman, Red Lake; HSA 3 (Min-Dak) had Grant and Traverse; HSA 4 (Central) had Benton, Cass, Pine, Sherburne; HSA 6 (Southwestern) had Murray, Redwood, Sibley, and Watonwan. The remaining high-ratio county was Houston, in HSA 7 (Southeastern).

It must be pointed out again, however, that the majority of counties and all of the HSAs did experience a decrease in these ratios during the 1970's and hence presumably had better access to health care.

The population to licensed dentist ratios become less favorable (increased) in 54 of the 87 counties. As with the physician ratios, most of the counties experienced small increases: However, there were substantial (over 500:1) increases in the ratios for Brown, Cass, Chippewa, Jackson, Kanabec, LeSueur, Lyon, Murray, Nicollet, Sibley, Swift, Wadena, Wilkin, Winona, and Yellow Medicine; and especially in Clearwater and Lake of the Woods counties. As can be seen in Figure 3, 10 of the counties with substantial increases were in HSA 6 (Southwestern); 3 in HSA 4 (Central); and 1 each in HSA 3 (Min-Dak) and HSA 7 (Southeastern). The 2 counties with the highest increases (over 2000:1) were in HSA 1 (Agassiz).

As of 1979 6 of the 87 counties had population to dentist ratios of more than 4000:1, and one of these, Benton, had a ratio of 6000:1. HSA 1 (Agassiz) contained 3 of these high ratio counties: Clearwater, Lake of the Woods, and Marshall. Two more were in HSA 4 (Central): Benton and Sherburne. The remaining high ratio county, Murray, was in HSA 6 (Southwestern).

Figure 3: Counties Experiencing an Increase in Population to Dentist Ratio



The population to licensed, registered nurse ratios mirrored the State and HSA trends with all but 4 counties experiencing a decrease (improvement) from 1970 to 1977. Also, among the four counties experiencing an increase, the largest increase was a mere 8; certainly not indicative of a significant worsening. As of 1977 only 4 counties--all in HSA 1 (Agassiz)--had population to nurse ratios over 300:1, these counties were Clearwater, Mahnomen, Red Lake, and Norman.

The probable large discrepancy between the number of licensed, registered nurses and the actual full-time-equivalent supply of nurses working in Minnesota suggests that population to licensed nurse ratios must be interpreted cautiously. (See earlier discussion of this point.)

Primary Medical Care Shortage Areas

To allocate rationally the resources of several Public Health Service programs designed to improve the U.S. distribution of health professionals, law has been enacted and criteria developed for the designated of federal health manpower shortage areas. Separate lists of shortage areas have been developed for each of eight types of health professionals. The present section of this paper,however, discusses only those data relevant to the designation of Minnesota health manpower shortage areas in primary medical care.

Primary medical care manpower includes primary care physicians (patient care physicians in the specialties of general or family practice, internal medicine, pediatrics, and obstetrics/gynecology), nurse practitioners, and physicians' assistants.

Federal criteria used for designation of a primary medical care shortage area include (a) a population to physician ratio of at least 3,500:1 ; (b) a birth rate of at least 100 per 1,000 women age 15-44; (c) a birth rate of over 40 per 1,000 women age 13-17, (d) over 20 infant deaths per 1,000 births; (3) over 30% of area population below the federally defined poverty level; and (f) over 20 miles of travel, on the average, to a physician. A high population to physician ratio (exceeding 3,500:1) is prima facie evidence for shortage area designation, but the remaining criteria can be used as "correction factors" to bolster an area's case for shortage area designation--and to increase a designated area's priority for service under Public Health Service programs.

Table 7 presents available Minnesota county data relevant to each of the criteria used to designate primary medical care shortage areas. In addition, Table 7 shows which counties have been federally designated as primary care shortage areas. The population to physician ratio, based on

