



UNIVERSITY OF MINNESOTA  
TWIN CITIES

Section of Medical Oncology  
Department of Medicine, School of Medicine  
Box 286, University Hospitals  
Minneapolis, Minnesota 55455  
(612) 373-4303

RECEIVED

DEC 5 1975

December 1, 1975

UNIV. OF MINN.  
HEALTH SCIENCES  
PLANNING OFFICE

To: Drs. Levitt  
Krivit  
Nesbit  
Mr. Tom Jones  
Mr. Paul Maupin  
Ms. Cherie Perlmutter

RE: Building D

In the early planning of the Health Sciences Center, a published report showed the existence of a Building D as a radiation therapy facility. Subsequently, space for that facility was considered as part of B-C in terms of a cancer center grant. This did not come to be.

On October 3, 1975 a construction grant meeting was held with you in attendance and we were led to believe that the original concept of Building D could be resurrected and undertaken. Hence, on November 3rd I submitted some preliminary plans in order to stimulate the process of planning.

It was suggested that assistance to this could be obtained from a planning contractor. On November 15, 1975 we received a proposed contract from J.R.B. Associates, Inc. who have been doing outreach planning for the Department of Therapeutic Radiology.

On November 18th Mr. Jones raised a number of questions regarding the new clinical facility which had to be addressed:

1. Clinic expansion requiring certificate of need. It was recommended this be discussed with Dr. Varco, Chairman of the Clinical Facilities Planning Committee and Dr. Glen Gullickson, Chairman of the Clinic Space Allocation Committee. The latter had already reviewed the Masonic Clinic problem and acknowledged through his committee the need for new clinic space.

RE: Building D  
December 1, 1975  
Page 2

2. Impact of proposal on Unit J (Powell Hall Site):  
Re-evaluation of the Unit D was recommended for the  
impact on Unit J.

3. The Bed Allocation Committee should be consulted  
regarding changes on Masonic I.

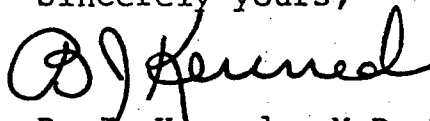
Therefore, on Wednesday, November 26th Mr. Tom Jones,  
Dr. Richard Varco and I met regarding the proposal.  
Dr. Varco strongly urged that a feasibility study regarding  
Unit D be carried out with emphasis on the potentials  
of Unit J as an additional cancer facility. This is  
reasonable.

Since the long range plan had so clearly defined  
Units D and J, I naively thought most of that type of  
planning had been done. Obviously, it has not been.

Therefore, Dr. Varco, Mr. Jones and myself have  
authorized a feasibility study. Funds from the  
Masonic Hospital Fund will be utilized as originally  
planned. The principle of this feasibility study will be  
to evaluate the future role of the Masonic Memorial Hospital,  
cancer clinic needs, Therapeutic Radiology facilities and  
the scope of clinical and research facilities that might  
be blended into the long range planning of building J.

We will attempt to conduct this within the next two  
months and if successful and reasonable, attempt to meet  
a June 1st deadline for a construction grant application.  
Your cooperation and suggestions would be appreciated.

Sincerely yours,



B. J. Kennedy, M.D.  
Professor of Medicine  
Director of Medical Oncology  
Masonic Professor of Oncology

BJK:jn

cc: Dr. Varco  
Dr. French

Unit N-  
Construction Grant *JK*  
RECEIVED

CONSTRUCTION GRANT MEETING

NOV 7 1975

THERAPEUTIC RADIATION ONCOLOGY CENTER, UNIV. OF MINN.  
HEALTH SCIENCE  
PLANNING OFFICE

A Construction Grant Meeting was held in room 1020 Powell Hall on Monday, October 27, 1975 at 2:30. Present were Drs. Levitt, Khan, Song, Buchsbaum, Mr. T. Jones and Mr. Paul Maupin. ✓

Dr. Levitt asked Paul Maupin how far the construction could go in the direction of east and west. Mr. Maupin informed the group that construction could not go any farther east than the Harvard stop at the west end of the intersection and could go west to the east elevation of Diehl Hall.

It was decided that the floor space for the new construction could be 80x104. Mr. Maupin suggested that we stay in the confines of 89x104. It was decided that the construction could go three floors deep with a necessity for an elevator system. Dr. Levitt explained that we could share 6 exam rooms plus eliminate some animal space providing that the Diehl labs could be maintained. Dr. Levitt and Buchsbaum agreed that the center could get by with 20,000 sq. feet net space, if all the research space presently assigned to the Department were retained.

Mr. Maupin estimated that the approximate date for construction of the new center could possibly be early in 1978 with construction cost about 7 million by 1979.

Several other alternatives were considered. If enough space could not be obtained from Masonic then the Department could possibly take over the first floor (Station 12 and the Morgue) of the hospital until the new hospital was built. It was also suggested that the Department go on double shifts, but Dr. Levitt disagreed with this alternative because of availability of staff and exam space.

Mr. Jones and Mr. Maupin suggested to Dr. Levitt that he and Dr. Kennedy should have a meeting to consider these possibilities. Dr. Levitt was concerned about building a new cancer center that did not have enough building space. He felt then that we should wait and be included in the new hospital building that will replace Powell Hall. Dr. Levitt agreed that possibly an architectural firm should be hired to evaluate the space for the new cancer center.

The meeting adjourned at 3:30 p.m.

RECEIVED

OCT 20 1975

CONSTRUCTION GRANT MEETING

THERAPEUTIC RADIATION ONCOLOGY CENTER  
UNIV. OF MINN.  
HEALTH SCIENCE  
PLANNING OFFICE

The Construction grant meeting was held in room M407 at 11:00 a.m. on Friday, October 3, 1975. Present were Drs. Levitt, Kennedy, Buchsbaum, Nesbit, Drehmel, Mr. Bob Baker, Mr. Tom Jones, Mr. Paul Maupin, Ms. Cherie Perlmutter, and Mr. Nelson.

Dr. Levitt opened the meeting describing the facilities, equipment, and space of the current Therapeutic Radiology Department. Dr. Levitt explained that the patient load in the Therapeutic Radiology Department had increased 70% since 1970 requiring additional space for treatment and anesthetizing rooms, in addition, to more examining rooms, waiting rooms, and washrooms for patients and staff.

Dr. Levitt, Kennedy, and Nesbit agreed that preliminary studies regarding facilities, equipment, and space should begin before approval for the \$10,000 line drawing. After the preliminary studies are concluded Dr. Kennedy will submit them to the Masons for possible approval for the \$10,000 line drawings. The National Cancer Institute will provide funding for 75% of the construction requiring the additional 25% funding from another source. Cherie Perlmutter assured the group that there were no available funds from Health Sciences for that purpose. The first grant application must be submitted by March 1, 1976.

The new cancer unit, according to Mr. Paul Maupin, would have to be below grade with possible skyway connection to Masonic Hospital with no more than six floors below and approximately 6,000 useable feet per floor. Mr. Maupin believed the construction of the cancer oncology building would be approximately 5 million dollars.

Dr. B.J. Kennedy elaborated on options concerning the new oncology center and the Masonic Hospital. He viewed that some of the space should be used for family counseling and cancer teaching.

Dr. Levitt, Kennedy, and Nesbit, decided to meet Saturday, October 18, 1975 in the forenoon for further work on the preliminary studies for the new oncology center.

The meeting adjourned at 12:00 noon.

Respectively submitted,

Sandy Christensen  
Secretary



UNIVERSITY OF MINNESOTA  
TWIN CITIES

University Hospitals  
Minneapolis, Minnesota 55455

JANUARY 20, 1976

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JAN 21 1976

UNIV. OF MINN.  
HEALTH SCIENCE  
PLANNING OFFICE

TO: PAUL MAUPIN  
FROM: TOM JONES *Tom Jones*  
SUBJ: UNIT "D" PLANNING

I HAVE ENCLOSED SOME PRELIMINARY UNIT "D" INFORMATION WHICH MIGHT BE USEFUL TO T.A.C. AND IMPACT FOR EARLY ANALYSIS.

THIS ANALYSIS COULD THEN LEAD TO PROPOSALS FOR ARCHITECTURAL FEASIBILITY AND COST CONSULTING SERVICES.

WE AGREED THAT YOU WOULD INITIATE THE NECESSARY CONTACTS WITH THESE FIRMS AND THUS THIS MEMO TO YOU.

THANKS FOR YOUR HELP.



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TWIN CITIES

Section of Medical Oncology  
Department of Medicine, School of Medicine  
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(612) 373-4303

RECEIVED

NOV 6 1975

November 3, 1975 UNIV. OF MINN.  
HEALTH SCIENCE  
PLANNING OFFICE

Mr. Paul Maupin  
Health Sciences Planning Office  
4104 Powell Hall

Dear Mr. Maupin:

Enclosed is a preliminary plan for the addition to the Masonic Memorial Hospital. This proposal encompasses new facilities for radiation therapy, radiation research laboratories, and new outpatient facilities for oncology. It involves remodeling the south end of the Masonic Hospital on the first floor to a minor degree and a change in utilization of the basement level. In general, I do not believe that these changes represent a great cost, so that most of the projected expenditure would be in the new construction.

These are ideas that would help us begin to design a concept for what I would like to call the Masonic Cancer Center.

The Masonic Cancer Center would encompass the Masonic Memorial Hospital, the Radiation Oncology Center, the Special Cancer Center and could even include the Veterans of Foreign Wars Cancer Research Building.

The suggestions are accompanied by a very rough sketch of some of the change that might be made. I offer these as a means to begin some architectural planning and design concept by those involved.

Sincerely yours,

B. J. Kennedy, M.D.  
Professor of Medicine  
Director of Medical Oncology  
Masonic Professor of Oncology

BJK:jn  
cc: Dr. Seymour Levitt  
Dr. Tom Jones  
Dr. William Krivit  
Mr. Robert Baker

## The Masonic Cancer Center

The Masonic Memorial Hospital was originally designed and built to care for "terminal" cancer patients. It was conceived on the idea of providing control of cancer. As the years have passed, it is clear that "cure" of cancer is a potential and that the institution has become a center for which cancer patients of a wide scope are now admitted. Moreover, the greatest burden to the institution has been the rapidly increasing<sup>ing</sup> for ambulatory facilities and supportive care.

The following proposals represent ideas that could be incorporated in the institution and add to the supporting facilities that are required:

### I. Scope of Construction

The plan is based upon an understanding that a three story, underground building could be constructed south of the Masonic Hospital extending from the existing building to the wall of the apartment south of the Masonic Hospital. This width would amount to 89 feet. The length of the new structure would extend from the sidewalk in front of the Masonic Hospital to the Diehl Hall underground structure, a length of 144 feet.

The three floors of the new structure would be labeled levels A, B and C, the top level being A. For purposes of orientation the A level would contain a new outpatient clinic for Medical Oncology, Pediatric Oncology and New Medical and Radiation Oncology. Level B would contain radiation research laboratories and departmental offices for Therapeutic Radiology. Level C would contain a complete clinical unit for radiation therapy including the radiation therapy machines, patient examining rooms and waiting area to meet the needs of clinical radiation therapy.

With this orientation, the following represent more specific concepts of the new structure.

### II. Masonic Hospital

#### A. New Entrance

The dining room wall of the Masonic Hospital Building would be extended to approximately the edge of the sidewalk. The wall would be windows. A new entrance to the Masonic Hospital would enter into this addition so that patients could go to the clinic levels via the elevator or the immediate stairway.

### B. Reception Area

Where the existing food counter now stands, a reception desk would be installed. This reception desk would allow an information center for patients and families coming to the clinic system and the hospital.

### C. Kitchen Area

As I understand it, the kitchen area will not be needed after the changeover to microwave food handling. Therefore, the current kitchen area would be converted to a large seminar room for cancer education. This would provide an easy entrance to medical students from the outside without interfering with hospital or clinic activities. It would also provide an excellent public education facility since it also has easy access from the street.

### D. Existing Front Door Area

The existing front door would be closed off and the vestibule area converted to an office. The present reception desk would be converted to an office. The offices in this area would be devoted to two social workers for routine social work and two additional offices for the social workers carrying out family counseling activities. An additional office would provide secretarial services for the social service activities.

The existing nursing supervisor office should be converted to the basement level in the new planning of that area.

One of the offices would constitute expansion area. It is conceivable that the Fire Marshal would not allow closing off the door to this area and hence, this could be a waiting room area for family counseling.

### E. Masonic I Nursing Station:

The existing nursing station on Masonic I has 26 beds. This unit would be converted to a low intensity care unit. It would provide beds for medical oncology patients, teen-age pediatric patients, radiation therapy, gynecology and surgery.

The unit would consist of patients who are self-care, diagnostic evaluations and overnight chemotherapy administration patients. Food would be served to the patients on this service. Low intensity nursing care is an important aspect of oncology and could be run economically. Severely ill patients would be maintained on the other nursing stations of the Masonic Hospital



#### E. Summary

The changes on the first floor of the Masonic Hospital would constitute an improvement in the entry system to the clinic and hospital area, providing open lounge and lobby region without congestion. Also it provides space for family counseling which is an important activity for the Cancer Center. The beds on the first floor would be devoted to low intensity care.

### III. Masonic Basement

The Masonic basement would become a central part of the oncology outpatient clinic system.

#### A. Leukapheresis Unit

The leukapheresis laboratory would be converted to a hematology laboratory and service the clinic patients. Currently the Medical Oncology patients are tested on the fourth floor of the Masonic Hospital and this activity should be brought to the clinic level.

#### B. Auxillary Room

The former auxillary room and the hospital storage area behind it would be converted to the Cancer Registry and research charting by nurses and staff with respect to protocol type studies.

#### C. Existing Masonic Clinic

The existing Masonic Clinic would be converted to offices for two dietitians and two nursing supervisors and a cancer center manager. The waiting room of the clinic would become the waiting room for these important administrators of hospital and research services and a student teaching area.

#### D. Storage Area-Room M9

The M9 storage area is ineffectively used at the present time. Re-organization of this area should include installation of the time clock in this area and a linen entrance so that the linen carts are kept out of the hallway. This hallway in the long run will certainly become a major traffic region and should not have house-keeping supplies in the hallway. The vending machines at the entrance of the Diehl Hall tunnel should be removed since they are an obstruction to traffic.

The current door to the linen room should be changed to enter into the adjacent storage room and not into the hallway.

### IV. New Building

The new building would contain the following activities on each floor. It is obvious that a major

corridor will exist through the center of the building in line with the existing basement corridor.

A. Level A

1. To the east of the corridor the Masonic Masonic Clinic should be located to consist of: reception desk, record area, large nurses treatment area, doctor's room for x-ray viewing, deak and discussion area separate from patient area, at least 9 examing rooms, a special room for minor operative procedures (including bone marrows). An additional area equivalent to three examing rooms should provide bed space for ambulatory patients receiving prolonged infusion chemotherapy.

2. To the west of the corridor would be two elevators and an open area in front of them so that patients getting off the elevator do not step into the major corridor. Adjacent to this region would be a large waiting room to accomodate the patients and their families attending the Masonic Clinic. Behind this area or south of it would be additional examining rooms for the new oncology patients. This is primarily a medical student activity and hence the room use would be slower than in the Masonic Clinic. There should be small conference rooms and x-ray viewing facilities. Since this would be for new patients only, extensive treatment facilities are not necessary.

B. Level B

1. On this floor would be the departmental offices for Therapeutic Radiology, a conference room/library, specific offices for Associate Professor and Professor level faculty, and radiation research laboratories. It is suggested that faculty of the Instructor and Assistant Professor level be provided study carrels in their research laboratories or small work area offices.

2. On this floor also will be physics laboratories as needed. There will be no animal laboratories in this area. Access will be provided to the Diehl Hall basement laboratories. The Therapeutic Radiology Laboratories now in Diehl Hall will be converted to animal facilities and animal research, so that all animal work is contained within that area.

### C. Level C

1. Level C will be designed to accommodate the clinical needs of Therapeutic Radiology. The treatment machines will be placed on the ground level at the east end of the construction requiring the least amount of shielding. The area will contain examining rooms, simulator rooms, a waiting area, x-ray viewing and planning area, and a resident's room. There will be no staff offices as such. However, easy access to the second floor facility should be provided. Therefore, the faculty offices should be as close to the stair area and easy access to level C. The major portion of this floor should be devoted to the interests of patients receiving radiation therapy.

### V. Special Notes

X-ray facilities will not be necessary in the new construction since the new X-ray Department in the B-C Building would provide most of these needs and they are not too far distant from the clinic area. The new B-C planning will provide direct tunnel access for hospitalized patients through the tunnel directly to the radiology floor in the main hospital.

A RADIATION ONCOLOGY RESEARCH  
AND TREATMENT CENTER  
AT THE UNIVERSITY OF MINNESOTA

B/C Building

Basement Floor

<u>Room No.</u>	<u>Description</u>	<u>Preferred Area</u>	<u>Illustrated Area</u>
1	Toilet	75	72
2	Toilet	75	72
3	Darkroom for X-O-Mat	60	40
4	X-O-Mat Room	50	40
5	Clinical Dosimetry	200	210
6	Mould Room	180	175
7	Simulator-Tomograph	350	365
8	Hot Lab	150	320
9	Fast Neutron Treatment Room	850	820
10	Linen Storage	30	30
11	Staff Toilet	75	33
12	Storage	45	48
13	Linac 4 MeV Treatment Room	480	455
14	Cobalt-60 Treatment Room	480	510
15	Central Control Station	350	354
16	Medium Energy Linac	620	584
17	Storage	200	210
18	High Energy Linac (Clinac 35)	680	540
19	Modulator Room	320	235
20	Staff Lounge	200	200
21	Hyperbaric Oxygen Room	180	102
22	Storage	100	110
23	Resident's Study	300	190
24	Control Room	30	24
25	Super/Ortho	300	240
26	Toilet	30	36
27	Gowned Waiting	220	180
28	Gowned Waiting	220	180
29	Toilet	30	30
30	Simulator	200	320

Basement Floor - continued

<u>Room No.</u>	<u>Description</u>	<u>Preferred Area</u>	<u>Illustrated Area</u>
31	Treatment Planning	300	195
32	Computer	300	195
33	Examination Room	150	130
34	Examination Room	150	130
35	Examination Room	150	130
36	Nurses Station	60	60
37	Toilet	30	30
38	Toilet	30	30
39	Nurses/Technicians	200	130
40	Examination Room	150	115
41	Litters Waiting	160	120
42	Sick Patient Room	150	158
43	Examination Room	150	160
44	Records & File Secretary	400	200
45	Typing Pool	240	175
46	Staff	150	155
47	Staff	150	145
48	Staff	150	155
49	Reception	150	100
50	Waiting Room	400	360
51	Examination Room	150	135
52	Examination Room	150	120
53	Examination Room	150	126
54	Examination Room	150	142
55	Secretary	150	110
56	Examination Room	150	110
57	Examination Room	150	102
58	Staff	150	102
59	Janitor	50	55
60	Women's Toilet	140	144
61	Men's Toilet	140	168
62	Janitor	30	42
63	Staff	150	110
64	Staff	150	110
65	Staff	150	110
66	Secretary	100	102
67	Chairman's Office	200	189
68	Secretary	150	174
--	Patient Dressing Cubicles 20 each x 15 (22 illustrated)	300	245

Basement Floor - continued

<u>Room No.</u>	<u>Description</u>	<u>Preferred Area</u>	<u>Illustrated Area</u>
69	Conference/Classroom & Library	300	378
70	Machine Shop	400	729
71	Biophysics Laboratory	200	234
72	Isotope Laboratory	180	195
73	Isotope Laboratory	180	208
74	Staff	120	130
75	Staff	120	123
76	Secretary/Library	200	215
77	Staff	120	120
78	Staff	120	120
79	Staff	120	120
80	Staff	120	120
81	DarkRoom	120	120
82	X-ray	280	228
83	Storage	200	180
84	Control		
85	Preparation		
86	Animals	400	480
87	Animals	400	420
88	Animals	400	312
89	Animals	400	420
90	Cold Room/Dead Animals	150	138
91	Storage	200	144
92	Electronics Development	250	294
93	Physics Director	150	144
94	Secretary	100	126
95	Lockers	90	88
96	Tissue Culture	300	242
97	Tissue Culture		
98	Storage	50	72
99	Cold Room	100	126
100	Glass Wash & Glassware Storage	400	126
101	Instrument Room	240	322
102	Lockers	90	92
103	Histopathology	300	294
104	Chemistry Laboratory	300	270
105	Chemistry Laboratory	300	270

Basement Floor - continued

<u>Room No.</u>	<u>Description</u>	<u>Preferred Area</u>	<u>Illustrated Area</u>
106	Histopathology	300	294
107	Animal Operating Room	200	297
108	Animal Operating Room	200	280
109	Storage	150	193
--	Animal Operating Room	<u>200</u>	<u>--</u>
		21,910	

Totals for Basement Floor

Gross Area

Illustrated Area

34,781

20,663

CONSTRUCTION COST ESTIMATE FOR A  
RADIATION ONCOLOGY RESEARCH AND TREATMENT CENTER  
AT THE UNIVERSITY OF MINNESOTA

B/C Building

Basement Level:

Radiation Therapy

Treatment Areas	5,454 GSF @ \$250/SF	=	\$1,363,500
Clinical Areas	15,837 GSF @ \$ 60/SF	=	950,220
Physics Support	<u>2,846 GSF @ \$ 70/SF</u>	=	<u>199,220</u>
Subtotal Radiation Therapy	24,137		\$2,512,940

Research Area

Animal Areas	2,830 GSF @ \$125/SF	=	\$ 353,750
Offices	1,377 GSF @ \$ 50/SF	=	68,850
Labs/Central Services	2,835 GSF @ \$ 75/SF	=	212,625
Corridors/Stairs/Elevators	<u>3,602 GSF @ \$ 40/SF</u>	=	<u>144,080</u>
Subtotal Research Area	10,644		\$ 799,305
Total Basement Level	34,781		\$3,292,245



UNIVERSITY OF MINNESOTA  
HEALTH SCIENCES EXPANSION

U. OF MINN.

DATE: DEC 10

MEETING NOTES

COPY	ATTN.	INIT.
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	X 4.14	
BD	X	

DATE: 1 December 1970

PLACE: Powell Hall

PRESENT: Dr. Eugene Gedgaudas, Dr. Robert Mulhausen, Jim Solverson, Ken Taylor

TAC JOB: Unit B-C, #70046

SUBJECT: Distribution of Department of Radiology Space to Diagnostic Radiology and Radiation Therapy

BY: Ken Taylor

The discussion in this meeting centered on the feasibility of the use of 600 S.F. of Radiation Therapy space in Diehl Hall for Neurology. Dr. Leavit would like to retain that space as part of his research facilities and has done some remodeling in the area. An adjustment in the assigned space for Radiation therapy and Diagnostic Radiology was made which permitted the 600 S.F. to be retained by Radiation Therapy.

This redistribution of space was part of a larger reallocation of Department of Radiology space. The former Department of Radiology with its divisions of Diagnostic Radiology, Nuclear Medicine, and Radiation Therapy has been reorganized into two new departments, Radiology Department including Diagnostic Radiology and Nuclear Medicine, and Therapeutic Radiology. The original departmental space which accommodated research and administrative areas, is redistributed to these two new departments. A table for this redistribution is included as part of these notes.

U. OF MINN.

DATE:	
H. G. S. P.	
P. P. & D.	
H. S. - COOD.	X
H. S. A. E.	
H. J. S. A.	
LERCH	
FL	
C. D. M.	

KT/kb  
14 December 1970

PH. SANDRO	X
R. MULHAUSEN	X
E. GEDGAUDAS	X
N. LEVITT	X

1 December 1970  
 15 October 1970  
 1 July 1970

PHASE 1 SCHEMATIC PROPOSAL

Existing	Additional	Total	Existing to Vacate	Existing to Remain	Additional New	Additional Remodeled
4.12 Radiology Department						
6,585	3,080	9,585				
Mayo 1				398		581 (2.4)
Mayo B1				294		420 (4.3)
Mayo 2				1,112		
Diehl 1				3,333		1,999
VFW B				1,448		
4.13 Diagnostic Radiology- Nuclear Medicine						
16,796	7,897	24,693				
Mayo 1				2,744		
Mayo 2				11,699		5,347
VCHH 1				2,353		
UNIT BC 1					2,500	
4.14 Radiation Therapy						
2,993	2,056	5,049				
Mayo 1				2,993		
Powell 1						2,056
4.15 Department of Surgery						
10,020*	4,310	14,330				
Mayo B1				2,629		195
Mayo 5			2,258	714		
Diehl 1.			1,127	1,182		947
305 Union Street			1,097			
510 Washington			1,337			
UNIT BC 11					4,575	
UNIT BB					3,638	
UNIT A 11					450	

\* Transfer 612 SPN to 4.19 Urology in Diehl F130

UNIVERSITY OF MINNESOTA MEDICAL CENTER  
**PHASE I PROGRAM FOR RADIOLOGY SHOWING REDISTRIBUTION OF 4.12 DEPARTMENT OF RADIOLOGY SPACE.**

1 December 1970  
 15 October 1970  
 1 July 1970

**PHASE 1 SCHEMATIC PROPOSAL**

Existing	Additional	Total	Existing to Vacate	Existing to Remain	Additional New	Additional Remodeled
4.12 Radiology Department			(REDISTRIBUTED TO 4.13 AND 4.14)			
6,585	3,080	9,585				
Mayo 1				398 <sup>①</sup>		581 <sup>②</sup>
Mayo B1				294 <sup>③</sup>		420 <sup>④</sup>
Mayo 2				1,112 <sup>⑤</sup>		
Diehl 1			521 <sup>⑥</sup>	2,312 <sup>⑦</sup>		2,424 <sup>⑧</sup>
VFW B				1,448 <sup>⑨</sup>		1,999
<b>RADIOLOGY DEPARTMENT</b>						
4.13 Diagnostic Radiology						
Nuclear Medicine						
<del>16,796</del>	<del>7,897</del>	<del>24,693</del>				
19,356	7,634	26,990				
Mayo 1				2,744		1,112 <sup>①</sup>
Mayo 2			12,811	11,699 <sup>⑤</sup>		1,598 <sup>③</sup>
VCHH 1				2,353		5,347*
VFW B				1,443 <sup>⑨</sup>		
UNIT BC 1					2,500	
DIEHL 1						2,424 <sup>⑧</sup>
<b>THERAPEUTIC RADIOLOGY</b>						
4.14 Radiation Therapy						
<del>2,993</del>	<del>2,056</del>	<del>5,049</del>				
5,805	2,637	8,442				
Mayo 1				2,993		581 <sup>②</sup>
Powell 1						2,056
DIEHL 1				2,812 <sup>⑦</sup>		

**NOTES ON REDISTRIBUTION OF 4.12 PROGRAM**

- ① MAYO B185, B186, B187 TO 4.13 RADIOLOGY DEPARTMENT
- ② MAYO B139, B140, TO 4.14, THERAPEUTIC RADIOLOGY
- ③ MAYO B127-6, B127-19 TO 4.13 RADIOLOGY DEPARTMENT
- ④ MAYO B115, B116 TO 4.13 RADIOLOGY DEPARTMENT
- ⑤ EXISTING MAYO 2 SPACE NOW HOUSING ADMINISTRATION TO 4.13 RADIOLOGY DEPARTMENT
- ⑥ EXISTING DIEHL L106 TO 4.8 PEDIATRICS DEPARTMENT
- ⑦ EXISTING DIEHL 1 SPACE EXCEPT L106 TO 4.14 THERAPEUTIC RADIOLOGY
- ⑧ ADDITIONAL DIEHL 1 SPACE TO 4.13 RADIOLOGY DEPARTMENT
- ⑨ EXISTING VFW B SPACE TO 4.13 RADIOLOGY DEPARTMENT

\* CLINICAL EXPANSION FOR RADIOLOGY DEPARTMENT MAYO B285, B283, B207, B209

15 December 1970

15 October 1970

1 July 1970

PHASE 1 SCHEMATIC PROPOSAL

	Existing to Vacate	Existing to Remain	Additional New	Additional Remodeled
4.12 Radiology Department (Space Reassigned to 4.13 and 4.14)				
4.13 Radiology Department *				
19,356 7,634 26,990				
Mayo 1		2,744		
Mayo 2		12,811		1,112
VCHH 1		2,353		
VFW B		1,448		
UNIT BC 1			2,500	
Diehl 1				2,424
4.14 Therapeutic Radiology**				
5,805 2,637 8,442				
Mayo 1		2,993		581
Powell 1				2,056
Diehl 1		2,812		
4.15 Department of Surgery				
10,020 4,310 14,330				
Mayo B1		2,629		195
Mayo 5	2,258	714		
Diehl 1	1,127	1,182		947
305 Union Street	1,097			
510 Washington	1,337			
UNIT BC 11			4,575	
UNIT BB			3,638	
UNIT A 11			450	

\* Formerly Diagnostic Radiology - Nuclear Medicine  
 \*\*Formerly Radiation Therapy

Program Meeting Notes Part I  
University of Minnesota  
Health Sciences Center

4.12

Date: 30 September 1968

Place: Dr. Gedgaudas's office, Mayo Building

Subject: Diagnostic Radiology Department,  
The Roles of Nuclear Medicine  
and Therapy Departments.

