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UNIVERSITY OF MINNESOTA
Health Sciences Center

Report to
Higher Education Coordinating Commission

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UNIVERSITY OF MINNESOTA
Report from the Health Sciences

## INTRODUCTION

The health system in Minnesota has become a matter of major concern. Citizens of the state are demanding access to a rational health system at a reasonable cost. Responsible agencies have responded with numerous analyses of what we have and an abundance of ideas to get us where we want to go. Thus the situation has been defined, some objectives set, and programs to meet those objectives are being advanced.

As part of the production and delivery system in the state, the University has pursued a vigorous course in planning for growth, accommodating for change, and reshaping its mission and organization. The purpose of this paper is to outline what the health sciences have done in relation to the state health system and suggest what will be the shaping trends.

The methods by which health care is provided are the prime determinants of health manpower needs. The need for re-evaluation of the system is well recognized and evidence is now available that significant changes both at a national and state level are occurring at a rate much faster than just a few years ago. Health education instititutions and the agencies responsible for administering delivery will be major influences in forming these changes.

The mission statement of the Board of Regents describes a commitment to improvement of both the quality and availability of health care in Minnesota. The primary mission of the University health sciences is to educate health care professionals for the needs of the state. The Regents also state that the health sciences have a long tradition of distinguished research aimed at understanding the causes, prevention and treatment of disease, which should continue as one major mission. But the Regents believe that emphasis must be given to research and development of innovative systems for delivering optimum health care, systems which will serve all areas and all people of the state. They also emphasize that a way must be found to place more family doctors at the service of our people.

As the primary provider of practicing health professionals within the state and with the teaching-service impact of the largest health complex in Minnesota, the University is in a key position to carry out its health care objectives.

In working toward fulfillment of its commitments, the University clearly recognizes its obligation and the necessity of working closely and cooperatively with other health agencies.

## EDUCATION OF HEALTH PROFESSIONALS

The integration of activities of health professionals to deliver care effectively is becoming increasingly important. In recognition of the continuing and anticipated trend toward the organization of health services in health centers, clinics, hospitals and other facilities, health professionals and their associates will be required to work together more closely. Professional staff who will be required to work together should to the greatest extent possible be trained together so that the multidisciplinary team concept can have reality in rural practice and in urban settings. In addition, there should be greater integration of preprofessional and professional curricula and an increase in student options so that basic training in health related sciences can lead to training for a variety of health related professions as well as medicine and dentistry.

A new health sciences organization within the University has been designed to facilitate integration of health sciences disciplines through the creation of a single organization coordinating all University health sciences efforts. Programs have been initiated to achieve this integration both through curricular and student activities. This team approach emphasizes the desirability of a broad range of health sciences programs within an educational setting.

1. Medical Education -

a. Undergraduate Medical Education

Undergraduate medical education at the University of Minnesota Twin Cities Campus Medical School reflects innovations to the traditional form of two years of basic medical sciences education followed by two years of clinically oriented training. Some of these innovations reflect trends common to many programs throughout the country; others are unique to this University. Changes include interaction with patients very early in the educational process, greater appreciation of and emphasis on the team approach to health care, more elective courses and offerings from the behavioral sciences, the option to concentrate on a specialty of practice at an earlier date, more exposure to alternate forms of medical practice organization, more extensive use of community clinical facilities as a part of the educational process and the option of a more flexible time frame, in many cases three years of medical education, for achievement of the M.D. degree. Hopefully, these changes in the educational process and content will produce more appropriately trained physicians in a shorter period of time.

The University of Minnesota Medical School on the Twin Cities campus has developed into not only one of the largest but one of the best medical schools in the nation. Considering total programs of the Medical School, a major portion of the funding has been through other than state funds. With the assistance of a new federal Physicians Augmentation Program which provides per capita student financing and funds for space rental, expansion of enrollments by 40% have been effected this past year. This program has permitted immediate growth to the class size projected for 1975. A few years ago it was anticipated that the freshman medical school class size would go over 200 in 1975. The freshman class is now at 227 students.

