Updated as of 2-15-71

A Narrative Description Including
an Architectural Program with Space Schedules

UNIVERSITY OF MINNESOTA
MEDICAL SCHOOL

An Educational Unit of the Health
Sciences at the University of Minnesota
Located in the Health Sciences Center
on the Minneapolis Campus of the University

This grant application for Physicians Educational Facilities was prepared under the direction of:

H. Mead Cavert, M.S., Ph.D., Associate Dean and Executive Officer, Medical School.
John Westerman, B.A., B.S.L., M.H.A., Hospital Director, University Hospitals; Associate Professor, School of Public Health.

assisted by:

Robert Mulhausen, M.D., M.S., Assistant Dean, Medical School; Associate Professor of Medicine.
Peter H. Sammond, B.A., M.B.A., Associate Director, University Hospitals.
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November 1, 1970

UNIVERSITY OF MINNESOTA

MEDICAL SCHOOL

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PART II

Item 15 - 2

ABSTRACT

This application seeks funds for construction of Unit B/C of the University of Minnesota Health Sciences development program. Unit B/C is the second step in this program and was approved as being eligible for consideration by the 1969 Advisory Council which approved the Unit A grant application. The construction of both of these units will permit major enrollment increase in the Medical School and the School of Dentistry and facilitate closer integration of all health science programs.

The decision to undertake a major health sciences expansion derived from concern within and outside of the University to provide Minnesota and the upper Mid-west region with adequate numbers of well trained health professionals. An independent study of health manpower in the area documented the need and proposed that the University is the most appropriate institution to provide increased training opportunities. Present facilities cannot accommodate such expanded programs due to inadequacies of both a quantitative and qualitative nature.

Whereas Unit "A" is primarily a Dental School facility, Unit B/C, the subject of this application, is primarily a Medical School facility. It will make possible an increase in the Medical School class from 163 to 220 students. Training programs for other health professionals will also be increased in size. The latter increase will occur primarily in spaces vacated by the Medical School in it move to Unit B/C.

Unit B/C is a 15 story structure which will include: faculty offices and teaching labs for many Medical School clinical departments; classrooms, seminar rooms and learning resource or independent study spaces; student and staff dining and lounge facilities; hospital out-patient clinics including the hospital dentistry clinic, and support departments; and animal hospital and handling area. This facility will connect with Unit "A" as well as existing structures within the Health Sciences Center.

The estimated cost of UnitB/C is approximately $52 million of which $34 million is for construction. Of the total amount, $2.7 million relates to the School of Dentistry program and the balance to the Medical School program. The Health Sciences development program, including Units A, B/C, E (supply receiving and distribution center), F (College of Pharmacy), and remodeling (Basic Science, School of Nursing, School of Public Health, Medical School and Hospital) will cost approximately $120 million. Long range master planning is underway for future developments including facilities for a cardiovascular research center, a new University Hospital and other clinical facilities and a School of Public Health.

FACILITIES AND THEIR DEFICIENCIES

The clinical programs and facilities of the School of Medicine are housed in the University Hospital complex, which includes the Mayo Tower, Todd and Eustis Wings, the Variety Club Heart Hospital, the Masonic Memorial Hospital and the Children's Rehabilitation Center. The latter three units were built in 1949, 1958, and 1962 respectively while the main hospital complex was developed in stages from 1911 and 1954. These facilities also serve the inpatient and outpatient programs of not only the Medical School but the other Health Sciences as well.

There is a serious shortage of seminar areas and classroom facilities in these areas. Large classrooms and auditoria are outmoded and unable to accommodate, at any one time, a single, current Medical School class. Patient, faculty, and student traffic pathways are inefficient and time consuming. Clinical faculty and departmental offices, which are located in this complex, are greatly outmoded and seriously over-crowded with the result that it is necessary to house faculty in buildings outside the hospital complex and even off campus.

Student laboratories are small, cramped, and contain few services. There are not enough laboratory facilities to accommodate the number of faculty needed to teach the current medical students, so that faculty laboratories have been developed in old and temporary structures away from the hospital complex and from the campus and away from the clinical activities of the faculty.

The major portion of the outpatient clinics are in portions of the building planned and constructed in the 1920's. While redecorating and some remodeling have served to improve them, the original building shape and design prevent the incorporation of techniques and devices which would be considered standard in a teaching clinic of today. There is little air-conditioning; an inadequate number of class, conference, and seminar rooms; no pneumatic tube or other automated materials handling; no overall communications system; little dictating space or recording space; and no waiting rooms. It might be possible to provide these improvements with total gutting, which would likely be as costly as new construction.

The space now assigned to clinics (about 25,000 sq. ft.) has not been appreciably increased since the Hospitals had half its present bed capacity and patient load. The increased hospital census over the past 40 years as well as the current replacement of bed care by ambulatory care (and teaching) make the present space grossly inadequate.

The Headships of half the clinical departments of the School of Medicine have changed hands during the last few years. Consequently, young, aggressive medical educators have assumed the leadership roles in these departments, bringing along with them faculty who are interested in new and expanding programs. Many of these programs presently are making do with inadequate, although sometimes remodeled, facilities. At the same time many of the smaller clinical departments have increased the size of their staffs from one or two men to three or four men, thus doubling the requirements for office and laboratory space.

The inability to accommodate these expanded programs physically is heightened by the difficulty of adapting architecture, designed as much as fifty years ago, to contemporary needs and potentialities. The present facilities, even when remodeled, do not allow us to take advantage of many forms of electronic communication for transmission of data, records, and information or mechanical transportation systems for better flow of patient records, radiographic film and patient service items. These deficiencies have an inhibiting effect on patient service and medical education.

Complete development of the new curriculum, which stresses the student as a learner of the art and practice of medicine is curtailed by the lack of appropriate facilities. At the present time, the Learning Center, which plays a vital role in the new curriculum is severely restricted by study space and there is little space for preparation of appropriate teaching aids.

Initial experience with an increased class size under the Physicians Augmentation Program has demonstrated clearly the need for expanded facilities in order to accommodate the increased class size and the number of faculty attendant upon this increase. It has become necessary to develop facilities away from the campus in several locations. These facilities are not optimally efficient, tend to separate faculty from students, and make it difficult for faculty to pursue their teaching and clinical responsibilities. It would be impossible to sustain an increased class size beyond a relatively short, restricted period because of the marked overcrowding and relative lack of student and faculty facilities at the Health Sciences Center, and the suboptimal temporary facilities located at some distance from the Health Sciences Center. Because of the clearly inadequate facilities to handle an increased class size, the faculty agreed to assume the responsibilities of the significant increase in class size under the Physicians Augmentation Program only if expanded and renovated permanent physical facilities at the Health Sciences Center could be available in the relatively near future.

Without expansion and renovation of current facilities, it would be impossible to maintain an expanded Medical School enrollment. Not only would it be impossible to house the students at the Health Sicences Center, but there would be no space available for the increase of faculty attendant upon the increased enrollment. Under current conditions, in spite of increased faculty endeavors, the quality of instruction has suffered. It would be impossible to substantially improve the quality of instruction by the use of newer teaching techniques and to develop fully the new curriculum which requires versatility of physical facilities.

1. Present Enrollment (as of October 15)

	Number of Students	
	Schools other than P.H.	Schools of P.H.
(a) Undergraduate		
1st year	227*	
2nd year	163	
3rd year	178	XXXX
4th year	180	XXXX
5th year		XXXX
6th year		XXXX
TOTAL	748	
(b) Graduate	680	
(c) Continuing Education	1035	

2. If application proposes expanding the training capacity of an existing school, show the highest enrollment for any of the five full school years preceding the year in which application is made. Include first-year students enrolled as a result of receiving basic improvement grant. (as of October 15)

163 HIGHEST UNDERGRADUATE FIRST YEAR ENROLLMENT

680 HIGHEST ADVANCED TRAINING ENROLLMENT

1035 HIGHEST CONTINUING EDUCATION ENROLLMENT

First-year enrollment is defined as the full-time students who are, according to the admissions policy of the school, formally enrolled in the first class of that particular school.

3. Indicate the estimated first-year enrollment for each of the five full school years following completion of construction. The applicant is required to maintain the increased enrollment for a period of 10 years after completion of construction. If an enrollment increase beyond the committment in this application is contemplated, please indicate.

NUMBER OF STUDENTS

YEAR	First Year * Undergraduate	Advanced	Continuing Education
1974	227	800	1200
1975	227	800	1200
1976	227	800	1200
1977	220	800	1200
1978	220	800	1200

Student Increase over highest enrollment shown in Item 2 above:

57 UNDERGRADUATE (FIRST-YEAR) Health Profession Students

120 ADVANCED

165 CONTINUING EDUCATION

4. If application is for assistance with no student increase committment, indicate whether the facilities are so obsolete as to require the school to curtail substantially:

(1) ___ Its enrollment, or

(2) ___ The quality of training provided

(Attach a statement explaining how and the extent to which, the structural and functional condition of the facility affects the enrollment or quality of training provided. Also attach a letter from accrediting body in support of the statement.)

*See following explanatory statement.

In 1969 approval was obtained for funding of Unit A of the Health Sciences Development Program and the eligibility for 66 2/3% Federal participation for Units A and B/C, based upon a 35% increase in the size of the Medical School first year class from a base of 163, to a total of 220, was established. At the same time, the Executive Faculty of the Medical School agreed to participate in the Physicians Augmentation Program. This participation resulted in an increment of 60 students admitted in the entering class in September, 1970, raising the first year class total to 227. Five students were included in the Fall, 1970, entering class of 227 to conform with requirements for continuation of the institutional Basic Improvement Grant of the Medical School. The 60 student increase under PAP was significantly larger than that of any other school which participated in that program and represented, we believe, an earnest, prompt response and contribution of the Medical School faculty toward alleviation of the serious physician manpower shortage in the region and in the United States.

The decision to increase the Medical School class through PAP in the Fall of 1970 was based to a major extent upon the expectation that permanent, optimal physical facilities, needed to teach a class of 220 students and to house the faculty necessary to teach these students, would be available in the foreseeable future. Unit B/C, the subject of this grant request, provides these facilities to a substantial degree.

The 1974 class total listed on the preceding page reflects continued participation in the fifth year of the Physicians Augmentation Program. The 1975 and 1976 first year class enrollment estimate assumes continuing participation in a renewed Physicians Augmentation Program or some similar program designed to maintain the impetus gained under PAP. The 1977 figure is based upon the obligation of the University Medical School to assume an entering class of 220 on the basis of Federal participation under the Health Professions Teaching Facilities Program.

Please note the following correspondence regarding the Physicians Augmentation Program and its relation to the Health Professions Teaching Facilities Program.

September 29, 1969

Mr. Theodore Lorenzen
Division of Education and Research Facilities
National Institutes of Health
Bethesda, Maryland 20014

Dear Mr. Lorenzen:

In this period of increasing demands for medical manpower, the University of Minnesota Medical School, in order to fulfil its increased responsibilities, may be called upon to augment substantially its physician output within the next several years by enlarging the sizes of the incoming classes. If done, this will place an increased demand upon existing physical facilities at the University Medical School - facilities which under current conditions are already inadequate.

It appears prudent, therefore, to reiterate our understanding of the conditions under which our Phase I development program is submitted to the Health Professions Teaching Facilities Branch of NIH.

We understand that our 163 base in first year student enrollment, determined by the highest first year enrollment in any of the 5 preceding years prior to July 1, 1969, the date of our grant request, not only applies to the funds requested for Building A, Step 1, of the proposal but also applies to the succeeding Steps 2 and 3 of Phase I. These will be the subjects of grant requests to be submitted within the next few years.

It is also our understanding that the guaranteed increase in first year enrollment of 35% or 57 students, raising our incoming class to 220, applies to this entire Phase I project, including Steps 1, 2 and 3. As you may note we are projecting a class size of 203 from 1973, the expected completion date of Building A, Step 1 through 1976. In 1977, three years after the anticipated completion of the entire Phase I, Steps 1, 2 and 3, we are guaranteeing the 35% increase, or a total of 220 in the incoming first year class. We understand that this time schedule is appropriate to the above mentioned considerations and consistent with the existing legislation.

Our enthusiasm to quickly increase Medical School enrollment by participation in programs designed tooincrease Medical School operating funds from Federal sources, is tempered by our desire not to jeopardize current capital improvement programs

aimed at similar goals. It is with this concern in mind that we underscore our current understanding of the conditions under which our Health Sciences Development Program funding are undertaken. We appreciate that legislation governing these programs might change, but we are anxious to clarify with you, insofar as possible, the current situation as it is understood by the Medical School. Any comments or assurances which are appropriate to these concerns would be appreciated.

Sincerely yours,

Robert B. Howard
Dean, Medical School

RBH/jls

UNIVERSITY OF Minnesota

MEDICAL SCHOOL
1305 MAYO MEMORIAL BUILDING • MINNEAPOLIS, MINNESOTA 55455

Office of the Associate Dean

October 14, 1969

Health Manpower Grants Branch
Division of Health Manpower
Educational Services
Bureau of Health Professions
Education and Manpower Training
National Institutes of Health
9000 Rockville Pike
Bethesda, Maryland 20014

Dear Sir:

The Medical School at the University of Minnesota submits herewith an application for participation in the Physician Augmentation Program. It is our belief that this proposed program, if adequately funded, can be implemented with sufficient rapidity to augment substantially the entering class of fall, 1970. It is to be emphasized that effective launching of the program proposed will require an input of extra effort, utilization of special or temporary physical facilities, and negotiation of various temporary arrangements with certain teaching and supportive personnel. The Administrative Board and the Executive Faculty of the Medical School, firmly convinced of the urgency of our response to the expressed critical physician manpower needs of the nation, have affirmed their willingness and determination to carry forward this program on a temporary, relatively emergency basis. The Central Administration of the University of Minnesota has also indicated its approval and support of this extensive increment in the Medical School's educational effort.

In submitting an application for participation in the Physician Augmentation Program (PAP), the University of Minnesota Medical School wishes to record as clearly as possible our understanding of stated projections of student enrollments related to the PAP Program and some possible implications of commitments related to those projections. This matter is of particular concern as it relates to a currently pending application from the University of Minnesota for funding of a major Health Sciences Development Program through the Health Professions Teaching Facilities Branch of the National Institutes of Health. That extensive construction program and the corresponding application for federal matching funds are also based upon commitments by the University of Minnesota to effect major increments in medical student enrollment, beginning with the class entering in 1973.

It is our assumption and understanding that the increase in entering class size proposed as the basis for participation in the PAP, beginning in September, 1970, will in no manner conflict with or jeopardize eligibility of the University of Minnesota for receiving matching funds for construction through the Health Professions Teaching Facilities Branch. This statement,

we assume, is valid not only with respect to the current pending application for federal construction funds related to Building A, Step 1 of the University of Minnesota Health Sciences Development Program, but also with respect to additional applications to be filed within the next several months for construction matching funds related to succeeding buildings and steps in that total Development Program, specifically those building units designated as Phase I, steps 2 and 3. It is our understanding and assumption, therefore, that any enrollment increases realized through University of Minnesota participation in the PAP Program would not alter the base figure of medical student entering class size, 163, employed by us in developing projections of future enrollment as presented in applications for federal matching funding of the University of Minnesota Health Sciences Development Program. We consider it important to reiterate, therefore, that our considerable and sincere determination to increase Medical School enrollment rapidly and significantly through participation in the PAP Program is tempered only by our equally great concern and determination not to jeopardize thereby the current University of Minnesota construction program directed toward similar goals of physician manpower production on a more long-range schedule.

In this connection, we are enclosing a copy of a corresponding letter transmitted on September 29 to the Health Professions Teaching Facilities Branch of the National Institutes of Health.

Thank you for consideration of this application for funding of a Physician Augmentation Program at the University of Minnesota. We look forward to the opportunity of discussing this program and the contents of the application with representatives of the National Institutes of Health.

Sincerely yours,

Robert B. Howard

Robert B. Howard, M.D.
Dean, College of Medical Sciences

H. Mead Cavert

H. Mead Cavert, M.D.
Associate Dean and Executive Officer
Medical School

RBH:HMC/pka

Encl.

HISTORY OF THE MEDICAL SCHOOL

1888 First classes in Medical School, following surrender of charters of three private Twin Cities schools to Univerisity of Minnesota for purpose of establishing a Medical School. Department of Medicine included College of Medicine and Surgery, College of Dentistry and College of Hemeopathic Medicine and Surgery.

1892 Reorganization of the Department of Medicine, resulting in establishment of three separate colleges and the addition of the College of Pharmacy.

Further reorganization resulted in formation of College of Medical Sciences composed of Medical School, School of Nursing, School of Public Health and University Hospitals

1911 Dedication of furst unit of University Hospitals.

Further expansion resulted in progressive increase in size of the Medical School Classes and emergence of the School as a major teaching and research center.

1963 Administrative Committee of Medical School recommends increase in class size, then 150, contingent upon adequate facilities and staff.

1964 Regents authorize Louis W. and Maud Hill Family Foundation to investigate health needs of the State of Minnesota and their relationship to the University of Minnesota Medical School.

1966 Citizens Advisory Committee , recommends, on the basis of the Hill Family Foundation Report, "Health Manpower for the Upper Midwest", that University of Minnesota Medical School expand class size to 200 at an early date and plan for expansion to 250 students; that University encourage additional students from 2 year Medical Schools in North Dakota and South Dakota to complete their training at the University of Minnesota; and that the University strengthen teaching of skills and attitudes relative to the responsibilities of the personal or family physician.

1966 Adoption of new constitution and by-laws of the University Medical School. (Revised, 1968)

1968 Formation of the Department of Family Practice and Community Health.

1968 Adoption of new curriculum, implemented in September, 1969.

1969 Approval for first unit of Health Sciences Development Program.

1970 Inauguration of Physicians Augmentation Program, increasing class size to 227.

1970 Reorganization of Health Sciences, which includs Medical School, School of Dentistry, School of Pharmacy, School of Nursing, School of Public Health, and University Hospitals, under leadership of Vice President for the Health Sciences.

EDUCATIONAL PHILOSOPHY OF THE MEDICAL SCHOOL

The objectives of the Medical School are to teach students, at all levels of training and experience, the expanding art and science of Medicine; to foster basic and clinical research; and to provide exemplary models for health care for the people of Minnesota, the Upper Midwest, and the Nation.

Responding to the needs of the student of Medicine to assimilate ever increasing bodies of knowledge and to develop professional attitudes responsive to the needs of society, to the demands of the people of the State of Minnesota and of the Nation for improved health care, and to the chances in the professional structure of American medicine; the faculty adopted a new undergraduate curriculum in 1968. This curriculum stresses goals which ensure a relevant, flexible medical education and which emphasizes the student as a learner of medicine. The curriculum will improve communications among famulty and students, will prepare the Medical student for the future of Medical practice, and will inculcate the humanistic aspects of Medical care. These goals are to be pursued in a setting which encourages interchange with other health science students and personnel leading to an awareness of the health team concept in the provision of health care.

These same goals are applicable to graduate education where, in addition, excellence in the basic sciences and the various clinical specialities, including family practice, is pursued.

Realizing the need for continuing education for the graduate physician, the post-graduate education program not only stresses the short-course method for providing relevant and important information for the practicing specialist and generalist, but also is expanding its out-reach into the practicing medical community.

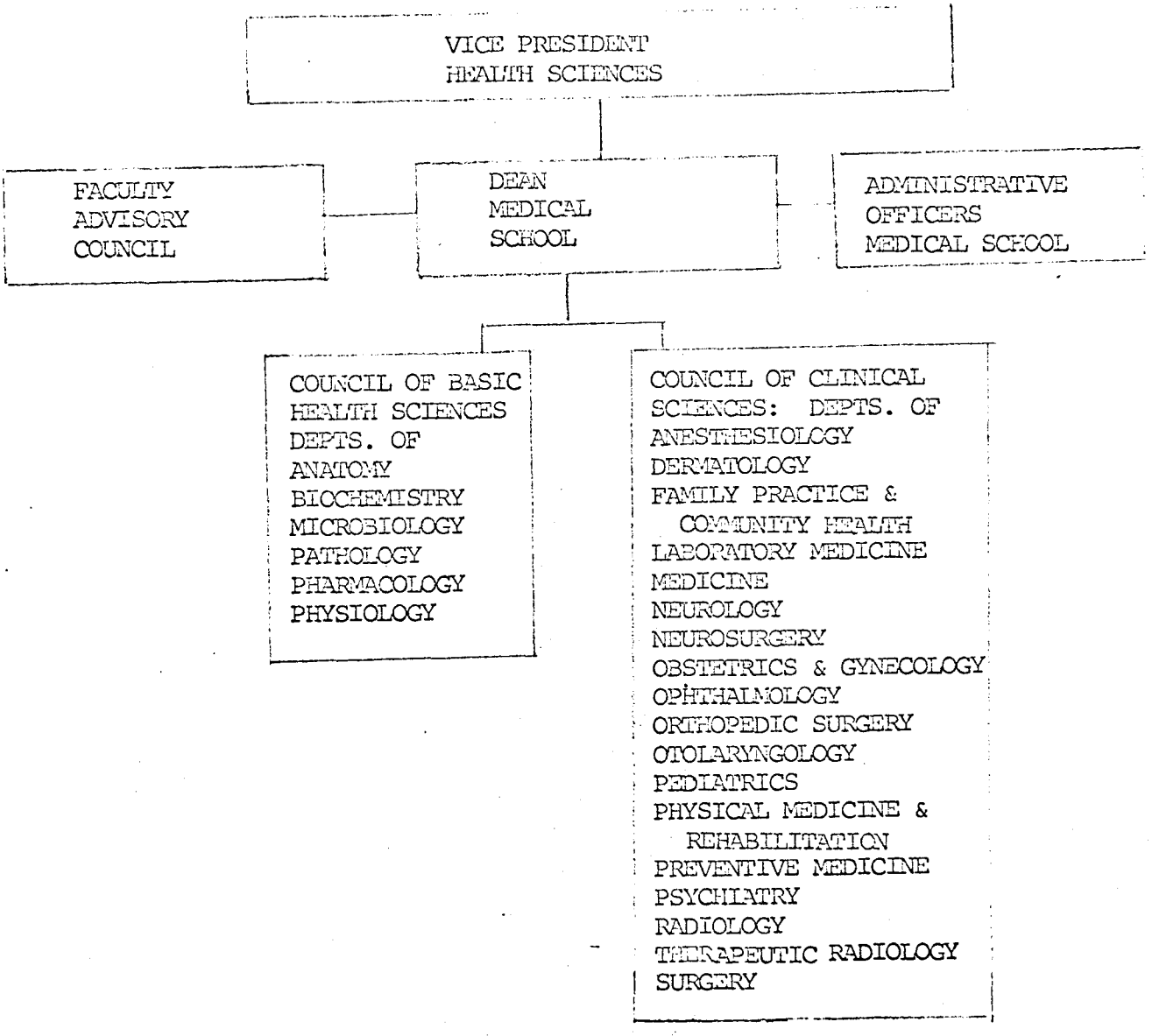
Research at the University of Minnesota has focused primarily upon inquiry into basic biological phenomena and applied clinical reasearch. These endeavors have also included investigation into medical education and the social influences upon health education and health care delivery.

The University's concept of service has been expanded by the faculty and students of the Medical School by their example of health care in the community, by their consultation services to the physicians of the State and region, by their provision of health care to the indigent of the State and the Metropolitan area, by their participation in Community-Medical related projects, and by their encouragement of the health care team concept.

MEDICAL SCHOOL ORGANIZATION

Along with the other Health Sciences Units, the Medical School recently has been included in a reorganization of these units into the Health Sciences Center. See GENERAL NARRATIVE, Health Sciences Organization.

Presently, the Medical School is headed administratively by an Associate Dean of the School who has been designated as Executive Officer of the School. The Associate Dean is aided by three assistant deans with responsibilities in the areas of student affairs and planning. The Faculty Advisory council, an elected committee of the Executive Faculty of the Medical School, advises the Executive Officer in matters of policy for the Medical School.



MEDICAL SCHOOL COMMITTEES

Administrative Board of the Medical School

It shall be responsible for overseeing the administration of the policies of the Executive Faculty relating to educational matters and shall be advisory to the Dean with respect to budgetary and other aspects of the administration of the Medical School. In particular, the Dean will discuss with the Administrative Board all aspects of the preparation of the annual budget, including policies governing the allocation of funds for salary increases and general policies concerning the allocation and expenditure of the various resources of the Medical School not designated for specific purposes.

Faculty Advisory Council of the Medical School

In recognition of the need of the Dean for a small, responsible group of advisors who can meet with him frequently, regularly, and on short notice when necessary, there shall be a Faculty Advisory Council that shall include members elected by the Executive Faculty. On policy matters the Faculty Advisory Council shall, through the Dean, make recommendations to the Administrative Board and/or the Executive Faculty, as may be appropriate. It shall take definitive action only with respect to such matters for which responsibility has been delegated to it by the Administrative Board or Executive Faculty. Such delegated responsibilities shall be defined in the Bylaws.

Committee on Committees of the Medical School

The Committee on Committees shall review the scope of the various standing Committees of the Executive Faculty. It shall, after consultation with the Dean, recommend for the consideration of the Executive Faculty at the October meeting each year a slate of candidates for election to each of the various other standing committees of the Executive Faculty. The Committee on Committees shall make a report concerning its activities to the Executive Faculty at least once each year.

Educational Policy Committee of the Medical School

The Committee on Educational Policy shall be responsible for continuing review and evaluation of the undergraduate and graduate educational programs of the Medical School and for making appropriate recommendations to the Executive Faculty for additions to or modifications of the educational programs of the Medical School. It shall make a report concerning its activities to the Executive Faculty at least once each year. Recommendations reported to the Executive Faculty for action shall be subject to prior consideration by the Administrative Board as described in Section D of the Bylaws of the Medical School.

Medical School Admissions Committee

The Medical School Admissions Committee shall be responsible for the selection each year of the students who will carry out studies toward the degree Doctor of Medicine.

Faculty Academic Promotions Committee of the Medical School

Review of recommendations for faculty promotion made by the various Medical School Departments to the Dean's office; notification to the Dean of the Medical School of the Committee's recommendation concerning each proposed promotion; general advice to the Dean of the Medical School concerning policies and procedures for Medical School faculty academic promotions, in accord with the Academic Promotion Policy of the College of Medical Sciences adopted by the General Faculty of the College on November 7, 1968. (The Medical School Committee elects a Chairman each year from among its members; Dr. James Dawson was elected Chairman for 1969).

Committee on Student Scholastic Standing of the Medical School

This Committee will consider the cases of students doing unsatisfactory Medical School work at the end of each academic quarter and recommend appropriate disposition of each case. Acting for the Executive Faculty, it shall be responsible for recommending to the Dean those students eligible for advancement and those students eligible for graduation with the degree Doctor of Medicine. Policy matters not satisfactorily resolved by the usual procedures of the Committee will be referred for final determination to the Executive Faculty as a whole, which shall hold a special meeting for this purpose at the request of the Committee. In any event, the Committee on Student Scholastic Standing will report on its activities to the Executive Faculty at least once each year.

Internship Advisory Committee for the Medical School

Development of policies concerning advising medical students concerning selection of internships; implementation of such policies.

Ad hoc Committee to Consider Special Programs in Medical Education Programs for Disadvantaged Students

Study of the present and future roles of the Medical School in education of students from disadvantaged minority groups, especially Negroes and Indians, in accordance with action of the Exectutive Faculty on October 15, 1968; proposal of possible special programs in this area to be presented in Spring 1969 to the Executive Faculty of the Medical School as well as other appropriate Medical School bodies.

SERVICES FROM OTHER ACADEMIC UNITS

The University of Minnesota Medical School is fortunate in its location in a large academic community to be able to obtain services from other University components or academic institutions.

The University Hospitals provide the clinical laboratories for the education of the medical student. This major component of the College of Medical Sciences is devoted primarily to the education of the Health Sciences students and provides a milieu in which excellent health care may be learned. Its many programs and services, administrators and staff, contribute greatly to the educational endeavors of the Medical School.

The School of Public Health provides instruction to the Medical School student on the principles and practices of Public Health. The relationship between the Medical School and the School of Public Health is strengthened by the Medical School's department of Public Health which consists of faculty from the School of Public Health. The Division of Biometry of the School of Public Health work closely with the departments of the Medical School in the development of various types of statistical data. In addition, faculty from the School of Public Health are working closely with several medical school departments, especially the Department of Family Practice and Community Health, in the development of viable methods for health care delivery in this region.

Faculty of the School of Dentistry contribute to the instruction of medical students in the basic science disciplines and participate in the instruction of the maxillo-facial disorders and certain aspects of cancer and genetics.

The Audio-Visual Department of the University participates in the development of electronic aids in the instruction of Medical Students.

A Physical Plants department of the University plays a predominant role in the maintenance, renovation, and construction of the physical facilities of the School. Staff from the academic areas of engineering and biophysics and the College of Biological Sciences contribute to the teaching and research endeavors of the Medical School faculty.

The faculty and staff of the Medical School will continue to use the computer services of the University main computer center, not only for data processing, but also for computer assisted instruction.

Paramedical students, including occupational therapy students, physical therapy students, medical technology students, and radiology technology students gain their general education through the College of Liberal Arts of the University of Minnesota.

Planned cultural programs for students and faculty continue to enlist the faculty from a number of academic units on the campus, including the history, politics, music, art, philosophy, and education areas.

Services including housing and eating, recreational, sports, and cultural facilities are provided for the Medical Student by the University.

The central administration of the University plays a supportive role in the administration of the Medical School by providing assistance in fiscal and personnel matters.

Part I C Organization

SERVICES RENDERED TO OTHER UNIVERSITY COMPONENTS AND INSTITUTIONS

A significant portion of the activities of the faculty of the Basic Science Departments is the instruction of health science students other than medical students. Instruction in the basic medical sciences is offered to dentistry students, pharmacy students, nursing students, occupational therapy, physical therapy, and medical technology students, mortuary science students, and certain students in the College of Liberal Arts.

The audiology section of the Department of Otolaryngology participates in the education of speech therapy students.

The Department of Psychiatry and the Division of Clinical Psychology combines its education facilities and staff with the Psychology department of the College of Liberal Arts.

Faculty of the Medical School participates strongly in the affairs of the University through membership of the Faculty-Student Senate and several key committees of that group. The administration of the Human Volunteers Review Committee of the University falls within the Medical School. Many Medical School faculty participate in this campus-wide activity.

There is a widespread participation by the student and the faculty of the Medical School in the various community health projects. These are described in a earlier section.

RELATIONSHIPS TO CLINICAL PROGRAMS

Overall curricular development and control is vested with the Education Policy Committee of the faculty. Clinical programs are developed in the various clinical departments within the guidelines established by the objectives and goals of the curriculum. The Council of Clinical Sciences and Council of Basic Sciences consider problems of the educational needs of the school within the curricular framework. The individual teaching programs, conducted in the various affiliated hospitals, also fall within purview of the appropriate hospital committees appointed by the Vice President for the Health Sciences and interrelated through a Health Sciences Coordinator for Affiliated Programs. These committees, the Joint Educational Council of the St. Paul-Ramsey Hospital, the Joint Education Advisory Committee of the Hennepin County General Hospital, and the Dean's Committee of the Veterans Administration Hospital, supervise and coordinate the educational programs within these hospitals.

ACCREDITATION

Last accreditation visit, January, 1969. See attached letter.

Proposed date for next visit, 1979.

The following statement regarding physical facilities of the school is quoted directly from the accreditation report:

"Facilities. Proposed physical expansions are clearly necessary and probably they are sufficient; they are not optimal. Responsible administrators appear to have scaled down their building plans to conform to anticipated realities of financing, rather than to actual need. When the entire building program is completed basic science departments will have 258,000 gross square * feet of space. This amount is currently recommended for new medical schools of somewhat smaller enrollment than Minnesota's. The building plans, even if entirely implemented, clearly will not eliminate the medical school's space problems."

Included in the following pages of this section is a copy of reasonable assurance which applied to the 1969 grant submission to the Health Professions Teaching Facilities Program for the Health Sciences Development Program.

* The accreditation site visitors misunderstood the appropriate square footage which should be 258,000 net square feet. ROM

LIAISON COMMITTEE ON MEDICAL EDUCATION

Council on Medical Education
American Medical Association
535 North Dearborn Street
Chicago, Illinois 60610

January 7, 1970

Executive Council
Association of American Medical Colleges
One Dupont Circle, N.W.
Washington, D.C. 20036

Malcolm Moos, Ph.D.
President
The University of Minnesota
Minneapolis, Minnesota 55455

Dear President Moos:

It is a pleasure to transmit to the University of Minnesota formally the final report of the team representing the Liaison Committee on Medical Education, which visited the University of Minnesota Medical School in January of 1969. As you know, this committee represented the Executive Council of the Association of American Medical Colleges and the Council on Medical Education of the American Medical Association. The purpose of the visit was to accredit the program in undergraduate medical education at the University of Minnesota Medical School.

The report recommends continuing accreditation of the program in undergraduate medical education at the University of Minnesota Medical School, effective the date of the survey, January 23, 1969, and continuing Institutional Membership in the Association of American Medical Colleges. The report calls attention to certain problems at the Medical School and asks that the Dean of the School submit reports dealing with these problems one and three years after the survey visit.

A copy of the report is being sent to Dr. Robert B. Howard, Dean of the Medical School. If there are any questions about this report, any of its parts, its implications or uses, I am sure that you will get in touch with this office.

The report is considered confidential. However, it is for the use of the University and the Medical School as dictated by their best judgment. Characteristically, it has not proven advantageous to release the contents of these reports to the public press.

Sincerely,

Hayden C. Nicholson

Hayden C. Nicholson, M.D.
Secretary, Liaison Committee
on Medical Education

HCN:jmz

cc: Robert B. Howard, M.D., Ph.D.
Cheves McC. Smythe, M.D.

UNIVERSITY OF Minnesota

MEDICAL SCHOOL
1305 MAYO MEMORIAL BUILDING • MINNEAPOLIS, MINNESOTA 55455

Office of the Associate Dean

October 8, 1970

Dr. Marjorie Wilson
Secretary, AAMC-AMA Liaison
Committee on Medical Education
Association of American Medical Colleges
One Dupont Circle, N.W.
Washington, D. C. 20036

Dear Doctor Wilson: Re: LCME Letter of Reasonable Assurance

Dr. Hayden Nicholson has suggested that it is appropriate to address to you, as Secretary of the AAMC-AMA Liaison Committee on Medical Education (LCME), this request for a current updated "letter of reasonable assurance" from the LCME.

The University of Minnesota Medical School received and used such a document from the LCME as necessary evidence presented with the University's application in 1969 to the Bureau of Health Professions Education and Manpower Training, National Institutes of Health, for funding of educational facilities construction under the Health Professions Education Act of 1968. A copy of that letter of assurance from LCME, dated July 8, 1969, is enclosed.

The University of Minnesota is now submitting a second application to NIH for funds to finance the next step of this major long-range program for construction of health educational facilities, including Medical School facilities. A current "letter of assurance" from the LCME should be included with that application and available to the appropriate NIH officials prior to the coming NIH site visit, scheduled for December 3, 1970, concerning this current request for federal funding of the Minnesota Health Sciences Development Program. The application for this step in the program, identified as Buildings B and C, will be submitted by the University of Minnesota to NIH by November 1. The proposed construction program will permit expansion of the first-year enrollment in the Medical School from its base of 163 to approximately 220 by 1977. These projections are exclusive of our present participation in the Physicians Augmentation Program under a Special Project Grant from the NIH.

The LCME conducted a regular decennial accreditation survey of the University of Minnesota Medical School on January 20-23, 1969. Dr. C. Arden Miller, Vice-Chancellor for Health Sciences at the University of North Carolina, was chairman of the LCME survey team at that time. On January 7, 1970, Dr. Hayden C. Nicholson reported to President Malcolm Moos the recommendation of the LCME for continuing accreditation of the undergraduate medical education program of the University of Minnesota Medical School. A copy of Dr. Nicholson's letter of January 7 is enclosed. In accordance with a recommendation of the LCME, a progress report, dated March 4, 1970, was sent

to Dr. Nicholson by Dr. Robert B. Howard, then Dean of the College of Medical Sciences (copy enclosed).

I would appreciate receiving a copy of the updated letter of reasonable assurance, preferably by November 1, 1970. Please call me if you have any questions or need further information on this matter. Thank you for your assistance.

Sincerely yours,

H. Mead Cavert

H. Mead Cavert, M.D.
Associate Dean

HMC/rk
Encls.
cc: Dr. Lyle French
Dr. Hayden Nicholson, AMA

LIAISON COMMITTEE ON MEDICAL EDUCATION

Council on Medical Education
American Medical Association
535 North Dearborn Street
Chicago, Illinois 60610

December 4, 1969

Executive Council
Association of American Medical Colleges
2530 Ridge Avenue
Evanston, Illinois 60201

Harry W. Bruce, Jr., D.D.S.
Director, Division of Educational
and Research Facilities
Department of Health, Education
and Welfare
National Institutes of Health
Bethesda, Maryland 20014

Dear Dr. Bruce:

Last July there was forwarded to you a letter from the Liaison Committee on Medical Education indicating that in the opinion of the Committee, the plans of the University of Minnesota Medical School to increase the size of its entering class from 160 to 200 students did not endanger the accreditation of the institution.

The Committee has now been informed that the University of Minnesota Medical School contemplates increasing the size of its entering class to approximately 220 students rather than the 200 previously envisioned. The Liaison Committee has considered this matter and has voted that there be forwarded to you a letter indicating that there is reasonable assurance that this further increase in class size does not endanger the accreditation of the University of Minnesota Medical School.

Very sincerely yours,

Hayden C. Nicholson

Hayden C. Nicholson, M.D.
Secretary, Liaison Committee
on Medical Education

HCN:jmz

cc: Mr. Theodore Lorenzen
Dr. Cheves McC. Smythe
Dr. Frank McKee

THE MEDICAL SCHOOL CURRICULUM

At the end of 1968 the Executive Faculty of the Medical School approved a new curriculum, implemented September, 1969. This approval followed several years of intensive planning by faculty and students under the auspices of the Educational Policy Committee of the Executive faculty.

Because of the explosion in medical knowledge, the public demand for better medical care, the changes in postgraduate training which dictate that all physicians specialize, and the importance of developing student attitudes which are conducive to the improvement of the medical profession and of health care delivery, the Educational Policy Committee formulated certain goals to be satisfied in the new curriculum.

Goal of FLEXIBILITY

To achieve this goal, a three-fold approach has been incorporated: 1) the curriculum will consist of a core of basic medical and clinical science knowledge constituting a part of the medical education of all physicians. It will be followed by continued study and training along "tracks" planned by the student and his advisor from elective offerings related to the student's individual interest; 2) elective courses will be taken concurrently with the later quarters of the core curriculum; 3) selected students will be given the option of completing medical school in three calendar years.

Goal of STUDENT AS LEARNER

To achieve this goal, provision has been made for the student to involve himself early in his student career by selecting certain experiences, such as those relating to the early introduction to the patient, on an optional basis. Later, in Phase B he must not only select a certain minimum number of elective offerings but must to a great extent plan and structure his day to maximize his opportunities for studying and learning. In Phase D, the student must select and develop a program within a track.

In order to augment the development of this goal, particular attention will be paid to newer methods of instruction, including the use of appropriate self-learning devices and audio-visual and TV instructional methods. The student will be encouraged to utilize appropriate print and non-print educational material and aids in a Learning Center environment.

Goal of RELEVANCE

Relevance (a traceable, significant logical connection) of the medical education to the ultimate goal of patient care will be dramatized in the experiences in the introduction to the patient

where clinical problems in a variety of settings will be shown to students from the very start of their medical education. Relevance and importance of the basic medical sciences to clinical medicine will be built into the basic clinical correlations used as examples in Phase A, in interdisciplinary teaching sections in Phase B, and by including basic science electives in Phase D.

Goal of IMPROVED COMMUNICATION AMONG FACULTY AND BETWEEN FACULTY AND STUDENT

The most powerful mechanism for bringing the faculty together and improving communication between individuals with similar interest in several departments will be the teaching section method of curriculum planning and presentation in Phase B. The establishment of an effective advisor system will help to bridge the gap between student and faculty.

Goal of PREPARATION FOR THE FUTURE OF MEDICAL PRACTICE

The revolutionary social changes in the world together with the rapid advance in science and technology make it impossible to predict the nature of medical practice in the future. The curriculum will develop in our students the desire for continuing education so that they may be prepared to administer contemporary health care.

Goal of HUMANISM IN MEDICAL PRACTICE

To this end the student will be exposed early to man and will develop an understanding of his inner psychological workings and his relationship to society. This involves early exposure to the behavioral sciences and early exposure to patients in a setting which places emphasis on an understanding of their human problems.

GENERAL DESCRIPTION OF THE CURRICULUM

The curriculum for the Doctor of Medicine degree is to be organized into a core program for all students composed of a Phase A of 3 academic quarters and a Phase B of 5 academic quarters in length. On completion of this core program, the student is to begin an individualized program ("pathway" or "track") which will be 3 academic quarters or 5 academic quarters in length, depending on the span of the student's entire program. The standard curriculum for the degree of Doctor of Medicine will be 13 academic quarters, to be completed in less than 4 calendar years. Students will be considered, at their request, for completion of work for the M.D. degree in 11 academic quarters in less than 3 calendar years with the stipulation that the internship will be taken at a University of a major affiliated teaching hospital.

Phase A

Phase A is planned for three academic quarters beginning in the fall. The major emphasis of the Phase A curriculum is a presentation of a core of material in five basic medical sciences, anatomy, biochemistry, physiology, microbiology and general pathology. In addition, there will be courses titled Introudction to the Patient and Behavioral Science. The content of the quarters will be as follows:

		Hours/10 wk. qtr.
Fall --	Biochemistry	80
	Embryology	20
	Gross Anatomy (incl. introduction to Neuroanatomy)	105
	Histology	50
	Introduction to the Patient	40
	Behavorial Science	20
		315 (31.5 hrs./wk.)
Winter --	Biochemistry	60
	Embryology	20
	Gross Anatomy	105
	Histology	50
	Introduction to the Patient	40
	Behavioral Science	40
		315 (31.5 hrs./wk.)
Spring --	Introduction to the Patient	40
	Microbiology	120
	Pathology (General) - 1st five weeks	48
	Physiology	120
	Behavorial Science - last five weeks	10
		338 (34 hrs./wk.)

Since Phase A is due to be implemented in September, 1969, the necessary organization of the course schedule and curriculum is proceeding quickly. A recent report of the Phase A subcommittee outlining some specific plans for this Phase follows:

UNIVERSITY OF MINNESOTA
MEDICAL SCHOOL

Subcommittee on Phase A

Assignment to the Subcommittee

The Subcommittee on Phase A was requested to study, develop, and propose a curriculum outline for the first phase of a medical educational program in the direction and spirit broadly suggested for Phase A--Introduction to Human Biology, as derived from discussions at the fall 1967 retreat of the Medical School Executive Faculty.

Working Objectives for Development of Phase A Curriculum

1. Phase A, the first of three inter-related stages in a medical "core" curriculum, should include presentation of a core program in the anatomical sciences, human physiology, fundamental biochemistry, and basic microbiology. Ideally, a common core program presents the minimum, essential, but adequate knowledge, both factual and conceptual, necessary for initial mastery and comprehension by every medical student, regardless of his eventual future professional direction or specialty.

2. Phase A should incorporate, wherever feasible and advantageous, correlation and integration of subject matter among logically related basic disciplines.

3. Phase A, in concentrating on fundamental information and concepts of human biology, should be consolidated and abbreviated into no more than a single academic year.

4. Courses in Phase A should accomplish reduction or elimination of any existing unnecessary overlap or duplication in subject matter coverage.

5. The Phase A curriculum should be planned in a manner to encourage and generate coordination and communication between basic medical sciences and relevant clinical fields.

6. Phase A should contribute in any effective, feasible way toward significant reduction in the total time span of medical education.

7. Early in the Phase A curriculum, future physicians should be introduced to and involved meaningfully with people having medical problems which can be effectively correlated with students' current learning in basic medical sciences. "He (the student) needs to be active in his area of concern and future responsibility, namely, in the care of people" (Cope, Oliver. Man, Mind, and Medicine, 1968).

8. In Phase A, medical students must be provided a broader and more thorough introduction to the relevant subject matter and tools of behavioral disciplines, in order that they might have a more solid, relevant foundation for future dealing with personal, social, cultural, and economic aspects of patient problems.

Note: The above statements express only certain specific objectives basic

to the subcommittee's development of the Phase A segment of the curriculum. Assumed but not stated explicitly here are other, more general and inclusive objectives for the entire medical educational program.

Implementation of Objectives in Proposed Phase A Curriculum

1. There has been a careful selectivity exercised in weighing and pruning subject matter to be presented in Phase A core, not merely a redistribution and reduction of total credits and clock hours assigned.

2. Three major anatomical sciences -- gross anatomy, embryology, and histology -- have been placed in direct relation to each other toward facilitation of effective and more complete integration of their common subject matter. Basic neurological sciences have also been closely correlated and interdigitated. Biochemistry and physiology have moved toward greater complimentarily of topics in their curriculum.

3. Core physiology and microbiology, at least the basic introductory aspects, have been transferred forward from the second year into Phase A core. Corresponsingly, it is assumed that certain aspects of basic science material will be included in the integrated systemic courses and topics of Phase B.

4. A major block of time, one half day weekly, has been designated for presentation of a new challenging program on "Introduction to Clinical Medicine and the Patient", intended to involve the embryonic physician in his own synthesis and correlation of basic sciences with clinical applications and in direct, personal confrontation with human illness and patient care.

5. Provision has been made for a substantial expansion of student attention to pertinent areas of behavioral disciplines as they contribute to and find application in medicine.

6. All proposed courses in Phase A are structured to present a major impact and to require extensive student commitment. Formerly minor allocations of teaching time (as isolated one-credit courses) have been incorporated into larger, major course programs.

PHASE A

Fall

Hour	Monday	Tuesday		Wednesday	Thursday		Friday	Saturday
I		Histology		Behav Science	Histology			Introduct
II		Histo	Bio-	Behav Sci Gr	Bio-	Histo		to
III		Lab	chem		chem	Lab		Clinical
IV	Biochem	A	Lab B	Biochem	Lab A	B	Biochem	Medicine
V								
VI	Gross Anat	Embryology		Gross Anat	Embryology		Gross Anat	
VII	Gross	Biochem		Gross	Biochem		Gross	
VIII	Anat			Anat			Anat	
IX	Lab			Lab			Lab	

Hours in class = 31.5
Free time = 13.5 - 44

PHASE A

Winter

Hour	Monday	Tuesday		Wednesday	Thursday		Friday	Saturday
I		Histology		Behav Science	Histology		Behav Science	Introduction
II		Histo	Bio-	Behav Sci Gr	Bio-	Histo	Behav Sci Gr	to
III		Lab	chem		chem	Lab		Clinical
IV	Biochem	A	Lab B	Biochem	Lab A	B	Biochem	Medicine
V								
[illegible]	Gross Anat	Embryology		Gross Anat	Embryology		Gross Anat	
VII	Gross			Gross			Gross	
VIII	Anat			Anat			Anat	
IX	Lab			Lab			Lab	

Hours in class = 31.5
Free time = 13.5 -44

PHASE A

Spring

Hour	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday
I	Physiol		Physiol		Physiol		Physiol		Physiol		Physiol
II	Microbiol		Microbiol		Microbiol		Microbiol		Microbiol		Introduction
III	Micro-		Path*		Path*	Micro	Path*		Microbiol		to
IV	biol		Phys		Lab	biol		Phys			Clinical
V	A		Lab		A	Lab B		Lab			Medicine
	Path*		A		Microbiol			B	Path*		
VII	Path*	Micro-	Phys		Micro-	Path*		Phys		Path*	
VIII	Lab	biol	Lab		biol	Lab		Lab		Lab	
IX	A	Lab B	A		Lab A	B		B		B	

Ave. hours in class = 34
Free time = 10 - 44

* No pathology or lab last 5 weeks (Last 5 weeks scheduled by neuropsychiatry for 2 hours on Friday p.m. for clinical demonstrations).

Phase B

Phase B is being taught in five academic quarters beginning in the summer. The first quarter of Phase B program was completed in summer, 1970. The Phase B curriculum consists of core material related to organs, systems and topics organized and presented by interdepartmental sections with emphasis on pathophysiology and general and basic concepts. An outline of the course content in the 5 quarters, with hours assigned to core time, is as follows. (see pages 1 & 2) Within Phase B, the student will study the behavior of man, will learn about the approach to clinical problem solving and begin to perfect his clinical skills on hospital and clinic patients in the setting of a tutorial. He will choose elective work which fits his developing interests or to fill gaps in knowledge.

Quarter	Sections	Approximate Hours
Summer (B_1)	Student as Physician	17
	Laboratory Medicine	16
	Total Care	16
	Tutorial	54
	Discussion	2
	Man in His Community	16
	Basic Pharmacology	29
	Behavior of Man (Interview Technique)	10
	TOTAL	160
	% available time scheduled =	44%
Fall (B_2) & Winter (B_3)	Cardiovascular	22
	Respiratory	22
	Blood I (Fluids, electrolytes)	32
	Renal	25
	Endocrine Metabolic	45
	Reproduction	33
	ENT	19
	Eye	15
	Skin	17
	Blood II	22
	Behavior of Man	50
	Student as Physician	130
	Man in His Community	17
	Electives	46
	TOTAL	495
	% available time scheduled =	51%

Quarter	Sections	Approximate Hours
Spring (B_4) & Summer (B_5)	Nervous System	86
	Gut	35
	Bones, Connective Tissue	39
	Man in His Community	17
	Student as Physician	131
	Elective	46
	TOTAL	354
	% available time scheduled =	86%

The course numbers of these presentations are as follows:

InMD 5-201	Student as Physician	InMD 5-221	Respiratory
InMD 5-202	" "	InMD 5-222	Blood I
InMD 5-203	" "	InMD 5-223	Kidney and Urinary Tract
InMD 5-204	" "	InMD 5-224	Endocrine
InMD 5-205	" "	InMD 5-225	Reproduction
InMD 5-206	Man in His Community	InMD 5-226	Blood II
InMD 5-207	" "	InMD 5-227	Skin
InMD 5-208	" "	InMD 5-228	Ear, Nose & Throat
InMD 5-209	" "	InMD 5-229	Eye
InMD 5-210	" "	InMD 5-230	Nervous System & Muscle Disorder
InMD 5-211	Behavior of Man	InMD 5-231	Gut
InMD 5-212	" "	InMD 5-232	Bones, Connective Tissue and Joints
InMD 5-213	Pharmacology		
InMD 5-221	Cardiovascular		

The following paragraphs summarize the chief features of selected courses within Phase B.

Student as Physician

There is a concentration of lectures and didactic work in the first quarter designed to provide an introduction to the approach to the patient, history taking, and physical diagnosis. In the following four quarters (B_2, B_3, B_4, B_5) the student is assigned at least one patient per week. Of the 6 hours assigned each week to this course, 3 will be for patient workup and 3 for tutorial. Students are tutored in groups of two and are assigned to a primary tutor. The primary tutor is responsible for seeing that appropriate patients are assigned, to emphasize the clinical core material which is being presented at that point. The tutor checks the student's histories and physicals, discusses the patient, the workup and the approach, assigns reading and in general supervises the student's involvement in this clinical

setting to maximize the potential for learning and for professonal development. The tutor can call upon a panel of associate tutors, specialists in surgery, pediatrics, family practice, to participate by amplifying discussions of selected cases. Within the hospital in which students will be assigned patients (University Hospitals, Veterans Administration Hospital, Hennepin County General Hospital, St. Paul-Ramsey County Hospital, Northwestern, Fairview-St. Mary's, Methodist, Mt. Sinai) staff men in radiology and pathology will be available to review laboratory studies and X-rays of the assigned patients with students. For the tutorials for the 80 student pairs in the 1970-71 year, some 200 faculty, from both fulltime and clinical faculty ranks have been assigned to participate in this program.

Within this large course which represents nearly one-third of the scheduled hours in Phase B, the student will not only learn the essential skills necessary to begin to study patients but will be guided through clinical problem solving experiences on patients of all ages, including neonatal patients and patients with various medical, surgical and obstetrical conditions. In order to provide the student with some background information to help him develop problem solving skills, a portion of core time in Phase B_1 was devoted to discussions of problem solving, theory and approach, by Mr. James Hamilton, Professor Emeritus of Hospital Administration. In Phase B_2, problem oriented medical records will be discussed by Dr. Lawrence Weed. This problem oriented approach was introduced to students in Phase B_1 and they will use all or part of it, at their option, during the tutorial portions of Phase B.

<u>Cardiovascular and Respiratory and Other Organ Systems</u> These systems are to be studies during the first quarter of Phase B and include a series of lecutures over approximately a one month period.

To study and prepare himself in each of the topics covered and on the Cardiovascular section in general, the student is expected to review the appropriate basic medical science subjects (in this instance anatomy

and physiology) and to consult textbook and selected references for material on pathology, pathophysiology and clinical medicine. He is expected to study slides, museum specimens and other material in pathology. Faculty instructors are available, on schedule as needs dictate, in pathology laboratories and clinical areas. The student is encouraged to consult the learning center for additional material to aid him in his studies.

The class time during the week is divided into core time required activities, constituting about 50% of available time, (this includes some elective offerings (see below)) and free time, during which there is scheduled a wide variety of activities designed to assist the student in his study, comprehension and mastery of the core material. The schedule of free time activities, available to students on a sign-up basis for one week during the presentation of the Cardiovascular and Respiratory organ system material is listed below. Scheduling has been arranged so that students must make choices among several free time opportunities.

Monday

10-12 Respiratory - Pathology Clinical Demonstration
10-12 Anesthesia Demonstration - Operating Room
10-12 Demonstration, Heart Lund - Pharmacology Lab
1- 2 Pulmonary Radiology
1- 2 Visit Pulmonary Function Lab
2- 3 Movie -"Congestive Failure in Infants"

Tuesday

10-12 Combined Conference - Cardiovascular - Respiratory
1- 3 Respiratory Physiology Demonstration
2- 3 Pathology Demonstration - Atherosclerosis
3- 4 Movie - "Congestive Failure"
3- 5 Pathology Lab

Wednesday

1- 3 Respiratory - Physiology Demonstration
1- 3 EKG Lab
3- 4 Pneumothorax and Post Op Lab
3- 5 Pathology Lab
4- 5 X-ray Demonstration

Thursday

10-12 Respiratory Anatomy - Radiology Demonstration
1-12 Resuscitation Demonstration

1- 2 Visit Respiratory Care Unit
1- 3 EKG Lab
2- 4 Pharmacology Demonstration
4- 5 X-ray Demonstration

Friday

10-12 Anesthesiology Demonstration
10-12 Respiratory - Anatomy Radiology Demonstration
11-12 Cardiac CPC
1- 2 Pediatrics Respiratory Care Unit

Saturday

10-12 Quiz - Discussion

(Basic Medical Science - Clinical Science Seminar) Each of the teaching sections has been assigned two hours for a seminar to highlight a problem with important basic and clinical science ramifications. An example of such a seminar in the cardiovascular section might be endocarditis. With a group of 15, a microbiologist (or pathologist) and an internist (or pediatrician) would lead the discussion (of this prepared group of students). The range of subjects might be from rheumatic to pneumococcal, basic and clinical. The objective would be to stimulate, to involve, to tie together, with no attempt to cover.

Blood I This section includes presentations on body water, electrolytes and osmotic relationships, plasma proteins, immunoglobulins and acid base balance, among others.

Man in His Community This section is designed to achieve the following goals:

Knowledge - of the community, of relevant contemporary health related issues, of some aspects of the health care system including medical economics, health and health related information of community resources related to health and of the doctor's role as a physician.

Skills - In problem solving, in working with providers of health care in human relations, in communication and in participation in groups.

Attitudes - Related to comfort in changing situations and toward continuation education.

The core time in Man in His Community is planned to highlight aspects of these course objectives. The free time activities of this course are centered in optional discussion groups, each led by an experienced group leader. As each student pursues the course objectives at this own pace, he will be drawn to a catalog of "experiences," a collection of contacts of individuals or agencies which are related to Community Health problems. After developing his knowledge, awareness and skills in relation to the study and/or participation in a given experience, the student then turns to the discussion group to present his findings. This setting furnishes the opportunity for group participation and reaction, free discussion of attitudes, development of potential solutions to problems and the opportunity for the broadest possible approach to subject matter traditionally given in courses in public health. Subjects and topics of general interest to group discussants, such as those in biometry, epidemiology, and health care systems, will be presented during the course, in relation to need as the year's work progresses.