Table 7

Health Care Variables for Minnesota Counties

County	HSA	Federal Shortage Areas-'79[a]	Population[b] per Patient Care Physician[c]-'77	Birth Rate/15-44 Yr. olds-'78[e]	Birth Rate/13-17 Yr. olds-'78[e]	Infant Death Rate-'78[e]	% Below Poverty Level-'70[f]	Average Distance to Physician-'77[g]
Aitkin	2	Part	2183	87	20	10.0	18.3	12
Anoka	5		2076	58	10	11.5	3.4	2
Becker	3		1255	88	23	11.8	18.2	5
Beltrami	1	All	1254	69	25	13.5	17.3	7
Benton	4		3257	103*	15	12.0	10.6	5
Big Stone	6		1520	69	17	10.5	15.6	7
Blue Earth	6		779	59	14	13.9	7.8	2
Brown	6		1424	71	13	8.8	12.6	4
Carlton	2		1547	78	21	10.3	8.6	5
Carver	5		1239	72	6	10.3	7.1	3
Cass	4	All	6867*	84	17	19.2	21.4	18
Chippewa	6		1722	83	11	12.0	13.0	6
Chisago	4		2270	81	21	4.9	10.2	5
Clay	3	Part	2963	54	7	12.6	7.8	6
Clearwater	1		2967	98	16	0	24.0	13
Cook	2		1050	67	32	0	8.3	13
Cottonwood	6	Part	2171	83	10	17.0	11.7	7
Crow Wing	4	Part	1070	79	17	15.2	11.6	4
Dakota	5		2482	61	8	11.5	3.5	2
Dodge	7		3425	89	8	4.0	11.8	7
Douglas	3		988	81	14	9.3	14.7	4
Faribault	6		1320	86	15	9.6	13.0	5
Fillmore	7		2422	82	12	15.5	14.8	7
Freeborn	7		1194	72	15	5.7	8.2	3
Goodhue	7		1277	72	11	12.6	9.5	4
Grant	3		3800*	82	17	27.0	17.3	12
Hennepin	5	Part	391	55	11	11.8	4.7	0
Houston	7		3620*	70	8	3.8	10.3	8
Hubbard	1		1433	86	11	9.4	20.7	7
Isanti	4		1360	67	9	5.9	8.3	4
Itasca	2		1252	87	17	21.3*	12.7	6
Jackson	6		2417	75	10	9.7	12.4	8
Kanabec	4	Part	1629	84	26	31.6*	13.6	6
Kandiyohi	6		609	86	11	12.1	11.0	3
Kittson	1		2300	75	6	22.2*	13.3	14
Koochiching	2		1760	69	16	31.6*	11.0	13
Lac Qui Parle	6	Part	2775	76	9	6.6	19.4	10
Lake	2		1255	73	9	14.2	5.5	10
Lake of the Wood	1	All	1400	114*	29	12.5	16.1	15
LeSueur	6		1375	86	10	2.7	10.2	4
Lincoln	6	Part	1660	86	0	0	19.1	7
Lyon	6		1300	82	9	11.3	11.3	4
McLeod	6		1390	70	8	9.0	9.1	3
Mahnomen	1		2850	95	16	9.4	24.6	12
Marshall	1		4467*	93	3	0	21.5	17

Table 7
(cont.)