The problem that still remains is to determine the number of physicians necessary to satisfy health care needs. Authoritative studies regarding physician manpower in Minnesota made during the past five years include the Hill Family Foundation study of Health Manpower for the Upper Midwest, published in June of 1966, and the Minnesota Legislative Interim Committee study published in April of 1969.

These studies describe a physician population ratio above the national average. They do, however, point out the weaknesses of this measure as the criterion for determining physician needs. The Hill study conclusions suggest the need for an additional 200 to 300 physicians in Minnesota by 1975, and recommend that the University expand its class to 200 students. The Legislative study points out a need for an additional 280 physicians if doctors in the state could be distributed geographically and by specialty in relationship to the needs of Minnesota residents. The study suggests that with no change in geographic and specialty factors, Minnesota suffers a functional shortage of 1,000 physicians.

Minnesota ranks 12th in the United States in the number of entering medical students per 100,000 population by state of residence (1965). As indicated in Table I, legislative action during the last session has permitted initiation of a very accelerated rate of growth in numbers of medical students in the state. Again, these efforts have been supplemented by the augmentation program, which enabled a 40% increase in the size of the Twin Cities Medical School. Programs now being established will result in a doubling of the number of freshmen medical students in Minnesota schools during the ten year period of 1965-1975.

The planned new school at Duluth, a two-year basic sciences school, will have 24 students per class the first two years and current plans call for an increase of twelve students every two years, thereby doubling in size to 48 by 1976. The majority of these students will continue their training in the University program, within the State of Minnesota. As a consequence of this addition the graduating class size, which at present is approximately 165 students, will increase to approximately 240 in 1974, and to 280 by 1976. With the establishment of the Mayo program total medical school admissions will exceed 300 by 1975.

Mention should be made that the ability to expand the clinical class size on the Twin Cities campus relates to utilization of affiliated hospitals. At the present time both Hennepin County General Hospital and Ramsey Hospital in St. Paul are being greatly utilized. The Veterans Administration Hospital and Mt. Sinai Hospital in Minneapolis are also major affiliates. These institutions, representing over 2,000 hospital beds, could accommodate additional students. Other Twin Cities hospitals now involved with undergraduate education on a more limited basis could also accommodate additional students. In addition, there are medical student programs in many private hospitals, clinics and physician offices throughout the state.

The numbers of medical students now projected exceed recommendations of the Hill report and represent plans for the enrollment of medical students in Minnesota which we consider appropriate at the present time. As solutions to other health issues, including those described in the following paragraphs, effect changes in the delivery system as well as the distribution and utilization of health professionals, the numbers of graduates can be increased as necessary through expansion of existing programs.

TABLE I

Freshmen Students Enrolled in Minnesota Medical Schools
(1965-1974 Projected)

| | University of Minnesota Twin Cities Campus | Mayo | University of Minnesota Duluth | Total* |
|---|---|---|---|---|
| 1965 | 153 | -- | -- | 153 |
| 1966 | 160 | -- | -- | 160 |
| 1967 | 160 | -- | -- | 160 |
| 1968 | 161 | -- | -- | 161 |
| 1969 | 164 | -- | -- | 164 |
| 1970 | 227 | -- | -- | 227 |
| 1971 | 227 | -- | -- | 227 |
| 1972 | 227 | 40 | 24 | 291 |
| 1973 | 227 | 40 | 24 | 291 |
| 1974 | 227 | 40 | 36 | 303 |

*These figures do not include transfer students from the two year schools in North and South Dakota. In 1970, twenty (20) students transferred and in 1971, thirty (30) students have applied for transfer to the University of Minnesota.

b. Graduate Medical Education - Physician Specialty

As clearly pointed out in the Hill Foundation and Legislative studies, a key element in resolving health care issues is the type of practice selected by physicians. This factor is of prime importance to both the location of practice of a physician and the quantity of health care delivered. Family practitioners, for example, normally see substantially larger numbers of patients during a given day then do other specialists. Minnesota along with other states has suffered a decrease in the numbers of family practitioners, particularly during the 1950's. The location of practice is affected since evidence indicates that the choice of specialty and location of a physician's graduate education is important to the area selected for his medical practice. Currently 972 physicians are enrolled in graduate programs of the medical school representing an increase of 165 doctors over the past four years.