Electives In the B_2 through B_5 quarters each student will select some elective work, a minimum of four and a maximum of eight offerings. Electives have been developed by interdisciplinary teaching sections, by departments and divisions and by interested faculty. The list of electives for B_2 through B_5 quarters is as follows.

Electives (in Phase B)

Fall (B_2)	InMD 5-240	First Aid (also W, S, Su)*
	InMD 5-241	History of Medicine
	InMD 5-245	Drug Abuse
	InMD 5-252	Office Psychotherapy (also Su)
*W-Winter	InMD 5-254	Psychopharmacology for Office (also S)
S-Spring	InMD 5-255	Toxicology
Su-Summer	InMD 5-260	Lab. and Theory Hormone Assays
	InMD 5-264	Allergy
	InMD 5-265	Chronobiology (also W, S, Su)
	InMD 5-266	Computers (also W, S, Su)
Winter (B_3)	InMD 5-242	Legal, Ethical, Philosoph. Issues in Medicine
	InMD 5-247	Human Sex
	InMD 5-248	Medical Aspects of Sex
	InMD 5-257	Mechanism of Hormone Action
	InMD 5-262	Tropical Medicine
	InMD 5-267	Cancer Seminar

Spring (B_4)	InMD 5-244	Medical Education
	InMD 5-250	Population Control
	InMD 5-251	Psychosomatic Medicine (also S)
	InMD 5-253	Psychological Testing
	InMD 5-258	Management Diabetic Patient (also W,S, Su)
	InMD 5-268	Genetics
	InMD 5-269	Handicapped
Summer (B_5)	InMD 5-243	Forensic Pathology
	InMD 5-246	Leadership
	InMD 5-256	Dentistry
	InMD 5-259	Nutrition
	InMD 5-261	Biochemistry
	InMD 5-263	Immunobiology
	InMD 5-270	Laboratory Medicine

Blood II This section is what has been called hematology in the past and will include material on red cells, leukocytes, lymph nodes and spleen and aspects of immunobiology.

Neurological Sciences This teaching section includes most of neuroanatomy, approximately one half of the total curriculum time alloted to neurophysiology (the other half being in core physiology in Phase A) as well as the clinical neurological sciences core material, including neurology, neurosurgery and neuropathology.

Following completion of Phase B, the students will take the part I Examination of the National Board of Medical Examiners.

On the B_4 and B_5 quarters (spring and summer) students will be choosing advisors, planning the elective program for Phase D and making their own decision as to the 3 or 4 year optional curriculum for the M.D. degree. The decision to complete work in 11 quarters will necessitate prompt attention to internship application planning during the fall quarter.

Phase C

The Phase C Subcommittee after due deliberation, and following consultation with the Phase D Subcommittee, evolved a two-quarter segment that would include a core, of approximately one quarter, during which the student would be introduced to the special aspects of history taking, physical diagnosis and overall introduction to surgical patients, including all of the specialties plus Obstetrics and Gynecology.

Meanwhile, proceeding independently, Phase B Subcommittee decided that clinical problem solving both for hospitalized and ambulatory patients should be an integral part of Student as Physician. This section was to place a strong emphasis on tutorial work, specifically directed reading, and scholarly analysis of the role of laboratory diagnostic procedures, including radiological approaches to biological problem solving. They anticipated that the student would have an opportunity for studying in detail approximately sixty patients on various clinical services. Indeed, they propose that this represents, essentially, core clinical introductory material. It is concluded by the Educational Policy Committee that this continuum in B will suitably replace the intent of the Phase C Subcommittee introductory quarter. Therefore, Phase C as re-constituted will be utilized for other educational purposes. In regular 3 year and 4 year programs where all five quarters of Phase B are taken without interruption, only symbols B and D will be used. In special programs almost all of which will of necessity be the 4 year type, the symbols C_1 and C_2 may be used to represent quarters which are not fully elective (D) nor completely identical with a quarter in Phase B.

Phase C

The Phase C Subcommittee after due deliberation, and following consultation with the Phase D Subcommittee, evolved a two-quarter segment that would include a core, of approximately one quarter, during which the student would be introduced to the special aspects of history taking, physical diagnosis and overall introduction to surgical patients, including all of the specialties plus Obstetrics and Gynecology.

Meanwhile, proceeding independently, Phase B Subcommittee decided that clinical problem solving both for hospitalized and ambulatory patients should be an integral part of Student as Physician. This section was to place a strong emphasis on tutorial work, specifically directed reading, and scholarly analysis of the role of laboratory diagnostic procedures, including radiological approaches to biological problem solving. They anticipated that the student would have an opportunity for studying in detail approximately sixty patients on various clinical services. Indeed, they propose that this represents, essentially, core clinical introductory material. It is concluded by the Educational Policy Committee that this continuum in B will suitably replace the intent of the Phase C Subcommittee introductory quarter. Therefore, Phase C as re-constituted will be utilized for other educational purposes. In regular 3 year and 4 year programs where all five quarters of Phase B are taken without interruption, only symbols B and D will be used. In special programs, almost all of which will of necessity be the 4 year type, the symbols C_1 and C_2 may be used to represent quarters which are not fully elective (D) nor completely identical with a quarter in Phase B.

Phase D

In Phase D, the student, with the help of his advisor, will embark on an elective program of study in one of six career pathways. These pathways are the following:

1) Medicine, Pediatrics and Medical Specialties
2) Surgery and Surgical Specialties including Obstetrics and Gynecology
3) Psychiatry and Behavioral Sciences
4) Neurological Sciences
5) Family Medicine, Family Practice and Community Health
6) Medical Science

None of the pathways will contain mandatory requirements but each student will be urged to include at least twelve credits of basic science subjects in his program. The opportunity to return to basic science subjects after some exposure to clinical medicine is one of the attractive features of Phase D.

The length of Phase D will vary depending upon whether the student is on a three-year or a four-year plan. In the three-year plan, there will be three quarters of Phase D and either four or five quarters of D will be included in the four-year program.

A thesis on a research subject or defense of some proposition in the area of specialty will be a part of the requirement for completion of Phase D for each student.

Each pathway will be under the supervision of a review committee made up of the faculty involved in the pathway and including at least one member of a basic science faculty in each committee. The committees, which will also have representation from the student body and from the junior faculty, will be appointed by the Educational Policy Committee and will have the responsibility of reviewing and approving each student's program on the specific pathway.

Example of a four-quarter program for a student in the Medicine, Pediatrics, and Medical Specialties track, with an interest in cardiovascular medicine is the following: sub-internship in Medicine - 12 weeks; Pharmacology and Physiology - 12 weeks: Clinical Cardiology and Electrocardiography - 12 weeks; Diagnostic Radiology (Cardiovascular) - 6 weeks; Cardiovascular and Special Pathology - 6 weeks.

An exemplary program for a student embarked upon the three-year curriculum in a Medicine, Pediatric and Medical Specialty pathway may be the following: Medical Clerkship - 6 weeks; Pediatrics Clerkship - 6 weeks; Psychiatry and Neurology Clerkship - 6 weeks; General Surgical Clerkship - 6 weeks; Biochemistry and Physiology - 12 weeks.

Phase D

In Phase D, the student, with the help of his advisor, will embark on an elective program of study in one of six career pathways. These pathways are the following

1) Medicine, Pediatrics and Medical Specialties
2) Surgery and Surgical Specialties including Obstetrics and Gynecology
3) Psychiatry and Behavioral Sciences
4) Neurological Sciences
5) Family Medicine, Family Practice and Community Health
6) Medical Science

None of the pathways will contain mandatory requirements but each student will be urged to include at least twelve credits of basic science subjects in his program. The opportunity to return to basic science subjects after some exposure to clinical medicine is one of the attractive features of Phase D.

The length of Phase D will vary depending upon whether the student is on a three-year or a four-year plan. In the three-year plan, there will be three quarters of Phase D and either four or five quarters of D will be included in the four-year program.

A thesis on a research subject or defense of some proposition in the area of specialty will be a part of the requirement for completion of Phase D for each student.

Each pathway will be under the supervision of a review committee made up of the faculty involved in the pathway and including at least one member of a basic science faculty in each committee. The committees, which will

also have representation from the student body and from the junior faculty, will be appointed by the Educational Policy Committee and will have the responsibility of reviewing and approving each student's program on the specific pathway.

Example of a four-quarter program for a student in the Medicine, Pediatrics, and Medical Specialties track, with an interest in cardiovascular medicine is the following: sub-internship in Medicine - 12 weeks; Pharmacology and Physiology - 12 weeks; Clinical Cardiology and Electrocardiography - 12 weeks; Diagnostic Radiology (Cardiovascular) - 6 weeks; Cardiovascular and Special Pathology - 6 weeks.

An exemplary program for a student embarked upon the three-year curriculum in a Medicine, Pediatric and Medical Specialty pathway may be the following: Medical Clerkship - 6 weeks; Pediatrics Clerkship - 6 weeks; Psychiatry and Neurology Clerkship - 6 weeks; General Surgical Clerkship - 6 weeks; Biochemistry and Physiology - 12 weeks.

PHASE D

The present senior year is a prototype of the type of courses which will be offered in Phase D. A special course list outlining the breadth of the elective courses, chosen by the student and his advisor follows:

Department	Course Number	Course Title	Minimum Block Time Weeks
ANATOMY	Anat. 5-190	Advanced Anatomy	12
ANESTHESIOLOGY	Anes. 5-169	Research	6
	Anes. 5-181	Externship in Clinical Practice of Anesthesiology	3
	Anes. 5-182	Externship in Anesthesiology & Respiratory Problems (prereq. 5-181)	3
BIOCHEMISTRY	MdBc 8-200	Seminar	--
	MdBc 8-300	Research	12
	MdBc 8-206	Endocrinology and Steroid Chemistry	--
	MdBc 8-210	Metabolic Enzymology	--
	MdBc 8-211	Nucleic Acid Structure & Function	--
DERMATOLOGY	Derm. 5-182	Clinical Probelms in Derm.	3
	Derm. 5-183	Advanced Course in Derm.	3
FAMILY PRACTICE & COMMUNITY HEALTH	FPCH 5-500	Externship in Clinical Practice	6
HISTORY OF MEDICINE	HMed. 5-400	History of Medicine	--
	HMed. 5-401	History of Medicine	--
	HMed. 5-402	History of Medicine	--
	HMed. 5-410	Seminar	--

Department	Course Number	Course Title	Minimum Block Time Weeks
HISTORY OF MEDICINE (Con't.)	HMed. 5-411	Seminar	--
	HMed. 5-412	Seminar	--
LABORATORY MEDICINE	LMed 5-181	Laboratory and Clinical Hematology	6
	LMed 5-182	Medical Genetics	6
	LMed 5-183	Clinical and Laboratory Immunology	6
	LMed 5-184	Immunohematology in Blood Banking	3
	LMed 5-185	Laboratory Problems in Blood Coagulation	3
	LMed 5-186	Clinical Pathology Externship - HCGH	6
	LMed 5-187	Clinical Pathology Externship - Mt. Sinai	6
	LMed 5-188	Clinical Pathology Externship - Methodist Hospital	6
	LMed 5-189	Clinical Blood Bank Immunology	6
	LMed 5-190	Computer Applications in Laboratory Medicine	3
	LMed 5-191	General Clinical Microbiology	3 or 6
	LMed 5-192	Antibiotic Teaching Unit	3
	LMed 5-193	Clinical Pathology Externship at Hibbing General Hospital	3
	LMed 5-765	Hematology - blood and blood forming organs (Lecture series)	--
	LMed 5-766	Hematology - blood and bone marrow diagnosis (lecture series, pre req. LMed 5-765)	--
MEDICINE	Med 5-501	Medical Oncology Externship in Medicine at Univ. Hosp.	6
	Med 5-502	Medical Externship at V.A. Hospital	6

Department	Course Number	Course Title	Minimum Block Time Weeks
MEDICINE (con't.)	Med. 5-503	Medical Externship at St. Paul Ramsey	6
	Med. 5-504	Medical Externship at Northwestern	6
	Med. 5-505	Medicine Externship at Mt. Sinai	6
	Med. 5-511	Research in Gastroenterology at University Hospital	Arr.
	Med. 5-512	Research Topics in Hematology at University Hospital	12
	Med. 5-521	Problems in Clinical Medicine at University Hospital	--
	Med. 5-522	Gastroenterology at University Hospital	6
	Med. 5-523	Metabolism and Clinical Pharmacology at Univ. Hosp.	6
	Med. 5-524	Immunology, Allergy, and Infectious Disease at University Hospital	6
	Med. 5-525	Cardiovascular Disease at University Hospital	6
	Med. 5-526	Electrocardiography at University Hospital	3
	Med. 5-527	Renal at University Hospital	3
	Med. 5-528	Clinical Hematology at University Hospital	6
	Med. 5-529	Clinical Hematology (Abbreviated) at University Hospital	3
	Med. 5-530	Seminar in Oncology at University Hospital	--
	Med. 5-541	Trends, Methodology, and Techniques in the Delivery of Medical Service at St. Paul Ramsey Hospital	--
	Med. 5-542	Hematology at St. Paul-Ramsey Hospital	6

Department	Course Number	Course Title	Minimum Block Time Weeks
MEDICINE (con't.)	Med. 5-543	Cardiology at St. Paul-Ramsey Hospital	6
	Med. 5-544	Pulmonary Disease at St. Paul-Ramsey Hospital	6
	Med. 5-551	Cardiology (EKG) at V.A. Hospital	6
	Med. 5-552	Clinical Hematology at V.A. Hospital	6
	Med. 5-553	Pulmonary Disease at V.A. Hospital	6
	Med. 5-554	Fluid, Electrolyte and Acid-Base Metabolism at V.A. Hospital	6
	Med. 5-555	Electrocardiography - V.A.H.	6
	Med. 5-561	Cardiology Service at Hennepin County General Hospital	6
	Med. 5-562	Renology Service at Hennepin County General Hospital	6
	Med. 5-563	Pulmonary Disease at Hennepin County General Hospital	6
	Med. 5-571	Medical Emergency Room at St. Paul-Ramsey Hospital	6
	Med. 5-572	Ambulatory Medicine at St. Paul-Ramsey Hospital	6
	Med. 5-573	Medical Out-Patient Clinics at Hennepin County General Hospital	6
MICROBIOLOGY	MicB 5-116	Immunology	--
	MicB 5-117	Immunology Laboratory	--
	MicB 5-121	Physiology of Bacteria	--
	MicB 5-124	Biology of Viruses	--
	MicB 5-152	Special Problems	6
	MicB 8-202	Diagnostic Microbiology	--
	MicB 8-223	Bacterial Metabolism	--

Department	Course Number	Course Title	Minimum Block Time Weeks
NEUROLOGY	Neur. 5-510	Externship in Clinical Practice - U. Hospital	6
	Neur. 5-511	Externship in Clinical Practice - SPR Hospital	6
	Neur. 5-512	Externship in Clinical Practice HCG Hospital	6
	Neur. 5-513	Externship in Clinical Practice - VA Hospital	6
	Neur. 5-120	Selected Problems in Neurology	6
	Neur. 5-540	Neurochemistry (U. Hosp.)	6
	Neur. 5-541	Neurochemistry-Pediatrics Neurology (U. Hospital)	12
	Neur. 5-544	Clinical Electroencephalography (U. Hospital)	6
	Neur. 5-545	Electromyography (U. Hosp.)	6
	Neur. 5-550	Neuropathology	3
	Neur. 5-555	Clinical Neurophysiology (SPR Hospital)	12
	Neur. 5-560	Genetics (V.A. Hospital)	6
NEUROSURGERY	NSur. 5-500	Externship at Univ. Hosp.	3
	NSur. 5-510	Externship at V.A. Hospital	3
	NSur. 5-511	Externship at Hennepin County General	3
	NSur. 5-520	Neurosurgery Investigation	6
OBSTETRICS - GYNECOLOGY	Obst. 5-500	Externship in Obstetrics	6
	Obst. 5-505	Externship in Gynecology	6
	Obst. 5-510	Externship in Obstetrics & Gynecology	6
	Obst. 5-515	Obstetrics and Gynecology Externship in Clinical Pract.	3

Department	Course Number	Course Title	Minimum Block Time Weeks
OB. & GYN. (Cont.)	Obst. 5-520	Problems in Obstetrics & Gynecology	3
	Obst. 5-540	Psychiatric Aspects of Obstetrics & Gynecology	6
	Obst. 5-560	Research in Reproduction	12
OPHTHALMOLOGY	Opth. 5-180	Externship in Ophthalmology	3
	Opth. 5-190	Ophthalmology Research Problems	12
ORTHOPEDIC SURGERY	OrSu. 5-185	Externship in Orthopedic Surgery	6
	OrSu. 5-187	Externship in Orthopedic Surgery	6
	OrSu. 5-188	Externship in Orthopedic Surgery	6
	OrSu. 5-189	Externship in Orthopedic Surgery	6
	OrSu. 5-186	Research Problems in Orthopedic Surgery	12
OTOLARYNGOLOGY	Otol 5-191	Externship in Otolaryngology	3
	Otol 5-194	Research in Otolaryngology	12
PATHOLOGY	Path 5-105	Diseases of the Kidney	--
	Path 5-106	Diseases of the Heart	--
	Path 5-112	Diagnosis of Tumors	--
	Path 5-113	Surgical Pathology	3
	Path 5-114	Surgical Pathology	3
	Path 5-115	Surgical Pathology	3
	Path 5-122	Basic Science of Cancer	--
	Path 5-150	Problems in Pathology	6
	Path 5-151	Problems in Pathology HCGH	6
	Path 5-152	Problems in Pathology VA	6
	Path 5-161	Forensic Pathology	--

Department	Course Number	Course Title	Minimum Block Time Weeks
PEDIATRICS	Peds. 5-501	Inpatient Externship at Hennepin County General Hospital	6
	Peds. 5-502	Inpatient and Outpatient Externship at Children's Hospital	12, 6 Arr.
	Peds. 5-503	Inpatient Externship at St. Paul-Ramsey	6
	Peds. 5-511	Outpatient Externship at University Hospital	6
	Peds. 5-512	Outpatient Externship at Hennepin County General Hosp.	6
	Peds. 5-513	Clinical Experience at Community-University Health Care Center	12
	Peds. 5-514	Community Pediatrics at Pilot City Health Center	6
	Peds. 5-515	Outpatient Health Care at St.Paul-Ramsey Hospital	6
	Peds. 5-516	Clinical Pediatrics at the Mayo Clinic	6
	Peds. 5-531	Neo-Infant Program	16
	Peds. 5-532	Clinical Immunology at University Hospital	6
	Peds. 5-533	Pediatrics Cardiology at the Mayo Clinic	6
	Peds. 5-534	Pediatrics Cardiology at the University Hospital	6
	Peds. 5-535	Infectious Disease	6
	Peds. 5-536	Pediatric Hematology-Oncology at University Hospital	6
	Peds. 5-537	Pediatrics Endocrinology and Metabolism at Univ. Hosp.	6
	Peds. 5-538	Endocrinology and Metabolism	30
	Peds. 5-539	Introduction to Neonatology	6
	Peds. 5-540	Pediatric Neurology at University Hospital	6

Department	Course Number	Course Title	Minimum Block Time Weeks
PEDIATRICS (Con't.)	Peds. 5-541	Pediatric Neurology at the Mayo Clinic	6
	Peds. 5-542	Clinical Pharmacology	12
	Peds. 5-543	Nephrology at the Univ. Hosp.	6
	Peds. 5-544	Pediatric Pulmonary Disease	6
	Peds. 5-545	Child Psychiatry at the Mayo Clinic	12
	Peds. 5-571	Research at Community University Health Care Center	12
	Peds. 5-572	The Prenatal Interview as a Predictor of Health Risk areas for the Child	12
	Peds. 5-573	Research in Immunocytology	12
PHARMACOLOGY	Phcl. 5-105	Forensic Medicine and Medical Jurisprudence	--
	Phcl. 5-106	Toxicology	--
	Phcl. 8-201	Advanced Pharmacology: Physiological Disposition of Drugs	--
	Phcl. 8-202	Advanced Pharmacology: Pharmacodynamics	--
	Phcl. 8-203	Research in Pharmacology	12
	Phcl. 8-204	Seminar: Selected Topics in Pharmacology	--
	Phcl. 8-206	Seminar: Psychopharmacology	--
	Phcl. 5-501	Clinical Pharmacology	--
	Phcl. 5-502	Clinical Pharmacology	Arr.
PHYSICAL MEDICINE & REHABILITATION	PMed. 5-410	Adult Rehabilitation Medicine	6
	PMed. 5-411	Pediatric Rehabilitation Medicine	6
	PMed. 5-412	Arthritis Rehabilitation	3
	PMed. 5-413	Amputation Rehabilitation	3

Department	Course Number	Course Title	Minimum Block Time Weeks
PHYS. MED. & REHAB. (Con't)	PMed. 5-414	Physical Medicine and Rehab. for the Family Physician	3
	PMed. 5-415	Psychological Aspects of Chronic Disease	--
	PMed. 5-420	Histopathology, Electordiagnosis, and Kinesiology	3
	PMed. 5-430	Research in Physical Medicine and Rehabilitation	12
PHYSIOLOGY	Phsl 5-113	Problems in Physiology	--
	Phsl 8-201	Literature Seminar	--
	Phsl 8-202	Readings in Physiology	--
	Phsl 8-203	Research in Physiology	--
	Phsl 8-210	Selected Topics in Permeability	--
	Phsl 8-213	Selected Topics in Alimentary Physiology	--
	Phsl 8-216	Selected Topics in Neurophysiology	--
	Phsl 8-220	Methods of Analysis	--
	Phsl 8-227	Methods in Physiology	--
	Phsl 8-236	Hemodynamic Measurements	--
	Phsl 8-239	Topics in Microcirculation and Lymphatics	--
PSYCHIATRY	PtrA 5-500	Externship in Adult Psychiatry at HCGH	6
	PtrA 5-501	Externship in Adult Psychiatry at St. Paul Ramsey	6
	PtrA 5-502	Externship in Adult Psychiatry at V.A. Hospital	6
	PtrA 5-503	Externship in Adult Psychiatry at Fairview and St. Mary's	6

Department	Course Number	Course Title	Minimum Block Time Weeks
PSYCHIATRY (Con't.)	PtrA 5-510	Clinical Problems in Psychiatry	12
	PtrA 5-520	Psychological Problems in Medical Practice	6
DIVISION OF CHILD PSYCHIATRY	PtrC 5-500	Externship and Clinical Practice, Child Psychiatry	6
	PtrC 5-520	Externship in Child Psychiatry	--
PUBLIC HEALTH	PubH 5-104	Epidemiology I	--
	PubH 5-105	Epidemiology II	--
	PubH 5-106	Public Health Administration	--
	PubH 5-107	Maternal and Child Health	--
	PubH 5-120	Biomedical Computing	--
	PubH 5-123	Topics in Public Health	--
	PubH 5-124	Medical Statistics II	--
	PubH 5-129	Epidemiologic Survery Methods	--
	PubH 5-134	Human Genetics and Public Health	--
	PubH 5-136	Handicapped Children	--
	PubH 5-141	Social and Economic Aspects of Medical Care	--
	PubH 5-143	Measurement and Application of Ionizing Radiation	--
	PubH 5-147	Environmental Radioactivity	--
	PubH 5-151	Health Aspects of Air Control in Hospitals	--
	PubH 5-153	Principles and Methods of Accident Prevention	--
	PubH 5-155	Introduction to the Air Pollution Problem	--
	PubH 5-157	Radiation Protection Criteria for Hospitals	--

Department	Course Number	Course Title	Minimum Block Time Weeks
PUBLIC HEALTH (cont.)	PubH 5-158	Hospital Safety	--
	PubH 5-188	Comparative Medicine and Public Health	--
	PubH 5-191	Applied Human Nutrition	--
	PubH 5-195	Public Health Aspects of Cardiovascular Disease	--
	PUBH 8-200	Research	6
	PubH 8-214	Health of the School Age Child	--
	PubH 8-238	Radiation Dosimetry	--
	PubH 8-239	Radiation Dosimetry Laboratory	--
	PubH 8-241	Epidemiology of Noncommunicable Diseases	--
RADIOLOGY	Rad. 5-500	Externship in Radiology	3
	Rad. 5-501	Externship in Radiology	3
	Rad. 5-505	Externship in Radiation Therapy	3
	Rad. 5-510	Externship in Diagnostic Radiology at University Hospital	3
	Rad. 5-511	Externship in Diagnostic Radiology at H.C.G.H.	3
	Rad. 5-512	Externship in Diagnostic Radiology at Veterans Hospital	3
	Rad. 5-530	Problems in Radiation Biology and Radioactive Isotope Methods	3
SURGERY	Surg. 5-500	Externship in Surgery at University - Transplantation and General Surgery	6
	Surg. 5-501	Externship in Surgery at University Cardiovascular and Thoracic Problems	6
	Surg. 5-502	Externship in Surgery at University	6
	Surg. 5-503	Externship in Surgery at University - Pediatrics Surgery	6
	Surg. 5-504	Externship in Surgery at University - General Surgical Problems including some Thoracic and Cardiovascular Cases	6

Department	Course Number	Course Title	Minimum Block Time Weeks
SURGERY (Cont.)	Surg. 5-510	Externship in Surgery at V. A. Hospital	6
	Surg. 5-511	Externship in Surgery at St. Paul-Ramsey	6
	Surg. 5-512	Externship in Surgery at Hennepin County General	6
	Surg. 5-513	Externship in Surgery at Mt. Sinai Hospital	6
	Surg. 5-520	Experimental Surgery	6
DIVISION OF UROLOGY	Urol. 5-180	Externship in Urology	3

CURRICULUM EVALUATION

The Educational Policy Committee and its several, established review subcommittees provide ongoing study of the curriculum. Members of the Medical School student body serve on these committees.

The students of the Medical School have played a significant role in the establishment of the new Medical School curriculum. In addition, the students provide continual critiques of departmental curricula and the individual courses.

DEPARTMENTAL TEACHING PROGRAMS
1968-69

The following tabulations include Medical School department descriptions and current course offerings; including both undergraduate and graduate disciplines.

Department of Anatomy: The courses in the department provide an opportunity for examining the structure of the human body. In gross anatomy, three-dimensional architecture and relationships to other organs are studied by dissection. In microscopic anatomy, the organization of cells, tissues, and organs is assessed from stained sections using light microscopy and electron micrographs. For each system, in embryology, the normal development and anomalies are presented using preserved specimens and models. Special emphasis is given to neurocytology and neurochemistry in neuroanatomy. Where appropriate, the courses are correlated with the various clinical disciplines. Thus the student may enhance his powers of observation, his ability to communicate using specific terminology, and his synthesis of morphology with biochemistry and physiology. More depth in any of the subjects can be obtained through advanced course work on elective time.

Undergraduate Courses:

Medical:
- Gross Human Anatomy (5-100/5-101) - 12 hours per week
- Human Histology (5-103/5-104) - 5 hours per week
- Human Embryology (5-106/5-107) - 2 hours per week
- Advanced Anatomy (5-190) - Elective

Dental:
- Microscopic (5-105) - 13 hours per week
- Gross Anatomy (5-108/5-109) - 12 hours per week
- Neuroanatomy (5-110) - 4 hours per week

Others:
- Elementary Anatomy (1-004f,s) - 6 hours per week
- Anatomy for Physical Education (1-027) - 6 hours per week
- Anatomy for Mortuary Science (3-052) - 3 hours per week
- Anatomy for Physical Therapy & Occupational Therapy (3-058) - 9 hours per week
- Anatomy for Medical Technologists (5-765) - 6 hours per week
- Anatomy for Medical Technologists (5-766) - 6 hours per week

Department of Anatomy - Continued

Graduate Courses:

- Advanced Anatomy
- Special Research in Anatomy
- Electron Microscopy
- Anatomy Seminar
- Gross Anatomy (8-100/8-101) - 2 hours per week
- Human Histology (8-103/8-104) - 1 hour per week
- Embryology (8-106/8-107) - 1 hour per week
- Medical Neuroanatomy (8-111)

UNIVERSITY OF MINNESOTA

Department of Anatomy

Programs of Study

The Anatomy Department offers programs leading to the Ph.D. degree. (Students occasionally are accepted for the M.S. degree if this limited training is consistent with their career goals but preference is given to Ph.D. candidates.) The Ph.D. programs are geared to prepare students for independent research and teaching. The department also accepts students in the combined M.D.-Ph.D. and D.D.S.-Ph.D. programs. Students interested in the combined programs should write directly to the respective medical or dental schools.

The program in anatomy is designed to fulfill the needs of the modern anatomist. Anatomy today is concerned with the study of structure at all levels, from the whole organism to molecular structure; it is concerned with the manner in which structure varies with time, physiological state and pathological alteration.

The initial year of the program is devoted to acquiring a broad fundamental knowledge of microscopic anatomy, embryology, neuroanatomy and gross anatomy. In the ensuing years the student concentrates on a program designed to suit his needs. The candidate works under the supervision of a faculty adviser.

Candidates may avail themselves of graduate courses given at the Colleges of Medical Sciences, Engineering, Biological Sciences, and many others, all of which are located on a common campus.

The broad research interests of the faculty are indicated by the information on the reverse side of this page.

Research Facilities

The Anatomy Department is fully equipped to handle research projects in the several areas mentioned above. Air-conditioned animal quarters housing many varieties are readily available. Equipment includes several electron microscopes, automatic radioactive counters, spectrophotometers, including an infrared spectrophotometer, electronic quantitators, ultracentrifuge, photographic equipment and many other pieces of equipment usually found in departments of biochemistry. Some of these pieces of equipment are linked to the computer facilities available both at the main University and at the Medical Center.

Financial Aid

USPHS traineeships or University Fellowships are normally offered to acceptable students. Stipends are in keeping with USPHS standards – $2400 for the first post-baccalaureate year, $2600 for the years between the first and terminal year, and $2800 for the terminal year. USPHS trainees receive tuition allowances and further allowances of $500 for a dependent spouse and $500 for each dependent child.

Cost of Study

Tuition and fees are included in the stipends offered to Ph.D. candidates with USPHS traineeships. University Fellowships are tax-free but do not include tuition allowances.

Cost of Living

Both private and University housing (fraternity and non-fraternity) are available. Limited campus housing for married students also is available ranging from $70 to $90 per month. Private housing rates vary widely depending upon accommodations.

Student Body

A total of approximately 30 graduate students are enrolled in the anatomy program. Total enrollment on the Twin Cities campuses approximates 36,000 students of whom over 7,000 are graduate students.

The Twin Cities Area

The population of the Twin Cities of Minneapolis and St. Paul numbers about one million persons. It is richly endowed with lakes and parks. Cultural activities include the Minnesota Orchestra housed on the University campus, and several permanent theaters including the nationally famous Tyrone Guthrie Theater. Sports-minded individuals may participate in swimming, fishing, hunting, skiing, etc., within short distances of the campus. Spectator sports include major college sports on campus and professional teams in football (Vikings), baseball (Twins), and hockey (North Stars).

The University

The University of Minnesota was founded in 1851. It is considered one of the leading educational institutions in the world and is particularly strong in its research activities. The Medical Center includes the Schools of Dentistry, Pharmacy, Nursing, and Public Health, as well as Medicine.

Applying

Prospective students are advised to write for applications in the winter prior to the fall quarter in which they wish to be admitted. A bachelor's degree is required which includes 9 credits of biology; a good background in chemistry, physics and mathematics is strongly recommended. Applicants are urged to take the Graduate Record Examination. The deadline for applications is early in February.

Correspondence and Information

Coordinator of Graduate Study
Department of Anatomy
University of Minnesota
Minneapolis, Minnesota 55455

Scope of Research

Modern research in Anatomy is concerned with the study of structure at all levels, extending from the whole organism to the arrangement of molecules in the subcellular organelles of the cell; it is also concerned with the manner in which structure varies with time, with physiological state and with pathological alteration. The research interests of the departmental faculty members are varied. Our department has a major research emphasis in the following areas: cytochemistry-cell biology, electron microscopy, quantitative histochemistry, experimental teratology and tissue organ culture. A number of studies related to experimental diabetes, hematology and liver disease are in progress. A departmental USPHS program-project grant supports a multidiscipline study in experimental diabetes with major emphasis on the pancreatic islet tissue, the factors which influence the development and progression of diabetes in experimental animals and changes in the capillary basement membrane as it relates to the development of the complications of diabetes. Studies in information retrieval, with particular emphasis on the diabetes literature, relate to more effective methods of document handling in micro-image format and the machine retrieval of full-text using a computer base system. A more comprehensive picture of the departmental research interests is contained in the attached description of the departmental faculty published in the 1969 Peterson's Guide to Graduate Study.

The breakdown of the departmental staff by academic rank and source of funding follows:

DEPARTMENT OF ANATOMY STAFF

Rank	No.
Professors	4
Associate Professors	3
Assistant Professors	7
Instructors	3
Research Associates	4
Research Fellows	3
Technicians	31

Total salaries = $618,627

Total salaries from state funds = $260,542

Total salaries from other funds = $358,085

DEPARTMENT OF ANATOMY RESEARCH AND TRAINING GRANTS

Principle Investigator	Title	Amount	Source of Funds
Arnold Lazarow Professor and Head	Departmental Program Project Multi-discipline Diabetes Research Project	$145,606	Federal
" "	Departmental Diabetes Research Training Grant	86,152	Federal
" "	Fetal Endocrinology	48,156	Federal
" "	Diabetes Literature Retrieval	166,287	Federal
" "	Departmental Anatomical Sciences Training Grant	104,742	Federal
" "	Diabetes Related Literature Current Awareness Bulletin (University of Minnesota, University of Rochester and Western Reserve University).	27,096	Federal
Dean E. Abrahamson Assistant Professor	Study of Power Needs in U.S.	3,000	Private
" "	Evaluation of Normal and Malignant Tissue in Thin Sections	10,000	Private
G. Eric Bauer Associate Professor	Studies on the Synthesis of Secretory Proteins	13,580	Federal
H. David Coulter Instructor	Structure and Chemical Organization of Biological Membranes	3,500	State
" "	Studies on Communication Between Cells	6,830	Private
Padmakar K. Dixit Associate Professor	Mode of Action of Vitamin D (Mechanism of Calcification of Rachitic Cartilage Induced Vitamin D and Starvation).	2,000	State
" "	Research on Citrate Metabolism in Diabetes	1,000	Private
Donald W. Robertson Assistant Professor	Effects of Maternal Hypoglycemia	1,100	Private

DEPARTMENT OF ANATOMY RESEARCH AND TRAINING GRANTS (Continued)

Principle Investigator	Title	Amount	Source of Funds
R. Dorothy Sundberg Professor	Fatty Acid Deficiencies	4,690	Federal
Richard L. Wood Associate Professor	Cytodifferentiation in Embryonic and Fetal Liver	30,906	Federal

Research Grant Support

Federal	$ 627,215
State	5,500
Private	21,930
TOTAL	$654,645

Research Facilities

The departmental facilities include: air-conditioned animal quarters housing many varieties of animals, a walk-in cold room, a tissue culture laboratory, a radioisotope laboratory, and many other laboratories housing specialized facilities. Equipment includes several electron microscoped, automatic radioactive counters, spectrophotometers (including an infrared spectrophotometer), electron component quantitators, preparative ultracentrifuges, photographic equipment and many other specialized items of equipment. Specific equipment items are linked to the computer at the Biomedical Computing Center. Our current research facilities include:

Type of Laboratory	No.	Square Feet
Faculty and Graduate Student Laboratories	36	10,342
Research Support Laboratories (Electronics, Instrumentation, Isotopes)	7	2,182
Laboratories for Animals	8	2,591
TOTAL:		15,115 sq. ft.

Every physician should be prepared to resuscitate his patients in respiratory or circulatory distress, as well as initiate therapy for comatose or respiratory crippled patients. The best method of learning these arts is to be responsible for anesthetic management of surgical patients. Furthermore, over half the graduates of this school enter a surgically oriented practice, either as general practitioners or specialists, and they will usually be responsible for directing nurse anesthetists. They, as well as those who refer patients for surgery, should understand fundamental principles of anesthetic care, drugs, and complications.

A. Undergraduate

Medical: Research (5-169) - Elective
Externship in Clinical Practice of Anesthesiology (5-181) - Elective
Externship in Anesthesiology and Respiratory Problems (prereq. 5-181 & 5-182) - Elective

B. Advanced Training

1. Graduate Courses:

General Anesthesia - Instruction and experience in general anesthesia. (12 cr per qtr)
Regional Anesthesia - Observation, instruction, and administration of all types of local, regional, and spinal anesthesia. (4 cr per qtr)
Pre- and Postanesthetic Evaluation - Selection of proper anesthetic agent and technique, premedication, and observation of recovery from anesthesia. (2 cr per qtr
Seminar: Anesthesiology - Review of literature, report of case problems, and discussion of research work in progress within the department. (2 cr per qtr)
Research in Anesthesia - Anesthesia problems in experimental laboratory or in hospital. (cr and hrs ar)

2. Postgraduate Program:

General Anesthesia - Instruction and experience in general anesthesia. (12 cr per qtr)
Regional Anesthesia - Observation, instruction, and administration of all types of local, regional and spinal anesthesia. (4 cr per qtr)
Pre- and Postanesthetic Evaluation - Selection of proper anesthetic agent and technique, premedication and observation of recovery from anesthesia. (2 cr per qtr)
Seminar: Anesthesiology - Review of literature, report of case problems, and discussion of research work in progress within the department. (2 cr per qtr)
Research in Anesthesia - Anesthesia problems in experimental laboratory or in hospital. (cr and hrs ar)

The above are available to practitioners returning for three or more months refresher course activity. In addition, the Department annually offers a three-day intensive review of selected aspects of anesthesiology practice.

3. Interns and Residents:

Interns rotate for one month onto the Anesthesiology Service, and receive orientation and introductory experience with all forms of anesthesia, respiratory care and pain therapy. Residents register in the graduate course work outlined in (1) above.

C. Continuing Education:

N/A

D. Research Program

1. Research space currently available but scheduled for relocation and enlargement related to Buildings B/C:

Diehl Hall	F103	245 sq. ft.
	F104	104 sq. ft. (some study area for research fellows)
	F104-1	152 sq. ft.
	F104-2	505 sq. ft.
Mayo Memorial	B199	216 sq. ft.
Millard Hall	Some limited space available to fellows in Ph.D. program.	

2. Research Program - In general the department is concerned with two objectives:
   1) Research training in anesthesiology
   2) The accomplishment of specific research projects of both a clinical and basic nature.

   Research training provides selected candidates with opportunities to pursue basic training in pharmacology and allied basic sciences (e.g., biochemistry, physiology and biostatistics). Extensive clinical training in anesthesiology is a prerequisite. The interdisciplinary environment established at the outset of the program continues to foster development of academically oriented anesthesiologists.

   More specifically, our training program is geared for development of Clinical Pharmacologists in Anesthesiology. Trainees enroll in the same didactic courses, seminars and laboratory sessions as graduate students in pharmacology. Suitable research projects are selected conjointly by the Program Director, Principal Basic Sciences Advisor and Thesis Advisory Committee after consideration of the trainees' interests and technical capabilities. A Ph.D. in Pharmacology is a natural consequence of this training.

   Currently - specific research projects involve investigations into drug metabolism, elevation of cardiac fibrillation thresholds, effects of mechanical lung ventilation on pulmonary hemodynamics, postoperative respiratory impairment, and the evaluation of pulmonary function in patients with various lung diseases. A research fellow working under the direction of competent senior investigators can qualify for a Master's Degree upon submission of a thesis and satisfactory performance in a written and oral examination.

3. Current and pending research grants:

Investigator	Title of Project	Source of Fund	Amount	
F.H. VanBergen	Research Training in Anesthesiology	Institute of General Medical Sciences	$29,770	(1969-70)
F.H. VanBergen	A Functional Assessment of Mechanical Respirators	Health Services & Mental Health Administration	$14,501	(1969-70)
			$44,271	
H.D. Westgate	Cardiopulmonary Function Changes in Scoliosis	Orthopedic Research & Education Foundation	$ 6,000	(1969-70)
Department of Anesthesiology	Ralph T. Knight Fund	Minnesota Medical Foundation	Gifts from former fellows and memorials	

Curriculum

Department of Biochemistry: Biochemistry occupies a central position in all medical science and in clinical medicine. The required course first deals with general biochemistry and treats the chemical transformations fundamental to life processes occurring at the cellular and subcellular levels. A major emphasis is on the integration of biochemical processes and on the regulation and coordination of the metabolic reactions. Biochemical abnormalities in disease are employed to fortify the understanding of the normal processes and to indicate the application of biochemical principles to future studies of disease processes.

Undergraduate Courses:

Medical:
- Biochemistry (MdBc 5-100, 5-101)
- Seminar (MdBc 8-200) - Elective
- Research (MdBc 8-300) - Elective
- Endocrinology and Steroid Chemistry (MdBc 8-206) - Elective
- Nucleic Acid Structure & Function (MdBc 8-211) - Elective

Dental:
- Biochemistry (MdBc 5-200, 5-201)

Others:
- Topics in Lipid Chemistry (MdBc 8-215)
- Protein Chemistry (MdBc 8-217)
- Biochemistry of Specialized Tissues (MdBc 8-219)
- Biochemistry (MdBc 1-030)
- Biochemistry (MdBc 3-050)
- Biochemistry (MdBc 5-300, 5-301)

Graduate Courses:
- Problems in Biochemistry (MdBc 5-053)
- Advanced Endocrinology & Steroid Chemistry (MdBc 8-206)
- Nucleic Acid Structure & Function (MdBc 8-211)
- Biochemistry (MdBc 5-741, 5-742, 5-743)
- Laboratory for Graduate Students (MdBc 5-750)
- Endocrinology (MdBc 8-206)
- Nucleic Acids (MdBc 8-211)
- Lipid Metabolism (MdBc 8-215)
- Protein Chemistry (MdBc 8-217)
- Research (MdBc 8-300)
- Seminar (MdBc 8-150)
- Biochemistry of Specialized Tissues (MdBc 8-219)
- Biochemistry (MdBc 5-600, 5-601)

DEPARTMENT OF BIOCHEMISTRY

There are 12 persons at the rank of Assistant Professor or above funded through the department. In addition, 13 other persons at these ranks, founded via other departments and sources, contribute significantly to our research, teaching and service enterprises.

The teaching is intended to furnish a broad coverage of the basic aspects of biochemistry at the cellular and molecular levels with emphasis on biochemistry as an experimental and rapidly evolving science. An equally important objective of our major courses (for medical and dental students) is attention to disturbances of biochemical processes in disease. Separate courses are given to students of: Medicine, Dentistry, Nursing (2 courses), Medical Technology and to Graduate Students. The graduate student courses are a 3-term survey course and 7 advanced level and specialized courses. Five of the latter are given in alternate years.

The research work in the department is varied in that each senior staff person develops a unique field for investigation. Fields of biochemistry represented at the research and graduate institution levels are: Metabolic enzymology, Calcified tissues, Protein biosynthesis, Physical biochemistry; Steroid hormone metabolism, Protein-polysaccharide structure and metabolism, guanido compound metabolism, Metal-protein interactions, Biochemical genetics, Structure and function of proteins, Cholesterol biosynthesis.

The department of Biochemistry research is funded from the Public Health Service in all but two instances. These exceptions are contracts from the American Cancer Society. The total amount of funds available for research from these sources is $598,973.

P.H.S.----------$568,973.
American Cancer--$30,000.

Total Research Space Available----------14,686 sq. ft.

DEPARTMENT OF DERMATOLOGY

Program considerations:

Undergraduate
- Dermatology 123
- Dermatology 182
- Dermatology 183

Advanced Training (Nos. 1 - 3)
- Dermatology 225
- Dermatology 226
- Dermatology 227
- Dermatology 228
- Dermatology 230

Research Program
1. Electron Microscopy of Skin (especially pigment cells)
2. Will depend on new Department Head.
3. See below.

Research Grant Support

Alvin S. Zelickson, M.D. Associate Professor	Training Grant in Dermatology	USPHS Grant 105,000 (3 yrs.)
Alvin S. Zelickson, M.D. Associate Professor	Electron Microscopy of the Langerhans Cell & Melanocyte	NIH Grant 112,000 (3 yrs.)
Alvin S. Zelickson, M.D. Associate Professor	Enahnced Tolerance of Skin to Ultra-Violet Light by Systemic Use of Psoralens	Graduate School Not Funded
	Federal:	$217,000 (3 yrs.)
	Federal 1970-71 Participation:	83,000

DEPARTMENT OF FAMILY PRACTICE AND COMMUNITY HEALTH
UNIVERSITY OF MINNESOTA HOSPITALS

HEALTH CARE RESEARCH PROGRAM

Introduction

In January, 1969, the University of Minnesota established a Department of Family Practice and Community Health. In cooperation with Minnesota Blue Cross, the Prudential Insurance Company and the Northwestern National Life Insurance Company, this Department is developing a prepaid comprehensive health insurance program. Beginning in 1970, with the opening of the Family Practice wing in the University of Minnesota Hospitals, this insurance program will provide complete health care for an anticipated 1,500 families (approximately 10,000 persons). This new group of patients at the University of Minnesota Hospitals will furnish an opportunity to design a health care system structured to provide maximum opportunities for health services research.

The multi-disciplinary research program in Family Practice and Community Health will be oriented toward involving our patients help in definition, early detection and prevention of disease. Defining the natural history of selected medical problems will allow the application of statistical decision analyses to medical practice.

Departmental Goals

"The primary mission of the Department of Family Practice is to develop an academic program to train students and physicians in all aspects of primary health care and to develop fresh and imaginative approaches to problems in the delivery of medical care...."

These goals can be subdivided into three sections:

1. To develop an academic program to train students and physicians in all aspects of primary health care.

2. To discover new approaches to problems in the delivery of health care.

3. To improve present methods of health care delivery.

Situation

In the Report of the Subcommittee on Family Practice and Community Health, dated October, 1967, the Committee defined the broad outline of the body of knowledge of the family physician as follows:

1. Knowledge of the physician's role as a clinician. This includes specific definition of the doctor-patient relationship....

2. Knowledge of the natural history of disease, particularly of common diseases....

3. Knowledge of treatment of total illness in a holistic manner....

4. Knowledge of epidemiology and statistics

5. Knowledge of the dynamics of family development and of individual developmental crises and their influence on the well being of the patient....

6. Intensive training in history taking....

7. Knowledge of skills and contribution to be expected from other health professionals....

8. Continuing attention must be given to improve techniques for continuing education of the physician....

"The primary educational goal of the program in Family Practice is to develop and teach a definable and encompassable body of knowledge which embraces the discipline of family medicine. This includes the development of expertise in the natural history of common disease, in relevant areas of human behavior as they apply to medical practice, and in approaches to more effective application of principles of health maintenance in day-to-day medical practice."

Objectives of the Research Program

The research group in the Department of Family Practice and Community Health seeks to develop the "fresh and imaginative approach" to the problem of delivery of medical care which will satisfy the goals of the total program. The job of the Department of Family Practice and Community Health is to educate family physicians and to provide the tools to simplify their work. Our efforts will be directed toward the application of computer technology in the storage, categorization and utilization of data in ongoing health care.

Research Grant Support

Non-Federal	$5,000
TOTAL	$5,000

Table 1 relates departmental goals and specific research objectives:

Table 1

Departmental Goals	Research Objectives
To develop an academic program to educate students and physicians in all aspects of primary health care.	To define the body of knowledge encompassed by family practice by a study of current general practice and by an ongoing analysis of the Department of Family Practice and Community Health Clinic.
	To use statistical decision analysis as a teaching tool
	To develop an ongoing program of education of health workers and patients designed to broaden the base of responsibility for ongoing health care
To develop new approaches to health care delivery.	To develop a program of self-recording data -- to enlist our patients in this program designed to provide a method of disease prevention and early detection.
	To utilize the technique of statistical decision analysis to help define the pathway of medical decision making and to utilize this tool in all aspects of our departmental operation.
To improve present approaches to health care delivery.	To provide an ongoing study of health care prepayment systems.
	To establish a broad data base for research studies in family practice.
	To improve pharmacist-patient-physician cooperation in health care delivery.

DEPARTMENT OF FAMILY PRACTICE
AND COMMUNITY HEALTH
DEPARTMENTAL EDUCATIONAL RESPONSIBILITY

I. Undergraduate Studies

A. Phase A

1. Human Behavior
2. Introduction to the Patient
3. Evaluation of Above

B. Phase B

1. Behavior of Man
2. Man and His Community
3. Student as Physician
4. Evaluation of Above

C. Phase D

1. Structure of Family Practice; Phase D Curriculum Committee
2. Externships
3. Evaluation of Above

II. Graduate Studies

A. Integrated Internship

1. Nature of our Relationship to Committee Responsibility for Integrated Internship
2. Selection
3. Program Development
4. Evaluation of Above

B. Residency

1. Selection
2. Program Development

a. Core Program
b. Electives

3. Evaluation of Above

C. Master's Program

1. Selection
2. Graduate School Requirements for Admission
3. Advisor System
4. Course Development

5. Examination System
6. Plan B - Research Requirements
7. Evaluation of Above

III. Continuing Education

1. Role of Community Hospital
2. Evaluation of Above

Currently, the Department of Family Practice and Community Health contributes to the undergraduate medical program in phases A, B, and D. However, contingent on expected program development it is predicted that 1/3 or more of all phase D students will track into the family practice program.

GRADUATE COURSES

APPENDIX A - Courses in Family Practice and Community Health

8-201 Clinical Family Medicine. Supervised care for a fixed population of patients of all ages on a continuous, primary, preventive and general diagnostic basis. Emphasis will be placed on diagnosis, methods of treatment and problem solving devices for the benefit of the patient and family. Particular emphasis will be placed upon health hazard appraisal. New and refined methods of recording, documentation and retrieval of clinical data will also be emphasized. (cr ar) Fuller, Verby, O'Leary, Defoe and staff

8-203 Family Practice in the Community, Practical experiences in the delivery of health care in the community. (cr ar) Verby and staff

8-204 Quantitative Logic in Clinical Judgement. Seminar sessions covering quantitative methods applied to medical practice. Students must prepare and present their own applications of quantitative logic and methods to medical practice problems. (1 cr) Weckwerth

8-205 Medical Records Systems. Introduction to the problem-oriented medical record. Stress will be placed on forms analysis, systems of tabulation and on the use of a structured medical record in health services research. (2 cr) O'Leary

8-206 Human Behavior. Seminar dealing with the psycho-social aspects of disease. (1 cr) Gendron and staff

8-207 Seminar: Common Diseases Seen in Family Practice. (1 cr) Defoe and staff

8-208 Family Medicine Conferences. Presentation of problem cases from the Family Practice service. Discussion of diagnosis, treatment and consideration of relevant current literature. (1 cr) Fuller and staff

8-209 Family Medicine X-Ray Conference. (1 cr) Fuller and staff

8-210 Family Medicine Grand Rounds. (1 cr) Fuller and staff

8-225 Medical Sociology. A critical review of sociological research in medical areas, illness behavior, the sick role, sociological aspects of the doctor-patient relationship, the problem of delay in seeking treatment, and differential reactions to pain will be explored. (3 cr) Berkanovic

8-226 Medical Sociology Seminar. For physicians and graduate students in sociology. Focus of discussions will be the problems in the delivery of comprehensive health care. (2 cr) Berkanovic

8-228 Interdisciplinary Health Seminar. (2 cr) Fuller and representatives from other disciplines.

8-240 Community Resources. Opportunities for the resident to participate in discussions with representatives of selected community agencies. (2 cr) Jensen

8-242 Economics of Health Care Delivery Systems. An analysis of the economic aspects of health care delivery. Discussions will focus on the economic impact of illness to the total cost and cost effectiveness of various delivery systems. (3 cr) Peterson and staff

8-243 Family Medicine in the Rural Area. An analysis of problems specific to rural areas such as physician distribution, ancillary health personnel utilization, initial emergency treatment, referral patterns. (cr ar) Hunt and staff

8-245 Analysis of Instruction and Educational Evaluation. Discussions will focus upon the psychology of learning, preparation of instructional objectives, educational evaluation, the uses of instructional media and educational methodology. (cr ar) Kenney and staff

8-253* Research Problems. (cr ar) staff

DEPARTMENT OF MEDICINE

The Department of Medicine has two goals in teaching. The first is to instruct the student in certain general skills such as history taking and physical examination which are necessary in the care of patients. Working in small groups with a tutor, the student integrates the information obtained from the patient including his assessment of the social background and emotional reaction to illness with the laboratory and x-ray data in an attempt to design a plan of therapy.

The second goal is to acquaint the student with the body of knowledge represented by the subspecialties of medicine including dermatology. This is accomplished by study of patients with disease, supplemented by reading and lectures.

With the introduction of the new curriculum, a large part of the teaching of the Department of Medicine will be in Phase B. Phase B is an integrated program which includes both didactic material and clinical experience with patients. The Department of Medicine participates extensively in the Phase B didactic presentation of cardiovascular, respiratory, renal, blood, endocrine and metabolism, and bones and connective tissue. All of these programs are planned by interdepartmental committees. The Department of Medicine also participates extensively in the portion of Phase B entitled, "Student As a Physician". During the first quarter of Phase B, much time is devoted to teaching the student the principles of physical diagnosis. During the remaining quarters, students are assigned to tutors who meet with the students once weekly in groups of two. The exercise is centered about the presentation of a patient by the student to the tutor. The Department of Medicine is responsible for assigning large numbers of tutors to this portion of the program.

During Phase D, a number of elective offerings will be made available by the Department of Medicine. These include in-patient clerkships as well as a variety of special experiences within the subspecialties of medicine and in ambulatory care.

Undergraduate Courses:

Medical:

Medical Oncology Externship in Medicine at University Hospital (Med 5-501) - Elective
Medical Externship at Veterans Administration Hospital (Med 5-502) - Elective
Medical Externship at St. Paul Ramsey (Med 5-503) - Elective
Medical Externship at Northwestern (Med 5-504) - Elective
Medical Externship at Mt. Sinai (Med 5-505) - Elective
Research in Gastroenterology at University Hospital (Med 5-511) - Elective
Research Topics in Hematology at University Hospital (Med 5-512) - Elective
Problems in Clinical Medicine at University Hospital (Med 5-521) - Elective
Gastroenterology at University Hospital (Med 5-522) - Elective

Metabolism and Clinical Pharmacology at University Hospital (Med 5-523) - Elective
Immunology, Allergy, and Infectious Disease at University Hospital (Med 5-524) - Elective
Cardiovascular Disease at University Hospital (Med 5-525) - Elective
Electrocardiography at University Hospital (Med 5-526) - Elective
Renal at University Hospital (Med 5-527) - Elective
Clinical Hematology at University Hospital (Med 5-528) - Elective
Clinical Hematology (Abbreviated) at University Hospital (Med 5-529) - Elective
Seminar in Oncology at University Hospital (Med 5-530) - Elective
Rheumatology at University and St. Paul Ramsey Hospitals (Med 5-531) - Elective
Pulmonary Disease at University Hospitals (Med 5-532) - Elective
Allergy, Clinical, University and Veterans Administration Hospitals (Med 5-533) - Elective
Trends, Methodology, and Techniques in the Delivery of Medical Service at St. Paul-Ramsey Hospital (Med 5-541) - Elective
Hematology at St. Paul-Ramsey Hospital (Med 5-542) - Elective
Cardiology at St. Paul-Ramsey Hospital (Med 5-543) - Elective
Pulmonary Disease at St. Paul-Ramsey Hospital (Med 5-544) - Elective
Endocrinology, Clinical, at St. Paul-Ramsey Hospital (Med 5-545) - Elective
Infectious Disease and Immunology, Clinical, at St. Paul-Ramsey Hospital (Med 5-546) - Elective
Infectious Disease and Immunology, Research, at St. Paul-Ramsey Hospital (Med 5-547) - Elective
Cardiology (EKG) at Veterans Administration Hospital (Med 5-551) - Elective
Clinical Hematology at Veterans Administration Hospital (Med 5-552) - Elective
Pulmonary Disease at Veterans Administration Hospital (Med 5-553) - Elective
Fluid, Electrolyte and Acid-Base Metabolism at Veterans Administration Hospital (Med 5-554) - Elective
Electrocardiography at Veterans Administration Hospital (Med 5-555) - Elective
Cardiology Service at Hennepin County General Hospital (Med 5-561) - Elective
Renology Service at Hennepin County General Hospital (Med 5-562) - Elective
Pulmonary Disease at Hennepin County General Hospital (Med 5-563) - Elective
Infectious Disease at Hennepin County General Hospital (Med 5-564) - Elective
Gastroenterology at Hennepin County General Hospital (Med 5-565) - Elective
Medical Emergency Room at St. Paul-Ramsey Hospital (Med 5-571) - Elective
Ambulatory Medicine at St. Paul-Ramsey Hospital (Med 5-572) - Elective
Medical Out-patient Clinics at Hennepin County General Hospital (Med 5-573) - Elective
Internal Medicine at St. Mary's Hospital (Med 5-581) - Elective

The graduate training program in the Department of Medicine has as its goal, the provision of a broad general medical training which will permit the individual to enter into practice and to provide primary medical care

in the field of internal medicine. In addition, advanced training programs are provided which permit residents to develop their interests in the subspecialities of medicine. The general medical training program consists of the internship and the first two years of residency. The internship program is hospital centered although there is considerable rotation of interns between the various hospitals. The residency program is integrated between the University Hospital, St. Paul-Ramsey Hospital, and the Veterans Hospital. The first year of the residency consists of ward assignments in general medicine with supervision of interns and students. The second year of the program consists of a rotation to the various subspecialties. It is expected that a number of residents completing the program will enter into practice at this point in their training. A lesser number will continue on in training in a subspecialty. The training programs in the subspecialties are supported by training grants from the NIH or from the VA. These programs are designed to provide a broad general training in the subspecialty and also to provide some experience in research. A few individuals may choose to go into depth in research in the area and to take the course work necessary for a Ph.D. in medicine.