County		Federal Shortage Areas-'79[a]	Population per Patient Care Physician[b] '77[c]	Birth Rate/15-44 Yr. olds-'78[e]	Birth Rate/13-17 Yr. olds-'78[e]	Infant Death Rate-'78[e]	% Below Poverty Level-'70[f]	Average Distance to Physician-'77[g]
Martin	6		1250	82	17	20.9*	9.7	4
Meeker	6		2030	79	14	3.3	15.8	6
Mille Lacs	4	Part	1415	84	31	16.1	14.5	5
Morrison	4	Part	1561	93	17	5.7	18.0	6
Mower	7		1259	67	10	16.5	8.6	3
Murray	6		4067*	82	3	15.6	14.9	11
Nicollet	6		2100	69	15	9.2	8.1	4
Nobles	6		1041	80	10	5.6	11.4	4
Norman	1		3233	82	7	14.7	17.2	12
Olmsted	7		81	60	8	13.1	5.4	1
Otter Tail	3		1096	78	13	11.0	16.1	5
Pennington	1		750	79	21	12.1	9.0	4
Pine	4	Part	6333*	96	17	9.0	14.3	15
Pipestone	6		1967	86	13	5.2	17.0	6
Polk	1	Part	1714	82	13	8.7	13.0	7
Pope	3		2280	90	8	11.2	14.7	8
Ramsey	5	Part	506	61	13	13.1	5.1	0
Red Lake	1		5300*	100*	11	0	21.2	15
Red Wood	6	All	3940*	89	11	6.3	15.7	9
Renville	6		2638	92	12	12.0	13.5	8
Rice	7		1473	60	13	12.2	7.4	3
Rock	6		1600	75	5	6.0	10.7	6
Roseau	1	All	2540	104*	17	24.5*	14.9	13
St. Louis	2		714	71	12	13.9	7.9	3
Scott	5		2195	68	7	21.1*	7.7	3
Sherburne	4		5660*	75	12	13.3	7.5	7
Sibley	6		3950*	80	13	12.2	14.4	9
Stearns	4		992	65	8	8.5	12.3	3
Steele	7		1257	72	10	16.3	7.6	3
Stevens	3		2825	70	4	5.6	13.1	8
Swift	6		1663	86	14	14.8	18.6	7
Todd	4		2667	100*	10	11.4	24.5	7
Traverse	3		3050	66	20	25.6*	17.9	12
Wabasha	7		1454	92	6	25.8*	10.0	4
Wadena	4		1390	94	21	15.6	17.4	5
[illegible]eca	6		2022	93	11	3.0	9.6	5
[illegible]shington	5		2511	61	3	9.6	4.0	2
[illegible]atonwan	6		3100	86	22	10.2	12.6	7
Wilkin	3	Part	1483	71	7	0	13.4	8
Winona	7		1227	59	11	13.6	9.8	3
Wright	4		2092	95	10	8.6	10.8	4
Yellow Medicine	6	Part	1763	81	29	4.7	15.5	7
State			653	79	13	12	13	7

a. "List of Health Manpower Shortage Areas Designated under Section 332 of the Public Health Service Act" Federal Register.
b. "Population Estimates for Minnesota Counties, 1978" Office of State Demographer .
c. "Distribution of Physicians in the US, 1977" American Medical Association.
d. "Annual Rural Area Services Report: Migrants in Minnesota, 1978" Minnesota Department of Economic Security.
e. Minnesota Department of Health, Bureau of Health Statistics.
f. 1970 Census Data, Bureau of Census.
g. Calculated from area of county ("County and City Data Book, 1977" Bureau of Census) and number of active, non-federal patient care physicians in county.