The University has placed prime emphasis on increasing the numbers of family doctors in Minnesota. It has done so through the establishment of a program in family practice involving both graduate programs and extensive contact of family practice faculty with undergraduate medical students, a factor which may influence their selection of family practice as a career. As shown in the table below, a family practice graduate education program has also been established at Hennepin County General Hospital and is planned for St. Paul Ramsey Hospital as well.

TABLE II

Planned Graduate Education Programs in Family Practice

| | July 1971 | July 1972 |
|---|---|---|
| University of Minnesota | 52 | 70 - 84 |
| Hennepin County General Hospital | 22 | 31 |
| St. Paul Ramsey Hospital | 8 | 13 |
| | 82 | 114 - 128 |

Family Practice programs represent what could be an extremely significant factor in the solution to physician shortage and distribution problems. The 82 positions available in the state in 1971, if funded and filled, are expected to enroll physicians both from within the state and substantial numbers from other states. These physicians would probably otherwise have been attracted to graduate family practice programs in other states. As indicated earlier, evidence exists that the location of graduate education is important to the area selected for medical practice and, as reported in the Hill Foundation study, family practitioners are more likely than other specialists to settle in rural communities.

An increasing pool of medical graduates is becoming available from which graduate education programs can draw candidates; in 1965, 8,759 students were enrolled in medical schools on a nation wide basis compared with 11,360 in 1970.

2. Dental Education -

The ratio of dentists to population has been declining steadily in Minnesota. The Hill Family Foundation Report on Health Manpower cited the following:

in 1940 there were 77 dentists per 100,000 population

in 1963 there were 68 dentists per 100,000 population

More recently published data by the United States Public Health Service listed the number of active dentists in 1967 as 58 per 100,000 population. In 1964, 27% of the dentists in the state were 65 years and older, while in 1968 the number increased to 31% of the total dentists in the state.

The Hill Foundation report recommended an increase in dental students. Plans were undertaken to increase the entering freshmen dental class from 110 to 150, dental hygiene from 50 to 150 and dental assisting from 35 to 150. Since then the School of Dentistry has increased its entering freshmen dental class to 120 and has applied for a federal Dental Augmentation Program grant which will increase the fall class in 1971 to 130 if it is funded.

The entering class of dental hygienists has been increased by 10 from 50 to 60. The graduate student enrollment has doubled from 35 to 70. The following table summarizes present enrollments and projections for 1975.

TABLE III

Dental School Enrollment
1971-1975 (Projected)

| | 1971 | 1975 |
|---|---|---|
| Dental Students | 429 | 558 |
| Dental Hygiene (2 yr. program) | 118 | 288 |
| Dental Assisting (1 yr. program) | 26 | 150 |
| Graduate Students | 70 | 120 |
| TOTAL | 643 | 1,116 |

The projected enrollments for dental students appear to be adequate to meet the demands of care in the 1970s because of the increasing productivity of dentists through the more efficient utilization of dental auxiliaries including hygienist assistants, technicians and "dental associates". The school has changed its curriculum to permit teaching the concept of team dentistry, thus the student will transfer his experience to a private practice setting.

A new dental hygiene program is also planned for the Duluth campus. The plan calls for an initial class of 16 students in 1972. This program is intended to increase the number of dental hygienists available to serve the citizens of Northern Minnesota.

One method of helping to alleviate the critical shortage of dentists in the state is to develop more efficient methods of practice. Four years ago, the School of Dentistry began experimenting with new methods of delivering dental health care to patients. The goal of this on-going research effort is to find and implement a more effective system of treating and preventing oral diseases. In addition to educating dental assistants and dental hygienists, new types of paradental workers are being developed who will increase the productivity of dentists in their offices. These new dental auxiliaries will be trained to perform some of the simpler repetitive tasks and to insert amalgam and synthetic restorations in teeth after the dentist prepares the cavities. This new method of treating patients can increase the output of a dentist by up to seventy percent. The School of Dentistry is beginning to train a number of these health workers to become teachers in satellite training centers as they may develop in state colleges and vocational-technical schools in rural areas.