Graduate Courses:

Clinical Medicine (8-201)
Diseases of the Cardiovascular Apparatus (8-202)
Research in Medicine (8-203)
Diseases of the Chest (8-205)
Clinical Conference (8-206)
Clinical Pathological Conference (8-207)
Clinical Radiological Conference (8-208)
Seminar: Infectious Disease (8-210)
Electrocardiographic Conference (8-211)
Pigment Metabolism (8-212)
Psychosomatic Medicine (8-213)
Seminar: Cardiovascular (8-214)

RESEARCH PROGRAM

It is the objective of the Department of Medicine to maintain a balanced research program in the belief that teachers who have an active interest in investigation are stimulating and productive. To achieve this objective, an attempt has been made to build strong programs in each of the various areas of Medicine. The Department is divided into sections such as hematology, cardiology, gastroenterology, etc. In general, the head of the section is responsible for the research and teaching program in his area. The research in each section is supported by several research grants. A training grant, if available, permits the development of research talent in those graduate students in the Department who have an interest in research.

In addition to the research program at the University Medical Center, the Department also has a strong program at the Veterans Hospital under the direction of Dr. Leslie Zieve. An attempt has been made to integrate the the graduate training and research programs at the University Medical Center and the Veterans Hospital. An example of such an integration is the newly-developed program in hematology.

Research in Gastroenterology

The program in gastroenterology in the Department is under the general direction of Dr. Leslie Zieve. The program at the University Hospitals is directed by Dr. Dodd Wilson and Dr. Michael Levitt. This is a very active program with emphasis on metabolism of bile acid. Studies on damage to the liver from lithocholic acid have been of particular interest. Other projects in the section include studies on immune mechanisms and liver disease by Dr. Dodd Wilson and intestinal gas by Dr. Michael Levitt. The section has a very active training program and has succeeded in recruiting some very fine young men. The program is supplemented by a large research program directed by Dr. Leslie Zieve at the Veterans Hospital.

Endocrine and Metabolism

Dr. Richard Doe has taken responsibility for endocrinology and metabolism, both at the University Medical Center and the Veterans Hospital. As of July 1, 1969, he has been fulltime at the University Medical Center. His interests have been largely related to the steroid hormones, and particularly to protein binding of these hormones in the plasma. Frederick Goetz is program director of the Clinical Research Center. His major interest has been diabetes mellitus. One of his projects relates to the mechanism of release of insulin from the mammalian pancreas. He is also involved in a cooperative study on the relation of treatment to complication of diabetes. Dr. Goetz works closely with Dr. Jonathan Bishop who is also on the staff of the Clinical Research Center. Dr. Bishop is in the Department of Medicine. He was formerly in the Department of Biochemistry where he worked closely with Dr. Joseph Larner. Dr. Bishop has a particular interest in the enzymes related to glycogen metabolism and the relation of these enzymes to insulin resistance. Dr. Thomas Rose is also associated with this group. The endocrine group plans a very active training program.

Section of Cardiology

Dr. Ivan Frantz is Clark Research Professor of Medicine. He carries on a large program in research related to coronary arteriosclerosis. He has had a long-standing interest in metabolism of cholesterol. In addition, he is engaged in a large-scale study of the effect of dietary change on human cardiovascular disease. This study is carried out in six mental hospitals in the state of Minnesota. The purpose of this study is to determine whether lowering blood cholesterol by dietary means will influence the incidence of the clinical manifestations of coronary disease. Other projects include the use of the computer and the study of electorcardiography by Dr. Tuna, the effect of exercise on hemodynamics by Dr. Wang, the study of expenditure of cardiac energy for pulsatile flow by Dr. Jorgensen, and the study of the inotropic effect of certain nondigitalis compounds by Dr. From. In addition, there is a large clinical training program in cardiology headed by Dr. Howard Burchell and Dr. Yang Wang.

Renal Section

Dr. Louis Tobian is responsible for this section. He has a distinguished record of research in hypertension and renal disease. In the past he has

had a major interest in the juxtaglomerular apparatus and renin secretion. At the moment he is studying the lipid granules in the interstitial cells of the renal papillae with particular interest in their chemical composition in relationship to hypertension. Dr. Kunau has recently joined the faculty. He was trained at Southwestern Medical School where he has worked with Donald Seldin. His interest is in renal micropuncture and the use of this technique in the study of sodium excretion. Dr. Kjellstrand is responsible for renal dialysis and is carrying on a study on the pathogenesis of hypertension in dialyzed uremic patients.

Section of Hematology

The hematology section has a strong research program headed by Dr. Harry Jacob. Dr. Jacob has varied interests including studies of red cell membrane defects, the study of the unstable hemoglobins and bone transplantation in hematologic malignancies. Dr. Manuel Kaplan joined the faculty in June 1969. He is responsible for the hematology section at the VA Hospital but is also closely associated with Dr. Jacob at the University Medical Center. His field of interest is immunohematology and he is now studying the structure and biologic activity of isohemagglutins. Dr. Samuel Schwartz is the career investigator of the National Institute of Health, and is full time in research. He has a record of distinguished investigation in porphyrin metabolism.

Chest Disease Section

Dr. Richard Ebert has a research project on the use of radioactive xenon, the scintillation camera, and the computer in the recognition of areas of decreased ventilation and perfusion. The intent is to develop this method to permit its use in epidemiologic studies of emphysema. These studies will be performed in conjunction with a group in the Department of Physiological Hygiene. Work in this area is being done in conjunction with the Department of Radiology. Dr. Richard Kronenberg joined the group on July 1, 1970. He was trained by Dr. Severinghaus at the Research Institute at the University of California. His interest is in the regulation of respiration with particular emphasis on the role of hypoxia. He is also studying the influence of drugs on ventilation in patients with chronic CO_2 retention. In addition, there is a large active group in pulmonary disease at the Veterans Hospital.

Section on Infectious Disease

Dr. Wesley Spink is responsible for the program in this area. Dr. Spink has a distinguished record of investigation and continues to be very active in research. He will, however, retire in a few years and it will be necessary to re-structure the section at that time. Dr. Wendell Hall, Chief of Service at the VA, has a primary interest in infectious disease and continues a strong research program.

Section on Arthritis

Dr. Erskine Caperton has recently assumed responsiblity for this section. His field of research interest is the role of rheumatoid factor in the pathogenesis of the manifestation of rheumatoid arthritis.

Section on Oncology

Dr. B. J. Kennedy has had a strong program in oncology for several years. A special hospital (The Masonic Hospital) is devoted to the care of cancer patients. Included in thsi hospital are extensive laboratory facilities for research. Dr. Kennedy's major interest has been in agents used for chemotherapy of cancer. He has been assisted by Dr. Fortuny and Dr. Theologides.

Programs in Clinical Pharmacology and Medical Genetics

Dr. Hunninghake is developing a strong training program in clinical pharmacology. This program is operated jointly by the Department of Pharmacology and by the Department of Medicine. At the present time Dr. Hunninghake has his major research facilities located within the Department of Pharmacology. However, in the plans for the new building space is included for Clinical Pharmacology. His research interests include a study of drugs influencing the level of lipds in the plasma and drug interactions.

At the present time there is no one in the Department with a primary interest in medical genetics; however, Richard King will join our faculty in 1971. He has completed a medical residency and is completing a Ph.D. in genetics. During the next two years he will be associated with the atomic bomb project in Japan. He will establish a program in medical genetics when he returns.

Programs in gastroenterology, hematology, infectious disease, arthritis, clinical pharmacology and medical genetics will be located in Building B-C.

Number of faculty members engaged in research:

12 - Professors
7 - Associate Professors
9 - Assistant Professors
2 - Instructors
3 - Research Associates
1 - Clinical Assistant Professor

Department of Medicine space by Sections:

1836 sq. ft. - Renal
1756 sq. ft. - Oncology
1402 sq. ft. - Infectious Disease
3173 sq. ft. - Hematology
1472 sq. ft. - Endocrine-Metabolism
1443 sq. ft. - Cardiology
1637 sq. ft. - Cardiac Research
2367 sq. ft. - Gastro-Intestinal
1452 sq. ft. - Departmental

16,538 sq. ft. - Total Space - Research Only

Research Planned in the Department of Medicine in the Newly Constructed Facilities

The present research effort of the Department of Medicine has been described. No radical changes in the direction of research are planned during the next five years. Research in Hematology, Endocrinology and Metabolism, Renal Disease, Infectious Disease, Arthritis, and Immunology, Clinical Pharmacology, and Medical Genetics are planned in the new building. Research in Cardiology, Pulmonary Disease, Oncology will remain in their present locations. Gastroenterology will probably also remain in the VFW Building, although this is not completely settled. The Clinical Research Center will remain in the Masonic Hospital. The direction of research will be the responsibility of the heads of the various sections. With the retirement of Dr. Spink new directions may develop in the research program in infectious disease. The replacement for Dr. Williams in Arthritis will develop a new program.

Grant Support

Federal	1,852,109
Private	174,529
State	26,950
Total	$2,053,588

DEPARTMENT OF LABORATORY MEDICINE

Report on Research Program

The major research effort in the Department of Laboratory Medicine which will make use of the projected facilities include the following.

1. Structure and function of heart and skeletal muscle cells in health and disease. Investigators: Drs. Ellis Benson, Andreas Rosenberg, Mary Dempsey, Nancy Staley, Moon Han, Karim Ahmed, and Mr. Ben Hallaway. These studies include: (1) the role of the intracellular and intercellular membranes in excitation and contraction coupling in heart muscle cells; (2) The function of the Z line and abnormalities in the Z line in abnormally functioning muscle cells; (3) differences in structure and function and enzymatic activity between cardiac and skeletal contractile proteins including myosin, actin, tropomyosin, and troponin; (4) The role of actin conformation change in muscular contraction; and (5) binding interactions of calcium and other metal ions with myosin, actin tropomyosin and troponin and their relationships to muscular contraction.

2. Cellular and molecular studies on immunological tolerance and the role of the thymus. Investigators include Edmond Yunis, Osias Stutman, and Miguel Azar. The role of the thymus and other central lymphoid organs in the development of immunological tolerance is under study. The effect of thymic cells and cell free extracts in the production of immunological competence and tolerance is also studied. Carcinogen induced thymomas and their role in immunological function is included in this overall study.

3. Tissue transplantation antigens and antibodies. Investigator, Edmond Yunis. A study of improved means of tissue histocompatibility matching by laboratory techniques is the aim of this project.

4. DNA replications in developing mammals and the role of constitutive heterochromatins in developmental biology. Investigators, Jorge Yunis and Walid Yasmineh. A study of the role of heterochromatin in patterns of chromosomal replication and in normal and abnormal functional states is included. DNA replication patterns are related to abnormal chromosome patterns.

5. Studies on platelet factors in coagulation. Investigator, J. Roger Edson. A study of the interconversions of platelet factor 3 and their relationship to blood coagulation in normal and in abnormal states is included.

7. Mechanism of hydrogen exchange in proteins. Investigators, Andreas Rosenberg, Ellis Benson, Ben Hallaway. The relationship between protein conformation and kinetics of exchange in aqueous medium is under study. The "motility" or protein, as detected by exchange properties, may have important bearing on such biological events as muscular contraction, antibody-antigen reaction and the interaction of heme proteins with oxygen and other ligands.

8. Investigator, David Brown. Several aspects of the biochemical basis of diabetic vascular disease are under investigation utilizing the experimental models of spontaneous diabetes mellitus in Chinese hamsters as well as alloxan-induced disease in rats. The parameters being studied include determination of the composition and turnover of components of the glomerulus, mesangial cell function and immunofluorescent analysis of the kidney for plasma proteins with particular emphasis on the glomerulus. Other problems being investigated include aspects of the physiologic basis for calcitonin in experimental animals, examination of the effects of growth hormone on sodium transport in frog skin and collagen metabolism in fibroblasts from pateints with connective tissue disorders.

9. Effect of Blood Bank Storage on Leukocyte Function. Investigator, Jeffrey McCullough. Although the survival of erythrocytes, platelets and plasma factors has been well established, very little information is available concerning leukocyte function. We are investigating the effects of anticoagulants and various storage conditions on leukocyte function. Lymphocytes appear functional for at least two weeks under standard storage conditions thus constituting a possible source of graft versus host reaction. Polymorphonuclear neutrophils (PMN) are thought to survive poorly in bank blood; however, we have shown that PMN function is not lost for four days in standard storage conditions. We are now investigating methods for lengthening the storage period and bactericidal capacity of PMN's.

10. Investigator, John Matsen. Research efforts are in the clinical assessment of new antibiotic compounds, in new techniques and procedures in clinical microbiology, in characterizations of pathogenic organisms, and in the delineations of the infectious pathogenesis and appropriate therapy of urinary tract and pulmonary infections.

11. Investigator, Philip Blume. Research in the areas of development of an automated system for clinical bacteriology, development of improved clinical chemistry methodologies, studies of basic immunology, development of improved systems for automated data processing in the clinical laboratory.

12. Investigator, John Rosevear. Research activities are concerned with developing and testing methods for physiological and biochemical monitoring of acutely ill patients, and several other activities in conjunction with patient monitoring in the Department of Surgery and other phases of applied computer technology in conjunction with the Division of Health Computer Sciences.

13. Investigator, Eugene Ackerman. Services in support of research and development are supplied to all of the major subdivision of the Health Sciences Center. These include computer services, tabulation and applied programming services. Computer systems are being developed in coordination with all aspects of the Health Sciences Center. Specific studies utilizing computer techniques include physiological modeling systems, biostatistical models, stochastic modeling of epidemics, temperature effects and organic anion chromatography.

14. Investigator, Clare Woodward. The examination of protein interactions of membrane structural proteins by using the method of hydrogen exchange and nuclear magnetic resonance to study the specific association of plasma membrane structural proteins. The proteins being examined include RNA and alkaline phosphatase. Binary solvents with lipid-like character are being utilized in order to approximate the the cellular environment rather than to use dilute aqueous buffers which may not define intracellular mellieu.

Research Space Available

Room Number	Sq. Ft.	Laboratory
C208	270	Dr. Benson
C210	150	Microbiology
C211	210	Microbiology
C216	110	Dr. Dempsey
C289	350	Chemistry
C290	150	Chemistry
C242	150	Hematology/Chemistry
C244-1	150	Hematology/Chemistry
C244-2	290	Chemistry
C244-3	180	Chemistry
C292	400	Chemistry
B204	150	Blood Bank
D208	200	Blood Bank
L227	360	Genetics
L237	200	Immunology
Diehl Hall	1350	Dr. Vernier, Dr. Warwick
203		Electron Microscopy, Dr. Staley
224		Protein Chemistry

Research Grant Support

Non-Federal	$ 609,456
Federal	665,116
TOTAL	$1,274,572
Non-Federal Pending	$ 53,695
Federal Pending	867,608
TOTAL Pending	$ 921,303

LABORATORY MEDICINE

Undergraduate Courses:

Medical:

5-101 & 102	Methods of Laboratory Examination for Diagnostic Purposes
5-150	Introduction to Clinical Chemistry
5-160	Human Cytogenetics
5-161	Human Cytogenetics Laboratory
5-162	Human Biochemical Genetics
5-163	Human Biochemical Genetics Laboratory
5-765 & 766	Hematology
5-767	Hematology Seminar
5-172	Human Genetics Traits
5-173 & 174	Analytical Techniques in Laboratory Medicine
5-177	Clinical Chemistry
5-181 & 198	Electives for Medical Students
5-181	Laboratory and Clinical Hematology
5-182	Medical Genetics
5-183	Clinical and Laboratory Immunology
5-184	Immunohematology in Blood Banking
5-185	Laboratory Problems in Blood Coagulation
5-186	Clinical Pathology Externship - HCGH
5-187	Clinical Pathology Externship - Mt. Sinai
5-188	Clinical Pathology Externship - Methodist
5-189	Clinical Blood Bank Immunology
5-190	Computer Applications in Laboratory Medicine
5-191	General Clinical Microbiology
5-192	Antibiotic Teaching Unit

5-193	Clinical Pathology Externship at Hibbing
5-194	Computer Applications in Medicine
5-195	Computer Applications in Medical Research
5-196	Computer and Biochemical Patient Monitoring
5-197	Clinical Pathology Biochemistry - St. Paul Ramsey
5-198	Clinical Pathology Hematology - St. Paul Ramsey

5-261	Topics in Hematology
5-262	Topics in Immunology
5-263	Clinical Chemistry Seminar
5-264	Research Seminar
5-265	Departmental Seminar
5-266	Immunology Seminar
5-267	Muscle Cell Structure and Function
5-268	Topics in Clinical Microbiology
5-269	Immunohematology Seminar

Graduate Courses:

8-235	Advanced Clinical Laboratory Medicine. Residency rotation.
8-236	Research on Clinical Laboratory Problems
8-251	Research in Human Genetics

MEDICAL TECHNOLOGY

1-010	Orientation in Medical Technology
1-30, 31, 32	Case Presentations
5-062	Introduction to Clinical Chemistry
5-063	Introduction to Urinalysis
5-065	Clinical Hematology: Methodology
5-066	Introduction to Clinical Immunohematology
5-072	Clinical Chemistry
5-082	Applied Clinical Chemistry
5-086	Applied Clinical Hematology and Immunohematology
5-088	Applied Diagnostic Microbiology
5-090	Special Laboratory Methods
5-092	Honors Program in Laboratory Methods
5-100	Basic Electronics of Laboratory Instruments

GRADUATE COURSES

5-105	Introduction to Biologic Electron Microscopy
5-106	Basic Techniques for Electron Microscopy
5-110 & 111	Advanced Clinical Laboratory Techniques
5-120	Seminar: Medical Technology
5-130, 131	Elements of Administration in Medical Technology
5-140 & 141	Educational Administration in Medical Technology
5-145	Development of Medical Technology
5-150	Selected Topics in Bacteriology
5-151	Selected Topics in Chemistry
5-152	Selected Topics in Hematology

5-153	Selected Topics in Immunology
5-154	Selected Topics in Advanced Techniques and Theory of Electron Microscopy
5-155	Topics: Bacteriology
5-156	Topics: Chemistry
5-157	Topics: Hematology
5-158	Topics: Immunology

Department of Microbiology: Microbiology for medical students educates the future practicing physician in the principles and techniques which help to understand host-parasite relationships and pathogenesis in infectious diseases. The application of modern microbiology to medical diagnosis guides the future physician in the treatment and prevention of infectious diseases and in the use of chemotherapeutic and antibiotic agents.

In the lecture portion of the course, experts in each area review current research and basic principles in medical bacteriology, immunology, mycology and virology. Through intensive laboratory experience the future clinician is trained to interpret laboratory results as well as to appreciate his role in, and the need for, cooperation between the modern physician and the diagnostic laboratory.

Undergraduate Courses

Medical

Microbiology for Medical Students (5-205)	
Immunology (5-216)	Elective
Immunology Laboratory (5-217)	"
Physiology of Bacteria (5-321)	"
Physiology of Bacteria Laboratory (8-322)	"
Biology of Viruses (5-424)	"
Special Problems (5-970)	"
Diagnostic Microbiology (8-242)	"
Advanced Medical Microbiology (8-234)	"
Immunobiology and Immunochemistry (8-218)	"

Dental

Microbiology for Dental Students (5-201)

Others

Elementary Microbiology (1-101)
General Microbiology (3-103)
Medical Microbiology (5-232)
Biology of Microorganisms (5-105)
Ecology of Soil Microorganisms (5-612)
Microbial Genetics (5-311)
General Mycology (5-512)

Graduate Courses

Microbiology Graduate Core Course (8-110, 8-111, 8-112). Integrated series of lectures on microorganisms including ecology, structure and function, growth, nutrition, physiology, metabolism, genetics, virology, immunobiology, medical microbiology, and host parasite interactions.

Microbiology Laboratories (8-120, 8-121, 8-122). Experimentation in general microbiology, ecology, physiology, virology, genetics, immunology and medical microbiology at the graduate level.

Research in Microbiology (8-990)
Seminar (8-910)
Advances in Immunology (8-920).

DEPARTMENT OF MICROBIOLOGY

Extent and Objectives of the Department

The Department of Microbiology will continue to develop and emphasize the quantitative molecular biologic aspects of the science. Physiology, genetics and developmental biology will be continually strengthened. At the same time, however, the Department will not lose sight of the fact that microorganisms do produce disease, and although some of the host-parasite relationships are complex, there is much useful information to be gained somewhat above the molecular level.

The Department maintains strong teaching and research programs at the graduate level, along with an interest in and strengthening of medical school education. The teaching of medical students is a primary function of the department, and the Department has recognized the changing trends in this area.

Under its present administration, the Department will maintain a balance among the various phases of microbiology--basic, applied, clinical--both through primary staff appointments as well as through the concept of joint appointments of microbiologists in other departments. Too, it will continue its present balance between teaching and research.

Staff

Number of Individuals and Academic Rank

6 Professors (primary appointments)
7 Professors (joint appointments)

4 Associate Professors (primary appointments)
4 Associate Professors (joint appointments)

3 Assistant Professors (primary appointments)
2 Assistant Professors (joint appointments)

2 Instructors (primary appointments)

Source and Amount of Funding

Complete departmental resources total approximately $1,064,000 annually; of this amount 73% comes from federal sources and 27% from the state. Salary sources and amounts for the primary staff appointments are as follows:

6 Professors	65% State	35% Federal
4 Associate Professors	83% State	17% Federal
3 Assistant Professors	27% State	73% Federal
2 Instructors	42% State	58% Federal

Research Space

Although the Department of Microbiology will not occupy research space in the B/C building program, renovated animal research laboratories are dependent on this program. We will need to replace our existing facilities on the second floor of Mayo with appropriate space in a different area.

Currently the Department occupies the 9th and 10th floors of the University Hospital where each investigator has appropriate and well-equipped research space. This includes four laboratories for graduate student use and two instrument rooms containing among other equipment, 3 scintillation counters, a Model E analytical ultracentrifuge and Nikon optical comparator, an accelerated system amino acid analyzer and computer, gas chromatograph, preparative ultracentrifuge, gas flow Gm counter, high voltage electrophoresis, ratio recording spectrophotometer, Tiselius electrophoresis equipment, a sonicator with high intensity probe.

Teaching and research space is currently housed on the second floor of the University Hospital and totals approximately 5,300 square feet.

A germfree laboratory and electron microscope facility is now housed in Diehl Hall.

Total research space is approximately 14,529 sq. ft.

Primary Staff Appointments - Department of Microbiology

Dennis W. Watson	Professor and Head
Robert W. Bernlohr	Professor
Gerhard K. Brand	Professor
Martin Dworkin	Professor
Palmer Rogers	Professor
E. L. Schmidt	Professor
Russell C. Johnson	Associate Professor
Yoon Berm Kim	Associate Professor
Peter G. Plagemann	Associate Professor
James T. Prince	Associate Professor
Beulah Holmes Gray	Assistant Professor
Edward Savard	Assistant Professor
James F. Zissler	Assistant Professor
David E. Peterson	Instructor
Jane Wakley	Instructor

DEPARTMENT OF NEUROLOGY

a) Undergraduate

1. Students in their second year of Medicine (Phase B) will be given a series of instructional sessions designed to teach the basic aspects of clinical neurology. These sessions will consist of:

a. A series of 20 hours describing and demonstrating the principles of neuroanatomy and physiology as related to clinical neurology, the technique of the neurologic examination, the technique of bedside neurologic diagnosis and the art of doctor-patient relationship in neurology.

b. A series of 33 hourly lectures covering the more common neurologic diseases encountered in the practice of medicine. This is a combined course in the Neurologic Sciences and will be participated in by Neuroanatomy, Neurophysiology, Neurosurgery, Neuroradiology and Neuropathology along with Neurology. It is an attempt to present a comprehensive survey of neurological disease in all its aspects.

c. An elective consisting of 10-2 hour sessions demonstrating the more common neurologic diseases and discussing their therapy.

d. An elective consisting of bedside rounds of small groups of 2-3 students meeting once weekly with a senior staff member. For this exercise the affiliated hospital services in Neurology will also be used.

2. During the tract system (third and fourth years of Medicine) it is anticipated that students will be assigned full time to the Neurology

service for a 6 weeks period. They will be given full patient responsibility under the supervision of the staff. The affiliated hospitals will also be used for this exercise. For students in their Tract years (third and fourth years) the following additional electives will be available:

Selected Problems in Neurology (NEUR 5-120)

Neurochemistry (NEUR 5-540)

Clinical Electroencephalography (NEUR 5-544)

Genetics (NEUR 5-560)

Pediatric Neurology-Neurochemistry (NEUR 5-541)

Electromyography (NEUR 5-545)

Neuropathology (NEUR 5-550)

Clinical Neurophysiology (NEUR 5-555)

Pathological and Biochemical Correlates of Neurology (NEUR 5-565)

Immunology (NEUR 5-570)

Externship in Consultative Neurology (NEUR 5-575)

b) Advanced Training

1. Graduate Program: This is a 5 year program leading to an advanced degree. The first three years are spent in acquiring an adequate familiarity with basic and clinical neurology to enable the physician to qualify for certification in the specialty of Neurology. It consists of the following:

a. (1) Eighteen months assignment to the clinical neurology service at one or more of the four teaching units (University Hospitals, St. Paul Ramsey Hospital, Hennepin County General Hospital and the

Veterans Administration Hospital) under the supervision of the senior clinical staff at each of these units.

(2) Three months assignment to Child Neurology Clinical service.

(3) Three months service in Clinical Psychiatry.

(4) Six months assignment to Electroencephalography and Electromyography.

(5) Three months assignment to Neuropathology.

(6) Three months assignment to one of the research laboratories in the Department.

b. During this three year period special didactic courses are given to cover special aspects of basic and clinical neurology. These courses are a combination of lecture and demonstration courses. Those that are compulsory are listed:

Advanced Neuropathology

Survey of Neuropathology

Neuropharmacology

Neurological Complications of Internal Disease

Clinical Neurochemistry

Advanced Clinical Neurology

Neurochemistry

Infectious Disease of the Nervous System

Neuro-ophthalmology

Behavior Assessment of the Neurology Patient

Applied EEG and Myography

Applied Neuroroentgenology

Neuroradiology

Neurological Speech Disorders

Neurogenetics

c. As can be seen from the above listed courses there is a close liason in this postgraduate training program with Neurosurgery, Neuroradiology, Neuropathology and Clinical Psychology.

d. After completion of the first three years of applied basic and clinical neurology, the candidate for an advanced degree may select his particular field of basic or clinical interest in Neurology and is assigned to the senior staff man of his choice to spend two additional years in the research laboratories preparing his research thesis for his advanced degree.

2. Postgraduate Program: Same as the first three years of the Graduate Program.

3. Interns: Medical Interns rotate for 1 month on the Neurological service. They are assigned full patient responsibility under the supervision of one of the senior staff in service. They receive the same patient responsibility as the resident staff.

c) Continuing Education

1. Once a year a 3 day refresher course is offered in Neurology. This covers the more common neurologic syndromes encountered by the physician. About 40 internists and practitioners usually attend this course each year.

d) Research Program:

1. (Comments concerning plans to be carried out in Buildings B & C will be deferred until further information can be obtained from Dr. Mulhausen.)

2. Support for research in the Department of Neurology is derived from two major sources and eight or so other research grants. One of the major sources is a special legislative appropriation for research in Multiple Sclerosis and Other Neurological Diseases. The other major source is a NIH grant for a Neurological Center for Research in Cerebrovascular Disease.

Research in multiple sclerosis encompasses not only basic animal studies but also clinical investigations, including drug trials and epidemiologic field work. The basic research is concerned with experimental models such as animals with experimental allergic encephalomyelitis. Other types of neurological diseases are also investigated. For example, there is currently in progress a very definitive study on the use of L-Dopa in patients, which is soon to be expanded into some basic pharmacological research. The laboratory of EEG is engaged in the study of the circadian rhythms as well as computer averaging of transients in health and disease.

The Center for Research in Cerebrovascular Disease is a large, multidisciplinary project involving investigators not only from different departments in the Medical School but also from different shcools in the Health Sciences Center; for example, the College of Veterinary Medicine and the School of Public Health. Clinical studies include the natural history of stroke as exemplified by 150 patients who were examined after an acute

stroke and subsequently on an annual basis. A prospective study in an aging population free of vascular disease is examined at regular intervals. In addition an ICU functions as a clinical laboratory for the study of pathophysiology of acute strokes, particularly those caused by hemorrhage. More basic investigations in the Center include research into methods for cerebral blood flow determination, more advanced electrophysiological techniques, experimental pathology of cerebral infarction and neurochemistry investigations into the role of lipids in cerebrovascular disease as well as brain metabolism under aerobic and anaerobic states. In the area of epidemiology, investigators are engaged in a study of stroke prevalence in Minnesota as well as geographic pathologic studies on cerebral atherosclerosis in which material is collected from approximately 20 countries.

The basic Neurophysiology Laboratory in the Department of Neurology is working in biomedical engineering problems as well as the pathology of spinal cord injury and bladder dysfunction. The Neuropathology Laboratory in addition to the basic research on Cerebrovascular disease is doing research in the pathology of the aging. The latter is based on animal studies as well as human brain tissue.

The Neuromuscular Laboratory is presently engaged in a very definite study in the muscle spindle in health and disease. This involves both animals and human research.

d) 2. (continued)

Number of Individuals	43
ACADEMIC RANK:	
Professors	9
Associate Professors	9
Assistant Professors	13
Instructors	8
Research Fellows	4

- -

Research space available in Department of Neurology

Graduate Instruction - Staff Research space in Department of Neurology-

8,719 sq. ft.

Offices-1112 sq. ft.

Laboratories-5392 sq. ft.

Auxiliary-2215 sq. ft.

Research Grant Support

Pending	
Federal	$779,268
Non-Federal	27,501
TOTAL	$806,769
Existing	
Federal	$821,021
Non-Federal	100,157
TOTAL	$921,178

DEPARTMENT OF NEUROSURGERY: Provides instruction in the discipline of neurosurgery to medical and graduate students. Provides the medical student with the ability to properly examine a patient from a neurological standpoint and to provide him with basic information on those problems which he would be called upon to manage primarily in acute situations such as head injuries, seizures, etc. Under a newly implemented curriculum, faculty members also participate in the first and second year medical student education in Anatomy, Embryology, and Physiology. Such sessions emphasize correlation of basic and clinical sciences. Provides graduate instruction in the specialty of Neurological Surgery; and qualified them for American Board eligibility. Emphasis is placed on academic excellence.

Undergraduate Courses:

Medical:

Clinical Lectures in Neurosurgery (127)
Externship at University Hospital (NSur. 5-500)-Elective
Externship at Veterans Administration Hospital (NSur. 5-510)-Elective
Externship at Hennepin County General Hospital (NSur. 5-511)-Elective
Neurosurgery Investigation (NSur. 5-520)-Elective

Graduate Courses:

Neurosurgery Diagnosis
Neurosurgery Service
Operative Neurosurgery
Neurosurgery Research
Neurosurgery Conference
Neurophysiology Seminar
Neuroradiology Conference
Principles of Neurosurgical Education

RESEARCH PROGRAM

The broad categories of research carried out in the Department of Neurosurgery relate to functions of the canine and human bladder and the development of an automatic stimulating device. Another area is that of brain neoplasm growth and cerebral edema which requires us to have tissue culture and electron microscope facilities. Another broad area is somewhat electrophysiological, having to do with evoked potentials of the spinal cord and the cerebellum. This latter, to some extent, does fit in with the earlier area of functions of the human bladder. Another area of investigation relates to the longitudinal psychometric evaluations of patients with discrete brain lesions which is a study in which we try to assess any significance of various parts of the brain.

Lyle A. French, M. D., M. S., Ph. D.
Professor and Head

Shelley N. Chou, M. D., M. S., Ph. D.
Professor

Manfred Meier, Ph. D.
Professor

William Bradley, M. D.
Professor

Donlin M. Long, M. D., Ph. D.
Associate Professor

James R. Bloedel, Ph. D.
Assistant Professor

John Cleary, M. D.
Assistant Professor

Edward L. Seljeskog, M. D.
In structor

Jess Mottaz
Research Fellow

RESEARCH SPACE IN NEUROSURGERY

Neuropsychology	657 sq. ft.
Electron Microscopy	429 sq. ft.
Electrophysiology	709 sq. ft.
Animal Quarters	PRN
Tissue Photography Lab and Office	132 sq. ft.

Research Grant Support

Federal	$135,964
Non-Federal	93,500
TOTAL	$229,464

DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

Obstetrics and gynecology encompasses all aspects of human reproduction. The course of study in the Medical School provides the student with a basic knowledge of the reproductive process and an understanding of the function of the female reproductive system, especially during pregnancy and childbirth. At University Hospitals, practical obstetrical experience is gained in the management of normal pregnancy, in the evaluation of the status of the fetus in the utero, in the supervision of labor, and in the conduct of delivery. The clinical experience in obstetrics and gynecology is expanded at affiliated community hospitals. Experience in gynecology includes a systematic study of the diagnosis and therapy of diseases of the female reproductive system and includes gynecological endocrinology and clinical gynecological cytology and pathology. In seminars and small group discussions, problems of current importance in human reproductive biology are discussed, ranging from the broad social problems of fertility regulation to the specific medical problems of the infertile couple.

The primary aim of the Department of Obstetrics and Gynecology is to provide a basic foundation which will enable the student to master the fundamentals of the human reproductive process at a level consistent with his ultimate career goals. Accordingly, a series of clinical and investigative elective courses are available to interested students.

Undergraduate Program (see above narrative)

Lectures in Obstetrics and Gynecology (5-120)
The physiology of pregnancy, labor, and the puerperium. The diagnosis and therapy of the common diseases of the female reproductive system. (4 cr; 1 hr./wk.)

Introduction to Obstetrics and Gynecology (5-124)
A series of lectures to acquaint the student with the problems of the specialty of obstetrics and gynecology and to provide an introduction to clinical obstetrics. (1 cr.)
NOTE: In the 1970-71 academic year, this course will be replaced by an interdepartmental course in Phase B called "Reproduction."

Clinical Clerkship in Obstetrics and Gynecology (5-135)
Supervised study of hospitalized and clinic patients at University Hospitals and selected affiliated community hospitals. (12 cr.)

Externship in Obstetrics (5-500)
Elective. (Cr. ar.)

Externship in Gynecology (5-505)
Elective. (Cr. ar.)

Externship in Obstetrics and Gynecology (5-510)
Elective. (Cr. ar.)

Obstetrics and Gynecology Externship in Clinical Practice (5-515)
Elective. (Cr. ar.)

Problems in Obstetrics and Gynecology (5-520)
Elective. (Cr. ar.)

Psychiatric Aspects of Obstetrics and Gynecology (5-540)
Elective. (Cr. ar.)

Advanced Training

The advanced training program consists of a formal, Board-approved, 4-year residency program at the University of Minnesota Hospitals. In addition, a post-graduate program, leading to an advanced degree, is available.

Graduate Program: Advanced Obstetrics and Gynecology, Part I (8-201)
Advanced Obstetrics and Gynecology, Part II (8-205)
Advanced Obstetrics and Gynecology, Part III (8-209)
Advanced Seminar (8-213)
Research in Reproduction (8-230)
Clinical Obstetrics and Gynecology (8-221)
Gynecological Oncology (8-222)
Gynecological Endocrinology (8-223)

Postgraduate Program: The Department of Obstetrics and Gynecology has positions available for six (6) post-doctoral fellows each year (see below - Research Program).

Intern and Residents: The Department of Obstetrics and Gynecology has positions available for six (6) interns and twenty-four (24) residents each year.

Research Program

The research program of the Department of Obstetrics involves five major areas of investigation. These programs are not only investigational but are also training programs for both undergraduate and graduate departmental instruction. All will be carried out wholly or partially in buildings B-C.

1. Reproductive Endocrinology and Infertility
   - Staff: Erlio Gurpide, Ph.D., Professor Ob-Gyn and Biochemistry
     John J. Sciarra, M.D., Ph.D., Professor Ob-Gyn
     George E. Tagatz, M.D., Assistant Professor Ob-Gyn
     Richard P. Bendel, M.D., Assistant Professor Ob-Gyn
     John Tseng, Ph.D., Assistant Professor Ob-Gyn
     Linda Tseng, Ph.D., Assistant Professor Ob-Gyn
   - Projects: Steroid dynamics and metabolism
     Hormone production by the placenta
     Angiotensin studies in pregnancy
     Evaluation of the infertile couple
     Gynecological endocrinology
   - Funding: Departmental
     Federal and private grants

2. Reproductive Physiology
   - Staff: Edward C. Hanisch, Jr., M.D., Assistant Professor Ob-Gyn and Anesthesiology
     Luis Escarcena, Research Fellow
   - Projects: Measurement of fetal and maternal parameters associated with normal and abnormal labor
     Placental transfer of drugs
     Analgesia in obstetrics

Funding: Departmental
Federal and private grants in preparation

3. Placental Physiology and Pathology
   Staff: John J. Sciarra, M.D., Ph.D., Professor Ob-Gyn
   Takashi Okagaki, M.D., Professor Ob-Gyn
   Projects: Protein hormones of the placenta
   Gynecological pathology
   Electron microscopy in gynecological pathology
   Diagnostic cytology
   Funding: Departmental
   Federal and private grants in preparation

4. Gynecologic Oncology
   Staff: Konald A. Prem, M.D., Professor Ob-Gyn
   Robert D. Hilgers, M.D., Assistant Professor Ob-Gyn
   Preston P. Williams, M.D., Instructor Ob-Gyn
   Projects: Evaluation of therapy of gynecologic malignancies
   Premalignant changes of uterine cervix
   Embryonal Rhabdomyosarcoma of the bladder
   Stromal luteination of the ovary
   Clinical application of laparoscopy in gynecology
   Funding: Departmental

5. Psychiatric Aspects of Obstetrics and Gynecology
   Staff: Irving C. Bernstein, M.D., Clinical Professor Ob-Gyn and Psychiatry
   Projects: Psychiatry in residency education in Ob-Gyn
   Funding: Departmental

Research Grant Support

Federal:	90,620
Non-Federal:	23,000
TOTAL:	$113,620

Department of Ophthalmology: It is the general objective of the Department of Ophthalmology to provide the medical student with sufficient knowledge of the function, measurement of function and diseases of the visual system, particularly as they relate to systemic diseases. It will provide those medical students with particular interest in the field of Ophthalmology, the opportunity to express it either at the clinical level or in the research laboratory. It will adequately train at the graduate level physicians for the private practice of Ophthalmology. It will provide certain, selected, interested individuals additional training so that they may have the necessary background for academic ophthalmology. It will develop a basic research program in the field of Ophthalmology which will embrace the major basic sciences as they are applied to the study of ocular tissues. It will develop a clinical research program which may or may not tie in with the basic research being done in the laboratory but by so doing to acquaint the graduate student regardless of his ultimate goals with the requirements of doing and evaluating good research. It will develop within the framework of the department a service program which will devote itself to certain of the special areas of service which are either best handled in a large center because of the necessary equipment and expertise for which the center can serve as consultant to the individuals in the private practice of Ophthalmology. It will provide the mechanisms for continuing education of both the generalist or family practitioner and the specialist in the field of Ophthalmology.

Medical:

Ophthalmology	(5-100)
Externship in Ophthalmology	(5-181)
Ophthalmology Research Problems	(5-190)

Graduate Courses:

Clinical Ophthalmology	(8-101)
Practical Ocular Surgery	(8-131)
Ocular Pathology Conference	(8-141)
Basic and Applied Ophthalmology	(8-151)
Seminar: Ophthalmology	(8-154)
Neuro-ophthalmology	(8-701)
Refraction	(8-121)
Ocular Motility	(8-105)
Pathology of the Eye	(8-143)
Radiology of the Eye, Orbit and Head	(8-104)
External Diseases	(8-102)
Medical Ophthalmology	(8-103)
Physiologic Optics	(8-122)
Ophthalmology Laboratory	(8-152)
Research in Ophthalmology	(8-153)
Ophthalmic Pathology Laboratory	(8-142)
Strabismus Management	(8-106)
Anatomy of Orbit	(8-107)

1. Basic Research

A. Lens

1. Study of the factors which control the cation and water content of the lens. This is ultimately aimed at a better understanding of cataract formation. Fluxes of cations are measured using appropriate isotopes. Studies of the labeled amino acid uptake are also included. Lenses are almost exclusively from experimental animals and our studies range from that of the normal to those lenses made cataractous by various means.

2. Isolation and characterization of enzymes of the lens, in particular, LDH and the enzymes involved in the synthesis of glutathione. Glutathione is found in higher concentration in the lens than in any other tissue. It is one of the first substances to disappear in cataract formation.

3. Identification and characterization of antigens common to the lens and skin. These studies have clinical significance in that certain skin disorders are associated with cataracts.

4. Other studies which are germane to the three main ones listed above are also carried out as needed. These include changes in total protein, free amino acids, lipid composition, etc., in various experimental situations involving the normal and cataractous lens.

B. Cornea

1. Study of the factors which control the hydration of the cornea. These studies are done generally on experimental animal corneas although a fair number of human corneas are also used. A variety of parameters are measured. The clinical significance of these studies lies in the fact that most corneal insults cause hydration and decrease in clarity.

2. Study of the factors which influence the homograft reaction in a corneal transplant. Our concern here has been with the particular structures of the cornea involved in the induction of the homograft reaction.

3. Identification and characterization of antigens common to the skin and the cornea. This is part of the same study which is being carried out in the lens and motivated by the same reasons, namely, certain skin diseases are associated with corneal disease.

4. Studies of other factors which might influence the fate of a corneal transplant. These include such practical things as the ability to determine the viability of donor material, the preservation of donor material, technical aspects of corneal transplants and the like.

C. Study of the factors that produce retinal detachments in monkeys and the pathogenesis of same.

D. Study of the turnover of aqueous humor using various isotopes. These studies include the formation and the routes of drainage under various conditions.

E. Study of the penetration via various routes and distribution within various ocular structures of drugs of ophthalmic interest. Radio-isotopically labeled drugs are employed.

F. Special pathologic studies of various human ocular diseases.

II. Clinical Research

A. Studies of the etiology and modes of treatment of retinal detachment on a broad front. This includes genetic aspects of retinal detachment, association with other diseases, detachments in children, operative techniques, factors leading to delayed infection and the like.

B. Studies of the natural history and the effect of photocoagulation on diabetic retinopathy.

C. Studies of various retinal diseases employing fluorescein angiography.

D. Studies of various corneal diseases over a rather wide front, particularly the rather intractable corneal diseases not amenable to usual therapeutic techniques and the use of keratoplasty in these diseases. Also included are studies of congenital corneal diseases, studies on corneal transplantation in the human and the like.

E. Studies of the ocular diseases of children particularly those due to a prenatal influence.

F. Studies of problems of the extraocular muscles.

The professional personnel carrying on these studies include one individual with both Ph. D. and M. D. degrees, who is a professor, two Ph.D's in Biochemistry, one an associate professor and the other an assistant professor and three M.D.'s, one an associate professor and the other two, assistant professors. In addition, there is one key individual who has a M. S. degree in Biochemistry who holds a civil service rank of Scientist. All are full time in the Department of Ophthalmology. Eleven non-professional personnel with various civil service ratings assist in the research program. Residents and Special Fellows are also engaged in research, both basic and clinical.

The major source of funding for research is from the NIH. Currently this totals $159,402. This is derived from the two major research grants listed below. Current private support totals approximately $40,000. This comes from a variety of sources and is generally uncommitted support. Representative of these sources are Research to Prevent Blindness, Inc., the Minnesota Lions Clubs and individual gifts. In addition, the department has a vision research training grant from the NIH in the amount of $70,964. Finally the Department of Ophthalmology is under contract to the National Eye Institute to study vision manpower in the United States. This is financed at the level of $40,000.

Current Support:

Principal Investigator: John E. Harris, Professor and Head
Title: Movement of Water and Solutes across Ocular Barriers
Source of Fund: NIH

Principal Investigator: William B. Rathbun, Assistant Professor
Title: Antigenic Relationships between Lens and Skin
Source of Fund: NIH

Submitted:

Principal Investigator: William B. Rathbun, Assistant Professor
Title: Antigenic Relationships between Lens and Skin (continuation)
Source of Fund: NIH

Principal Investigator: W. L. Fowlks, Associate Professor
Title: Study of the Blood Vitreous Body Barrier using several radioisotopes simultaneously
Source of Fund: Seeing Eye, Inc.

Existing Space		sq. ft.
Diehl 228	Sterile pack, washroom, and storage	156
Diehl 230	General purpose room	243
Diehl 250	Research lab, eye bank	291
Diehl 251	Research lab	434
Diehl 254	Instrument room	132
Diehl 255	Research lab	585
Diehl 256	Lab darkroom	70
VFW 162A	Research lab	230
VFW 173A	Cold room	100
Powell 6413	Research office	180
	Total	2,421

The research program to be carried on in the proposed facilities will include an expanded version of that already underway. Our basic programs which lie in the area of the biochemistry and physiology of the normal and pathologically altered ocular structures will continue. Increased space will permit the department to move forward on all projects at once instead of individually as is now the case. New projects will include studies of the electrical response of the retina and the extraocular muscles using the electroretinogram, electro-oculogram, evoked occipital potentials and electromyograms. Electron microscopy studies of the pathologically altered ocular structures will also be mounted.

DEPARTMENT OF ORTHOPEDIC SURGERY:

COURSE LISTINGS:

UNDERGRADUATE:

Clinical Lectures in Orthopedic Surgery (140)

Externship in Orthopedic Surgery and Fractures (185)

Research Problems (186)

Externship in Orthopedic Surgery (5-185) Elective
Externship in Orthopedic Surgery (5-187) Elective
Externship in Orthopedic Surgery (5-188) Elective
Externship in Orthopedic Surgery (5-189) Elective

GRADUATE:

Orthopedic Conference

Fractures

Orthopedic Diagnosis

Pediatric Orthopedics

Orthopedic Problems and management

Orthopedic Pathology

Orthopedic Operative Surgery

Orthopedic Anatomy

Orthopedic Research

Department of Orthopedic SurgerY: Provides the medical student with the ability to properly examine a patient from an orthopedic standpoint and to provide him with basic information on those problems which he would be called upon to manage in a variety of situations. Provides graduate instruction in the specialty of orthopedic surgery.

DEPARTMENT OF ORTHOPEDIC SURGERY FACULTY:

PROFESSOR AND HEAD:
- John H. Moe, M.D.

PROFESSOR EMERITUS:
- Dr. Wallace H. Cole

CLINICAL PROFESSOR EMERITUS:
- Edward T. Evans, M.D.

CLINICAL PROFESSOR:
- Harry B. Hall, M.D.

ASSOCIATE PROFESSOR:
- William J. Kane, M.D.

CLINICAL ASSOC. PROF. EMERITUS
- Carl C. Chatterton, M.D.

CL. ASSOCIATE PROFESSOR
- Lester W. Carlander, M.D.
- Frederick C. Drill, M.D.
- Richard H. Jones, M.D.
- Harvey E. O'Phelan, M.D.
- Ramon B. Gustilo, M.D.

ASSISTANT PROFESSOR:
- David S. Bradford, M.D.
- James H. House, M.D.
- Robert Premer, M.D.
- Thomas Comfort, M.D.

CL. ASSISTANT PROFESSOR:
- Paul M. Arnesen, M.D.
- Frank S. Babb, M.D.
- Robert M. Barnett, M.D.
- Paul O. Gustafson, M.D.
- Arnold Hamel, M.D.
- Edward H. Kelly, M.D.
- Sheldon M. Lagaard, M.D.
- Donald R. Lannin, M.D.
- D. Keith Millett, M.D.
- George E. Nelson, M.D.
- Richard E. Reilley, M.D.
- Frederick G. Rosendahl, M.D.
- Joseph M. Tambornino, M.D.
- Wayne W. Thompson, M.D.
- Robert B. Winter, M.D.

INSTRUCTOR:
- Charles C. Lai, M.D.

CLINICAL INSTRUCTOR:
- Michael Davis, M.D.
- David Florence, M.D.
- Richard Granquist, M.D.
- John A. Hartwig, M.D.
- Richard J. Johnson, M.D.
- Lowell H. Kleven, M.D.
- John Larkin, M.D.
- William R. Leslie, MD.
- Thomas Litman, M.D.
- Donald Madsen, M.D.
- Roland F. Neumann, M.D.
- Paul G. Patterson, M.D.
- Edward L. Salovich, M.D.
- Elmer R. Salovich, M.D.
- Irwin F. Schaffhausen, M.D.
- Francis J. Trost, M.D.

LABORATORY SPACE NOW ASSIGNED TO ORTHOPEDIC SURGERY

Mayo B190	127 square feet
Diehl F123	243 square feet

DEPARTMENT OF OTOLARYNGOLOGY

The medical student first becomes acquainted with otolaryngology through a series of didactic lectures which emphasize broad aspects of the field and discussions of basic principles when applicable. This provides the necessary first step in familiarization with the content of the specialty. The essence of teaching in the Department of Otolaryngology consists of active student participation in the clinical examination and diagnosis of patients with otolaryngological disorders. This is supplemented by video tape presentations as well as discussions and seminars with the faculty. During this time the student develops skills in the examination (especially indirect laryngoscopy) and interpretation of findings. Students are also encouraged to spend additional elective time in clinical, surgical, and research services in the Department.

The graduate level physician will receive training for the private practice of otolarngology. The program will also train certain, selected and interested physicians for careers in academic otolaryngology. There will be an opportunity for clinical as well as basic research so as to acquaint the graduate student, regardless of his goals, with the fundamentals of doing and evaluating research.

The objectives in research in the Department of Otolaryngology are to push forward our frontiers of knowledge as regards all of the communicative disorders. The communicative disorders especially involve deafness and speech problems. The research program in Otolaryngology is devoted to clinical otolaryngology as well as the communicative disorders and as such is involved with problems of head-neck oncology, etc. The main thrust of the research effort in this department is in the direction of deafness research. Each resident participates in research and full-time and part-time faculty participate in research as well. The future objectives are to expand current activities and to add additional faculty and additionally needed research laboratories. The following laboratories are currently established in the Department of Otolaryngology: 1) Temporal Bone Pathology and Light Microscopy, 2) Electron Microscopy, 3) Psychoacoustics, 4) Audiology Research, 5) Biochemistry of the Ear, Nose and Throat, 6) Vestibular Research and Electrophysiology, 7) Animal Clinical Operating and Storage Facilities. It is felt that research training built into the graduate training program of otolaryngologists enhances the clinicians ability to provide service as well as to keep current in new developments in his field. At the same time there is a dire need for teacher-investigators in the the profession of otolaryngology. The residency training program in otolaryngology has gone from a four to a five year program, mainly to allow each resident to participate more meaningfully in research oriented projects. This will, we hope, provide a partial answer to the serious manpower shortage as regards quality teacher-investigators in the field of otolaryngology.

Presently the Department has 2,500 square feel of research oriented space at the University Hospitals (about 4,000 - 5,000 for the entire program including the affiliated hospitals).

Research Grant Support

Federal:	20,600	Non-Federal:	238,718	TOTAL:	$ 259,318

Department of Pathology

Special concern of the department with experimental pathology and pathogenetic analysis of human disease will be contined, developed and expanded. Intensive research and teaching programs focused in application using modern methodologies of virology, biochemistry, immunochemistry, membrane chemistry, chronobiology, immunobiology, experimental pathology, cancer biology, cellular biology, tissue culture techniques, ultrastructural analysis and the approaches of cellular and immunologic engineering will be emphasized and expanded.

Courses Offered in the Department of Pathology

Medical (Undergraduate)

General Pathology (5-101)

Dental (Undergraduate)

Pathology for Dental Students (5-100)

Health related Sciences (Undergraduate)

Pathology for Pharmacy Students (5-099)
Pathology for Physical Therapists (3-060)
Pathology for Mortuary Science (5-053; 5-054)

Elective Courses - Offered to Interns, residents and Phase B,C,D Medical Students

Current	To Be Offered
Diseases of the Kidney	Immunopathology
Diseases of the Heart	Clinical immunobiology
Diagnosis of Tumors	Neonatal pathology
Surgical Pathology (Given also at HCG & VAH)	Demonstrations in gross pathological analysis
Problems in Pathology (Given also at HCG & VAH)	Demonstrations in microscopic pathological analy
Basic Science of Cancer	Cancer biology
Forensic Pathology	Endocrine pathology
Introduction to Cytopathology	Chronobiology
	Pathogenesis of renal disease
	Viruses and pathogenesis of human disease
	General pathology in clinical practice
	Seminar in immunobiology
	Seminar in pathology
	Transplantation pathology
	Membranes - their chemistry, structure and role in disease.

Graduate Courses offered to Residents and Interns

Autopsies (5-104)

Conference on Autopsies (5-111)

Surgical Pathology (5-113)

Seminar: Experimental Pathology (Path 140)

Problems in Experimental Pathology (5-141)

Research (8-201

Research program

Currently research programs are actively underway addressing the following major issues in pathology. These research programs will be developed and expanded in the new areas to be provided with expansion in B/C: Nuclear transplantation cell fusion hybridization and complementation, control of intracellular membrane fusion, long and short term tissue culture of tumor lymphoid cell strains and lines, culture cell lines from patients with defective phagocytosis and cell lines from patients with increased susceptibility to cancer. Fundamental mechanisms of the phagocytic process, phagocytic killing of bacteria and viruses, intracellular metabolism that originates with phagocytic processes, functions, controls and role in human disease of monocytes and alveolar macrophages. The nature and fundamental basis of genetically determined diseases of immunodeficiency in man, ontogenetic and phylogenetic development of the lymphoid system and immune responses, pathogenetic basis of renal disease, nature of immunologic responsiveness and tolerance, enhancement and blocking antibodies; tumor immunology; viral and chrmical carcinogenesis; viruses in pathogenesis of human and experimental diseases especially "autoimmune" and mesenchymal diseases of man and animals. In addition we are studying the etiologic and pathogenetic role of viruses in experimental and human cancer; complement and effector mechanisms in human disease; ontogenic and phylogenetic development of the complement system. Immunochemistry and physical chemistry of immunoglobulins focused in developmental perspective. Cellular engineering and marrow transplantation are being developed as an approach to immunodeficiency diseases, aplastic anemia, leukemia, malignancy and blood dyscrasias. Opportunistic and neonatal infections are under analysis. Morphologic analysis of tumors will be continued as well. Origin and nature of congenital cardiac defects. Biochemical and immunochemical basis of specificity in cell mediated immunity; role of nutrional and endocrine factors in development and maintenance of the lymphoid system. The basis of programmed involution of the lymphoid system with aging are being investigated. Pathogenetic basis of autoimmunity,

Research program Con't

malignancy and flagging immunity with aging are under study. Further programs encompass relation of histocompatibility determinants to development of congenital abnormality. Cytogenetics, chemical genetics.