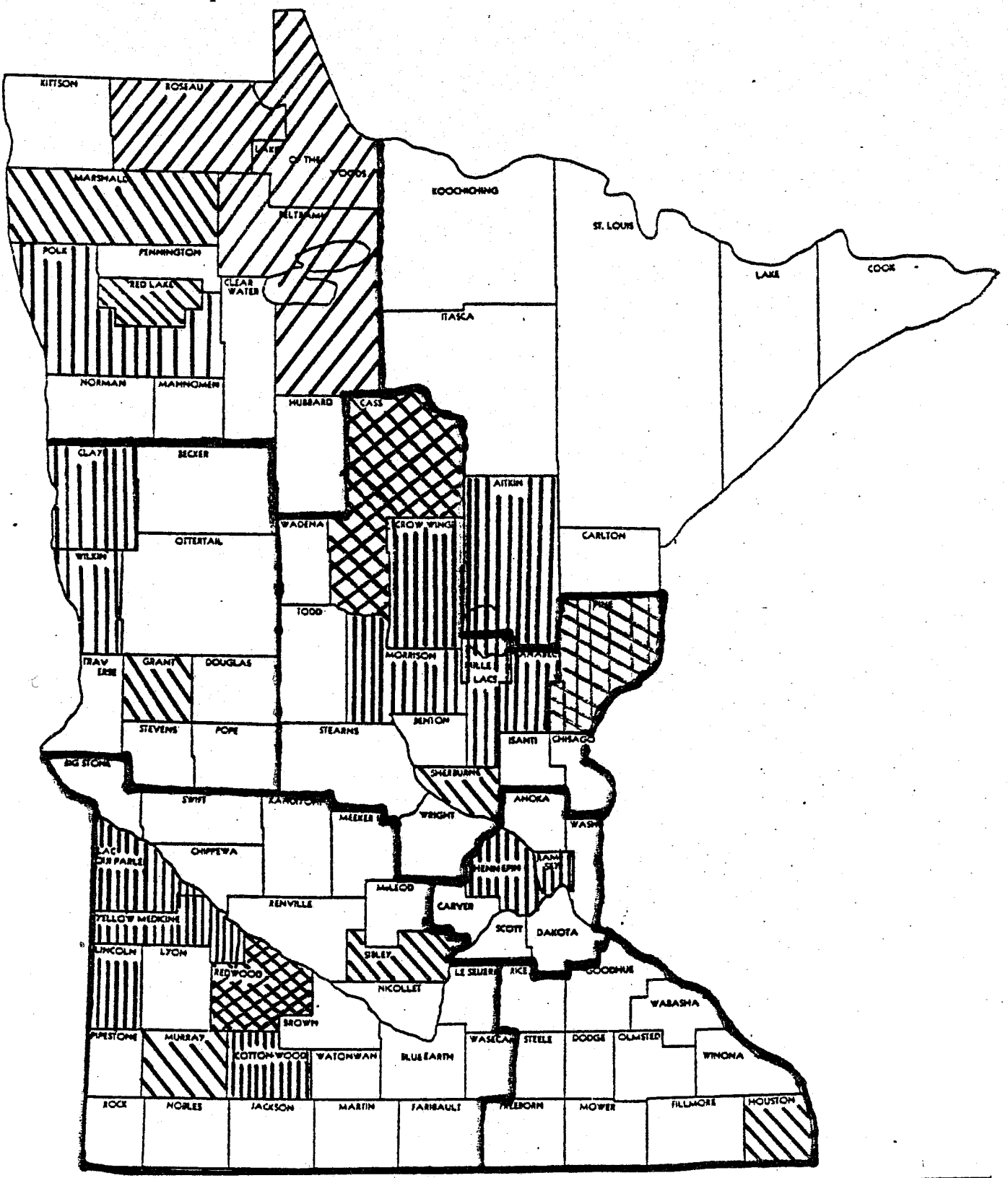
* Exceeds federal shortage area designation standards

AMA data for 1977, is the number of people per non-federal physicians active in patient care. This excludes any physicians primarily involved with teaching, administration, research, or any other non-patient-care oriented activity. Birth and death information for 1978 was obtained from the Minnesota Health Department's Center for Health Statistics. Poverty information is from the 1970 census. Distance statistics were calculated using the number of non-federal physicians active in patient care and the number of square miles per county. These distance statistics assume (arbitrarily) that physicians were spread evenly throughout the county. Complete references are included in the bibliography.

As of the late 1970's, 10 counties exceeded the federal criterion for population to physician ratios, 5 counties exceeded the birth rate standard for 15 to 44 year olds, and 9 counties exceeded the federal standards for infant mortality rate. Apparently, none of the counties exceeded the federal poverty criteria (when 1970 data were used), the distance to physician criterion, or the 13-17 year old birth rate criterion.

Minnesota counties designated as federal primary care shortage areas and those exceeding the federal criterion for population to physician ratios are indicated in Figure 4. Note that federally designated shortage areas do not necessarily follow county lines. For instance, the federally designated shortage area entitled Mille Lacs includes parts of five counties. Only 2 counties (Cass and Redwood) of the 10 with population to patient care physician ratios exceeding 3,500:1 were designated as primary care shortage areas. Even though Pine County had a 1977 ratio of 6,333:1, only part of this county was a federally designated shortage area. Another 7 counties with population to patient care physician ratios exceeding 3,500:1 were not included--either wholly or in part--in the federal list of shortage areas;

Figure 4: Counties Designated as Federal Health Shortage Areas and Counties with Population to Physician Ratios Exceeding 3,500



Part of County Federally Designated as Primary Care Shortage Areas

All of County Federally Designated as Primary Care Shortage Areas

Population to Physician Ratio Exceeding 3,500

these counties were Marshall and Red Lake in HSA 1, Grant in HSA 3, Sherburne in HSA 4, Murray and Sibley in HSA 6, and Houston in HSA 7. In contrast to these apparent high-ratio counties not included in the list of shortage areas, there were 17 federal shortage areas that included all or part of counties with apparent low ratios (less than 3,500:1).