Present: For The University of Minnesota Health Sciences Department:

Dr. Gedgaudas            Mr. Dopking  
Mr. Abrahamson

For The Architects Collaborative Inc.:

Mr. Kluver                Mr. Larsen

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I. Dr. Gedgaudas opened the meeting with several points essential to our understanding of their program requirements.

a. Excellence of the Radiology Department

In spite of the severely restricted space in which to conduct radiological procedures, the department enjoys an outstanding reputation. A recent survey of university hospital radiological departments has placed the University of Minnesota number one in the country. This reputation will be maintained.

b. Student Participation in the Radiology Department

In keeping with the broad based exposure for medical students at the hospital, the Radiology Department has experienced an excellent response from the students. Last year one-hundred and thirty-six out of one-hundred and fifty students elected to study in the Radiology Department during their course of training at the University of Minnesota Hospital.

c. Collateral Training Programs

A radiological technician training program is conducted at the University Hospital twice yearly. This program also has enjoyed an excellent response. In January, one-hundred students are registered and in June between sixty and seventy students are registered. At this time, no special facilities have been devoted to these teaching endeavors.

d. "Family Medicine Program"

There is no direct indication of what impact this program will have on the Radiology Department. Perhaps initially it will take the

form of "routine bucky work" only, which it is believed will be conducted outside the department but will require radiology staff for teaching and supervision.

If, on the other hand, in the future this program turned into a regional clinic set-up backed up by a major medical center, such as the University of Minnesota Hospital, for critical patient referral, then the impact on the more sophisticated areas of the Radiology suite could be profound.

e. Divisions of the Department

In spite of the ideal aspects of keeping Radiology one homogeneous department serving the whole medical center from a central point (as in the cited case of the Lund Clinic, Sweden), administrative considerations and practices at the University of Minnesota Medical Center have determined otherwise. A recent administrative decision has established Radio-therapy as a separate department.

Cystoscopy is conducted within the Urology Department. Cardiac catheterization is conducted in the heart hospital. Some of the new operating rooms, it is anticipated, will be equipped with x-ray devices. All of these activities outside the Radiology Department proper will impose additional demands on radiologists, technicians and radiological maintenance personnel and facilities.

f. Disposition of Nuclear Medicine

The full potential of Nuclear Medicine is not yet realized. Insofar as application is concerned, it would appear at this time to have excellent diagnostic capabilities achieved through scanning devices and nuclear camera imaging. Therefore, it would appear to have more direct application to the diagnostic end of Radiology and will be planned as a separate entity working in conjunction with the Diagnostic Radiology Department. An internist as opposed to a radiologist will be the chief of the Department of Nuclear Medicine.

II. With reference to the program material previously generated for the Diagnostic Department, Dr. Gedgaudas went on to make the following comments:

- a. He and his staff are in the process of developing basic diagrams referenced as "modules" for areas of sub-specialties within the Diagnostic suite. These diagrams are to be used as indications of ideal element arrangements and adjacencies, but not necessarily final size of examination rooms and ancillary areas. Extensive thought must be given to the actual equipment located in the rooms and the position of transformers supplying power to the equipment.
- b. The Department of Diagnostic Radiology will be divided into suites in which to conduct sub-specialties:
  1. There will be production rooms for "routine bucky" work which will be conducted by technicians, intervention by clinicians. being only in the reading of the final films.

2. There will be a G.I. suite which will require equal time of both clinicians and technicians. In this suite clinicians will conduct fluoroscopic procedures and will be involved in the reading of films as they emerge from the processor. Since the patient will be required to stand by during the progress of the G.I. series, it would be well to have sub-waiting areas where the patients, male and female, could relax in a lounge atmosphere while gowned.
3. There will be a Pediatric suite with its own waiting room which will ideally have a playroom character. A separate patients' toilet equipped with juvenile fixtures is required. Parents and siblings will be expected to wait in this area while the patient's examination procedures are under way. The equipment in this area will be specialized in nature in that it will adapt to smaller bodies and will have a great deal of facility due to the limited doses of radiation allowed for pediatric work. Clinician and technician services will be required about equally in this area.
4. There will be a Thoracic or Chest suite wherein both fluoroscopy and tomography will be extensively applied. There is indication that this would be an excellent area to have an interplay with the Nuclear Medicine Department. The employment of radio-isotopes in certain vascular explorations has proved to be an excellent contrast media. The examinations conducted in this suite will be mainly clinician controlled.
5. The Neurological Radiology suite will be located close to Dr. Peterson's administrative offices. It is assumed that this suite will derive most of its patients from the inpatients community and a few from emergency. If this is the case, then a large stretcher parking area (say for two examination rooms, four stretchers). These examinations are frequently done under general anesthesia, therefore, the suite would best be located close to the recovery room which will be described later. It is also assumed that this would be another area of interplay with the Department of Nuclear Medicine. The examinations conducted in this area are frequently done at the request of the neuro-surgeons as prelude to neuro-surgical procedures. Therefore, areas for consultation between neurological staff and radiological staff are essential. Procedures conducted in this suite entail the filling of spaces in the central nervous system with fluids of positive and negative contrast for examination. These procedures are conducted only by clinicians. One of the examination rooms in the suite will be equipped with a Polytome unit.
6. All of the sub-specialty suites mentioned above will have their own dark room, high-speed processor (as Kodak M-6 unit) and reading room with a film transporting device to carry films back to the case assembly, film display and hot film storage areas.
7. Out of the way of the general traffic pattern of the radiological suite, two large rooms (say 24 feet by 24 ft.) are to be reserved for clinical investigation and research and work set-up laboratories. These rooms would ideally interface with the electronic data

processing system and would have access to ducted air conditioning systems to provide conditioned air according to equipment demands. It is felt by Dr. Gedgaudas that these rooms are the essential "open end" to the constantly changing radiological sciences.

- 8. Adjacent to the areas mentioned above (item 7) should be the radiological engineers' office and workshop. This shop should be comprehensively equipped to conduct routine maintenance operations for the entire Diagnostic Radiology Department as well as do fitting and assembly of special items of equipment for the specialty suites.
- 9. It was assessed that by 1973, the Diagnostic Radiology Department would examine 350 patients a day (including emergency). To regulate the flow of this volume of patients through the department, a careful analysis of waiting and sub-waiting areas must be made.

At the entrance to the Diagnostic Radiological suite there must be a control desk and patients' record area. From here the patient should be able to progress to a comfortable waiting area then on to the examination room for any particular radiological procedure. Beyond the general waiting area, in close proximity to the examination rooms, there must be another waiting area for stretcher patients. Many of these stretcher patients are in critical condition and must be under the constant surveillance of trained nurses. Therefore, a nursing station with minor utility and medication facilities must be provided. A stretcher parking alcove will be part of the waiting area. To the left and right of the nurses station will be a patients' preparation area on one side where I. V. and barium preparations, etc. will be administered, and on the other side, a recovery room. Each of these rooms will accommodate two or three patients who will, through the use of glass panels, be observed by the nursing staff at all times. Curtains for privacy will be provided in both rooms.

III. Ancillary to the Diagnostic Radiology Department proper are the teaching and study areas which are required over and above the small group teaching sessions that can take place in the diagnostic examination rooms. Briefly, these areas are as follows:

- a. Three Conference Rooms:

One for fifty persons

Two for thirty persons each.

These areas would be used for working conferences. As an example, pediatrics will frequently have gatherings of forty people. There is a traditional noon time gathering of up to 100 residents where all of the previous day's films are shown and commented upon. This is an extremely important teaching function. To accommodate this large group of people, the three conference rooms mentioned above could be opened up into one large room. Good lighting and ventilation are imperative to the success of the conference rooms.



- b. There must be study carrels provided for thirty (including five Nuclear Medicine) Residents. These carrels should be close to the department library and hot film storage area and film reading room.
  - c. A general study area for fifteen medical students who stay in the department for three to six weeks must also be provided.
4. The Diagnostic Radiology administrative facilities will be as follows:
- a. An office for the head of the department with full toilet and shower facilities. Adjoining and interconnected to this office should be a conference room with extensive film viewing capabilities.
  - b. Dr. Peterson's office should be the same general nature as the one above, but located close to the Neuro-Radiology suite. This office should have an anteroom with space for two secretaries.
  - c. The Chief of Diagnostic Radiology and the Chief of Nuclear Medicine should have private offices and perhaps shared toilet facilities.
  - d. The study carrels provided for the Residents and the departmental library should be located by these offices. A close liaison between the Department Head, the Chiefs and the Residents will be above all encouraged.
  - e. A common secretarial area to the offices of the Chiefs will be provided. The secretarial office to the head of the department being private and adjoining that office.
  - f. The Administrative Assistant's office will be the business office for the whole Diagnostic Radiology Department. This function has proved to be an invaluable service to the departmental head.
  - g. As a service to the departmental staff, a lounge and coffee shop will be provided. Dr. Gedgaudas said that for the very few minutes of leisure that his staff has during the working day, he did not want them to spend them in discomfort and inconvenient conditions.

Program Meeting Notes Part II  
 University of Minnesota  
 Health Sciences Center

Date: 30 September 1968

Place: Dr. Gedgaudas's office, Mayo Building

Subject: Radiology Research Program

Present: For The University of Minnesota Health Sciences Department:  
           Dr. Hahn

          For The Architects Collaborative Inc.  
           Mr. Kluver     Mr. Larsen

I. This discussion represented the first attempts to arrive at program areas for Radiology Research. It must be pointed out from the start that the figures represented here are minimum areas in which to conduct the anticipated research activities:

a. It is assumed that by 1973 there will be between thirty-five and forty-one full-time research personnel working in the department.

	<u>Existing</u>	<u>Required in 1973</u>
(1973 Personnel=) 35*	X 6,629 Net S.F.	= 11,000 S.F. for animals,
(1967 Personnel=) 21		labs and services

\*This personnel figure is based on Therapy and Nuclear Medicine only. Research facilities for Diagnostic Radiology have provided within the department. See item II-7, Program Meeting Notes Part I, 30 September 1968.

b. An assessment was made to accommodate these personnel relative to the existing facilities.

	<u>Existing Areas</u> <u>Net S. F.</u>	<u>% of Total</u> <u>Net Area</u>	<u>Assessed New Areas</u> <u>Net S. F.</u>
Lab	2,873	.50	5,500
Animals (corrected)	1,600	.28	3,080
Services	<u>1,273</u> 5,746	<u>.22</u> 1.00	<u>2,420*</u> (1,500 would 11,000 be enough)

\* If the Service Area is reduced, this area should be redistributed to Lab and Animal functions.

c. Projected area for:

Lab, Animals & Services	=	11,000 S.F. Net
Offices	=	1,750 S.F. Net
Radiation Biophysics	=	<u>500 S.F. Net</u>
Total		13,250 S.F. Net

d. Break-down of area allotted to Radiation Biophysics:

2 Labs @ 200 S.F. each	=	400 S.F. Net
Office for 2-3 Graduate Students	=	<u>100 S.F. Net</u>
Total		500 S.F. Net

This Area must be located adjacent to Radiation Therapy.

e. Ideal adjacencies for the Radiology Research facilities arranged in order of their direct connection with work conducted in the department:

First	-	with Radiation Therapy
Second	-	with Nuclear Medicine
Third	-	with Diagnostic Radiology

Program Meeting Notes Part III

University of Minnesota

Health Sciences Center

Date: 30 September 1968

Place: Dr. Gedgaudas's office, Mayo Building

Subject: Program Requirements of  
Department of Radio-Therapy

Present: For The University of Minnesota Health Sciences Department:

Dr. Charyulu

For The Architects Collaborative Inc.

Mr. Larsen

I. Dr. Charyulu talked about the program requirements at length with reference to the previously prepared Summary of Required Spaces. The following information was generated:

- a. There must be two waiting areas in the department. The first area must accommodate approximately 16 patients from the outpatient department. The second area will be for follow-up visits and will accommodate 20 patients. The second waiting area should be convenient to a car parking area. Both areas should have a reception desk and records area. Every effort should be made to make the areas comfortable and convenient for the patients. Male and female toilet facilities for the patients must be provided in both areas.
- b. The head of Radiation Therapy's office will be provided with full toilet facilities. This office will interconnect with the conference room and his private secretary's office.
- c. The office staff will number fifteen persons in all, twelve of which will be full-time staff members and three of which will be either teaching or research associates.
- d. Fourteen study carrels will be provided for Residents.
- e. There will be four clerical employees.

II. The layout of the department was described in some detail, the main points being these:

- a. Beyond the waiting area from the outpatient department should be located six examination rooms and a fluoroscopy room. These areas will be used for the initial as well as the follow-up examinations of the patient.

- b. From the information gained at the initial and fluoroscopic examinations, extensive work on the part of the radiation therapist will follow in the Treatment Planning Rooms. This room may very well be equipped with a computer.
- c. Adjacent to the Treatment Planning room will be the Simulator Room where the radiation therapist will work with the patient to make actual set-up to conduct the treatment plan of action. To accomplish this, casts will frequently be made of the patient from which masks and collimators will be built up in the departmental shop. Several x-ray films will be processed in an adjoining dark room (in an automatic processor as Kodak M-6).
- d. Once this preliminary work is completed, the patient will be moved into the actual Therapy Rooms. The Therapy Rooms are ideally located around and adjacent to the Simulator Room.
- e. Therapy Rooms of assumed approximate sizes: \*

1. Orthovoltage Superficial Therapy Room  
containing 2 each 250 KV machines.

Room will be approximately	20' x 14'
Control Area	8' x 6'
Auxiliary Equipment Space	8' x 6'
With a 9-10 ft. ceiling ht.	

2. 25 mv Betatron Room

Treatment Room Size	20' x 25'
Control Area	8' x 12'
Entrance Maze	6' x 8'
Auxiliary Equipment Space	12' x 20'
With a 13 ft. ceiling ht.	

3. Cobalt-60 Therapy Room

Treatment Room Size	16' x 16'
Control Area	6' x 12'
Entrance Maze	6' x 12'
With a 10-12 ft ceiling	

4. 6-mv Linear Accelerator Room

Treatment Room Size	18' x 20'
Control Area	6' x 12'
Entrance Maze	6' x 12'
Auxiliary Equipment Space	6' x 12'
With a 12 ft. ceiling ht.	

\* NEED ACCESS FROM TOP FOR EQUIPMENT  
REMOVAL AND REPAIRS.

5. Neutron Source Room is still under consideration. Room characteristics will be determined later.
- f. All of these Therapy Rooms will be television-monitored. They will require oxygen outlets.
- g. Air and vacuum will be supplied to the Mold Room.
- h. In the area of the Therapy Rooms, male and female toilets will be required.
- i. In relation to the waiting areas mentioned in I above, there will be a Nurses' Station and Patients' Preparation-Dressing Room and Recovery-Rest Room. Adjoining this area will be a storage area for stretchers and wheel chairs. A linen control area will also be close at hand.
- j. Out of the way of the general traffic in the department will be an Electronic Work Shop and Engineers' Office.
- k. The break-down of the Radiation Biophysics Lab associated with this department is contained in Part II of this report under item I-d. This lab, it is assumed, would best be located adjacent to the treatment planning area.

III. Personnel facilities required for the department would be as follows:

- a. Male and female Staff Lounges
- b. Male and female Staff Toilets/Shower and Locker Rooms adjacent to the administrative area and also adjacent to the Staff Lounges mentioned above.

- IV. Dr. Charyulu strongly recommended that Nuclear Medicine be located away from the path of patients coming from Radiation Therapy. They have experienced radio interference in the equipment used in Nuclear Medicine by patients who have been treated in Radiation Therapy.

Frederick A. Larsen

The Architects Collaborative Inc.

14 October 1968

FAL/mck

DEPARTMENT OF THERAPEUTIC RADIOLOGY  
BOX 187 MAYO MEMORIAL BUILDING • MINNEAPOLIS, MINNESOTA 55455

September 24, 1971

Mr. Paul Maupin  
Health Sciences Coordinator  
Box 235 Mayo

Dear Mr. Maupin:

The site visitors for the Planning Grant in Radiation Therapy will be here on Thursday, October 7. Your scheduled time to meet with the site visitors is 9:15 - 9:35 in Room 1020 Powell Hall. The site visitors are as follows:

Dr. Raul Mercado, Jr.  
Program Director for Radiation  
National Cancer Institute

Dr. Morris J. Wizenberg  
Head, Division of Radiotherapy  
University of Maryland Hospital

Dr. Frederick W. George  
Professor of Radiology  
University of Southern California

Mr. Peter Wooton  
Director, Division of Radiation Physics  
University of Washington Hospital

There will be a served luncheon from 12:00 to 1:00 in the Board Room of the Campus Club.

If there is any problem with this schedule, please let us know as soon as possible.

Sincerely yours,

*Seymour H. Levitt, M.D.*

Seymour H. Levitt, M.D.  
Professor and Head



HEALTH SCIENCES CENTER  
UNIVERSITY HOSPITALS

SHL:ad

DEPARTMENT OF THERAPEUTIC RADIOLOGY  
BOX 187 MAYO MEMORIAL BUILDING • MINNEAPOLIS, MINNESOTA 55455

May 6, 1971

TO: Members of the Planning Committee for the Therapeutic  
Radiology Facility

FROM: Seymour H. Levitt, M.D.

I am enclosing a rough copy of the grant proposal for planning of the Therapeutic Radiology Facility. I would appreciate your comments, suggestions, and criticisms. Since we are trying to meet a deadline of June 1, 1971, I would appreciate these being returned with your notes as soon as possible. I have invited Drs. Cavanaugh and Roberson from NIH to visit the campus on the 26th or 27th of May, and at that time we can go into further detail about the planning grant and they will probably be able to answer any questions which we may have.

SHL:ad





## I. INTRODUCTION

The purpose of this grant application is to permit the accomplishment of an exploratory study directed at planning for the establishment and determining long-range goals of a Radiation Therapy Cancer Center to be operated by the University of Minnesota Health Sciences Center. The Radiation Therapy Center will serve the clinical service, research and training requirements for the Medical School and affiliated institutions throughout the state, and surrounding regions. This program will be the second phase of the planned development of an interdisciplinary Health Science Division Cancer program. This will provide planning for the development of the clinical and clinical research facilities of the Department of Therapeutic Radiology and closely correlated services such as Medical Oncology, Surgical Oncology, Pediatric Oncology, Gynecology, and Neurosurgery, necessary to serve this area. The information and directions gained from this study will be utilized in the next planned phase of this University program which will involve the development of cancer facilities throughout the Health Sciences of the University of Minnesota.

Five years ago, the University of Minnesota established a phase I in an overall cancer program by the application by the institution of a research program "Integrated Study of Advanced Malignant Diseases as provided by the National Cancer Institute." This cancer program conducted in the facilities of the Masonic Memorial Hospital and Veterans of Foreign Wars Cancer Research Building provided the interdisciplinary opportunity for the study of advanced malignant diseases. The success of this program

has warranted renewal of the support for that purpose. The proposed center for radiotherapy treatment represents a phase II in the overall planning of the University of Minnesota for the cancer problem. It would provide the necessary planning to establish the role and future needs of Therapeutic Radiology at the University of Minnesota.

It is the intent of the University of Minnesota to establish an overall cancer program which is to be regarded as Phase III in cancer planning. This will encompass a program from the office of Vice President of Health Sciences Affairs, which will involve coordination of the cancer programs in the six facilities under that office's coordination.

The goal and objectives of such a Center will provide a nucleus for research in treatment of cancer with ionizing radiation and correlated improved clinical care of cancer patients. This program would be expected to involve research in the practical clinical applications of radiation biology, cancer immunology, cancer chemotherapy, and surgery as they relate to radiation therapy in the treatment of cancer.

The creation of a Radiation Therapy Research and Clinical Center for this area will result in better care for the cancer patient at an economical cost and will also provide facilities and clinical material for the training of urgently needed radiation therapists, therapy technicians and support personnel, as well as establishing a center for radiation therapy related cancer research in cooperation with the other major oncologic specialties.

The planning program will investigate the feasibility of the creation of such a Center, along with the interim and long-range requirements for staff, equipment and facilities needed for a major radiation therapy cooperative program throughout the state. Facility schematics, special facility and equipment design criteria, and budgeting cost estimates for the interim and permanent facilities will be accomplished in this planning effort.

## II. BACKGROUND AND GENERAL INFORMATION

### 2.1 HISTORY OF THE MEDICAL SCHOOL

The first classes in medicine at the University began in 1888 when three of the four private or proprietary medical schools in Minneapolis and St. Paul offered their charters and resources to the state. In accepting this offer the Regents assumed responsibility on behalf of the people of the state of Minnesota for medical education. In 1908 the remaining proprietary school was incorporated into the University Medical School; since then there have been no other schools of medicine in Minnesota.

In 1905, money for the construction of a hospital was offered to the University by the executor of a private estate. Various delays were encountered but eventually legislative approval and additional money were obtained. The Elliot Memorial Hospital, the first unit of University Hospitals, was dedicated in 1911. The act of acceptance passed by the Legislature stated that the hospital would belong to and be a part of the University, that indigent residents of Minnesota would receive free care and treatment, and that the hospital would be managed and controlled by the Regents of the University. Additional hospital and Medical school buildings have been added along a similar pattern of private donation to the University with control and management by the Regents and with legislative appropriations to supplement the gifts of private donors. These include the Todd Hospital, the Cancer and Christian gifts, Eustis Hospital, Mayo Memorial, Variety Club Heart Hospital, Masonic Memorial Hospital, Veterans of Foreign Wars Cancer Research Center, and the Children's Rehabilitation Center -- called collectively the University Hospitals.

The origins of the strengths of the Medical School can be traced to strong departments in the basic medical sciences and this strength has pervaded the clinical departments and has fostered a tradition of clinical research.

## 2.2 HEALTH SCIENCES OF THE UNIVERSITY OF MINNESOTA

The Health Sciences is a major academic unit of the University of Minnesota and is coordinated by the Vice President for Health Science Affairs. This encompasses administrative coordination for the Medical School, Dental School, School of Nursing, School of Public Health, School of Pharmacy, School of Veterinary Medicine, and University Hospitals. The Vice President of Health Science Affairs is assisted in his duties related to the respective schools by the deans.

## 2.3 MEDICAL SCHOOL

The University of Minnesota Medical School is situated on the University of Minnesota Campus in Minneapolis, and serves as a center for an overall population of 6,000,000 in Minnesota and many of the neighboring states including Wisconsin, Iowa, South and North Dakota, Wyoming, Montana, and for the metropolitan area population of approximately 2,000,000. The medical school presently has 703 students in training with plans to increase the number of students soon. 266 residents are in training in the University Hospitals. In addition to the medical school, a dental school, nursing school, and many other paramedical schools are on this campus. The full-time faculty of the Medical School numbers approximately 500.

The University Hospitals contain 828 beds, approximately 120 of these beds being devoted to patients with neoplastic disease. The Veterans Administration Hospital has 500 beds, and its staff and facilities are closely involved in the oncology program of the University of Minnesota. In addition to the University Hospital, the Medical School is also affiliated with Veterans Administration Hospital, the Hennepin County General Hospital and

### 2.3.1 Major Cancer Facilities at the University of Minnesota

A number of cancer treatment and research facilities are present at the University of Minnesota:

#### A. The Mayo Building:

The major teaching facility of the University of Minnesota Hospital complex is the Mayo building. This houses the Departments of Internal Medicine, Surgery, Pediatrics, Orthopedics, Urology, Otolaryngology, Neurosurgery and Gynecology along with other departments that are concerned with cancer patients. This hospital, including the Heart Hospital and Rehabilitation Hospital has 708 beds of which approximately 100 are occupied by patients with malignant disease at any one time. These patients provide the major teaching area for medical students and house officers in all departments and ensures a population of patients that represents the core of the clinical medical education of all of the students in the school. Because this building houses all of the clinical departments, some of the departments of basic sciences, the operating rooms, and all of the clinical laboratories, it is an area where the application of different disciplines and the exchange of ideas on given clinical problems are easily carried out. The result is a system of easy consultation and exchange that benefits patients, students, and faculty.

#### B. Masonic Memorial Hospital:

The Masonic Memorial Hospital is designed as a facility for the study and care of patients with advanced malignant disease. It consists of 120 beds for patients with advanced malignant disease or other chronic diseases, research laboratories in 10,000 square feet of space, and office suites for the cancer staff of the departments of Medicine, Surgery and Pediatrics. The research laboratories are designed primarily to conduct

studies relative to the problems of patients in the Masonic Hospital. The basement of the Masonic Memorial Hospital contains special laboratories of the Department of Laboratory Medicine, electron microscope facilities of the Department of Dermatology, the Cancer Detection Center, and computer facilities of the Bio-Medical Data Processing Center and the Masonic Clinic. This clinic is an ambulatory facility for the study and care of patients with advanced malignant disease or patients who are undergoing special research tests, procedures, or therapies. It is supervised by the Cancer Coordinating Committee and is available to any department of the school requiring this type of cancer facility.

C. The Veterans of Foreign Wars Cancer Research Center:

The VFW Cancer Research Center is adjacent to the Masonic Memorial Hospital. This contains 28,000 square feet of space devoted to the study of cancer and other special facilities. A large portion of the research in advanced cancer included in this facility is currently supported by the NCI (CA 08832), Integrated Study of Advanced Malignant Diseases. Within these units the cancer facilities consist of:

1. The Animal Research Laboratory in the basement of the VFW Building provides small animals in support of cancer research activities conducted in the VFW Building and Masonic Hospital.
2. Radiation Laboratories in the basement of the VFW Building provide counting equipment and a "hot" laboratory.
3. A Tumor Immunology Laboratory, occupying most of one floor of the VFW Cancer Research Center, is devoted to the study of many aspects of the immune response to malignant disease. This includes identification of tumor specific antigens, isolation and characterization of these antigens, induction and evaluation of the immune responses of animals and patients bearing antigenic tumors, manipulation of these immune responses, immunologic studies of the origin and significance of tumor antigens.

and studies of the effect of malignancy on the general immune response. A large portion of the work being carried out in these laboratories is now devoted to the studies of the antigenicity of human tumors, particularly those thought possibly to be induced by viruses. In addition, a new program in Experimental Immuno-therapy is being instituted to devise methods by which the immune response of patients to their own antigenic tumors can be substantially increased. These laboratories have provided fruitful research experiences for several medical students as well as for pre-doctoral and post-doctoral fellows.

4. Neurosurgery Research Laboratories (Masonic Hospital): An intensive study of primary brain tumor is being developed because of the pioneering chemotherapy studies of glioblastoma multiforme by the Section of Medical Oncology in conjunction with the Departments of Neurosurgery and Therapeutic Radiology. This area of research will provide a teaching-therapy program in advanced brain neoplasms. An electron microscope is being installed to coordinate with this program.
5. Metabolic Clinical Research Center: This center has been recently awarded to the Medical School in order to conduct metabolism studies in a variety of clinical areas. Studies of cancer patients will be incorporated in this endeavor. This unit is located on the second floor of the VFW Building and the Masonic Memorial Hospital.

D. Interdisciplinary Tumor Clinic:

The out-patient Tumor Clinic is an interdisciplinary clinic supervised by the Cancer Coordinating Committee. It provides follow-up of



patients with tumor problems from many services, particularly surgery and radiotherapy, following primary treatment of the disease. In addition, active chemotherapy is carried out on patients with solid tumors, many of whom had previous surgery. The clinic serves as a recognized source of interdepartmental consultation for patients with tumors that may be referred from any department in the hospital complex. The Tumor Clinic had 1,028 visits between July 1, 1967 and June 30, 1968. In addition, each specialty that cares for malignant disease has its own out-patient clinic. These include Neurosurgery, Urology, Gynecology, ENT, Radiotherapy, and Medical Oncology. The last of these is the largest medical specialty clinic and has approximately 1,400 patient visits per year.

E. Diehl Hall Library:

The Diehl Hall Library is a fully equipped modern Bio-Medical library adjacent to the cancer facilities. This library represents a library available to the University of Minnesota Health Sciences Center including those relating to cancer research.

F. Bio-Medical Data Processing Center:

The Bio-Medical Computer Center is available for studies requiring statistical aid. This facility consists of heavy computer equipment in the basement of the Masonic Memorial Hospital and offices on the entire third floor of the VFW Cancer Research Building. These facilities support activities of the Cancer Registry and research activities in cancer.

G. Cancer Detection Center:

The Cancer Detection Center in the basement of the Masonic Memorial Hospital is a center that has been in existence for more than 21 years. It encompasses a complete examination of normal people in an attempt to detect

cancer. It exemplifies various techniques for diagnosing asymptomatic or early cancer. It is a model for teaching cancer students, clinical fellows, staff, and community physicians in the appropriate examination technique for cancer diagnosis. It is recognized as one of the few medical centers from which cancer detection statistics can be obtained in the nation.

H. Department of Pathology, Dr. Robert Good, Professor of Pathology and American Legionate Professor of Research

This department is undergoing extensive remodeling. As a new Chief of Pathology, Dr. Good has brought in to pathology a new concept of experimental research directly relating to patient care. Interest in genetics, immunology, aging and specific tumor problems are major portions of his cell engineering concept. This department is correlating its cancer activities with all departments of the medical school.

I. Department of Gynecology, John Sciarra, Director

This department has undergone extensive remodeling directed towards an intensification of their role in the cancer problem. A new section of gynecologic pathology headed by Dr. Okagaki has been created along with a separate clinical neoplastic service for gynecological malignancies. These studies correlate with the Department of Therapeutic Radiology activities.

J. Department of Pediatrics, Dr. William Krivit, Dr. Mark Nesbit

The Department of Pediatrics has a strong section on hematology-oncology directed towards the neoplastic disease problem. The clinical studies involve the direct participation of the Department of Therapeutic Radiology.

K. Section of Medical Oncology, Department of Medicine

Medical Oncology has been recognized as a new specialty of internal medicine. Under the direction of Dr. B. J. Kennedy, Professor of Medicine and Masonic Professor of Oncology, this section has an active role in the care of advanced cancer patients. Clinical and research studies have been directly established between the Department of Therapeutic Radiology and Medical Oncology. Combination therapies in various neoplastic diseases have been established. A continuing program is planned between these areas.