Research Grant Support

Federal	$306,780
State	68,821
TOTAL	$375,601

DEPARTMENT OF PEDIATRICS

The field of pediatrics is concerned with the basic aspects of human developmental biology during prenatal and postnatal life extending through the entire period of growth and development to maturity. Students obtain experience by participating in the patient-care programs for children in the outpatient and inpatient services of the University Hospitals and in affiliated community hospitals. Working experience in all aspects of diseases as they occur in children is provided. Students have the opportunity to observe and participate in diagnostic and care programs concerned with the premature and the newborn, growth and developmental processes, endocrinology, allergy, cardiology, psychiatry, communicable diseases, and in problems of a nutritional or metabolic nature. There is considerable emphasis on preventive as well as therapeutic medicine. The program provides a broad spectrum of experience concerning all of the medical, psychologic, and social problems that may affect children.

To help the student reinforce fundamental concepts, the program maintains strong emphasis on the application of basic knowledge in the prevention, diagnosis, and management of diseases in infants and children. Opportunities for a special interest in selected areas of pediatrics are provided to interested students.

Undergraduate Courses

Medical:

- Clinical Lectures in Pediatrics (Ped 120)
- Clinical Clerkship in Pediatrics (Ped 135)
- Clinical Pharmacology (Ped 5-542) - Elective
- Nephrology at the University Hospital (Ped 5-543) - Elective
- Immunology at the University Hospital (182M) - Elective
- Pediatric Pulmonary Disease (Ped 5-544) - Elective
- Infectious Disease at University Hospital (Ped 1820) - Elective
- Pediatric Neurology at the Mayo Clinic (Ped 5-541) - Elective
- Child Psychiatry at the Mayo Clinic (Ped 5-545) - Elective
- Research at Community University Health Care Center (Ped 5-571) - Elective
- Research in Pediatrics (Ped 183) - Elective
- The Prenatal Interview as a Predictor of Health Risk Areas for the Child (Ped 5-572) - Elective
- Research in Immunocytology (Ped 5-573) - Elective
- Inpatient Externship at Hennepin County General Hospital (Ped 501) - Elective
- Inpatient and Outpatient Externship at Children's Hospital (Ped 502) - Elective
- Inpatient Externship at St. Paul Ramsey Hospital (Ped 503) - Elective
- Outpatient Externship at University Hospital (Ped 511) - Elective
- Outpatient Externship at Hennepin County General Hospital (Ped 512) - Elective
- Clinical Experience at Community-University Health Care Center (Ped 513) - Elective
- Community Pediatrics at Pilot City Health Center (Ped 514) - Elective
- Outpatient Health Care at St. Paul Ramsey Hospital (Ped 515) - Elective
- Clinical Pediatrics at the Mayo Clinic (Ped 516) - Elective

Neo-Infant Program (Ped 531) - Elective
Clinical Immunology at University Hospital (Ped 532) - Elective
Pediatrics Cardiology at the Mayo Clinic (Ped 533) - Elective
Pediatrics Cardiology at the University Hospital (Ped 543) - Elective
Infectious Disease (Ped 535) - Elective
Pediatric Hematology-Oncology at University Hospital (Ped 536) - Elective
Pediatric Endocrinology and Metabolism at University Hospital (Ped 537) - Elective
Endocrinology and Metabolism (Ped 538) - Elective
Introduction to Neonatology (Ped 539) - Elective
Pediatric Neurology at University Hospital (Ped 540) - Elective

Graduate Courses

Pediatric Seminar
Pediatric Clinic
Pediatric Residency
Pediatric Special Interest
Pediatric Research

The Department of Pediatrics--John A. Anderson, Professor and Head

The Department of Pediatrics has developed historically from primarily clinical investigation to a healthy mixture of clinical and basic science investigations. For purposes of discussion the research interests of the Department can be arbitrarily divided into seven groups:

I. The Biochemical Group include studies of the metabolism of amino acids related to birth defects, direct and indirect calorimetry in newborns, maturation of adrenocortical function in the newborn, problems of diabetes, hypoglycemia and growth, the effects of growth hormone on collagen and protein synthesis, neonatal pharmacology, embryogenesis of the adrenergic nervous system, neutrophil metabolism during bacterial phagocytosis and studies of pulmonary disease in infants and children.

II. The Renal Group has a long standing interest in the pathogenesis of glomerulonephritis, the nature of cellular and renal extracellular membranes and the immunopathology of renal disease.

III. The Infectious Disease Group is studying the biology of pathogenic staphylococci, the biology and epidemiology of Group A streptococci, the pathogenesis of rheumatic fever and studies of factors involved in phagocytosis.

IV. The Hematology-Oncology Group conducts a large diagnostic, treatment and research program in the cancer of childhood, chemotherapy of leukemia; basic investigations in the areas of platelet ultrastructure and function; the metabolism of phospholipid and cholesterol in cell membranes and coagulation studies in patients with cardiac disease.

V. The Immunology Group has a long and famous history of the study of the development of the immune systems, the pathogenesis of auto immune disorders, the study of renal disease in children, the phylogenetic development of plasma proteins, the developmental bases for birth

defects of the immunological apparatus and body defenses, the relationship of immunogenesis and leukemogenesis; and in the area of transplantation, studies immunologic responses, tolerance, and transplant antigens.

VI. The Cardiology Group is involved primarily in diagnosis of congenital heart diseases, pre and post operative management of cardiac surgical patients and the long term follow-up of the cardiodynamics following cardiac surgery.

VII. The Ambulatory Pediatrics Group has an active program of research in community pediatrics which includes the delivery of pediatric comprehensive care to disadvantaged neighborhoods in two locations; the Community-University Health Care Clinic and the Pilot City Project. The University Hospitals Out-Patient Department Group works in conjunction with the faculty and staff in directing birth defects and special clinics related to specific disease problems.

Areas in which research programs are being developed that will represent expansion of research and teaching in the Department of Pediatrics include virology, neonatology and gastroenterology. These programs cannot be developed and those programs presently in existence cannot be adequately housed without expanded facilities. It is proposed that the new pediatric research laboratories in Building A and B will house the following groups: Biochemical Group, Renal Group, Virology, Neonatology, and Gastroenterology. Without this facility, faculty expansion for educational needs of larger medical school classes will not be possible. It is anticipated that the location of pediatric laboratories and offices on the same level as patient-care facilities will create an environment which affords ample communication of medical students with faculty, postdoctoral fellows and associated medical personnel. This should provide an ideal situation for development of programs in which students participate in bedside care and laboratory investigation of clinical problems relative to the pathogenesis, diagnosis, and treatment of human disease. In addition the availability of an extensive research program in the Department of Pediatrics will provide a consultative service for the region at a unique highly sophisticated level and create an atmosphere in which quality of medical care is stimulated and developed.

NUMBER OF INDIVIDUALS IN THE DEPARTMENT OF PEDIATRICS
ACADEMIC RANK

Professor and Head	1	Research Fellows	7
Professors	15	Research Specialists	13
Associate Professors	12	Research Assistants	2
Assistant Professors	23	Medical Fellows (Research)	30
Research Associates	3	Medical Fellows (Resident)	32
Lecturers	4	Interns	17
Instructors	6		
		TOTAL:	163

RESEARCH GRANT SUPPORT

Federal: $1,530,908 Non-Federal: $276,503 TOTAL: $1,807,411

Department of Pharmacology: The purpose of the medical courses in pharmacology is to provide students with a fundamental understanding, in depth, of underlying principles upon which rational therapy is based. Emphasis is placed on mechanism of action, absorption, distribution, biotransformation, and excretion of drugs both in general and in specific terms. Laboratories and therapeutic conferences are included as adjuncts to lectures so that actions of drugs in health and disease can be illustrated. During the clinical experiences, clinical pharmacologists attempt to show by means of ward rounds and clinical conferences how principles of pharmacology are applied for treatment of disease in patients.

Undergraduate Courses:

Medical:

General Pharmacology (INMD-213)

Forensic Medicine, Medical Jurisprudence (5-105) - Elective

Problems (5-109)

Advanced Pharmacology: Pharmacodynamics (8-212, 8-213) - Elective

Toxicology (Phcl. 5-106) - Elective

Advanced Pharmacology: Physiological Disposition of Drugs (8-211) - Elective

Research in Pharmacology (Phcl. 8-203) - Elective

Seminar: Selected Topics in Pharmacology (Phcl. 8-204) - Elective

Seminar: Psychopharmacology (Phcl. 8-207) - Elective

Clinical Pharmacology (Phcl. 5-501) - Elective

Clinical Pharmacology (Phcl. 5-202) - Elective

Department of Pharmacology - Continued

Dental:

Dental Therapeutics (1-001)

General Pharmacology (5-101, 5-102)

Dental Therapeutics (5-108)

Others:

Pharmacology for Nursing Students (1-009)

General Pharmacology (5-101, 5-012)

Toxicology (5-106)

Biological Assay of Drugs (5-162)

Pharmacometrics (5-107)

Graduate Courses:

Research in Pharmacology (8-203)

Seminar: Selected Topics in Pharmacology (8-204)

Seminar: Psychopharmacology (8-207)

Prim. of Phcl. (8-210)

Physiological Disposition of Drugs (8-211)

Pharmacodynamics (8-212 and 8-213)

Toxicology (8-214)

Chemotherapy (8-215)

Endocrine Phcl. (8-216)

Cardiovascular-Renal Phcl. (8-217)

Neuropharmacology (8-218)

Behavioral Phcl. (8-219)

DEPARTMENT OF PHARMACOLOGY

A. Number of individuals and academic rank associated with research

Chairman and Professor	1
Professors	3
Associate Professors	5
Assistant Professors	8
	17

B. Departmental grant funding and source

1) Current research grants

No. of Grants	Grantor	Source of Funds	Amount
12	NIH	Federal	$556,320
		Subtotal - Federal	$556,320
2	PMA	Private	$ 18,042
2	SKF	Private	3,800
2	MHA	Private	8,150
6	Misc	Private	17,100
		Subtotal - Private	$ 47,092
		Current Total	$603,412

2) Pending Research Grants

No. of Grants	Grantor	Source of Funds	Amount
2		Federal	$70,516
1		Private	12,225
		Total	$82,741

AVAILABLE RESEARCH SPACE

Total Area 15,094 sq. ft.

Department of Physical Medicine and Rehabilitation: The comprehensive medical management of patients with chronic disease and disability requires that the physician be skilled in leading the multidisciplinary approach of the health sciences. The Department of Physical Medicine and Rehabilitation utilizes the rehabilitation center to provide within a single area of University Hospitals the setting in which the multidisciplinary approach can be taught. By example, precept, and tutorial methods the concept of comprehensive care of the patient as the minimal program for adequate patient care is taught. Methods of coordination, communication, leadership, and administration are taught upon a foundation of patient management and the practice of physical medicine. By active involvement the student may become prepared for similar activities in his own professional practice. The rehabilitation process takes place in a setting of research into new techniques and programs for the better management of patients and for the better education of members of the health professions.

Undergraduate:

Medical:

181 (5-410). Adult Rehabilitation Medicine.
181 (5-411). Pediatric Rehabilitation Medicine.
181 (5-412). Arthritis Rehabilitation.
181 (5-413). Amputation Rehabilitation.
181 (5-414). Physical Medicine and Rehabilitation for the Family Physician.
181 (5-415). Psychological Aspects of Chronic Disease.
181 (5-420). Histopathology, Electrodiagnosis, and Kinesiology.
190 (5-430). Research in Physical Medicine and Rehabilitation.

Occupational Therapy:

1 (1-001). Introduction to Occupational Therapy.
2B (5-201). Orientation to Physical Therapy and Rehabilitation.
3 (1-003). Orientation to Occupational Therapy.
5 (1-004). Therapeutic Recreation.
55 (5-375). Community Resources.
57 (5-100). History and Philosophy of Rehabilitation Medicine.
61-62 (5-161/5-162). Medical Science Lectures.
66 (5-391). Introduction to Scientific Literature.
67 (5-392). Methods of Scientific Research.
71 (5-340). Theory: Human Development.
72 (5-341). Theory: General Medical and Surgical Conditions.
73 (5-342). Theory: Psychosocial Dysfunction.
74-75 (5-310/5-311). Therapeutic Activities.
76 (5-312). Techniques of Occupational Therapy.

77 (5-343). Theory: Physical Dysfunction.
78 (5-360). Group Process Seminar.
79 (5-393). Advanced Evaluation Techniques.
82 (5-182). Functional Neuroanatomy and Neurophysiology.
83B(5-330). Theory and Technique of Muscle Function, Tests, and Measurements.
84 (5-370). Rehabilitation Procedures.
93 (5-380). Administration and Supervision.
94-95-96 (5-396/5-397/5-398). Clinical Education in Occupational Therapy.

Physical Therapy:

2A (1-002). Orientation to Physical Therapy.
4 (5-301). Orientation to Occupational Therapy.
54 (5-105). Medical Terminology.
57 (5-100). History and Philosophy of Rehabilitation Medicine.
58 (5-223). Bandaging, Aseptic, and Isolation Techniques.
59 (5-220). Therapeutic Procedures I.
60A(5-221). Therapeutic Procedures II.
61-62 (5-161/5-162). Medical Science Lectures.
68 (5-275). Applied Anatomy.
70 (5-222). Theory and Technique of Massage.
80A-B (5-281/5-282). Theory of Therapeutic Exercise.
81A-B (5-283/5-284). Techniques of Therapeutic Exercise.
81C(5-285). Techniques of Therapeutic Exercise.
82 (5-182). Functional Neuroanatomy and Neurophysiology.
83A(5-230). Theory and Technique of Muscle Function; Tests and Measurements.
85 (5-270). Rehabilitation Procedures.
87 (5-215). Introduction to Physical Therapy Clinical Education.
88 (5-255). Clinical Education in Physical Therapy.
89 (5-295). Clinical Education in Physical Therapy.
90 (5-290). Administration.
98 (5-292). Introduction to Scientific Research.
101 (5-289). Patient Assessment.

Graduate:

Medicine:

200 (8-200). Physiatry Service.
204 (8-204). Peripheral Vascular Disease Clinic.
205 (8-205). Readings in Physical Medicine and Rehabilitation.
206 (8-206). Conference on Physical Medicine and Rehabilitation.
210 (8-210). Research in Physical Medicine.
211 (8-211). Electronics in Physical Medicine.
212 (8-212). Electromyography.
220 (8-220). Seminar: Physical Medicine and Rehabilitation.

Physical Therapy:

103 (8-103). Physical Therapy Clinic.
130x(8-130). Current Literature Seminar in Physical Therapy.
161 (8-161, 8-162). Clinical Medicine in Rehabilitation.
170 (8-170). Special Topics in Physical Therapy.
171 (8-171). Special Topics in Administration of Physical Therapy.
181,182 (8-180, 8-181). Physiological Bases for Therapeutic Exercise.
185 (8-185). Problems in Physical Therapy.
197 (8-192). Introduction to Scientific Literature and Research in Physical Therapy.
198 (8-193). Research Problems in Physical Therapy.
199 (8-195). Research in Physical Therapy.

Rehabilitation Counseling:

218-219-220. Practicum in Rehabilitation Counseling Psychology.

RESEARCH

A. Objectives

The program for the development of research in the broad field of rehabilitation has been continued in accord with the objectives stated at the time the RT-2 Center was established.

1. To develop a permanent research staff to conduct research in the various aspects of rehabilitation.

2. To promote interdisciplinary research on multi-factorial problems in rehabilitation.

3. To identify the significant problems which impede rehabilitation and develop research studies to help solve those problems.

4. To test the concepts, methods and procedures derived from research during the application of rehabilitation.

5. To conduct graduate education in research in rehabilitation.

B. Research in the Department of Physical Medicine and Rehabilitation, University of Minnesota

Research has been developed as broad programs of investigation of the major problems which are obstacles to successful rehabilitation of disabled or chronically ill patients. As a result there is a continuity of the research program, with the results of current studies indicating the direction for continuing studies. The programs of research undertaken have been indicated by major needs of patients who have been treated in rehabilitation. The common problems which cause continuing or increasing physical and economic dependency, and which consign not only the patient but often the family to a disadvantaged position in the community, have been given priority. Since, in concept, a patient is not rehabilitated until he can return to his home as a productive member of his community, each program presents a broad range of problems which may vary from the pathophysiology of cells and organs to homeostasis of the patient, psychological adjustment, inter-personal psychologic problems of the patient with his family and community, educational training, and vocational rehabilitation.

The breadth of the problems requires the participation of research workers from many of the health professions to investigate aspects specific to each specialty and also to participate in broader multi-professional studies. Within the capabilities of the staff, this Research and Training Center has been trying to develop such a research program.

The major categories of disease causing chronic disability are cardiovascular disease including stroke, rheumatic diseases, accidents, congenital diseases and disabilities, and neurologic diseases. These diseases have been the focus of our research programs. In general, the research has been oriented to the problems involved in the restoration of the impaired individual to a higher level of performance, both by psychophysiological adaptation of the individual and also by alterations in his environment. Some of the research has been devoted to the development of better methodology needed to be able to study these problems.

Physiologic studies to increase knowledge and methodology for defining performance of organ systems have been continued. Studies are being made of reliability and applicability of the impedance cardiometer. Likewise impedance plethysmography is being tested against air plethysmography for evaluation of peripheral blood flow. The quadripole mass spectrometer combined with a differential pressure airflow meter is being used to study respiratory diseases.

Ischemic ulcers have been a major problem of patients immobilized by neuromuscular, metabolic or orthopedic diseases. These ulcers contribute both to morbidity and mortality. They are the second most common cause of death on paraplegic and quadriplegic patients. The cost of treatment of an ischemic ulcer in one of these patients is staggering - estimated to average 3 months of hospitalization at a cost exceeding $4,000. A series of studies are being conducted on the pathogenesis, methods of prevention, and treatment of ischemic ulcers. Psychological studies are also in progress to learn how to obtain the cooperation of the patient in prevention of ulcers.

Neuromuscular diseases have engaged a significant part of the research effort. Histological and electron microscopic studies of muscle and neuromuscular junctions as well as enzyme variations are being studied. Spasticity, which is a major clinical problem is being investigated. Body orientation, balance and proprioception are subjects for investigation in relationship to congenital damage of the central nervous system.

<u>Research Grant Support</u>

Federal	$ 139,620
Federal/State	1,897,764
TOTAL	$2,037,384

DEPARTMENT OF PHYSIOLOGY

Provides courses in human physiology and a number of subjects fundamental thereto to undergraduate liberal arts, medical, dental, nursing, pharmacy, and allied health science students and to graduate students in the medical sciences.

Undergraduate

Medical:

Human Physiology (5-100) core course - 12 hrs/wk - lecture and laboratory

Integrated Basic Science - Clinical Courses - 10 hrs/wk - lecture, laboratory, seminar

- Blood I
- Cardiovascular
- Endocrine and Metabolic
- Gut
- Kidney and Urinary Tract
- Nervous System and Muscle Disorders
- Reproduction
- Respiratory

General Physiology (5-103) - Elective - 3 hrs/wk - lecture, discussion

Neurophysiology (5-104) - Elective - 4 hrs/wk - lecture, discussion

Cardiovascular Physiology (5-105) - Elective - 4 hrs/wk - lecture, discussion

Respiratory Physiology (5-106) - Elective - 3 hrs/wk - lecture, discussion

Alimentary Physiology (5-107) - Elective - 3 hrs/wk - lecture, discussion

Nephrology (5-108) - Elective - 3 hrs/wk - lecture, discussion

Problems in Physiology (5-113) - Elective - tutorial, hours and topic arr.

History of Physiology (5-554) - Elective - seminar - hours arr.

Dental:

Human Physiology (1-002) - Survey course for dental hygiene - 6 hrs/wk - lecture, laboratory

Human Physiology (5-102) - Survey course for dentistry - 10 hrs/wk - lecture, laboratory, discussion

Other:

Human Physiology (1-002) - Survey course for 3 yr. nurses, occupational therapy, mortuary science - 5 hrs/wk - lecture, demonstration

Human Physiology (3-051) - Survey course for 5 yr. nurses, physical therapy, home economics - 6 hrs/wk - lecture, lab

Principles of Physiology (3-052/3-053) - Quantitative approach to physiology for engineering students - 3 hrs/wk - lecture

Principles of Physiology (3-055/3-056) - Quantitative approach to physiology for undergraduate physiology majors - 5 hrs/wk - lecture, discussion

Human Physiology (3-070) - Survey course for pharmacy - 8 hrs/wk - lecture, laboratory

Readings in Physiology (3-091H) - Honors tutorial, hrs. arr.

Problems in Physiology (3-092H) - Honors laboratory research, hrs. arr.

Systems Analysis for Biologists (5-109) - Elective for undergraduate majors and health science students - 3 hrs/wk - seminar
Physics for Biologists (5-110/5-111) - Elective for undergraduate majors and health science students - 3 hrs/wk - lecture

Advanced Training

Graduate and Post-Graduate:
Human Physiology (8-100) - Introductory course - 15 hrs/wk - lecture, laboratory, discussion
Human Physiology (8-102) - Introductory course for medical-surgical nursing - 7 hrs/wk - lecture, discussion
General Physiology (8-103) - 3 hrs/wk - lecture, discussion
Neurophysiology (8-104) - 7 hrs/wk - lecture, discussion
Cardiovascular Physiology (8-105) - 4 hrs/wk - lecture, discussion
Respiratory Physiology (8-106) - 3 hrs/wk - lecture, discussion
Alimentary Physiology (8-107) - 3 hrs/wk - lecture, discussion
Nephrology (8-108) - 3 hrs/wk - lecture, discussion
Systems Analysis for Biologists (8-109) - 3 hrs/wk - seminar
Physics for Biologists (8-110/8-111) - 3 hrs/wk - lecture
Problems in Physiology (8-113) - hours arr. - tutorial
Literature Seminar (8-201) - 1 hr/wk - seminar
Readings in Physiology (8-202) - hrs arr. - tutorial
Research in Physiology (8-203) - hrs arr. - laboratory
History of Physiology (8-204) - hrs arr. - seminar
Selected Topics in Permeability (8-210) - hrs arr. - seminar
Selected Topics in Heart and Circulation (8-211) - hrs arr. - seminar
Selected topics in Respiration (8-212) - hrs arr. - seminar
Selected Topics in Alimentary Physiology (8-213) - hrs arr.
Selected Topics in Nephrology (8-214) - hrs arr. - seminar
Selected Topics in Neurophysiology (8-216) - hrs arr. - seminar
Methods of Mathematical Analysis (8-220) - 3 hrs/wk - lecture, discussion
Methods in Physiology (8-227) - 3 hrs/wk - lecture, demonstration
Transport Processes in Biology (8-230/8-231) - 3 hrs/wk - lecture, discussion
Respiration, Acid-Base Chemistry and Electrolyte Metabolidm (8-234) - hrs arr. - seminar
Bioenergetics of Cardiac Contraction (8-235) - hrs arr. - seminar
Hemodynamic Measurements (8-236) - 3 hrs/wk - seminar
Neural and Humoral Control of Circulation (8-238) - hrs arr. - seminar
Topics in Microcirculation and Lymphatics (8-239) - hrs arr. - seminar

Research Program

1. No research programs to be carried out in Buildings B-C.
2. The research programs of the Department of Physiology at the University of Minnesota include a wide range of objectives varying from a theoretical and mathematical treatment of population dynamics to a clinical study of anti-fibrillatory agents. The extent of the programs is reasonably well shown by the research projects presently receiving support.

Research projects underway include: sugar transport by isolated contracting muscle. Contractile work and sugar transport in heart. H. Mead Cavernt, Prof.; movement of water and ions in viscera. Eugene Grim, Prof. and Head;

transport in isolated perfused heart. John a. Johnson, Prof.; absorption by dog intestinal mucosa in vitro. Nathan Lifson, Prof.; ion fluxes in cardiac muscle. Cardiovascular training grant. Victor Lorber, Prof.; problems in nerve cell physiology. Neurophysiology training grant, post-doctoral. Systems analysis of sensory and motor cells. Carlo Terzuolo, Prof.; heart circulation studies. Historical review of reciprocal impacts on science. Cardiovascular research. M.B. Visscher, Regents Prof., Emeritus; bretylium study. Cardiac arrhythmias. Marvin Bacaner, Assoc. Prof.; hypotension from polymers and hypertonic solutions. Indicator-dilution techniques. Left ventricular baroreceptor function. I.J. Fox, Assoc. Prof.; renal concentrating mechanisms. R.B. Harvey, Assoc. Prof.; mechanism of water absorption from intestine. Effect of cholera toxin on intestinal transport. Jui S. Lee, Assoc. Prof.; factors in reflex muscle control. Neurophysiology training grant. R. Poppele, Assoc. Prof.; integrative mechanisms of neurons. R. Purple, Assoc. Prof.; human red cell cultures in vitro. Active transport in red blood cells. G. Kepner, Ass't. Prof.; distribution of open capillaries in muscle. David Levitt, Ass't. Prof.

Research Grant Support

Federal:	551,000
Non-Federal:	86,000
TOTAL:	$ 637,000

Department of Psychiatry: Provides instruction in principles of psychiatry regardless of the specialty the student subsequently enters. Instruction in the specialty of psychiatry is provided for graduate students. This department includes the Division of Clinical Psychology and the Division of Child Psychiatry

Undergraduate Courses

Medical:

5-103 Clinical Clerkship in Psychiatry (6 cr) Staff
5-107 Human Behavior (2 cr) Thompson
5-111 Social Behavior (1 cr) Staff
5-500 Externship in Adult Psychiatry - General Hospital (cr ar)Jepson - elective
5-501 Externship in Adult Psychiatry - St. Paul Ramsey Hospital (cr ar) Teeter-elective
5-502 Externship in Adult Psychiatry - VA Hospital (cr ar) Simon - elective
5-503 Externship in Adult Psychiatry - Fairview-St. Mary's Hospital (cr ar) Haberle - elective
5-510 Clinical Problems in Psychiatry (cr ar) Staff - elective
5-521 Community Psychiatry (cr ar) Nagobads - elective
5-522 Adolescent and Young Adult Psychiatry (cr ar) Cline - elective
5-523 Community Psychiatry (cr ar) Daggett - elective
5-524 Problems in Psychiatry (cr ar) Pollock - elective
5-525 State Mental Health Program, St. Paul Office (cr ar) Vail - elective

Other:

5-121 Descriptive Psychiatry (cr ar) Rowe - Occupational and Physical Therapy students

Graduate Courses

Psychiatry

8-201 Clinical Inpatient Psychiatry (cr ar) Staff
8-202 Clinical Outpatient Psychiatry (cr ar) Staff
8-203 Advanced Clinical Inpatient Psychiatry (cr ar) Staff
8-204 Advanced Clinical Outpatient Psychiatry (cr ar) Staff
8-205 Special Assignments (cr ar) Staff
8-206 Research (cr ar)
8-207 Orientation to Clinical Psychiatry
8-208 Survey of Physiological Treatments in Psychiatry
8-209 Introduction to Clinical Psychology
8-210 Social Psychiatry (1 cr) Malmquist
8-211 Introduction to Psychotherapy (3 cr) Raths
8-212 Review of Current Literature (2 cr) Hastings
8-213 Basic Readings from Psychoanalysis I (1 cr) Hambidge
8-214 Survey of Psychosomatic Medicine (1 cr)
8-215 Current Research in Psychiatry (1 cr)
8-216 Introduction to Family Therapy (1 cr)
8-217 Development of Psychiatric Thought (1 cr)
8-218 Readings in Psychoanalysis II (1 cr) Hambidge

8-219 Seminar: Special Topics (1 cr) Schiele
8-220 Survey of Psychiatry for Neurology Residents (1 cr) Staff
8-222 Special Supervision in Psychotherapy (1 cr)
8-223 Problems in Teaching Psychiatry (cr ar)
8-224 Introduction to Group Therapy (1 cr)

Child Psychiatry

Graduate Courses:

8-201 Clinical Child Psychiatry (cr ar) Malmquist and Staff
8-202 Advanced Clinical Child Psychiatry (cr ar) Malmquist and Staff
8-203 Basic Readings in Child Psychiatry (1 cr)
8-204 Current Literature Seminar (1 cr)
8-205 Diagnostic and Therapeutic Methods in Child Psychiatry (1 cr)
8-206 Research in Child Psychiatry (cr Ar)

Clinical Psychology

8-200 Descriptive Psychopathology (3 cr) Roberts
8-201 Readings in the HIstory of Psychiatry (1 cr) Schofield
8-202 Special Research Topics (cr ar)
8-203 Psychometric Clerkship (cr ar)
8-204 Internship in Clinical Psychology (2 or 4 cr) Staff
8-205 Advanced Seminar (1 cr)
8-206 Medical Psychology A (2 cr)
8-207 Medical Psychology B (2 cr)
8-208 Medical Psychology C (2 cr)
8-209 Medical Psychology D (2 cr)
8-210 Introduction to Clinical Psychology (1 cr)
8-211 Seminar: Basic Principles of Clinical Psychology (1 cr)
8-212 Psychophysiology for Psychiatrists (1cr) Heistad
8-213 Organic Therapies in Psychiatry (1cr) Sines
8-214 Organic Syndromes in Psychiatry (1 cr) Sines
8-215 Professional Problems in Clinical Psychology (1 cr) Sines

UNIVERSITY OF Minnesota

DEPARTMENT OF PSYCHIATRY
MAYO MEMORIAL BUILDING · MINNEAPOLIS, MINNESOTA 55455

August, 1970

Research Grants

1. USPHS Early Clinical Drug Evaluation Unit, B. C. Schiele, M. D. MH 05106-09
   May 1, 1970 to April 30, 1971: $145,209.00

   Total grant 5-1-71 to 4-30-74: $408,491.00 (0709-5228)

2. USPHS Drug Self-Administration by Animals, T. Thompson, Ph. D. MH 15349
   April 1, 1970 to May 31, 1971: $39,891.00

   Total grant 4-1-68 to 5-31-75: $432,524 (0709-5267)

3. USPHS Adult Adjustment of Adolescrnt Patient Group, A. J. Hafner and W. Quest, Ph.D. MH 12038

   9-1-70 to 8-31-71: $25,724 (0709-5258)

   continuation not yet confirmed

4. USPHS Psychophysiological Arousal in Schizophrenia, D. T. Lykken, Ph. D. MH 15461
   June 1, 1968 through December 31, 1970 (extension): $55,205 (0709-5268)

5. NSF The Analysis of Agreessive Behavior by Operant and Ethological Techniques, T. Thompson, Ph. D.

   $101,652 9-1-68 to 9-30-70 (0709-5352)
   pending

6. USPHS Control of the Subjective Intensity of Sensation, D. T. Lykken, Ph. D., 9-1-70 to 8-31-75: $193,166

7. Psychiatry Research Special, 1970-71: $145,000.00 - State of Minnesota

8. Sex Offender Project, 1970-71, PHS via State of Minnesota: $50,000.00

Total: $145,000 - State Funds
$1,266,762 - Federal Funds

HEALTH SCIENCES CENTER
MEDICAL SCHOOL

Department of Preventive Medicine and Public Health

a. This department of the Medical School has direct responsibility for lectures and discussion in Phase B of the new curriculum "Man and His Community" relative to the preventive medicine and community aspects of health. John M. Phin, M.D., Assistant Professor in the School of Public Health's division of Hospital and Health Care Administration is chairman of the committee for "Man and His Community" and Lee D. Stauffer, Associate Professor and Dean, School of Public Health, is directly responsible for a lecture-discussion section. Other School of Public Health faculty contribute to this curriculum as required. In addition, elective courses in public health, epidemiology, biometry, and maternal and child health are available through the School of Public Health for those medical students desirous of taking additional work. To further supplement the medical student's desire for meaningful community involvement, apprenticeships in public health are available to a limited number of students for off-quarter experience. At the present time, a joint M.D.-M.P.H. degree program is under discussion and a joint Department of Pediatrics--School of Public Health Nurse Practitioner Training Program is currently being established.

b. Students desirous of pursuing a residency in preventive medicine are accommodated in a cooperative program between the School of Public Health and the Minnesota State Department of Health which has its offices on the University Campus. State Health Department staff involved with the residency program also carry University of Minnesota faculty appointments in the School of Public Health.

c. The School of Public Health, not having direct research activity located in Buildings B and C, does as a Department of Preventive Medicine and Public Health within the Medical School collaborate on research activities through joint appointments of its faculty in other departments such as Physical Medicine and

Rehabilitation, Psychiatry, Medicine and others. In addition, the faculty of the Biometry Unit of the School of Public Health and the Program in Hospital and Health Care Administration consult and collaborate directly on numerous research projects and programs of other Medical School departments and in some instances are co-investigators with faculty in other departments.

DEPARTMENT OF RADIOLOGY

The new curriculum at the University of Minnesota Medical School provides even a broader spectrum of involvement for Diagnostic Radiology and Nuclear Medicine. Besides very active participation in various clinical areas in the form of lectures and panels, we offer the student numerous elective courses in radiology, which in the near future may become the basis for radiological training of the medical students. The scope of training has to be broad enough to show all the advantages and limitations of these diagnostic procedures as well as to provide adequate practical introduction within the scope of the chosen area of interest.

The Residency Program in Radiology provides the training for radiologists with interest in general radiology as well as those preparing themselves for academic careers where a certain amount of research work is greatly encouraged. Advanced academic degree programs are offered and in the last few years have met with increasing interest by the residents in radiology.

Radiology Courses

0-120 X-Ray Conference
0-121 Medical Roentgenologic Conference
0-122 Pediatric-Roentgenologic Conference for Graduate Students
0-123 Surgical Roentgenologic Conference
0-124 Neurosurgical-Roentgenologic Conference
0-125 Cardiovascular Roentgenologic Conference
0-126 Roentgenologic Conference on Chest
0-127 Roentgen-Surgical Pathology Conference
0-220 Nuclear Medicine Conference
0-320 Radiation Therapy Conference
0-321 Tumor Clinic Conference
5-100 Externship: Nuclear Medicine
5-101 Externship: Diagnostic Radiology-U Hospital
5-102 Externship: Diagnostic Radiology-Vets Hospital
5-103 Externship: Diagnostic Radiology-HCGH
5-140 Special Probs: Roentgenology
5-240 Special Probs: Nuclear Medicine
5-305 Externship: Radiation Therapy
5-340 Special Probs: Radiation Therapy
5-440 Special Probs: Radiation Biology
5-510 Basic Principles of Radiological Physics
5-511 Roentgen Technique
5-512 Dosimetry of Internal, External Radiation Emitters
5-540 Special Probs: Radiological Physics
5-770 Radiation Physics
8-100 Gastrointestinal Roentgenology
8-101 Urologic Roentgenology
8-102 Neurological Roentgenology
8-103 Cardiovascular Roentgenology
8-104 Pediatric Roentgenology
8-105 Pulmonary Roentgenology
8-110 Neuroradiology

8-150 Research: Roentgenology
8-200 Nuclear Medicine
8-210 Fundamentals of Nuclear Medicine
8-250 Seminar
8-300 Radiation Therapy
8-310 Fundamentals of Radiation Therapy
8-350 Research: Radiation Therapy
8-410 Seminar
8-450 Research: Radiation Biology
8-550 Research: Radiological Physics

Department of Radiology Staff

Eugene Gedgaudas, M.D.	Professor and Head
Harold O. Peterson, M.D.	Professor
Kurt Amplatz, M.D.	Professor
Merle K. Loken, Ph.D., M.D.	Professor and Director of Nuc. Med.
Stephen A. Kieffer, M.D.	Associate Professor
Norbert S. Domek, Ph.D.	Assistant Professor
Robert S. Frech, M.D.	Assistant Professor
Philippe R. L-Heureux, M.D.	Assistant Professor
Charles C. Nicolette, M.D.	Assistant Professor
Leonard A. Brunette, M.D.	Instructor
Lawrence H. A. Gold	Instructor
Richard W. Johnson	Instructor
Jay Thomas Payne, Ph. D.	Instructor

Research Space Available in the Department of Radiology

Presently, the Department has 2,784 square feet of research oriented space. This space consists of:

Laboratory Space	1,312 sq. ft.
Animal Quarters	303 sq. ft.
Offices	158 sq. ft.
Services	1,011 sq. ft.

Research Grant Support

Federal funds	$26,955
Non-Federal funds	6,000
TOTAL:	$32,955

GENERAL SURGERY

Undergraduate Teaching: The courses for medical students are designed to provide the student with a basic knowledge of the pathophysiology of disease and to encourage application of basic science knowledge to clinical surgical diseases in both general surgery and the surgical subspecialties. The students are given an exposure to basic pathophysiology and a study of the etiology, pathogenesis, and diagnosis of various surgical disease entities and how they relate to clinical surgery. Initial contact with the medical student is during the fourth quarter of Medical School. Using tutorial teaching, the students learn (through demonstration and practice on patients) to perfect, coordinate and synthesize learned diagnostic skills into a diagnosis. In the 3rd year, the student is given an opportunity to apply physiological diagnostic knowledge to surgical diseases through patient contact during the surgical clerkship at the University Hospitals and at affiliated hospitals. In addition to the in-patient surgical clerkship, small group seminar sessions with individual members of the full-time staff are offered each afternoon to provide close contact between the students and staff to review basic surgical problems. In addition, the student received instruction in operating room asepsis and pre- and postoperative care initially in two 6 week (4hrs/wk) dog surgery course and finally in the operating room.

Residency Program: It is the intention of the Residency Program in General Surgery at the University of Minnesota to provide excellent training both on the clinical wards and in the laboratory with the ultimate aim of training men both for the practice of surgery and for positions in the academic surgical world. Toward this goal, a merger of the residency training programs of the University of Minnesota Hospitals and the Minneapolis Veterans Administration Hospital was effected on July 1, 1968. In addition, the program offers rotations at the Hennepin County General Hospital in Minneapolis, the St. Paul-Ramsey County Hospital in St. Paul, the Mount Sinai Hospital in Minneapolis, the Methodist Hospital in Minneapolis, the Anoka State Hospital, and the Stillwater Prison Hospital. Each residency appointment is for one year, and reappointment is contingent upon superior performance.

Elective courses are offered in general surgery and all the surgical subspecialties, primarily to increase the scope of clinical exposure and give the student an opportunity to participate in the fundamentals of surgical research.

Undergraduate Courses:

Medical:

Clinical Clerkship (135)
Cardiovascular Surgery (181)
Problems in Clinical Investigation and/or Problems in Experimental Surgery (182)
Externship in Surgery at University-Transplantation and General Surgery (Surg. 5-500) - Elective
Externship in Surgery at University-Cardiovascular and Thoracic Problems (Surg. 5-501) - Elective
Externship in Surgery at University (Surg. 5-502) - Elective
Externship in Pediatric Surgery at University - (Surg. 5-503) - Elective
Externship in Surgery at University - General Surgical Problems including some Thoracic and Cardiovascular Cases (Surg. 5-504) - Elective
Externship in Surgery at Veterans Administration Hospital (Surg. 5-510) - (Includes General Surgery, Vascular, Cardiovascular and Thoracic) Elective
Externship in Surgery at St. Paul Ramsey Hospital (Surg. 5-511) - Elective
Externship in Surgery at Hennepin County General Hospital (Surg. 5-512) - Elective
Externship in Surgery at Mt. Sinai Hospital (Surg. 5-513) - Elective
Experimental Surgery (Surg. 5-520) - Elective
Tumor Immunology (Surg. 5-514)
Surgical Oncology (Surg. 5-515)

Graduate Courses:

Surgical Research
Clinical Surgical Problems and Management
Surgical-Roentgenological Conference
Surgical Complications and Research Conference
Biomedical-Engineering Seminar
Transplant and Bone Marrow Conference

SURGICAL CARDIOVASCULAR TRAINING PROGRAM

The current Surgical Cardiovascular Training Program has significantly contributed to the establishment of an environment in which an highly effective balance has been achieved: Training in those diagnostic and therapeutic skills unique in cardiovascular surgery is complemented by laboratory and curricular modes during which our trainees acquire a thorough and firsthand identification with relevant basic science. Specifically, each trainee is encouraged both by advisors and by flexibility of scheduling to develop an individually tailored program maximally suited to graded progress. Thus, individualistically, he is stimulated to acquire a thorough understanding of the fundamentals of cardiovascular surgery. From this set of trainees come, largely on the bases of personal motivation and talents, a sub-set of candidates quite committed to a continuing academic career in cardiovascular surgery. In summary, our plan is to use cardiovascular surgical training and relevant research experience as an highly effective component for achieving the overall goals in general surgical training of the Department of this University. We affirm that the effectiveness whether judged by the substantial number and sound quality of appointees to academic faculties, the stature and significance of research productivity of the several dozen men who have been trained, the active role of many others in the practice of cardiovascular surgery at the community level or even the healthy and keen competition currently existing for all available traineeships within our institution -, demonstrably attests to the strength of this philosophy for graduate surgical cardiovascular training. We affirm the highly desirable need for expanding this training support base, fiscally, in order best to meet the growing public needs for, to mention but one, transplantation competence in both the academic and metropolitan community. In fact, no modern Department of Surgery can realistically seek to fulfill its goals and obligations within even those well documented purposes of a university, unless it has, and continues to strive for, excellence in surgical cardiovascular training.

Cancer Training Program

With a clinical cancer training program that has been productively in operation for 12 years, there are no areas to be deliberately deleted or changed. However, it is inevitable that changes will come into the program as a result of new personnel with new skills and interests, changing interests in personnel already associated with the program, and gradual evolution of the clinical and research opportunities offered by the University. Four such changes can currently be identified and may be expected to influence the program in the future.

a. Transplantation The Department of Surgery and other Departments of the University of Minnesota are developing deep interests in clinical and basic research in transplantation immunology as well as in clinical transplantation. The Departments primarily involved in this include Surgery, Pediatrics, Medicine and Microbiology. The areas of clinical transplantation have extended beyond the kidney to include the pancreas and the liver and eventually other organs. Already serious thought is being given to the application of this bold approach to the treatment of malignant disease. The Department of Surgery has joined the Departments of Pediatrics and Medicine in research and clinical studies directed toward the effective use of bone marrow transplantation as an adjunct to definitive therapy for leukemia and lymphoma. Research activities in transplantation are directed toward the effective use of antilymphocyte serum, immunologic enhancement of normal tissues, the induction of adult tolerance, and "masking" of normal transplantation antigens. Primarily responsible for these programs are Drs. John Najarian and Richard Simmons of the Department of Surgery, Robert Good of the Departments of Pediatrics and Microbiology, and Dr. Harry Jacobs from the Department of Medicine (Hematology).

b. Tumor Cell Biology and Immunology A large program is being initiated by the Departments of Surgery and Microbiology for the study of tumor Cell Biology, with particular respect to the Immunology of Malignancy. The areas being investigated include the genetic origins of tumor specific antigens, the cellular localization and biochemical characterization of these antigens, the nature of the hose immune responses to antigenic tumors, the effect of antigenicity on "success" of tumor, and the effect of antigenic tumors on the general immune response of the host. A large study is being initiated to investigate the antigenicity of human tumors. This involves recovering tumor specimens and specimens of normal tissue (skin) from patients undergoing surgery for malignant disease, and growing these in tissue culture. At appropriate intervals the cellular immunity and antibody responses are sought after in materials recovered from the same patients and from other patients with similar malignancies. In addition to primarily immunologic studies, investigations are being undertaken of other abnormalities of cell membranes in malignancy. Consultants, and possible collaborators for this work, will be Dr. Murray Rosenberg of the Department of Biology; University of Minnesota, and Dr. Donald Wallach, Department of Biochemistry, Harvard Medical School. These studies are primarily directed by Dr. Charles F. McKhann.

c. Chronic Malignant Disease At the present time more and more primary surgery for clinical cancer is being carried out in smaller hospitals in the state of Minnesota. Many of the less radical surgical procedures that were at one time the stock and trade of the University Hospital are now seen increasing rarely. Instead are coming more patients with far advanced disease, requiring radical surgery or palliative surgery. The development of the Masonic Memorial Hospital as part of the University Hospital complex has provided an opportunity for the care and study of a large number of patients with chronic malignancy. From this is evolving a new understanding of the problems of long-term palliation for these patients, allowing them to live with their diseases productively and comfortably for years at a time. Instrumental in this is the sequential use of surgery, radiotherapy, and particularly chemotherapy. Assisting in this portion of the program is Dr. B. J. Kennedy of the Department of Medicine (Oncology). This area is under the direction of Dr. Theodor Grage and Dr. Charles McKahnn.

d. The Minneapolis Veterans Administration Hospital The Surgical Service of the Veterans Administration Hospital has been completely integrated with that of the University Hospital for the past year and can be expected to provide rotations for most of the trainees in the future. This hospital has its own completely academically oriented program well established, including weekly inter-departmental Tumor Conferences, a Pathology Conference, a weekly Chest Conference, a Proctology Clinic, and Tumor Followup Clinic and Registry, Surgical Grand Rounds, weekly Staff Lectures, and a Surgical Journal Club. This hospital has partaken extensively in chemotherapeutic trial programs, with particular reference to tumors of the lung and of the bowel. It maintains 30 chemotherapy beds at all times and offers a wide range of experience in this modality of treatment. Once a year the Pathology Service gives a course in tumors of bone consisting of ten, one-hour sessions. In addition, the V. A. Hospital houses several productive laboratories that are actively studying cell biology in malignancy, liver function in malignancy, and hepatic regeneration. The Chief of the Surgical Service of the Veterans Administration Hospital is Edward W. Humphrey.

D. INTERACTION WITH OTHER SERVICES

Clinical care of patients with cancer transgresses several services including Surgery, Medicine, Radiotherapy, and Pediatrics, and basic research in malignant disease crosses many disciplines, including Cell Biology, Cellular Genetics, Biochemistry, Immunology, and Pathology. A great deal of effort is being made to integrate these programs and disciplines, not only for better care of patients and more meaningful research endeavors, but also for purposes of clinical and research training. At a clinical level the program or the Department of Surgery is working closely with those of the Department of Medicine under Dr. B. J. Kennedy, of Radiotherapy under Drs. Maruyama and Charyulu, and of the Department of Pediatrics under Dr. Good and Dr. Krivit. As areas of clinical research are broadening, these disciplines now begin to include Otolaryngology under Dr. Michael Paparella, Gynecology under Dr. John Sciarra, Urology under Dr. Elwin Fraley, and Neurosurgery

under Dr. Lyle French. Research activities also cross many borders, now including the Departments of Medicine, Pediatrics, Pathology, Biochemistry, and Biology. This now only brings together people of similar interests from these various services, but also greatly strengthens the program by providing an almost unlimited variety of outlets for trainees who wish to pursue specialized interests.

E. HOSPITAL FACILITIES.

1) In-Patient Facilities The University of Minnesota Medical Center at the present time has 900 beds of which 120 beds are in the Masonic Memorial Hospital, devoted specifically to the treatment of advanced malignant disease. Annually there are approximately 16,000 admissions to the Medical Center of which 1,100 are to the Masonic Memorial Cancer Hospital. About 15% of the in-patient population of the University Medical Center are treated for malignant disease. One hundred thirty beds are devoted to general surgery. The facilities of the Medical Center include 14 operating rooms, four of which are equipped for specialized procedures in the various surgical subspecialities. Approximately 12,000 surgical procedures are accomplished annually. Immediately adjacent to the operating suite is a surgical pathology laboratory under the supervision of a permanent director, an Associate Professor of Pathology. This offers the opportunity for full time training of three or four fellows in surgical pathology each year. The laboratory examines about 20,000 specimens annually.

2) Facilities For Patients with Advanced Malignancies The facilities of the Masonic Memorial Cancer Hospital are utilized for the treatment of patients with advanced malignant diseases. Patients referred directly to this Hospital with advanced primary cancer or recurrent disseminated disease, constitute an increasing percentage of the total hospital population. Because of this abundant clinical material, increasing amounts of time and effort are being devoted to the study of advanced malignancy. Much of the clinical investigation carried out in this hospital encompasses integrated study programs of advanced malignant diseases of the Departments of Internal Medicine, Pediatrics, Radiation therapy, and General Surgery. Opportunities for participation in the treatment of patients with advanced malignancy using chemotherapeutic, radiologic and surgical techniques are made available to surgical fellows each year.

3) The Tumor Surgery Service The Department of Surgery has three general surgical services, one of which, the White Surgical Service, sees much of the malignant disease. This provides an excellent opportunity for operative and pre- and post-operative management of patients with complex problems of potentially curable malignant disease. These include modalities of radical surgery, perfusion and infusion of chemotherapeutic agents, and combined irradiation and surgical approaches. This service is responsible for supervising the Tumor Clinic and for the conduct of the inter-Departmental Surgical Conferences held weekly. The records of the Tumor Clinic have been maintained for over 20 years and provide a wealth of material for the study of the end results of cancer therapy.

4) Out-Patient Facilities The University of Minnesota Medical Center Out-Patient Department has approximately 120,000 patient visits annually. Of these, 1,500 are visits to the inter-disciplinary Tumor Clinic which meets one morning each week. Closely associated with the Tumor Clinic is the inter-disciplinary Tumor Conference composed of members from the Departments of Surgery, Medicine, Radiationtherapy, and Pediatrics.

The Tumor Conference is under the responsibility of the Department of Surgery Medicine and Radiotherapy in an annual rotation to insure continuing interest by all of these services and to promote the strongest possible cooperation between them. The most interesting tumor patients that can be found in the hospital are presented each week with a high priority on those patients that are candidates for interdisciplinary combined therapy. The Tumor Conference also exists as a consultation service to the entire staff of the hospital, through which patients with various problems can be seen and evaluated by representatives of these three services at one time.

5) Cancer Detection Unit A separate unit designated as the Cancer Detection Unit sees approximately 5,000 patients a year over the age of 40 for annual re-examinations. This is primarily for the detection of cancer in patients who show no evidence of malignant disease. It is shown that early diagnosis may affect favorably the five-year survival of patients with some types of cancer. It also suggests that attention to certain premalignant lesions may result in a decreased instance of malignant disease. It also provides a better opportunity to study the early natural history of cancer than does the average hospital population.

RICHARD L. SIMMONS, M. D.

Research Summary:

Dr. Simmons recently returned from the military service, where he was an Assistant Chief of Experimental Surgery at the Walter Reed Army Institute of Research and Chief of the U. S. Army Surgical Research Team in Viet Nam. In that role, he made a number of contributions in areas related to our Cardiovascular Training Program. A brief summary of his investigations is as follows:

(1) Modification of the cardiovascular effects of endotoxin by inducing tolerance. Dogs were made tolerant to the lethal effects of intravenous E. coli endotoxin by repeated administration of sublethal quantities of the same endotoxin over periods of 2 weeks to 2 months.

In almost all parameters measured, the endotoxin tolerant animals displayed minimal abnormalities in response to an otherwise lethal endotoxin challenge; a lesser hypotensive response and a shorter period of hypotension: a failure to demonstrate marked elevations in acid phosphatase, serum transaminase, or lactic dehydrogenases; lesser degree of lactic acidemia less dehydration -- than control animals. Greater degrees of tolerance to alterations in these parameters were achieved when the tolerance-induction periods were prolonged.

Antibody titers to the E. coli antigen were markedly elevated in endotoxin tolerant dogs. Coagulation abnormalities which usually develop in response to endotoxin administration were absent in tolerant animals.

In contrast to most parameters measured, an equal degree of granulocytopenia and thrombocytopenia developed in both tolerant and nontolerant animals within 5 minutes of endotoxin administration. These results cast some doubt on the previously proposed roles of platelet or leu sequestration in the trigger mechanism of endotoxin shock as well as the role of platelet agglutination in the development of the coagulopathy of endotoxin shock.

(2) The hemodynamic and cardiovascular alterations associated with the central nervous effects of endotoxin. In order to define the possible contribution of CNS effects of endotoxin to endotoxin shock, small doses of E. coli endotoxin were introduced at various sites within the cerebrospinal fluid system.

The relative efficacy of endotoxin in producing death depends on the proximity of the endotoxin to higher nervous centers. Less than one-fifth the intravenous dose was required when endotoxin was introduced into the lateral cerebral ventricles.

CNS endotoxin does not exert its lethal effect by escaping into the vascular system.

CNS endotoxin produced minimal microscopic congestion of the intestinal villi, subendocardial and intramyocardial hemorrhage, areas of micronecrosis of the myocardium, hemorrhage and edema of the mitral and tricuspid valves and a massive hemorrhagic pulmonary edema. These findings are compared with those found after the systemic administration of endotoxin.

Only rare clinical neurologic deficits and no neuropathological lesions other than a minimal reactive meningtiis or ependymitis at the site of injection could be found.

Since the pathologic changes which appear after the injection of CNS endotoxin differ significantly from those which follow lethal intravenous endotoxin, it is concluded that systemic endotoxin does not act primarily through its influence on the CNS. However, the central nervous effects of endotoxin may well contribute to the evolution of endotoxin shock as well as to the systemic effects of intracranial infections.

(B) The administration of relatively small doses of E. coli endotoxin into the lateral ventricles results in the death of dogs. The present study documents hemodynamic, respiratory and metabolic alterations which follow the introduction of endotoxin into the central nervous sytem.

Severe hyperventilation promptly follows CNS endotoxin and results in hypocarbia and respiratory alkalosis. An increase in arterial lactate levels minimizes the pH deviation in the presence of severe hypocarbia. Following a period of normal ventilation, hyperventilation retums and is followed by respiratory arrest.

CNS endotoxin leads to a progressive gradual fall in cardic output accompanied by a lesser fall in heart rate and arterial blood pressure. A later sharp rise in total peripheral resistance precedes death. Cardiovascular failure does not appear to be immediately responsible for death.

No alterations in serum enzyme levels, coagulation screening tests, plasma volume or extracellular fluid volume could be detected. Blood glucose levels were elevated only for a short time in the first hour following endotoxin administration.

The possible role of endotoxin acting on the central nervous system during systemic endotoxin shock is discussed.

(C) In order to define the possible contribution of intracranial meningococcal endotoxin to the total picture of meningococcal meningitis, small doses of Neisseria meningitidis endotoxin were introduced into the lateral and third ventricles of dogs. Doses of meningococcal endotoxin, which are totally ineffective when given intravenously, produce death when introduced into the ventricular system. Central nervous system endotoxin produced a massive hemorrhagic pulmonary edema, subendocardial hemorrhages, hemorrhage and edema of both mitral and tricuspid valves, visceral congestion and adrenal hemorrhage. These findings are compared with the lesions found in meningococcal infections in man and those produced by intraventricular Escherichia coli endotoxin in dogs.

The suggestion is made that small amounts of intracranial meningococcal endotoxin may play a significant role in the pathogenesis of death in meningococcal infections even in the absence of meningococcemia.

(3) The hemodynamic effects of increased intracranial pressure. In a study involving 5 dogs and five monkeys, intracranial pressure was raised by subarachnoid infusion or sustained inflation of an epidural balloon. While the intracranial pressure was controlled, hemodynamic, respiratory, and electrocardiographic changes were recorded. In addition to the well-known pressor response that raises diastolic pressure above intracranial pressure, the pulmonary venous and arterial pressures rose significantly in all

animals. About 20% of both dogs and monkeys demonstrated a definite sequence of hemodynamic events: elevation of intracranial pressure, systemic vasoconstriction, systemic arterial hypertension, pulmonary venous hypertension, and massive pulmonary edema. Compensatory pulmonary artery pressure elevation with little change in the systemic central venous pressure was observed in this setting. Neither cervical vagotomy nor controlled positive pressure respiration altered the hemodynamic response. In contrast, cervical cord section did prevent the entire sequence of events at the expense of an impaired cerebral circulation.

We conclude that the pulmonary circulation is involved in the pressor hemodynamic response to raised intracranial pressure and that sudden pulmonary edema may result from these alterations.

(B) The hemodynamic response of seven chimpanzees to varying degrees of increased intracranial pressure was determined in order to delineate the sequence of events which precedes the development of pulmonary edema in patients with intracranial disease.

At moderate elevations of intracranial pressure, there is an inital transient increase in central venous pressure, followed by an increase in cardiac output and systemic arterial pressor response. No increase in total peripheral resistance was present.

At marked elevations of intracranial pressure, the systemic pressor response is accompanied by marked increases in total peripheral resistance, leading to significant degrees of left heart strain. In two of the seven chimpanzees, the cardiac output fell, the left atrium dilated, and the left atrial pressure transiently exceeded the pulmonary arterial pressure, leading to pulmonary edema.