The discrepancies between the official Minnesota list of primary care shortage areas, and the list one might develop independently using Table 7 and Figure 4, can probably be accounted for in terms of (a) different manpower and health-related statistics available to the authors vs. federal officials, and (b) the political and historical factors involved in designation of Minnesota shortage areas. Designation of shortage areas is clearly a complex process.

It does appear, however, that several counties in Minnesota, in addition to those that have been federally designated, may indeed have significant shortages of primary health care personnel.

Physician Specialty Choice

As noted earlier, physicians from four specialty categories are considered to be engaged in primary patient care: general or family practitioners, internists, pediatricians, and obstetricians/gynecologists. Since one of the goals of AHEC is to increase the number of physicians in primary care--and since about one-third of the participants in Minnesota AHEC programs have been medical students or resident physicians, making medical education the single most important AHEC emphasis in Minnesota--data on the change in the number of physicians in these specialties were collected and are presented here. In addition, the numbers of general surgeons and psychiatrists are included because of the federal AHEC office's interest in these specialties. Data are from the AMA tapes for 1973 and 1977, and were provided by the UofM Center for Health Services Research. The numbers represent active non-federal physicians indicating a predominant time emphasis in these particular specialty areas.

Table 8 compares for each HSA and for the State, the number of specialists in each category in 1973 vs. 1977. Table 9 presents the same data for each county.

From 1973 to 1977 there was a 20% increase (from 2,768 to 3,311) in the number of active, non-federal primary care physicians in Minnesota. The specialty of internal medicine showed the largest increase--both in absolute and proportional terms--from 966 to 1,250, or 29%.

Table 8

Active, Non-Federal Physicians[a] in Selected Specialties
In Minnesota Health Service Areas

Specialty	Agassiz	W.Lake Superior	Min-Dak	Central	Metro	Southwest (HSA 6)	Southeast	State Total
Family Or General Practice								
1973	41	104	63	126	587	197	116	1234
1977	46	134	65	139	686	204	129	1403
Internal Medicine								
1973	7	37	7	14	499	21	381	966
1977	8	49	12	21	709	32	419	1250
Pediatrics								
1973	1	12	1	8	215	9	49	295
1977	4	15	3	13	264	10	48	357
Obstetrics/ Gynecology								
1973	4	16	3	9	188	7	46	273
1977	6	18	4	11	206	9	47	301
General Surgery								
1973	8	35	8	16	325	36	110	538
1977	11	38	11	21	339	38	133	591
Psychiatry								
1973	3	18	5	8	144	13	34	225
1977	3	16	5	12	175	15	46	272
State Total								
1973	64	222	87	181	1958	283	736	3531
1977	78	270	100	217	2379	308	822	4174

[a]Note: Data are from American Medical Association data tapes for 1973 and 1977, as analyzed by starr of the Center for Health Services Research, UofM.

Table 9

Active, Non-Federal Physicians in Selected Specialties
In Minnesota Counties[a]