L. Department of Surgery:

The Department of Surgery has a long history of research and clinical activity in neoplastic diseases. This has entailed a cooperative association with the Department of Therapeutic Radiology. Currently, specific studies relate to the immunological studies following radiotherapy. The neoplastic disease problem in the various surgical fields include cooperative studies with the Department of Otolaryngology, Division of Urology, Department of Neurosurgery, Department of Orthopedic Surgery, and Department of Oral Surgery, School of Dentistry and they would be cooperative in view of approach to them I am sure.

M. Cancer Coordinating Committee Administrative Facilities:

The Cancer Coordinating Committee is an advisory committee to the Dean of the Medical School and maintains an administrative office on the fourth floor of the Masonic Memorial Hospital. This contains an office suite for two secretaries, an office for the Director of Cancer Tutorial Program, a secretarial work office, and a faculty office. Adjacent to this office is a cancer seminar room and an audio-visual teaching laboratory. In this area teaching materials include audio-visual tape programs, movies, lanterns, slide teaching materials, and other audio-visual equipment. The secretarial office provides a Xerox Copier available for reproduction of teaching materials and other cancer teaching activities.

III. A DESCRIPTION OF PROGRAMS, FACILITIES, STAFF

EQUIPMENT AND PATIENT LOAD DATA

WITHIN THE DEPARTMENT OF THERAPEUTIC RADIOLOGY

3.1 GENERAL

The Department of Therapeutic Radiology was established as a separate department in the medical school in August, 1970. The staff includes two therapists, two physicists, two radiobiologists, and a paramedical staff of five nurse technicians, five secretaries, and other paramedical personnel. We are now actively recruiting for a third and fourth radiotherapy staff physician.

Presently there are three full time radiotherapy trainees in addition to four to five general radiology trainees assigned to the department for periods ranging from six months to a year. The University of Minnesota Hospitals will financially support two residents in Radiation Therapy beginning July 1, 1971.

The Department occupies about 10,000 square feet allocated to clinical facilities, offices, examination rooms, and laboratory space.

3.2 EQUIPMENT

The Equipment in the Department includes a newly installed Toshiba, 12 MeV Linear Accelerator, an Elcorado-8 Cobalt 60 Telecobalt unit, a General Electric Maxitron X-ray 250 KVP unit, General Electric Maximar X-ray 220 KVP research unit, Picker 120 KVP X-ray unit, Phillips Contact X-ray 50 KVP unit. The department also has approximately 800 mgms of radium in the forms of needles and capsules.

A transverse Axial Tomogram unit, a Toshiba treatment simulator and an automatic processor are in the department. A Spear treatment planning computer is part of the department equipment being used for treatment planning and training. This computer will shortly be connected with a 3300 unit which will increase the speed and capacity of the computer

3.3 PROGRAMS AND PATIENT LOADS

Approximately 1,100 patients are seen yearly in the department. About 900 are treated. Approximately 700 of these are new patients and 200 return patients.

Five radiotherapy beds are assigned to the department. These are situated in the Masonic Memorial Hospital. In addition, the department has unlimited admitting in the minimal care and out-patient treatment facilities.

Numerous clinical and experimental research programs are under way at the present time. Each of these programs involves training to a major extent. Each program is designed with the thought of the research and training being of utmost concern. Among these are:

1. Esophagus protocol. Split dose.
2. Pre-operative head and neck protocol.
3. Randomized Hodgkin's Disease, Stage III treatment.
4. Randomized pre-operative Hypernephroma protocol.
5. Effect of hypertension and arteriosclerosis on response of squamous cell cancer of cervix to irradiation protocol.
6. Randomized split dose lung protocol.
7. Randomized treatment of Brain Metastases.
8. Pilot Study in combination treatment of Glioblastoma Multiforme.
9. Animal tumor vascularity response to radiation.
10. Pilot Study in evaluation of effect of local radiation on Immune response.

3.4 EXISTING INTRAMURAL AFFILIATIONS AMONG DEPARTMENTS INVOLVED  
IN ONCOLOGY AND THERAPEUTIC RADIOLOGY

3.4.1 Therapeutic Radiology

The Department of Therapeutic Radiology has active ongoing collaborative research programs with the Departments of Surgery, Gynecology, Pediatrics and Medical Oncology. These include protocols, rounds, etc.

3.4.2 Surgery

The collaborative programs include head and neck tumor pre-operative irradiation, combined chemotherapy, radiation, and surgery for head and neck tumor, and a protocol for the staging of Hodgkin's Disease and other lymphomas surgically.

3.4.3 Gynecology

There are joint rounds and teaching sessions between the two services and a joint care program for oncology patients on the gynecology services. The radiation therapy residents are intimately involved in the treatment of gynecologic cancer patients with radium. Combined rounds are held weekly to discuss new patients and patients under treatment.

3.4.4 Pediatrics

Combined rounds are held with the section of oncology of the Department of Pediatrics. These include ward rounds, discussions of patients with tumors on the pediatric service being treated with radiation therapy, and Pediatric Grant Rounds (Cancer). In addition, collaborative programs in the treatment of patients with acute leukemias are underway.

3.4.5 Medical Oncology

An active interrelationship between Medical Oncology and Radiation Therapy exists and a number of combined protocols are underway; specifically,

randomization for treatment of Stage III, Hodgkin's Disease patients with radiation therapy or chemotherapy, and pilot studies in the use of mithramycin combined with radiation therapy in the treatment of patients with Glioblastoma. In addition, the Department of Neurosurgery is involved in this latter protocol.

#### 3.4.6 Other Department Interaction

The Departments of Medicine, Pediatrics, Neurosurgery, Radiotherapy and Surgery are involved in a protocol and a grant program for the study of advanced malignant disease.

#### 3.5 AREAS WHERE CURRENT PROGRAM CAN BE STRENGTHENED

At present, there is no long-range plan for the development of the Therapeutic Radiology clinical research and clinical facilities within the University structure. There is a requisite for an assessment of the need for such a Center and evaluation of the effect of such a center on the operation of the overall cancer management system in the entire state and surrounding region. This grant should help us determine what this center could and should provide to the area we serve and what it should not.

Since the needs of the Radiation Therapy facility are based to a great extent on the future role of those other departments working in collaboration, this study must also project and evaluate the future role of these departments insofar as source of patients, kinds of patients, relationship to feeder and other hospitals, etc., is concerned. This grant should also help us to plan for purposes of instruction and better patient management in these other areas and would also assist in improved coordination among those responsible for oncologic care. Additionally, it is felt that this planning effort would have a significant impact on expansion of ambulatory care and primary care facilities in this area.

Another area of need involves a requirement for coordination of area wide medical records, cancer patients records and improvement of referral patterns.

Finally, there is room for some improvement of coordination with other treatment areas such as surgery and chemotherapy in the state although it is quite good at this time. There is a need for patient registry and follow-up system.



#### IV. PLANNING PROCEDURE

##### 4.1 INTERNAL ORGANIZATION OF PLANNING EFFORT

The principal investigator for this program will be responsible for organizing, directing and coordinating the scientific and management aspects of the overall program with the assistance of a multidisciplinary planning committee. To assist him in this endeavor, it will be necessary to obtain funding support for an administrator in the new center (full-time), and a secretary to the administrator (full-time). In addition, it is expected that key staff members at certain of the affiliated institutions will participate in the planning effort. This will include, but not be limited to, hospital administrators, radiologists, radiation therapists, oncologic surgeons, medical oncologists, gynecologists, and pediatricians, etc.

A planning committee will be formally established within the institution made up of individuals from various disciplines closely identified with clinical <sup>care and clinical</sup> research and especially related to Radiation Therapy and collaborative studies. This committee will consist of the planning director for the University of Minnesota Medical School and representatives of the Section of Medical Oncology of the Department of Medicine, Department of Surgery, Department of Gynecology and the Department of Pediatrics. The chairman will be the Chairman of the Department of Therapeutic Radiology. Other key individuals in the University of Minnesota Medical School involved with oncology will have an opportunity to input their thoughts through completion of the Planning Questionnaires (Step 1) and later will participate in review of all

planning documents generated by the planning program. In this manner, it is expected that all of the individuals and institutions will be fully conversant with all phases of the planning program.

#### 4.2 MAJOR PROGRAM GOALS

Major program goals are as follows:

Analysis and prediction of patient loads, referral patterns and identification of probable cooperative institutions and physicians in the State of Minnesota and surrounding regions. This will help to define the region served and determine what we can do and provide that they need.

Determination of the estimated impact caused by establishment of a major referral center for cancer patients on the existing staff, facilities and equipment. This determination will be made by predictions of the clinical service, and diagnostic procedures (i.e., radiographic lab tests) developed from a detailed breakdown of patient "tracks" for in-patient care, gynecology, oncologic surgery, etc. made available by a proprietary computer simulator program developed by a consultant firm.

Development of facility, equipment, staff and program requirements for both immediate future and long-range needs for cancer research, training and clinical services in the Minneapolis-St. Paul area and patient referral region.

Determination of inter-institutional relationships and organizational structure for the new Therapeutic Radiology Treatment Center.

Establishment of sound fiscal and operational criteria to ensure financial viability for start-up and continuing operation of the new Center.

Analysis of advanced radiation therapy equipment requirements which will permit expansion of existing training and research programs along with the initiation of new programs in medical cancer research and treatment.

Development of conceptual facility designs, design criteria and cost estimates for an interim facility renovation and modification program at the existing institutions, to enhance the quality of cancer care at the earliest possible moment.

Development of the conceptual facility design, schematics, facility design criteria and budgetary cost estimates for the construction of a new Interdisciplinary Cancer Research and Clinical Center to serve the region in the 1976 time period and beyond.

### 4.3 JUSTIFICATION OF THE NEED FOR EXTRAMURAL PLANNING ASSISTANCE

#### 4.3.1 Data Collection and Feasibility Study

In order to facilitate the collection of data and establish criteria and evaluate the feasibility of various approaches, the administrator of the Medical School and staff within the Department of Therapeutic Radiology are convinced of the necessity of drawing upon the expertise and skills of independent extramural planning and consultation organizations who have previously demonstrated their abilities in the field of analysis of, and planning for, other similar programs and facilities in cancer.

#### 4.3.2 Conceptual Design for an Interim Facility Expansion Program

The implementation of the total program and opening of a new Interdisciplinary Radiotherapy Cancer Research and Clinical Center will probably take from three to six years, depending on budgeting, funding, design and construction. During the period until completion of the final concept, it will be necessary to develop and implement plans for an interim radiation therapy program and other needed facilities in order to:

Identify space for an increase in staff and programs (laboratories, etc.);

Procure, install and make use of modern diagnostic and radiation therapy devices;

Implement cooperative arrangements with cancer treatment activities and institutions outside the Minneapolis-St. Paul area;

Provide for an increase in the cancer patient load commensurate with the initiation of the cohesive program.

#### 4.3.3 Conceptual Design for a New Center

Included in the study desired under the scope of this grant will be the provision for a conceptual design study for a new, model facility for radiotherapy cancer treatment and research which can carry out the objectives outlined in the previous sections.

#### 4.3.4 Operational Analysis and Budget/Financial Planning

Sound fiscal planning for the delivery of health services demand that programs of health care be economically viable. Moreover, the exigencies of fiscal planning today for medical education, research and patient care demand a clear delineation and separation of costs attributable to each category; instruction, research and patient care. A fiscal analysis of the program, with an analysis of sources of funding, will be necessary in order to enable the University to determine the feasibility of the project, its priority and operation in relation to other Medical School programs.

#### 4.4 OUTLINE OF PLANNING PROCEDURE PROPOSED BY CONSULTANT FIRM

As indicated previously; a significant portion of the grant funds (if approved) will be used to obtain the services of an outside consulting firm. Preliminary discussions have been conducted with representatives of such a consulting firm, and they have indicated that the study would be conducted in four steps over a 24-month period.

Step I of the program, a Feasibility Study, will be conducted by the completion of detailed facility and equipment planning questionnaires prepared by the consultant firm and submitted to the staff of the Medical School and cooperating institutions within the state. The completed questionnaires will be analyzed by the consulting firm's staff and then followed up by interviews with all administrative and medical

personnel involved in the program. From the information developed, the gross facility and equipment requirements will be determined. Evaluation of the space requirements needed to accomplish clinical procedures, research and training commitments will also be made. Based on the information compiled, a Feasibility Study will be prepared and presented to the planning committee. The report will contain information concerning the general space requirements and equipment needs, along with cost information and recommendations for implementing the facility development program, identify both interim facility requirements and the needs for an Interdisciplinary Research and Clinical Center. This report will contain cost data, staff requirements and an outline of facility development alternatives. Subsequent phases will not commence until review and approval of the Step I Feasibility Study is completed.

Step II of the study will consider the development of an Interim Program and Facilities Report. This study will be designed to identify interim program staff, equipment and facility needs, which will fill the requirements of the University of Minnesota Medical School. The planning consultant will work closely with University planning officials and architectural representatives in order to identify areas where space can be made available (for the interim period) should an increase in the scope of activities, building of necessary staff, and installation of new equipment be necessary. The report will contain schematic facility layouts and design criteria for the renovation and alteration of existing space, if available, and detailed budget estimates for the renovations and construction, as well as funding of operations for the interim facility, will also be investigated and discussed in the report. Step II will proceed concurrently with Step III.

The Step III study will consist of developing a Conceptual Facility Design Study for a new Interdisciplinary Research and Clinical Center. The design study will include schematic facility layouts, design criteria for the entire facility, shielding calculations relating to the specific radiation therapy equipment desired, utility requirements for the advanced radiation sources, and heating, ventilation, and air conditioning requirements for all space.

Additionally, detailed project cost estimates will be prepared for budget programming purposes and will include major equipment costs as well as facility construction estimates. The Step III study will be prepared in a format which can be used by the University architect as guidance in the preparation of detailed working drawings and specifications.

All aspects of this study will be closely coordinated with the Medical School planning committee and hospital planning officials and the University architect (or architects). The Step III study will be developed within the boundary limitations and budget programming guidance established by the institutions after their review of the Step I Feasibility Report.

The Step IV work effort involves preparation and submission of a Financial Analysis Report for the Radiation Therapy related Interdisciplinary Cancer Research and Clinical Center. This report will contain an analysis of estimated operating costs for the Center including projected expenses for staff salaries, equipment maintenance, building services, administrative and management costs, as well as estimates of income that can be expected from all sources, such as fees for clinical services, grants for training and operation from governmental sources, as well as necessity for other subsidies from private and local agencies. Information

obtained from the questionnaires and discussions with the staff of the Therapeutic Radiology Center and discussions with outside agencies such as the National Cancer Institute, American Cancer Society, etc., will be used in the preparation of this report.

Accomplishment of this document will provide a logical basis for funding efforts, such as preparation and submission of grant requests for governmental assistance and solicitation from private agencies.

4.5 PLANNING CONSULTANTS BUDGET BREAKDOWN





**BUDGET ESTIMATES FOR ALL YEARS OF SUPPORT REQUESTED FROM PUBLIC HEALTH SERVICE  
DIRECT COSTS ONLY (Omit Cents)**

DESCRIPTION	1ST PERIOD (SAME AS DE- TAILED BUDGET)	ADDITIONAL YEARS SUPPORT REQUESTED <i>(This application only)</i>					
		2ND YEAR	3RD YEAR	4TH YEAR	5TH YEAR	6TH YEAR	7TH YEAR
PERSONNEL COSTS	25,740	27,027					
CONSULTANT COSTS <i>(Include fees, travel, etc.)</i>	76,592	43,438					
EQUIPMENT	2,000	1,000					
SUPPLIES	500	500					
TRAVEL	DOMESTIC	1,200	1,200				
	FOREIGN	-----	-----				
PATIENT COSTS	-----	-----					
ALTERATIONS AND RENOVATIONS	-----	-----					
OTHER EXPENSES	-----	-----					
TOTAL DIRECT COSTS	106,040	73,165					
TOTAL FOR ENTIRE PROPOSED PROJECT PERIOD <i>(Enter on Page 1, Item 4)</i> →					\$ 179,205		

REMARKS: *Justify all costs for the first year for which the need may not be obvious. For future years, justify equipment costs, as well as any significant increases in any other category. If a recurring annual increase in personnel costs is requested, give percentage. (Use continuation page if needed.)*

**BUDGET JUSTIFICATION - FIRST YEAR**

- A. Salaries - The services of the principal investigator will be provided by the Medical School as a contribution to the grant.

Salary support for a project administrator (full-time) and secretary (full-time) is needed in order to provide the administrative support required for a project of this magnitude. The administrator for the project will serve full time on the Medical School campus in order to provide necessary scheduling, coordination, travel authorization, record keeping, and activities associated with the planning effort. Typical examples of work performed by this individual will include establishing meetings between the planning consultants and key staff, distribution and collection of planning questionnaires, distribution of planning documents, collection and transmittal of review comments to the consultant firm and assuring continuity of the planning effort in the temporary absence of the Principal Investigator. The large volume of paper work, correspondence, memoranda, etc. will require the full time utilization of a secretary/stenographer.

BUDGET JUSTIFICATION - FIRST YEAR (continued)

B. Consultants:

Private Planning Organization - The professional multidisciplinary architect/engineer/scientific planning firm selected to carry out the technical aspects of the program will perform the functions outlined in the main narrative of the grant request. Discussions with the representatives of such firms have been held and these representatives have indicated that a 29 man-month effort will be necessary to accomplish all phases of the program. Professional disciplines expected to be required for the accomplishment of this study include physicians, physicists, research analysts, computer specialists, lawyers, business administrators and of course, architect/engineers. The planning firm will work under the scientific direction of the Principal Investigator. The funds requested in the budget reflect the cost quotation furnished by the representatives of the firm which has been determined to be the best qualified to perform the planning program contained in the grant application.

C. Equipment - Equipment costs involve normal office equipment items for the administrator and his secretary. This includes 2 desks, 2 chairs, table, wastebaskets, 2 filing cabinets, and an electric typewriter.

D. Supplies - Include normal office supplies for the administrator and secretary.

E. Travel - Domestic Travel funds are required for the Principal Investigator and Assistant Principal Investigator for travel to the consultants office on the West Coast. Travel is computed as follows:

1 roundtrip Minneapolis-West Coats <i>CP</i>	\$ 204.00
2 days per diem each trip @ \$25.00/day	50.00
Rental car - two days @ \$16.00/day	32.00
Miscellaneous Expenditures	14.00
TOTAL	<u>\$ 300.00 per trip</u>
Times 4 Trips @ \$300.00/trip =	<u>\$1,200.00</u>

**ENVIRO-MED, INC. BUDGET BREAKDOWN**

	<i>Step I</i> PHASE I - Feasibility Study				<i>Step II</i> PHASE II Interim Facility	<i>Step</i> PHASE III Conceptual Design	<i>Step</i> PHASE IV Financial Analysis	TOTAL PROGRAM
	Data Collection	Analysis	Report	Total Phase I				
Architect-Engineers	1.50	2.00	1.50	5.00	5.00	6.00	.50	16.50
Scientists	.50	1.00	.50	2.00	1.00	1.50	----	4.50
Financial Analysts	.50	.50	.25	1.25	.50	.50	6.00	8.25
<b>TOTAL Man-Months</b>	<b>2.50</b>	<b>3.50</b>	<b>2.25</b>	<b>8.25</b>	<b>6.50</b>	<b>8.00</b>	<b>6.50</b>	<b>29.25</b>
<b><u>Contract Cost Development</u></b>								
Direct Labor	\$ 3,600	\$ 5,150	\$3,225	\$11,975	\$ 9,050	\$11,250	\$ 9,650	\$ 41,925
Fringe @ 20%	720	1,030	645	2,395	1,810	2,250	1,930	8,385
Overhead @ 115%	4,140	5,922	3,709	13,771	10,408	12,938	11,098	48,215
Travel	750	750	750	2,250	500	750	750	4,250
Reproduction	-----	-----	300	300	300	500	500	1,600
<b>Total Cost</b>	<b>\$ 9,210</b>	<b>\$12,852</b>	<b>\$8,629</b>	<b>\$30,691</b>	<b>\$22,068</b>	<b>\$27,688</b>	<b>\$23,928</b>	<b>\$104,375</b>
<b>Fee @ 15%</b>	<b>1,381</b>	<b>1,928</b>	<b>1,294</b>	<b>4,603</b>	<b>3,310</b>	<b>4,153</b>	<b>3,589</b>	<b>15,655</b>
<b>TOTAL PRICE</b>	<b><u>\$10,591</u></b>	<b><u>\$14,780</u></b>	<b><u>\$9,923</u></b>	<b><u>\$35,294</u></b>	<b><u>\$25,378</u></b>	<b><u>\$31,841</u></b>	<b><u>\$27,517</u></b>	<b><u>\$120,030</u></b>

SUPPORTING INFORMATION  
REQUEST FOR A RESEARCH GRANT  
FOR EXPLORATORY STUDY  
RADIATION THERAPY RESEARCH AND CLINICAL CENTER  
UNIVERSITY OF MINNESOTA MEDICAL SCHOOL

## I. INTRODUCTION

Funds outlined in this grant application are requested in order to permit the accomplishment of an exploratory study directed at planning for the establishment and long-range goals of a Radiation Therapy Research and Clinical Center to be operated by the Department of Therapeutic Radiology at the University of Minnesota Medical School. The Radiation Therapy Center will serve the clinical service, research and training requirements for the Medical School and affiliated institutions throughout the state, and surrounding regions.

The goal and objectives of such a Center will provide a nucleus for research in treatment of cancer with ionizing radiation and correlated improved clinical care of cancer patients. This program would be expected to involve research in the practical clinical applications of radiation biology, cancer immunology, cancer chemotherapy, and surgery as they relate to radiation therapy in the treatment of cancer.

The creation of a Radiation Therapy Research and Clinical Center for this area will result in better care for the cancer patient at an economical cost and will also provide facilities and clinical material for the training of urgently needed radiation therapists, therapy technicians and support personnel, as well as establishing a center for radiation therapy related cancer research in cooperation with the other major oncologic specialties.

The planning program will investigate the feasibility of the creation of such a Center, along with the interim and long-range requirements for staff, equipment and facilities needed for a major radiation therapy cooperative program throughout the state. Facility schematics, special facility and equipment design criteria, and budgeting cost estimates for the interim and permanent facilities will be accomplished in this planning effort.

## II. BACKGROUND AND GENERAL INFORMATION

### 2.1 HISTORY OF THE MEDICAL SCHOOL

The first classes in medicine at the University began in 1888 when three of the four private or proprietary medical schools in Minneapolis and St. Paul offered their charters and resources to the state. In accepting this offer the Regents assumed responsibility on behalf of the people of the state of Minnesota for medical education. In 1908 the remaining proprietary school was incorporated into the University Medical School; since then there have been no other schools of medicine in Minnesota.

In 1905, money for the construction of a hospital was offered to the University by the executor of a private estate. Various delays were encountered but eventually legislative approval and additional money were obtained. The Elliot Memorial Hospital, the first unit of University Hospitals, was dedicated in 1911. The act of acceptance passed by the Legislature stated that the hospital would belong to and be a part of the University, that indigent residents of Minnesota would receive free care and treatment, and that the hospital would be managed and controlled by the Regents of the University. Additional hospital and medical school buildings have been added along a similar pattern of private donation to the University with control and management by the Regents and with legislative appropriations to supplement the gifts of private donors. These include the Todd Hospital, the Cancer and Christian gifts, Eustis Hospital, Mayo Memorial, Variety Club Heart Hospital, Masonic Memorial Hospital, Veterans of Foreign Wars Cancer Research Center, and the Children's Rehabilitation Center -- called collectively the University Hospitals.

The origins of the strengths of the Medical School can be traced to strong departments in the basic medical sciences and this strength has pervaded the clinical departments and has fostered a tradition of clinical research.

## 2.2 MEDICAL SCHOOL ADMINISTRATION

The College of Medical Sciences is a major academic unit of the University of Minnesota and has administrative responsibility for the Medical School, the School of Nursing, the School of Public Health, and University Hospitals. The principal administrative officer of the college is the dean who is assisted in his duties related to the college and the Medical School by associate and assistant deans. The Schools of Nursing and of Public Health and the University Hospitals are administered by their respective directors and deans. The administrative center for the Medical School and for Medical Student Affairs is located in 1305 Mayo Memorial Building in the Health Sciences Center on the Minneapolis Campus.

## 2.3 FACULTY

The full-time faculty of the Medical School numbers approximately 500, of which approximately 180 are members of the Executive Faculty. The Executive Faculty has delegated to its appropriate constituted committees the responsibility for determining student qualifications for admission and readmission and for decisions pertaining to student scholastic standing and dismissal from Medical School.

The Medical School Admissions Committee is responsible for selection of each year's entering class and for approving applications for transfer to the Medical School. The Admissions Committee is also responsible for readmission of students to Medical School. The Committee on Student Scholastic Standing evaluates each student's academic and professional performance and general suitability for medicine periodically through his medical school work. It is the decision of this committee which permits each student to continue to progress yearly to the succeeding class

and to the goal of the M. D. degree. Decisions made by this committee are subject to appeal by the student. Another committee of the Executive Faculty is the Educational Policy Committee, which has as its function ongoing curriculum review. Recommendations for curriculum change are made to the Executive Faculty. Each of these major committees includes within its membership at least one student representative.

#### 2.4 PHYSICAL FACILITIES OF THE MEDICAL SCHOOL

The University of Minnesota Health Science Center is situated on the University of Minnesota Campus in Minneapolis, and the University Hospitals function as a major referral center for the metropolitan area population of approximately 2,000,000. It serves as a referral center for most of Minnesota and the majority of the neighboring states including Wisconsin, Iowa, South and North Dakota, Wyoming, and Montana. The medical school presently has 703 students in training with plans to increase the number of students soon. 266 residents are in training in the University Hospitals. In addition to the medical school, a dental school, nursing school, and many other paramedical schools are on this campus.

The University Hospitals contain 845 beds, 120 of these beds being devoted exclusively to patients with neoplastic disease. The Veterans Administration Hospital has 500 beds, and its staff and facilities are closely involved in the oncology program of the University of Minnesota. The Department of Therapeutic Radiology is one of a number of departments involved in the training, treatment, and research in cancer. In addition to University Hospital, the Medical School is also affiliated with the Veterans Administration Hospital, the Hennepin County General Hospital and the Ramsey County Hospital in St. Paul.



2.4.1 Other Major Cancer Facilities at the University of Minnesota

A number of cancer treatment and research facilities are present at the University of Minnesota, which are of great usefulness in the training of the radiation therapy fellows. Included among these are:

A. Cancer Coordinating Committee Administrative Facilities:

The Cancer Coordinating Committee is an advisory committee to the Dean of the Medical School and maintains an administrative office on the fourth floor of the Masonic Memorial Hospital. This contains an office suite for two secretaries, an office for the Director of Cancer Tutorial Program, a secretarial work office, and a faculty office. Adjacent to this office is a cancer seminar room and an audio-visual teaching laboratory. In this area teaching materials include audio-visual tape programs, movies, lanterns, slide teaching materials, and other audio-visual equipment. The secretarial office provides a Xerox Copier available for reproduction of teaching materials and other cancer teaching activities.

B. The Mayo Building:

The major teaching facility of the University of Minnesota Hospital complex is the Mayo Building. This houses the Departments of Internal Medicine, Surgery, Pediatrics, Orthopedics, Urology, Otolaryngology, Neurosurgery and Gynecology along with other departments that are concerned with cancer patients. This hospital, including the Heart Hospital and Rehabilitation Hospital has 730 beds of which approximately 100 are occupied by patients with malignant disease at any one time. These patients provide the major teaching area for medical students and house officers in all departments and ensures a population of patients that represents the core of the clinical medical education of all of the students in the school.

Because this building houses all of the clinical departments, some of the departments of basic sciences, the operating rooms, and all of the clinical laboratories, it is an area where the application of different disciplines and the exchange of ideas on given clinical problems are easily carried out. The result is a system of easy consultation and exchange that benefits patients, students and faculty.

C. Masonic Memorial Hospital:

The Masonic Memorial Hospital is designed as a facility for the study and care of patients with advanced malignant disease. It consists of 120 beds for patients with advanced malignant disease or other chronic diseases, research laboratories in 10,000 square feet of space, and office suites for the cancer staff of the departments of Medicine, Surgery, and Pediatrics. The research laboratories are designed primarily to conduct studies relative to the problems of patients in the Masonic Hospital. The basement of the Masonic Memorial Hospital contains special laboratories of the Department of Laboratory Medicine, electron microscope facilities of the Department of Dermatology, the Cancer Detection Center, and computer facilities of the Bio-Medical Data Processing Center. The VFW Research Clinic will be changed to the basement of the Masonic Memorial Hospital and the name altered to the "Masonic Clinic".

D. The Veterans of Foreign Wars Cancer Research Center:

The VFW Cancer Research Center is adjacent to the Masonic Memorial Hospital. This contains 28,000 square feet of space devoted to the study of cancer and other special facilities. Within this unit the cancer facilities consist of:

1. The VFW Research Clinic, an ambulatory facility for the study and care of patients with advanced malignant disease or patients who are undergoing special research tests, procedures, or therapies. It is supervised by the Cancer Coordinating Committee and is available to any department of the school requiring this type of cancer facility. It is planned to transfer this to a new area in the Masonic Memorial Hospital.
2. The Animal Research Laboratory in the basement of the VFW Building provides small animals in support of cancer research activities conducted in the Cancer Center.
3. Radiation Laboratories in the basement of the VFW Building provide counting equipment and a "hot" laboratory.
4. A Tumor Immunology Laboratory, occupying most of one floor of the VFW Cancer Research Center, is devoted to the study of many aspects of the immune response to malignant disease. This includes identification of tumor specific antigens, isolation and characterization of these antigens, induction and evaluation of the immune responses of animals and patients bearing antigenic tumors, manipulation of these immune responses, immunogenetic studies of the origin and significance of tumor antigens, and studies of the effect of malignancy on the general immune response. A large portion of the work being carried out in these laboratories is now devoted to the studies of the antigenicity of human tumors, particularly those thought possibly to be induced by viruses. In addition, a new program in Experimental Immuno-therapy is being instituted to devise methods by which the immune response of patients to their own antigenic tumors can be substantially increased. These laboratories have provided fruitful research experiences for several medical students as well as for pre-doctoral and post-doctoral fellows.