The results are in agreement with the hypothesis that the central nervous system tends to maintain systemic arterial pressure at levels greater than cerebral pressure by gradations of sympathetic discharge. Venoconstriction, a myocardial inotropic response, and peripheral arterial constriction are sequentially called into play in order to maintain brain perfusion. On occasion, left heart failure may result from massive sudden increases in peripheral vasoconstriction.

(4) Myocardial pathology in Viet Nam. Myocardial zonal lesions have been demonstrated in a wounded soldier following exsanguination. The lesion is identical to that found in experimental models of hemorrhagic shock and occurs as a region of supercontraction of myocytes at the intercolated disks. Its etiology appears to rest in the rapid vigorous contraction of the incompletely filled ventricles. The extensive development of this lesion early in the course of hemorrhagic shock may represent the anatomic basis for the subsequent development of cardiac failure.

(5) Studies of blood volumes following hemorrhagic shock in Viet Nam. Red blood cell mass and plasma volume were simultaneously determined within an hour after resuscitation and operation in 29 acutely wounded combat casualties. All patients were clinically stable at the time of blood volume determination and were considered to be adequately transfused by clinical criteria.

Thirteen of the 29 patients were undertransfused 18-41% below the predicted normal value for total blood volume. The major portion of this deficit was in the red blood cell mass. No patients were overtransfused.

The degree of undertransfusion could not be correlated with the post-operative pulse rate, blood pressure, pulse pressure, urine output or central venous pressure.

There was a direct correlation between the degree of undertransfusion and the depth of shock and acidosis which had existed on admission prior to resuscitation.

These results suggest that a severe degree of shock is associated with a contracted vascular space which is not expanded during resuscitation even by large quantities of blood and crystalloid solution.

Normal or low blood volumes were found in four patients who developed pulmonary edema. The role of a semi-rigid contraction of the vascular capacitance bed in the pathogenesis of post-traumatic pulmonary edema is postulated.

(6) Fluid distribution in hemorrhagic shock in Viet Nam. The fluid defined by the dilutional phase volumes of I^{125} labelled albumin and $S^{35}O_4$ were determined in 50 combat soldiers in Vietnam. The plasma volumes and extracellular water spaces were compared between base camp troops, minimally injured patients from the field and casualties in various degrees of shock.

The sulfate equilibration time of casualties was prolonged. Sampling at a time interval prior to isotope equilibration resulted in falsely low estimates of extracellular water.

No deficits in extracellular water could be shown in patients in shock which were not attributable to dehydration and transcapillary refilling of the vascular space.

There is no evidence in these patients for extracellular fluid losses into cells during relatively brief periods of hemorrhagic hypotension.

(7) Studies on coagulation after wounding and shock. (a) A number of coagulation parameters were studied in acutely wounded combat casualties on arrival at the hospital and prior to the administration of any intravenous therapy.

Fibrinolysin levels were higher than normal but platelet counts and fibrinogen levels were not consistently abnormal.

The prothrombin (PT) and partial thromboplastin (PTT) could be statistically correlated with the degree of hypotension, acidosis, and lactatemia. Mildly to moderately wounded patients had normal or shortened PT and PTT. Severely wounded patients in shock had normal or prolonged PT and PTT.

The findings are consistent with experimental observations that trauma and shock produce an initial phase of hypercoagulability followed by a return to normal and a phase of hypocoagulability. The hypocoagulable phase seems best explained by the onset of disseminated intravascular coagulation precipitated by the presence of hemolysis, the release of tissue

thromboplastin, acidosis, and the state of hypoperfusion seen in patients in hypovolemic and traumatic shock.

The severity of the coagulation defect in these young men is mild. The effect of similar qualitative changes in more delibitated civilian casualties is discussed.

(b) Transfusion of combat casualties is accompanied by dilutional coagulation defects compatible with the levels of coagulation factors in stored bank blood. Platelet levels fell rapidly during transfusion to about 100,000/mm^3. The prothrombin times, partial thromboplastin times and fibrinogen levels were less severly affected.

Significant operative bleeding was not encountered in conjunction with these mild dilutional coagulation changes.

The administration of stored bank blood to casualties who have developed coagulation defects secondary to shock results in a partial retum of the coagulation factors toward normal. Pre-existing coagulation defects were not aggravated by thromboplastic substances in bank blood.

Transfusion with stored bank blood may mask the appearance of endogenous coagulation disorders which develop in patients in prolonged shock.

The use of fresh whole blood will partially counteract the dilutional effect on the coagulation parameters but is rarely necessary in these young, previously healthy men. In the presence of coagulation defects, associated with presumed disseminated intravascular coagulation, fresh whole blood was not associated with any permanent improvement in coagulation parameters.

(c) Coagulation studies were performed as often as three times daily on 120 combat casualties during early convalescence.

The prothrombin time and partial thromboplastin time of almost all patients were normal within the first 24 hours after their resuscitative operation. Thereafter abnormalities were noted in either or both parameters in 57 patients. The presence of these abnormalities could be correlated with the presence of shock on admission to the hospita, the transfusion of large quantities of blood, and the presence of abnormalities in clotting parameters prior to operation.

The degree of prolongation of PT or PTT was much greater than that seen either at the time of admission or during transfusion.

In 24 patients a pattern of recurring PT or PTT prolongations appeared in the post-operative period with intervening periods in which these parameters were normal. The presence of four or more of these peaks could be correlated with the appearance of significant life - threatening 13 complications. All patients who dies had abnormalities at some time prior to death. However, bleeding episodes which required reoperation were not associated with coagulation abnormalities.

Fibrinogen values rose to levels which were greater than normal in almost all patients. This pattern of recovery was delayed in patients who had been in shock on admission, or who developed prolongations of PT or PTT during convalescence.

Platelet counts returned to normal levels over the first week in almost all patients. Recovery was delayed in patients who had been in shock on admission, who had received large quantities of blood, or who developed prolongations of PT or PTT during convalescence

Fibrinolysin values returned toward normal but remained elevated in most patients during the first convalescent week. The values were significantly higher if prolongations of PT and PTT were present during this period but no correlation could be made with the degree of shock on admission.

The coincidence of abnormalities of PT and PTT with thrombocytopenia and fibrinolysis, and a relative deficiency of fibrinogen in the most seriously wounded patients is consistent with the idea that non-lethal episodes of disseminated intravascular coagulation occur during recovery from severe trauma and shock.

(8) Pulmonary edema following shock in Viet Nam. An autopsy study of 96 combat casualties dying following resuscitation demonstrated that early deaths are associated with pulmonary edema, congestion, and hemorrhage in almost all cases.

An autopsy study of 56 patients who dies with head wounds revealed that pulmonary edema is an almost constant finding even in patients dying instantaneously after wounding.

In a series of 148 patients whose wounds were restricted to the extremities and soft tissues, arterial hypoxemia was found to be associated with severe shock, fractures, and blast injuries.

Hypoxemia in these patients during the post resuscitative period could be correlated with hypoxemia immediately after wounding, shock on admission, and fractures. The clinical syndrome of fat embolism was associated with very severe hypoxemia.

Nine cases of acute pulmonary edema in patients without evidence of head injury, overtransfusion or cardiac failure were reviewed. The most important factors associated with the occurrence of pulmonary edema were the presence of shock on admission, exposure to blasts, and the presence of fractures.

Pulmonary injury of varying degrees seems to accompany head injury, shock, blasts, and peripheral fractures in man. On occasion, the pulmonary injury induced by such injuries is sufficient to cause acute pulmonary edema even in the absence of overtransfusion or cardiac failure.

Clinically, the ileal bypass program provides the surgical house staff with the opportunity to study and manage hypyercholesterolemic and atherosclerotic patients. They see the patient prior to his operation, for the surgery, and in the years thereafter. This temporal spectrum of patient contact with people afflicted with a disease process -- atherosclerosis -- accounting for the greatest number of deaths in the United States today, is a unique experience provided by our study program. There are approximately two to three patients in our program on the surgical service at any one time.

HENRY BUCHWALD, M. D.

Research Summary

Partial ileal bypass has enjoyed six years of clinical trial at the University of Minnesota in the treatment of hypercholesterolemia and atherosclerosis. At present, this operation appears to be the most effective single method available to achieve maximal cholesterol reduction in hypercholesterolemic patients. The procedure has been prefaced by at least a three month trial of low cholesterol, low saturated fat dietary managment and patients have been maintained on these dietary restrictions in the post-operative period as an adjuvant to the operative effect. Overall cholesterol reduction three months following bypass has been 40% in comparison to the pre-operative post dietary baseline; and, at two years or longer this reduction has increased to 45%. The cholesterol reduction has been maintained or has progressed throughout the follow-up period of each of our patients; there does not seem to be any trend to return to the pre-operative cholesterol value. In our current series of 63 patients we have documented clinically in the laboratory, partial ileal bypass is not associated with weight loss, malnutrition, electrolyte abnormalities, or unmanageable diarrhea.

The patients who had angina pectoris pre-operatively have uniformily offered testimony to a decrease in the occurrence of their angina pectoris subsequent to operation. This decrease in the frequency of their cardiac pain pattern is associated with an increase in work capacity, exercise tolerance, and sense of well being. Similar statements may be made for patients with complaints of cerebral vascular insufficiency or intermittent claudications. These are clinical impressions and no objective measurements to confirm them have been made, nor are they subject to statistical analysis. The regression of xanthomata, subcutaneous xanthomota, and priobratal xanthelasma following partial renal bypass has been observed and pictorially documented. The double masters electrocardiograms of 4 patients have converted to a positive pre-operative tracing to a negative one, one year later following operation. These reversals are again stated to be clinical findings and are not intended as evidence for the regression of atheroscelerotic coronary heart disease. Sequential analysis of selected coronary angiograms and peripheral arteriograms in our current patient group have, in the six years of study, shown no visible progression of the disease process as defined as the appearance of new plaques or the enlargement of existing plaques.

Our research laboratory, which employs nine people and can provide a research experience for a surgical resident, is primarily concerned with the animal and clinical study of cholesterol bile acid metabolism. We have shown that subsequent to partial ileal bypass there is an increase in the cholesterol synthesis rate, an increase in sterol excretion, an increase in bile acid excretion, increase cholesterol turnover and a decrease in the body cholesterol pools. That the body cholesterol loss subsequent is probably not restricted to the plasma or freely miscible cholesterol pool is inferred from calculation of a marked decrease in the total body exchangeable cholesterol pool, and, therein, predominately a decrease in the slowly miscile fraction. Our laboratory data seems to have sugstantiated the theoretical rational of partial ileal bypass in the treatment of hypercholesterolemia; namely, the establishment of the two-fold drain on the body cholesterol pool. A direct drain results from increased fecal loss of normally absorbed (xenogenous) and reabsorbed (endogenous) cholesterol. Secondly, an indirect or metabolic drain results from reduced bile acid reabsorbtion causing a compensitory increase in hepatic conversion of cholesterol bile salts.

DEMETRE M. NICOLOFF, M. D.

Research Summary:

Current research interest has been principally centered on the metabolic changes that occur in the dog following total hepatectomy. The prime areas of investigation have been:

(1) Development of a technique by which a one-stage hepatectomy can be done with virtually a 0% surgical mortality and on average length of survival of 27 $\pm$ 5 hours.

(2) Determination of changes that occur in substrates and enzymes in both the aerobic and anaerobic pathways in the canine brain for periods of 24 to 30 hours after total hepatectomy.

(3) Study of the hematologic changes that occur in the coagulation factors following total hepatectomy. The principal area of interest in this regard has been the role of the liver in maintaining the level of plasminogen and the level of activity of the plasmin system by determining the accumulation of split products in the serum.

(4) Determination of what role the liver plays in the release of insulin from islet cells following the administration of glucose and ribose.

(5) Demonstration that following hepatectomy there is a marked and prolonged drop of serum complement which indicates that the liver is a major source of complement formation.

(6) Demonstration that renal function and blood flow are not altered 18 to 24 hours after a total hepatectomy in the dog. The parameters measured were the clearance of PAH, insulin, urea, and various amino acids.

ALDO CASTANEDA, M. D.

Research Summary

(A) Presently, our laboratory is involved in extensive experimentation with perfusion techniques in the infant where a very high mortality still exists for a number of congenital malformations. The ability to perfuse successfully animals and humans as small as 2 to 3 kg. would permit direct surgical intervention in some ventricular septal defects with high pulmonary vascular resistance, complete transposition of the great vessels, Taussig-Bing syndrome, and tetralogy of Fallot, to mention a few. In puppies (2 to 4 kg.) the effect of two hours total heart-lung bypass utilizing various cardiopulmonary bypass equipment is being investigated. (1) Hematologic changes (mechanical and osmotic fragility, red blood cell half life, plasma hemoglobin, etc.), (2) Pulmonary surfactant changes (bubble stability techniques and volume pressure curve determinations) and (3) Metabolic consequences are being identified. Successful application of some of these bypass techniques have already been transposed from the laboratory to the operating room. A number of infants (3 to 4 kg.) had successful correction of complex intracardiac defects. Miniaturization of equipment and application of animal perfusion techniques proved of value.

In addition, long-term cardiopulmonary assist (12 to 24 hours) is being tested in puppies utilizing a membrane oxygenator and a simple roller pump. A membrane oxygenator has been selected since by avoiding direct blood-gas interface, it is hoped that blood trauma can be substantially lessened.

(B) Because of the intimate functional interdependence of heart and lungs either primary or secondary irreversible lung disease often co-exists with severe heart disease. In these instances allotransplantation of the heart and lungs as a unit would be of critical clinical importance.

We are presently initiating a series of experiments of heart-lung transplantations in primates (baboons). These studies are designed: (1) to develop a surgical technique which will uniformly yield survival first of cardiopulmonary autotransplants and then allotransplants, (2) to obtain a functional analysis of early and late performance of the heart and lungs after these types of transplantation, and (3) to obtain a reasonable understanding of those problems of transplantation produced by an allogenic rejection both early and late.

so called tolerance. Production of the same quantity of cardiac damage in such tolerant dogs results in initial reduction in cardiac output, but the same increase in vasoconstriction and decrease in tissue perfusion does not occur, and 100 percent of these dogs survived.

These studies emphasized the key role played by the sympathetic nervous system in cardiogenic shock. In other experiments it has been shown that the sympathetic nervous system effect in cardiogenic shock can be blunted by drugs such as Phenoxybenzamine or massive doses of corticosteroids. Treatment of dogs in cardiogenic shock with these drugs, reduced vasoconstriction, increased tissue perfusion and increased survival from 20 to 60 percent.

Clinically, monitoring patients in cardiogenic shock following cardiac surgery, a similar constellation of findings has been observed. The cardiac output is reduced, vasoconstriction increased and tissue perfusion reduced. Survival in such patients has been under 20 percent. Treatment with the vasocilating drugs, Phenoxybenzamine or massive doses of corticosteroids in conjunction with positive inotropic agents has improved survival to 60 percent. Monitoring has included measurements of cardiac output, arterial and central venous pressure, total peripheral resistance, left ventricular strobe work, oxygen consumption, lactic acid levels and circulating catecholamine.

Future plans include the measurement of left atrial pressure, differential right and left ventricular cardiac output and lysosomal enzymes.

Monitoring of patients in cardiogenic shock following acute myocardial infarction is underway and is now being expanded to three University affiliated hospital coronary care units.

Studies are also continuing with the production of tolerance to shock with epinephrine and other similar substances. Epinephrine-tolerant dogs survive usually lethal hemorrhagic, endotoxic, or carciogenic shock. The basic cause for this appears to be in the decreased reactivity of the micro-circulation of the viscera to the insult of blood loss, endotoxin, or cardiac damage in tolerant dogs.

Methods for Freezing and Thawing of Whole Ogans:

Methods have been established to assess damage to organs which occur in both the freezing and the thawing processes. These methods depend on analysis of intracellular enzymes which are released by cell damage. These can be analyzed by collecting the venous effluent from perfused organs during the freezing and thawing process. A perfusion system has been developed to saturate organs with 15% glyceryl in preparation for freezing. Freezing has then been accomplished with liquid nitrogen taking the organs down to -195°C. Thawing is then done with a newly developed micro-wave oven which allows us to thaw a kidney from -195 C. to 37°C. within 2 minutes. Such kidneys have produced urine fro short periods, but no longterm surviving kidneys have yet been established with this procedure.

Research in Cardiogenic Shock:

Clinical studies have been carried out on some 150 patients suffering shock from volume loss in gram negative bacterial infection or cardiac damage. These studies have been facilitated by the development of a portable shockcart which allows us to measure cardiac output, arterial and venous pressure, and obtain derived values from these measurements. Survival rates in late shock have been increased from 30% to 60% with the use of a combined program of volume, vasodilitation with a massive loss of steroids or phenoxybenzamine and in selected patients, the use of inotropic agents such as isoproterinol or levarterinol.

Finally, work has begun on the development of a reliable cardiac assist device called "RECAD" which we hope will eventually prove an in vitro or in vivo substitute for the heart and lung.

R. C. Lillehei Lab Report:

Studies in cardiogenic shock have been conducted both experimentally and clinically.

Experimentally, studies have been confined to the dog. Induction of cardiogenic shock by closed chest intracoronary artery microsphere embolization results in a dramatic decrease in cardiac output, increase in peripheral vasoconstriction, a consequent decrease in measured tissue perfusion, a 20% survival. It is recognized that the primary problem is cardiac damage and a reduction in cardiac output. Changes in peripheral vasoconstriction and tissue perfusion are secondary. However, it is also recognized that once cardiac damage has been sustained, little clinically can be done to increase cardiac output directly. Consequently, methods to reduce vasoconstriction and improve tissue perfusion have been explored in an attempt to increase survival. It has been found that those responses to reduction in cardiac output are mediated through the sympathetic nervous system. Experimentally, a near total chemical sympathectomy can be produced by chronic injections of epinephrine or norepinephrine

Transplantation: Dr. Lillehei

Organ Survival Under Experimental Conditions:

During the past year, methods have been developed to preserve the functional viability of the kidney in vitro for periods as long as 24 hours. Previously we had been able to preserve a kidney in vitro with hypothermia and hyperbaria with oxygen for periods of 24 hours, but only at the cost of a temporary loss of viability. Thus, such a kidney would not support life until it had been in place in the new host for one to three weeks. Now with the addition of a low-flow perfusion to the hypothermia and hyperbaria, it is possible to preserve functional viability of the kidney for 24-hour periods in vitro, so that such a kidney will immediately support the life of a nephrectomized dog following transplantation.

Similar studies have been carried out with the lung and with the pancreas. The pancreas has been preserved in vitro for 24 hours and then placed in a pancretectomized recipient dog and supported the life of this animal without the need for added insulin.

Similar studies are continuing with the liver also. Transplantation studies have been conducted in which the liver has been transplanted as an auxillary liver and the recipient's own liver defunctionalized by tying the portal vein and common bile duct. Such an auxillary liver has then supported life for periods beyond 4 months with demonstrated activity by direct biopsy, as well as by indirect studies with radioactive tracers.

Shock: Dr. Lillehei

Cause and Prevention of Irreversible Shock

Studies have continued on basic mechanisms in shock due to bleeding, endotoxin, or myocardial damage. While isolated blood flow experiments have established that endotoxin decreases capillary perfusion pressure with an increased trans-sedation of fluid from the vascular system into the tissues, such an effect of endotoxin is prevented by previous development of tolerance to epinephrine or by the giving of a massive dose of methylprednisolone. A similar study had indicated that a massive dose of methylprednisolone decreases the ability of postganglionic sympathetic nerve fibers to transmit nerve impulses. This is a possible explanation of the vasodilitation following the use of a massive dose of steroids.

Still in other studies shunting in the lung, liver, and intestine have been studies in endotoxin shock. These studies have been carried out using microspheres of a diameter of 25$\pm$ 5 micra. Shunting has also been studied by the use of Berggren's formula which allows one to estimate shunting in the lung. With all these methods, we find no evidence that shunting occurs after the injection of endotoxin or after the injection of bacteria or injection of endotoxin combined with bacteria. Thus, the dog model differs from the human model in this respect when studying septic shock.

However, when the aspect of inflammation is added to the injection of endotoxin and bacteria in the dog model, then arterial venous shunting seems to occur, similar to that which occurs in man.

Transplantation Dr. Varco

Our long term research objective is elucidation of the effector mechanisms responsible for the functional failure of renal allografts. In 1963 it became clear to us that current experimental approaches and methodology were inadequate for dissection of the pathophysiology of first set renal allograft rejection. Therefore, we temporarily directed our attention to renal rejection models in which the effector processes, by reason of being temporally compressed and amplified, accordingly should have been more amenable to dissection. Work based upon that hypothesis has already shed much light on the effector processes not only of accelerated rejection but even first-set allograft rejection. Our discovery of participation of the complement system in rejection of renal xenografts led directly to our investigations and demonstration of its utilization in allogeneic renal graft rejection. Indeed, it led us to the demonstration of three forms of allogeneic renal graft pathology differentiated by the role of the complement system in each. Our current and proposed investigations of leukocyte and platelet phenomena in the production of morphologic and functional damage to renal xenografts are similarly directing our research into their roles in allogeneic renal damage. It is our belief that knowledge of these effector steps in renal graft destruction is essential to formulation of a rational and successful approach to preservation of renal function in clinical transplantation. This in no way minimizes the value of the enormous volume of basic immunological work being done on host recognition and antibody synthesis mechanisms but rather complements it and increases the number of potential avenues for successful solution of the transplant problem. It seems apparent that many of the effector steps once known will be susceptable to specific attack with resulting benefits to the host much superior to those of the therapeutic regimens now in use and will be of value in understanding and development of specific therapy for a wide variety of phenomenologically related diseases as well.

Transplantation: Dr. Najarian

The research objectives are to provide an opportunity to study transplantation biology in both animals and man. In addition, we continue a detailed investigation of transplantation immunology relating to the different and afferent mechanisms of rejection in an attempt to better define the precise mechanism of rejection and to develop methods for abrogating this response. The physiological response of kidney, liver, cardiovascular, and pulmonary systems under the circumstances of transplantation will also be investigated. Finally, better methods of immuno-suppression, utilizing drugs and/or antilymphocytle serum, are currently being tested along with improved methods of tissue matching and histocompatibility typing. The final objective of the transplant studies is to find a solution the problem of renal, hepatic, cardiac, pancreatic, and pulmonary failure in man by application of the knowledge learned in the laboratory.

Transplantation Research Program

The listing below covers areas of activity in the experimental and clinical transplantation program at the University of Minnesota, directed by Dr. John S. Najarian.

In addition, a bibliography of accomplishments from these projects is attached.

CLINICAL STUDIES:

I. Selection of Recipients

A. Diabetes including pancreatic transplants
B. Results in poor risk patients

II. Preparation, Purification and Immunosuppressive Action of Antilymphoblast Globulin in Man.

A. Forced flow electrophoretic purification of anti-human lymphoblast globulin.
B. Immunosuppression by anti-human lymphoblast globulin.
C. Serological and clinical reactivities to horse antilymphoblast globulin in man.
D. Heterophile antibody response to skin grafts in antilymphoblast globulin treated patients.
E. Immunofluorescent studies with antilymphoblast globulin.

III. Prevention of Death Following Renal Transplantation.

A. Prevention of operative mortality
B. Toxic encephalopathy following renal transplant rejection
C. Association of infection and rejection following renal transplantation
D. Prevention of late death following transplantation

IV. Care of Malignancies Following Renal Transplantation

V. Birth Defects in a Child of Male Kidney Recipient of Kidney Transplant

VI. Growth Following Transplantation in Children

VII. Clinical Research in Dialysis and Treatment of Renal Failure

A. A new arterio-venous shunt design.
B. A disposable parallel flow artificial kidney.
C. A simple method of regional heparinization during dialysis.
D. Indications for diuresis in acute renal failure.

Bone Marrow Transplantation

Liver Transplantation

EXPERIMENTAL ANIMAL STUDIES

I. The Role of the Complement System in Generating Tissue Injury

II. Mechanism of Xenograft Rejection and Its Prevention

III. Histocompatibility Antigens

IV. Allograft Prolongation by Immunosuppressive Agents

A. Antilymphocyte globulin
B. Other immunosuppressive Agents

V. Experimental Organ Transplant ation

A. Cardiopulmonary autotransplantation in primates
B. Intestinal transplantation
C. Pancreatic transplantation
D. Auxiliary liver transplantation

VI. Organ Preservation

DEPARTMENT OF SURGERY
RESEARCH SPACE

RESEARCH PROGRAM	SPACE AVAILABLE
Malignant Disease	2,327 square feet
Transplantation	2,913 square feet
Cardiovascular	2,075 square feet
Pediatric Surgery	536 square feet
Gastroenterology	2,003 square feet

Research Grant Support

Federal	$1,178,223
Non-Federal	324,576
TOTAL	$1,502,799

DEPARTMENT OF SURGERY

GENERAL SURGERY STAFF 1970

JOHN S. NAJARIAN, M. D.	PROFESSOR AND CHAIRMAN
RICHARD L. VARCO, M. D.	PROFESSOR
RICHARD C. LILLEHEI, M. D.	PROFESSOR
CHARLES F. MCKHANN, M. D.	PROFESSOR
ALDO CASTANEDA, M. D.	PROFESSOR
ARNOLD LEONARD, M. D.	ASSOCIATE PROFESSOR
ALBERT SULLIVAN, M. D.	ASSOCIATE PROFESSOR
JOHN P. DELANEY, M. D.	ASSOCIATE PROFESSOR
THEODOR GRAGE, M. D.	ASSOCIATE PROFESSOR
HENRY SOSIN, M. D.	ASSISTANT PROFESSOR
RICHARD L. SIMMONS, M. D.	ASSOCIATE PROFESSOR
ROBERT L. GOODALE, M. D.	ASSISTANT PROFESSOR
VICTOR GILBERTSON, M. D.	ASSISTANT PROFESSOR
HENRY BUCHWALD, M. D.	ASSOCIATE PROFESSOR
DEMETRE NICOLOFF, M. D.	ASSISTANT PROFESSOR

DEPARTMENT OF THERAPEUTIC RADIOLOGY

Aims and Objectives

The aims of this department are quite broad but specifically are related to the teaching of the medical student and graduate physician the broad field of oncology in all its aspects plus the role of the therapeutic radiologist in the treatment of neoplasms. We feel that the most effective method of teaching is that of the personal instructor and student in the clinical laboratory, the seminar, and the bedside situation. The most effective method of teaching is to demonstrate the clinical problem, discuss the methods of treatment and demonstrate the efficiency of a particular method in the treatment. From this stimulation of the clinical aspect and the clinical interest of the student, we can then direct our attention to the research interest in the basic science area. We hope by these methods and activities to stimulate interest and knowledge of radiation biology and oncology. We also hope to develop a core of individuals interested in both the practice of radiation therapy and in the academic setting of the Medical School.

GRADUATE PROGRAM IN THERAPEUTIC RADIOLOGY

Radiation Therapy

103f,w,s, (8-310). Fundamentals of Radiation Therapy. (1 cr./qtr.)

204f,w,s, (0-321). Tumor Clinic Conference.

205f,w,s,su (8-350). Reasearch in Radiation Therapy. (Cr. ar.)

240f,w,s, (0-320). Radiation Therapy Conference.

(5-340)f,w,s, Special Problems in Radiation Therapy. (Cr. ar.)

(8-300)f,w,s,sr, Radiation Therapy. (Cr. ar.)

Radiation Biology

205f,w,s,su, (5-450). Research in Radiation Biology. (Cr. ar.)

212f,w,s,su, (8-410). Seminar: Radiation Biology. (1 cr/qtr.; prereq. #)

(5-440)f,w,s,su, Special Problems in Radiation Biology. (Cr. ar.)

Radiological Physics

103f,w,s, (5-510). Basic Principles of Radiological Physics. (1 cr./qtr.; offered alternate years)

170f (5-770). Radiological Physics. (3 cr.)

171w (5-771). Medical Nuclear Physics. (3 cr./qtr.)

172s (5-772). Radiation Biology. (3 cr./qtr.)

205f,w,s,su, (8-550). Research in Radiological Physics. (Cr. ar.)

210f,w,s, (5-511). Roentgen Technique. (1 cr./qtr.; offered alt. yrs.)

211f,w,s,su, (5-512). Dosimetry of Internal and External Radiation Emitters. (1 cr./qtr.)

(5-540)f,w,s,su, Special Problems in Radiological Physics.

DEPARTMENT OF THERAPEUTIC RADIOLOGY

Staff and General Areas of Interest

Four Physicians (M.D.) (One Prof., one Assoc. Prof., one Asst. Prof., and one Instructor).
Clinical Research and Patient Care.

Two Physicists (Ph.D.) (Two Asst. Prof.)
(Two M.S.) Dosimetry, Computer Application to Radiotherapeutic sciences, Instrumentation, X- and Gamma-Ray generators, Radioactive Materials.

Two Radiobiologists (One Ph.D., Asst. Prof.) (One M.S., Instructor).

Radiobiology at whole animal level.

Ten Medical fellow-grad student trainees.

Research Space and Program

Program: Research

Teaching and research in: Cellular radiobiology, biochemistry, whole animal radiobiology, combined drug-radiation effect, radiation and fertility, perfusion of limbs and organs, radiosensitizers and protectors. Dosimetry, radiological physics, tracers and isotopes for therapy and metabolism.

Space

About 5,000 Sq. Ft.
General laboratory and animal space
X-radiation machine

Clinical Program

850 - 900 new cancer patients treated annually.

PROJECTS OF PHYSICS SECTION

I. V. Moore

1. Development of PC computer programs to read the coordinates of Radium needles from AP-lateral or orthogonal films.

2. Development of PC computer program for dynamic 3-dimensional display of Radium needles on CRT oscilloscope.

3. Development of PC computer program to link PC computer and Toshiba automatic Isodose Plotter to produce beam card data directly from Isodose Plotter or from isodensity plotting from from film dosimeter.

4. Development of connection of PC computer to a CDC 3300 computer via a PDP 12 computer in order to use PC as a remote terminal for a larger computer.

5. Development of a treatment planning center for use by radiation therapists at other institutions.

6. Preparation of isodose curves for 10MV X-Rays and 8 to 13 MeV electrons from Toshiba 13 MeV Linac-direct measurements and computer analysis.

7. Development of Laser beam method of cutting divergent patterns in styroforam plastic for lead-shop-in plastic fields.

II. Faiz Khan

1. Dosimetry of partially blocked fields using CDC 3300 computer.

2. Dosimetry of mantle fields using Cobalt teletherapy and 10 MV X-Rays from linear accelerator. Comparative evaluation of the two techniques and attempts to achieve homogeneity of dose in the tumor areas.

3. Development of quick and accurate manual methods of dosage calculations for irregularly shaped fields.

4. Synthesis of isodose curves for 10 MV X-Rays and electron beams using CDC 300 computer.

5. Feasibility studies of Cerenkov radiation for the determination of energy spectrum of high energy electron beams.

6. Effect of tissue in homogeneitis on dose distribution in high energy X-Rays and electron beam therapy using linear accelerator.

THERAPEUTIC RADIOLOGY DESCRIPTION OF COURSES

ELECTIVE COURSES

182 (5-505). Externship in Radiation Therapy. (Cr. ar.; prereq. regis. med.)

183 (5-530). Problems in Radiation Biology and Radioactive Isotope Methods. (Cr. ar.; prereq. regis. med.)

ADVANCED CREDIT COURSES

103 (5-103). Fundamentals of Radiation Physics, Radiology. (1 cr.)

170, 171, 172, (5-170, 5-171, 5-172). Radiation Physics. (3 cr.; prereq. #)

204 (8-204). Tumor Clinic Conference

205 (8-205). Research: Radiation Therapy, Nuclear Medicine, Radiobiology

208 (8-208). Seminar: Radiology Pathology

211 (8-211). Dosimetry of Internal, External Radiation Emitters.

212 (8-212). Seminar: Radiation Biophysics

240 (8-240). Seminar: Radiation Therapy

RESEARCH PROGRAMS BEING CARRIED OUT IN
THE DEPARTMENT OF THERAPEUTIC RADIOLOGY

Yosh Maruyama, M.D.	Radiobiology of Mouse Lymphoma Cells
	Study of Spleen Lumphoma Colony Forming Cells
V.T. Fallon, M.D.	Evaluation of swine skin reaction to X-rays: Study of moist reaction therapy with topical steroids
S.H. Levitt, M.D.	(1) Effect of vascular disease on Tumor Responses (2) Tumor dose relationships in Radiation Therapy (3) Preoperative Irradiation of Renal Tumors (4) Randomized Study of Treatment of Advanced Hodgkin's Disease
C.W. Song, M.D. S.H. Levitt, M.D.	Response of Tumor Vessels and Normal Vessels in Normal Rats to Radiation
C.W. Song, M.D. S.H. Levitt, M.D.	Response of Tumor and Normal Vessels in Hypertensive Rats to Irradiation

RESEARCH GRANT SUPPORT

Federal:	$92,639
Non-Federal:	20,000
TOTAL:	$112,639

DIVISION OF UROLOGY, DEPARTMENT OF SURGERY

Undergraduate Programs

The Division of Urology, Department of Surgery, provides undergraduate exposure at the Junior and Senior student level by a didactic and elective program of instruction. Students visit the department for one to three week periods in groups of three to four when all aspects of basic urological instruction are provided. The students join in day to day activities, have formal and informal teaching, meet visiting and attending staff, and have opportunities to visit affiliated programs.

Similar services and instruction are provided by affiliated programs at the Veterans Administration Hospital, Hennepin County General Hospital, and the St. Paul Ramsey Hospital. These are affiliated hospitals with the University of Minnesota Training Program facilities.

The undergraduate education facilities are provided through the above mentioned hospitals, each of which has an individually approved urology training program under the University of Minnesota combined Urology Training Program. Each program has a separate head and attending staff and work closely within the University of Minnesota affiliation.

Advanced Training

Advanced training is provided at the graduate, postgraduate, postdoctoral and special fellowship levels through a variety of mechanisms.

1. Residency Training - Approved residency training in Urology is provided on a three year program following internship and two years of basic surgical training. The three year urological training is provided by a rotational system utilizing the services of the affiliated hospitals of the University Hospitals, Veterans Administration Hospital, Hennepin County General Hospital and Fairview Hospital. Each of these hospitals has recently been approved (1970) by the Residency Review Committee of the American Medical Association for a part of a rotational program so as to provide residency positions for four men each year. It is anticipated that the three year program will graduate four chief residents yearly.

2. United States Public Health Service Training Program - A graduate trainee program in Urology has been available since 1965. This has recently been re-evaluated (August 1970) for a period of seven years, contingent on funding.

This graduate training program allows academic training to one or two graduate trainees each year. This is both a training period essentially aimed at giving experience in basic science, and urological research through our recently enlarged urologic laboratories to allow one or two years of extra training to graduate students who seek academic exposure.

Other methods of training that are currently being used include postdoctoral fellowships and special fellowships, again provided by the United States Public Health Service.

Other fellowships by the American Cancer Society, the Kidney Foundation, and direct help from the Graduate School are available and have been used to supplement training.

Review of Training Plan

a) Structure of Training Program - In the early stages of the training program, six months fulltime in the laboratory was offered to every resident. The time for taking a period of fulltime laboratory study was left without any rigid definition, and was so designed that it could be related to other means of support, such as postdoctoral or special fellowship award. In two instances such awards were obtained (Drs. Feldman and Merrill) and it appears that the training grant mechanism was responsible for encouraging these men toward academic careers. Originally the program had a fairly tight structure with each trainee assigned to spend a certain time of each year in the laboratory. Experience over the last five years has shown this structuring was too rigid, so a more flexible program was developed related to a trainee's interest as he continued to develop. In this way, each trainee could take six or twelve months for fulltime graduate training combined with varying periods of clinical study. Many times these two areas of interest overlapped, however, the overall structure of the program maintained the academic atmosphere.

b) Examples of Training Activities (Past, Present and Future):

1) Concurrent clinical training - University of Minnesota College of Health Sciences has an established approved Urological Training Program as part of the Graduate School of the University of Minnesota. At present we offer a three-year program, shortly to be increased to four years. A rotation is then organized utilizing affiliate hospitals including Veterans Administration and the Hennepin County General Hospitals in Minneapolis. Current training is based on the following general plan--

First year resident spends three months at the University Hospital, six months at the Veterans Administration Hospital and three months at the Hennepin County General Hospital.

Second year resident spends three months at the University Hospital, six months at the Veterans Hospital and three months at the Fairview Hospital.

Third year resident spends three month periods as chief resident rotating through all hospitals with other assignments in Student Health and Cancer Detection Clinic.

The training includes the direct care of all patients, under direct supervision of the fulltime staff at each of these three hospitals. Each has a private and ward service and includes all types of clinical work, pre and postoperative investigation, and in-patient and out-patient care. There is a large pediatric service at the University Hospital and the Hennepin County General Hospital.

2) Graduate Medical Student Teaching - The third and fourth year medical students have one and two week rotations on the Urology Service as part of an elective during these years. At this time groups of three to four students rotate through the University Hospitals program and are also rotated through the affiliate hospitals as part of a schedule.

Graduate Courses:

8-250	Urological Surgery
8-251	Cystoscopy and Urology Diagnosis
8-252	Urological Conference
8-253	Research in Urology
8-254	Urological Seminar
8-255	Urology-Radiology Conference
8-256	Urology-Pathology Conference

c) Research Work in Progress:

Introduction: Since 1964 a laboratory and clinical program investigating certain aspects of neurovesical dysfunction has evolved. Tests of bladder innervation and methods of evaluating the elastic characteristics of the bladder wall have been developed. Further methods of returning volitional control of micturition to patients with neuro-vesical dysfunction based on electrical vesical stimulation and control of incontinence by an implantable externally controlled incontinence device are under study. Both the electronic vesical stimulator and the incontinence device have had extensive laboratory and animal testing.

In 1969 the laboratory space was expanded and personnel were recruited related to the research program in macromolecular biology and viral oncology. Additional equipment was purchased to modernize the biochemestry laboratory and the tissue culture facility. Further, attempts have been made to secure project support for research in these areas.

Initial research in this aspect of our investigative program has been directed toward developing all lines derived from human tumors and to establishing a comprehensive serum and tissue bank with serums and tumors from patients with different urological neoplasms and with varying clinical stages of disease. The tissue and serum bank will serve as a resource for the studies outlined herein.

Another area of continuing research is the macromolecular pathology of the kidney. Work is continuing in certain aspects of nuclear RNA metabolism in normal kidney and attempts are being made to further characterize the early macromolecular defects in the obstructed kidney.

General Description

1. Curriculum -

Everyday 4:30 p.m.	- Radiologic review of urologic radiography of the day.
Monthly Journal Club	- Review of journal articles of interest to clinical and laboratory research programs.

2. Areas for Future Development-

We plan to develop additional consulting arrangements through our visiting scientist program in the fields of viral oncology and biochemistry.

3. Future Research -

a) Neurovesical Dysfunction and Related Projects

1) Air Cystometry
2) Sacral Nerve Root Stimulation
3) Bladder Biopsy
4) Electronmicroscopy

b) Development of New Techniques for Diagnostic Measurement of Neural and Detrusor Function

c) Colonic Bladder Substitution

d) Proposed Animal Studies

e) Studies on Humans

f) Viral Oncology, Tumor Immunology and Macromolecular Pathology

1) Tumor Immunology - Search for tumor specific antigens in genitourinary neoplasms. Development of tests for circulating tumor specific antibodies in patients with tumors.

2) Viral Oncology - Founding of serum and tissue bank. Establishment of cell lines derived from different genitourinary neoplasms. Attempts to recover virus from urologic neoplasms. Viral sensitivity of human prostatic epithelium.

3) Macromolecular Pathology - Work will continue on various aspects of nucleic acid matabolism in normal and obstructed kidney as outlined previously.

4. Facilities -

Clinical - The training program in Urology utilizes University of Minnesota Hospitals which are closely associated with the basic science departments of the Medical School, the Minneapolis Veterans Administration Hospital and the Hennepin County General Hospital. The nearby St. Mary's-Fairview Hospitals will also be an affiliated clinical training center starting in July 1970.

Research -

a) Large Animal Surgical Suite - (F-119 Diehl Hall - 246 sq. ft.) is fully equipped for open and animal surgery. This unit includes an operating table, operating lights, coagulation unit, two complete sets of surgical instruments, anesthetic and sterilization equipment. Research is supervised by a senior technician skilled in animal anesthesia, sterilization procedures and various surgical techniques.

b) Cellular Biology and Viral Oncology Laboratory - (F-130 Diehl Hall - 936 sq. ft.) is equipped with a Forma Environmental Room, centrifuges, liquid scintillation counter and teletypewriter, Beckman spectrophotometer, electronic calculators, Millipore distilled water system, etc. This facility is managed by Dr. Elliott, a virologist and Mr. Bell, a cellular biologist.

c) Biochemistry Laboratory - (B-195 Mayo - 124 sq. ft.) is equipped with a Technicon Auto Analyzer, Flame Photometer, Osmometer, ph meter, Leitz photometer, Voland analytical balance and Leitz binocular microscope with camera attachment.

d) Tissue Culture Room - (B178 Mayo - 140 sq. ft.) is equipped with an Environcom laminar flow tissue culture hood, a Wedco double incubator with refrigeration, a Leitz inverted microscope with camera attachment, etc.

e) Neurovesical Dysfunction Laboratory - (2108 Diehl Hall - 400 sq. ft.) is fully equipped for neurophysiological investigation including channel magnetic tape deck, oscilloscopes, amplifiers, pulse generator, and Mentor intracellular amplifier.

f) Large Animal Quarters - (B-127 Mayo - 170 sq. ft.) will accommodate 27 animals.

g) Small Animal Quarters - (B-241 Mayo - 140 sq. ft.) accommodates 600 small animal cages.

5. Interns -

Interns rotate through the Division of Urology for one month throughout the year. These are provided through the Department of Surgery.

6. Continuing Education -

Continuing Education is provided on a yearly basis through the Post Graduate Education Department.

a) Refresher Courses - A refresher course for general practitioners in Urology will be provided in January, 1971, aiming to provide current knowledge of everyday urology to a group of about 100 general practitioners from the midwest.

b) Postgraduate studies provided by weekly Saturday morning conferences when members of the attending staff and urologists from the five state area partake in weekly departmental teaching conferences.

c) Undergraduate continuing education is provided by undergraduates attending the conferences, and also by their visiting with the downtown staff on a one-day weekly preceptorship type program.

RESEARCH GRANT SUPPORT

FEDERAL	$168,720
NON-FEDERAL	41,500
TOTAL	$210,220

GRADUATE PROGRAM

Graduate students, including those in Basic Science programs and all Clinical Residents (fellows) are enrolled in the Graduate School of the University and attend courses which lead to the M.S. or PH.D. degree. The following table lists the number of graduate students or fellows enrolled in the particular Basic Science discipline or clinical specialty for the years 1965 - 1970. Granted degrees are also listed.

DEPARTMENT	FELLOWS ENROLLED					DEGREES GRANTED									
						1965-66		1966-67		1967-68		1968-69		1969-70	
	1965-66	1966-67	1967-68	1968-69	1969-70	MS	PHD	MS	PHD	MS	PHD	MS	PHD	MS	PHD
BASIC SCIENCES															
Anatomy	41	45	44	42	47	3	2	1	8	-	3	1	4	2	3
Biochemistry	82	95	109	90	100	-	1	-	-	11	17	6	6	5	13
Microbiology	57	55	60	56	58	8	6	5	6	3	5	9	3	3	5
Pathology	33	30	20	24	19	-	-	-	1	-	-	-	-	3	2
Pharmacology	29	37	29	33	38	-	5	-	8	-	8	1	-	-	3
Physiology	53	47	51	40	40	-	2	1	3	2	7	1	7	1	6
CLINICAL SCIENCES															
Anesthesiology	16	21	28	25	24	-	-	-	-	1	-	2	-	2	3
Dermatology	14	10	9	12	14	4	-	-	-	-	-	-	-	3	-
Laboratory Medicine	0	0	7	8	12	-	-	-	-	-	-	-	-	-	-
Medicine, Internal	131	107	115	130	158	-	1	-	2	3	1	-	2	4	2
Neurology	25	20	23	27	32	1	2	1	-	-	-	-	-	1	-

Continued

DEPARTMENT	FELLOWS ENROLLED					DEGREES GRANTED									
						1965-66		1966-67		1967-68		1968-69		1969-70	
	1965-66	1966-67	1967-68	1968-69	1969-70	MS	PHD	MS	PHD	MS	PHD	MS	PHD	MS	PHD
CLINICAL SCIENCES (Continued)															
Neurosurgery	7	8	12	14	14	-	-	-	-	-	-	-	-	-	-
Obstetrics & Gynecology	15	12	16	16	23	-	-	-	-	-	-	-	-	-	-
Opthalmology	15	17	18	19	17	-	-	-	-	-	-	-	-	-	-
Orthopedic Surgery	22	23	28	17	37	-	-	-	-	-	-	1	-	3	-
Otolaryngology	11	13	13	15	17	-	-	-	-	-	-	-	-	2	-
Pediatrics	44	47	48	56	62	-	-	-	-	-	-	-	-	-	-
Physical Medicine & Rehabilitation	5	9	10	13	12	-	-	1	-	1	1	-	-	1	-
Proctology	1	0	0	0	0	-	-	-	-	-	-	-	-	-	-
Psychiatry	28	21	24	31	32	-	1	-	-	1	-	-	-	1	-
Radiology	52	50	58	69	78	1	1	1	-	-	-	1	-	3	-
Surgery	134	120	120	106	123	-	5	-	11	2	5	1	1	4	6
Urology	14	20	20	14	15	1	1	-	-	-	-	-	-	2	-
TOTALS	829	807	862	857	972	18	27	10	39	24	46	23	23	40	43

It is planned that by completion of the proposed facilities, at least 120 graduate students, including clinical department residents will be added to the various programs.

POSTGRADUATE EDUCATIONAL ACTIVITIES

The department of Postgraduate Educational Activities is making a concentrated effort to work with the Minnesota Academy of General Practice in an attempt to correlate several of our programs with the needs of the practicing physicians in the state.

Development of relationships with hospitals and practitioners in the state is underway through the Northlands Regional Medical Program and Doctor William Fifer. His objective is to continue postgraduate medical education through the development of lifetime educational programs for the Health Care System.

Short courses will continue to be offered encompassing a broader variety of topics for the family physicians and for several specialty groups.

MEDICAL EDUCATION COURSES

OFFICE OF POSTGRADUATE EDUCATIONAL ACTIVITIES

COLLEGE OF MEDICAL SCIENCES

1969 - 1970

NAME	DATES	COURSE HOURS	ENROLLMENT
Epidemiology	June 15 - July 3, 1969	126	81
Dermal Pathology	August 18-22, 1969	30	74
Fourth Annual Symposium on Kidney Disease	September 20, 1969	6	33
Workshop on Hypnosis	September 25-27, 1969	22	132
Neurological Aspects of Internal Disease	October 2-4, 1969	16½	34
Medical Oncology Today	October 8-11, 1969	21	85
Automotive Medicine	October 16-18, 1969	14½	112
Obstetrics	October 22-24, 1969	20½	46
Radiology	October 27-31, 1969	30	335
Dermatology	November 6-8, 1969	13½	27
Diabetes	November 12-14, 1969	15½	26
Ophthalmology (Refraction)	November 12-14, 1969	13½	5
Scoliosis	November 17-19, 1969	19	61
Internal Medicine	February 16-17, 1970	14½	82
Otolaryngology	February 16-17, 1970	12	70
Clinical E.N.T.	February 18-19, 1970	14	
Clinical Management of Allergy	March 5-7, 1969	19	36
Trauma	April 17, 1970	7	23
Ophthalmology	May 4-5, 1970	12	46

Proctology	May 4-8, 1970	28½	26
Laboratory Medicine	May 14-16, 1970	19	137
Surgery	May 20-23, 1970	23½	303
Environmental Health	June 15-19, 1970	30	40
Clinical Otology	June 18-20, 1970	15	218
Hibbing Clinical Seminars	1 session per month for 7 months	24½	?
	TOTAL	567	2032

PROJECTED

MEDICAL EDUCATION COURSES

OFFICE OF POSTGRADUATE EDUCATIONAL ACTIVITIES

COLLEGE OF MEDICAL SCIENCES

1970 - 1971

NAME	DATES	COURSE HOURS	ENROLLMENT
Pulmonary Infections	September 9-11, 1970	18	25
Obstetrics	September 16-18, 1970	18	108
Child Abuse Institute	September 17-18, 1970	12	49
Hibbing Clinical Seminars	9/22/70 - 5/20/71	45	20/session
Clinical Program in E.N.T. for G.P.'s	September 24-25, 1970	12	14
Clinical Hypnosis & Hypnotherapy	October 15-17, 1970	18	102
Fall Meeting-Central Society of Nuclear Med.	October 16-17, 1970	12	70
Minn. Med. Alumni Program	October 29-30, 1970	3	85
Radiology	October 19-23, 1970	30	454
Pediatric Neurology	October 29-31, 1970	18	25
Dermatology	November 5-7, 1970	18	30
Refraction	November 11-13, 1970	18	7
General Orthopedics	November 16-18, 1970	18	25
Clinic Management for Doctors	December 3-5, 1970	18	100
Common Urological Problems	January 18-20, 1971	18	30
Trauma	February 11-12, 1971	6	80
Diagnosis of Pulmonary Disease	February 15-16, 1971	12	75
Practical ENT	February 22-23, 1971	12	75
Elective Clinical Program in ENT	February 24-25, 1971	12	15

NAME	DATES	COURSE HOURS	ENROLLMENT
Allergy	March 4-6, 1971	18	35
Arthritis	March 11-12, 1971	12	50
Office Management of the Emotionally Disturbed Patient	March 18-20, 1971	18	40
Proctology	March 22-26, 1971	30	40
Ophthalmology	May 3-4, 1971	12	50
Laboratory Medicine	May 12-15, 1971	18	150
Anesthesiology	May 24-26, 1971	18	25
Surgery	May 24-26, 1971	18	300
Summer Graduate Course in Epidemiology	June 20-July 10, 1971	126	85
	TOTAL	588	2304

MEDICAL STUDENT SELECTION AND CLASS DATA

An established committee of the Medical School, the Medical School Admissions Committee, composed of nine voting members, including a medical student and a consultant from the Division of Clinical Psychology, and three ex-officio members, is charged by the faculty to select qualified applicants. Academic records; the results of certain tests including the Medical College Admissions Test, the Strong Vocational Interest Test, and the Miller Analogies Test; personal recommendations; and a personal interview with the applicant contribute to the judgment of the committee. After consideration of the applicants by the committee, a primary listing of accepted students is constructed. An alternate group is also picked in case those applicants on the primary list decline admission to the Medical School.

In 1969, the faculty of the Medical School adopted a policy which encourages acceptance of disadvantaged students into the Medical School curriculum. This policy has been implemented and a number of these students were admitted with the 1969-70 and 70-71 classes.

The over-all attrition rate of medical students has not been greater than 5-6% for the last several years.

Approximately 50% of the graduates of the school continue to reside in the state.

The following tables statistically portray features of each of the entering classes of the last 3 years only.

September 30, 1970

UNIVERSITY OF MINNESOTA
MEDICAL SCHOOL ADMISSION STATISTICS
Freshman Medical Class Entering Fall 1970

1970 Applicants (Number = 974)

Residents	397	Females	94
Non-Residents	577	Males	880

Applicants offered positions in 1970 class 298
Declined or withdrew 69
Residents 34
Non-Residents 35
Freshman Class for 1970, as of 9-30-70 = 229

1970 Entering Class (Number = 229)

Residents	187	Females	21
Non-Residents	42	Males	208

Total Grade Point Average **

3.6 and higher	65	(29%)
3.1 - 3.5	111	(49%)
2.6 - 3.0	41	(18%)
less than 2.6	10	(4%)
Range	2.06 - 4.00	
Mean GPA	3.34	
Median GPA	3.39	

** 2 students had no overall GPA

Pre-Medical Education

University of Minnesota	78	(34%)
Minnesota State Colleges	6	(2.6%)
Minnesota Junior Colleges *	6	(2.6%)
Minnesota Private Colleges	73	(32%)
Colleges in surrounding states	15	(7%)
Eastern Colleges	18	(8%)
Other	37	(16%)
With four years of college	201	(88%)

* Attended for 2 years only

Medical College Admission Test Scores ***

Verbal Ability

700 and higher	3	(1%)
650 - 699	23	(10%)
600 - 649	46	(20%)
550 - 599	64	(28%)
500 - 549	53	(23%)
450 - 499	31	(14%)
less than 450	7	(3%)

Median - 565

General Information

700 and higher	7	(3%)
650 - 699	29	(13%)
600 - 649	50	(22%)
550 - 599	57	(25%)
500 - 549	51	(22%)
450 - 499	26	(11%)
less than 450	7	(3%)

Median - 575

Quantitative Ability

700 and higher	36	(16%)
650 - 699	50	(22%)
600 - 649	70	(36%)
550 - 599	42	(19%)
500 - 549	23	(10%)
450 - 499	4	(2%)
less than 450	2	(1%)

Median - 635

Science

700 and higher	1	(4%)
650 - 699	13	(6%)
600 - 649	57	(25%)
550 - 599	73	(32%)
500 - 549	53	(23%)
450 - 499	21	(9%)
less than 450	9	(4%)

Median = 575

*** 3 students had no MCAT scores

	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
# of Appl.	232	319	337	392	504	612	689	798	639	642	639	835	974
# Enrolled	135	137	134	147	152	155	156	153	163	160	161	164	229

February 24, 1969

UNIVERSITY OF MINNESOTA
MEDICAL SCHOOL ADMISSION STATISTICS
Freshman Medical Class Entering Fall 1969

1969 Applicants (Number = 833)

Residents	414	Males	743
Non-Residents	419	Females	90

Applicants offered positions in 1969 class 188
Declined or withdrew 28
Residents 14
Non-Residents 14
Freshman Class for 1969, as of 2-24-69 = 160

1969 Entering Class (Number = 160)

Residents	145	(91%)	Males	140	(88%)
Non-Residents	15	(9%)	Females	20	(12%)

(Includes: Surrounding states = 10, Foreign = 0)

Total Grade Point Average

3.6 and higher	50	(31%)
3.1 - 3.5	85	(53%)
2.6 - 3.0	24	(15%)
less than 2.6	1	(1%)
Range	2.5 - 3.98	
Mean GPA	3.36	
Median GPA	3.42	

Pre-Medical Education

University of Minnesota	66	(41%)
Minnesota State Colleges	7	(4%)
Minnesota Junior Colleges*	0	
Minnesota Private Colleges	48	(30%)
Colleges in surrounding states	10	(6%)
Eastern Colleges	9	(6%)
Other	20	(13%)

*Attended for 2 years only

With four years of college 135 (84%)

Medical College Admission Test Scores

Verbal Ability

700 and higher	5	(3%)
650 - 699	25	(16%)
600 - 649	27	(17%)
550 - 599	30	(19%)
500 - 549	41	(25%)
450 - 499	25	(16%)
less than 450	7	(4%)

Median - 565

General Information

700 and higher	7	(4%)
650 - 699	25	(16%)
600 - 649	30	(19%)
550 - 599	49	(30%)
500 - 549	31	(19%)
450 - 499	14	(9%)
less than 450	4	(3%)

Median - 585

Quantitative Ability

700 and higher	37	(23%)
650 - 699	43	(27%)
600 - 649	37	(23%)
550 - 599	28	(17%)
500 - 549	11	(7%)
450 - 499	3	(2%)
less than 450	1	(1%)

Median - 650

Science

700 and higher	10	(6%)
650 - 699	31	(19%)
600 - 649	47	(30%)
550 - 599	38	(24%)
500 - 549	21	(13%)
450 - 499	11	(7%)
less than 450	2	(1%)

Median - 605

	1958	1959	1960	1961	1962	1963	1964	1965	1966	[illegible]	[illegible]	1969
# of Appl.	282	319	337	392	504	612	689	798	639	643	[illegible]	833
# Enrolled	135	137	134	147	152	155	156	153	163	160	161	

September 23, 1968

UNIVERSITY OF MINNESOTA
MEDICAL SCHOOL ADMISSION STATISTICS
Freshman Medical Class Entering Fall 1968

1968 Applicants (Number = 619)

Residents	346	(56%)	Males	559	(90%)
Non-Residents	273	(44%)	Females	60	(10%)

Applicants offered positions in 1968 class 211
Declined or withdrew 49
Residents 26
Non-Residents 23
Freshman class for 1968, as of September 23, 1968 = 162

1968 Entering Class (Number = 162)

Residents	146	(90%)	Males	145	(90%)
Non-Residents	16	(10%)	Females	17	(10%)

(Includes: Surrounding states = 12, Foreign = 2)

Total Grade Point Average

3.6 and higher	47	(29%)
3.1 - 3.5	79	(48%)
2.6 - 3.0	34	(21%)
less than 2.6	3	(2%)
Range	2.4 - 3.9	
Mean GPA	3.34	
Median GPA	3.4	

Pre-Medical Education

University of Minnesota	69	(42%)
Minnesota State Colleges	5	(3%)
Minnesota Junior Colleges*	2	(1%)
Minnesota Private Colleges	48	(30%)
Colleges in surrounding states	14	(9%)
Eastern Colleges	8	(5%)
Other	17	(10%)
*Attended for 2 years only		
With four years of college	130	(80%)

Medical College Admission Test Scores

Verbal Ability

700 and higher	4	(2)
650 - 699	16	(9)
600 - 649	23	(14)
550 - 599	35	(21)
500 - 549	34	(21)
450 - 499	39	(24)
less than 450	15	(9)
Median - 545		

General Information

700 and higher	9	(6%)
650 - 699	21	(13%)
600 - 649	28	(17%)
550 - 599	41	(25%)
500 - 549	41	(25%)
450 - 499	18	(11%)
less than 450	5	(3%)
Median - 575		

Quantitative Ability

700 and higher	32	(20%)
650 - 699	44	(27%)
600 - 649	51	(31%)
550 - 599	21	(13%)
500 - 549	13	(8%)
450 - 499	2	(1%)
less than 450	0	(0%)
Median - 645		

Science

700 and higher	2	(1%)
650 - 699	15	(9%)
600 - 649	60	(37%)
550 - 599	52	(32%)
500 - 549	26	(16%)
450 - 499	5	(3%)
less than 450	3	(2%)
Median - 595		

	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968
No. of Applicants	282	319	337	392	504	612	689	798	639	643	619
No. Enrolled	135	137	134	147	152	155	156	153	163	160	162

MEDICAL SCHOOL FACULTY AT HEALTH SCIENCES CENTER

	Total Faculty[3] 1970	Total Projected Faculty[3] 1977
Anatomy	27[1]	32[1]
Biochemistry	16[1]	20[1]
Microbiology	14[1]	22[1]
Pathology	9[1]	32[1]
Pharmacology	18[1]	26[1]
Physiology	19[1]	24[1]
TOTAL	103	156
Anesthesiology	9	14
Dermatology	4	7
Family Practice and Community Health	8	20
Internal Medicine	31	52
Laboratory Medicine	35[2]	47[2]
Neurology	25	30
Neurosurgery	8	11
Obstetrics-Gynecology	14	30
Orthopedic Surgery	5	9
Ophthalmology	6	11
Otolaryngology	12	20
Pediatrics	39	53
Physical Medicine and Rehabilitation	36[2]	54[2]
Psychiatry	32	41
Radiology	12	18
Surgery	24	35
Urology	6	9
Therapeutic Radiology	8[2]	14[2]
TOTAL	314	475

1. Although administratively within the Medical School, faculty in these departments are responsible for the instruction of not only Medical Students, but, also of other Health Sciences Center students including Dental, Pharmacy, Nursing, Ancillary Health and other students.