3. Nursing -

In 1966, under sponsorship of the Minnesota Nurses Association and the Minnesota League for Nursing, the Citizens' Committee for Nursing in Minnesota was created. This group, with funding through the Hill Foundation, sponsored a study of nursing manpower which was conducted by the Upper Midwest Research and Development Council. The study had as its goal the examination of nursing resources and nurse utilization for the projection of future nursing needs in the Upper Midwest.

The study pointed out a favorable nurse-population ratio within Minnesota in comparison with the national average. In 1966 the number of registered nurses per 100,000 population was 313 for the nation as compared with 397 for the State of Minnesota. The committee pointed out that by 1985 the United States projection is 450 nurses per 100,000 population and recommended that the desirable ratio for Minnesota would be 475 per 100,000. To reach this goal it will be necessary that Minnesota substantially increase the number of nurses being graduated from Minnesota schools.

The study pointed out that Minnesota has proportionately more faculty in nursing schools with Masters and Baccalaureate degrees than the national average, but recommended that the University of Minnesota, as the only institution for graduate nursing education within Minnesota, should expand its graduate program.

As shown in the Table IV below, very substantial increases are planned for education in nursing. The area of graduate education is of primary importance in the allocation of resources within the nursing school.

TABLE IV

School of Nursing Enrollment
1971-1975 (Projected)

| | 1971 | 1975 |
|---|---|---|
| Undergraduate | 254 | 520 |
| Graduate | | |
| Maternal-Child Nursing | --- | 40 |
| Medical-Surgical Nursing | 22 | 66 |
| Psychiatric Nursing | 16 | 50 |
| Post Masters Program | 8 | 20 |
| Adult Special | 2 | 14 |
| TOTAL | 302 | 710 |

An additional key program within the nursing school is concerned with career mobility of Minnesota nurses. A program has begun which will provide flexibility in enabling registered nurses who do not have bachelor degrees to attain those degrees through the University of Minnesota without the necessity of academic work to obtain the total number of credits necessary for graduation. This program, through validation examinations, provides the opportunity for nurses to obtain credit for existing knowledge toward a bachelor's degree.

4. Public Health -

The table below reflects the very broad range of health disciplines contained within the School of Public Health. While the department conducts very extensive educational programs for many undergraduate programs within the health sciences, all students registered in the School are pursuing graduate degrees.

New programs responding to the State need for particular types of trained health personnel include continued education of administrators of nursing homes and extended care facilities as well as academic programs for health planners and for public health nurses to function as pediatric nurse practitioners.

TABLE V

School of Public Health Enrollment
1971-1975 (Projected)

| | 1971 | 1975 |
|---|---|---|
| Biostatistics | 31 | 60 |
| Environmental Health | 83 | 80 |
| Epidemiology | 5 | 15 |
| Health Administration | 23 | 20 |
| Health Education | 16 | 25 |
| Hospital Administration | 83 | 120 |
| Public Health Nursing | 43 | 80 |
| Veterinary Public Health | 9 | 12 |
| Other | 10 | 37 |
| TOTAL | 303 | 449 |

The school has been charged with a specific objective "to develop broad innovative patterns for delivery of health care and health services involving professionals from within and without the Health Sciences." A significant example of an on-going project is the School of Public Health leadership in a demonstration project in Freeborn and Mower counties to study the health needs of citizens there and to help plan a model rural health service system.