5. Neurosurgery Research Laboratories: An intensive study of primary brain tumor is being developed because of the pioneering chemotherapy studies of glioblastoma multiforme by the Section of Medical Oncology in conjunction with the Department of Neurosurgery. This area of research will provide a teaching-therapy program in advanced brain neoplasms. An electron microscope is being installed to coordinate with this program.
6. Metabolic Clinical Research Center: This center has been recently awarded to the Medical School in order to conduct metabolism studies in a variety of clinical areas. Studies of cancer patients will be incorporated in this endeavor. This unit is located on the second floor of the VFW Building.

E. Interdisciplinary Tumor Clinic:

The out-patient Tumor Clinic is an interdisciplinary clinic supervised by the Cancer Coordinating Committee. It provides follow-up of patients with tumor problems from many services, particularly surgery and radiotherapy, following primary treatment of the disease. In addition, active chemotherapy is carried out on patients with solid tumors, many of whom had previous surgery. The clinic serves as a recognized source of interdepartmental consultation for patients with tumors that may be referred from any department in the hospital complex. The Tumor Clinic had 1,028 visits between July 1, 1967 and June 30, 1968. In addition, each specialty that cares for malignant disease has its own out-patient clinic. These include Neurosurgery, Urology, Gynecology, ENT, Radiotherapy, and Medical Oncology. The last of these is the largest medical specialty clinic and has approximately 1,400 patient visits per year.

F. Diehl Hall Library:

The Diehl Hall Library is a fully equipped modern Bio-Medical library adjacent to the cancer facilities. This library represents a library available to the University of Minnesota Health Sciences Center including those relating to cancer research. The library has a department of the History of Medicine.

G. Bio-Medical Data Processing Center:

The Bio-Medical Computer Center is available for studies requiring statistical aid. This facility consists of heavy computer equipment in the basement of the Masonic Memorial Hospital and offices on the entire third floor of the VFW Cancer Research Building. These facilities support activities of the Cancer Registry and research activities in cancer.

H. Cancer Detection Center:

The Cancer Detection Center in the basement of the Masonic Memorial Hospital is a center that has been in existence for more than 21 years. It encompasses a complete examination of normal people in an attempt to detect cancer. It exemplifies various techniques for diagnosing asymptomatic or early cancer. It is a model for teaching cancer students, clinical fellows, staff, and community physicians in the appropriate examination technique for cancer diagnosis. It is recognized as one of the few medical centers from which cancer detection statistics can be obtained in the nation.

III. A DESCRIPTION OF PROGRAMS, FACILITIES, STAFF  
EQUIPMENT AND PATIENT LOAD DATA  
WITHIN THE DEPARTMENT OF THERAPEUTIC RADIOLOGY

3.1 GENERAL

The Department of Therapeutic Radiology was established as a separate department in the medical school in August, 1970. The staff includes three therapists, two physicists, two radiobiologists, and a paramedical staff of five nurse technicians, five secretaries, and other paramedical personnel. We are now actively recruiting for a fourth radiotherapy staff physician.

Presently there are three full time radiotherapy trainees in addition to four to five general radiology trainees assigned to the department for periods ranging from six months to a year. The University of Minnesota Hospitals will financially support two residents in Radiation Therapy beginning July 1, 1971.

The Department occupies about 10,000 square feet allocated to clinical facilities, offices, examination rooms, and laboratory space.

3.2 EQUIPMENT

The equipment in the Department includes a newly installed Toshiba, 12 MeV Linear Accelerator, an Eldorado Cobalt 60 Telecobalt unit, a General Electric Maxitron X-ray 250 KVP unit, General Electric Maximar X-ray 220 KVP research unit, Picker 120 KVP X-ray unit, Phillips Contact X-ray 50 KVP unit. The department also has approximately 800 mgms of radium in the forms of needles and capsules.

In addition, a transverse Axial Tomogram unit and simulator are being installed, as is an automatic processor. A Spear treatment planning computer is now functioning and being used for treatment planning and training.

### 3.3 PROGRAMS AND PATIENT LOADS

Approximately 1,100 new patients are seen yearly in the department. About 900 are treated. Approximately 700 of these are new patients and 200 return patients.

Five radiotherapy beds are assigned to the department. These are situated in the Masonic Memorial Hospital, a 120 bed malignant disease hospital. In addition, the department has unlimited admitting in the minimal care and out-patient treatment facilities.

Numerous clinical and experimental research programs are under way at the present time. Each of these programs involves training to a major extent. Each program is designed with the thought of the research and training being of utmost concern. Among these are:

1. Esophagus protocol. Split dose.
2. Pre-operative head and neck protocol.
3. Randomized Hodgkin's Disease.
4. Randomized pre-operative Hypernephroma protocol.
5. Effect of hypertension and arteriosclerosis on response of squamous cell cancer of cervix to irradiation protocol.
6. Randomized split dose lung protocol.

3.4 EXISTING INTRAMURAL AFFILIATIONS AMONG OTHER DEPARTMENTS INVOLVED IN ONCOLOGY

3.4.1 Therapeutic Radiology

The Department of Therapeutic Radiology was established as a separate department in the Medical School in August, 1970. The staff presently includes two full time therapists, two physicists, two radiobiologists and a paramedical staff of five nurse technicians, five secretaries and other paramedical personnel. In addition, we are now actively recruiting for a third and fourth radiotherapy staff physician. There are presently three full time therapy radiotherapy trainees in addition to three general radiology trainees assigned to this department. The Department of Therapeutic Radiology has active ongoing programs in the Departments of Surgery, Gynecology, Pediatrics and Medical Oncology. These include protocols, rounds, etc.

3.4.2 Surgery

Includes head and neck preoperative radiation protocol, combined chemotherapy, radiation, and surgery for head and neck protocol, and a protocol for the staging of Hodgkin's Disease and other lymphomas surgically.

3.4.3 Gynecology

There are joint rounds and teaching sessions between the two services and a joint care program for oncology patients on the gynecology services. The radiation therapy residents are intimately involved in the treatment of gynecologic cancer patients with radium. Combined rounds are held weekly to discuss new patients and patients under treatment.



#### 3.4.4 Pediatrics

Combined rounds are held with the section of oncology of the Department of Pediatrics. These include ward rounds, discussions of patients with tumors on the pediatric service being treated with radiation therapy, and Pediatric Grant Rounds (Cancer).

#### 3.4.5 Medical Oncology

An active interrelationship between Medical Oncology and Radiation Therapy exists and a number of combined protocols are underway; specifically, randomization for treatment of Stage III, Hodgkin's Disease patients with radiation therapy or chemotherapy and pilot studies in the use of mithramycin combined with radiation therapy in the treatment of patients with Glioblastoma. In addition, the Department of Neurosurgery is involved in this latter protocol.

The Departments of Medicine, Pediatrics, Neurosurgery, Radiotherapy and Surgery are involved in a protocol and a grant program for the study of advanced malignant disease.

#### 3.5 AREAS WHERE CURRENT PROGRAM CAN BE STRENGTHENED

At the present, there is no long-range plan for the development of radiation therapy research and clinical facilities within the University structure and there is a need for an evaluation of such a Centers effect on the operation of the overall cancer management system in the entire state and surrounding region. This planning would also assist in improved coordination among those responsible for oncologic care. Additionally, it is felt that this planning effort would have a significant impact on expansion of ambulatory care and primary care facilities. Another area of need involves a requirement for coordination of area wide medical records, cancer patients records and improvement of referral patterns and, again, there is room for some improvement of coordination with other treatment areas such as surgery and chemotherapy in the state although it is quite good at this time.

### 4.3

## JUSTIFICATION OF THE NEED FOR EXTRAMURAL PLANNING ASSISTANCE

### 4.3.1 Data Collection and Feasibility Study

Inherent in the design of a system [whether it be the implementation of a process, control of a disease, design of a hospital or one of its components] is an analysis of the probability of success of the enterprise and of the feasibility of its accomplishment considering the alternatives and limitations. Limitations may be physical (i. e., size of the site, building code height limits, etc.) or economic/fiscal. The professional, scientific and instructional activities of a school of medicine and operating hospitals (1) are generally not structured for such an objective evaluation, (2) do not have all of the professional skills needed for such a study, and (3) do not have time available from other duties for total accomplishment of this type of effort. The administrator of the Medical School and staff within the Department of Therapeutic Radiology are convinced of the necessity of drawing upon the expertise and skills of independent extramural planning and consultation organizations who have previously demonstrated their abilities in the field of analysis of, and planning for, other similar programs and facilities in cancer.

### 4.3.2 Conceptual Design for an Interim Facility Expansion Program

The implementation of the total program and opening of a new Radiation Therapy Research and Clinical Center will probably take from three to six years, depending on budgeting, funding, design and construction. During the period until completion of the final concept, it will be necessary to develop and implement plans for an interim radiation therapy program in order to:

- Identify space for an increase in staff and programs (laboratories, etc.);
- Procure, install and make use of modern diagnostic and radiation therapy devices;
- Implement cooperative arrangements with radiation therapy activities and institutions outside the Medical Center District;
- Provide for an increase in the radiation therapy patient load commensurate with the initiation of the cohesive program.

#### 4.3.3 Conceptual Design for a New Center

Included in the study desired under the scope of this grant will be the provision for a conceptual design study for a new, model facility for Therapeutic Radiology which can carry out the objectives outlined in the previous sections.

#### 4.3.4 Operational Analysis and Budget/Financial Planning

Sound fiscal planning for the delivery of health services demand that programs of health care be economically viable. Moreover, the exigencies of fiscal planning today for medical education, research and patient care demand a clear delineation and separation of costs attributable to each category; instruction, research and patient care. A fiscal analysis of the program, with an analysis of sources of funding, will be necessary in order to enable the University to determine the feasibility of the project, its priority and operation in relation to other Medical School programs.

#### 4.4 OUTLINE OF PLANNING PROCEDURE PROPOSED BY CONSULTANT FIRM

As indicated previously, a significant portion of the grant funds (if approved) will be used to obtain the services of an outside con-

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sulting firm. Preliminary discussions have been conducted with representatives of such a consulting firm, and they have indicated that the study would be conducted in four phases over a 24-month period.

Phase I of the program, a Feasibility Study, will be conducted by the completion of detailed facility and equipment planning questionnaires prepared by the consultant firm and submitted to the staff of the Medical School and cooperating institutions within the state. The completed questionnaires will be analyzed by the consulting firm's staff and then followed up by interviews with all administrative and medical personnel involved in the program. From the information developed, the gross facility and equipment requirements will be determined. Evaluation of the space requirements needed to accomplish clinical procedures, research and training commitments will also be made. Based on the information compiled, a Feasibility Study will be prepared and presented to the Medical School officials. The report will contain information concerning the general space requirements and equipment needs, along with cost information and recommendations for implementing the facility development program, identify both interim facility requirements and the needs for a Radiation Therapy Research and Clinical Center. This report will contain cost data, staff requirements and an outline of facility development alternatives. Subsequent phases will not commence until review and approval of the Phase I Feasibility Study is completed.

Phase II of the study will consider the development of an Interim Program and Facilities Report. This study will be designed to identify interim program staff, equipment and facility needs, which will fill the requirements of the University of Minnesota Medical School. The planning consultant will work closely with University planning officials and architectural representatives in order to identify areas where space

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can be made available (for the interim period) should an increase in the scope of activities, building of necessary staff, and installation of new equipment be necessary. The report will contain schematic facility layouts and design criteria for the renovation and alteration of existing space, if available, and detailed budget estimates for the renovations and equipment installation. Possible sources of funding for alterations, renovations and construction, as well as funding of operations for the interim facility, will also be investigated and discussed in the report. Phase II will proceed concurrently with Phase III.

The Phase II study will consist of developing a Conceptual Facility Design Study for a new Radiation Therapy Research and Clinical Center. The design study will include schematic facility layouts, design criteria for the entire facility, shielding calculations relating to the specific radiation therapy equipment desired, utility requirements for the advanced radiation sources, and heating, ventilation, and air conditioning requirements for all space.

Additionally, detailed project cost estimates will be prepared for budget programming purposes and will include major equipment costs as well as facility construction estimates. The Phase III study will be prepared in a format which can be used by the University architect as guidance in the preparation of detailed working drawings and specifications.

All phases of this study will be closely coordinated with the Medical School and hospital planning officials and the University architect (or architects). The Phase III study will be developed within the boundary limitations and budget programming guidance established by the institutions after their review of the Phase I Feasibility Report.

The Phase IV work effort involves preparation and submission of a Financial Analysis Report for the Radiation Therapy Research and

Clinical Center. This report will contain an analysis of estimated operating costs for the Center including projected expenses for staff salaries, equipment maintenance, building services, administrative and management costs, as well as estimates of income that can be expected from all sources, such as fees for clinical services, grants for training and operation from governmental sources, as well as necessity for other subsidies from private and local agencies. Information obtained from the questionnaires and discussions with the staff of the Cancer Center and discussions with outside agencies such as the National Cancer Institute, American Cancer Society, etc., will be used in the preparation of this report.

Accomplishment of this document will provide a logical basis for funding efforts, such as preparation and submission of grant requests for governmental assistance and solicitation from private agencies.

#### 4.5 PLANNING CONSULTANTS BUDGET BREAKDOWN

See next page.

BUDGET JUSTIFICATION - FIRST YEAR (continued)

B. Consultants:

Private Planning Organization - The professional multidisciplinary architect/engineer/scientific planning firm selected to carry out the technical aspects of the program will perform the functions outlined in the main narrative of the grant request. Discussions with the representatives of such firms have been held and these representatives have indicated that a 29 man-month effort will be necessary to accomplish all phases of the program. Professional disciplines expected to be required for the accomplishment of this study include physicians, physicists, research analysts, computer specialists, lawyers, business administrators and of course, architect/engineers. The planning firm will work under the scientific direction of the Principal Investigator. The funds requested in the budget reflect the cost quotation furnished by the representatives of the firm which has been determined to be the best qualified to perform the planning program contained in the grant application.

C. Equipment - Equipment costs involve normal office equipment items for the administrator and his secretary. This includes 2 desks, 2 chairs, table, wastebaskets, 2 filing cabinets, and an electric typewriter.

D. Supplies - Include normal office supplies for the administrator and secretary.

E. Travel - Domestic Travel funds are required for the Principal Investigator and Assistant Principal Investigator for travel to the consultants office on the West Coast. Travel is computed as follows:

1 roundtrip Minneapolis-West Coats	\$ 204.00
2 days per diem each trip @ \$25.00/day	50.00
Rental car - two days @ \$16.00/day	32.00
Miscellaneous Expenditures	14.00
TOTAL	<u>\$ 300.00 per trip</u>
Times 4 Trips @ \$300.00/trip =	<u><u>\$1,200.00</u></u>

**BUDGET ESTIMATES FOR ALL YEARS OF SUPPORT REQUESTED FROM PUBLIC HEALTH SERVICE  
DIRECT COSTS ONLY (Omit Cents)**

DESCRIPTION	1ST PERIOD (SAME AS 1- TAILED BUDGET)	ADDITIONAL YEARS SUPPORT REQUESTED <i>(This application only)</i>					
		2ND YEAR	3RD YEAR	4TH YEAR	5TH YEAR	6TH YEAR	7TH YEAR
PERSONNEL COSTS	25,740	27,027					
CONSULTANT COSTS <i>(Include fees, travel, etc.)</i>	76,592	43,438					
EQUIPMENT	2,000	1,000					
SUPPLIES	500	500					
TRAVEL	DOMESTIC	1,200	1,200				
	FOREIGN	-----	-----				
PATIENT COSTS	-----	-----					
ALTERATIONS AND RENOVATIONS	-----	-----					
OTHER EXPENSES	-----	-----					
<b>TOTAL DIRECT COSTS</b>	<b>106,040</b>	<b>73,165</b>					

TOTAL FOR ENTIRE PROPOSED PROJECT PERIOD *(Enter on Page 1, Item 4)* → \$ 179,205

REMARKS: *Justify all costs for the first year for which the need may not be obvious. For future years, justify equipment costs, as well as any significant increases in any other category. If a recurring annual increase in personnel costs is requested, give percentage. (Use continuation page if needed.)*

**BUDGET JUSTIFICATION - FIRST YEAR**

- A. Salaries - The services of the principal investigator will be provided by the Medical School as a contribution to the grant.

Salary support for a project administrator (full-time) and secretary (full-time) is needed in order to provide the administrative support required for a project of this magnitude. The administrator for the project will serve full time on the Medical School campus in order to provide necessary scheduling, coordination, travel authorization, record keeping, and activities associated with the planning effort. Typical examples of work performed by this individual will include establishing meetings between the planning consultants and key staff, distribution and collection of planning questionnaires, distribution of planning documents, collection and transmittal of review comments to the consultant firm and assuring continuity of the planning effort in the temporary absence of the Principal Investigator. The large volume of paper work, correspondence, memoranda, etc. will require the full time utilization of a secretary/stenographer.

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DETAILED BUDGET FOR FIRST 12-MONTH PERIOD

FROM 1 January 1972

THROUGH 31 December 1972

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DESCRIPTION (Itemize)		TIME OR EFFORT (HRS.)	AMOUNT REQUESTED (Omit cents)			
PERSONNEL	NAME		TITLE OF POSITION	SALARY	FRINGE BENEFITS	TOTAL
	Seymour H. Levitt		PRINCIPAL INVESTIGATOR	2		NONE
	Administrator	40	to be named	18,000	1,800	19,800
	Secretary	40	to be named	5,400	540	5,940
SUBTOTAL						\$25,740
CONSULTANT COSTS Funds required for obtaining the consultant services						76,592
EQUIPMENT Office equipment (2 desks, chairs, typewriter, filing cabinet)						2,000
SUPPLIES Normal office supplies						500
TRAVEL	DOMESTIC 4 roundtrips to consultants office in Calif. for review conf					1,200
	FOREIGN					0
PATIENT COSTS (See instructions)						
ALTERATIONS AND RENOVATIONS						
OTHER EXPENSES (Itemize)						
TOTAL DIRECT COST (Enter on Page 1, Item 5)						106,040

INDIRECT COST (See Instructions)

DATE OF DHEW AGREEMENT:

- WAIVED
- UNDER NEGOTIATION WITH:

\_\_\_\_\_% S&W\*  
 \_\_\_\_\_% TDC\*  
 \*IF THIS IS A SPECIAL RATE (e.g. off-site), SO INDICATE.

ENVIRO-MED, INC. BUDGET BREAKDOWN

	<u>PHASE I - Feasibility Study</u>			<u>Total Phase I</u>	<u>PHASE II Interim Facility</u>	<u>PHASE III Conceptual Design</u>	<u>PHASE IV Financial Analysis</u>	<u>TOTAL PROGRAM</u>
	<u>Data Collection</u>	<u>Analysis</u>	<u>Report</u>					
Architect-Engineers	1.50	2.00	1.50	5.00	5.00	6.00	.50	16.50
Scientists	.50	1.00	.50	2.00	1.00	1.50	----	4.50
Financial Analysts	.50	.50	.25	1.25	.50	.50	6.00	8.25
<b>TOTAL Man-Months</b>	<b>2.50</b>	<b>3.50</b>	<b>2.25</b>	<b>8.25</b>	<b>6.50</b>	<b>8.00</b>	<b>6.50</b>	<b>29.25</b>
<u>Contract Cost Development</u>								
Direct Labor	\$ 3,600	\$ 5,150	\$3,225	\$11,975	\$ 9,050	\$11,250	\$ 9,650	\$ 41,925
Fringe @ 20%	720	1,030	645	2,395	1,810	2,250	1,930	8,385
Overhead @ 115%	4,140	5,922	3,709	13,771	10,408	12,938	11,098	48,215
Travel	750	750	750	2,250	500	750	750	4,250
Reproduction	-----	-----	300	300	300	500	500	1,600
<b>Total Cost</b>	<b>\$ 9,210</b>	<b>\$12,852</b>	<b>\$8,629</b>	<b>\$30,691</b>	<b>\$22,068</b>	<b>\$27,688</b>	<b>\$23,928</b>	<b>\$104,375</b>
Fee @ 15%	1,381	1,928	1,294	4,603	3,310	4,153	3,589	15,655
<b>TOTAL PRICE</b>	<b>\$10,591</b>	<b>\$14,780</b>	<b>\$9,923</b>	<b>\$35,294</b>	<b>\$25,378</b>	<b>\$31,841</b>	<b>\$27,517</b>	<b>\$120,030</b>

DEPARTMENT OF  
HEALTH, EDUCATION, AND WELFARE  
PUBLIC HEALTH SERVICE

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## GRANT APPLICATION

TYPE	PROGRAM	NUMBER
REVIEW GROUP		FORMERLY
COUNCIL (Month, Year)		DATE RECEIVED

TO BE COMPLETED BY PRINCIPAL INVESTIGATOR (Items 1 through 7 and 15A)

1. TITLE OF PROPOSAL (Do not exceed 53 typewriter spaces)

Exploratory Study - Radiation Therapy Research and Clinical Center

2. PRINCIPAL INVESTIGATOR

2A. NAME (Last, First, Initial)

Levitt, Seymour H., M. D.

3. DATES OF ENTIRE PROPOSED PROJECT PERIOD (This applicatio

FROM

1 January 1972

THROUGH

31 December 1973

2B. TITLE OF POSITION

Professor and Head  
Department of Therapeutic Radiology4. TOTAL DIRECT COSTS RE-  
QUESTED FOR PERIOD IN  
ITEM 35. DIRECT COSTS REQUESTED  
FOR FIRST 12-MONTH PERIO

2C. MAILING ADDRESS (Street, City, State, Zip Code)

Department of Therapeutic Radiology  
Box 187  
Mayo Memorial Building  
Minneapolis, Minnesota 55455

6. PERFORMANCE SITE(S) (See Instructions)

Department of Therapeutic Radiology  
Box 187  
Mayo Memorial Building  
Minneapolis, Minnesota 55455

(enter Congressional District)

2D. DEGREE

M. D.

2E. SOCIAL SECURITY NO.

2F. TELE-  
PHONE  
DATAArea Code  
612

TELEPHONE NUMBER AND EXTENSION

373-8680

2G. DEPARTMENT, SERVICE, LABORATORY OR EQUIVALENT  
(See Instructions)

Department of Therapeutic Radiology

2H. MAJOR SUBDIVISION (See Instructions)

N/A

7. Research Involving Human Subjects (See Instructions)

A.  NO B.  YES Approved: \_\_\_\_\_C.  YES - Pending Review Date \_\_\_\_\_

8. Inventions (Renewal Applicants Only - See Instructions)

A.  NO B.  YES - Not previously reportedC.  YES - Previously reported

TO BE COMPLETED BY RESPONSIBLE ADMINISTRATIVE AUTHORITY (Items 8 through 13 and 15B)

9. APPLICANT ORGANIZATION(S) (See Instructions)

11. TYPE OF ORGANIZATION (Check applicable item)

 FEDERAL  STATE  LOCAL  OTHER (Specify)12. NAME, TITLE, ADDRESS, AND TELEPHONE NUMBER OF  
OFFICIAL IN BUSINESS OFFICE WHO SHOULD ALSO BE  
NOTIFIED IF AN AWARD IS MADE

Telephone Number \_\_\_\_\_

10. NAME, TITLE, AND TELEPHONE NUMBER OF OFFICIAL(S)  
SIGNING FOR APPLICANT ORGANIZATION(S)13. IDENTIFY ORGANIZATIONAL COMPONENT TO RECEIVE CRED  
FOR INSTITUTIONAL GRANT PURPOSES (See Instructions)

01-School of Medicine

14. PHS ACCOUNT NUMBER (Enter if known)

Telephone Number (s) \_\_\_\_\_

15. CERTIFICATION AND ACCEPTANCE. We, the undersigned, certify that the statements herein are true and complete to the best of our knowledge and accept, as to any grant awarded, the obligation to comply with Public Health Service terms and conditions in effect at the time of the award.

SIGNATURES

(Signatures required on  
original copy only.  
Use ink, "Per" signatures  
not acceptable)

A. SIGNATURE OF PERSON NAMED IN ITEM 2A

DATE

B. SIGNATURE(S) OF PERSON(S) NAMED IN ITEM 10

DATE

CHECKLIST FOR RESEARCH GRANT APPLICATION  
(PHS-398)

PRINCIPAL INVESTIGATOR

Seymour H. Levitt, M. D.

COMPLETE AND FORWARD THIS SHEET WITH YOUR APPLICATION.

A. TYPE OF APPLICATION:

NEW (A research project for which PHS support is being sought for the first time.)

RENEWAL OF GRANT NO. \_\_\_\_\_  
(A request for funds to support a research project beyond the current project period.)

REVISION OF APPLICATION NO. \_\_\_\_\_  
(An application which replaces the prior version.)

SUPPLEMENT TO GRANT NO. \_\_\_\_\_  
(A request for additional funds during an approved project period. A supplement may not extend the previously approved project period.)

B. AUXILIARY INFORMATION IN CONNECTION WITH:

CIVIL RIGHTS:

ASSURANCE FILED

ASSURANCE NOT FILED

COST SHARING:

INSTITUTIONAL AGREEMENT DATED \_\_\_\_\_

NO INSTITUTIONAL AGREEMENT

C. CONTENTS OF ENVELOPE

1. FORMAL APPLICATION PREPARED ON FORM PHS-398 ASSEMBLED IN FOLLOWING ORDER:

SECTION I

PAGE 1, FACE SHEET, ALL ITEMS COMPLETED OR NA (NOT APPLICABLE) INSERTED.  
TWO SIGNATURES INCLUDED

PAGE 2, RESEARCH OBJECTIVES, (LIMITED TO SPACE PROVIDED)

SECTION II

PAGE 3, DETAILED BUDGET FOR FIRST 12 MONTH PERIOD. (JUSTIFICATION INCLUDED AS REQUIRED.)

PAGE , BUDGET ESTIMATES FOR ALL YEARS OF SUPPORT. (JUSTIFICATION INCLUDED AS REQUIRED.)

PAGE , BIOGRAPHICAL SKETCHES FOR ALL PROFESSIONAL PERSONNEL.

PAGE , RESEARCH PLAN.

PAGE , PROGRESS REPORT (REQUIRED FOR RENEWAL AND SUPPLEMENTAL APPLICATIONS.)

2.  APPLICATION RECEIPT RECORD, FORM PHS-3830 (PERFORATED CARD)

3.  CHECKLIST ATTACHED TO ORIGINAL COPY WITH PAPER CLIP

4.  APPENDIX (12 COPIES). LIST CONTENTS BELOW:

ING

SEVEN COPIES OF THE APPLICATION (THE ORIGINAL SHEETS FORMING ONE SET, WHICH IS NOT TO BE STAPLED BUT SECURED WITH A PAPER CLIP) AND 12 SETS OF ANY APPENDIX MATERIAL, TOGETHER WITH THE CHECKLIST, ARE TO BE MAILED IN THE ENVELOPE PROVIDED.

## BIOGRAPHICAL SKETCH

(Give the following information for all professional personnel listed on page 3, beginning with the Principal Investigator. Use continuation pages and follow the same general format for each person.)

NAME	TITLE	BIRTHDATE (Mo., Day, Yr.)
PLACE OF BIRTH (City, State, Country)	PRESENT NATIONALITY (If non-U.S. citizen, indicate kind of visa and expiration date)	SEX <input type="checkbox"/> Male <input type="checkbox"/> Female

EDUCATION (Begin with baccalaureate training and include postdoctoral)

INSTITUTION AND LOCATION	DEGREE	YEAR CONFERRED	SCIENTIFIC FIELD

HONORS

MAJOR RESEARCH INTEREST

ROLE IN PROPOSED PROJECT

RESEARCH SUPPORT (See instructions)

RESEARCH AND/OR PROFESSIONAL EXPERIENCE (Starting with present position, list training and experience relevant to area of project. List all or most representative publications. Do not exceed 3 pages for each individual.)

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NOT FOR  
PUBLICATION  
OR  
PUBLICATION  
REFERENCEDEPARTMENT OF HEALTH, EDUCATION, AND WELFARE  
PUBLIC HEALTH SERVICE

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PROJECT NUMBER

## RESEARCH OBJECTIVES

NAME AND ADDRESS OF APPLICANT ORGANIZATION

Department of Therapeutic Radiology  
University of Minnesota Medical SchoolNAME, SOCIAL SECURITY NUMBER, OFFICIAL TITLE, AND DEPARTMENT OF ALL PROFESSIONAL PERSONNEL ENGAGED ON  
PROJECT, BEGINNING WITH PRINCIPAL INVESTIGATORSeymour H. Levitt, M. D. ( ) Professor & Head, Department of  
Therapeutic Radiology

(Add names as required)

TITLE OF PROJECT

Exploratory Study - Radiation Therapy Research and Clinical Center

USE THIS SPACE TO ABSTRACT YOUR PROPOSED RESEARCH, OUTLINE OBJECTIVES AND METHODS, UNDERSCORE THE KEY WORDS  
(NOT TO EXCEED 10) IN YOUR ABSTRACT. Funds outlined in this grant application are requested in

order to permit the accomplishment of an exploratory study directed at planning for the establishment and long-range goals of a Radiation Therapy Research and Clinical Center to be operated by the Department of Therapeutic Radiology at the University of Minnesota Medical School. The Radiation Therapy Center will serve the clinical service, research and training requirements for the Medical School and affiliated institutions throughout the state, and surrounding regions.