2. Faculty in these Medical School departments are responsible for the administration and instruction of substantial programs in the Ancillary Health Fields, including Medical Technology, Physical and Occupational Therapy, and X-Ray Technology. Therefore, faculty projections in these departments include several positions designated for instruction in those programs.

3. Projections are for faculty of rank, assistant professor or higher. In a few instances, whereever appropriate, instructors are included.

FACULTY APPOINTMENTS

The Dean of the Medical School, upon the recommendation of a faculty advisory committee, recommends the appointment of a Department Head of a Basic Science department to the Vice President of the Health Sciences, who in turn recommends the appointment to the President and Regents of the University for final approval of the appointment. Selection of basic science faculty is initiated by the department head with the approval of the Dean,with subsequent submission for approval of the appointment to the President and the Regents of the University. For appointments at tenure level,the Dean seeks the advice of the Faculty Committee on Academic promotions. The same procedures apply to clinical department appointments.

FACULTY RECRUITMENT

One of the major impediments to faculty recruitment at the University of Minnesota Medical School is the critical shortage of physical facilities, and heretofore the indefinite time table for expansion of these facilities. The plans contained in the Unit B/C development program of the Health Sciences Expansion will greatly augment the Medical School's ability to recruit faculty. Relatively limited support of faculty from state sources, with consequent undue reliance on Federal and other outside sources, has further impeded faculty recruitment. The plans of the University to correct this situation and to strengthen state support for the operation of the Medical School will greatly enhance the Medical School's ability to recruit faculty.

FACULTY VACANCIES

At the present there are approximately 12 vacancies in the senior faculty of the Medical School. This includes two department heads and four faculty members of the department of Pathology. The head of the Department of Family Practice and Community Health has recently resigned and a faculty search committee is actively seeking a new department head. The head of the Department of Dermatology will be named in the very near future, possibly by the time of the site visit, Devember, 1970. The new head of the Department of Pathology, Dr. Robert Good, will soon appoint four additional faculty members to the Department of Pathology.

INTRAMURAL PRACTICE PROGRAM

Until several years ago the clinical faculty of the Medical School engaged in a geographic full-time system of medical practice. Under this system the individual faculty member received a basic salary from the University which he augmented by funds from private practice. Three years ago a strict full-time system was developed and was made available on a voluntary basis.

Under the strict full-time system, an individual receives a total University salary which is thoughtofasconsisting of two components. "Basic salary" is a salary comparable to that received by other people of comparable rank and stature in various other parts of the University, for example, the Basic Science departments, the Department of Psychology, and the ArtsCollege, etc. This segment is subject to the same kind of considerations and negotiated in the same manner as are all University salaries. The second segment is known as a "commutation allowance", which the individual receives in lieu of private fees directly received. This segment is also negotiated each year, but the basis of negotiation is different from that applied to the "basic salary". The commutation allowance is influenced by the particular specialty of the individual and by the nature and extent of his clinical activities within the department. The basic salary and commutation allowance together constitute the individual's University salary for the year in question. The department on the strict full-time basis thus has a substantially higher University salary scale than the department on the geographic type basis.

Commutation allowances are derived from a number of sources, but a good measure comes from the departmental fee pool, into which fees resulting from the professional services of faculty members are placed. Instructional funds provided by the state are not used for commutation allowances. Currently the Department of Pediatrics, the Department of Physical Medicine and Rehabilitation, the Department of Family Practice and Community Health, the Department of Obstetrics and Gynecology, the Department of Medicine, and a group within the Department of Surgery serve on a strict full-time basis. Certain administrative officers serve on a strict full-time basis as individuals.

Faculty on a geographic full-time basis also receive a basic University support salary. As a general rule, income augmentation does not exceed this basic salary, in accordance with a University Regents Policy decision of 1963, modified in 1966.

There are no intramural practice areas, as such, in the University Hospital. All patients admitted to the out-patient and in-patient services are used for teaching purposes regardless of whether their faculty physicians serve on a geographic full-time or strict full-time basis.

Faculty Salary Ranges, 1970-71

	BASIC SCIENCE DEPARTMENTS			GEOGRAPHIC FULL-TIME CLINICAL DEPARTMENTS (INCLUDING PATHOLOGY)		
	Maximum	Minimum	Average	Maximum	Minimum	Average
Department Head	37,800	33,500	35,971	31,500	22,000	28,424
Professors	30,700	17,550	23,802	31,100	16,150	23,594
Associate Professors	24,000	14,500	19,100	25,000	13,500	19,139
Assistant Professors	16,700	11,448	14,429	24,000	11,448	16,770
Instructors	12,900	10,920	11,388	19,500	10,920	12,902

STRICT FULL-TIME CLINICAL DEPARTMENTS

	Maximum	Minimum	Average
Department Head	70,750	34,000	48,233
Professors	50,000	21,000	36,411
Associate Professors	42,576	21,000	31,648
Assistant Professors	35,747	15,600	24,253
Instructors	27,300	17,000	18,780

Projected salary ranges may be computed on the basis of a 5-6% increase per year.

Other Teaching Reponsibilities

Types and numbers of students, other than Mecical students, to be taught in the facility by Medical School faculty -

Dental Students	560 - 600
Graduate Students	800
Veterinary Medical Students	
Pharmacy Students	400
Nursing Students	185
Medical Technologists	250
Occupational Therapists	80
Physical Therapists	90
Xray Technologists	
Arts College and other students	

John A. Anderson, M.D., Ph.D.

BIRTHDATE: October 28, 1908 BIRTHPLACE: Sioux Falls, South Dakota

EDUCATION:

Degree	Year	Institution	Major
		Washington High School, Sioux Falls, S.D.	
	1926-1928	University of South Dakota	
B.S.	1930	University of Minnesota, Minneapolis	
M.B.	1933	University of Minnesota, Minneapolis	
M.D.	1934	University of Minnesota, Minneapolis	Medicine
Ph.D.	1940	University of Minnesota, Minneapolis	Physiology & Pediatrics

HONORS AND AWARDS: Sigma Xi, Phi Kappa Phi (Scholastic)

FRATERNITIES: Delta Chi, Phi Chi

APPOINTMENTS:

1933 (3 mo.)	Internship: Dept. of Obstetrics, Mpls. General Hospital and University of Minnesota
1933-34	Department of Pediatrics, University of Minnesota
1934-35	Residency: Department of Pediatrics, University of Minnesota
1935-37	Child Research Council, Denver, Colorado
1937-43	Instructor and Assistant Professor, Department of Pediatrics, University of Minnesota
1943-49	Professor and Head, Department of Pediatrics, U. of Utah
1949-55	Department of Pediatrics, Stanford U.
1955-date	Department of Pediatrics, U. of Minnesota

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"Prenatal and postnatal developmental consequences of maternal phenylketonuria," (with Fisch, R.O., and Walker, W.A.). Pediatrics. 37:979-986, June, 1966.

"L-tryptophan metabolism in phenylketonuria," (with Yarbro, M.T.). Journal of Pediatrics, 68:895-904, June, 1966.

"Failure to detect subtle neurotropism of live, attenuated measles virus vaccine," (with Halberg, F., Jones, F., St. Geme, J.W., Jr., Wright, F.S.). Journal of Pediatrics, 70:36-45, January, 1967.

"Tryptophan Oxidation in Phenylketonuria," (with Bruhl, H., Doeden, D., Michaels, A.J.). Pediatric Research, 1:372-385, 1967.

"The effect of excess L-phenylalanine on mothers and their breast-fed infants," (with Doeden, D., Fisch, R.O., and Jenness, R.). The Journal of Pediatrics. 71:2:176-180, August 1967.

"Circidan Rhythm in serum 5-hydroxytryptamine of healthy men and patients with [illegible]," ([illegible]). [illegible]

WALLACE D. ARMSTRONG, Head, Department of Biochemistry

B.A., Univ. of Texas (1926); Sc.M., New York Univ. (1928); Ph.D., Univ. of Minn. (1932); M.D., Univ. of Minn. (1937).

Academic positions, Univ. of Minn.: Assistant, 1929-32; Instructor, 1932-37; Assist. Prof., 1937-40; Assoc. Prof., 1940-43; Prof., 1943-46; Professor and Head, 1946-present.

Professional Organizations: Am. Soc. Biological Chemists; Soc. Exp. Biol. and Medicine; Am. Physiological Soc.; Inter. Assoc. Dent. Res. (President 1945-46); Biochem. Soc. (London); Am. College of Dentists (Hon.). Am. Dentist Soc., Dental Soc. Sweden (Hon.).

Honors and Scientific Awards: Doctor of Odontology (Honoris Causa), Karolinska Institutet, 1955, Biological Mineralization Award (1966) and H. T. Dean Award (1967) - Int. Assoc. Dent. Res.; Commonwealth Fund Fellowships (Denmark and England - 1937-38), Sweden (1960).

Research Interests: Biochemistry and physiology of calcified tissues; Fluoride physiology and analysis; Mineral Metabolism.

Bibliography: Fetal and neonatal fluoride uptake by calcified tissues of rats; Itzhak Gedalia, Leon Singer, James J. Vogel and Wallace D. Armstrong, Israel Journal of Medical Sciences, 3, 726-730 (1967); Skeletal Magnesium changes in the rat during varying dietary fluoride intake and growth; J. J. Vogel, Leon Singer and W. D. Armstrong, Journ. of Nutrition, 93, no. 4, 425-428 (1967); Determination of Fluoride in Bone with the Fluoride Electrode, Leon Singer and W. D. Armstrong, Analytical Chemistry, 40, 613 (1968); The Incorporation and Removal of Large Amounts of Strontium by Physiologic Mechanisms in Mineralized Tissues of the Rat, A. R. Johnson, W. D. Armstrong and Leon Singer, Calc. Tissue Res., 2, 242-252 (1968); Nature and Origin of the Plaque Produced in Cutaneous Calciphylaxis, Dick R. Lavender, Leon Singer, and W. D. Armstrong, Journal of Dental Research, 47, 907, (1968). Determination of Fluoride Content of Urine by Electrode Potential Measurements, Leon Singer, W. D. Armstrong and J. J. Vogel, The Journ. of Lab. and Clin. Med., 74, 2, 354-358, (1969); Relation Between the Fluoride Contents of Rat Calcified Tissues, Leon Singer and W. D. Armstrong, Journ. of Dental Research, 48, 5, 947-950, (1969); Placental Transfer of Fluoride and Calcium, W. D. Armstrong, Leon Singer and Edgar L. Makowski, Amer. Journ. of Obstetrics and Gynecology, 107, 3, 432-434 (1970); Total Fluoride Content of Human Serum, Leon Singer and W. D. Armstrong, Archives of Oral Biology, 14, 1343-1347 (1969); Fluoride in Plaque, Leon Singer, B. A. Jarvey, P. Venkateswarlu, and W. D. Armstrong, J. Dent. Res., 49, 2, 455 (1970); Adrenal Gland Factors in Magnesium Deficient Rats, Ronald J. Elin, W. D. Armstrong, and Leon Singer, Proc. Soc. Exp. Biol. and Med., 134, 542-547 (1970).

A. B. Baker, M.D.

Birth: March 27, 1908, Minneapolis, Minnesota

Educational History:

University of Minnesota	B.A.	1928
University of Minnesota	B.S.	1929
University of Minnesota	M.B.	1930
University of Minnesota	M.D.	1931
University of Minnesota	Ph.D.	1934

Other Training and Experience:

Robert Pack Hospital, Pennsylvania Internship 1930-1931

Honors:

Undergraduate	Graduate
Phi Beta Kappa	Sigma Xi
Alpha Omega Alpha	

Professional Organizations:

Multiple Sclerosis Society - Member Advisory Board
Epilepsy Foundation - Medical Advisory Board, Chairman
American Board of Psychiatry and Neurology
American Neurological Association, President
American Academy of Neurology

Post-doctorate Honors and Awards:

Membership	1959	Norwegian Academy of Science
Honorary Membership	1961	Argentine Neur. Society
Honorary Membership	1961	Chilean Neur. Society
Honorary Membership	1969	Japanese Neurological Association

Research Interests:

Cerebrovascular Disease; Atherosclerosis; Epilepsy

Selected Bibliography:

CLINICAL NEUROLOGY, 4 Volumes, Editor, Paul B. Hoeber, Inc. 3rd edition, (in press).

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Physical Factors in the Pathogenesis of Cerebral Atherosclerosis, Stroke, Vol. 1, March April, 1970.

Cerebral Atherosclerosis in Greek and Minnesota Populations, Geriatrics, Vol. 25, May, 1970.

ELLIS STARBRANCH BENSON, M. D.

Born: October 28, 1919

Education: Augustana College, Rock Island, Illinois, B.A., 1941
University of Minnesota Medical School, M.D., 1945

Graduate Medical Training:

Residency in pathology and internal medicine, Veterans Administration Hospital, Minneapolis, 1947-49.

Graduate School, University of Minnesota, 1947-53, pathology and biochemistry.

Postdoctoral fellowship, biochemistry (with Prof. K. Linderstrøm-Lang), Carlsberg Laboratory, Copenhagen, 1957-58.

Positions Held:

Instructor, Assistant Professor, Associate Professor - Laboratory Medicine, University of Minnesota, 1949-62.

Professor, Laboratory Medicine and Biochemistry, 1962---.

Head, Laboratory Medicine, 1966---.

Outside Positions and Consultations:

Member, Pathology "A" Study Section, NIH, 1964-68.

Member, Pathology Training Grant Committee, NIGMS, 1968-71.

President. Academic Clinical Laboratory Physicians and Scientists (ACLPS), 1966-68.

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[illegible] Contraction Coupling. Jour. Cell Biol., 38:99, 1969.

Richard V. Ebert, M.D.

BIRTH: October 25, 1912, St. Paul, Minnesota
UNDERGRADUATE WORK: University of Chicago, B.S., 1933
MEDICAL SCHOOL: University of Chicago Medical School, M.D., 1937
INTERNSHIP: Boston City Hospital, 2nd Medical Service, 1937-1939
RESIDENCY: Peter Bent Brigham Hospital, Assistant Resident, 1939-1941
ACADEMIC POSITIONS:

Research Fellow, Harvard Medical School, 1940-1942
Associate Professor of Medicine, University of Minnesota, 1946-1949
Professor of Medicine, University of Minnesota, 1949-1952
George S. Clark Professor of Medicine, University of Minnesota, 1952-1953
Professor and Head, Department of Medicine, University of Arkansas Medical Center, September 1954 to June 1, 1966
Professor and Head, Department of Medicine, University of Minnesota, June 1, 1966 to present

POSITIONS OTHER THAN ACADEMIC:

Junior Associate in Medicine, Peter Bent Brigham Hospital, 1941-1946
Chief, Medical Service, Veterans Administration Hospital, Minneapolis 1946-1952
Chief, Medical Service, Veterans Administration Research Hospital, Chicago, 1953-54

CERTIFIED: American Board of Internal Medicine, 1944

HONORS RECEIVED: Phi Beta Kappa; Alpha Omega Alpha; Brone Star Medal.

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Curriculum Vitae

Name: Elwin E. Fraley, M. D.

Date of Birth: May 3, 1934

Marital Status: Married, six children

Current Status:

Professor and Chairman
Division of Urology
University of Minnesota School of Medicine
Minneapolis, Minnesota 55455

Consulting Urologist
Veterans Administration Hospital
Minneapolis, Minnesota 55417

Consulting Urologist
Fairview Hospital
Minneapolis, Minnesota

Consulting Urologist
Hennepin County General Hospital
Minneapolis, Minnesota 55415

Education:

Phillips Exeter Academy	1951-1953	
Princeton University	1953-1957	A. B. (cum laude)
Harvard Medical School	1957-1961	M. D. (cum laude)

Training and Experience:

1961-1962	Internship, Surgery Massachusetts General Hospital Boston, Massachusetts
1962-1963	Third Assistant Resident in Surgery Massachusetts General Hospital Boston, Massachusetts
1963-1964	Junior Assistant Resident in Urology Massachusetts General Hospital Boston, Massachusetts
1964-1965	Senior Assistant Resident in Urology Massachusetts General Hospital Boston, Massachusetts
1965-1966	Resident in Urology Massachusetts General Hospital Boston, Massachusetts

1966-1967 Assistant in Urology
Massachusetts General Hospital
Instructor in Surgery
Harvard Medical School
Boston, Massachusetts

1967-1969 Senior Investigator and Staff Urologist
Surgery Branch
National Cancer Institute
National Institutes of Health
Bethesda, Maryland CMPR, USPHS

Research Experience:

4 years of independent research:

1 year at Massachusetts General Hospital
2 years as Senior Investigator in the Surgery Branch of the National Cancer Institute
1 year Division of Urology, University of Minnesota

Other:

Diplomat of National Board of Medicine
Licensed Physician State of Minnesota 1969
Clinical Research Fellow, American Cancer Society, 1964-1966
Researcher, John Hartford Foundation, Inc., 1966-1968
Clinical Research Prize, American Urological Ass'n., 1964
Soma Weiss Award, Harvard Medical School, 1963
First Prize, New England Section, American Urological Association Essay Contest, 1966
First Prize, American Urological Association Clinic Research Essay Contest, 1967
First Prize, American Urological Association Laboratory Research Essay Contest, 1968
First Prize for Movies, Annual Meeting of the American Urological Association, 1969
First Prize, American Urological Association Laboratory Research Essay Contest - Work done in my laboratory - submitted by David F. Paulson, M. D., 1969
Annual Motion Picture Award, American Urological Association, 1969

Societies:

Associate Member, North Central Section of the American Urological Association
Washington Urological Society
American Nephrology Society
Sigma Xi
AOA
Visiting Professor of Urology, University of Mississippi Medical Center, 1968
Society of University Urologists
Hennepin County Medical Society
American Medical Association
American Urological Association
American Association for the Advancement of Science
Minnesota State Medical Association
Minneapolis Pediatric Society

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1. Fraley, E. E. and Weiss, L.: An Electron Microscopic Study of the Lymphatic Vessels in the Penile Skin of the Rat. Amer. J. Anatomy 109:85-102, 1961.

2. Fraley, E. E. and Weiss, L.: An Electron Microscopic Study of Absorption of Thorium Dioxide from the Peritoneal Cavity of the Rat. Anatomical Record 133:90, 1959.

3. Clouse, M. E., Fraley, E. E. and Litwin, S. B.: Lymphangiographic Criteria for the Diagnosis of Retroperitoneal Fibrosis. Radiology 83:1-5, 1964.

4. Fraley, E. E., Clouse, M. E. and Litwin, S. B.: The Uses of Lymphangiography, Lymphadenography and Color Lymphadenography in Urology. J. Urol. 93: 319-325, 1965.

5. Litwin, S. B., Fraley, E. E. and Clouse, M. E.: Lymphography in Patients with Pelvic Cancer. Obst. & Gynec. 84:809-816, 1964.

6. Suby, H. S., Kerr, W. W., Graham, J. R. and Fraley, E. E.: Retroperitoneal Fibrosis - A Missing Link in the Chain. Trans. Amer. Assoc. G. U. Surg. 56:148-153, 1964.

7. Suby, H. S., Kerr, W. W., Graham, J. R., and Fraley, E. E.: Retroperitoneal Fibrosis - A Missing Link in the Chain. J. Urol. 93:144-152, 1965.

8. Howard, P. J. and Fraley, E. E.: Elevations of the Acid Phosphatase in Benign Prostatic Disease. J. Urol. 94:687-689, 1965.

9. Fraley, E. E., and Howard, P. J.: Serum Prostatic Acid Phosphatase (PAP) in Cancer of the Prostate. Surg. Forum XVLL 519-520, 1966.

10. Fraley, E. E. and Halverstadt, D. B.: Dangers in the Conservative Therapy of Renal Trauma - An Unsuspected Case of Wilms' Tumor. New Eng. J. Med. 275:373-374, 1966.

11. Fraley, E. E.: Vascular Obstruction of the Superior Infundibulum Causing Nephralgia. New Eng. J. Med. 275:1403-1409, 1966.

12. Fraley, E. E. and Halverstadt, D. B.: Ruptured Ureter - An Unusual Complication of Ileostrogram. J. Urol. 97:1017-1018, 1967.

13. Halverstadt, D. B. and Fraley, E. E.: Amulsion of the Upper Ureter Due to Blunt Trauma. Brit. J. of Urol. 39:588-593, 1967.

14. Fraley, E. E.: Surgical Correction of Intrarenal Disease. 1. Obstruction of the Superior Infundibulum. J. Urol. 98:54-64, 1967.

15. Kerr, W. S., Suby, H. S., Vickery, A. and Fraley, E. E.: Clinical Experience with 15 Cases of Idiopathic Retroperitoneal Fibrosis. J. Urol. 99:575-584, 1968.

16. Fraley, E. E.: Book Review of Der. Prostatakrebs by Doz. Dr. Zoltan Szendroi. New Eng. J. Med. 273:993, 1965.

17. Leadbetter, G. W. and Fraley, E. E.: The Surgical Correction of Total Urinary Incontinence: Five Years After. J. Urol. 97: 869-873, 1967.

18. Fraley, E. E. and Malt, R. A.: Specific Intracellular Defect In Hypoxia. Surgery 62:221-226, 1967.

19. Nebesar, R. A., Pollard, J. J. and Fraley, E. E.: Renal Vascular Impressions Incidence and Clinical Significance. Amer. J. Roentgenology, Radium Therapy and Nuclear Med. 101:719-727, 1967.

20. Paulson, D. F., Rabson, A. S. and Fraley, E. E.: Viral Transformation of Hamster Prostate by SV40 Virus. Science 159: 200-201, 1967.

21. Fraley, E. E. and Ketcham, A. S.: Teratoma of the Testis in an Infant: Report of a Case. J. Urol. 100:659-660, 1968.

22. Halverstadt, D. B. and Fraley, E. E.: Complication of Ileal Conduit Diversion; Formation of an Ileal Conduit Stone on Non-absorbable Suture Material. J. Urol. 102:188-189 1969.

23. DeKernion, J., Fraley, E. E. and Ketcham, A. S.: Late Complication of Ileal Conduit Diversion. J. Urol. 102:320-324, 1969.

24. Paulson, D. F., Fraley, E. E., Rabson, A. and Ketcham, A. S.: SV40-Transformed Hamster Prostatic Tissue: A Model of Human Prostatic Malignancy. Surgery 64:241-247, 1968.

25. Fraley, E. E.: Dismembered Infundibulopyelostomy: An Improved Technique for Correcting Vascular Obstruction of the Superior Infundibulum. J. Urol. 101:144-148, 1969.

26. Fraley, E. E.: Book review of Atlas of Urologic Surgery by Phillip R. Roen, New Eng. J. Med. 278:568, 1968.

27. Fraley, E. E. and Paulson, D. F.: Morphological and Biochemical Studies of SV40 Transformed Prostatic Tissue. J. Urol. 101: 735-740, 1969.

28. Fraley, E. E. and Paulson, D. F.: The Effect of Estrogen. Testosterone and Combined Estrogen-Testosterone Therapy on the Growth of Virus (SV40) Induced Prostatic Tumors. Surg. Forum XLX: 544-545, 1968.

29. Paulson, D. F., Marshall, J. F. and Fraley, E. E.: A New and Simplified Method of Cystoscopic Photography. J. Urol. 101: 752-753, 1969.

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33. Fraley, E. E. and Paulson, D. F.: Urologic Surgery in Medical Progress. New Eng. J. Med. 281:355-364, 1969.

34. Paulson, D. F. and Fraley, E. E.: Sequential changes in bulk renal protein and polyribosomes in acutely obstructed mouse kidney. J. Urol. 103:257-261, 1970.

35. Harbert, J., Fraley, E. E. and Deckers, P. J.: Alterations in the Radioisotope Renogram Pattern after Urinary Bladder Distention. J. A. M. A. 211:810-811, 1970.

36. Deckers, P. J., Fraley, E. E., Harbert, J., Doppman, J. and Paulson, D. F.: Vascular Obstruction of the Superior Infundibulum Causing Nephralgia in Children. Surgery 67:856-862, 1970.

37. Kirchner, M. A., Jacobs, J. B. and Fraley, E. E.: Bilateral Anorchia with Persistent Testosterone Production. New Eng. J. Med. 282:240-244, 1970.

38. Wood, W.C., Marshall, J., and Fraley, E.E.: Postobstructive Diuresis Complicating Relief of Lower Urinary Tract Obstruction by Ureterine Leiomyotomasa. Obst. & Gyn. 35:427-431, 1970.

39. Fraley, E.E. and Najarian, John S.: Treatment of Renal Vein Thrombosis (Letter to the Editor). J.A.M.A. 212:1377, 1970.

Accepted for Publication (In Press)

40. Fraley, E.E.: Vascular Obstruction of the Superior Infundibulum in Children. Clinical Urography. Edited by John Emmett.

41. Feldman, B., Kjellstrand, C.M., and Fraley, E.E.: Mannitol Intoxication. J. of Urol. 1970

42. Merrill, D., Markland, C., and Fraley, E.E.: Urinary Appliances and Stomal Care. Minn. Medicine.

43. Paulson, D.F. and Fraley, E.E.: Early but Unsustained Growth in the Acutely Obstructed Kidney. Am. J. Physiol.

44. Fraley, E.E., Ecker, S., and Vincent, M.D.: Spontaneous in Vitro Neoplastic Transformation of Human Prostatic Epithelium. Science.

45. Ecker, S. and Fraley, E.E.: Autoradiographic Study of RNA Metabolism in Acutely Obstructed Mouse Kidney. Invest. Urol.

46. Fraley, E.E. and Ecker, S.: Tumor Production in Immune-Suppressed Hamsters by spontaneously Transferred Human Prostatic Epithelium. J. of Urol.

47. Mauer, S.M., Fraley, E.E., Fish, A.J., Michael, A.F., Vernier, R.L., and Najarian, J.S.: Renal Vein Thrombosis in Infancy: Report of a Survivor Following Surgical Intervention. J. of Pediatrics.

48. Fraley, E.E.: Viruses and Neoplasms of the Genitourinary Tract. Minn. Medicine.

Papers in Preparation

1. deKernion, J.B. and Fraley, E.E.: In Vitro Studies of the Estrogen-Induced Hamster Kidney Tumor.

2. Brandes, D.F., Fraley, E.E., and Ecker, S.: The Fine Structure of Spontaneously Transformed Human Prostatic Epithelium-MA160.

Lyle Albert French, M.D.

COLLEGES AND UNIVERSITIES ATTENDED: Macalester College, St. Paul 1933-35
University of Minn., Mpls. 1935-47

INTERNSHIP: University of Minnesota, Minneapolis, Minnesota 1939-40

RESIDENCY: University of Minnesota, Minneapolis, Minnesota 1940-47

SOCIETIES AND DATE JOINED:

American Academy of Neurological Surgery	1954
Harvey Cushing Society	1952
Minneapolis Academy of Medicine (President 60-61)	1952
Minnesota Society of Neurological Sciences (President 64)	1948
Neurosurgical Society of America (President 57-58)	1948
Society of Neurological Surgeons	1955
Society of University Surgeons	1955

STAFF POSITIONS AND DATE:

Consultant and Acting Chief of Neurosurgery, Veterans Administration Hospital, Minneapolis, Minn. 1948 to present

Chief of Staff, University Hospitals, University of Minnesota 1968-

Professor and Head, Department of Neurosurgery, University of Minnesota, July, 1960 to present

DEGREES: B.S.- 1936, M.B.- 1939, M.D.- 1940
M.S. in Neurosurgery -46 (thesis title: Injuries to Peripheral Nerves)
Ph.D. in Neurosurgery -47 (thesis title: Brain Tumors in Children)

ADVISORY POSITIONS: Consultant in Neurosurgery, U.S. Army, 1963
Special Consultant, V.A., Neurosurgery, 1968-
Member, American Board of Neurological Surgery, 62-68
Member, Advisory Committee, National Paraplegia Foundation
Member, NIH, Training Grants Program

BIBLIOGRAPHY

French, L.A. and Galicich, J.H.: The Use of Steroids for the Control of Cerebral Edema, Clinical Neurosurgery, 10:212-223, 1962.

French, L.A., Chou, S.N. and Story, J.L.: Cerebrovascular Malformations. Clinical Neurosurgery, 14:171-182, 1964.

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French, L.A. and Chous, S.M.: Conventional Methods of Treating Intracranial Arteriovenous Malformations, Progress in Neurological Surg. Volume 3, Karger, Basel/New York, 1967.

EUGENE GEDGAUDAS, M.D.

Professor and Head, Department of Radiology
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CURRICULUM VITAE

BIRTH:	October 7, 1924, Lithuania
CITIZENSHIP:	United States
MARITAL STATUS:	Married - 4 children
EDUCATION:	M.D., University of Munich, Germany, 1948
INTERNSHIP:	St. Boniface General Hospital, Winnipeg, Manitoba, Canada (University of Manitoba Teaching Hospital)
	Two years residency in diseases of the chest
RESIDENCY IN RADIOLOGY:	St. Boniface General Hospital, Winnipeg, Manitoba, Canada, 1954 to 1956 and 1957 to 1958
	July 1, 1956 to June 30, 1957, University of Minnesota Hospitals under Dr. Leo G. Rigler
SPECIALTY BOARD CERTIFICATION:	The American Board of Radiology, 1958
	Certification in Radiology, Royal College of Physicians and Surgeons of Canada
LICENSURE:	State of Minnesota by examination
	Basic Sciences Certificate, State of Minnesota, by examination
	Province of Manitoba, Canada, by examination of Medical Council of Canada
POSITIONS:	1958 to 1963, Chairman, Cardiac Unit, Demonstrator, Member of Active Staff and Associate Radiologist, St. Boniface General Hospital, Winnipeg, Manitoba
	Consultant in Radiology, Veterans Administration Hospital, Winnipeg, Manitoba

Chairman, Department of Radiology, Misericordia General Hospital, Winnipeg, Manitoba (500-bed teaching hospital)

Director of School of X-ray Technology, Misericordia General Hospital

1963 to PRESENT: Assistant Professor of Radiology, University of Minnesota

1967, Associate Professor of Radiology, University of Minnesota

1968, Appointed Director of the Division of Diagnostic Radiology at the University of Minnesota

Consultant Radiologist, Hennepin County General Hospital

December, 1968 until April 1, 1969, Acting Head of the Department of Radiology, University of Minnesota

Consultant Radiologist for the State of Minnesota

October 1, 1969, Professor and Head, Department of Radiology

PROFESSIONAL AND HONORARY SOCIETIES: Diplomate, American Board of Radiology

Diplomate, Royal College of Physicians and Surgeons of Canada

Member, American College of Radiology

Member, Canadian Association of Radiologists

Fellow, International College of Surgeons

Fellow, American College of Angiology

Member, Ramsey County Medical Society

Member, Minnesota State Medical Association

Member, American Medical Association

Member, Radiological Society of North America

Member, Roentgen Ray Society

Member, Minnesota State Radiological Society

Member, Sigma Xi

Member, Association of University Radiologists

Member, Society of Chairmen of Academic Radiology Departments

Honorary Member, Rocky Mountain Radiological Society

EUGENE GEDGAUDAS, M.D.

BIBLIOGRAPHY

1. Method of Radiological Diagnosis of Congenital Heart Disease in Children.
   Lester, Gedgaudas and Rigler.
   J. OF AMER. MED. ASSOC., Vol. 166, No. 5, Feb. 1, 1958.

2. Advances in Cardiovascular Radiology.
   Gedgaudas.
   MANITOBA MEDICAL REVIEW, Vol. 39, No. 1, Jan., 1959.

3. Roentgen Diagnosis of Congenital Heart Disease in Infants and Children.
   Lester, Rigler and Gedgaudas.
   POSTGRADUATE MEDICINE, Vol. 27, No. 4, April, 1960.

4. Solitary Nodular Lesion of the Lung.
   Gedgaudas and Ohrt.
   MANITOBA MEDICAL REVIEW, Vol. 43, No. 3, March, 1963.

5. Roentgen Findings in Common Ventricle with Transposition of Great Vessels.
   Elliott and Gedgaudas.
   RADIOLOGY, Vol. 82, No. 5, May, 1964.

6. The Roentgenologic Findings in Left Ventricular - Right Atrial Communication.
   Elliott, Gedgaudas, Morris, Levi and Jesse Edwards.
   AMER. J. OF ROENTGENOLOGY, Vol. 93, No. 2, Feb., 1965.

7. Gastric Freezing.
   Delaney, Ritchie, Engel, Gedgaudas and Wangensteen.
   AMER. J. OF GASTROENTEROLOGY, Vol. 43, No. 6, June, 1965.

8. Indications for Phlebography in Chronic Venous Disease.
   Gedgaudas and Emerson.
   VASCULAR DISEASES, Vol. 3, No. 4, Aug., 1966.

9. Residual Radiopaque Bolus in Managing Intraspinal Neoplasms.
   Martin, Gedgaudas and D'Angio.
   AMER. J. OF ROENTGENOLOGY, ROENTGEN THERAPY AND NUCLEAR MEDICINE, Vol. 97, 1966.

10. Roentgenologic Identification of Pulmonary Metastases.
Moody, Edlich and Gedgaudas.
DISEASES OF THE CHEST, Vol. 51, No. 3, March, 1967.

11. Radiological Evaluation of Hypertensive Patient.
Gedgaudas and Staab.
MINNESOTA MEDICINE, June, 1965.

12. Left Atrial Calcifications.
Gedgaudas, Erickson and Kieffer.
AMER. J. OF ROENTGENOLOGY, RADIATION THERAPY AND NUCLEAR MEDICINE.
Vol. 102, No. 2, Feb., 1968.

13. History of Department of Radiology, University of Minnesota.
Book by J. Arthur Myers, M.D., Warren H. Green, Inc.
MASTERS OF MEDICINE.

14. Excretory Urography in the Evaluation of Renal Transplants.
Accepted for publication in RADIOLOGY.

15. Radiology -- Responsibilities and Opportunities.
MINNESOTA MEDICINE, December, 1969.

16. Nephrocalcinosis.
Accepted for publication in AMERICAN JOUNRAL OF ROENTGENOLOGY, RADIATION THERAPY AND NUCLEAR MEDICINE.

17. Radiolucent Bands in Cholecystogram.
Submitted for publication.

C U R R I C U L U M V I T A E

Robert A. Good, M.D., Ph.D.

Birth: Crosby, Minnesota

May 21, 1922

Education:

Minneapolis Public Schools, Grades 0 - 12, 1927 - 1940
Graduated 1940 - Second in Class of 350
National Honor Society

University of Minnesota - 1940 - 1944
B.A. 1944 - Cum Laude, Phi Beta Kappa

University of Minnesota Medical School - 1943 - 1947
M.B. - 1946 - First in Class of 110
1946 - Alpha Omega Alpha Honorary Medical Society
M.D. - 1947

University of Minnesota Graduate School - 1944 - 1947
Ph.D. - 1947
Major: Anatomy
Minor: Bacteriology

Professional Experience:

Teaching Assistant, Department of Anatomy, University of Minnesota
1944 - 1945

Intern in Pediatrics - 1947

Assistant Resident in Pediatrics, University of Minnesota Hospitals
1948 - 1949

Visiting Investigator, Rockefeller Institute for Medical Research, New York
1949 - 1950

Assistant Physician to the Hospital of the Rockefeller Institute for Medical Research, New York 1949 - 1950

Instructor in Pediatrics, University of Minnesota Medical School
1950 - 1951

Assistant Professor of Pediatrics, University of Minnesota Medical School
1951 - 1953

Associate Professor of Pediatrics, University of Minnesota Medical School
1953 - 1954

Attending Pediatrician, Hennepin County General Hospital 1950 - present

Consultant on the Pediatrics and Pediatric Contagion Service Hennepin County General Hospital 1960 - present

American Legion Memorial Research Professor of Pediatrics, University of Minnesota 1954 - present

Professor of Microbiology, University of Minnesota 1962 - present

Regents' Professor of Pediatrics and Microbiology 1969 - present

Membership in Honorary and Professional Societies:

Academy of Multidisciplinary Research - Charter Fellow

Alpha Omega Alpha - Honorary Medical Society

American Association of the History of Medicine

American Cancer Society - Advisory Council

American Federation for Clinical Research

American Heart Association
- Basic Sciences Section
- Central Research Committee
- Committee on Ethics
- Research Study Committee of the Council on Rheumatic Fever and Congenital Heart Disease, Chairman
- Scientific Council

American Association for the Advancement of Science - Fellow

American Association for Laboratory Animal Science

American Association of Anatomists

American Association of Immunologists

American Association of University Professors

American Pediatric Society

American Rheumatism Association

American Society for Clinical Investigation
- Councilor
- President 1968

American Society for Experimental Pathology
- Councilor 1970

American Society for Microbiology

Association of American Physicians

Central Society for Clinical Research
- Council Member
- President 1966

Collegium Internationale Allergologicum

Membership in Honorary and Professional Societies (continued):

Harvey Society

Infectious Disease Society

International Society of Nephrology

International Academy of Pathology

International Society for Transplantation Biology - Council

Kidney Foundation of the Upper Midwest - Scientific Advisory Board

Leukemia Society Medical Advisory Committee

Minnesota Chapter, Arthritis Foundation
- Member
- Board of Directors
- Chairman
- Medical and Scientific Committee (1958-1966)

Minnesota Heart Association
- Member
- Board of Directors
- Corporate Membership
- Past chairman of committee on Rheumatic Fever

Minneapolis Pediatric Society

Minnesota State Medical Association
- Committee on Rheumatology and Rheumatic Diseases
- Committee on Medical Education (1967-70)

Minnesota Academy of Science

National Academy of Science
- National Research Council, Committee on Tissue Transplantation
- Advisory Committee to the Federal Radiation Council

New York Academy of Science - Fellow

Northwestern Pediatric Society

Phi Beta Kappa - Honorary Scholastic Fraternity

Reticuloendothelial Society

Sigma Xi - Honorary Scientific Fraternity

Society for Experimental Biology and Medicine

Society for Pediatric Research

Transplantation Society

Western Association of Immunologists - Council

Editorial:

A.M.A. Journal of Diseases of Children - Editorial Board

Advisory Editorial Board - Blood (1964 - 1967)

Arthritis and Rheumatism - Editorial Board

Cancer Research - Editorial Advisory Board

Cellular Immunology - Advisory Board 1969 - present

Excerpta Medica - International Editorial Board of Arthritis and Rheumatism
International Editorial Board of the section: Immunology
Serology and Transplantation
Human Developmental Biology

Folia Allergologica - International Editorial Board

International Archives of Allergy and Applied Immunology - Corresponding Editor

Journal of Clinical Investigation - Editorial Board

Journal of Laboratory and Clinical Medicine - Associate Editor

Laboratory Investigation - Editorial Board (1963 - 1966)

Modern Medicine - Editorial Board

National Association on Standard Medical Vocabulary - Consultant in Pediatrics 1962

Nephron - American Associate Editor

Proceedings of the Transplantation Society - Editorial Advisory Board

Honors and Awards:

Recipient of Borden Undergraduate Research Award, University of Minnesota Medical School, 1946

Fellow - National Foundation for Infantile Paralysis, Inc., 1947

Helen Hay Whitney Foundation Fellow in Rheumatic Fever Research, 1948 - 1950

Markle Foundation Scholar in Medical Science, 1950 - 1955

Recipient of E. Mead Johnson First Award for Outstanding Research Contributions to Pediatrics, 1955

Recipient of Theobald Smith Award for Outstanding Research Contributions to Medical Science, 1955

Recipient of Parke-Davis 6th Annual Award for Excellence of Research in Experimental Pathology, 1962

Rector's Medal - University of Helsinki for Outstanding Contributions to Medicine and Microbiology, 1963 - 1964

Honorary Doctor of Medicine Degree, University of Uppsala (Doctor of Medicine, H.C.) 1966

The Pemberton Lectureship Award for Outstanding Contributions to the Study of Rheumatic Disease, 1966

President of the Central Society for Clinical Research 1966 - 1967

The R.E. Dyer Lectureship Award for Outstanding Achievement in Research Important to Medical Science, 1967

Recipient of Gordon Wilson Gold Medal for Outstanding Research in Medicine presented by the American Clinical and Climatological Association, 1967

Recipient of the Robert A. Cooke Gold Medal for Outstanding Contributions to Immunology, presented by the American Academy of Allergy, 1968

Recipient of the Clemons Von Pirquet Gold Medal Award for Outstanding Contributions to Allergy, presented at the Ninth Annual Forum on Allergy, 1968

President's Medal of the University of Padua, Italy, recognizing Outstanding Contributions to Immunopathology, 1968

First recipient of the Squibb Award for Excellence of Achievement, presented by the Infectious Diseases Society of America, 1968.

President of the American Society for Clinical Investigation, 1968

Honors and Awards (continued):

Tap Teen Award (Teen Age Program for March of Dimes) Minneapolis, March, 1969.

McGraw Medal Award, Detroit Surgical Association, May 1969

Regents' Professor of Pediatrics and Microbiology, University of Minnesota October, 1969

John Stewart Memorial Award - Dalhousie University, Halifax, Nova Scotia, for Outstanding Contributions to Medicine, November, 1969

Ricketts' Award, University of Chicago, 1970 - For Outstanding Contributions to Medicine

Golden Plate Award, "Salute to Excellence" American Academy of Achievement, June, 1970

Gairdner Foundation Award for medical research, October, 1970

Borden Award for outstanding research in medicine conducted by a member of a faculty of an affiliated college, October 1970. Association of American Medical Colleges.

Activities:

Committee of Management, Southeast Branch of YMCA - 1950 - 1954

Member Unitarian Service Commission Medical Exchange Team to:
France, Germany, Switzerland, and Czechoslovakia - 1958

Advisory Council Member, The Children's Hospital Research Foundation, Cincinnati, Ohio - 1954 - 1958

Consultant in Research, Veterans Administration Hospital, Minneapolis 1959-1960

Consultant and Scientific Advisor to the National Jewish Hospital at Denver and the Children's Asthma Research Institute and Hospital, Denver 1964-1969

Special Program Planning Committee, National Institute of Child Health and Human Development 1964 - 1967

U.S. Public Health Service Hematology Study Section 1952 - 1956

U.S. Public Health Service Allergy and Immunology B Study Section 1965 - 1969

World Health Organization Expert Advisory Panel on Immunology, 1967 - present

Consultant in Immunologic Research, Merck and Co., New Jersey 1968 - present

President's Scientific Advisory Council on Biological and Medical Science 1970

Advisory Council, Life Insurance Medical Research Fund

CURRICULUM VITAE

Eugene Grim, Born July 19, 1922, Stillwater, Oklahoma.
Married, one child.

Education

Kansas State University, B. S. Chemistry, 1945
Kansas State University, M. S. Biochemistry, 1946
University of Minnesota, Ph.D. Physiological Chemistry, 1950

Employment

Aeronautical Engineer, Missouri and Connecticut, 1941-43
Teaching Assistant, University of Minnesota, 1945-47
Pre-doctorate Fellow, National Institutes of Health, 1947-50
Post-doctorate Fellow, University of Minnesota, 1951-52
Instructor, Physiology, University of Minnesota, 1952-54
Assistant Professor, Physiology, University of Minnesota, 1954-58
Associate Professor, Physiology, University of Minnesota, 1958-62
Professor, Physiology, University of Minnesota, 1962-68
Professor and Head, Physiology, University of Minnesota, 1968 -

Other Current Occupations

Deputy Section Editor - American Journal of Physiology and Journal of Applied Physiology
Chairman - NIH Study Section for Physiology

Research Interests

Transport processes, especially those associated with the gastro-intestinal and cardiovascular systems.

Selected Bibliography

Grim, E., J. Lee, and M. Visscher. "Water exchange between intestinal contents, tissues and blood", Amer. J. Physiol. 182:359 (1955).

Grim, E. and K. Sollner, "Contributions of normal and anomalous osmosis to the osmotic effects arising across charged membranes with solutions of electrolytes", J. Gen. Physiol. 40:887 (1957).

Grim, E., "The flow of blood in the mesenteric vessels" in Handbook of Physiology. Sect. 2, Vol. II, P. 1439 (1963).

Grim, E., "A mechanism for absorption of sodium chloride solutions from the canine gallbladder", Am. J. Physiol., 207: 147 (1963).

Delaney, J. and E. Grim., "Canine gastric blood flow and its distribution", Am. J. Physiol. 207: 1195 (1964).

NAME: John E. Harris, Ph.D., M.D.

BIRTHDATE: December 27, 1913 PLACE OF BIRTH: Toledo, Ohio

EDUCATION: University of Toledo, Toledo, Ohio, 1931-35, B.S., 1935
University of Iowa, 1936-40, Ph.D., Biochemistry, 1940
University of Oregon Medical School, 1946-50, M.D., 1950

SPECIAL TRAINING: Internship: Walter Reed Army Hospital, 1950-51
Residency: Ophthalmology at University of Oregon Medical School, 1951-54

PROFESSIONAL EXPERIENCE AND POSITIONS:

Research Associate	State University of Iowa	1940-41
Fellow, National Research Council	University of Pennsylvania	1941-42
Research Associate	University of Oregon	1946-50
Assistant Professor of Ophthalmology	University of Oregon	1951-54
Associate Professor of Ophthalmology	University of Oregon	1955-58
Professor and Head, Department of Ophthalmology	University of Minnesota	1959 to present

HONORS AND AWARDS:
Markle Scholar in Medical Science, 1951-56
First Friedenwald Memorial Award, June, 1957

RESEARCH INTERESTS:
Biochemistry of lens and cornea
Natural history of diabetic retinopathy
Human corneal diseases and their treatment
Pharmacology as related to ocular structures

BIBLIOGRAPHY:
Harris, J.E.: The physiologic control of corneal hydration: The first Jonas S. Friedenwald Memorial Lecture. Am.J.Ophthal. 44:262-280, 1957

Harris, J.E. and Gruber, L.: The electrolyte and water balance of the lens. Exp. Eye Res. 1:372-384, 1962

Harris, J.E.: Current thoughts on the maintenance of corneal hydration in vivo. Arch. Ophthal. 78:126-132, 1967

Harris, J.E.: The temperature reversible cation shift of the lens. Trans. Am. Ophthal. Soc. 64:675-699, 1966

Harris, J.E., Gruber, L.: The reversal of triparanol induced cataracts in the rat. Documentia Ophthal. 26:324-333, 1969

Hausman, William

Born 7-25-25, Brooklyn, New York

Medical School: Washington University, M. D., 1947
Internship: Coney Island Hospital, Brooklyn, 1947-48

Residency: Worcester State Hospital, 1948-49
Institute of Pennsylvania Hospital, 1949-50 and 1951-52

Licensed: Missouri, Maryland, Minnesota

Certified: Psychiatry ABP&N; Fellow APA

Professional Experience

Division Psychiatrist, 24th Infantry Division, Korea 1950-51

Asst. Chief, P&N Section, Army Hospital, West Point, 1952-53
Chief, Medical Research Project and P&N Section, West Point, 1953-58

Chief, Consultation Service, Letterman General Hospital, 1958-61
Chief, Psychiatric Service, 1961-62

Chief, Behavioral Science Research Branch, Army Medical Research and Development Command, Office of the Surgeon General, 1962-65

Deputy Director, Division of P&N, Walter Reed Institute of Research, 1965-66

Associate Professor and Psychiatrist-in-Charge, Student Mental Health Service, Johns Hopkins, 1966-69

Professor and Head, Department of Psychiatry, University of Minnesota Medical School, 1969 to date

Publications

Adaptation to West Point. U. S. Military Academy, 1959

Psychiatric screening of West Point candidates. U. S. Military Academy, 1960.

Who comes to West Point? U. S. Military Academy, 1960.

Military Psychiatry. Archives of General Psychiatry, 1967.

CURRICULUM VITAE

FREDERIC J. KOTTKE, M.D., Ph.D., Professor and Head

Department of Physical Medicine and Rehabilitation
University of Minnesota Medical School
Minneapolis, Minnesota

Birthdate:

May 26, 1917

Academic Record:

High School Graduate - Windom, Minnesota - 1935
B.S., University of Minnesota - 1939
M.S. in Physiology; minor, Pathology
University of Minnesota - 1941
Ph.D. in Physiology; minor, Pathology
University of Minnesota - 1944
M.D., University of Minnesota - 1945
Baruch Fellow - Physical Medicine,
University of Minnesota - 1946-47

Professional Record:

Teaching Assistant, Physiology,
University of Minnesota - 1939-40
Instructor, Physiology, University of Minnesota - 1941-44
Medical Licensure, Minnesota - 1947
Assistant Professor, Physical Medicine - 1947-49
Associate Professor, Physical Medicine - 1949-53
Director, Division of Physical Medicine - 1949-52
Head, Department of Physical Medicine and Rehabilitation - 1952
Professor, Physical Medicine and Rehabilitation - 1953-
Diplomate, American Board of Physical Medicine
and Rehabilitation - 1949

Professional Memberships:

American Academy of Physical Medicine and Rehabilitation
American Congress of Rehabilitation Medicine
American Medical Association
American Heart Association, Councils on Clinical Cardiology
and Cerebrovascular Disease
American Association of University Professors
American Rehabilitation Foundation, Expert Medical Committee
American Physiological Society
Hennepin County Medical Society
International Society for Rehabilitation of the Disabled
Minnesota Academy of Science

Minnesota Heart Association
Minnesota Medical Alumni Association
Minnesota Medical Foundation
Minnesota State Medical Association
Minnesota Rehabilitation Association
Minnesota Society for the Prevention of Cruelty
New York Academy of Sciences
Sigma Xi
National Rehabilitation Association
American Association for Laboratory Animal Science

Appointments and Services:

Editorial Board, Modern Medicine, 1955-
Editorial Board, Archives of Physical Medicine and Rehabilitation, 1952-
American Congress of Physical Medicine and Rehabilitation
5th Vice President, 1954
4th Vice President, 1955
3rd Vice President, 1956
2nd Vice President, 1957
1st Vice President, 1958
President-elect, 1959
President, 1960
American Board of Physical Medicine and Rehabilitation
Member - 1955-69
Chairman - 1963-69
Executive Committee, Third International Congress of Physical Medicine - 1960
Program Chairman, Third International Congress of Physical Medicine - 1960
Delegate, International Federation of Physical Medicine - 1964
President, Minnesota Examining Committee for Physical Therapists - 1951-60
Member, Minnesota Governor's Advisory Committee on Vocational Rehabilitation - 1956-60
Member, Medical Advisory Committee, Vocational Rehabilitation Administration - 1960-67
Member, Medical Advisory Committee, Social and Rehabilitation Service - 1968-69
Member, Medical Research Study Section, Vocational Rehabilitation Administration - 1961-63
American Medical Association Advisory Committee on Physical Therapy Education - 1957-59
American Medical Association Commission to Coordinate the Relationships of Medicine with the Allied Health Professions and Services - 1962-63

Medical and Scientific Committee, Minnesota Chapter, Arthritis and Rheumatism Foundation - 1960-65
Member, Board of Directors, Kenny Rehabilitation Foundation - 1960-64
Vice President - 1960-63
Secretary - 1964
Member, Board of Directors, American Rehabilitation Foundation - 1964--
Secretary - 1964
Member, Residency Review Committee on Physical Medicine and Rehabilitation, American Medical Association - 1956-58, 1963-68
Member, Minnesota Legislative Interim Commission on Employment of the Physically Handicapped - 1957-59
Member, Minnesota State Board of Health - 1964-67
Consultant in Physical Medicine and Rehabilitation, Minneapolis Veterans Administration Hospital - 1956--

Honors:

Distinguished Service Key, American Congress for Physical Medicine and Rehabilitation - 1961
Citation, President's Committee on Employment of the Physically Handicapped - 1959
John Stanley Coulter Memorial Lecture (XVIII), August 28, 1968
Award of Merit of Rehabilitation Institute of Montreal, 1970

Lazarow, Arnold, M.D.,Ph.D.

BIRTHPLACE: Detroit, Michigan

EDUCATION: University of Chicago, Chicago, Ill. B.S., Biochemistry, 1937
University of Chicago, Chicago, Ill. M.D., 1941
University of Chicago, Chicago, Ill. Ph.D., Anatomy 1941

HONORS: Phi Beta Kappa
Alpha Omega Alpha
Sigma Xi
Joseph A. Capps Prize in Medicine, 1942

MAJOR RESEARCH: Experimental Diabetes, Cytochemistry, Information Retrieval

PROFESSIONAL EXPERIENCE:
Senior Instructor, Western Reserve University 1943-46
Assistant Professor of Anatomy, Western Reserve U. 1946-48
Associate Professor of Anatomy, Western Reserve U. 1948-54
Professor and Head, Department of Anatomy, U. of Minn. 1954-

ADVISORY POSITIONS:
Executive Committee, American Association of Anatomists, 1963-67
President, 1965-66 and Council member, 1952-55, Histochemical Society
National Institute of Arthritis and Metabolic Disease Council (USPHS) 1961-65
Study Section Metabolism and Nutrition, (USPHS) 1957-60
Cell Biology 1960-61
Council of American Diabetes Association 1956-62

EDITORIAL EXPERIENCE:
Editorial Board, Journal of Histo- and Cytochemistry 1960-62
DIABETES, Journal of American Diabetes Association, 1962-68
Chairman of Diabetes Abstract Literature Committee, American Diabetes Association 1957-64
Editor, Diabetes Literature Index 1966

RECENT PUBLICATIONS

Lazarow, A.: Glomerular basement membrane thickening in diabetes. Proceedings of the Sixth Congress of the International Diabetes Federation, Excerpta Medica Foundation, Amsterdam, 1969.