County	HSA	Family Or General Practice		Internal Medicine		Pediatrics		Obstetrics/ Gynecology		General Surgery		Psychiatry	
		1973	1977	1973	1977	1973	1977	1973	1977	1973	1977	1973	1977
Aitkin	2	2	4	1	0	0	0	0	0	0	0	0	0
Anoka	5	28	37	3	10	1	6	6	9	3	5	0	1
Becker	3	7	10	1	3	0	0	1	1	2	4	0	0
Beltrami	1	5	6	3	4	0	1	2	2	4	4	1	1
Benton	4	5	5	0	0	0	0	0	0	0	0	2	2
Big Stone	6	4	4	0	0	0	0	0	0	1	0	0	0
Blue Earth	6	10	11	9	10	4	4	2	4	8	9	3	4
Brown	6	10	13	0	1	0	0	1	1	3	2	0	0
Carlton	2	12	14	0	0	0	0	0	0	2	2	3	1
Carver	5	12	14	2	4	0	0	2	3	4	5	0	0
Cass	4	3	3	1	0	0	0	0	0	0	0	0	0
Chippewa	6	8	8	1	0	0	0	0	0	0	1	0	0
Chisago	4	6	9	0	0	0	0	0	0	0	0	0	0
Clay	3	9	9	2	2	0	1	0	0	0	0	1	0
Clearwater	1	4	2	0	0	0	1	0	0	0	0	0	0
Cook	2	3	2	0	0	0	0	0	0	0	0	0	0
Cottonwood	6	5	5	0	0	0	0	0	0	2	1	0	0
Crow Wing	4	15	17	0	2	1	1	1	1	3	5	1	2
Dakota	5	28	35	5	11	1	4	1	2	3	5	2	2
Dodge	7	2	3	0	1	0	0	0	0	0	0	0	0
Douglas	3	15	16	0	1	0	1	0	0	2	2	0	0
Faribault	6	10	12	0	0	0	0	1	1	2	1	0	0
Fillmore	7	9	7	0	0	0	0	0	0	0	0	0	0
Freeborn	7	14	12	2	2	2	2	4	4	3	5	0	1
Goodhue	7	9	11	5	5	2	2	3	4	4	3	0	0
Grant	3	2	1	0	0	0	0	0	0	0	0	0	0
Hennepin	7	321	363	389	505	166	191	134	133	235	249	94	121
Houston	5	3	3	0	2	0	0	0	0	0	0	0	1
Hubbard	1	3	6	0	0	0	0	0	0	0	1	0	0
Isanti	4	11	9	0	0	0	1	1	1	1	1	0	1
Itasca	2	14	16	3	6	0	0	0	0	3	5	1	1
Jackson	6	5	3	0	0	1	1	0	0	0	1	0	0
Kanabec	4	3	6	0	0	0	0	0	0	1	1	0	0
Kandiyohi	6	13	13	5	9	2	2	1	1	4	5	4	6
Kittson	1	4	3	0	0	0	0	0	0	0	0	0	0
Koochiching	2	7	10	0	0	0	0	0	0	0	0	0	0
Lac Qui Parle	6	3	3	0	0	0	0	0	0	1	1	0	0
Lake	2	7	6	0	0	0	0	0	0	1	1	0	1
Lake of the Woods	1	2	2	0	0	0	0	0	0	0	1	0	0
LeSueur	6	11	12	0	0	0	0	0	0	1	3	0	0
Lincoln	6	4	4	0	0	0	0	0	0	0	1	0	0
Lyon	6	10	12	0	1	0	0	0	1	3	2	0	0
McLeod	6	11	15	0	0	0	0	0	0	1	0	1	1
Mahnomen	1	1	1	0	0	0	0	0	1	0	0	0	0
Marshall	1	1	2	0	0	0	1	0	0	0	0	0	0

Table 9
(cont.)