The goal and objectives of such a Center will provide a nucleus for research in treatment of cancer with ionizing radiation and correlated improved clinical care of cancer patients. This program would be expected to involve research in the practical clinical applications of radiation biology, cancer immunology, cancer chemotherapy, and surgery as they relate to radiation therapy in the treatment of cancer.

The creation of a Radiation Therapy Research and Clinical Center for this area will result in better care for the cancer patient at an economical cost and will also provide facilities and clinical material for the training of urgently needed radiation therapists, therapy technicians and support personnel, as well as establishing a center for radiation therapy related cancer research in cooperation with the other major oncologic specialties. The planning program will investigate the feasibility of the creation of such a Center, along with the interim and long-range requirements for staff, equipment and facilities needed for a major radiation therapy cooperative program throughout the state. Facility schematics, special facility and equipment design criteria, and budgeting cost estimates for the interim and permanent facilities will be accomplished in this planning effort.

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TO: Cancer-Interested People at the University of Minnesota

FROM: Charles F. McKhann, M. D.  
Chairman, Health Sciences Cancer Coordinating Committee

Re: Application for a Planning Grant for a Cancer Research Center at the University of Minnesota

Enclosed is a copy of the final draft of the planning grant that was submitted to the National Institutes of Health for consideration and development of a Cancer Research Center at the University of Minnesota. It is obvious that there are some defects in this application in that there was not enough time to get all the material that could have been included. The application, however, is only the first step in what we hope will be a major effort to bring together widely separated interests, focussing our various talents in many disciplines on the overall problem of cancer. A casual perusal of the enclosed application will indicate how much depth we already have.

In order to use this application as a basis for collecting more ideas and developing imaginative long-range plans, 250 copies of the application have been mimeographed. We would like to distribute it to all people who think they may have any interest in the development of such a center. If you know of anyone whom you think would be interested in receiving a copy, please notify Mrs. Bronder in the Cancer Coordinating Office (373-4449) and she will send one out.

I urge you to look over this application and note down any suggestions that you would like to make concerning your own area of interest and also broader ideas that you may have. I would welcome receiving these notes at any time. Ideas that we gather now will form a nucleus of any Cancer Research Center grant that can be developed in Minnesota.

The enclosed papers do not include a.) the budget, b.) biographies and bibliographies of the members of the Cancer Coordinating Committee and its subcommittees, and c.) the appendix concerned with the break-down of time required by the outside consultants. The total budget request was \$208,000 over a period of two years, the bulk of this to go to our professional consultants, Enviro-Med

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of La Jolla, California. Copies of any of these portions that have been omitted can be obtained by telephoning Mrs. Bronder.

Although we will not know whether this is going to be funded until early summer, I hope that we can begin to work on our own within the next few weeks. Your interest and help are greatly appreciated.

CFM:lk



The University of Minnesota Health Sciences has a long-standing interest in cancer research, education and patient care. A succession of major steps has taken place in all of these areas, including the construction of the 120 bed Masonic Memorial Hospital for cancer patients, development of an interdepartmental center grant for patients with advanced malignant diseases, and the recent submission of a planning grant application for further development of therapeutic radiology facilities. Extensive development of basic research in tumor biology and related areas is reflected in a total budget for funded cancer research in excess of 3.5 million dollars per year. The next appropriate step is the development of a Cancer Research Center.

In addition to having extensive programs in basic investigation already established in many areas of cancer research, education, and patient care, the geographical location and population served by the University of Minnesota make it an excellent location for development of a Cancer Research Center. Such a Center would bring together investigators in related areas and foster better discussion of ideas and problems between basic and clinical investigators insuring prompt application of new methods to clinical diseases. The amalgamation of many disciplines in an identifiable Center located at a major education institution will focus the attention of students, faculty, physicians throughout the region and the general public on all aspects of oncology.

Development of such a Center requires time and extensive planning. The present application is for funds to enable the Health Sciences Center of the University of Minnesota to evaluate the feasibility of a major Cancer Research Center. The planning grant will encourage early interaction between all interested investigators and clinicians, at the same time encouraging their eventual cooperation in the development of the Center. The first stage of the planning will consist of collecting appropriate information in a variety of areas related to research, patient care, education, and epidemiology, not only at the University of Minnesota but throughout the entire region. An indepth review of existing programs will permit realistic appraisal of our strengths and weaknesses and full exploration of opportunities for collaborative efforts. Analysis of this data will provide the basis for selecting those research studies which can best be carried out in the organizational structure of a Cancer Research Center and developing a model for the entire cancer-related effort at the University of Minnesota that balances and interrelates the areas of research, education, and patient care.

The second stage of this planning will be oriented toward determination of space and facilities required for the Center and the third phase will be devoted to an analysis of the financial requirements for development and for operation of the Center. The entire planning can be expected to require between one and two years. It should be noted that the present application was preceded by six months by an application from the Department of Therapeutic Radiology for funds for planning of expansion of the Therapeutic Radiology facilities. The present application is designed to complement this earlier application, expanding the planning into a comprehensive program for the entire Health Sciences Center of the University. The integration of the current planning application and that submitted by the Department of Therapeutic Radiology is complete and the responsibilities to be covered under each planning grant are delineated in detail in the budget section.

From the initial planning effort currently underway there is clearly much interest and enthusiasm for the development of an integrated multi-disciplinary approach to cancer research, teaching and patient care through a Cancer Research Center at the University of Minnesota.

A-2 BACKGROUND AND GENERAL INFORMATION

## HEALTH SCIENCES OF THE UNIVERSITY OF MINNESOTA

The health Sciences Center exists as a major academic unit of the University of Minnesota and is coordinated by the Vice President for Health Sciences Affairs. This encompasses administrative coordination for the Medical School, Dental School, School of Nursing, School of Public Health, College of Pharmacy, School of Veterinary Medicine, and University Hospitals. The Vice President of Health Sciences Affairs is assisted in his duties related to the respective schools by a Council comprised of their deans and directors. The Health Sciences Cancer Coordinating Committee is responsible to the Vice President.

THE MEDICAL SCHOOL

The first classes in medicine at the University began in 1888 when three of the four private or proprietary medical schools in Minneapolis and St. Paul offered their charters and resources to the state. In accepting this offer, the Regents assumed responsibility on behalf of the people of the State of Minnesota for medical education. In 1908 the remaining proprietary school was incorporated into the University Medical School; since then there have been no other Schools of Medicine in Minnesota. At present, however, two new Medical Schools are being developed, at the Mayo Clinic in Rochester and in Duluth. Both of these will be connected to the University of Minnesota. Each of the new schools expects to admit students in September, 1972.

Origins of the strengths of the Medical School can be traced to strong departments and basic medical sciences. This strength has prevailed the clinical departments and has fostered a noteworthy tradition of basic and clinical research. The University of Minnesota Medical School is situated on the University of Minnesota campus in Minneapolis, and serves as a center for an overall population of six million in Minnesota and many of the neighboring states including Wisconsin, Iowa, South and North Dakota, Wyoming, Montana, and for the metropolitan area population of approximately two million. The Medical School presently has 703 students in training with plans to increase the number of students soon. Two-hundred and sixty-six Residents are in training in the University Hospitals. The full-time faculty of the Medical School numbers approximately 500. There are, at this time, over 4,000 Health Sciences students in the Health Sciences complex of the campus.

The University Hospitals contain 828 beds, approximately 120 of these beds being devoted to patients with neoplastic disease. The Veterans Administration Hospital has 960 beds, and its staff and facilities are closely involved in the oncology program of the University of Minnesota. In addition to the University Hospital, the Medical School is also affiliated for major programs with Veterans Administration Hospital, the Hennepin County General Hospital, the St. Paul Ramsey Hospital, and Mount Sinai Hospital.

The School of Dentistry is located immediately adjacent to the University Hospitals, Medical School and basic medical science departments. Undergraduate programs in dentistry, dental hygiene and dental assisting are fully approved. School of Dentistry facilities will constitute eleven of the twenty floors currently being constructed as Health Sciences Center addition Phase A at a total project cost of nearly \$50 million. Occupancy is scheduled for September, 1973. Major advanced training or graduate programs in fields such as oral pathology, oral surgery, prosthodontics, pediatric dentistry, periodontics, orthodontics, endodontics as well as several advanced basic science oriented disciplines are offered. All programs have full approval of the Council on Dental Education and the School is a member of the American Association of Dental Schools.

There are currently seventy-eight full time staff members and one hundred twenty-seven staff members on a part time basis at the School of Dentistry. There are 365 undergraduate dental students, 116 students of dental hygiene, 42 dental assisting students and 63 students at the graduate level presently enrolled in the School of Dentistry.

A considerable educational effort has been extended in Minnesota to broaden the understanding and contribution of dentistry to the total management, recognition, identification and treatment, of the cancer patient. This effort is devisable into areas of research, education and service. The precise future role of dentistry is being significantly expanded at the present time.

SCHOOL OF NURSING

The School of Nursing was founded in 1909 and was the first nursing program located on a university campus. A nursing program leading to a baccalaureate degree was begun in 1951. In 1963 and 1965 graduate programs in psychiatric nursing and medical-surgical nursing were offered in the Graduate School. The faculty presently consists of 37 undergraduate faculty and ten graduate faculty. There are presently 290 undergraduate students and 66 graduate students enrolled in the programs.

Both the undergraduate and graduate curricula are designed with the primary focus on people in health and illness. In the undergraduate program, a person with cancer is often used as a prototype to present nursing content and selected clinical experiences. In the graduate program the study of the individual's illness experience can be applied to the person with cancer and students may select patients who have cancer in their clinical experience. At the present time, cancer research is not being conducted in the School of Nursing; however, hopefully in the future, the faculty and students will move from being primarily consumers of research to active researchers of nursing problems which relate to patients with cancer.

SCHOOL OF PUBLIC HEALTH

The School of Public Health was established in 1944 by action of the Board of Regents. It was the outgrowth of the Medical School's Department of Preventive Medicine and Public Health which had been organized in 1922. The creation of The School followed by four years the authorization of the Master of Public Health degree by the Board of Regents.

The School currently occupies approximately 40,500 square feet of University space. Most of its Divisional offices and laboratories are housed in the Mayo Memorial Building. The Mayo 11th floor houses the Division of Environmental Health and of Epidemiology. The 12th floor is shared by the Divisions of Hospital and Health Care Administration, Maternal and Child Health, Health Education and Biometry. One half of the 13th floor is occupied by the Offices of The School and the Divisions of Public Health Nursing and Personal Health. Some additional space in Ford Hall is occupied by the Division of Biometry. The Laboratory of Physiological Hygiene which became part of The School in 1946 occupies space beneath the Stadium. Environmental Health has additional research and teaching facilities on the ground floor of the West Wing of the University Health Service. Unit A of the new Health Sciences Expansion will provide 7,500 square feet for the Division of Epidemiology in lieu of its present 2,400 square feet, 7,700 additional square feet for the Laboratory of Physiological Hygiene and about 1,000 square feet of space to be shared by Epidemiology and Physiological Hygiene.

The current School enrollment totals 205. These are distributed according to programs as follows:

Biometry	-14	Hosp. and Health Care Adm.	-46
Environmental Health	-55	Physiological Hygiene	- 0
Epidemiology	- 9	Public Health Adm.	-11
Health Education	-16	Public Health Nursing	-48
Occupational Therapy	- 2	Nutrition	- 4

Total faculty in The School of Public Health numbers 79. These are distributed by Programs as follows:

Biometry	-10
Enviromental Health	-20
Epidemiology	- 6
Health Education	- 4
Hospital and Health Care Adm.	-16
Maternal and Child Health	- 5
(Includes Nutrition)	
Physiological Hygiene	- 5
Public Health Adm.	- 2
Public Health Nursing	-11

Most of the Divisions of the School of Public Health are interested in cancer since this group of diseases does constitute the second most important killer of man. Though care, research in care delivery systems and education of the public are the basic concerns of many of the Divisions of The School in terms of all disease, the Divisions of Epidemiology and Biometry have had and continue, in increasing degree, to have specialized interests in cancer research as is evident in the section for the Planning Grant Application submitted for the Subcommittee on Epidemiology.

Interests of the Environmental Health faculty are two fold: 1) teaching and research relating to control of environmental contaminants that may be suspect as carcinogens in the air, water and food media, and in the work environment and 2) teaching and research relating to the control of biohazards (e. g. oncogenic viruses) in health care and medical research facilities. The Division has just been notified of receipt of a contract for the training of personnel working in facility environments of high biological hazards such as oncogenic viruses. This has in part been the result of the experience of this group with the development of microbial-free environments for leukemia patients under chemotherapy at the N. I. H. Clinical Center and the application to patients under immunosuppressant therapy.

#### COLLEGE OF PHARMACY

The College of Pharmacy has a present undergraduate enrollment of 320 students. At the graduate level the College has three departments in the Pharmaceutical Sciences; Medicinal Chemistry, Pharmaceutics and Pharmacognosy. We presently have forty graduate students and nine postdoctorals in our research programs. There are twenty full time faculty in the College of Pharmacy.

A Pharmaceutical Sciences Training Grant has recently been awarded to the College in the amount of \$350,000. In addition, many of the faculty have individual research grants. The Medicinal Chemistry Department has been involved in Cancer Institute supported research for several years. Our present program involving rational design and synthesis of selective enzyme inhibitors has provided the National Cancer Institute with many potential anticancer agents which are presently under investigation. Because of the unique background of the medicinal chemist, he is able to coordinate the problems of pharmacology, biochemistry, and organic chemistry into a program of drug design and synthesis. Programs such as these provide the foundation for cancer research since they provide the drugs that are eventually used in clinical programs.

#### COLLEGE OF VETERINARY MEDICINE

In 1947, the College of Veterinary Medicine was established by the Regents of the University of Minnesota as authorized by the Minnesota Legislature. Located on the Twin Cities Campus, St. Paul, this College has nine departments including: Anatomy, Microbiology and Public Health, Physiology and

Pharmacology, Pathology and Parasitology, Diagnostic Laboratories, Medicine, Obstetrics and Gynecology, Surgery and Radiology. A Department of University Veterinary Hospitals provides facilities and support for patients and the clinical teaching program of the College.

Facilities for teaching, research and service include several major buildings on the St. Paul Campus and additional research facilities on 600 acres of land at the University's Rosemount Research Center. In St. Paul, new laboratories were recently constructed for research on cancer viruses. In addition facilities for large and small animals used in comparative medical research on leukemias of animals are located on the St. Paul Campus and at the Rosemount Research Center.

For the 1971-72 academic year the College is providing instructional programs in basic sciences and clinical sciences for 250 professional students seeking the D.V.M. degree and about 50 graduate students seeking M.S. and Ph.D. degrees. In addition the faculty of the College provides instruction, primarily in the basic sciences, for over 500 students registered in other colleges of the University. In 1970, administrators of the University and the Board of Regents approved plans for the College to expand its programs, faculty, and facilities to serve 450 professional students, 140 graduate and postdoctoral students and about 1,000 students registered in other colleges.

Faculty of this college have a strong interest and capability for biomedical research and many are participating in interdisciplinary, interdepartmental and intercollegiate research projects. Cooperative research efforts with faculty of the medical school have been developing since the establishment of the original Department of Veterinary Science in 1881. These cooperative efforts have been expanded and now include other units of the Health Sciences. A number of comparative medical research projects have been funded by NIH & AEC including several interdisciplinary and interdepartmental projects concerned with demonstrating a viral etiology for animal and human leukemia, studies of basic mechanisms of oncogenesis, and studies of the epidemiology, pathology and clinical aspects of cancer using animals as comparative model systems. These projects indicate the mutual benefits of comparative research and graduate teaching among the collegiate units of the Health Sciences.

#### POPULATION AND CANCER INCIDENCE

The University of Minnesota is a health referral center for much of the Upper Midwest, including Minnesota, North Dakota, South Dakota, and parts of Wisconsin, Iowa, Montana and Michigan. The total population served is about nine million. The crude mortality from cancer in this population in 1967 was 150/100,000 but greater statistical detail on this large population is not available. More exact data are known for the Minneapolis-St. Paul Metropolitan statistical area (including Anoka, Dakota, Hennepin, Ramsey and Washington Counties). This includes a population of 1.8 million. In 1969, 7,029 new tumors were diagnosed of which 5,266 were in people residing in this area. The incidence rates of new malignancies in all sites in this population in 1970 was 321/100,000 compared with 297/100,000 in 1950.

The University of Minnesota Hospitals and their largest fully affiliated hospitals, including Hennepin County General Hospital, St. Paul Ramsey Hospital, Minneapolis Veterans Administration Hospital and Mount Sinai Hospital admitted a total of 2,981 patients with malignancies in 1969, of which 1,682 were newly diagnosed. In addition to these hospitals, there are a large number of excellent private hospitals in this area with which the University has looser affiliations and which also treat many cancer patients.

#### HEALTH SCIENCES CANCER COORDINATING COMMITTEE

In 1947 the Medical School established a Cancer Coordinating Committee to develop and promote multiple disciplinary interest, financial support and facilities for education, research and specific care related to cancer and the cancer patient. This Committee planned and oversaw the construction of the Masonic Hospital and the Veterans of Foreign Wars Cancer Research Building. It developed several large grants including an interdepartmental training grant, an interdepartmental grant for the study of advanced malignant diseases and an institutional research grant, all of which are still in effect. The primary responsibility of this Committee was to advise the Dean of the Medical School on matters concerned with cancer-related research, education and patient care.

With the reorganization of the various schools of Health Sciences under a Vice President, a new Health Sciences Cancer Coordinating Committee was appointed in August 1971. The purpose of this is to encourage a broader base of collaborative activity in cancer among all of the Health Sciences. In keeping with this goal, the new Health Sciences Cancer Committee identified four major areas of cancer endeavor in which the University of Minnesota has responsibility: Research, Education, Patient Care and Epidemiology. Sub-committees were appointed in each of these areas. Biographical sketches of the members of the Health Sciences Cancer Coordinating Committee and each of the Subcommittees are enclosed. The old Cancer Coordinating Committee of the Medical School was asked to administer its existing grants until such time as the appropriate new Subcommittees (Training Grants to the Education Subcommittee, etc.) could take over these responsibilities. The first task for each of these Subcommittees was preparation of materials comprising this application.

A-3 RATIONALE

Five years ago the University of Minnesota initiated its first inter-departmental cooperative approach to cancer with a Center Grant for the "Study of Advanced Malignant Disease." Devoted primarily to applied clinical research, the success of this was dramatic. The second step in developing a Cancer Center at the University of Minnesota began in May, 1971 with the submission of an application for an "Exploratory Study for a Therapeutic Radiology Research and Clinical Center." This application has been reviewed and it is hoped will be funded by February 1972.

The third step will be the development of a full scale Cancer Research Center with a much broader base. Such a Center should include all of the Health Sciences, encouraging them to interact as productively as possible on all levels.

Founded on a wide range of basic research approaches to the study of malignancy, it will have as its main goal the development of real collaboration between basic scientists in related areas, and between basic scientists and clinical research. The dissemination of information to students, practicing clinicians and the lay public as well as improved care of the cancer patient at all levels will be important components of this program.

At the present time the University of Minnesota holds an outstanding position among state universities with respect to basic and clinical research. The people responsible for this contribute to cancer research, education and patient care in a wide variety of areas. They include those in full-time basic research and teaching, those in clinical research, and a few who are able to contribute in both areas. With little to bring them together, it is not surprising that they differ widely in practice, thinking and even philosophy. Clinicians, used to working together in the management of cancer patients find it easy to collaborate with each other. Further stimulus for this grew out of the Cancer Coordinating Committee and the grants that it developed.

The full-time basic science investigator leads a more independent existence. There has been limited collaboration between individual basic scientists and probably less between them and people involved in clinical research. It is quite apparent that anything new will come first from the basic research laboratories. Establishment of a Cancer Research Center at the University of Minnesota will require a level of interest, commitment and cooperation that can best be developed through the medium of an Exploratory Grant. This will encourage orientation of a significant portion of existing research toward identifiable cancer goals and provide for detailed planning of new areas to be developed, including acquiring new personnel. More important, it will require the development of continuing communication and interaction between basic and clinical research. Through this the basic scientist may illuminate basic problems in our understanding of cancer and orient his research more directly toward their study, sharing some of the feeling of urgency that motivates clinical research. Conversely, the clinical investigator may broaden his approach to patient management, acquiring more quickly new laboratory tools and leads, in the development of which he participated.



B SPECIFIC GOALS

1. Is development of a Cancer Research Center at the University of Minnesota feasible?
2. To identify those units, laboratories and individuals interested and able to contribute to such a Center.
3. To identify, evaluate and develop possible components of a Research Center based upon the input of individual investigators eventually establishing priorities it will determine the direction the Center will take.
4. For each individual investigator, to determine the optimal relationship to the Center for the best development of the individual and the Center program.
5. To develop alternative models of administrative structures and select that which best suits the needs of the University of Minnesota.
6. To select a Director/Coordinator for the Center.
7. To determine the personnel needs (new personnel) for proper conduct of the Research Center activities after inside affiliations have been set up.
8. To determine the space needs of the Research Center program.
9. To determine the cost of the Research Center program.
  - a. for development, construction, and renovation and
  - b. for continuing operation
10. To establish increasingly accessible avenues of communication between basic sciences and clinical research.
11. To develop and train new investigators in basic and clinical research in an atmosphere where the individual can benefit from contact with both areas.

## C METHODS

The problems to be considered in planning a Cancer Research Center fall into four general areas: 1) planning and administration, 2) component identification, selection and development, 3) space requirements and 4) financial analysis. Each of these is related to the other and all must be advanced almost simultaneously. To do this will require a major effort by many people already involved in cancer research, education and patient care at the University as well as substantial help from outside consultants. Each of the several areas discussed below will undergo its own development but will also be continuously related to all adjacent and overlapping areas as the planning progresses.

### 1) Planning for the Cancer Research Center

Primary responsibility for planning will rest with the Chairman of the Health Sciences Cancer Coordinating Committee until a Director/Coordinator of the Center is appointed. He will be helped by the Health Sciences Cancer Coordinating Committee, a planning administrator from the Vice President's Office and others as needed.

The major working units for development of much of the program will be the Subcommittees for Research, Education, Patient Care and Epidemiology. Panels of advisors have already been established for each of the Subcommittees. These include not only interested people from Health Sciences but also from other major divisions of the University, particularly the College of Biological Sciences, and from the Medical and lay community outside of the University. It is intended that these panels will be broadly representative and that they will have direct input into the development of planning for the Center on a continuing basis. The Subcommittees will function relatively independently of each other but will exchange ideas, plans and programs at regular intervals to insure coordinated development.

### 2) Development of administration of a Cancer Research Center

Administrative models of other similar centers would be examined and evaluated in light of the particular needs of the University of Minnesota. Although it should be possible to select an appropriate model or models at a relatively early stage, the development of a final plan, with such selection of personnel, other than the director/coordinator, would have to await development of actual programs to be carried out within the Center. It is obvious that the administrative design should reflect the make up and needs of the Center itself.

### 3) Selection of a Director/Coordinator

One of the major tasks to be carried out under the Planning Grant is the selection of a Director/Coordinator for the Cancer Research Center. Because the input of such an individual will be of great value in the actual planning phase this will be initiated as early as possible. Because the Director/Coordinator would have to have the authority to organize and operate the Center across departmental and school lines, a search committee would be convened to find such a person and to establish an appropriate base for him. While outside

consultants may be able to contribute some help in this direction, it is anticipated that most of the ground work will have to be done by the faculty of the schools of the Health Sciences, and more particularly by the members of the search committee. Funds for travel, both for members of the committee and for possible candidates for the Directorship would be required.

4) Selection and development of programs

The selection of appropriate programs for inclusion in the Cancer Research Center would require an intensive analysis of all existing programs in the areas of research, education, patient care, and epidemiology. The methods required will differ from one area to another but each will be carried out partly by internal review and partly by use of professional consultants. The acquisition and analysis of this background information will make up a major portion of the cost of the initial phases of the planning study. Because of the major differences involved, these are discussed separately.

A. Research

The areas of cancer research currently undertaken at the University of Minnesota and, therefore, appropriate for inclusion in a Cancer Research Center grant are listed below. They are also described in more detail in the appendix. It should be noted that the areas described are not intended to be balanced resumes, but should indicate the direction we are going and where further emphasis may be needed. These investigations are distributed widely throughout the University. They include the following categories:

- 1) Tumor immunology (microbiology, pathology, biochemistry, pediatrics, surgery, and urology)
- 2) Virol oncology (microbiology, pathology, surgery, urology, zoology, veterinary medicine)
- 3) Chemotherapy (medical oncology, pediatrics, surgery, biochemistry, urology, neurosurgery, pharmacology, gynecology)
- 4) Biological membranes (medicine, pediatrics, chemistry, biochemistry, dentistry, zoology, engineering sciences)
- 5) Molecular biology (biochemistry, microbiology, genetics, cell biology)
- 6) Metabolism and regulation (biochemistry, microbiology, chemistry, pharmacology, cell biology, gynecology)
- 7) Carcinogenesis (microbiology, pathology)
- 8) Comparative oncology (College of Veterinary Medicine, College of Biological Sciences)

- 9) Radiobiology (therapeutic radiology)
- 10) Cytogenetics (oral pathology, laboratory medicine)
- 11) Clinical Pathology (pathology, oral pathology, gynecology)
- 12) Comparative Oncology (oral pathology)

Individual investigators from the entire spectrum of departments have indicated an interest and willingness to cooperate in the establishment of a broadly based basic research oriented Cancer Research Center. These offers have often been accompanied by expressions of concern about possible loss of fiscal and/or scientific independence. One of the major questions is "Is there a potential for real and extensive interactions between individual investigators of cancer-related issues?" The answer appears to be a strong yes. The success of the Interdepartmental Membrane Discussion Group in bringing together staff from all parts of the University for evening discussion meetings is demonstrable proof of the willingness of our faculties to participate in interdisciplinary enterprises. It is also worth noting that a large fraction of those involved in the Membrane Group are participating in some form of cancer-related research. The willingness to form an intellectual community around a closely related subject area has been actively demonstrated. There are good reasons to believe that investigators in other cancer-related areas strongly desire the formation of closer association. Many express concern about the isolation of individual laboratories from each other, intellectually even more than physically, and look forward to the development of much better communications.

A second major area of concern is "Is it possible to construct an administrative framework and staffing which will effectively guarantee the independence of all participating investigators, while encouraging real communication?" This is a much more complicated problem, the solution of which can only be achieved in the time allotted to plan for the Center. It is clear, for example, that the framework within which the basic scientist pursues research is quite different from that of the clinical investigator. While the clinical scientist often desires specific solutions to specific disease problems within a limited length of time, the basic scientist seeks an understanding of cellular processes or mechanisms often dwelling on and solving limited problems requiring long periods of time. Recognizing these differences in approach to research, one mission of the planning will be to search for the most effective methods of taking advantage of our strength at the University of Minnesota in active groups of both clinical and basic research scientists. Collaborative programs for a Research Center, as well as other modes of effective communication, will be developed from ongoing research at the University augmented by the addition of new investigation.

Although a small amount of help may be obtained from professional consultants, the selection and development of research programs will be primarily the responsibility of the investigators themselves and will reflect their interest in communicating and cooperating with each other.

## B. Education

A Cancer Research Center at the University of Minnesota should be organized into a functional unit to provide an integrated multi-disciplinary approach to cancer teaching and to provide an atmosphere where diverse scientific disciplines can focus on this goal with an exchange of ideas, techniques and evaluation. In that improved patient care based upon information devulged in Cancer Research Centers will be the ultimate measure of success, the term research must not be too narrowly limited to basic science or clinical therapeutic disciplines. Research on education with respect to cancer will also be rewarding.

Cataloguing of information concerning education and training in the various departments of the medical school at both the basic science and clinical level and in the Schools of Dentistry, Public Health, Nursing and Pharmacology was begun and a partial list is included in the Appendix. A panel of advisors, with wide representation was developed from most of the departments within the medical school and the other schools within the Health Sciences Center, the Department of Cellular Biology and from representatives of the community hospitals, practicing physicians interested in the cancer problem and representatives of the American Academy of General Practice, the Minnesota State Medical Association, the American Cancer Society, the Department of Public Health and other voluntary and state agencies interested in the cancer problem in the State of Minnesota. A complete list of the panel of advisors is found in the Appendix. An outline of the recommendations of the Subcommittee on Education and its advisory panel provides an overall view of the major areas of cancer education and training to be considered in planning for a Cancer Research Center.

1) Undergraduate Education: The subject of oncology is presently being taught at the Medical School in a piecemeal fashion by various departments and sections. In some areas this has worked out well and in other areas this has led to serious deficiencies. It is recommended that a core curriculum be developed and proposed to the Educational Policy Committee which would provide the following:

- a) A broad understanding of cellular biology to prepare the student to understand cancer in terms of the expanding information in cellular biology, virology, immunology, genetics, biochemistry, pharmacology, pathology and epidemiology.

- b) Provide each student with up to date information on the value of cancer detection, particularly as it relates to areas in which this information has its greatest impact.
- c) To acquaint the student with the multi-disciplinary approach to treatment of the cancer patient including surgery, therapeutic radiation, chemotherapy and immunotherapy.
- d) Provide the student a thorough understanding of certain areas such as:
  - 1) rehabilitation after extensive ablative surgery
  - 2) the psychological support of the patient and his family
  - 3) basic information as to the role of surgery, chemotherapy, and therapeutic radiation in the management of malignant diseases, and
  - 4) a realistic and accurate understanding of the role of community agencies in handling the problem of cancer morbidity and mortality.