Abrahamson, D.E. and Lazarow, A.: A computer-linked, two wavelength microspectrophotometer. Ann N.Y. Acad. Sci. 157-298, 1969.

Erlandsen, S.L., Wells, L.J., and Lazarow, A.: Organ culture of pancreases of fetuses from normal and diabetic rats: Effect of glucose on the insulin content of the media. Metabolism 17:638, 1968.

Lazarow, A.: Insulin synthesis, storage, release, transport and antagonism. Diabetes 15:281, 1966.

Lazarow, A.: Physical methods in quantitative histo- and cytochemistry. J. Histo Cyto 14:832, 1966.

CURRICULUM VITAE

Seymour H. Levitt, M.D.

BORN: July 18, 1928 - Chicago, Illinois

MARITAL STATUS: Married - three children

EDUCATION: Elementary and High School, Denver, Colorado

UNDERGRADUATE EDUCATION: University of Colorado, Denver, Colorado
Graduated Cum Laude, 1950, B.A. Degree

MEDICAL SCHOOL: University of Colorado, Denver, Colorado
Awarded Boettcher Foundation Academic Scholarships in junior and senior class
Graduated 1954 - M.D. Degree

INTERNSHIP: Philadelphia General Hospital - Philadelphia, Pennsylvania
1954 - 1955, Rotating Internship

MILITARY SERVICE: 1955 - 1957
One year General Medical Officer, 47th Infantry Reg.
One year Ward Officer, Internal Medicine Service, 5th General Hospital, Stuttgart, Germany

RESIDENCIES: Internal Medicine, 1957 - 1958, University of California, San Francisco, California
Radiology, 1958 - 1961, University of California, San Francisco, California

FELLOWSHIPS: American Cancer Society Clinical Fellow, 1959 - 1960

SOCIETY MEMBERSHIPS: The American Society of Therapeutic Radiologists
American College of Radiology
American Medical Association
Radiological Society of North America
Society of Nuclear Medicine
Richmond Academy of Medicine
Virginia State Medical Society
Richmond Radiological Society
American Radium Society
New York Academy of Sciences
Association of University Radiologists

HONORARY SOCIETY MEMBERSHIPS: Phi Beta Kappa
Alpha Omega Alpha
Alpha Epsilon Delta, Pre-Medical Honorary Society
Phi Sigma, Biology Honorary Society
Fellow, American College of Radiology

SPECIALITY BOARD:
American Board of Radiology - Certificate in Radiology and Nuclear Medicine

STAFF POSITIONS: July, 1961 - June, 1962, Instructor, Radiation Therapy, University of Michigan, Ann Arbor, Michigan

June, 1962 - July, 1963, Assistant Radiotherapist, University of Rochester Medical Center, Rochester, New York

July, 1963 - June, 1966, Radiotherapist and Chief of Division of Radiation Therapy, University of Oklahoma Medical Center; Associate Professor, Department of Radiology, University of Oklahoma Medical Center, Oklahoma City, Oklahoma

April, 1964 - September, 1964, Acting Chief of Radiology Service, Veterans Administration Hospital, Oklahoma City, Oklahoma

July, 1963 - June, 1965, Co-Coordinator Tumor Registry, University of Oklahoma Medical Center, Oklahoma City, Oklahoma

July, 1965 - June, 1966, Coordinator, Tumor Registry, University of Oklahoma Medical Center, Oklahoma City, Oklahoma

June, 1966 - present, Chairman, Division of Radiotherapy and Oncology, Medical College of Virginia; Professor of Radiology, Department of Radiology, Medical College of Virginia, Richmond, Virginia

CONSULTANT POSITIONS: July, 1963 - June, 1966, Consultant Radiotherapist, Veterans Administration Hospital, Oklahoma City, Oklahoma

July, 1963 - June, 1966, Consultant Radiotherapist, Oklahoma Medical Research Foundation, Oklahoma City, Oklahoma

July, 1965 - June, 1966, Consultant Radiotherapist, Central State Hospital, Norman, Oklahoma

June, 1966 - Present, Consultant Radiotherapist, Veterans Administration Hospital, Richmond, Virginia

HONORARY POSITIONS: Director at Large, American Cancer Society, Oklahoma Division January, 1966 to June, 1966

Member, Advisory Committee on the Survey of Research and Education in the Veterans Administration, National Academy of Sciences, National Research Council

Guest examiner, American Board of Radiology

Member of Committee of Constitution and By-laws, American Society of Therapeutic Radiologists

Member, Committee on Cancer Management
American College of Radiology

Chairman of Region III, Committee on Cancer Management
American College of Radiology

PUBLICATIONS

"Tandem Elution of Technetium-99^{M} Generators:, AMERICAN JOURNAL OF ROENTGENOLOGY, August 1966, Bogardus, C.R., Jr., Levitt, S,H., and Ficken, V.W.

"An Improved Radiation Therapy Table Top", RADIOLOGY, Volume 86, 1966, Bogardus, C.R., Jr., and Levitt, S.H.

"Effect of Hypertension and Arteriosclerosis on Tumor Response to Radiation Therapy in Carcinoma of the Cervix: A Clinical Study", Radiology, Volume 89, 1967, Rogers, C.C., Levitt, S.H. and Crosby, W.C.

"Split Dose Intensive Radiation Therapy in the Treatment of Inoperable Lung Cancer: A Randomized Study", RADIOLOGY, Volume 88, 1967, Levitt, S.H., Bogardus, C.R., Jr., and Ladd, G.

"The Influence of Certain Clinical Factors on Survival in Hodgkin's Disease", RADIOLOGICA CLINICA ET BIOLOGICA, Volume 36, 1967. Kurahara, S.S., George, F.W., III, Levitt, S.H. and Rubin, P.

"Split Dose Approach in Radiation Therapy", RADIOLOGICAL CLINICS OF NORTH AMERICA, August, 1969, Levitt, S.H.

"The Advantages and Disadvantages of Split Dose Radiation Therapy" Levitt, S.H. and Bogardus, C.R., Jr., FRONTIERS OF RADIATION THERAPY, Volume III, 1968. Ed. by J. Vaeth, S. Karger, 1968, N.Y., NY.

"Significant Factors in Red Cell Mass Changes Following Fractionated Local Radiotherapy", Levitt, S.H., To be published - ACTA RADIOLOGICA

"Radiation Therapy of Primary Pituitary Tumors Associated with Cushing's Syndrome", Levitt, S.H., To be published - CLINICAL RADIOLOGY

"Radiation as An Immunosuppressive Agent in Organ Transplantation", King, E.R., Levitt, S.H., Royster, R.L., and Wolfe, J.S., To be published - RADIOLOGY

"Effect of Preoperative Irradiation on Tensile Strength and Collagen Content of Canine Neck Incisors", Zimberg, Y.H., Levitt, S.H. and Whitsell, A., To be published - RADIOLOGY

"Effect of Fractionated Doses of Selectively Applied X-Ray Radiation on Histologic Structure of Major Salivary Glands of the Rat", Elzay, R.P., Levitt, S.H., Sweeney, W.T. and Jones, T.K. To be published - RADIOLOGY

"Effectiveness of Radiation Therapy in the Treatment of Carcinoma of the Esophagus: A Retrospective Study", Frazier, A.B. and Levitt, S.H., To be published - AMERICAN JOURNAL OF ROENTGENOLOGY

Robert John McCollister

BIRTHDATE: July 27, 1928, Iowa City, Iowa

DEGREES:

State University of Iowa	1945-1949	B.A. degree in 1949
State University of Iowa	1948-1952	M.D. degree in 1952
University of Minnesota Graduate School	1955-1959	None

POSITIONS:

1952-53	Intern at Highland Alameda County Hospital, Oakland, California
1953-55	Lt. and Capt., USAF (Flight Surgeon)
1955-59	Resident in Medicine, Veterans Administration Hospital, Mpls.
1959-60	Chief Resident in Medicine, University Hospital, Minneapolis
1960-61	Instructor in Medicine, University of Minnesota, Minneapolis
1961-62	Instructor in Medicine, Duke University
1962-65	Instructor in Medicine, University of Minnesota, Minneapolis
1965	Assistant Professor of Medicine, University of Minnesota
1964	Assistant Dean, Medical Student Affairs, University of Minn.

COLLEGE HONORARY SOCIETY: Delta Phi Alpha (Honorary German Fraternity)

SOCIETIES: Minneapolis Society of Internal Medicine
American Federation for Clinical Research
American Society of Hematology
Hennepin County Medical Society

BIBLIOGRAPHY

1. McCollister, R.J., Metabolism of Melanin Pigment, Minnesota Medicine, 39:800-802, 831, 1956.
2. Flink, E.B., McCollister, R., Prasad, A.S., Melby, J.C., Doe, R.P., Evidences for Clinical Magnesium Deficiency, Ann. Int. Med., 47:956-968, 1957.
3. McCollister, R., Flink, E.B., Doe, R.P., Magnesium Deficiency in Chronic Alcoholism, J. Lab. Clin., Med. 52:928, 1958.
4. McCollister, R., Prasad, A.S., Doe, R.P., Flink, E.B., Normal Renal Magnesium Clearance and the Effect of Water Loading, Chlorothiazide and Ethanol on Magnesium Excretion, J. Lab. Clin. Med. 52:928, 1958 (Abstract)
5. Prasad, A.S., Zinneman, H.H., Flink, E.B., McCollister, R.J., Magnesium Protein Relationship and Status of Ultrafilterable Magnesium in Normal and Abnormal Human Sera, Clin. Res., (Abstrac t) 6:260-261, 1958.
6. McCollister, R.J., Flink, E.B., Doe, R.P., Magnesium Balance Studies in Chronic Alcoholism, J. Lab. Clin. Med., 55:98, 1960.
7. McCollister, R.J., Flink, E.B., Lewis, M.D., Urinary Excretion of Magnesium in Man Following the Ingestion of Ethanol, Amer. J. Clin. Nutr. 12:415-420, 1963.
8. McCollister, R.J., Gilbert, W.R., Ashton, D., Wyngaarden, J.B., Pseudo Feed Back Inhibition of Purine Biosynthesis by 6-MP Ribonucleotides and Other Purine Analogs, J. Biol. Chem, 239:1560-1563, 1964.

CURRICULUM VITAE

NAME: John H. Moe, M.D.

ADDRESS: 6 Webster Place, Hopkins, Minnesota

BIRTHPLACE: Grafton, North Dakota

BIRTHDATE: August 14, 1905

ELEMENTARY ED: Grafton, North Dakota

HIGH SCHOOL: Grafton High School, Grafton, North Dakota

COLLEGES AND UNIVERSITIES ATTENDED:

University of North Dakota	B.S.	1927
Northwestern University	M.B.	1929
Northwestern University	M.D.	1930

INTERNSHIP: Illinois Research and Educational Hospital

RESIDENCIES:

Illinois Research and Educational Hospital	1930
Gillette State Hospital, St. Paul, Minnesota	1931
San Joaquin Hospital, Stockton, California	1932

Special Certification: American Board of Orthopaedic Surgery 1936

STAFF POSITIONS: Professor and Head, Department of Orthopedic Surgery
University of Minnesota, Minneapolis, Minnesota
Chief of Staff, Gillette State Hospital, St. Paul, Minnesota

MEMBERSHIP IN SOCIETIES:

The International Society of Orthopaedic Surgery and Traumatology
Chairman, U.S. National Committee, 1970.
American Academy of Orthopaedic Surgeons
American Orthopedic Association
President-Elect, 1970
Pan Pacific Surgical Association
Chicago Orthopaedic Society
Clinical Orthopedic Society
American College of Surgeons
Scoliosis Research Society
President 1966-1968
Twin City Orthopaedic Society
Minnesota Medical Association
American Medical Association
Hennepin County Medical Association
Canadian Orthopedic Association
British Orthopedic Association

HONORARY:

Sociedad Chilena de Orthopedia y Traumatology
La Sveliedad Peruana de Orthopedia y Tramatologia

Moe, John H: Evaluation of Surgical Treatment of Idiopathic Scoliosis, SICOT, X Congres, Paris, September, 1966

Moe, John H: Back Problems in the Young Athlete, The Journal oft he American College Health Association, December, 1968, Vol. 17, Number 2

Moe, John H.: Methods and Technique of Evaluation Scoliosis, AAOS Symposium of the Spine, C.V. Mosby Co, 1969.

Nash, C.L. and Moe, John H.: A Study of Vertebral Rotation, The Journal of Bone and Joint Surgery, Vol. 51-A, No. 2, pp. 223-229, March, 1969.

Westgate, Hugh D. and Moe, John H.: Pulmonary Fucntion in Kyphoscoliosis before and after Correction by the Harrington Instrumentation Method, The Journal of Bone and Joint Surgery, Vol. 51-A, No. 5, pp. 935-946, July, 1969.

Kane, William J. and John H. Moe: Delayed Union and Nonunion of Long-Bone Fractures, Hospital Medicine, February, 1970, 26-36.

Robert O. Mulhausen, M.D.

BIRTHDATE: June 7, 1930, Chicago, Illinois

EDUCATION: University of Illinois, B.S., Chemistry, 1951
University of Illinois, B.S., Medicine, 1953
University of Illinois, M.D., 1955
University of Minnesota, M.S., Internal Medicine, 1964

Internship: Ancker Hospital, St. Paul, 1955-56
Residency: Internal Medicine, Minneapolis Veterans Hospital, 1956-59
Graduate School, Medical Fellow, University of Minnesota, 1956-59
Diplomate, American Board of Internal Medicine, 1962
Fellow, American College of Physicians, 1965

Fulbright Research Award (with Poul Astrup, Copenhagen University, Denmark) 1965-66

PROFESSIONAL EXPERIENCE:

Staff Physician, Medical Service, Minneapolis V.A. Hospital	1959-60
Assistant Chief, Medical Service, Minneapolis V.A. Hospital	1960-67
Instructor, Department of Medicine, University of Minnesota	1959-64
Assistant Professor, Department of Medicine, Univ. of Minn.	1964-69
Assistant Dean, College of Medical Sciences, Univ. of Minn.	1969-67-
Associate Professor, Department of Medicine, Univ. of Minn.	1969-

RESEARCH ACTIVITIES: Blood gas and renal research

SOCIETIES: American College of Physicians
American Federation for Clinical Research
American Society of Nephrology
Association American Medical Colleges
Minnesota Society of Internal Medicine
Minneapolis Society of Internal Medicine

SELECTED BIBLIOGRAPHY

Mulhausen, Robert, Eichenholz, A., and Redleaf, Paul: Effect of high CO_2 tension on banked ACD blood. Clinical Research, 10:293, Oct. 1962 (Abstract)

Mulhausen, Robt., Eichenholz, A., and Blumentals, A.: Acid-base disturbances in patients with cirrhosis of the liver. Medicine, 46:185, 1967.

Mulhausen, Robert, Astrup, P., and Kjeldsen, K.: Oxygen affinity of hemoglobin in patients with cardiovascular disease, anemia, and cirrhosis of the liver. Scand. J. Lab. Clin. Invest. 19:291, 1967.

Mulhausen, Robert, Astrup P., and Mellemgaard, K. Oxygen affinity and acid-base status of human blood during exposure to hypoxia and carbon monoxide. Scand. J. Clin. Lab. Invest. Suppl. 103:9, 1968.

Mulhausen, R., Brown, D., Onstand, G. Renal clearance of amylase in patients with pancreatitis. Accepted for publication.

CURRICULUM VITAE

John S. Najarian, M.D.

Personal Statistics:
Date of Birth: December 22, 1927
Place of Birth: Oakland, California
Marital Status: Married, four children

Education:
University of California, 1945-1948, AB with Honors
University of California Medical School, 1948-1952, M.D.

Military Service:
Division Surgeon, 34th Air Division (DEF) USAF, 1953-1955, Albuquerque, New Mexico.

Post Doctoral Training:
Internship - straight surgical, University of California Medical School, 1952-1953
Residency - surgical, University of California Medical School, 1955-1960

Research Training:
Surgical Physiology, University of California Medical School, 1955-1956
Immunopathology, University of Pittsburgh Medical School, Special Research Fellow, NIH, 1960-1961.
Tissue Transplantation Immunology, Scripps Clinic and Research Foundation, La Jolla, California, Senior Fellow and Associate NIH, 1961 - 1963.

Visiting Professorships:
Winnipeg General Hospital, Winnipeg, Manitoba, Canada - 1967.
Johns Hopkins University, Baltimore, Maryland - 1968.
Marquette School of Medicine, Milwaukee, Wisconsin - 1969.
Ohio State University, Columbus, Ohio - 1969.
University of California, Los Angeles, California - 1969.
Massachusetts General Hospital, Boston, Massachusetts - 1969.
Rochester School of Medicine, Rochester, New York - 1970.

Honors:
Alpha Omega Alpha - 1965
Markle Scholar in Academic Medicine, 1964-1969
California Trudeau Society Award - 1962
University of California Football Alumnus-of-the-Year - 1967
William C. Beaumont Memorial Lecture - 1968
Sommer Memorial Lecturer - 1969

Professional Organizations:

Diplomate, American Board of Surgery
Fellow, American College of Surgeons
Society of University Surgeons
The Howard C. Naffziger Surgical Society
Society for Experimental Biology and Medicine
American Association for the Advancement of Science
American Society for Experimental Pathology
American Surgical Association
American Association of Immunologists
Hagfish Society (Immunology)
American Medical Association
Transplantation Society
Halsted Surgical Society
The American Society of Nephrology
International Society of Nephrology
American Association for Laboratory Animal Science
Association for Academic Surgery - President, 1969
Minneapolis Surgical Society
Hennepin County Medical Society
St. Paul Surgical Society
Surgical Biology Club
Minnesota Medical Foundation
Minnesota Medical Association
Minnesota Academy of Medicine
Society of Surgical Chairmen
Society of Clinical Surgery
Minnesota Surgical Society
Minnesota State Medical Society
Central Surgical Association
Sigma Xi
International Society of Surgery

Staff Positions:

Assistant Professor of Surgery, Director of Surgical Research Laboratories and Chief, Transplantation Service, Department of Surgery, University of California School of Medicine, San Francisco, California, 1963-1966; Professor and Vice-Chairman 1966-1967.

Professor and Chairman, Department of Surgery, College of Medical Sciences, University of Minnesota, Minneapolis, July, 1967 - Present.

Editorial Boards:

Journal of Surgical Research, 1968-
Minnesota Medicine, 1968 -
Journal of Surgical Oncology, 1968-
American Journal of Surgery, 1967-
Year Book of Surgery, 1970-
Surgery, Associate Editor, 1971

Other:

Special Consultant, United States Public Health Service, National Institutes of Health, Clinical Research Training Committee, Institute of General Medical Sciences, 1965-1969.
Consultant, United States Bureau of the Budget, 1966-1968.
Member, Scientific Advisory Board, National Kidney Foundation.
Member, Advisory Committee on Hemodialysis and Renal Transplantation, Department of Public Welfare, Minnesota State Medical Association.
Consultant, Upper Midwest Chapter of the National Kidney Foundation.
Council Member, Midwinter Conference of Immunologists.
Member, Board of Directors, Variety Club Heart Hospital, University of Minnesota.
Member, Board of Trustees, Minnesota Medical Foundation.
Member, Committee regarding Ethical Problems, International Transplantation Society, 1970.
Member, Legislative Liaison Committee of the National Kidney Foundation, 1970
Chief of Hospital Staff, University of Minnesota Hospitals, 1970

Name: Michael M. Paparella, M.D.

Date and Place of Birth: February 13, 1933; Detroit, Michigan

Education and Professional Experience:

1950-1953	(B.S.) University of Michigan, Ann Arbor, Michigan
1953-1957	(M.D.) University of Michigan, Ann Arbor, Michigan
1957-1958	Rotating Internship, Emanuel Hospital, Portland, Oregon
1958-1961	Residency in Otolaryngology, Henry Ford Hospital, Detroit, Michigan
1960-1961	Junior Member of Staff, Henry Ford Hospital, Detroit, Michigan
1961-1963	Chief; Ear, Nose and Throat Department, U.S. Army Hospital (20th Station Hospital) Nuremburg, Germany
1963-1964	Full-time geographic staff in Otolaryngology, Massachusetts Eye and Ear Infirmary, Boston, Massachusetts
	Assistant in Otolaryngology, Massachusetts Eye and Ear Infirmary, Boston, Massachusetts
1964-1967	Assistant Professor, Department of Otolaryngology and Consultant, Veterans Administration Hospital, Dayton, Ohio
	Director of the Otological Research Laboratory, Ohio State University, College of Medicine, Columbus, Ohio
1967 to present	Professor (Apr 1967) and Chairman (July 1967), Department of Otolaryngology, University of Minnesota, Minneapolis, Minnesota

Honors: Kobrak Research Award, 1960; Travel Fellowship to VII International Congress of Otolaryngology, Tokyo, Japan, October 1965; various scholarships throughout medical school.

Major Research Interest: Research Otology

Certified: American Board of Otolaryngology, October 1963

Publications:

Author of more than 40 scientific publications in the field of Otolaryngology, including several chapters of books and three textbooks--Atlas of Ear Surgery (Mosby Publishing Company), Biochemistry of the Ear (Academic Press) and Textbook of Otolaryngology (in preparation -- 3 volumes).

Paparella, M.M.: A high-frequency microvibrator (bioacoustical effects). A.M.A. Arch. Otolaryng. 74:112, 1961.

Paparella, M.M.: A chapter in Sensorineural Hearing Processes and Disorders, Henry Ford Hospital International Symposium on Sensorineural Hearing Processes and Disorders. Little Brown and Company, 1967. Paper presented on Mar 26, 1965.

Paparella, M.M. and Saunders, W.H.: Atlas of Ear Surgery. C. V. Mosby Publishing Company, 1968. This book includes the current surgical techniques of leading otologists of various countries. The first section of the book consists of an outline for dissection of temporal bones.

Paparella, M.M.: Experimental tympanoplasty. Laryngoscope, 77:1755-1794, 1967.

Paparella, M.M. (editor): Biochemical Mechanisms in Hearing and Deafness. Charles C. Thomas Publisher, Springfield, 1970.

CURRICULUM VITAE

Biography

Name: John J. Sciarra

Born: March 4, 1932 in West Haven, Connecticut

Education: Yale University, New Haven, Connecticut, B.S., 1953.
M.D.,1957, and Ph.D., Anatomy, 1963, Columbia University.

Major University Appointments:

Assistant Professor, Department of Obstetrics and Gynecology, College of Physicians and Surgeons, Columbia University, New York City, 1965-1968.

Professor and Head, Department of Obstetrics and Gynecology, University of Minnesota Medical School, Minneapolis, 1968-

Research Interests

General: Endocrinology of reproduction
Placental anatomy and physiology

Specific: Protein hormones of the pituitary and placenta
Placental function studies
Investigation of the infertile couple

Selected Bibliography

1. Johnson, P.M.; Sciarra, J.J., and O'Leary, J.A.: Placental scanning with sodium pertechnetate TC-99m bound to serum albumin. Radiology 89:321, 1967.

2. Kaplan, S.L.; Gurpide, E.,; Sciarra, J.J. and Grumbach, M.M.: Metabolic clearance rate and production rate of chorionic growth hormone - prolactin in late pregnancy. J. Clin. Endo. 28:1450, 196

3. Grumbach, M.M.; Kaplan, S.L, Sciarra, J.J., and Burr, I.M.: Chorionic growth hormone - prolactin (CGP): Secretion, disposition biologic activity in man, and postulated function as "growth hormo of the second half of pregnancy. Ann. N.Y. Acad. Sciences, 148: 501, 1968.

4. Sciarra, J.J.; Sherwood, Louis M.; Varma, Andre A.; and Lundberg, Walter B.: Human placental lactogen (HPL) and placental weight. Am. J. of Obstet. & Gynec. 101:413, 1968.

5. Bell, Jenifer, J,; Canfield, Robert E., and Sciarra, J.J.: Purification and characterization of human chorionic gonadotropin. Endocr. 84:298, 1969.

Frederick Earl Shideman

Born: October 16, 1915 at Albion, Michigan

Married: August 12, 1939 to Margaret E. Reiner, Four children

Degrees:

B.A.	Albion College, Albion, Michigan	1936
Ph.D.	University of Wisconsin Major: Pharmacology Minor: Physiology Thesis subject: Effects of Morphine and its Derivatives on Intermediary Metabolism	1941
M.D.	University of Michigan	1946

Positions Held:

Wisconsin Alumni Research Foundation Research Assistant in Pharmacology, Univ. of Wisconsin Medical School	1936-41
W.A.R.F. Postdoctorate Fellow in Pharmacology, University of Wisconsin Medical School	1941-42
Research Fellow in Pharmacology, University of Michigan	1942-43
Instructor in Pharmacology, University of Michigan	1943-47
Assistant Professor of Pharmacology, University of Michigan	1947-49
Associate Professor of Pharmacology, University of Michigan	1949-52
Professor of Pharmacology and Toxicology, University of Wisconsin	1952-62
Chairman, Department of Pharmacology and Toxicology, University of Wisconsin	1954-62
Professor and Head, Department of Pharmacology, University of Minnesota	1962-

Professional and Honor Societies:

Sigma XI	1939
Phi Lambda Upsilon	1939
Sigma Sigma	1939
Alpha Omega Alpha	1947
American Society for Pharmacology and Experimental Therapeutics	1944

Society for Experimental Biology and Medicine	1947
American Association for the Advancement of Science	1947
Michigan Academy of Science, Arts and Letters	1946
Wisconsin State Medical Society (Honorary)	1956
Phi Beta Kappa (Alumni Membership)	1957
American Institute of Nutrition	1960
Royal Society of Medicine, Fellow	1961
Society of Toxicology	1963
American Therapeutic Society	1963
The Korean Medical Association (Honorary)	1965
The Minnesota Society of Neurological Sciences	1963
American Men of Science	
Who's Who	

Member:

Panel on Sterilization of Blood and Plasma, National Research Council, 1952 - 1955.

Membership Committee, American Society for Pharmacology and Experimental Therapeutics, Inc., 1954-1957.

Study Section on Pharmacology and Experimental Therapeutics, National Institutes of Health, 1960 - 1965, Chairman 1963 - 1965.

Advisory Committee on Personnel for Research, American Cancer Society, 1960 - 1963.

Chairman, Advisory Committee on Personnel for Research, American Cancer Society, 1964 - 1965.

Basic Science Research Study Committee, American Heart Association, 1962 - 1965.

Treasurer, American Society for Pharmacology and Experimental Therapeutics, Inc., 1960 - 1962.

Finance Committee, Chairman, American Society for Pharmacology and Experimental Therapeutics, Inc., 1961 - 1962.

President-elect, American Society for Pharmacology and Experimental Therapeutics, Inc., 1962 - 1963.

President, American Society for Pharmacology and Experimental Therapeutics, Inc., 1963-1964.

Specialty Advisory Board, Postgraduate Medicine, 1963 - .

Pharmacology and Toxicology Training Committee, National Institutes of Health, 1965 - 1969.

Editorial Committee, Annual Review of Pharmacology, 1966 - 1970.

Advisory Committee on Abuse of Dependant and Stimulant Drugs, Food and Drug Administration, 1966 - .

Expert Panel of the New York State Narcotic Addiction Control Commission, 1969 - .

Cardiovascular System Research Evaluation Committee, Veterans Administration, 1969 - .

Scientific Advisory Committee on Drugs, U.S. Department of Justice, (chairman) 1968 - .

Consulting Editor, American Scientist, 1969 - .

Community Activities

Boy Scouts of America, Member of District Committee, 1954 - 1960.
Chairman of Committee, 1958 - 1959.

School Board, Shorewood Hills, 1958 - 1962.
Director, 1959 - 1962.

Frederick E. Shideman, Ph.D., M.D.

SELECTED BIBLIOGRAPHY

Synthesis of acetylcholine from labeled choline by brain.
Lawrence W. Chakrin and F. E. Shideman.
Int. J. Neuropharmacol. 7:337, 1968.

The *in vivo* synthesis and release of tritium labeled acetylcholine by cat cerebral cortex.
Lawrence W. Chakrin, F. E. Shideman and Amedeo Marrazzi.
Int. J. Neuropharmacol. 7:351, 1968.

Catecholamine accumulation in the brains of infant and adult rats after monoamine oxidase inhibition.
A. S. Kulkarni and F. E. Shideman.
European Journal of Pharmacology 3:269, 1968.

A comparison of the absorption, distribution and metabolism of reserpine in infant and adult rats.
R. A. Mueller and F. E. Shideman.
J. Pharmacol. and Exptl. Therap. 163:91, 1968.

Uptake of norepinephrine as a determinant of the magnitude of the inotropic response.
Jacques LeLorier and F. E. Shideman.
Proc. Soc. Exp. Biol. Med. 130:265, 1969.

CURRICULUM VITAE

STAUFFER, Lee D., Associate Professor and Dean, School of Public Health. Born Wisner, Nebraska, March 20, 1929. B. S. University of Nebraska, 1951; M.P.H. University of Minnesota, 1956. Registered Sanitarian, 1958. U.S. Marine Corps, 1946-47; USNR, 1947-48; USPHS Reserve, 1955-present, rank Sanitarian. Lincoln-Lancaster County (Nebraska) Health Dept. Sanitarian, 1951-52. Housing Inspector University of Minnesota Health Service, 1952-53; Assistant to Public Health Engineer and Instructor, 1954-55; Sanitarian and Instructor, 1955-58; and Senior Sanitarian and Assistant Professor, 1958-62, University of Minnesota Health Service and School of Public Health. Assistant Professor and Assistant Director, School of Public Health, University of Minnesota, 1962-66. Executive Secretary, American College Health Association, 1966-68. Assistant Professor of Public Health and Assistant Director of Continuation Medical Education, University of Minnesota School of Public Health and Medical School, 1968. Assistant Professor of Public Health and Executive Director, Office of Postgraduate Educational Activities, College of Medical Sciences, University of Minnesota, 1969-70. Fellow, American Public Health Association; Chairman, Food Protection Committee, 1962-64; Member, Engineering and Sanitation Section Council, 1964-66; APHA Representative to National Restaurant Association, 1962-66. Minnesota Public Health Association, Treasurer, 1962-65; Chairman, Resolutions Committee, 1964-65; Program Committee and Chairman, Awards Committee, 1966; Nominating Committee, 1968. Minnesota Society of Professional Sanitarians, Chairman of Registration Committee, 1962-66; Board of Directors, 1966. American College Health Association, Chairman of Committee on Student Housing, 1958-60; Liaison Committee, 1958-60; Chairman, Publicity Committee, 1966-67; Editorial Committee, 1966-68. Intersociety Board for the Certification of Sanitarians, Founder Diplomate, 1969-present. Deputy Health Officer, Coon Rapids, Minn., 1960-64. Trustee: North Suburban Minnesota Sanitary

Sewer District Deputy Chairman, 1962-63, 65-66; Chairman, 1964; District Representative to Metropolitan Planning Commission, 1965-66. Trustee: Lutheran Deaconess Home and Hospital, 1963-66; and Chairman of School of Nursing Committee, 1964-66. Second Vice President, St. Anthony Village Minnesota Elementary School P.T.A., 1968-69. School Board Director, St. Anthony Village District #282, 1969-70 and Vice Chairman, 1970. Member, Environmental Health Planning Task Force, Minnesota State Planning Agency, 1969-present. Member, Metropolitan Health Board, Metropolitan Planning Commission, 1970-present. Consultant, USPHS-Communicable Disease Center, Community Health Training Branch, 1962-present; Division of Environmental Engineering and Food Protection, 1962-66. Consultant-American Hospital Association, Plant Operations Committee and Committee on Infections within Hospitals, 1962-64; New York State Health Dept., 1964-68; Bureau of Health, City of St. Paul, 1964; Miller Hospital, St. Paul, 1965-66. Project Coordinator USPHS Contract "Survey of Attitudes, Behavior and Beliefs on Smoking and Health Among Students of American Colleges and Universities", 1966-68. Northlands Regional Medical Program-Vice Chairman, Ad Hoc Committee on Continuing Medical Education, 1968; Acting Director, University of Minnesota Division, 1968-70; Dial Access Committee, 1969-70; Alternate, Board of Trustees, 1968-present; Chairman, Education Committee, 1969-present. Guest Lecturer, University of North Carolina School of Public Health, 1970. University of Minnesota--Executive Secretary, Friday Hospital Staff Meeting Committee, 1968-70; Executive Secretary, Advisory Committee on Postgraduate Education and Regional Medical Programs, 1968-70; Ex-officio member, Medical School Administrative Board, 1968-present; All University Steering Committee for Continuing Education Facilities Planning, 1969-present; Search Committee for Director of Conferences and Institutes, 1969-70; Member (and Chairman 1970), Committee on Fees and Salaries, 1969-70; Member, Committee on Research, General Extension Division, 1970; Member, Rural Health Care Project Committee, 1969-70; Member, Council of Deans and Directors, University Health Sciences, 1970-present; Vice Chairman, All University Consolidated Fund Drive 1969. Selected publications:

"Food Service Equipment Considerations in the Prevention of Hospital Infections." Continuation Course in the Prevention and Control of Infections in Hospitals at Universtiy of Minnesota Center for Continuation Study. September 8-9, 1958.

"Environmental Health and Safety." Proceedings of the Five State College Health Conference in Conjunction with the 21st Annual Meeting of the North Central College Health Association pp. 31-34. March 1959. Minnesota Tuberculosis and Health Association, St. Paul, Minnesota.

"How Linen Handling Methods Affect Cross-Infection Rate." Hospitals 33: 82-84. June 16, 1959.

"The Fire Problem in Student Residences." Safety Monograph No. 10, Seventh National Conference on Campus Safety pp. 78-85. National Safety Council, 425 North Michigan, Chicago 11, Illinois, 1960.

"Standards for Student Housing - Realistic or Idealistic?" Safety Monograph No.12, Eighth National Conference on Campus Safety pp. 61-66. National Safety Council, 425 North Michigan, Chicago 11, Illinois, 1961.

"Foreword, Student Housing Standards." Student Medicine 10: 366-367, Feb. 1962.

"Sanitation in Hospital Food Service." Hospitals 38: 162-170, July 16, 1964.

"Food Preparation Techniques that Minimize Bacterial Contamination and Growth." Hospitals. 38: 80-87. August 1, 1964.

"Operation Water Safety 4th Grade. Report of a Community Effort in Drowning Prevention." (With Theodore Pederson) Health Department Activities in Drowning Prevention. U. S. Department of Health Education and Welfare, Public Health Service, Division of Accident Prevention, Washington, D.C., 1966.

Editor, "Newsletter of the American College Health Association," June 1967-March, 1968.

Editor, "Proceedings of the International Infectious Mononucleosis Symposium, March 27-28, 1967" American College Health Association, 2807 Central Street, Evanston, Illinois 60201, 1968. 260 pp.

W. Albert Sullivan, Jr. M.D.

Date and Place of Birth - April 6, 1924, Nashville, Tennessee

High School - West End High School, Nashville, Tennessee 1941

Undergraduate Education - The University of the South
Sewanee, Tennessee
Major - Chemistry

Medical School - Tulane Medical School 1947
New Orleans, Louisiana

Internship - University of Minnesota Hospitals in Straight Surgery
Minneapolis, Minnesota

Residency Training - Department of Surgery, University of Minnesota under
Dr. Owen H. Wangensteen

Special Training for 1 1/2 years (1949-50) in Vascular Surgery under Professor
Rene Leriche at the American Hospital of Paris in France

First Lt. to Captain in U.S. Army as Surgeon with the 8076th M.A.S.H. in Korea
and subsequently at Camp Carson, Colorado 1951-53.

Director, Cancer Detection Center, University of Minnesota Hospitals 1955-58

Director, Department of Continuation Medical Education
University of Minnesota Medical School 1958-68
Associate Professor of Surgery - 1964
Assistant Dean, and Director of Admissions
University of Minnesota Medical School November 1968

Diplomate American Board of Surgery - 1958
Fellow American College of Surgeons

Member Ramsey County, Minnesota, and American Medical Associations
Central Surgical Society
Minnesota Surgical Society
St. Paul Surgical Society

Member Committee on Continuing Medical Education of the AMA
Advisory Committee on Continuing Medical Education of the Council of
Medical Education of the AMA
Committee on Continuing Medical Education of the Association of American
Medical Colleges and Chairman from 1964 to 1968

Director, Tumor Clinic University of Minnesota Hospitals

H. Mead Cavert, M.D.

DATE OF BIRTH: March 30, 1922

PRESENT POSITION: Professor of Physiology and Associate Dean and Executive Officer of the University of Minnesota Medical School

EDUCATION:

1942 B.S., Agricultural Biochemistry, University of Minnesota
1951 M.D., University of Minnesota
1952 Ph.D., Physiology, University of Minnesota

PROFESSIONAL EXPERIENCE:

1946 Research Assistant, Department of Physiology, University of Minnesota
1950-51 Teaching Assistant, Department of Physiology, University of Minnesota
1951-54 Research Fellow, American Heart Association
1954-57 Established Investigator, American Heart Association
1953-59 Assistant Professor, Department of Physiology, University of Minnesota
1957-64 Assistant Dean, College of Medical Sciences, University of Minnesota
1959-68 Associate Professor, Department of Physiology, University of Minnesota
1968- Professor, Department of Physiology, University of Minnesota
1961-62 National Heart Institute Special Research Fellow and Visiting Professor, University of Edinburgh, Scotland (Sabbatical Leave).
1964- Associate Dean, Medical School, University of Minnesota
1966-69 Member, Program Project Committee B, National Heart Institute
1964- Member, Group on Student Affairs; 1964-68, Committee on Student Aspects of International Aspects of Medical Education, Association of American Medical Colleges, Chairman, SAIME 1967-68. Member, Committee on International Relations in Medical Education, AAMC, 1968-.

MAJOR RESEARCH INTERESTS: Physiology; skeletal and cardiac muscle; transmembrane transport of cellular constituents.

PUBLICATIONS:

1) Bihler, I., H.M. Cavert, and R.B. Fisher, J. Physiol. 180:157, 1965. "The uptake of pentoses by the perfused isolated rabbit heart."
2) Bihler, I., H.M. Cavert, and R.B. Fisher, J. Physiol. 180:168, 1965. "A differential effect of inhibitors on sugar penetration into the isolated rabbit heart." (J. Physiol. 169:22, 1963. Abstract of above paper for presentation to the Physiological Society (British), Edinburgh, July 12, 1963.)
3) Co-author, "Machinery of the Body," 5th Edition, University of Chicago Press, 1961, with A.J. Carlson and Victor Johnson.
4) Thompson, A.M., H.M. Cavert, N. Lifson, and R.L. Evans. "Regional tissue uptake of D_2O in perfused organs: Rat liver, dog heart and gastrocnemius." American Journal of Physiology, 197:897, 1959.
5) Cavert, H.M., "Some current views on the biochemistry and physiology of myocardial contraction," Bulletin New York Academy of Medicine. 34:445, 1958.

RECENT ABSTRACTS:

Cronau, L.H., Jr., H.M. Cavert, and C. Quello. Federation Proceedings 26:258, 1967. "Repetitive contraction and uptake of D-Xylose in isolated perfused rat diaphragm."

Wermers, G.W., H.M. Cavert, C. Quello and L.H. Rusin. Federation Proceedings 28:462, 1969. "The effect of repetitive contraction on accumulation of amino acids in isolated perfused rat diaphragm."

W. Albert Sullivan, Jr, M. D.

Date and Place of birth - April 6, 1924, Nashville, Tennessee

High School - West End High School, Nashville, Tennessee 1941

Undergraduate Education - The University of the South
Sewanee, Tennessee
Major Chemistry

Medical School - Tulane Medical School 1947
New Orleans, Louisiana

Internship - University of Minnesota Hospitals in straight Surgery
Minneapolis, Minnesota

Residency Training - Department of Surgery, University of Minnesota under
Dr. Owen H. Wangensteen

Special Training for 1½ years (1949-50) in Vascular Surgery under Prof. Rene
Leriche at the American Hospital of Paris in France

First Lt. to Captain in U. S. Army as Surgeon with the 8076th M. A. S. H. in
Korea and subsequently at Camp Carson, Colorado 1951-53.

Director, Cancer Detection Center, University of Minnesota Hospitals 1955 - 1958

Director, Department of Continuation Medical Education
University of Minnesota Medical School 1958 - 1968

Associate Professor of Surgery - 1964
Assistant Dean, and Director of Admissions
University of Minnesota Medical School Nov. 1968

Diplomate American Board of Surgery - 1958
Fellow American College of Surgeons

Member Ramsey County, Minnesota, and American Medical Associations
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Minnesota Surgical Society
St. Paul Surgical Society

Member Committee on Continuing Medical Education of the AMA
Advisory Committee on Continuing Medical Education of the Council of
Medical Education of the AMA
Committee on Continuing Medical Education of the Association of American
Medical Colleges and Chairman from 1964 to 1968

Director, Tumor Clinic University of Minnesota Hospitals

H. Mead Cavert, M.D.

DATE OF BIRTH: March 30, 1922
PRESENT POSITION: Professor of Physiology and Associate Dean and Executive Officer of the University of Minnesota Medical School

EDUCATION:

1942 B.S., Agricultural Biochemistry, University of Minnesota
1951 M.D., University of Minnesota
1952 Ph.D., Physiology, University of Minnesota

PROFESSIONAL EXPERIENCE:

1946 Research Assistant, Department of Physiology, University of Minnesota
1950-51 Teaching Assistant, Department of Physiology, University of Minnesota
1951-54 Research Fellow, American Heart Association
1954-57 Established Investigator, American Heart Association
1953-59 Assistant Professor, Department of Physiology, University of Minnesota
1957-64 Assistant Dean, College of Medical Sciences, University of Minnesota
1959-68 Associate Professor, Department of Physiology, University of Minnesota
1968- Professor, Departmentof Physiology, University of Minnesota
1961-62 National Heart Institute Special Research Fellow and Visiting Professor, University of Edinburgh, Scotland (Sabbatical Leave).
1964- Associate Dean, Medical School, University of Minnesota
1966-69 Member, Program Project Committee B, National Heart Institute.
1964- Member, Group on Student Affairs; 1964-63, Committee on Student Aspects of International Aspects of Medical Education, Association of American Medical Colleges, Chairman, SAIME 1967-68. Member, Committee on International Relations in Medical Education, AAMC, 1968-.

MAJOR RESEARCH INTERESTS: Physiology; skeletal and cardiac muscle; transmembrane transport of cellular constituents.

PUBLICATIONS:

1) Bihler, I., H.M. Cavert, and R.B. Fisher, J. Physiol. 180:157, 1965. "The uptake of pentoses by the perfused isolated rabbit heart."
2) Bihler, I., H.M. Cavert, and R.B. Fisher. J. Physiol. 180:168, 1965. "A differential effect of inhibitors on sugar penetration into the isolated rabbit heart." (J. Physiol. 169:22, 1963. Abstract of above paper for presentation to the Physiological Society (British), Edinburgh, July 12, 1963.)
3) Co-author, "Machinery of the Body," 5th Edition, University of Chicago Press, 1961, with A.J. Carlson and Victor Johnson.
4) Thompson, A.M., H.M. Cavert, N. Lifson, and R.L. Evans. "Regional tissue uptake of D_2O in perfused organs: Rat liver, dog heart and gastrocnemius." American Journal of Physiology, 197:897, 1959.
5) Cavert, H.M., "Some current views on the biochemistry and physiology of myocardial contraction," Bulletin New York Academy of Medicine. 34:445, 1958.

RECENT ABSTRACTS:

Cronau, L.H., Jr., H.M. Cavert, and C. Quello. Federation Proceedings 26: 258, 1967. "Repetitive contraction and uptake of D-Xylose in isolated perfused rat diaphragm."

[illegible] Cavert, C. Quello and [illegible]. Federation [illegible] 28:462 [illegible] "The effect of repetitive contraction on [illegible] of [illegible] in isolated perfused rat diaphragm."

CURRICULUM VITAE -

F. H. Van Bergen, Professor and Head, Department of Anesthesiology
Mayo C596 Mayo

Education - High School - Shattuck Military Academy 1929-1930
St. Thomas Military Academy 1930-1933
College - St. Thomas College, 1933-37
University of Minnesota, 1940, B.S.
Medical School - University of Minnesota, 1937-41, M.B.; 1942, M.D.
Internship - U.S. Naval Hospital, Bremerton, Wash., 1941-1942
Residencies - Univ. of Minn. Medical School, 1946-48
Division of Anesthesiology, 1952, M.S.

Field of major interest as undergraduate - chemistry, physiology, pharmacology
Field of major interest as graduate - Anesthesiology, physiology, pharmacology, physics
Honors, Prizes, Scholarships - St. Thomas Military Academy - cum laude,
St. Thomas College - honor student, member of Aesculapian Club

Professional Career - Hospital Staff Appointments
Univ. of Minn. Medical School, Anesthesiology, 1/48-7/53, Instructor
Univ. of Minn. Medical School, Anesthesiology, 7/53-7/54, Assistant Professor and Associate Director
Univ. of Minn. Medical School, Anesthesiology, 7/54-7/55, Associate Professor and Acting Director
Univ. of Minn. Medical School, Anesthesiology, 7/55-7/57, Associate Professor and Head
Univ. of Minn. Medical School, Anesthesiology, 7/57 - present Professor and Chairman

Teaching Affiliations
Consultant in Anesthesiology - Gillette State Hospital for Crippled Children; St. Paul Ramsey Hospital; Hennepin General Hospital

Certification of Board - American Board of Anesthesiology - 1951
License to Practice Medicine - Minnesota, No. 8904, Exam, 1942

Medical and Scientific Organizations - American Medical Association, American Society of Anesthesiologists, Minnesota Society of Anesthesiologists (President, 1955), International Anesthesia Research Society, American Board of Anesthesiologists, Association of University Anesthetists, Academy of Anesthesiology (Immediate Past President), AmericanCollege of Anesthesiology.

CURRICULUM VITAE - F. H. Van Bergen, M. D. con't.

University Organizations - Chairman of the Council of Clinical Sciences
College Promotions Advisory Committee
Honors and Awards Committee
Scholastic Standing

Military Service - Medical Officer, U. S. N., 7/27/41 - 7/1/42
Reserve, Medical Office, 7/42 - 3/46

Books published and inventions -Van Bergen Respirator, 1957 - 1962
Associate Editor, Survey of Anesthesiology, 1957 - 1962
Editor, Anesthesiology, Modern Medicine, 1954 - present

Awards, Citations, honors, etc.
American Society of Anesthesiologists, Certificate of Merit, First Place 1952 Scientific Exhibit, Boston, Massachusetts

Thesis Title: "Surgical Hemorrhage: An Evaluation of its Control by Hexamethonium Induced Hypotension and Postural Ischemia"

BIBLIOGRAPHY

Van Bergen, F. H., Weatherhead, D. S. P., Treloar, Alan E., Dobkin, Allan B. and Buckley, J. J.: Comparison of indirect and direct methods of measuring arterial blood pressure, Circulation, Vol. X, No. 4, October 1954.

Van Bergen, F. H. and Buckley, J. J.: The management of severe systemic tetanus, Anesthesiology, 13:599-604, November, 1952.

Van Bergen, F. H., Buckley, J. J., French, L. A., Dobkin, A. B. and Brown, I. A.: Physiologic alterations associated with hexamethonium-induced hypotension, Anesthesiology 15:507-536, Sept. 1954.

Van Bergen, F. H., Buckley, J.J., Weatherhead, D. S. P., Schultz, E. A. and Gordon, J. R.: A new respirator, Anesthesiology 17:708-723, Sept.-Oct. 1956.

Van Bergen, M. D.: The Mechanical Lung Ventilator as Another 'Black Box". Can. Anaes. Soc. J., Vol. 14, 3:159-182, May 1967.

CURRICULUM VITAE

John Edward Verby, Jr., M.D.

Date and Place of Birth: May 24, 1923, Saint Paul, Minnesota. resident of Minnesota

Present Home Address: 9609 Washburn Road, Bloomington, Minnesota

Marital Status: Married to the former Jane E. Crawford of Lake City, Minnesota. Children: John III, age 21, Senior, St. Olaf College, Northfield, Minnesota; Steven, age 18, Freshman, St. Olaf College, Northfield, Minnesota; Ruth, age 12, 7th grade, Rochester Public Schools; Karl, age 7, 2nd grade, Rochester Public Schools.

1941 - Graduated from Saint Paul Johnson High School
In upper 10% of class
Member of National Honor Society
President of Senior Class
Awarded Pickett Achievement Award

1944 - Graduated from Carleton College, Northfield, Minnesota, Bachelor of Arts Degree. (Awarded scholastic grant-in-aide to complete education) (Major - chemistry; minor - math)

1943) -
1944) Selected to Who's Who Among Students in American Universities and Colleges from Carleton College

1944 - Elected to Philo Mathean Literary Society

1946 - Bachelor of Science Degree from University of Minnesota

1967 - Bachelor of Medicine Degree from University of Minnesota

1948 - Doctor of Medicine Degree from University of Minnesota

1947)
1948) Elected to Iron Wedge Scholastic Society

1947)
1949) Rotating Internship for 18 months from October, 1947, to March, 1949, at Minneapolis General Hospital

1941)
1949) Played semi-professional baseball in numerous communities of Southern Minnesota for financing medical education - Owatonna, New Ulm, Mankato

1949)
1951) Solo General Practice, Litchfield, Minnesota
1953-1954)

1951)
1953) First Lieutenant, Medical Carps, U. A. Armed Forces. Service in Korea and Okinawa with Third Infantry Division.

1954)
1968) General Practice, Olmsted Medical Group, P.A.

1969 on - Associate Professor - Department of Family Practice and Community Health

Some Offices Held:

1958 - First President and Original Organizer of the Rochester Youth Baseball Association, Inc.

1958 - Chief of Staff, Olmsted Community Hospital, Rochester, Minnesota

1958 - President, Holmes Elementary School PTA, Rochester, Minnesota

1962)
to - Secretary and/or Treasurer, Olmsted Medical Group, P. A., Board of
1968) Directors

1966)
1967)- Lay Speaker and Chairman, Board of Trustees, First Methodist Church,
1968) Rochester, Minnesota

Some Personal Interests:

Active member of First Methodist Church, Rochester, Minnesota
Serves as Lay Speaker (Accepts speaking engagements to small rural churches to fill pulpit in absence of ministers)
Charter member of YMCA, Rochester, Minnesota
Sports Participation: Baseball (pitcher); handball. In 1945 awarded University of Minnesota Varsity Letter M for Baseball.

Special Miscellaneous Addresses and Enclosures:

1964 - Importance of Christian Education
Presented to Sunday School Teachers of Bethel Lutheran Church, Rochester, Minnesota, January 8, 1964

1968 - Report on Two Months' Hospital Service (May 1 to July 1, 1968)
Presented to the Board of Directors, Olmsted Medical Group, P.A.

1968 - Yin and Yang (Future Function of Nurses in Care of Patients) Presented to the First Graduating Class of Practical Nurses, Rochester Area Vocational School

1967)
1968)- Copies of Correspondence (Critique Letters - Dr. John Fry and Dr. John Anderson, England

Medical Society Memberships:

1954 - American Academy of General Practice (Recertified 4 times)

1965)
1966)- President Southeastern Minnesota Chapter AAGP

Member: Zumbro Valled Medical Society
Minnesota State Medical Association
American Medical Association

1962 - Fellow in American Geriatric Society

1967 - Life Membership in American Medical Society of Vienna, Austria

Area of Special Research Interest: Diseases of the Thyroid and Related Problems

1967 - Appointment as Special Project Associate at the Mayo Clinic for the study of thyroiditis, Grave's Disease, and Hypothyroidism in the Rochester and Olmsted County, Minnesota Population.

Co-workers: Dr. William M. McConahey, Chairman of a Section of Endocrinology, Mayo Clinic; Lewis B. Woolner, M.D., Department of Pathology (Special Interest - Thyroid Disease), Mayo Clinic; Leonard T. Kurland, M.D., Chairman, Section of Bio-Statistics, Epidemiology and Population Genetics.

1967 - July - September:
Sabbatical leave of three months to visit Central Europe and England with family.

Special studies at University of Vienna in Psychosomatic Medicine.

Three Weeks special study of the delivery of medical care in England. (Critique Letter - Dr. John Fry - attached)

Recent Courses Attended:

1965 - Course in Communicable Disease, Atlanta, Georgia

1965 - Course in General Practice, Colorado Medical School, Denver, Colorado

1966 - New Orleans Medical Society Interstate Medical Congress

Medical Paper Presentations:

1959 - Pregnancy with Ruptured Uterus and Salvage of Living Newborn and Mother
Case Presentation to Zumbro Valled Medical Society.

1960 - Familial Periodic Paralysis.
Case Presentation to Southern Minnesota Medical Society, Mankato, Minnesota.

1961 - General Practice Defined
Presentation of Paper to Southern Minnesota Medical Society.

1962 - Changing Trends in General Practice
Paper presented to the Southeastern Minnesota Chapter of the Academy of General Practice, Hubbell House, Mantorville, Minnesota, January 10, 1962.

1966 - An Example of Cooperation and Coordination of Medical Care for the Elderly Through the General Practitioner, Specialist, and Regional Medical Referral Center, Giving the Patient Full Benefits of What Each Has to Offer.
Presented to Olmsted Community Hospital Medical Staff Meeting.

1967 - Critique of the General Practice Section, Olmsted Medical Group
Presented to the Board of Directors, Olmsted Medical Group, P.A., December, 1967

1968 - Thyroid Cancer in Olmsted County 1935-1965
Presented to Society on Epidemiological Research, Washington, D.C., May 10, 1968, published Journal of the National Cancer Institute, Volume 43, Number 4, October, 1969.

1969 - Appointed Associate Professor - Department of Family Practice and Community Health, University of Minnesota Medical School, January 1, 1969.

1969)
1970) Director or Externship Program for Senior Medical Students
Director of new course (Saturday A.M. Sessions) - Introduction to Clinical Medicine for Freshman Medical Students.
Director of new course for Sophomore Medical Students in Observing Externships with practicing physicians of the metropolitan area - Twin Cities, Minnesota.

Dennis W. Watson, Ph. D.
Professor and Head
Department of Microbiology
University of Minnesota [redacted]

Date of Birth: April 29, 1914
Place of Birth: Morpeth, Ontario, Canada
Present citizenship: U.S. citizen

Educational Experience

BSA	University of Toronto	Chemistry	1934
MSc	Dalhousie University	Biochemistry	1937
Ph. D.	University of Wisconsin	Bacteriology	1941

Research Experience

Visiting professor with Dr. O. Westphal, Dr. A. Wander, Forschungsinstitut, Freiburg, Germany, 1960-61.

Major Scientific Interest

Host-parasite interactions, streptococcal toxins, gram negative bacterial toxins, immunochemistry.

Background:

Postdoctoral fellowship, Dept. Bact., Univ. Wisconsin, 1941-42; visiting investigator, Rockefeller Inst. for Med. Res., N. Y., supported by Wisc. Alumni Res. Foundation, 1942; Connaught Laboratories for Med. Res., Univ. Toronto, 1942-44; Med. Consultant Fed. Security Agency, Washington, D. C., 1944; Commissioned U.S. Army, Chem. Warfare Service, Camp Detrick, Frederick, Md., 1944; discharged U.S. Army, 1946; Assist. Prof. Bacteriol., Univ. Wis., 1946-49; Assoc. Prof. Bacteriol. & Immunol., Univ. Minnesota, 1949-52; visiting professor, Univ. Washington, Seattle, 1950; Professor, Bacteriol. & Immunol., Univ. Minnesota, 1952-65; Professor and Head, Dept. Microbiology, Univ. Minnesota, 1965-; USPHS Career Award Professor, 1962-65; Am. Soc. Microbiol.; Am. Assoc. Immunol.; Soc. Exptl. Biol. Med.; Am. Chem. Soc.; Minnesota Path. Soc.; Sigma Xi; AAAS; Assoc. Member, Commission of Immunization, Armed Forces Epidem. Board, 1946-59; member, Board of Scientific Counselors, Div. Biol. Sand., N.I.H., 1957-59; member, Allergy & Immunol. Study Section, N.I.H., 1954-58; member, Training Grant Committee, Inst. Allergy & Infect. Dis., N.I.H. (Chairman, 1964); member, Office of Naval Research Microbiology Panel, 1963-; Council Policy Comm., A.S.M., 1964-; Council, Soc. Exp. Biol. & Med., 1965. Vice President, American Society for Microbiology, 1967-68; Member of Council, National Institute of Allergy & Infectious Diseases, 1967-71. Member, U.S. national Committee of the International Union of Biological Scie[illegible] 1968-69.