5. Pharmacy -

The number of pharmacists graduating has increased significantly in the past five years and, as indicated in Table VI, will continue to increase. The change that will produce the greatest impact on health care is the patient-oriented clinical pharmacy programs which will prepare the future pharmacist for a more effective role in all areas of pharmacy practice. In addition to the academic phase, the clinical pharmacy faculty have contributed in the area of health services through programs such as the drug information center and its developing network to serve health professionals and other Minnesotans alike. Another important effort is at Cambridge State Hospital where drug utilization by patients has been improved and drug costs reduced by programs of the College of Pharmacy staff. A new program is being proposed to produce a specialist in drugs at the doctorate level.

TABLE VI

College of Pharmacy Enrollment
1971-1975 (Projected)

| | 1971 | 1975 |
|---|---|---|
| Undergraduate | 306 | 365 |
| Graduate | 42 | 50 |
| TOTAL | 348 | 415 |

The college has recognized its responsibility to educate the public on drug abuse. A training program for students and faculty has been in effect for two years. This program has resulted in more than 150 sessions presented to teen-age groups and professional organizations. Two continuing education seminars have trained almost 150 pharmacists from throughout the state to participate in planning and producing drug education programs in their home communities.

Closed-circuit television is used in eleven sites throughout Minnesota to provide patient-oriented continuing education. Ninety percent of the state's pharmacists can participate with less than an hour drive from home.

6. Other Allied Health Professionals

Meeting the health care needs of the state will rely heavily on the numbers, kinds, and use of allied health personnel. The costs as well as the feasibility of providing the services needed hinge on the utilization of existing and new kinds of allied health professionals at varying levels of training.

The University has given priority to the development of an organizational element within the health sciences which will enable a greater concentration of effort on the development of appropriate new types of health personnel and will assist integration of educational efforts among these disciplines. The University is in the unique position of pulling together in one setting a broad range of programs representing 4158 Health Sciences students. The challenge to education is to develop a team approach with the efforts of these varied professionals focused on the health care of individuals.

In addition to allied health programs described in previous sections, the table below lists other programs and projected student increases.

TABLE VII

Other Allied Health Professionals Enrollment
(1971-1975 Projected)

| | 1971 | 1975 |
|---|---|---|
| Medical Technology | 252 | 274 |
| Radiologic Technology* | 295 | 350 |
| Occupational Therapy | 62 | 84 |
| Physical Therapy | 98 | 105 |
| Rehabilitation Counselors | 38 | 65 |
| Mortuary Science | 64 | 76 |
| Nutrition - Dietary | 18 | 18 |
| E.K.G. Technician | 5 | 10 |
| E.E.G. Technician | 10 | 15 |
| TOTAL | 842 | 997 |

*Includes students from other schools who receive a major portion of their didactic training at University Hospitals.

## THE DELIVERY SYSTEM

The delivery of health care has been traditionally dominated with concern for the scientific validity of professional practice. We have perhaps given more emphasis to concerns with scientific approval than to the ultimate end--health care. There have been explosive advances in science and technology which have far outstripped our present ability to bring science to its purpose in the service of people.

Emphasis has rightfully changed. The public is demanding and must receive a greater volume of high quality care--delivered to those who need it when it is needed. The demand is for changes in the health care system. The University is interested in not only increasing health manpower and our basic knowledge in the health sciences but also in devising new methods of delivery which are applicable to society.

Again, the point bears underlining that the numbers, kinds and distribution of health personnel and even the content of their training will vary enormously depending upon the system that will be used for the delivery of services.

No system has yet evolved which will effectively and efficiently achieve the objective of a high level of health care for all. Attributes of such a system will be characterized by its provision of easy and convenient access and a comprehensive service which provides a full spectrum of health care resources with uninhibited referral from one to another. Within this framework, the system must be designed to ensure costs within reach of the public.

To achieve such a system for the State of Minnesota will require a great degree of coordination among agencies primarily concerned with health manpower and those concerned with health care delivery. This area-wide role has been vested in the State Comprehensive Health Planning Agency.

The need exists to strengthen ties through the mechanism of the Comprehensive Health Planning Agency so that assistance can be provided in the establishment of goals, priorities and the allocation of resources on a state-wide basis. Within this planning framework the need also exists for a single state agency to tie together health manpower efforts of the many public and private institutions concerned with the training of health personnel.