A proposal of the School of Dentistry to expand dentistry's role in the management of patients with cancer urges coordination and direction of existing dental facilities, personnel and other resources for better utilization by patients about to receive, receiving, or having already received treatment for cancer. This is considered a reasonable progression of responsibility by an already highly trained group of individuals who can add to many aspects of cancer education. Ultimately, this greater participation may yield improved and broadened concepts of patient care. Personal experience of students, staff example and identification of patients' needs are considered essential components for this type of educational program.

In the School of Nursing a coordinated teaching effort should enable the professional nurse to function independently in working with the cancer patient, his family, and the community.

2) Postgraduate Education: At the present time there are excellent postgraduate educational programs ongoing in various departments such as Internal Medicine, Surgery and its sub-specialties, Pathology, Pediatrics and Therapeutic Radiology. However, numerous opportunities could be developed in the future to provide a more integrated approach to the training of physicians in several disciplines. Areas which may need much greater emphasis are the development of cooperative ventures between general surgeons interested in head and neck cancer, otolaryngologists, radiation therapists, plastic surgeons and oral surgeons.

At present there are excellent graduate programs in immunology, genetics and other areas. There is a pressing need to increase the basic biological backgrounds of individuals doing clinical cancer research and contributing to the education of others in the field of cancer. There is a need for a more complete description of the education material offered in various departments such as genetics, biochemistry, developmental biology, cellular biology, and many others to aid those advising medical fellows and graduate students. Such coordination may provide a design for truly innovative graduate programs in oncology. There is also a pressing need for the education and training of workers in basic sciences of cancer research.

There is a need to attract and support graduate students in clinical and medical psychology to prepare for careers of specialization in cancer.

Postgraduate educational programs within the School of Dentistry that may in some way be identified as ones specifically or potentially related to cancer are those in oral pathology, oral surgery, prosthodontics, oral biology, periodontics and pediatric dentistry. Less identifiable, perhaps, are those dentists whose formal education has led them to be identified as basic scientists. These and other graduate educational endeavors have received broad financial support, e. g., National Institute for Dental Research, National Cancer Institute, American Cancer Society. There has been a tendency for graduate dental education to combine training of a specialty dental discipline and a traditional basic science. The result of this training has been an increasing number of basic science/clinicians possessing expertise in many aspects of the cancer problem (education, research and service), that should be included in a Health Science Center. Specific, more identifiable, dental participation in areas such as postsurgical, prosthetic rehabilitation of the oral cancer patient and the dental role within the "team" approach to oral cancer therapy are relatively undeveloped, and a Cancer Research Center could well serve as a model of patient care and education in these areas.

The School of Nursing has plans for further development of the extended nurse role including advanced physical assessment and psycho-social skills. The Cancer Research Center could serve a prime and essential area for development of such a role.

The development of a Pharmacology Support Unit by the Department of Pharmacology would provide outstanding opportunities for the training of clinical and basic pharmacologists in the area of cancer chemotherapy, and offer chemotherapists the opportunity to develop an appreciation of the role of pharmacology in the treatment of patients with cancer. An extensive review of this possibility will be part of the planning effort.

3). Continuing Education: A Cancer Research Center should assume responsibility in the education of the practicing physician, dentist, nurse and other health personnel and the public. Such effort must be coordinated with the existing voluntary and professional organizations such as the American Cancer Society, the State Medical Association, Minnesota Academy of General Practice, Minnesota Surgical Society, Minnesota State Dental Association, etc.

An effective teaching and training program in continuing education is desperately needed. Concentration and expertise of the many individuals interested in the cancer problem in a Cancer Research Center should provide stimulus, direction and leadership for continuing education and part of the planning will require funds to support preliminary research in this neglected aspect of health education. One of the most pressing needs is to find out what physicians should know about cancer to provide optimum patient care. This information might be obtained through a program such as the Medical Audit of the Northlands Regional Medical Program, which can provide documented needs based on evaluation of patient care, and could make its resources available to the Cancer Research Center through the Office of Postgraduate Medical Education to assist practicing physicians in the state to design continuing educational programs which are relevant and designed to improve patient care because they are based on demonstrated needs.

A testing device, such as the American College SESAP will be considered as a possible tool to uncover the areas of educational deficiencies.

A feasibility study is needed to determine the value of a regional cancer registry as a quality control program for the care of patients with malignant disease in the region and to provide an impetus for continuing education for the physician dealing with cancer patients.

The educational enterprise of the Cancer Research Center might best function through the development of outlying regional centers in populated areas such as Duluth, Hibbing, Rochester, etc., which in turn could serve the educational needs of the physicians and other health personnel in these areas. The Cancer Research Center would provide consultation for educational programs. It could invite interested individuals to spend periods of time in the Department of Medicine, to upgrade their knowledge in the field of chemotherapy, or the development of "mini-residencies" in the Department of Surgery to provide quick up to date information to practicing surgeons interested in more recent developments in extensive visceral surgery. The planning would involve the exploration of such opportunities at the University Hospitals, but also might include other metropolitan hospitals with large numbers of tumor patients. The continuing education program of the School of Nursing in cooperation with numerous nursing service agencies is beginning to develop an expansion of the training program for nurses to care for persons who have cancer and their families.



C. Cancer Patient Care

The University of Minnesota Health Sciences Center represents a major referral center for patients with malignant diseases. It has already established a significant role as a referral center for patients with advanced malignant diseases and developed strong programs of clinical research. Currently underway is a proposed planning grant for augmenting therapeutic radiology at the Health Sciences Center. Although the University of Minnesota has the personnel and skills to act as a primary patient care center for malignant disease, this role has been less than optimal. It contains one of the leading cancer detection centers in the United States and augmentation of the research aspects of this facility is required. The cancer patient materials currently available with augmentation of primary and secondary care problems can provide a major Cancer Research Center for clinical and basic science studies relative to patient care.

Program Goals:

The University of Minnesota Health Sciences conceives a Cancer Research Center which would involve a multidisciplinary approach to the management of patients with cancer. Although some areas of cancer patient management have been extensively developed, large gaps exist in a program for comprehensive cancer care. Therefore, a planning program will involve the consideration of primary patient care, secondary patient care, as well as the tertiary patient care in which it now excels. Augmentation of clinical research programs would seem desirable including involvement of the community hospital facilities in such planning. In the development of a planning program for clinical research care of cancer patients, the following major program goals are emphasized:

- 1) Analysis and prediction of patient loads, and referral patterns and identification of probably cooperative institutions and physicians in the state of Minnesota and surrounding regions.
- 2) Determination of the estimated impact caused by establishment of a major referral center for cancer patients on the existing staff, facilities and equipment. This determination will be based on predictions made from existing clinical service and diagnostic procedures.
- 3) Development of facilities, equipment, staff and program requirements for both immediate and future long-range needs for cancer research, training and clinical services in the metropolitan area and patient referral region.
- 4) Determination of future inter-institutional relationships with other hospitals in the city and state in developing a broadly based organizational structure for the Health Sciences Cancer Research Center Program.

- 5) Exploration and evaluation of new interdisciplinary projects that may be undertaken.
- 6) Exploration of the augmentation of the role of the Schools of Nursing, Pharmacy and Public Health in research studies relative to patient care.
- 7) Coordination of clinical research projects at the University of Minnesota Health Sciences and its affiliated institutions.
- 8) Feasibility of development of a regional registry to include all cancer patients in Minnesota and the adjacent areas.
- 9) Expansion of the scope and responsibility of the Cancer Detection Center.

The selection and development of programs in patient care require the acquisition of a great deal of information. This includes patient loads, distances traveled and referral patterns. In addition, the present planning must be considered in relationship to a planning grant already submitted for the further development of therapeutic radiology at the University of Minnesota. It is in the acquisition of information concerning patient care that these two planning projects interact the most. They also interact in development of facilities and space. In coordinating these two planning efforts, emphasis on collection data referable to patient care is being made the primary responsibility of the therapeutic radiology planning grant. This effort is being expanded to include information concerning all types of cancer patient and not just those concerned with therapeutic radiation.

#### D. EPIDEMIOLOGY

##### I. Introduction

In recognition of the integrative goals of a Cancer Research Center in all of its areas of endeavor, the Health Sciences Cancer Coordinating Committee, charged with providing such integration in the cancer research, teaching and service activities of the University, immediately upon its creation established an Epidemiology Subcommittee in addition to its Subcommittees on Research, Education and Patient Care. This was based on the contributions to the goal of integration which the discipline of epidemiology can be expected to contribute through its interdisciplinary approach to the measurement of disease, population studies of causal and risk factors and evaluation of programs and techniques. Epidemiology, along with the sister discipline, biometrics, can also be expected to provide consultation to the other cancer activities of the Health Sciences Center in research design and analysis, interpretation and display of data and by cross-fertilization of ideas through consultation and periodic evaluations of problems, programs and other activities.

The main areas of Epidemiology input include:

1. Epidemiologic and biometric research relative to cancer prevention;
2. Development of a cancer case ascertainment and surveillance system integrated with existing and proposed health information systems in other agencies as a base for such research; and
3. Support to other cancer research and teaching programs and activities of the Center through consultation and other services.

As an initial activity the Epidemiology Subcommittee undertook the cataloging of activities in its field related to cancer. This included the following categories of activities to be described in detail in the Appendix.

1. Epidemiologic and biometric services currently available to existing research programs in cancer; for example, data processing, computing, consultation in design, etc.;
2. Contributions to teaching and research training in cancer epidemiology and biometry;
3. Current research in cancer epidemiology and biometry;
4. Current and planned interagency cancer research activities.

## II. Considerations in the Center Planning Phase

### A. General

In the planning phase the Subcommittee on Epidemiology would delineate in detail the epidemiologic and biometric strengths existing currently in the areas of service, research and research training. It would assess the priorities of service and research training needs and would elaborate on the expansion of the epidemiologic and biometric research program in accordance with its existing expertise and experience in several subfields of cancer epidemiology.

### B. Specific Considerations

1. To what extent would the establishment of an expanded cancer research facility increase the service needs for consultative and related services in biometry, biomedical computing and epidemiology (e. g. design, analysis and interpretation of studies)? This will require closely integrated planning with the several Health Sciences Center cancer research programs concurrently being planned.

2. To what extent would service demands for assistance in program design, development and evaluation increase in the areas of cancer prevention programs, health care delivery systems deriving from therapeutic research, cancer detection programs and follow-up systems? To the extent that these will be planned by the several units of the Health Sciences Center and other community agencies including the state and local health departments, specific plans for assistance to these units and agencies from epidemiology, biometry and biomedical computing will be promulgated.
  
3. Since a case ascertainment and surveillance system is basically vital not only to epidemiologic research as a source of clinical material for testing causal hypotheses, but to clinical research in terms of magnitude of the problem, priorities, therapeutic research, follow-up and survivorship and to community research in prevention, in terms of trends and evaluation of such programs and procedures, the Epidemiology Subcommittee will, in the planning phase, explore the feasibility of and methodology for a cancer case ascertainment and surveillance system. Explorations will include systems on:
  - a) State-wide basis with University and State Health Department efforts integrated
  - b) Area or regional basis; or
  - c) University Hospitals and affiliated hospitals.

Feasibility explorations will include the capabilities of and willingness to cooperate among diagnostic facilities in the State, region or metropolitan area and the capability of a central registry system to provide useful rapid, analytic feedback to the participants. The planning phase will also entertain the problems of legal responsibility and administrative mechanisms for such a system. It will be necessary to make observational visits to successful registries such as those operated in Connecticut, up-state New York, Alameda County California, University of Utah and to such Cancer Detection operations as Health Insurance Plan (N. Y. C.) and Strang Clinic (N. Y. C.).

4. In the area of epidemiologic research several approaches will be explored:
  - a) Shall the acquired expertise and experience with gastrointestinal cancer epidemiology be expanded? This would integrate well with the basic science studies of Pathology and clinical staging studies of Medicine.

- b) Shall our expertise with leukemia epidemiology be capitalized on? This would integrate with the interests of Pediatrics, Pathology, Medicine, Hematology, Oncology and the Department of Laboratory Medicine.
  - c) Shall the venereal hypothesis in cervical and prostatic cancer be explored? The infectious disease expertise existing in the Division of Epidemiology and virologic expertise in the Department of Microbiology would be coordinated with the Departments of Urology and Gynecology.
  - d) Shall research in early detection of cancer, the specificity and sensitivity of promising tests be promoted? A cancer detection center presently exists in the Health Sciences Center. Can this facility be the focal point of such studies? Or must there be a multifocal approach for a more nearly representative and adequate case load? Can it be solely office-centered?
  - e) The State Health Department is interested in eliciting the contrasts in cancers in urban and rural populations in regard to cancer types and environment risk factors related to them. Shall a rural and an urban county be selected as a population base for such studies?
  - f) Shall primary prevention program research be promoted? For example, smoking control?
  - g) We have a strong veterinary component in the Health Sciences Center with a demonstrated interest and experience in cancer epidemiology (bovine leukemia) in the Department of Veterinary Microbiology and Public Health. Shall their interest in Animal Disease Surveillance Systems be expanded with special reference to animal cancers related to cancers in man (e. g. bovine leukemia and cat leukemia) for the evolution of causal hypotheses utilizing animal models?
5. In the area of biometric research the specific planning considerations include (among others):
- a) What are the resource needs for the necessary expansion of biometric techniques in cancer research particularly (but not exclusively) in epidemiology? For example,

applications of multivariate analysis, research in applications of such analyses and investigation of relative risk estimates in retrospective studies.

- b) What are the capabilities for expansion of the development of mathematical models in carcinogenesis?

5. Relationship to other hospitals and new medical schools

The University of Minnesota Hospitals hold a central position almost on the border between the cities of Minneapolis and St. Paul. They have several affiliated hospitals which may be able to contribute substantially to the development of a comprehensive Cancer Research Center. Exploration of the feasibility of this will require considerable time and possibly some professional help but interest has already been expressed. On a larger scale is the possibility of expanding the collaborative structure of the Cancer Research Center to include two new medical schools being developed in the state, at Rochester and at Duluth. Both of these schools are very much in the developmental stage and it would be quite appropriate to begin to consider with them possible areas of common interest in cancer research, education, and patient care during the planning stage of a Cancer Research Center.

6. Professional consultants

Many aspects of the outlined planning can be done best with the help of professional consultants. A planning grant previously submitted by the Department of Therapeutic Radiology and approved in January 1972 will make use of the firm of ENVIRO-MED Inc. Because the present planning enterprise will be completely interrelated with that of the Department of Therapeutic Radiology, it is highly desirable to utilize the same consultant firm. For this reason bids were not sent out to other firms and the portions of the planning program requiring consultation, as described in this application, were developed solely with the help of ENVIRO-MED. In the budget of the planning grant developed by the Department of Therapeutic Radiology, \$45,000 was designated for work to be done by ENVIRO-MED. This work will be applicable to the entire planning effort and will include evaluation of patient loads, sources, distances, inpatient versus outpatient requirements and possible ways to reduce costs. It will also include the gathering of information concerning the referral patterns of different types of tumor patients within the state of Minnesota.

Consultation requirements for the development plans for a Cancer Research Center at the University of Minnesota include the following:

- 1. An up-to-date registry of information on all funded cancer-related research at the University of Minnesota, with easy retrieval. This will be a reference registry and can be handled by use of appropriate questionnaires that can be easily updated each year. It will probably be computerized to provide maximal cross-referencing, including techniques and major equipment and laboratory capabilities. We will also include the names of all the investigators, including graduate students.

2. A survey of cancer research-oriented projects and investigators with particular reference to their possible relationships to a Cancer Research Center. This represents a much more complicated undertaking as it will also involve attitudes toward, requirements of, possible contributions to, and various affiliations within such a Center should it be developed. This questionnaire may be developed by the professional consultants but will have to be explored with the various investigators on a very personal basis by members of their own departments and disciplines.

3. The feasibility of a regional registry

The University of Minnesota, and all of the hospitals in this area have been strongly criticized for their lack of a coordinated effort in registering cancer patients and tabulating followup and results of treatment. Unless a registry can be developed that will include substantial amounts of useful information carried in a form that can be easily retrieved and tabulated, the entire project will not be of value. Too many registries file material that is never retrieved or utilized. If this appears to be feasible it should probably be considered on a scale that goes far beyond that of the University of Minnesota Hospitals but rather includes all of the cancer referral centers in the state and entire region.

4. Expansion of the role of the Cancer Detection Center

The University of Minnesota has a unique facility in the Cancer Detection Center. The possibility that this approach to preventive patient care can be expanded is now appropriate for consideration. The following points could be evaluated:

- a. Extension of the hours of the existing Cancer Detection Center
- b. Increasing the efficiency of processing of patients
- c. Record keeping
- d. Role as a teaching facility
- e. Role as a source of patients for the University Hospitals and expansion of examination beyond cancer detection.
- f. Extended satellite clinics elsewhere but tied to the University Center.

5. Evaluation of current cancer detection practices in the state (pap smears, guaiac tests, proctoscopy, etc.). This would need to be done with the help of the State Medical Society and the Academy of Family Practice along with other agencies such as the American Cancer Society, the Regional Medical Program, the State Dental Society, the nursing societies, etc.

6. Extension of educational programs to physicians and lay public in the region.

- a. Survey of current professional thinking regarding cancer detection and treatment.
- b. A survey of current lay thinking regarding cancer detection and treatment. This latter will include some indication of how far people will be willing to travel for various types of problems associated with malignancy.

7. Development of alternative models

At the conclusion of data gathering and analysis it will be necessary to develop models showing areas of collaboration and appropriate administrative structures that could be used to develop a Cancer Research Center. Although the basis of the Center would be basic research, the mission and resources of the University of Minnesota complex make it desirable to include in these models education and patient care. The development of optimal balance between these major areas will require considerable interaction between the planning committee of the University of Minnesota, professional consultants, and experienced outside advisors.

8. Facilities

The potential needs of a Cancer Research Center can only be hinted at at the present time. However, the following possible needs can be identified:

- a. Animal housing and husbandry
- b. Cell culture facilities
- c. Glass washing facilities
- d. Histology service
- e. Electron microscopy
- f. Radio biology
- g. Therapeutic radiation equipment
- h. Patient beds
- i. Teaching facilities, particularly conference rooms, auditorium and library
- j. Irradiation therapy equipment (not included in the present planning because it is an integral part of the application submitted by the Therapeutic Radiology Department.



9. Space

Along with facilities is the utilization and development of space. Both of these will require extensive help from professional consultants. Problems associated with space in a complex institution such as the University of Minnesota include:

- a. Better use of existing space
- b. Re modeling of existing space
- c. Utilization of newly constructed space (there are currently buildings under construction and others being planned)
- d. Construction of new space

10. Financial analysis

Another area that requires extensive use of consultation is analysis of the financial needs and resources for the development of a Cancer Research Center. These include expenses, patient load required for the financial success of clinical components, the availability of matching funds, state funds, and federal funds, and the development of funds by private subscription.

D SIGNIFICANCE

The University of Minnesota has many qualities to recommend it for development of a major Cancer Research Center. Geographically located far from other major population centers Minneapolis and St. Paul, and the University of Minnesota, represent the focal point of commerce, medical care and educational endeavors for a large portion of the United States. The University of Minnesota draws a population not only of its own state but all the surrounding states and as far west as Montana. The University of Minnesota ranks extremely high among state universities in the development of its medical research facilities and programs. Of these programs, significant proportion, distributed throughout all the Health Sciences and other portions of the University, are oriented toward cancer research. Of greater significance is the fact that the few weeks during which the possibility of eventual development of a Cancer Research Center has been discussed have already been rewarded with the expression of a high level of interest among many investigators whose work and interest make them potential contributors to development of the Center.

E.

PHYSICAL FACILITIES AT THE UNIVERSITY OF MINNESOTA HEALTH SCIENCES

The University of Minnesota Health Sciences Center is situated on the Minneapolis campus of the University of Minnesota and the University Hospitals function as a major referral center for the metropolitan area population of approximately two million. They serve as a referral center for most of Minnesota and many of the neighboring states including Wisconsin, Iowa, North and South Dakota, Wyoming and Montana.

University Hospitals

In 1905, money for the construction of a hospital was offered to the University by the executor of a private estate. In 1911, following legislative approval and the collection of additional funds, the Elliot Memorial Hospital, the first unit of University Hospitals, was dedicated. The act of acceptance passed by the legislature stated that the hospital would belong to and be a part of the University, the indigent residents of Minnesota would receive free care and treatment, and that the hospital would be controlled by the Regents of the University. Additional Health Sciences buildings have been constructed through grants, gifts, and appropriations. These include the Todd Hospital, the Cancer and Christian Gifts, Eustis Hospital, Mayo Memorial, Variety Club Heart Hospital, Masonic Memorial Hospital, Veterans of Foreign Wars Cancer Research Center, and the Children's Rehabilitation Center. These buildings are called collectively the University Hospitals.

The University Hospitals contain 828 beds, approximately 120 of these beds being devoted to patients with neoplastic disease. The average patient census is 676 patients. In addition, University Hospitals operate a large Outpatient Department with 137,000 outpatient visits per year. The outpatient clinics support the treatment and research of neoplastic disease.

The primary role of University Hospitals is to provide an environment for clinical education, research, and patient service in the Health Sciences. University Hospitals are involved and committed to the continued conquest of cancer.

The Minneapolis Veterans' Administration Hospital has 960 beds and its staff and facilities are closely involved in the cancer program of the University of Minnesota. In addition, the University of Minnesota is also affiliated with the Hennepin County General Hospital and the St. Paul Ramsey County Hospital. Affiliations with other smaller community health facilities also exist.

Major Cancer Facilities at the University of Minnesota

A number of cancer treatment and research facilities currently exist at the University of Minnesota. In addition to those listed below, numerous laboratories of individual investigators working in cancer related problems are distributed widely throughout the University.

A. Mayo Memorial Building: The major teaching facility of the University of Minnesota Health Sciences Center is the Mayo Memorial Building. This houses the Departments of Internal Medicine, Surgery, Pediatrics, Orthopedics, Otolaryngology, Microbiology, Urology, Neurosurgery, Gynecology, Radiology, Therapeutic Radiology and Public Health along with other departments which are concerned with the care of cancer patients. The hospital complex also includes the Variety Club Heart Hospital and the Rehabilitation Hospital. These total 828 beds, of which it is estimated that at any one time 100 are occupied by patients with malignant disease. These patients are a major teaching resource for medical students and house officers in all departments and assure a population of patients that represent the core of clinical medical education for all of the students in the school. Because this building houses all of the clinical departments, some of the departments of basic sciences, the operating rooms, and all of the clinical laboratories, it is an area where application of different disciplines and the exchange of ideas on clinical problems can be carried out easily. The result is a system of consultation and exchange which benefits patients, students and faculty.

B. Masonic Memorial Hospital: The Masonic Memorial Hospital was designed as a facility for the study of the care of patients with advanced malignant disease and allied chronic diseases. It consists of 120 beds for patients with advanced malignant disease including eleven patients incorporated in the Clinical Research Center. It provides 10,000 square feet of research laboratory space and office suites for some of the Oncology staff of the Departments of Medicine, Surgery and Pediatrics. The research laboratories are designed primarily to conduct applied research studies relative to the problems of patients in the Masonic Memorial Hospital. The basement of the Masonic Memorial Hospital contains special laboratories for the Department of Laboratory Medicine, electron microscope facilities of the Department of Dermatology, the Cancer Detection Center, the computer facilities of the Bio-medical Data Processing Center, and the Masonic Clinic for the care of ambulatory research patients. Research facilities on the fourth floor support activities of the Departments of Neurosurgery, Section of Oncology of the Department of Medicine, Pediatric Hematology-Oncology and the Department of Surgery.

C. Veterans of Foreign Wars Cancer Research Center: The Veterans of Foreign Wars Cancer Research Center is adjacent to the Masonic Memorial Hospital and contains 28,000 square feet of space devoted to the study of cancer. Within this unit, the cancer facilities consist of:

1. Small Animal Research Laboratory: Located in the basement of the VFW Building, this laboratory provides small animals for cancer research activities conducted in the VFW-Masonic Hospital complex.

2. Tumor Immunology Laboratory: This laboratory occupies most of the first floor of the VFW Cancer Research Center and is devoted to the study of the immune responses to malignant diseases. These laboratories provide research experiences for medical students, pre-doctoral and post-doctoral fellows.
  
3. Clinical Research Center: This Center, supported by the United States Public Health Service, conducts metabolic studies in a variety of clinical areas. Studies of patients with neoplastic diseases are also incorporated in this endeavor. The clinical beds are located in the Masonic Memorial Hospital and the research facilities are on the second floor of the VFW Building.

D. Tumor Clinics: Because of the increasing number of patients on ambulatory care, a number of tumor clinics have developed at the University of Minnesota Health Sciences Center. Initially centered around the Outpatient Tumor Clinic, subspecialty clinics have evolved to meet the specific needs of patients with neoplastic problems. The Tumor Clinic primarily provides follow-up care for the White Tumor Service of the Department of Surgery. This Clinic had 1,040 visits the past year. Other specialty clinics include the Therapeutic Radiation Clinic, Pediatric Oncology Clinic, Gynecology Tumor Clinic, Otolaryngology Tumor Clinic, Adult Hematology Clinic, Cancer Detection Center, Masonic Clinic for the research study of advanced cancer patients of the Departments of Pediatrics and the Section of Medical Oncology, and the Medical Oncology Clinic.

E. Department of Therapeutic Radiology: The Department of Therapeutic Radiology provides an interdisciplinary interaction for the care of patients requiring radiation therapy. A planning grant to develop a Therapeutic Radiology Cancer Center at the University of Minnesota has been submitted to the United States Public Health Service. It would also involve interaction with the Division of Nuclear Medicine and diagnostic facilities of the Department of Radiology. It has been site-visited and is now awaiting funding. The Department of Therapeutic Radiology occupies outmoded facilities and long-range planning of the rejuvenation of the facilities for this Department is planned. Hence, the proposed planning grant would aid in the development of the specific needs of this Department.

F. Diehl Hall Library: The Diehl Hall Library is a fully equipped modern biomedical library adjacent to the existing cancer facilities. This library is available to the members of the University of Minnesota Health Sciences Center including those relating to cancer research. The Library has a Department of the History of Medicine.

G. The Bio-Medical Data Processing Center: The bio-medical computer center is available for studies requiring statistical aid. This facility consists of heavy computer equipment in the basement of the Masonic Memorial Hospital and offices on the third floor of the VFW Cancer Research Building.

H. Cancer Detection Center: The Cancer Detection Center in the basement of the Masonic Memorial Hospital is a center which has been in existence for twenty-three years. It encompasses a complete examination of normal people in an attempt to detect cancer seeing a fixed population of 6,000 patients per year. It exemplifies various techniques for diagnosing asymptomatic or early cancer and is a model for teaching medical students, clinical fellows, staff and community physicians the appropriate examination techniques for cancer diagnosis. It is recognized as one of the few medical centers from which cancer detection statistics can be obtained in the United States.

F COLLABORATIVE ARRANGEMENTS

The primary collaborative arrangements are obviously internal, between investigators in a wide variety of basic and clinical areas in the Health Sciences. Superimposed upon this is the possibility of very fruitful collaboration outside of the Health Sciences but within the University of Minnesota. The major possibility is the College of Biological Sciences at the University of Minnesota; interest has already been expressed by several members of the Department.

The University of Minnesota has several affiliated hospitals with which it may be possible to collaborate in developing a broadly based Cancer Research Center. These include the Minneapolis Veterans' Administration Hospital, Hennepin County, Ramsey Hospital in St. Paul and several smaller private institutions. Individuals from each of the three major affiliated hospitals have already expressed interest in the program. Finally, it should be noted that two new medical schools are being developed in Minnesota. The Mayo Clinic Medical School and the University of Minnesota Medical School in Duluth will open their doors to small initial classes of students in September 1972. Both of these schools currently are besieged with the enormous problems of getting started but both may eventually be interested in some form of collaboration in the development of a Cancer Research Center. Many aspects of the Center, particularly those involved with patient care and education, will probably be planned on a state-wide and even regional basis, making the interest of these new schools highly desirable for the complete success of the program. The development of a fruitful relationship with these new schools presents an important task to be carried out during the planning phase of the Cancer Research Center.

CANCER COORDINATING COMMITTEE

FOR THE HEALTH SCIENCES

Mr. Robert Baker	Assistant Director, Hospital Administration
Dr. Gerhard K. Brand	Professor, Department of Microbiology
Miss Sheila Corcoran	Assistant Professor, School of Nursing
Miss Ellen Egan	Assistant Professor, School of Nursing
Dr. Robert Good	Regents Professor, Pediatrics; Head, Pathology
Dr. B.J. Kennedy	Professor, Medicine; Director, Oncology
Dr. William Krivit	Professor, Pediatrics
Dr. Seymour Levitt	Professor and Head, Therapeutic Radiology
Dr. Charles McKhann,	Professor, Surgery
Dr. Peter Plagemann	Associate Professor, Department of Microbiology
Dr. Leonard Schuman	Professor; Division Head, Epidemiology
Dr. Dale Sorensen	Professor and Head, Veterinary Medicine
Dr. Robert Vickers	Professor, Oral Pathology
Dr. Robert Vince	Associate Professor, Medicinal Chemistry

SUBCOMMITTEE ON EDUCATION

Miss Sheila Corcoran	Assistant Professor, School of Nursing
Dr. Ignacio Fortuny	Associate Professor, Medicine
Dr. Theodor Grage	Associate Professor, Surgery
Dr. Thomas Jones	Assistant Professor, Therapeutic Radiology
or	
Dr. Seymour Levitt	Professor and Head, Therapeutic Radiology
Dr. Mark Nesbit	Associate Professor, Pediatrics
Dr. James McArthur	Associate Professor, Medicine
Dr. Robert Vickers	Professor, Oral Pathology

Dr. Lee Wattenberg

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Dr. Elwin Fraley

Professor and Director, Urology

Dr. Harry Jacob

Professor, Medicine

Dr. William Krivit

Professor, Pediatrics

Dr. Donlin

Associate Professor, Neurosurgery

Dr. Charles McKhann

Professor, Surgery

Dr. Dale Sorensen

Professor and Head, Veterinary Medicine

Dr. Osias Stutman

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Dr. Robert Vince

Associate Professor, Medicinal Chemistry

Dr. Donald Wetlaufer

Professor, Biochemistry

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Professor; Director, Health Computer Sciences

Dr. Robert K. Anderson

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and Department of Public Health

Dr. Marcus Kjelsberg

Associate Professor; Assistant Director, Biometry

Dr. Warren Lawson

Secretary and Executive Officer, Minnesota Dept. of Health

Dr. Leonard Schuman

Professor; Division Head, Epidemiology

## APPENDIX

**Appendix I - Professional Personnel: Members of Health Sciences Cancer Coordinating Committee and Subcommittees - Biographies and Bibliographies**

**Appendix II- Cancer Research:** The enclosed materials represent a very limited and incomplete survey of some of the activities currently being undertaken in cancer research, education and patient care at the University of Minnesota. Some of the sections also include preliminary suggestions of areas of expansion. The most incomplete are those concerned with research where a comprehensive survey and analysis would be part of the Planning Grant activity itself. The section on research is divided into areas of research activity rather than departmental sponsorship.