SELECTED BIBLIOGRAPHY

Host-Parasite Factors in Group A Streptococcal Infections. Pyrogenic and Other Effects of Immunologic Distinct Exotoxins Related to Scarlet Fever Toxins. Dennis W. Watson. J. Exp. Med. 111:255-284, 1960.

Modifications of Host Responses to Bacterial Endotoxins. I. Specificity of Pyrogenicity, Lethality, and Skin Reactivity. Dennis W. Watson and Yoon Berm Kim. J. Exp. Med. 118:425, 1963.

Immunological Aspects of Pyrogenic Tolerance. D. W. Watson and Y. B. Kim, in Bacterial Endotoxins, M. Landy and W. Braun (editors), Rutgers University Press, 1964.

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PART I
SECTION I

AVAILABILITY OF PATIENTS

Until recently patients at the University of Minnesota Hospitals were admitted and treated only by referral from their own physicians. Certain exceptions to this policy have been made for specified groups such as emergencies, Community-University Health Care Center, Obstetrics patients and Family Practice. Patients come in equal numbers from the twin cities metropolitan areas and the balance of the state. Many of the non-private patients have formerly been funded by the progressive welfare programs of the State of Minnesota. With the introduction of Medicare and Medicaid there has been no major shift in types of patients, but rather a shift in source of funding from state/county welfare to these federally sponsored programs.

While the present patient population is adequate for the training of the existing student load, additional students as well as new programs referred to elsewhere will require increasing numbers of patients. To this end, other sources of patients such as defined metropolitan populations (possibly University staff), pre-paid insurance groups, a statewide air-ambulance emergency program, and expanded telephonic and television communications programs for remote clinical practice are being actively considered. In addition, the strict referral policy is being relaxed.

Out patients in fiscal 1970 made 124,400 visits to the University Hospitals. After the expanded outpatient facilities open in 1974 on the order of 190,000 visits are anticipated although the new clinic facilities are programmed to accommodate 250,000 annual visits without major expansion. It is felt that such capacity will be necessary in the 1980's as outpatient care replaces inpatient. It is the intention of the University Health Sciences to provide more and more services on an ambulatory basis and organize them in such a way as to be efficient for teaching pruposes. To this end, we are including a self-care ambulatory unit for patients undergoing diagnostic studies but not needing the full services of hospitalization.

There were 219,000 patient days of inpatient care provided at University Hospitals during the fiscal 1970. Without expansion of inpatient facilities during this phase of the development program, it will be difficult to increase this substantially although through realignment of services to achieve greater utilization out of some presently low use beds, we do expect to achieve 240,000 patient days by fiscal 1974.

TEACHING BEDS

	Univ. of Minn. Hospitals Existing	Hennepin County General Hospital Existing*	St. Paul-Ramsey Hospital Existing	Veterans Admin. Hospital Existing	Mount Sinai Hospital Existing
Anesthesiology	4				
Dentistry	4				
Obstetrics	18	38	26		
Gynecology	33		24		
Health Service	30				
Medicine	125	119[1]	135[1]	352[1]	50[1]
Dermatology	8				
Ophthalmology	24				
Otolaryngology	15				
Physical Medicine & Rehabilitation - Adult	20		28**	40**	
Child	20				
Psychiatry - Adult	59	20**	67**	102**	
Child	18				
Radiotherapy	5				
Surgery	124	55[2]	179[2]	381[2]	45[2]
Urology	23	10			
Orthopedics	24	41			
Neurology	48	27		85	
Neurosurgery	31				
Pediatrics - General	136	61[3]	69		
Intensive Care Unit	17	23			
Clinical Research	11				
Bassinets	31				
Other			32 (tuberculosis)		
TOTAL	828	394	560	960	95

1 Includes Medical Specialties 2 Includes Surgical Specialties 3 Includes Newborn

* A bed projection of 526 has been proposed but may not be realized.

** Indicates combined total adult and child.

UNIVERSITY OF MINNESOTA
Medical School
Projected Expenditures Through 1975-76

This table of data follows the format for itemization of expenditures presented in reports to the Liaison Committee on Medical Education, American Medical Association - Association of American Medical Colleges.

	1969-70	1970-71
A. I Expenditures for Sponsored Medical School Programs *		
a. Federally-Sponsored Teaching and Training	$ 3,982,881	4,182,025
b. Non-Federal Sponsored Teaching and Training	2,518,249	2,644,161
TOTAL, Sponsored Teaching and Training Programs	6,501,130	6,826,186
c. Federally Sponsored Research	10,403,982	10,924,181
d. State, County and City Sponsored Research	5,524	5,800
e.-h. Private Gifts and Grants Sponsoring Research	2,499,293	2,624,258
TOTAL, Sponsored Research	12,908,799	13,554,239
i. Other Sponsored Programs - Federal	221,525	1,306,762
j. Other Sponsored Programs - Non Federal	142,348	149,465
k. TOTAL, Sponsored Medical School	19,773,802	21,836,652
A. II Expenditures for Regular Teaching, Research, and Service Programs of the Medical School		
a.-b. Expenditures from Medical School Budget**	5,059,584	6,492,173

UNIVERSITY OF MINNESOTA
Medical School
Projected Expenditures Through 1975-76

This table of data follows the format for itemization of expenditures presented in reports to the Liaison Committee on Medical Education, American Medical Association - Association of American Medical Colleges.

	1971-72	1972-73	1973-74	1974-75	1975-76
A. I Expenditures for Sponsored Medical School Programs *					
a. Federally-Sponsored Teaching and Training $	4,391,126	4,610,683	4,841,217	5,083,278	5,337,441
b. Non-Federal Sponsored Teaching and Training	2,776,370	2,915,188	3,060.947	3,213,995	3,374,694
TOTAL, Sponsored Teaching and Training Programs	7,167,496	7,525,871	7,902,164	8,297,273	8,712,135
c. Federally Sponsored Research	11,470,390	12,043,910	12,646,105	13,278,410	13,942,331
d. State, County and City Sponsored Research	6,090	6,395	6,714	7,050	7,403
e.-h. Private Gifts and Grants Sponsoring Research	2,755,471	2,893,244	3,037,906	3,189,802	3,349,292
TOTAL, Sponsored Research	14,231,951	14,943,549	15,690,725	16,475,262	17,299,026
i. Other Sponsored Programs - Federal	1,853,948	2,147,070	2,077,251	1,975,559	2,074,338
j. Other Sponsored Programs - Non Federal	156,939	164,786	173,025	181.676	190,760
k. TOTAL, Sponsored Medical School	23,410,334	24,781,276	25,843,165	26,929,770	28,276,260
A. II Expenditures for Regular Teaching, Research, and Service Programs of the Medical School					
a.-b. Expenditures from Medical School Budget**	8,250,854	9,555,180	10,936,867	12,305,437	13,965,182

UNIVERSITY OF MINNESOTA
Medical School
Projected Expenditures Through 1975-76
(continued)

		1969-70	1970-71
c. Administrative Buildings and Grounds, Library and other Medical School costs paid by the University but not included in item a.***	$	2,576,903	2,731,517
Medical Service Funds (Professional Fees)		1,225,941	1,299,497
d. Teaching Hospitals or Clinics Costs related to teaching.****		1,745,744	1,850,489
d. (4) Special Unrestricted Funds		90,931	30,000
d. (5) Other		567,968	596,366
TOTAL Expenditures for Regular Medical School Programs		11,267,071	13,000,042
TOTAL Medical School Costs		31,040,873	34,836,694

* See page

UNIVERSITY OF MINNESOTA
Medical School
Projected Expenditures Through 1975-76
(continued)

	1971-72	1972-73	1973-74	1974-75	1975-76
c. Administrative Buildings and Grounds, Library and other Medical School costs paid by the University but not included in item a.***	2,895,408	3,069,133	3,253,281	3,448,477	3,655,386
Medical Service Funds (Professional Fees)	1,377,467	1,460,115	1,547,722	1,640,586	1,739,021
d. Teaching Hospitals or Clinics Costs related to teaching.****	1,961,518	2,079,209	2,203,962	2,336,199	2,476,371
d. (4) Special Unrestricted Funds	30,000	30,000	30,000	30,000	30,000
d. (5) Other	626,185	657,494	690,369	724,887	761,131
TOTAL Expenditures for Regular Medical School Programs	15,141,432	16,851,131	18,662,201	20,485,586	22,627,091
TOTAL Medical School Costs	38,551,766	41,632,407	44,505,366	47,415,356	50,903,351

* See page

UNIVERSITY OF MINNESOTA

Medical School

Projected Expenditures through 1975-76

* Amounts projected in these categories are based on a percentage increase of 5 percent per year.

** The projected Medical School budget has been increased annually in accordance with the following assumptions:

A. Annual academic salary increases of 6 percent.

B. Further new academic position funds required to bring funding to faculty staffing standards presented by the University of Minnesota, based on present teaching obligations and established University student-faculty ratios.

1971-72	966,116
1972-73	632,502

C. New faculty positions required by student enrollment increases, based on current University student-faculty ratios.

1973-74	546,294
1974-75	579,072
1975-76	613,816

This represents three-fourths of the new faculty positions required by student enrollment increases. The balance will be added during fiscal year 1976-77.

D. Funds for Civil Service (non-academic) new positions = 0.250 times amounts allocated for academic new positions.

E. Civil Service salary increases, alternating 4 and 8 percent each year, starting with 4 percent in 1970-71.

*** These amounts have been computed through application of a standard formula developed by the University of Minnesota; an annual 6 percent increment has been included.

**** This category includes items in the University of Minnesota Hospitals budget that have been reported as appropriately chargeable to Medical School educational programs.

Fringe benefit costs are included on all expenditures related to salaries.

PART TWO

B Building Function

Present Criteria for Space Determination

Allocation of space within the University is administered by the Office of Space Allocation. This office operates under a set of policy guidelines established with the counsel and advice of a faculty advisory committee. Actual allocations are based upon the guidelines which are modified by statements of programmatic needs submitted by faculty and administrators at the Departmental and Collegiate levels. Examples of the guidelines are:

A faculty office guideline --- 130 assignable square feet
A classroom student station --- 15 assignable square feet
A study room station --- 25 assignable square feet

PART II
SECTION B

DESCRIPTION OF PATIENT FLOW THROUGH UNIT B/C (OUTPATIENT BUILDING)

2. This description deals with the handling of medical outpatients primarily, but it should be recognized that many outpatients of University Hospitals will also be receiving dental care in the Hospitals Dental Clinic. For those patients the flow would be similar to others who are making visits to the medical clinics. The Dental section of the application deals specifically with those patients as well as patients using the Hospital Dental Clinic as a resource of the Dental School.

Patients will either come with a referral from a practicing physician or by self referral (walk in). Written referrals are directed either to individual faculty members or the hospital Admissions Office. After a faculty member has made an appointment for the patient, notification is given the Admissions Office and the appropriate clinic in which the appointment is to be kept. Preadmission forms are then sent to the patient so that his processing upon admission is foreshortened as much as possible. Telephone referrals to individual faculty members are handled in a similar manner with the faculty member making the appointment according to a pre-existing schedule and notification given to the clinic and the Admissions Office. Telephone calls and letters directed only to the University Hospitals are reviewed by a triage physician from the Department of Medicine, Department of Surgery, Department of Pediatrics or Department of Psychiatry as is appropriate to the individual case. He then assigns the patient to a clinic or requests admission to the hospital.

Self referred patients or walk-ins, have until this time been seen in the Emergency Room first and then given a scheduled appointment in the appropriate

clinic. This has been possible, as their number has been small due to the strict referral policy which has existed until recently. By the time Unit B/C is in operation, many more walk-in patients are anticipated. The building is designed so that patients may be processed either through the Emergency Department, planned for expansion in the existing Mayo Building, or through a triage clinic facility approximate to the admissions and main entrance area of Unit B/C. After triage, appropriate scheduled appointments will be made for the patient.

Patients arriving for their first visit at the Hospital through the Unit B/C entrance by car or bus at the third floor level or by direct access transportation to the parking ramp at the second floor level will be directed to the Admissions Office on Floor 2. At this point, whatever information had not been obtained by pre-registration, will be elicited, the patients will be classified financially (assuming there is still reason to do so), and then directed to or escorted to the appropriate specialty clinic.

Upon reaching the designated clinic, he will check in with the coordinator at the reception desk and be seated until his appointment time arrives. Normally, although it varies with the clinic, a nurse will greet each patient, do whatever preliminaries to examination that are necessary, discuss special aspects of the patients' health with him and then at the appropriate time escort the patient to the examining room. If confidential, this process may take place in a nurse consultation room. The nurse will then advise the physician of any information gained.

After physician examination appropriate tests will be ordered either for the conclusion of that visit or prior to the next, and the patient will be directed to the clinic reception desk where he will be given a return appointment and the appropriate test requisitions as well as any instructions related to his test. He may also be referred to another clinic that day or another day for consultation or possible transfer. The coordinator in the initial clinic will arrange the appointment in the consulting clinic, or preferrably arrange for the consultant to visit the clinic where the patient is. Before leaving the clinic, depending on the care plan for the patient, the nurse may discuss his health care plan with the patient. Upon subsequent visits, the patient will go directly to the individual clinic in which he has been seen, a consulting clinic, or for diagnostic tests, or treatment. There is no need to again stop at Admissions or any central office unless something has changed about the patient's financial or biographic status.

As much as possible outpatient treatment and therapeutic facilities have been planned as an integral part of Unit B/C so that outpatients may normally complete their diagnosis and care within that building. The Outpatient Treatment Center, consisting of a treatment and holding area, minor operating rooms, cast room, proctology suite, urology suite, EKG, clinical laboratory specimen taking, and generalized outpatient X-ray, will be located on the first floor in juxtaposition to the clinic modules serving surgery, orthopedics and related services. Therefore, with as economic staffing as possible there will be a comprehensive diagnostic and treatment unit centrally located and simply available to all outpatients.

Dietetic, Pharmacy and appliance services will be available to outpatients on the second floor. Since outpatient services are on a charge basis, the patient will need to go to the Business Office, also located on Floor 2, only to discuss his account or insurance. Therefore, there is no routine business office visit or cash payment on every visit thus freeing the patient to pursue his medical and health care needs with a minimum of concern about the business aspects of his care.

The true emergency patient will be handled in an expanded emergency room on the second floor of the Mayo building reached through the Mayo Garage. Multi-specialty emergency services will be available in this area on a 24 hour basis with ideal relationships between it and the operating rooms and X-ray. The services in Unit B/C are planned to be operated 8 hours a day on a pre-scheduled appointment basis as much as possible. This configuration then separates emergency from routine in a manner considered to be functional.

In addition to the Hospital Admissions Department and Business Office located in this unit there will be the Medical Records Department which will supply records to all the clinics as well as the inpatient services from this location. It will also be optimally available for physicians on their way in and out of the center for purpose of completing charts, signing referral correspondence, etc.

The Ambulatory Care facility planned on the 15th floor will provide rooms for patients undergoing diagnostic work-up or other services available on a self care basis. This unit will be next to a dining room

on the same level and the services described in the rest of Unit B/C as well as those located elsewhere in the complex will be available to these patients.

PART II
SECTION C

CURRENT FACILITIES

1. Description of Current Facilities Occupied By Departments In Unit B/C

The School of Medicine clinical departments which will receive expansion in Unit B/C currently occupy 105,847 square feet in Mayo, 40,171 square feet in Diehl Hall, 27,328 square feet in Variety Club Heart Hospital, 7,172 square feet in Masonic Hospital, 7,934 square feet in VFW, and 634 square feet in Powell Hall. Upon completion of Unit A in September 1973, these units will have an additional 40,016 square feet.

Outpatient clinics currently occupy 22,964 square feet in the Mayo Building on the second and third floors. An additional 1,988 square feet are located in Variety Club Heart Hospital. The existing Ambulatory Care Unit is temporarily housed on the third floor of Powell Hall. Hospital departments which will be located in Unit B/C are now housed primarily on the first and second floors of the Mayo Building. Employee facilities are located as well in Variety Heart Hospital, Masonic Hospital, Children's Rehabilitation Center, and Powell Hall. Medical Art and Photography is currently located on the fifth floor of the Mayo Building.

The School of Dentistry hospital office space is now located in Powell Hall on the third floor; the clinics are in the Mayo Building on the third floor.

Shared classrooms are currently located in Owre on the basement and first floors, in Millard, In Jackson on the basement and first floors, and in Mayo Auditorium. Upon completion of Unit A an additional 23,227 square feet of classrooms will be available. The Biomedical Library now accommodates an experimental educational resources retrieval unit.

AREAS TO BE REPLACED

The construction of B/C entails the replacement of one section of the existing construction. This section is the Animal Quarters located on the second floor adjacent to the Mayo Garage and immediately east of the Mayo Building. The space is poorly serviced and does not function adequately for its current use. In addition, the location of this facility adjacent to the main public concourse makes the housing of animals in this area incompatible with the new public functions adjacent to it. The area will be restructured and will house Food Service Facilities for Unit B/C.

PART II
SECTION C

FUTURE USE OF SPACE TO BE VACATED

1. School of Medicine

Existing space to be vacated by the School of Medicine in Mayo, Diehl, and VFW buildings will be used primarily for expansion of clinical departments which will remain in the existing structures. Space on Mayo first floor vacated by the Departments of Anesthesia, Medicine, Neurosurgery, Pediatrics and Neurology will provide expansion for the Animal Laboratory facilities of General Surgery Department. The Pediatrics Department Child Development Study space now located on the first floor on Mayo will provide expansion for the School of Nursing. Space on Mayo second floor, now occupied by Lab Medicine, will be vacated to provide expansion for Diagnostic Radiology. Family Practice space on the first floor will provide expansion for the Department of Laboratory Medicine. Animal Quarters on the second floor will be vacated and restructured for Food Service. Existing facilities belonging to the Departments of Microbiology and General Surgery will be replaced on the lower floor. On Mayo third floor the Departments of Medicine and Dermatology will relinquish space which will provide expansion area for the Departments of Orthopedic Surgery, Physical Medicine and Rehabilitation, and Anesthesia. On the fifth floor of Mayo, General Surgery, Neurology, and the Department of Surgery will vacate space which will provide expansion for Hospital Pathology, for Neurosurgery administrative areas, and for the Department of Neurology. On Mayo sixth floor, OB-Gynecology, Ophthalmology, and Otolaryngology Departments will vacate space to be remodeled for the Department of Psychiatry. Pediatrics Department will vacate all of the space on Mayo 14 and 15th floors which will provide for office and laboratory expansion for the Department of Microbiology.

2. Out-Patient Clinics

Existing out-patient clinics on Mayo second and third floors will be vacated to provide expansion for the School of Nursing, for the Department of Laboratory Medicine, and for Health Sciences Food Service.

3. Ambulatory Care

The temporary facility in Powell Hall for Ambulatory Care will be vacated to provide for School of Public Health expansion in that location.

PART II
SECTION C

4. Hospital Departments

Hospital Department space now occupied by Outpatient Administration, Admitting Department, Business Office, and Employee Health Service on the second floor of the Mayo Building will be vacated to provide expansion for the Department of Laboratory Medicine and the School of Nursing. First floor space now occupied by Medical Records will provide expansion for the School of Nursing. Medical Art and Photography space on Mayo fifth floor will be vacated and allow special inpatient bed areas to be developed in that location.

5. School of Dentistry

Existing Hospital Dentistry offices on the third floor of Powell Hall will be vacated to provide expansion for the School of Public Health. The existing Dental Clinic Mayo third floor will be remodeled for the School or Nursing.

6. Existing Shared Classrooms in Owre and Millard Halls on the first and second floor will provide expansion for Basic Science Departments. Existing Jackson 174, the balcony of an existing auditorium will be taken out of active use because of poor sight lines.

THE ARCHITECTS COLLABORATIVE, INC.

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION

TABULATION OF CURRENT FACILITIES
(Including Unit A Facilities to be Occupied September 1973)

SCHOOL OF MEDICINE

	To Be Vacated	Existing To Remain	Existing Total
MICROBIOLOGY DEPARTMENT			
Mayo, Second Floor	6,788	---	6,788
Mayo, Ninth Floor	---	6,924	6,924
Mayo, Tenth Floor	---	7,213	7,213
Diehl, First Floor	---	1,458	1,458
Unit A, Second Floor (1973)	---	9,051	9,051
Total, Microbiology Department	6,788	24,646	31,434
ANESTHESIA DEPARTMENT			
Mayo, First Floor	311	---	311
Mayo, Fifth Floor	---	791	791
Diehl, First Floor	---	965	965
Total, Anesthesia Department	311	1,756	2,067
LABORATORY MEDICINE DEPARTMENT			
Mayo, First Floor	---	125	125
Mayo, Second Floor	952	22,331	23,283
Variety Club Heart Hospital, 1st Fl.	---	8,417	8,417
Masonic, Basement	---	627	627
Diehl, Second Floor	1,392	---	1,392
Powell Hall	---	634	634
Total, Lab Medicine Department	2,344	32,134	34,478
MEDICINE DEPARTMENT			
Mayo, First Floor	691	---	691
Mayo, Second Floor	1,181	---	1,181
Mayo, Third Floor	5,248	649	5,897
Diehl, First Floor	4,421	---	4,421
VFW, Fourth Floor	---	3,018	3,018
Variety Club Hospital, 1st Fl.	---	384	384
Variety Club Hospital, 2nd Fl	---	1,416	1,416
Variety Club, 4th Floor	---	4,013	4,013
Unit A, Fourteenth Floor(1973)	---	7,550	7,550
Total, Medicine Department	11,451	17,030	28,571

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
TABULATION OF CURENT FACILITIES
Page 2

	To Be Vacated	Existing To Remain	Existing Total
DERMATOLOGY DEPARTMENT			
Mayo, Third Floor	932	---	932
Diehl, First Floor	1,182	---	1,182
VFW, First Floor	1,598	---	1,598
Masonic, Basement	---	732	732
Total, Dermatology Department	3,712	732	4,444
OBSTETRICS-GYNECOLOGY DEPARTMENT			
Mayo, Fifth Floor	---	568	568
Mayo, Sixth Floor	1,298	---	1,298
Diehl, Second Floor	1,649	---	1,649
Unit A, Twelth Floor(1973)	---	8,205	8,205
Total, Obstetrics-Gynecology Dept.	2,947	8,773	11,720
OPHTHALMOLOGY DEPARTMENT			
Mayo, Sixth Floor	1,625	---	1,625
Diehl, Second Floor	2,300	---	2,300
VFW, First Floor	230	---	230
Total, Ophthalmology Department	4,355	---	4,355
OTOLARYNGOLOGY DEPARTMENT			
Mayo, Sixth Floor	2,087	---	2,087
Diehl, Second Floor	1,752	---	1,752
Total, Otolaryngology Department	3,839	---	3,839
PEDIATRICS DEPARTMENT			
Mayo, First Floor	2,606	---	2,606
Mayo, Second Floor	597	---	597
Mayo, Fourteenth Floor	5,531	---	5,531
Mayo, Fifteenth Floor	2,288	---	2,288
Masonic, Fourth Floor	---	1,980	1,980
Diehl, First Floor	---	3,315	3,315
Diehl, Sixth Floor	---	2,930	2,930
Variety Club, Second Floor	---	3,386	3,386
Variety Club, Fifth Floor	---	4,993	4,993
612 Delaware Street	---	395	395
608 Oak Street	---	2,212	2,212
Unit A, Thirteenth Floor(1973)	---	7,615	7,615
Total, Pediatrics Department	11,022	26,826	37,848

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
TABULATION OF CURRENT FACILITIES

	To Be Vacated	Existing To Remain	Existing Total
NEUROLOGY DEPARTMENT			
Mayo, First Floor	158	---	158
Mayo, Fifth Floor	1,678	1,714	3,392
Diehl, First Floor	---	4,541	4,541
Diehl, Sixth Floor	---	5,203	5,203
Total, Neurology Department	1,836	11,458	13,294
RADIOLOGY DEPARTMENT			
Mayo, First Floor	---	692	692
Mayo, Second Floor	---	1,112	1,112
Diehl, First Floor	1,143	2,190	3,333
VFW, Basement	---	1,448	1,448
Total, Radiology Department	1,143	5,442	6,585
DIAGNOSTIC RADIOLOGY-NUCLEAR MEDICINE			
Mayo, First Floor	---	2,744	2,744
Mayo, Second Floor	---	8,500	8,500
Variety Club, First Floor	---	2,353	2,353
Total, Diagnostic Radiology, Nuclear Medicine	---	16,796	16,796
SURGERY DEPARTMENT			
Mayo, First Floor	---	2,629	2,629
Mayo, Fifth Floor	2,258	714	2,972
Diehl, First Floor	1,182	803	1,985
305 Union Street	1,097	---	1,097*
510 Washington	1,337	---	1,337*
Unit A, Eleventh Floor(1973)	---	450	450
Total, Surgery Department	5,838	4,596	10,470

* Vacated September 1970 to allow Unit A construction on site.

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
TABULATION OF CURRENT FACILITIES
Page 4

	To Be Vacated	Existing To Remain	Existing Total
GENERAL SURGERY DEPARTMENT			
Mayo, First Floor	-	5,459	5,459
Mayo, Second Floor	462	-	462
Mayo, Fifth Floor	3,014	-	3,014
Diehl, First Floor	1,847	-	1,847
Variety Club, Fourth Floor	-	348	348
Variety Club, Fifth Floor	-	2,018	2,018
305 Union Street	2,438	-	2,438
Masonic, Basement	-	1,764	1,764
Masonic, Fourth Floor	-	2,069	2,069
Unit A, Eleventh Floor (1973)	-	7,145	7,145
Total, General Surgery Dept.	7,761	18,803	26,564
NEUROSURGERY DEPARTMENT			
Mayo, First Floor	132	-	132
Mayo, Fifth Floor	-	878	878
Mayo, Sixth Floor	-	657	657
Diehl, First Floor	471	238	709
Total, Neurosurgery Department	603	1,773	2,376
UROLOGY DEPARTMENT			
Mayo, Fifth Floor	-	1,466	1,466
Diehl, First Floor	-	1,189	1,189
Total, Urology Department	-	2,655	2,655
FAMILY PRACTICE DEPARTMENT			
Mayo, Second Floor	844	-	844
Total, Family Practice Department	844	-	844
ANIMAL HOSPITAL			
Mayo, First Floor	525	2,537	3,062
Mayo, Second Floor	176	-	176
Diehl, First Floor	-	1,523	1,523
Diehl, Second Floor	732	-	732
Total, Animal Hospital	1,433	4,060	5,493

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
TABULATION OF CURRENT FACILITIES

	To Be Vacated	Existing To Remain	Existing Total
AUDITORIUM SEMINAR ROOMS			
Owre, Basement	-	3,773	3,773
Owre, First Floor	1,568	608	2,176
Millard, Second Floor	348	918	1,266
Jackson, Basement	-	1,386	1,386
Jackson, First Floor	2,014	-	2,014
Mayo Auditorium	-	2,754	2,754
Unit A, Second Floor (1973)	-	23,247	23,247
Total, Auditorium Seminar Rooms	3,930	32,686	36,616
OUTPATIENTS CLINICS *			
Variety Club, First Floor	-	1,988	1,988
Mayo, Second Floor	8,422	-	8,422
Mayo, Third Floor	14,542	-	14,542
Total, Outpatients Clinics	22,964	1,988	24,952
AMBULATORY CARE			
Powell Hall, Third Floor	2,443	-	2,443
Total, Ambulatory Care	2,443	-	2,443
HOSPITAL DEPARTMENTS			
ADMITTING DEPARTMENT			
Mayo, Second Floor	1,823	-	1,823
Total, Admitting Department	1,823	-	1,823
BUSINESS OFFICE			
Mayo, Second Floor	4,815	-	4,815
Total, Business Office	4,815	-	4,815

* Does not include Dental Clinic

UNIVERSITY OF MINNESOTA
HEALTH SCIENCES EXPANSION
TABULATION OF CURRENT FACILITIES

	To Be Vacated	Existing To Remain	Existing Total
EMPLOYEE FACILITIES			
Mayo Building	-	7,888	7,888
Variety Heart Hospital	-	320	320
Masonic Hospital	-	2,575	2,575
Childrens Rehabilitation	-	1,041	1,041
Powell Hall	-	1,035	1,035
Total, Employee Facilities	-	12,590	12,590
EMPLOYEE HEALTH SERVICE			
Mayo, Second Floor	324	-	324
Total, Employee Health Service	324	-	324
MEDICAL ART AND PHOTOGRAPHY			
Mayo, Fifth Floor	2,962	-	2,962
Total, Medical Art and Photography	2,962	-	2,962
MEDICAL RECORDS			
Mayo, First Floor	5,922	-	5,922
Total, Medical Records	5,922	-	5,922
SCHOOL OF DENTISTRY			
HOSPITAL DENTISTRY			
Powell Hall, Third Floor	333	-	333
Total, Hospital Dentistry	333	-	333
DENTAL CLINIC			
Mayo, Third Floor	487	-	487
Total, Dental Clinic	487	-	487

PART II
SECTION D

PROPOSED FACILITY

Detailed Description of Unit B-C

Unit B-C will consist of sixteen floors of space located directly south of and adjoining Unit A. Three of these floors are below ground level; the remaining rise thirteen stories above the street. A floor by floor description of functions in Unit B-C is as follows:

Basement

This level will provide primary location for major mechanical components serving the new construction. Mechanical space on this floor will be an expansion of facilities provided in Unit A. Steam from University Central Plant will be piped via the tunnel to Unit A on this level. Switchgear pumps, chiller, and emergency generating equipment will be located on this floor as well as floor 10. Major utilities will be distributed in vertical utility shafts located on a 48'-4" grid to all floors. In addition to the major mechanical space this floor will house animal quarters and laboratory facilities for the Departments of Laboratory Medicine, Department of Medicine, Department of OB-Gynecology, Department of Surgery, and the Department of General Surgery. In addition, Medical Art and Photography facilities will be housed on this floor.

Floor 1

The central service corridor for the Health Sciences at this level connects with the service corridor of Unit A and will provide access to the new receiving center, Unit E. Major program elements accommodated on this floor are: the lower level of the major shared teaching auditorium, two outpatient clinic modules, one to be used by Orthopedic Surgery and Physical Medicine and Rehabilitation, and the other to be used by Surgery and Urology. In addition, a Treatment Center which includes minor operating room, a satellite x-ray facility, as well as Proctology treatment rooms and a cast and gait room for Orthopedics is adjacent to the clinic modules. In addition, lab medicine will have a specimen collecting and drawing station and a hematology unit on this floor. An EKG unit will be adjacent to this satellite clinical lab. Employee locker and lounge space will be provided adjacent to the service corridor. Social Service offices, Employee Health Service and Medical Records File Room will also be located on this floor. Escalators will connect this floor to floors 2 and 3 which is the ground level. Elevators for Unit B-C are grouped in two cores, one on the east side primarily for public and patient traffic containing six elevators, and another on the west side for staff, student and service traffic also containing six elevators.

Facilities provided in remodeled space in the Mayo garage on this level include microbiology, animal quarters, and laboratory space, laboratory medicine animal quarters, and a central receiving and service unit for Animal Hospital Committee. The latter will be connected by a service elevator to the basement level of the new construction providing segregated access between the new animal quarters and laboratory areas and the central receiving area.

Diehl Hall remodeling on the first floor will provide expansion for the Anesthesia Department, Pediatrics Department, Neurology Department Radiology Department, Neurosurgery and Urology Departments. These facilities are primarily animal quarters and related laboratory facilities.

Floor 2

Floor 2 of Unit B-C, one floor below street level, will be the main entry point to the clinical facility. A tunnel connection at this level to a new 3,000 car parking ramp located near the intersection of Oak Street and Delaware Street will be the main entry point. Hospital Support Departments such as Admitting, Business Office, Outpatient Pharmacy, Nutrition Clinic, and Outpatient Administration will be located on this floor. In addition, an Outpatient Clinic module for medicine will perform triage functions on this floor. Entry to the clinical teaching auditorium, seating 325 students will be provided on this floor. Food service facilities for Unit B-C will be located directly west of the main north-south concourse. A link between this concourse and the main elevator core in the Mayo Building will be provided.

The new Educational Resources Retrieval Center will be located in the Biomedical Library at this level with direct access from the Main Concourse.

Floor 3, Ground Level

Unit B-C at street level will be occupied by the Family Practice Clinic. This location will afford direct access and visibility required by this clinic. It will also provide a main drop-off entry for the building.

Floor 4

Floor 4 of Unit B-C will house two outpatient clinic modules. Pediatric Clinic will occupy one of the modules and will have additional departmental space to provide for staff who will be spending a major amount of their time in the clinic. The other outpatient clinic modules will be occupied by Dermatology. The standard clinic module which accommodates Dermatology,

Medicine, Neurology, Neurosurgery, OB-GYN, Orthopedics, Pediatrics, Physical Medicine and Rehabilitation, Psychiatry, Surgery, Tumor, and Urology Clinics typically consist of eighteen examination rooms, four consultation rooms, and allied support facilities. Teaching areas in the outpatient clinic modules include a major seminar room which is divisible into two smaller rooms.

Floor 5

Floor 5 of Unit B-C will rpovide for a major horizontal connection between Millard, Unit A, Unit B-C, and the Mayo Building. Functions which will be located on this floor include one clinic module for Neurology and Neurosurgery, Department of Dermatology administrative and teaching space, a cafeteria, and shared teaching seminar rooms primarily for Medical School Phase B and D.

Floor 6

The two outpatient clinic modules which occupy this floor will be used by the OB-GYN clinic and the Psychiatry clinic. The standard module will be modified to include individual toilet rooms for each examination room in the OB-GYN clinic, and to provide all consultation rooms except one examination room in the Psychiatry clinic module. In addition, television facilities related to group and individual consultation rooms will be provided in the Psychiatry clinic. Family practice will have Departmental facilities on this floor.

Floor 7

Floor 7 of Unit B-C will house Hospital Dentistry clinic and departmental space. The sections which will be accommodated on this floor include Oral Surgery, Pediatric Dentistry, and Multi-Purpose clinics. Patients coming to this clinic will be admitted through the outpatient admissions in Unit B-C, through the Unit A Dental Clinic admissions, and from other patient areas of the University Hospitals. Lab and x-ray facilities will be provided on this floor.

Floor 8

Clinic and departmental space for Otolaryngology will be accommodated on this floor. The clinic facilities will be divided into the ENT clinic and the Audiology clinic. They will share a common waiting room and business office. Departmental facilities will provide laboratories and offices for faculty as well as seminar conference rooms and administrative offices for the department. All of the departmental facilities will be located on this floor.

Floor 9

This floor will accommodate the Ophthalmology Clinic and Ophthalmology Department in the Health Sciences. The Ophthalmology Clinic will be divided into a Children's Eye Clinic and an Adult Eye Clinic. Departmental space on this floor will provide offices and laboratories for faculty members, teaching areas and administrative offices for the department.

Floor 10

Mechanical space will occupy this entire floor.

Floor 11

This floor will be occupied by the Department of Surgery and will relate horizontally to surgery space in Unit A on the same floor. Departmental facilities will provide office and laboratory space for faculty members and teaching and administrative areas for the department. Animal quarters will be provided for laboratory work on this floor and will be linked directly to the central animal holding areas on the basement level by an exclusive use animal elevator. This elevator will also provide access to animal quarters on floors 8, 9, 12, and 13 of Unit B-C.

Floor 12

The Neurology Department space on this floor will house faculty offices teaching and administrative areas. In addition, laboratory space and animal holding facilities will be provided for the department of Obstetrics-Gynecology, which will relate to Unit A space for that department on the same level.

Floor 13

This floor will accommodate the remaining expansion area for the Department of Pediatrics. The department will also occupy Unit A space on this floor. The spaces which are provided on this floor will include faculty offices and laboratories, conference rooms for teaching, as well as administrative areas for the department.

Floor 14

Department of Medicine will occupy this space adjacent to Unit A, Floor 14 Department of Medicine space. Administrative areas, teaching areas, faculty offices and laboratories will comprise the functions on this floor. Laboratory space is flexible and modular and will have central support facilities.

Floor 15

Floor 15 of Unit B-C will accommodate Food Service facilities and will also accommodate the Ambulatory Care Unit. This self-care unit will provide 20 rooms for patients whose visits to the clinical facilities are more than one day in duration, but who can take care of themselves. Two treatment rooms and a doctor's work and recording room plus teaching area and nurses' space will provide support facilities. The remainder of the space on Floor 15 will be occupied by mechanical equipment.

ANALYSIS

A segment of the facilities necessary to satisfy the needs of an increased class size of the Medical School is included in the already approved, first unit of the Health Sciences Development Program, Building A, which consists primarily of Dental School program.

Unit B/C, the subject of this application, primarily is designed to provide further facilities for the Medical School expansion of student enrollment and will be constructed so as to be an integral unit with Building A and existing Health Sciences facilities.

Unit B/C consists of classrooms and seminar rooms, learning resource functions, teaching faculty offices, laboratory and support areas and an out-patient care unit, including Dental Clinic facilities.

All Medical students, but particularly those in Phases B and D, the more clinically oriented segments of the curriculum, will use the learning facilities of this unit. The major auditorium, seating 325 persons, is designed for clinical presentation as well as general use. Patient preparation rooms, appropriate audiovisual facilities and a configuration adaptable for patient presentation are included in its plan. The auditorium is arranged in a location convenient to major traffic pathways, out patient care units, and faculty facilities.

Nine, twenty seat seminar rooms, are located on Floors 2 and 5 of Unit B/C (17 similar seminar rooms, devoted primarily to the Medical School undergraduate student instruction, have been allocated in Unit A). The seminar rooms will be provided with appropriate audiovisual connections and will be used extensively in a curriculum which stresses small group teaching.

The Educational Resources Retrieval Area, a learning center function, is planned to be in juxtaposition to the Bio-Medical Library. This provides the Medical student easy access, in one location, to print and non-print teaching material. The Educational Resources Retrieval Area contains facilities for the retrieval of audiovisual materials, production of print and non-print materials and audiovisual aids, and student study areas.

The Auditorium, the classrooms, seminar rooms and the Education Resources Retrieval Area are located on the same levels as the major traffic concourses which interconnect Unit B/C with the other facilities of the Health Sciences. This provides for easy movement of Medical and other students of the Health Sciences to and from the major teaching facilities.

Unit B/C is designed to accommodate many of the clinical department faculty who are directly concerned with the instruction of Medical students in the clinical portions of the curriculum. Departmental and faculty offices and laboratories are arranged as conveniently as possible to inpatient and outpatient areas, teaching areas and laboratories. In many instances, departmental facilities are located next to, or are very close by, the respective department outpatient clinic. Thus, departmental offices and laboratories are integrated at one location with the respective department's clinics, where the major teaching of these departments is conducted. Faculty offices and teaching faculty laboratories are arranged so as to improve the efficiency of faculty time and effort. Consolidation of the departmental offices favorably affect faculty to faculty and faculty to student interrelationships. The departmental areas include, within their facilities, conference rooms and libraries for use by both students and staff.

The Family Practice Clinic is designed to provide a model for the students for the provision of comprehensive health care. It is located on the ground floor of the unit, allowing easy access to the unit for patients. Space is provided within the clinic area for various ancillary paramedical personnel such as clinical psychologists, social service workers and others. Included is an independent business office which will be designed to handle the business affairs of a specific patient population. These patients will be essential to the teaching mission of the department of Family Practice and Community Health.

Animal facilities are designed to consolidate animal quarters and support areas, allowing easy movement of animals to teaching and laboratory areas. Increased benefits as to animal care and the efficiency of administration and operation of animal facilities will accrue from this consolidation of animal quarters.

Patients from the outpatient department will be utilized extensively as clinical examples for student instruction in the Phase B segment of the curriculum. Students in this phase of the curriculum are concerned primarily with learning basic science clinical medicine correlations. Utilization of these patients will occur not only in the various didactic disciplinary segments of Phase B, but also in that portion of the curriculum, student as a physician, when the student recieves his first significant contact with patients on a one to one basis.

Many of the electives in Phase D of the curriculum, the track portion, are oriented towards ambulatory and outpatient medicine and much of the teaching will take place in the outpatient clinics at the tableside (see page , Phase D curriculum).

With half of the outpatient space assigned to specialized services such as Audiology, Otolaryngology, Opthalmology, etc., slightly less than forty thousand square feet have been planned

for the generalized services such as Medicine, Surgery, Pediatrics, Psychiatry, etc. These spaces are designed in such a way that they are useful to any general service, should the frequency of certain types of disease or the manner in which certain specialties are conducted change to such a degree in the future as to alter clinic loads substantially from present projections. This principle has been maintained in that each of the clinic modules reflects a common basic pattern. Within that framework, rooms have been designed to the degree necessary for the specialty involved, but always keeping in mind that the particular module may have to serve more than one specialty or a totally different specialty in the future. Thus, flexibility is maintained to shift program quickly in response to educational and patient care needs.

The clinics have been designed to accommodate student groups of various sizes. Each clinic module and each specialized clinic contains to the maximum degree possible education space for the student. Each unit has a dividable seminar room and several consultation rooms. In addition to student teaching and continuing education, these facilities are also available for patient teaching.

The clinics have been designed with excess capacity so that this phase of the University Hospitals operation will prove adequate for the foreseeable future by providing space for student teaching of ambulatory care. This would appear appropriate and relevant, since costs increasingly prohibit the extensive use of inpatient care facilities as the major form of health care delivery or clinical medical education.

Extensive thought has been given to tying the clinics into the learning resources systems. Therefore, conduit is planned in each of the seminar rooms so that learning resource monitors, both audio and visual, will be available to the students within each clinic on a quick reference or more formalized didactic basis.

Unit B/C contains an ambulatory care facility, which is designed to provide overnight beds for patients being seen in the outpatient department. This area is particularly adapted for student teaching, since the provision of overnight rooms allows the student more contact with the outpatient. The student can more effectively participate in and contribute to the longitudinal evaluation of the patient during his outpatient stay. The student is able to develop increased rapport with the patient and to become more aware of the patient's medical, social and psychological needs.

The outpatient department has been designed to help satisfy three of the major goals of the curriculum, relevant to patient care, improved communications among faculty and between faculty and students, and preparation for future and medical practice.

This has been accomplished by providing the facilities and framework wherein the student is taught the most relevant type of patient care for the foreseeable future, ambulatory care. By providing learning resources systems and teaching facilities in the efficient outpatient arrangement, improved communication among faculty and between faculty and students is accomplished.

PART TWO

Section F Analysis

2. Provision for Future Changes in Program and Enrollment

The physical planning has provided for both change and expansion by (a) a plan that will permit lateral and vertical expansion and (b) a long-span structural grid with an integrated mechanical system which permits complete rearrangement of rooms and the relocation or addition of all mechanical services.

PART TWO

Section G (Applicable to replacement, renovation, rehabilitation or addition to present structure)

1. Present Physical Plant

Present Buildings Occuppied	Year Constructed	Year of Major Additions or Remodeling	Total Building Net Square Feet
Jackson Hall	1912	1957, 1960 1962, 1969	43,138
Millard Hall	1912	1957, 1958 1959	57,539
Owre Hall	1930	1946, 1966	56, 446
Powell Hall	1933	1943	16,685
Variety Club Heart Hospital	1949	1957, 1964	47,722
Student Health Service	1949	1958, 1962 1966	71,492
Mayo Memorial Medical Center	1954	1957, 1969	419,979
Masonic Memorial Hospital	1958	1961, 1963 1966	47,011
Lyon Laboratories	1952	1953, 1957 1966	28,042
Diehl Hall	1958	1963	131,877
Jackson-Owre Building	1958		27,389
Childrens Rehabilitation Center	1962		41,242
VFW Cancer Research Center	1958	1968	7,837
Stadium	1925 *1946		88,329 *10,980

* Physiological Hygiene Laboratories only.

In addition to the above listed facilities, the University of Minnesota now rents space in six buildings which provides needed areas for teaching faculty laboratories,

offices, storerooms, class laboratory rooms, etc. The total net square feet of space occupied in these buildings is 37,094 square feet. In addition, the University is currently negotiating a lease for 26, 504 net square feet in the Gould Research Building at 2630 University Avenue.

PART TWO

Section II systems

1a. Animal Facilities

Current Animal Facilities

Currently the animal quarters are located in the research areas of seven different buildings of the medical complex. The animals are housed in 129 rooms which are located near the laboratories in which the animals are used. Approximately 50% of the animals at this institution are cared for by personnel of departments using the animals. The remainder of the animals are under the care of personnel of the Research Animal Hospital.

Current Animal Populations

The latest animal population survey available indicates the following species and numbers are housed in the animal colonies of the College of Medical Sciences.

Bovine -	10	Rats -	6,250
Ovine -	4	Mice -	63,051
Porcine -	15	Guinea Pig -	506
Caprine -	10	Hamsters -	507
Primates -	64	Poultry -	373
Canine -	937	Chinchilla -	24
Feline -	126	Plus numerous reptile species	
Rabbits -	1,102		

Based on the projected need table above, it is anticipated that these species will also increase in approximately the same magnitude as the canine, or a 50% increase by 1974.

Projected Animal Populations to 1974 (Dogs)

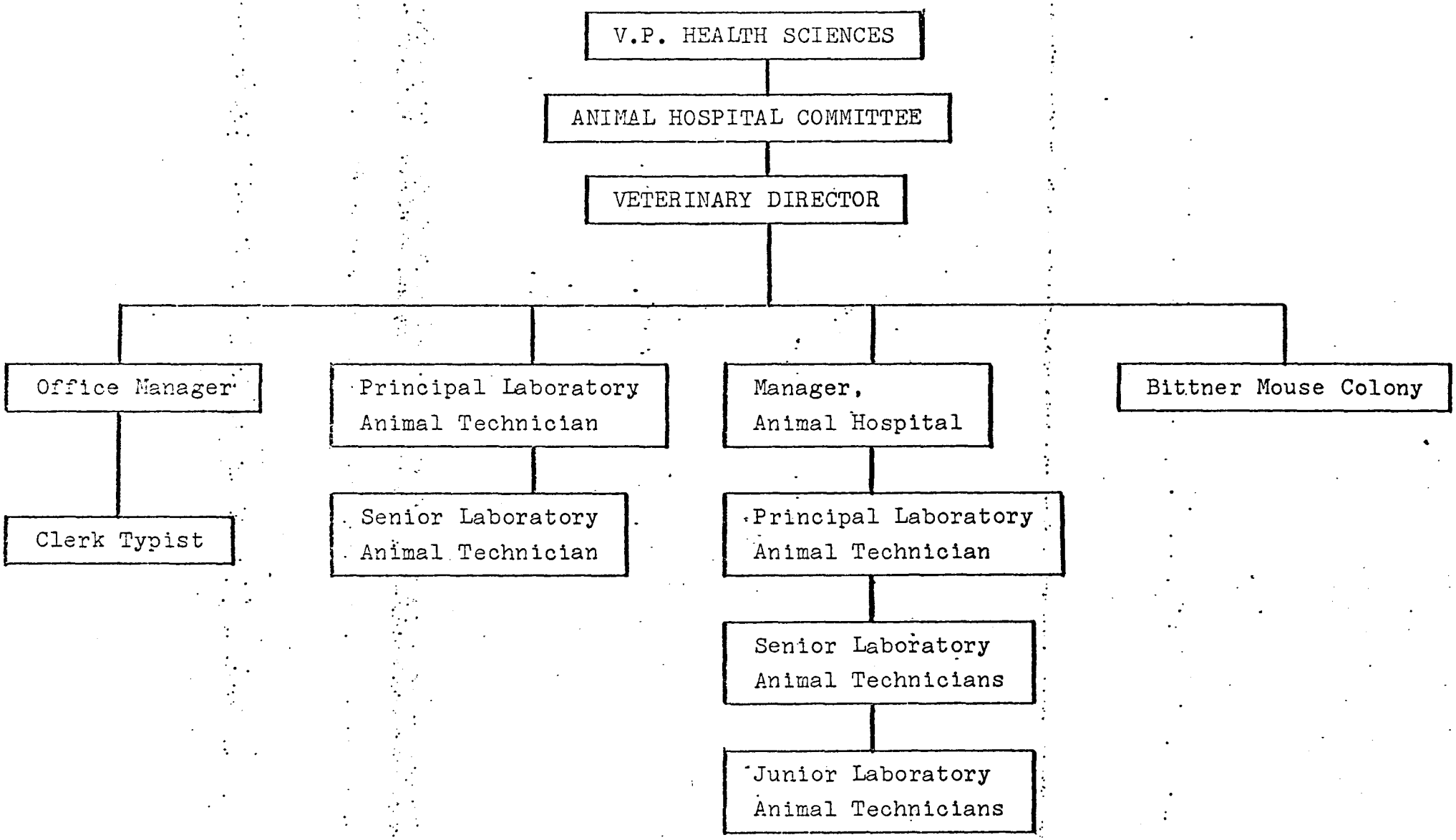
The Animal Hospital Committee has summarized the available information on projected space and animal needs in the following tables. These projected needs are based on the canine species since these figures are available and are representative of the needs for other animal species at this institution.

	Existing Net Square Feet		% Dog Space of Total		
	Total Animal Qtrs.	Dog Quarters	Animal Qtrs.	No. of Rooms	No. of Dogs
Animal Hospital Committee	508	508	1.6%	4	60
Basic Sciences	13,002	1,046	3.3%	5	63
Clinical Medicine Departments	18,335	8,146	25.6%	24	814
TOTAL	31,845	9,700	30.5%	33	937

	1974 Projected Needs Net Square Feet			No. of Dogs
	Total Animal Qtrs.	Dog Quarters	% Dog Space of Total Space	Possible at 12 Sq. Ft. Per Dog
Animal Hospital Committee	1,000	1,000		83
Basic Sciences	21,902	2,115	3.3%	176
Clinical Medicine Departments	41,188	16,407	25.6%	1,367
TOTAL	64,090	19,522		1,626

These figures were gathered in a recent survey of departmental expansion plans and indicate a 50% increase in space needs for animal quarters by 1974.

ADMINISTRATION ORGANIZATION AND LINE OF AUTHORITY FOR OPERATION OF THE ANIMAL HOSPITAL



M-300

EDUCATIONAL RESOURCES (AUDIOVISUAL) SYSTEMS AND FACILITIES

The University of Minnesota maintains two central audiovisual education departments for University-wide service. The Department of Radio and Television is responsible for the University's radio broadcasting and the primary closed circuit television production and distribution operation. Satellite television operations such as in the Health Sciences receive certain coordinating and back-up services from this department. The Department of Audiovisual Resources provides audiovisual materials, equipment, production and processing services, and facilities that are not available within the individual departments of the University. Specialized audiovisual needs of the individual departments and the University's large size make it necessary to maintain satellite audiovisual operations. Two of these in the Medical School and the School of Dentistry maintain limited closed circuit television operations and produce motion pictures, still photographs, slides, exhibits, and other graphics for their teaching and research needs.

Currently, the University is developing a new educational resources organization for improved University-wide coordination and management. Similarly, the Health Sciences have representative faculty developing a new audiovisual organization to be coordinated with the University's central operation. Final development and implementation of these two audiovisual organizations will improve substantially the efficiency of the audiovisual operation and the innovative use of educational resources within the Health Sciences.

The newly emerging curriculums in the Medical School and the School of Dentistry are designed to utilize more self learning and small group teaching. More free time is being provided in the students' schedules for autotutorial instruction using print and non-print materials. Both schools have recently developed pilot-Learning Centers featuring the use of self-contained and electronic study carrels. The audio tapes, slides, and video tapes used for the teaching are being correlated with print materials.

Careful planning has been done for the Phase I construction program to develop integrated and coordinated educational resources facilities. Unit A will house most of the new lecture and seminar rooms which will have television origination and receiving and extensive use of other audiovisual media. The television central control center of some 2500 net square feet will be located in Unit A and will be the hub of the electronic distribution system in the Health Sciences complex. Electronic interconnection to lecture rooms, laboratories, seminar rooms, hospital stations and operating rooms, clinics, and departmental production areas will be controlled from this central point. The major teletape operation will be housed in the television central control room. This room will have interconnection capacity (likely by microwave) with affiliated hospitals and other health science centers in the region and could be a segment of any national system which might develop.

Included in the future Health Sciences audiovisual network and operation will be the Learning Resources Center to be built on the second floor of the Bio-Medical Library (Diehl Hall) and the seminar rooms, clinical teaching

auditorium, and Medical Arts and Photography production area to be located in Unit C. These areas will be interconnected with the television control center in Unit A. The Medical Arts and Photography operation in Unit C will have facilities for producing audiovisual software and will have a television studio interconnected with the auditoria and seminar rooms in Units A and C and the control room in Unit A. This production area will be able to transmit live programs to the classrooms or instructional information such as video-photomicroscopy and video-radiography. The Unit C auditorium is being designed primarily for lectures and demonstrations associated with clinical teaching in medicine including viewing of patients directly and via video magnification.

A Learning Resources Center of some 13,700 net square feet will be constructed in remodeled space on the second floor of the Bio-Medical Library (Diehl Hall). This center will be physically and operationally related to the library and conveniently located near the audiovisual production area in Unit C. Depending on final design, the Learning Resources Center will have some 250-300 self-contained and electronic audiovisual study carrels located closely with special areas for study of print and model materials. Some of the carrels will be equipped for video receiving including retrieval of computer stored information. Support areas in the Learning Resources Center will include the following: (1) Interaction rooms for student-faculty conferences, film previews, small group viewing of audiovisual or video materials, and student discussion groups. These rooms will be cable-connected to the central control room in Unit A. (2) Office and work space for the educational resources director and staff and the curriculum coordinators. (3) Audiovisual library (4) Work space for preparing, previewing, and repairing audiovisual materials specifically used in the study carrels and space for storage and repair of equipment utilized in the study carrels.

The Medical School and School of Dentistry will be able to offer a much greater range of educational resources for their students when new and remodeled facilities are completed in the Phase I construction program. Obtaining these facilities is crucial and mandatory if we are to increase enrollment and develop innovative educational systems.

c. FOOD SERVICE

Present facilities for staff and student and ambulatory patient dining are very minimal. There is one small cafeteria in University Hospitals which seats approximately 150 people, and therefore serves only a fraction of the hospital staff. Several vending areas and a coffee shop are also available with a total seating capacity for another 150 persons. As a result of the small number which can be accommodated within the Center, the majority of staff and students must eat elsewhere. Ambulatory patients are often in the Center during a meal period but do not have access to dining facilities.

A food service consultant has been retained to assist in development of a system for staff, student and patient feeding. The agreed upon system will include several dining areas scattered throughout the Center. This will provide convenient access from each major population center and yet permit efficient sized operating units. Different types of feeding services will be available for different needs, ranging from cafeterias to snack-bars to vending areas. Strong emphasis will be given to convenience foods to the extent they are available from supplies.

All public feeding except vending will be the responsibility of the Hospital Nutrition Department. Vending will be managed by the Vending Services, a division of University Food Services. This unit handles all vending on the campus.

MATERIALS HANDLING

An in-depth study of present and future needs for the materials handling function has been conducted by an engineering consulting firm, Charles T. Main, Associates, in conjunction with Health Science staff and architects. The study developed concepts for a Receiving and Distribution Center (Unit "E") and for a distribution network for dissemination of supplies and equipment and collection of reprocessable and disposable materials throughout the Health Sciences Center.

The key features of the recommended plan are:

1. Centralization of responsibility for procurement and movement of supplies.

2. Minimization of storage within the Center with heavy dependence on University central warehouse facilities.

3. Limitation of cart traffic throughout Center by designation of traffic routes and separation of pedestrian and vehicle movement.

4. Concentration of deliveries and pick-ups at a single point with the major exception for animals.

5. Physical movement of carts by staff rather than via an automated system in order to minimize costs.

6. Utilization of chutes where possible.

The general concepts of this report have been accepted and are reflected in the architectural design.