County		Family Or General Practice		Internal Medicine		Pediatrics		Obstetrics/ Gynecology		General Surgery		Psychiatry	
		1973	1977	1973	1977	1973	1977	1973	1977	1973	1977	1973	1977
Martin	6	13	9	1	3	0	0	0	0	1	3	0	0
Meeker	6	10	10	1	0	0	0	0	0	1	1	0	0
Mille Lacs	4	9	11	1	0	0	0	0	0	0	0	0	1
Morrison	4	7	11	2	1	1	1	1	1	1	1	1	1
Mower	7	16	17	3	4	1	1	1	0	4	4	0	0
Murray	6	3	2	0	0	0	0	0	0	1	1	0	0
Nicollet	6	11	11	0	0	0	0	0	0	0	0	4	4
Nobles	6	3	4	4	8	2	3	2	1	3	3	1	0
Norman	1	3	3	0	0	0	0	0	0	0	0	0	0
Olmsted	7	18	23	359	390	40	38	35	37	88	106	33	44
Otter Tail	3	17	17	4	6	1	1	2	2	3	4	4	4
Pennington	1	8	11	1	1	0	0	0	1	1	2	0	0
Pine	4	4	3	0	0	0	0	0	0	0	0	0	0
Pipestone	6	6	5	0	0	0	0	0	0	0	0	0	0
Polk	1	6	5	3	3	1	1	2	2	3	3	2	2
Pope	3	3	4	0	0	0	0	0	0	0	0	0	0
Ramsey	5	165	194	99	174	47	62	45	57	78	71	44	46
Red Lake	1	1	1	0	0	0	0	0	0	0	0	0	0
Redwood	6	6	5	0	0	0	0	0	0	2	0	0	0
Renville	6	7	7	0	0	0	0	0	0	0	0	0	0
Rice	7	16	17	3	3	1	2	0	0	5	6	0	0
Rock	6	6	6	0	0	0	0	0	0	0	1	0	0
Roseau	1	3	4	0	0	0	0	0	0	0	0	0	0
St. Louis	2	59	82	33	43	12	15	16	18	29	30	14	13
Scott	5	13	14	0	0	0	1	0	0	1	2	0	0
Sherburne	4	3	3	0	0	0	0	0	1	0	0	0	0
Sibley	6	4	4	0	0	0	0	0	0	0	0	0	0
Stearns	4	32	31	9	14	5	8	6	7	9	11	4	5
Steele	7	13	14	2	4	0	0	0	0	2	3	0	0
Stevens	3	5	4	0	0	0	0	0	0	0	0	0	0
Swift	6	7	8	0	0	0	0	0	0	0	0	0	0
Todd	4	10	8	0	0	0	0	0	0	1	1	0	0
Traverse	3	3	2	0	0	0	0	0	0	0	0	0	0
Wabasha	7	8	11	0	0	0	0	0	0	1	1	0	0
Wadena	4	5	6	0	1	1	1	0	0	0	0	0	0
Waseca	6	6	8	0	0	0	0	0	0	0	0	0	0
Washington	5	20	29	1	5	0	0	0	2	1	2	4	5
Watonwan	6	4	3	0	0	0	0	0	0	1	1	0	0
Wilkin	3	2	2	0	0	0	0	0	1	1	1	0	1
Winona	7	8	11	7	8	3	3	3	2	3	5	1	0
Wright	4	13	17	1	3	0	1	0	0	0	1	0	0
Yellow Medicine	6	7	7	0	0	0	0	0	0	1	1	0	0

*Note: Data are from American Medical Association data tapes for 1973 and 1977 as analyzed by Center for Health Service Research, UofM

Family or general practice and internal medicine represented 80% of the primary care specialists as of 1977. Each of these two specialties as of 1977 accounted for about 40% of the 3,311 primary care physicians; with pediatrics accounting for another 11%; and obstetrics/gynecology, 9%.

The supply of family or general practitioners increased 14% (from 1,234 to 1,403) during the period 1973-1977; the supply of pediatricians, 21%; the supply of obstetricians/gynecologists, 11%.

The remaining (not primary care) specialties of general surgery and psychiatry increased 10% and 21%, respectively, during the period 1973-1977. In 1977, Minnesota had 591 active, non-federal general surgeons and 272 psychiatrists.

Table 8 shows that every Minnesota HSA increased its supply of primary care physicians from 1973 to 1977. Table 9 shows that a substantial majority of counties also increased their numbers of primary care specialists during this period. Only one county, Martin, experienced a decrease of more than two family practitioners. Physicians in primary care specialties other than family practice--as well as general surgeons and psychiatrists--tended to be concentrated in metropolitan counties (e.g., Hennepin, Ramsey, Olmsted, St. Louis).

The Need for Caution in Using These Data for Health Planning

Data in this report illuminate one factor--the distribution and per capita supply of three health professions--important in assessing the adequacy of Minnesota's health care delivery system and health professional training efforts.

Caution should, of course, be used in estimating the importance of the present data in planning programs for health care services delivery and health professional training. The per capita supply of health professionals of various types is not synonymous with the population's access to these same professionals.

Clearly, the accessibility of needed health care services to a given person in a given Minnesota county depends on many factors in addition to the overall per capita supplies of health professionals in that county. Such additional factors include the nature of that person's health care needs; the person's ability to pay for services; availability of health insurance or membership in a health maintenance organization; availability of transportation to health care providers; the productivity of health professionals in the county (for example, do area dentists efficiently use dental auxiliary personnel and modern equipment?); and even (for example, in the case of registered nurses) whether or not licensed professionals are actively employed in patient care.

The procedure for federal designation of health manpower shortage areas can take account of some accessibility factors other than population to provider ratios; i.e., high birth rates, high infant mortality rates, high poverty rates, and long average distances to health care providers.

The federal designation of shortage areas perhaps overemphasizes the importance of population to provider ratios, however, since high ratios are a sufficient condition for federal designation.

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