- A. Tumor Immunology
- B. Viral Oncology
- C. Chemotherapy
- D. Biological Membrane
- E. Molecular Biology
- F. Metabolism and Regulation
- G. Carcinogenesis
- H. Comparative Oncology
- I. Radiation Biology

### **Cancer-Related Grants at the University of Minnesota**

**Appendix III- Education: Members of the Advisory Panel to Education Subcommittee; Current areas of Oncology Education**

**Appendix IV- Epidemiology**

**Appendix V- Professional Consultants - ENVIRO-MED, Inc., Time Estimates**



## A. IMMUNOLOGY

In the biological sciences immunology is one of the strongest basic disciplines at this University. There is active research in almost all areas of immunobiology with emphasis on immunologic problems in transplantation, immune deficient diseases and tumor immunology.

A brief resume of the extensive work already in process is as follows:

1. Basic mechanisms of immune response to tumor cells:

A. General mechanisms of cell-mediated immunity (as applied to tumor, normal cells or infectious agents); role of lymphoid cells; thymus-dependency of these responses; receptors on thymus dependent cells; role of antibodies as regulators of these responses (modulation, cytotoxicity, enhancement, opsonization, blocking); role of different types of immunoglobulins in this regulation; selective modification of human versus cellular immunity (especially effect of protein deficient diets); ontogeny of these immune responses; involution of these immune responses (aging).

B. Modification of immunogenicity of tumor cells by different agents (neuraminidase, etc) as possible models for immunotherapy.

C. Establishment of human cell lines from tumor patients and from patients with immune deficiencies and high tumor risk; sensitivity to malignant transformation by oncogenic agents (SV40) of these different cell lines.

D. Attempts to develop tests to measure both cell-mediated and humoral responses of cancer patients may be helpful in diagnosis, prognosis and as a guide to therapy.

2. Studies on structure and function of membranes. Several groups interested in the structure of membranes in benign and malignant cells, especially as it relates to surfact tumor specific antigens.

A new tumor and serum bank has been established for genitourinary neoplasma in which all specimens are controlled by a program developed in collaboration with the Control Data Corporation. This specimen bank will provide the first well organized material from patients for use in immunologic studies so that the results from a large number of laboratory tests can be correlated with the clinical course of the patient. The bank is planned as a potential national resource.

It is obvious that work in immunology is central to any cancer research center today. It is hoped by bringing together a "critical mass" of immunologists with other scientists, both research in immunology as well as in other disciplines would benefit. In particular, strong interrelationship between immunology and virology oncology should be very fruitful.

The importance of viral oncology is now obvious. Although there is interest in this field at the University of Minnesota, it is an area for which the need for real development is felt.

Ongoing projects in basic virology include fundamental aspects of bacteriophage and the study of mengovirus - viral RNA synthesis in infected cells, isolation of viral-induced RNA polymerase, effects of inhibitors on viral replication, and work on "slow" viruses, etc.

In viral oncology attempts are being made to isolate virus from a variety of human neoplasma. Studies on various herpes viruses including herpes hominis type II are underway to determine whether there is any relation between this virus and tumors of the male reproductive system. Other studies are concerned with the effects of known DNA oncogenic viruses on DNA metabolism in transformed cells, identification and characterization of C-type viruses indigenous in established cell lines such as mouse L cells and Novikoff hepatoma. Attempts are being made both to characterize the nucleic acids of these viruses as well as to study the effects of various nutritional factors, inhibitors and other growth conditions on virus production.

Outstanding work is being carried out in comparative viral oncology. Research in leukemia in cattle is detailed elsewhere. The Department of Zoology has an extensive program devoted to the virus-induced renal adenocarcinoma in frogs.

At present there are no adequate facilities in which to carry out studies on oncogenic viruses safely. Almost all of the ongoing projects are being done under less than ideal safety conditions. Furthermore, the groups interested in virology and viral oncology are working at widely dispersed locations between the main campus and St. Paul. Not only are the virologists separated from each other but, in many cases, their work is not integrated with individuals working in scientific disciplines essential to support first class research in viral oncology. Thus, in planning for a new Cancer Center that would include facilities for a viral oncology group, provisions would be made for bringing the virologists together with electron microscopists, biochemists, immunologists, macromolecular biologists, as well as other potential collaborators. In addition, a viral oncology program would require extensive central support facilities for cell production, virus production and virus identification.

The University has well recognized programs in clinical chemotherapy which are supported by several United States Health Service grants including an advanced malignant disease center grant. The Masonic Memorial Hospital was established as a clinical facility to care for patients with advanced malignant diseases. A group of qualified investigators were assembled representing a variety of medical disciplines to study the problem of patients and conduct clinical investigations relative to these problems. Attempts are made to develop treatments that would result in improved patient care. Studies include immunological aspects of cancer, brain tissue reactions to tumor and primary brain tumor therapy, chemotherapy of a variety of tumors, biologic aspects of tumor growth, complications of the presence of cancer and complications of cancer treatments and radiobiological aspects of cancer. This program in advanced cancer has been deemed a Clinical Cancer Center and is supported by USPHS research grant 2-OP2-CA08832 now in its sixth year.

There are active clinical chemotherapy groups at all of the major University-affiliated hospitals. These programs are not only concerned with the testing and evaluation of new chemotherapeutic agents but also are working collaboratively with their basic science counterparts.

Pharmacology and Biochemistry have several groups investigating mechanisms of drug action. Work is going on at the preclinical chemotherapy level to develop new approaches to chemotherapy by investigating macromolecular mechanisms that may be exploitable by drugs. A cooperative effort between Biochemistry and Urologic Surgery involves the study of lipid metabolism in the hypernephroma cell with the hope of developing new chemotherapeutic approaches to a tumor for which, at the present time, there is no chemotherapy. In Neurologic Surgery, attempts are being made to develop new chemotherapeutic agents for malignant brain tumors using various animals and experimental models.

Many of the efforts in chemotherapy research are, already, interdisciplinary and it is reasonable to expect that this type of research would thrive in the environment of a Cancer Center.

#### D. BIOLOGICAL MEMBRANE

A large, loosely connected group of investigators of biological membranes exist at the University of Minnesota. Morphology (EM), biosynthesis, active and passive permeability, mechanical properties, molecular structure, enzymology, chemical reactivity, immunology of cell surfaces, theory of membrane structure, communication channels between cells, control of cell membrane synthesis, inherited abnormalities of red cell membrane and binding and transport proteins comprise a highly condensed listing of these investigations. They are carried out in numerous departments and indeed in numerous colleges, including Biological Sciences, Institute of Technology, Chemistry Department and College of Biological Sciences, as well as in both clinical and basic science departments of the Health Sciences.

A very large amount of research and biological membranes is currently going on. However, it is physically dispersed and communication between various laboratories is limited. In the past two years a Membrane Discussion Group has been formed which meets two times a month in the evening and provides for interaction that previously did not exist between the various interest groups.

#### E. MOLECULAR BIOLOGY

Molecular biological studies on the mechanisms of gene expression are being carried out (a) on the mechanisms of protein biosynthesis at the translational level and (b) on the molecular genetics and associate enzymology of bacteriophage infection and development. These studies are going on in the Departments of Biochemistry, Microbiology, and Genetics and Cell Biology. This important area is seriously underrepresented at the University of Minnesota as well as being conducted at laboratories that are relatively far apart.

#### F. METABOLISM AND REGULATION

A listing of active investigations includes: nucleic acid metabolism in differentiating systems, biosynthesis and structure of lipopolysaccharides and metabolism of amino-sugars, regulation of metabolic pathways and enzymes, and regulation during differentiation (microorganisms); pathways and mechanisms of sterol biosynthesis, and control of cholesterol biosynthesis; regulatory mechanisms for protein catabolism in mammalian tissues; metabolism of the steroid hormones, and hormonal effects on enzyme activity; structure and assembly mechanisms for proteins, membranes, and organelles; glyoxalase inhibitors as potential anti-cancer agents, and tissue-specificity of ribosomes with a view to selective inhibition; enzymes induced by phage infection; mechanism of DNA replication, regulation of the gal. operon in *E. coli* mechanisms of macromolecular association, including virus assembly microtubular formation, etc.; regulatory roles of cAMP and cGMP in intermediary metabolism; intercellular transport mechanisms; nuclear transplantation studies; regulation of growth of animal cells in culture; RNA and phospholipid metabolism of cultured animal cells, mechanisms of information retrieval within the cell, and mengovirus replication.

The above investigations are largely concentrated in the physically adjacent departments of Biochemistry and Microbiology, with a scattered representation from the Departments of Pharmacology, Medicinal Chemistry, Genetics and Cell Biology. A casual and more or less accidental set of interactions already exists between some of the investigators in this area. It is probably fair to say, however, that the present interactions are neither extensive nor intensive.

An extensive study is being conducted from cell biology viewpoints in the Department of Microbiology on foreign body tumorigenesis using polymer implants as the foreign body.

Studies of chemical carcinogenesis in the Department of Pathology are oriented toward 1) identification of the systems and mechanisms involved in detoxication of chemical carcinogens, 2) the inhibitory (protective) effect of some drugs on chemical carcinogenesis, and 3) cellular mechanisms involved in carcinogenesis *in vitro*.

A group of the Biochemistry Department is carrying on studies on the metabolism and mechanism of action of carcinogenic aryhydroxamic acids *in vitro* and *in vivo*.

#### H. COMPARATIVE ONCOLOGY

Comparative oncology is important to any interdisciplinary cancer research effort because most human tumors have a counterpart in animals. We believe that intensive study of animal tumor systems may contribute directly to our understanding of human malignancy.

There are ongoing programs in the field of comparative oncology at the University of Minnesota. Paramount among these, at the College of Veterinary Medicine, have been studies of the epidemiology, pathology, clinical signs and etiology of leukemia in cattle. This research project is already a multidisciplinary, interdepartmental effort involving clinicians, pathologists, virologists, epidemiologists and morphologists and has contributed significantly to the state of knowledge on this disease.

A similar cooperative study is being made of the epidemiology, etiology and pathology of benign hyperplasia and cancer of the prostate. In the Department of Zoology studies are ongoing of virus-induced renal adenocarcinoma in frogs and of chemical carcinogenesis and viral oncology in a variety of animals.

The College of Veterinary Medicine has expressed a willingness to expand their collaborative research efforts with individuals interested primarily in human cancer. The disciplines which would have the greatest potential for fruitful collaboration in comparative oncology would be immunology, virology, biochemistry, macromolecular virology, morphology and pathology. In support of this effort, there is a wealth of clinical material available through the College of Veterinary Medicine. Last year (1970), there were 361 tumor diagnosis in dogs alone.

Possible Facility Requirements

1. **Animal housing and husbandry:** This would provide experimental animal care for larger numbers and different species, especially primates, than we now have. This should include amphibian and aquatic species as well as mammals. This could include the capability of carrying some special tumor lines in vivo, to be available on short notice for new projects.
2. **Cell culture:** It would be very advantageous for several investigators to have large batch production and storage capabilities. This would provide experimental stock for a wide variety of approaches to cell biology and biochemistry. For both cell cultures and in vivo tumor lines, long delays are often encountered in obtaining and propagating tumor materials for new studies. It is obvious that this would require some selectivity and also some inevitable waste but properly handled the advantages would far outweigh these disadvantages.
3. **Compound synthesis and purification:** A facility for small batch production of new experimental compounds, i. e., potential carcinogens or anti-tumor agents, would greatly facilitate work in these areas.
4. **Histology service:** Most experimental animal work requires a good deal of fairly routine light microscopic histology and histochemical staining. This could be handled more efficiently by a laboratory devoted to this phase of the work. Initial screening of slides could be done by training paraprofessional people, and the training of technicians in such screening microscopy would be a part of the function of this laboratory.

Another service which might come under this could be the collection and distribution of sterile viable specimens removed at surgery which are needed by both basic research projects and studies conducted in the clinical departments. Now many of these materials are wasted because the people who need them do not become known or an efficient mechanism for retrieval is not available.

5. **Electron microscopy:** Several new areas of ultrastructural techniques have recently become available which are too expensive, too time consuming or too limited in application to warrant investment by a single investigator or even a single department. A common use facility accessible to several investigators would be desirable. This was envisioned not as a service laboratory to turn out micrographs for people on demand, but rather as a physical establishment of a group of instruments to be used by trained investigators already engaged in ultrastructural research. There are now at least seven or eight such people working on cancer problems in this institution. They would no doubt continue to use their own instruments and equipment for routine transmission microscopy. However, scanning electron microscopy, x-ray spectrometry, electron microscopic microanalysis of chemical composition, and freeze-etch replication techniques have a great deal to offer a wide variety of research areas but require specialized equipment and especially trained personnel to assist in the work.

6. **Radio biology:** Taking x-rays of the animals, exposure to high dose radiation, scanning, whole body counting, storage and procurement of radioisotopes could be handled by a central facility.
7. **Conference rooms and auditorium:** The research and teaching requirements of the University of Minnesota are badly in need of better teaching, lecturing, and conference facilities. One of the major requirements of a cancer research center would undoubtedly be facilities for bringing people together.
8. **Library:** Easy access to a selection of appropriate journals and books from a source close at hand to the investigator will greatly increase the efficiency of retrieval of information.
9. **Matching funds:** The Health Sciences Center has received generous gifts totaling 1.6 million dollars for construction of the Philips-Wangenstein Research Laboratories. Specific use of these funds has not yet been determined and the possibility exists that they could form the nucleus for matching funds if it is determined that the development of a Cancer Research Center will require construction of new facilities. In addition, the Minnesota State Legislature has provided generous support in the past for construction with similar requirements.

## I. RADIATION BIOLOGY

The following studies are part of ongoing research projects:

1. **Changes in vascularity in tumors after irradiation:** Curability of tumors by radiotherapy is greatly dependent upon the oxygen supply and thus upon the vascularity of tumors. Attempts are being made to find appropriate irradiation schedules to minimize the vascular damage in tumors under radiotherapy.
2. **Implications of hypertension for the curability of tumors by radiotherapy:** Clinical observation indicated that the tumor in hypertensive patients is harder to control by radiotherapy than that in normotensive patients. Experiments are going on to understand the possible role of vascular abnormality in tumors of such hypertensive patients in hindering the control of tumors by radiotherapy.
3. **Potentiation effect of drugs in radiotherapy:** A number of drugs have been tested as potentiators of radiation effects on tumors. Favorable results are being observed with Iodoacetamid in experimental animal tumors.
3. **Relative biological effect of different radiations:** Relative biological effect of high energy x-rays and electron beam from our newly installed linear accelerator are being compared with conventional CO-60 gamma ray to achieve optimal use of different radiation sources in treating tumors

## CANCER RELATED GRANTS - 1971

Atomic Energy Commission

Bovine Leukemia Study, Vet School

American Cancer Society

Bodley, M. W.	Translational Processes
Clawson, C. C.	Fellowship
Good, R. A.	Lymphomogenesis
McKhann, C. F.	Antigens in Malignancy
Page, D. R.	Scholarship
Simmons, R. L.	Immunogenicity of Tumors
Choi, Y. S.	Lymphoid Cell Distinction
	Institutional Research Grant

Hartford Foundation

Good, R. A.	Cellular engineering
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Graduate School Med. and Cancer Research Fund

About 20 small grants Cancer related  
Mass Spectroscopy facility

National Cancer Institute

Brand, G. K.	Carcinogenesis
Kennedy, B. J.	Advanced Malignant Diseases
McKhann, C. F.	Tumor Antigens
Kennedy, B. J.	Clinical Cancer Training
Najarian, J. S.	Cancer Research Training
Noland, W. E.	Unsat. Compounds
Paulus, H. J.	Polycyclic hydrocarb.
Schuman, L. M.	Mortality Study
Sheridan, J. D.	Cell Junction
Simmons, R. L.	Immune
Vince, R.	Glyoxalase Inhib.
Wattenberg, L. W.	Cancer Research Training
Yunis, E. J.	Induced Tymomas
Good, R. A.	Collab. Study with NCI
Krivit, W.	Platelet Study
Nesbit, M. E.	Chemotherapy
Estensen, R. D.	Cytoplasmic Division
Grage, T.	Central Oncology Group
Wattenberg, L.	In utero Effects of Environmental Carcinogens
Vince, R.	Career Development
Vince, R.	Glyoxalase Inhibitors



Mizuno, N.S.	Anit-tumor Agents
Good, R.A.	Non-specific Resistance
Najarian/McKhann	Cancer Research Training Grant
Levitt, S.	Clinical Cancer Training - Therapeutic Rad.
Borch, Richard	Synthesis of Natural Prod.
Schuman, L.M.	Third National Cancer Survey
Schuman, L.M.	Cancer Mortality Study
Sheridan, Judson D.	Cell Junctions in Growth
Simmons, Richard	Immunological Reactivity
Simmons, Richard	Immunological Reactivity(supplement)
Wattenberg, L.	Neoplasia Studies
Fraley, E.	Renal Carcinoma

National Institutes of Allergy and Infection

Clawson, C. C.	Macrophages
Plageman, P.G.	Virus Replic.
Page, A.R.	Neutrophil. Metab.
Good, R.A.	Immunobiology
Anderson, D.L.	Infectious DNA
Good, R.A.	Training Grant
Kim, Y. B.	Ontogeny Immune
Choi, Y.S.	Lymphoid System
Watson, D.W.	Allergy and Immunology
Varco, R.L.	Graft Rejections
Gatti, R.A.	Tumor Immunity
Good, R.A.	Endotoxin Research

Leukemia Task Force

Interdisciplinary

Minnesota Medical Foundation

Levitt-Song	Vascular Changes - Tumors
Feola, J.	Synergistic Effects of Iodoacetamed
Good, R.A.	Dev. Lymphoid System
Good, R.A.	Dev. Lymphoid System
McKhann, C.F.	Tumor Immunology

National Foundation

Good, R.A.	Immune Deficiency
Good, R.A.	Thym. Bursa

Damon Runyon

McKinnell, R.G.	Tumor Genome
Deinard, A.	Neutropenia-Tumor Pt.

General Medical Science

Rogers, P.

Messenger RNA Control

Others

McKinnell, R.

Tumor Virus

Halberg, F.

Circadian Rhythm

Witkop, C.

Pigment Defects (Melanoma)

Choi, Y. W.

Lymphoid Cells

Najarian, J.

Organ Preservation

Wattenberg, L.

Pulmonary Tissue

Youdin, S.

Lymphoid System

Youdin, S.

Lymphoid System

White, J.

Platelets

Lillehei, R. C.

Organ Preservation

Day, N.

Complement

Lopez, C.

Autoimmune Disease

Jose, D.

Malignant Tumor Rx

Good, R. A.

MMF EM Grant

Gray, E. D.

Cell Differentiation

Mariani, T. N.

Malignancy and Immunology

The total for the above grants is approximately \$3,500,000

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CANCER RELATED TEACHING

UNIVERSITY OF MINNESOTA HEALTH SCIENCES CENTER

DEPARTMENT	COURSE TITLE, IF ANY	CANCER HOURS PER YEAR	NUMBER OF STUDENTS	LEVEL OF STUDENTS
<u>Public Health</u>	Epidemiology of Non-Communicable Disease (PubH 8-340)	15		M. P. H., M. S., Ph. D. candidates in Epidemiology, medical student elective
Public Health	Epidemiology in Cancer	27		M. S. and Ph. D. candidates, postgraduate-medicine
Public Health	Man in his Community	5 (1972) 10 (1973)		Medical students
<u>Division of Public Health Nursing</u>	Long-Term Patient Care and Rehabilitation			
PubH 5-517	"	2		
PubH 5-518	"	6		
PubH 5-520	"	2		
PubH 8-520	"	av. 10%		
<u>Nursing</u>	Pathophysiology of Illness (Nu 5-400)	3	104	Undergraduate
Nursing	" (Nu 5-401)	2	104	Undergraduate
Nursing	" (Nu 5-402)	2.5	104	Undergraduate
Nursing	Perspective of the Nurse/Patient Relationship (Nu 5-230)	-	104	Undergraduate
Nursing	Core Concepts of Adaptation Theory and Nursing Process (5-410)	-	104	Undergraduate

DEPARTMENT	COURSE TITLE, IF ANY	CANCER HOURS PER YEAR	NUMBER OF STUDENTS	LEVEL OF STUDENTS
Nursing	Integration and Appreciation of Theory and Nursing (Nu 5-420)		104	Undergraduate
	(Nu 5-430)		104	Undergraduate
	(Nu 5-440)		104	Undergraduate
Nursing	Introduction to Community Health (Nu 5-625)		70	Undergraduate
Nursing	Nursing Synthesis and Nursing Roles (Nu 5-630)		70	Undergraduate
	(Nu 5-640)		70	Undergraduate
	(Nu 5-650)		70	Undergraduate
<u>Pathology</u>	Viruses in the Pathogenesis of disease (with emphasis on neoplastic entities).	10	25	Medical graduate
			5	Postdoctoral
Pathology	Diagnosis of Tumors (Lec. and Lab.) (Path 5-112)	80	20	Postdoctoral
			5	Medical graduate
Pathology	Surgical Pathology (Path 5-113)	Full time/	3	Postdoctoral
		3 weeks	2	Graduate, Medical
Pathology	Tumor Immunobiology (Fath 5-133)	10	25	Postdoctoral
			5	Graduate, Medical
Pathology	Basic Studies of Cancer	10	20	Medical graduate
			5	Postdoctoral



DEPARTMENT	COURSE TITLE, IF ANY	CANCER HOURS PER YEAR	NUMBER OF STUDENTS	LEVEL OF STUDENTS
Pathology	Problems in Experimental Pathology (Path 5-141)	Arranged	5	Medical Graduate Postdoctoral
<u>Radiation Therapy</u>	(8-300)	Arranged	5	Therapy Residents, Graduate
Radiation Therapy	Fundamentals of Radiation Therapy (8-310)	Arranged	5	Therapy Residents, Graduate
Radiation Therapy	Research in Radiation Therapy (8-350)	Arranged	5	Therapy Residents, Graduate
Radiation Therapy	Seminar: Radiation Biology (8-410)	50	5	Therapy Residents, Graduate
Radiation Therapy	Research in Radiation Biology (8-450)	Arranged	5	Therapy Residents, Graduate
Radiation Therapy	Research in Radiological Physics (8-550)	Arranged	5	Therapy Residents, Graduate and Ph. D. Physics
<u>Phase B Program</u>	1. Osseous Tumors 2. Radiation Injury 3. Cancer Management Symposium	1/3 hour 1/3 hour 2 hours		Undergraduate Undergraduate Undergraduate
Radiation Therapy	Externship in Therapeutic Radiology (5-505)	Arranged	Elective	Undergraduate
Radiation Therapy	Advanced Externship in Therapeutic Radiology (5-507)	Arranged	Elective	Undergraduate

DEPARTMENT	COURSE TITLE, IF ANY	CANCER HOURS PER YEAR	NUMBER OF STUDENTS	LEVEL OF STUDENTS
Radiation Therapy	Special Problems in Radiation Therapy (5-508)	Arranged	Elective	Undergraduate
Radiation Therapy	Tumor Clinic Conference (5-321)	50		Undergraduate and Graduate
Radiation Therapy	Special Problems in Radiation Therapy (5-340)	Arranged	5	Therapy Residents, Graduate
Radiation Therapy	Basic Principles of Radiological Physics (5-510)			Graduate
Radiation Therapy	Dosimetry of Internal and External Radiation (5-512)	50	5	Therapy Residents, Graduate
Radiation Therapy	Special Problems in Radiological Physics (5-540)	Arranged	Elective	Graduate
Radiation Therapy	Radiological Physics (5-770)	30	5	Therapy Residents, Graduate
<u>Medicine</u>	Gastro-intestinal Medicine	20	Entire Class	Undergraduate
Medicine	Chest Medicine	19	Entire Class	Undergraduate
Medicine	Endocrinology Medicine	1	Entire Class	Undergraduate
Medicine	Hematological Medicine	4	Entire Class	Undergraduate
Medicine	Brain and Cord Tumors	15	Entire Class	Undergraduate
Medicine	Introduction to Medical Genetics-Immunogenetics			Undergraduate

DEPARTMENT	COURSE TITLE, IF ANY	CANCER HOURS PER YEAR	NUMBER OF STUDENTS	LEVEL OF STUDENTS
Medicine	Human Cytogenetics			Undergraduate
Medicine	Oncology-Hematology	Phase B Core: 22 hours	8	Medical Fellows
		Phase D Elec. : 298 hours	8	Junior Residents
Medicine	Phase B-Internal Medicine/Hematology	14	234	Undergraduate
Medicine	Phase D-Internal Medicine/Hematology Hematologic malignancies	120	234	Undergraduate
<u>Surgery</u>	Phase B:	0 hours	23	
	Phase D:	150 hours	23	Interns, Residents
<u>Pediatrics</u>	Phase B:	8 hours	4	Residents
	Phase D:	125 hours		
<u>Neurology</u>	Phase B:	125 hours		Resident Staff
	Phase C:	0 hours		
<u>Dermatology</u>	Phase B:	4 hours		Residents
	Phase D:	0 hours		
<u>Therapeutic Radiology</u>	Phase B:	3 hours		Residents/x-ray
	Phase D:	10-20 hours		Techs/radiologists
<u>ENT</u>	Phase B:	1 hour		Residents
	Phase D:	5 hours		

DEPARTMENT	COURSE TITLE, IF ANY	CANCER HOURS PER YEAR	NUMBER OF STUDENTS	LEVEL OF STUDENTS
<u>Urology</u>	Phase B: Phase D:	18 hours 10 hours		Residents
<u>OB-GYN</u>	Phase B: Phase D:	23 hours 18 hours		Residents
OB-GYN	Phase B:	4 hours	150	Undergraduate
Clerkship in OB-GYN	Phase B:	6 (elective)		Undergraduate
<u>Clinical Psychology</u>	Phase B: Phase D:	2 hours 0 hours		
<u>Clinical Psychiatry</u>		Occasional lecture		
<u>Biochemistry</u>	Advanced Endocrinology and Steroid Biochem. (8-206)	30	30-40 year	2/3 Graduate 1/3 Postdoctoral
Biochemistry	Advanced Course in Nucleic Acids (8-241)	30	50	35 Graduate 10 Postdoctoral 5 Predoctoral
Biochemistry	Human Cytogenetics Lab. (5-161)	30		Undergraduate
Biochemistry	Human Biochemical Genetics	20		Undergraduate
Biochemistry	Human Biochemical Genetics Laboratory (5-163)	30		Undergraduate

DEPARTMENT	COURSE TITLE, IF ANY	CANCER HOURS PER YEAR	NUMBER OF STUDENTS	LEVEL OF STUDENTS
Biochemistry	Cancer Immunobiology (5-133)	10		Undergraduate
Biochemistry	Immunogenetics (5-132)	20		Undergraduate
Biochemistry	Genetic Markers in Medicine	10		Undergraduate
<u>Dentistry</u>	Oral Pathology (5-251, 5-252)	50	130	Undergraduate
Dentistry	Oral Pathology (8-002, 8-003)	50	130	Undergraduate
Dentistry	Oral Pathology-Introduction (5-160)	7	130	Undergraduate
Dentistry	Oral Biology (5-675)	2	125	Undergraduate
Dentistry	Special Oral Pathology (8-007)		10	Graduate
Dentistry	Advanced Oral Pathology (8-005)	30	10	Graduate
Dentistry	Oral Pathology (D.H. 1-180)	4	60	Undergraduate
Dentistry	Pathology (D.H. 1-176)	4	60	Undergraduate
Dentistry	Stomatology	4	150	Phase B Medical Students Undergraduate
Dentistry	Surgical Oral Pathology (8-011)	4	2	Graduate

DEPARTMENT	COURSE TITLE, IF ANY	CANCER HOURS PER YEAR	NUMBER OF STUDENTS	LEVEL OF STUDENTS
Dentistry	Medical Cyto genetics (8-010)	3	15-20	Graduate
Dentistry	Oral Surgery (5-310)	3	130	Undergraduate
Dentistry	Oral Surgery (5-315)	2	125	Undergraduate
Dentistry	Surgery (8-251)	10	8	Graduate
Dentistry	Tumor Clinic	10	8	Graduate
Dentistry	Principles of Maxillofacial Care (8-032)	4	3	Graduate
Dentistry	Advanced Clinical Maxillo-facial Prosthetics (8-034)	4	3	Graduate

Population and Incidence Statistics

	1970 Populations	1967 Cancer Deaths	Crude Cancer Mortality Rates (per 100,000)
Minnesota	3,805,069	5,847	153.66
North Dakota	617,761	900	145.68
South Dakota	666,257	1,093	164.05
Montana	694,409	1,002	144.29
Iowa	2,825,041	4,743	167.89
Wisconsin	4,417,933	6,878	155.68
Michigan	<u>8,875,083</u>	<u>13,008</u>	146.56
TOTAL	21,901,553	33,471	
(Without Michigan	13,026,470	20,463)	
(Without Michigan and Wisconsin	8,608,537	13,585)	
(Upper Peninsula of Michigan	304,347	446 *Est.)	

Incidence and Service Load Data for Minneapolis-St. Paul Metropolitan Statistical Area (Anoka, Dakota, Hennepin, Ramsey and Washington Counties)

1.	<u>Population of SMSA (1970)</u>	1,813,647
2.	<u>Cancer Cases Diagnosed 1969</u>	<u>7,029</u>
a)	Non-Residents	1,763
b)	Residents	5,266
	I. Male	2,303
	II. Female	2,963

3. Age-adjusted Incidence Rates for MSP. SMSAAll Survey  
Areas in U.S.a) 1970 Standard Population:All Sites:

Total	323.1	318.3
Males	341.5	343.4
Females	324.4	308.7

Sites exclusive of Cervix in Situ:

Total	305.2	299.8
Males	341.5	343.4
Females	289.4	272.7

b) 1950 Standard Population:MSP. SMSAAll Survey  
Areas in U.S.All Sites:

Total	296.9	395.4
Males	297.1	304.0
Females	311.0	298.2

Sites exclusive of Cervix in Situ

Total	276.2	274.0
Males	297.1	304.0
Females	270.5	256.4

4. Number of Cancer Cases Admitted (1969)Newly Diagnosed

a) University Hospitals	1267	635
b) Hennepin County General	286	185
c) Veterans Administration	760	430
d) St. Paul Ramsey	362	234
e) Mount Sinai	<u>306</u>	<u>198</u>
TOTAL	2981	1682



Rank Order of Cancers in Minneapolis-St. Paul SMSA Newly-diagnosed Resident Cases by Site and Percentage of Total

1.	Prostate	18.4 %	Breast	24.2%
2.	Lung	17.3	Colon	11.4
3.	Colon	11.6	Cervix uteri, in situ	11.3
4.	Urinary Bladder	6.6	Cervix uteri, invasive	5.9
5.	Stomach	5.2	Ovary	5.1
6.	Rectum	5.0	Corpus uteri	5.0
7.	Hodgkins & other lymphomas	4.7	Rectum	3.9
8.	Leukemia	4.0	Hodgkins & other lymphomas	3.9
9.	Pancreas	3.7	Lung	3.3
10.	Kidney	3.0	Pancreas	2.5

Current Activities, Epidemiology

A. General

The activities in epidemiology and biometry, whether research, consultation or service, reside for the most part in the Division of Epidemiology and Division of Biometry of the School of Public Health and the Division of Health Computer Sciences in the Department of Laboratory Medicine, School of Medicine. The Division of Epidemiology and Biometry are also Departments of the Graduate School. Several of the faculty of the Computer Center hold academic appointments in Biometry. The Department of Veterinary Microbiology and Public Health of the College of Veterinary Medicine is also engaged in related epidemiologic research. Joint appointments are mutually held between that Department and the Division of Epidemiology.

B. Epidemiologic and Biometric Services in Cancer Research Currently in Progress

Through its Biometry Consulting Laboratory the Division of Biometry provides consultation to all researchers in the Schools of the Health Sciences Center. This consultation covers the areas of specific research design, analysis and interpretation of data. Special expertise in biometric considerations in clinical trials is available. Several of the faculty have had extended

experience with a number of long-term evaluation studies of chemotherapeutic agents. These have included advisory activities to such projects as the National University Group Diabetes Project, Anti-coagulant Therapy Project, Hypertension-Stroke Therapy Project and the Cardiovascular Dietary Studies.

Current examples of involvement in the cancer field include:

1. Analysis of Experimental Data on Competing Mouse Tumors (A. Theologides, M. D.)
2. Summarization of Multiple Myeloma Case Data (D. Kiang, M. D.)
3. Evaluation of Data on Radiation Treatment of CNS Infiltrative Leukemia in Children (S. Levitt, M. D.)
4. Design Considerations for a Study of Mammary Cancer (G. Vosika, M. D.)

Recently completed consultations included:

1. Stomach Cancer Staging Project (B. J. Kennedy, M. D.)
2. Statistical Methodology for Cancer Detection Data (V. Gilbertsen, M. D.)

The Division of Health Computer Sciences provides the electro-mechanical computational capability for the Health Sciences Center. The professional staff supplies consultative services; the Applied Programming Service performs programming; and the facility provides computer and tabulation services. In the cancer field the Division of HCS has provided service to a number of investigators. A partial listing of current projects includes:

1. Norwegian-U.S. Gastrointestinal Cancer Study (L. M. Schuman, M. D. and E. Bjelke, M. D.) Frequency distributions from Norwegian and U.S. Case-control Tapes, Data Base: Two tapes with 2124 Norwegian and 3714 U.S. observations.
2. Cancer Registry of Norway - Migrant Study (L. M. Schuman and E. Bjelke) Creation of magnetic tape file of patient records. Data Base: Tape created from 1235 patient records.
3. Lutheran Brotherhood Cohort Study of Mortality (L. M. Schuman and E. Bjelke) Data Base: Creation of tape from insurance and mailed dietary survey records for 18,000 respondents and from insurance records on 7,000 non-respondents. Creation of tape from on-going death certifications for entire cohort.
4. Mouse Tumor Study (A. Rios and R. Simmons, M. D.) Analysis of mouse tumor diameters. Data Base\_ Up to 100 experiments supplied at any one time.

5. Cancer Detection Center - Systems Analysis (Victor Gilbertsen, M.D.) Consultation supplied on an on-going basis.
6. Stomach Cancer Staging (B. J. Kennedy) Cancer stage classification based on survival after diagnosis. Data Base: 1,241 patients from seven U.S. participating hospitals.
7. Analysis of State of Minnesota Mortality and Health Care Facilities Data - State Health Department (R. Hiller) Summary statistics and graphs from deaths and licensing certificates. Data Base: 35,000 deaths per year; 180 laboratories and 700 health care facilities per year.

The Division of Health Computer Sciences has a high level capability of providing geostatistical mapping and graphing on a service basis from an already completed data base (see attachments).

The Division of Epidemiology is frequently consulted on contemplated research with epidemiologic components by investigators from various departments of the Health Sciences Schools although most such research is initiated in the Division with basic science and clinical department cooperation from other schools.

C. Contributions to Teaching and Research Training in Cancer Epidemiology and Biometry

The Division of Epidemiology of the School of Public Health provides basic relevant instruction in cancer epidemiology not only to candidates for the MPH, M.S. and Ph.D. degrees in epidemiology (and in minor fields) but to medical students in their phase B course "Man in his Community" and as an elective available as "Non-Communicable Disease Epidemiology" (Pub.H. 8-340)

The Division of Epidemiology organized and has been directing a Graduate Summer Session in Epidemiology for the past five years. This Special Summer Session has attracted close to 500 students from among the faculties of Medical School Departments of Preventive Medicine, Community Health Medicine, Pathology, Pediatrics, Neurology, Veterinary and Dental Schools and governmental health research agencies. Although the sessions have catered primarily to U.S. faculties, a gratifyingly large international representation has been experienced. In the program of nine elective courses concentrated in seven hours of daily instruction over a period of three weeks, Cancer Epidemiology (Public Health 5-345) is offered in thirty hours of instruction by internationally known cancer epidemiologists.

Other relevant Divisional courses which provide emphasis on cancer include: Epidemiologic Survey Methods (Public Health 5-340) and Seminar in Epidemiology (Public Health 8-379). The Division of Epidemiology also participates in the Pathology Department's course "Basic Science of Cancer" (Path. 5-122).

The Division of Biometry offers the following courses relevant to cancer research training:

1. Biometry of Clinical Studies I, II (Pub. H. 5-409, 5-410)
2. Biometric Topics in Epidemiology (Pub. H. 5-461)
3. Biometry I, II, III and Lab (Pub. H. 5-450 through 5-455)

The Division also provides consultation on the biometric aspects of cancer research projects of graduate students in the various departments of the schools of the Health Sciences Center.

D. Research Activities in Cancer Epidemiology and Biometry

The research activities of the Divisions of Epidemiology and of Biometry (School of Public Health) and Department of Veterinary Microbiology and Public Health (College of Veterinary Medicine) have characteristically been multidisciplinary and have required high levels of interdepartmental cooperation. The research activities of the Division of Epidemiology have been predominantly in the cancer field as is evident from both recently completed and currently on-going studies:

1. Epidemiology of Childhood Leukemia. Total (case-control) case-load study of Minnesota deaths from leukemia in children aged 0-5 years. (All hospitals, relevant physicians, departments of radiology, pathology, hematologists and State Health Department participating.)
2. Tri-State (Minnesota, N. Y., Maryland) Study of Leukemia. Total case-load study (case control) of all cases diagnosed in a five-year period in Metropolitan Twin-Cities Area, Upstate N. Y. and Metropolitan Baltimore area. (All hospitals, relevant physicians, departments of radiology, pathology, hematologists and State Health Department participating.)
3. Study of Hematologic Variables in Families of Leukemia Patients and Controls. Utilized Minnesota component of Tri-State study. (Departments of Laboratory Medicine and Pediatrics Cooperating.) (Current).
4. Mortality from CNS Neoplasms in Minnesota. Analytic study of CNS neoplasms (State Health Department, University Departments of Pathology, Neurology, Neurosurgery Cooperating.)
5. Brain Tumors (Astrocytomas) and Toxoplasma gondii Infection. Case-control study of relationship of brain tumors to evidence of T. gondii infection. (Departments of Neuro-surgery, Surgery, Neurology and Pathology cooperating.)

6. Cancer-Mortality Study. Prospective dietary study of cohort of 25,000 male policy-holders of Lutheran Brotherhood. Part of Norwegian Migrant Cancer Mortality Study. Three-years follow-up now complete. (Lutheran Brotherhood participating.) (Current).
7. Gastrointestinal Cancer Study. Comparative dietary case-control study of gastrointestinal cancers in six hospitals (University, V.A., Mt. Sinai, St. Mary's, St. Barnabas, Hennepin County General) in Minneapolis and six hospitals in Oslo, Norway and surrounding area. (Hospitals as designated, their Departments of Pathology (for tissue sections) and Norwegian Cancer Registry participating.) (Current).
8. Cancer Survey of Twin Cities Metropolitan Statistical Area. Part of 3rd National Cancer Survey for 1969-71. Total Survey of prevalence and incidence of all cancers by site, histologic type and selected host factors. (All hospitals, physicians, pathologists, radiotherapists and State Health Department cooperating.) (Current).
9. Rare Sites Cancer Study. This is a cooperative study on a National basis. Parent institution is Johns Hopkins University School of Hygiene and Public Health. Based on cancers of rare sites elicited in Area Survey noted above.

The Division of Biometry is currently engaged in the following relevant research activities:

1. Continuing research effort in the refinement of medical diagnoses through application of nonlinear multivariate classification procedures;
2. Evaluation of patient survival as a function of observable characteristics.

The College of Veterinary Medicine has been engaged in a study of bovine leukemia. The Division of Epidemiology has collaborated in the epidemiologic phase particularly in the attempt to correlate county incidences of human leukemia with those of bovine leukemia.

The College of Veterinary Medicine has been collecting a data base on animal tumors seen and diagnosed in the University Veterinary Hospital as part of a nation-wide animal cancer surveillance system under the NCI. Data derived from all participating hospitals in the U.S. are available to investigators in cancer at this College.

Furthermore the Department of Veterinary Microbiology and Public Health in cooperation with other departments of the College and University and the State Veterinary Medical Association has recently established a state-wide animal disease surveillance system which will provide information on tumors in animals seen by veterinary practitioners of the State.

The epidemiologic research of this Department is integrated not only with several basic research studies of other departments of the College but also with Departments and Divisions of the Medical School and the School of Public Health.

E. Current and Planned Interagency Cancer Research Activities

As indicated under B 7, page 3, the State Health Department obtains consultation and computer service from the University's Division of Health Computer Sciences. This service includes computer analyses and display of cancer mortality according to a number of variables. The relationship of the Division of Biometry of the School of Public Health and the Division of Vital Statistics of the Minnesota State Health Department is an excellent one. The Division of Epidemiology has over the past seventeen years had strong ties with the Division of Preventible Diseases and the Division of Laboratories of the State Health Department and has engaged in cooperative epidemiologic research with them in such areas as poliomyelitis vaccine trials, evaluation and surveillance and in studies of toxoplasmosis to name but a few.

Initial talks have begun with the State Health officer in terms of establishment of State-wide disease surveillance system. The Health Department looks to the School of Public Health for consultative expertise and offers cooperation in community research. It has the legal power to institute cancer reporting and provides the legal protection of confidentiality of all cancer data gathered in the field. The State Health Officer has indicated a strong desire to participate in the integration of a State-wide cancer case-ascertainment and surveillance system with that of the University concurrent with the expansion of the epidemiologic and biometric research facilities to Cancer Center scope.

The inter-relationships existing between the several programs of the University and the State Health Department would appear to constitute a great strength in the development of those aspects of a cancer research center related to vital records, health statistics, disease surveillance systems, community research in prevention, evaluation of community preventive programs and in follow-up studies.

4.12

Program Meeting Notes Part I

University of Minnesota

Health Sciences Center

Date: 30 September 1968

Place: Dr. Gedgudas's office, Mayo Building

Subject: Diagnostic Radiology Department,  
The Roles of Nuclear Medicine  
and Therapy Departments.

Present: For The University of Minnesota Health Sciences Department:

Dr. Gedgudas            Mr. Dopking  
Mr. Abrahamson

For The Architects Collaborative Inc.:

Mr. Kluver            Mr. Larsen

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I. Dr. Gedgudas opened the meeting with several points essential to our understanding of their program requirements.

a. Excellence of the Radiology Department

In spite of the severely restricted space in which to conduct radiological procedures, the department enjoys an outstanding reputation. A recent survey of university hospital radiological departments has placed the University of Minnesota number one in the country. This reputation will be maintained.

b. Student Participation in the Radiology Department

In keeping with the broad based exposure for medical students at the hospital, the Radiology Department has experienced an excellent response from the students. Last year one-hundred and thirty-six out of one-hundred and fifty students elected to study in the Radiology Department during their course of training at the University of Minnesota Hospital.

c. Collateral Training Programs

A radiological technician training program is conducted at the University Hospital twice yearly. This program also has enjoyed an excellent response. In January, one-hundred students are registered and in June between sixty and seventy students are registered. At this time, no special facilities have been devoted to these teaching endeavors.

d. "Family Medicine Program"

There is no direct indication of what impact this program will have on the Radiology Department. Perhaps initially it will take the

form of "routine bucky work" only, which it is believed will be conducted outside the department but will require radiology staff for teaching and supervision.

If, on the other hand, in the future this program turned into a regional clinic set-up backed up by a major medical center, such as the University of Minnesota Hospital, for critical patient referral, then the impact on the more sophisticated areas of the Radiology suite could be profound.

e. Divisions of the Department

In spite of the ideal aspects of keeping Radiology one homogeneous department serving the whole medical center from a central point (as in the cited case of the Lund Clinic, Sweden), administrative considerations and practices at the University of Minnesota Medical Center have determined otherwise. A recent administrative decision has established Radio-therapy as a separate department.

Cystoscopy is conducted within the Urology Department. Cardiac catheterization is conducted in the heart hospital. Some of the new operating rooms, it is anticipated, will be equipped with x-ray devices. All of these activities outside the Radiology Department proper will impose additional demands on radiologists, technicians and radiological maintenance personnel and facilities.

f. Disposition of Nuclear Medicine

The full potential of Nuclear Medicine is not yet realized. Insofar as application is concerned, it would appear at this time to have excellent diagnostic capabilities achieved through scanning devices and nuclear camera imaging. Therefore, it would appear to have more direct application to the diagnostic end of Radiology and will be planned as a separate entity working in conjunction with the Diagnostic Radiology Department. An internist as opposed to a radiologist will be the chief of the Department of Nuclear Medicine.

II. With reference to the program material previously generated for the Diagnostic Department, Dr. Gedgaudas went on to make the following comments:

- a. He and his staff are in the process of developing basic diagrams referenced as "modules" for areas of sub-specialties within the Diagnostic suite. These diagrams are to be used as indications of ideal element arrangements and adjacencies, but not necessarily final size of examination rooms and ancillary areas. Extensive thought must be given to the actual equipment located in the rooms and the position of transformers supplying power to the equipment.
- b. The Department of Diagnostic Radiology will be divided into suites in which to conduct sub-specialties:
  1. There will be production rooms for "routine bucky" work which will be conducted by technicians, intervention by clinicians. being only in the reading of the final films.



2. There will be a G.I. suite which will require equal time of both clinicians and technicians. In this suite clinicians will conduct fluoroscopic procedures and will be involved in the reading of films as they emerge from the processor. Since the patient will be required to stand by during the progress of the G.I. series, it would be well to have sub-waiting areas where the patients, male and female, could relax in a lounge atmosphere while gowned.
3. There will be a Pediatric suite with its own waiting room which will ideally have a playroom character. A separate patients' toilet equipped with juvenile fixtures is required. Parents and siblings will be expected to wait in this area while the patient's examination procedures are under way. The equipment in this area will be specialized in nature in that it will adapt to smaller bodies and will have a great deal of facility due to the limited doses of radiation allowed for pediatric work. Clinician and technician services will be required about equally in this area.
4. There will be a Thoracic or Chest suite wherein both fluoroscopy and tomography will be extensively applied. There is indication that this would be an excellent area to have an interplay with the Nuclear Medicine Department. The employment of radio-isotopes in certain vascular explorations has proved to be an excellent contrast media. The examinations conducted in this suite will be mainly clinician controlled.
5. The Neurological Radiology suite will be located close to Dr. Peterson's administrative offices. It is assumed that this suite will derive most of its patients from the inpatients community and a few from emergency. If this is the case, then a large stretcher parking area (say for two examination rooms, four stretchers). These examinations are frequently done under general anesthesia, therefore, the suite would best be located close to the recovery room which will be described later. It is also assumed that this would be another area of interplay with the Department of Nuclear Medicine. The examinations conducted in this area are frequently done at the request of the neuro-surgeons as prelude to neuro-surgical procedures. Therefore, areas for consultation between neurological staff and radiological staff are essential. Procedures conducted in this suite entail the filling of spaces in the central nervous system with fluids of positive and negative contrast for examination. These procedures are conducted only by clinicians. One of the examination rooms in the suite will be equipped with a Polytome unit.
6. All of the sub-specialty suites mentioned above will have their own dark room, high-speed processor (as Kodak M-6 unit) and reading room with a film transporting device to carry films back to the case assembly, film display and hot film storage areas.
7. Out of the way of the general traffic pattern of the radiological suite, two large rooms (say 24 feet by 24 ft.) are to be reserved for clinical investigation and research and work set-up laboratories. These rooms would ideally interface with the electronic data

processing system and would have access to ducted air conditioning systems to provide conditioned air according to equipment demands. It is felt by Dr. Gedgaudas that these rooms are the essential "open end" to the constantly changing radiological sciences.

8. Adjacent to the areas mentioned above (item 7) should be the radiological engineers' office and workshop. This shop should be comprehensively equipped to conduct routine maintenance operations for the entire Diagnostic Radiology Department as well as do fitting and assembly of special items of equipment for the specialty suites.
9. It was assessed that by 1973, the Diagnostic Radiology Department would examine 350 patients a day (including emergency). To regulate the flow of this volume of patients through the department, a careful analysis of waiting and sub-waiting areas must be made.

At the entrance to the Diagnostic Radiological suite there must be a control desk and patients' record area. From here the patient should be able to progress to a comfortable waiting area then on to the examination room for any particular radiological procedure. Beyond the general waiting area, in close proximity to the examination rooms, there must be another waiting area for stretcher patients. Many of these stretcher patients are in critical condition and must be under the constant surveillance of trained nurses. Therefore, a nursing station with minor utility and medication facilities must be provided. A stretcher parking alcove will be part of the waiting area. To the left and right of the nurses station will be a patients' preparation area on one side where I. V. and barium preparations, etc. will be administered, and on the other side, a recovery room. Each of these rooms will accommodate two or three patients who will, through the use of glass panels, be observed by the nursing staff at all times. Curtains for privacy will be provided in both rooms.

III. Ancillary to the Diagnostic Radiology Department proper are the teaching and study areas which are required over and above the small group teaching sessions that can take place in the diagnostic examination rooms. Briefly, these areas are as follows:

a. Three Conference Rooms:

One for fifty persons

Two for thirty persons each.

These areas would be used for working conferences. As an example, pediatrics will frequently have gatherings of forty people. There is a traditional noon time gathering of up to 100 residents where all of the previous day's films are shown and commented upon. This is an extremely important teaching function. To accommodate this large group of people, the three conference rooms mentioned above could be opened up into one large room. Good lighting and ventilation are imperative to the success of the conference rooms.

- b. There must be study carrels provided for thirty (including five Nuclear Medicine) Residents. These carrels should be close to the department library and hot film storage area and film reading room.
  - c. A general study area for fifteen medical students who stay in the department for three to six weeks must also be provided.
4. The Diagnostic Radiology administrative facilities will be as follows:
- a. An office for the head of the department with full toilet and shower facilities. Adjoining and interconnected to this office should be a conference room with extensive film viewing capabilities.
  - b. Dr. Peterson's office should be the same general nature as the one above, but located close to the Neuro-Radiology suite. This office should have an anteroom with space for two secretaries.
  - c. The Chief of Diagnostic Radiology and the Chief of Nuclear Medicine should have private offices and perhaps shared toilet facilities.
  - d. The study carrels provided for the Residents and the departmental library should be located by these offices. A close liason between the Department Head, the Chiefs and the Residents will be above all encouraged.
  - e. A common secretarial area to the offices of the Chiefs will be provided. The secretarial office to the head of the department being private and adjoining that office.
  - f. The Administrative Assistant's office will be the business office for the whole Diagnostic Radiology Department. This function has proved to be an invaluable service to the departmental head.
  - g. As a service to the departmental staff, a lounge and coffee shop will be provided. Dr. Gedgaudas said that for the very few minutes of leisure that his staff has during the working day, he did not want them to spend them in discomfort and inconvenient conditions.

Program Meeting Notes Part II  
 University of Minnesota  
 Health Sciences Center

Date: 30 September 1968

Place: Dr. Gedgaudas's office, Mayo Building

Subject: Radiology Research Program

Present: For The University of Minnesota Health Sciences Department:  
           Dr. Hahn

          For The Architects Collaborative Inc.  
           Mr. Kluver      Mr. Larsen

I. This discussion represented the first attempts to arrive at program areas for Radiology Research. It must be pointed out from the start that the figures represented here are minimum areas in which to conduct the anticipated research activities:

a. It is assumed that by 1973 there will be between thirty-five and forty-one full-time research personnel working in the department.

	<u>Existing</u>	<u>Required in 1973</u>
(1973 Personnel=) 35*	X 6,629 Net S.F.	= 11,000 S.F. for animals,
(1967 Personnel=) 21		labs and services

\*This personnel figure is based on Therapy and Nuclear Medicine only Research facilities for Diagnostic Radiology have provided within the department. See item II-7, Program Meeting Notes Part I, 30 September 1968.

b. An assessment was made to accommodate these personnel relative to the existing facilities.

	<u>Existing Areas</u>	<u>% of Total</u>	<u>Assessed New Areas</u>
	<u>Net S. F.</u>	<u>Net Area</u>	<u>Net S. F.</u>
Lab	2,873	.50	5,500
Animals (corrected)	1,600	.28	3,080
Services	1,273	.22	2,420* (1,500 would
	5,746	1.00	11,000      be enough)

\* If the Service Area is reduced, this area should be redistributed to Lab and Animal functions.

c. Projected area for:

Lab, Animals & Services	=	11,000 S.F. Net
Offices	=	1,750 S.F. Net
Radiation Biophysics	=	<u>500</u> S.F. Net
Total		13,250 S.F. Net

d. Break-down of area allotted to Radiation Biophysics:

2 Labs @ 200 S.F. each	=	400 S.F. Net
Office for 2-3 Graduate Students	=	<u>100</u> S.F. Net
Total		500 S.F. Net

This Area must be located adjacent to Radiation Therapy.

e. Ideal adjacencies for the Radiology Research facilities arranged in order of their direct connection with work conducted in the department:

First	-	with Radiation Therapy
Second	-	with Nuclear Medicine
Third	-	with Diagnostic Radiology

THE ARCHITECTS COLLABORATIVE INC.  
Program Meeting Notes Part III

University of Minnesota  
Health Sciences Center

Date: 30 September 1968

Place: Dr. Gedgaudas's office, Mayo Building

Subject: Program Requirements of  
Department of Radio-Therapy

Present: For The University of Minnesota Health Sciences Department:  
Dr. Charyulu  
For The Architects Collaborative Inc.  
Mr. Larsen

- 
- I. Dr. Charyulu talked about the program requirements at length with reference to the previously prepared Summary of Required Spaces. The following information was generated:
- a. There must be two waiting areas in the department. The first area must accommodate approximately 16 patients from the outpatient department. The second area will be for follow-up visits and will accommodate 20 patients. The second waiting area should be convenient to a car parking area. Both areas should have a reception desk and records area. Every effort should be made to make the areas comfortable and convenient for the patients. Male and female toilet facilities for the patients must be provided in both areas.
  - b. The head of Radiation Therapy's office will be provided with full toilet facilities. This office will interconnect with the conference room and his private secretary's office.
  - c. The office staff will number fifteen persons in all, twelve of which will be full-time staff members and three of which will be either teaching or research associates.
  - d. Fourteen study carrels will be provided for Residents.
  - e. There will be four clerical employees.
- II. The layout of the department was described in some detail, the main points being these:
- a. Beyond the waiting area from the outpatient department should be located six examination rooms and a fluoroscopy room. These areas will be used for the initial as well as the follow-up examinations of the patient.

- b. From the information gained at the initial and fluoroscopic examinations, extensive work on the part of the radiation therapist will follow in the Treatment Planning Rooms. This room may very well be equipped with a computer.
- c. Adjacent to the Treatment Planning room will be the Simulator Room where the radiation therapist will work with the patient to make actual set-up to conduct the treatment plan of action. To accomplish this, casts will frequently be made of the patient from which masks and collimators will be built up in the departmental shop. Several x-ray films will be processed in an adjoining dark room (in an automatic processor as Kodak M-6).
- d. Once this preliminary work is completed, the patient will be moved into the actual Therapy Rooms. The Therapy Rooms are ideally located around and adjacent to the Simulator Room.
- e. Therapy Rooms of assumed approximate sizes: \*

1. Orthovoltage Superficial Therapy Room  
containing 2 each 250 KV machines.

Room will be approximately 20' x 14'  
Control Area 8' x 6'  
Auxiliary Equipment Space 8' x 6'  
With a 9-10 ft. ceiling ht.

2. 25 mv Betatron Room

Treatment Room Size 20' x 25'  
Control Area 8' x 12'  
Entrance Maze 6' x 8'  
Auxiliary Equipment Space 12' x 20'  
With a 13 ft. ceiling ht.

3. Cobalt-60 Therapy Room

Treatment Room Size 16' x 16'  
Control Area 6' x 12'  
Entrance Maze 6' x 12'  
With a 10-12 ft ceiling

4. 6-mv Linear Accelerator Room

Treatment Room Size 18' x 20'  
Control Area 6' x 12'  
Entrance Maze 6' x 12'  
Auxiliary Equipment Space 6' x 12'  
With a 12 ft. ceiling ht.

\* NEED ACCESS FROM TOP FOR EQUIPMENT  
REMOVAL AND REPAIRS.

5. Neutron Source Room is still under consideration. Room characteristics will be determined later.
- f. All of these Therapy Rooms will be television-monitored. They will require oxygen outlets.
- g. Air and vacuum will be supplied to the Mold Room.
- h. In the area of the Therapy Rooms, male and female toilets will be required.
- i. In relation to the waiting areas mentioned in I above, there will be a Nurses' Station and Patients' Preparation-Dressing Room and Recovery-Rest Room. Adjoining this area will be a storage area for stretchers and wheel chairs. A linen control area will also be close at hand.
- j. Out of the way of the general traffic in the department will be an Electronic Work Shop and Engineers' Office.
- k. The break-down of the Radiation Biophysics Lab associated with this department is contained in Part II of this report under item I-d. This lab, it is assumed, would best be located adjacent to the treatment planning area.

III. Personnel facilities required for the department would be as follows:

- a. Male and female Staff Lounges
- b. Male and female Staff Toilets/Shower and Locker Rooms adjacent to the administrative area and also adjacent to the Staff Lounges mentioned above.

- IV. Dr. Charyulu strongly recommended that Nuclear Medicine be located away from the path of patients coming from Radiation Therapy. They have experienced radio interference in the equipment used in Nuclear Medicine by patients who have been treated in Radiation Therapy.

Frederick A. Larsen

The Architects Collaborative Inc.

14 October 1968

FAL/mck



THE ARCHITECTS COLLABORATIVE Inc.

UNIVERSITY OF MINNESOTA  
HEALTH SCIENCES EXPANSION

U. OF MINN.

DATE: DEC 10

MEETING NOTES

COPY	ATTN.	INIT.
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JCH	
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DATE: 1 December 1970

PLACE: Powell Hall

PRESENT: Dr. Eugene Gedgudas, Dr. Robert Mulhausen, Jim Solverson, Ken Taylor

TAC JOB: Unit B-C, #70046

SUBJECT: Distribution of Department of Radiology Space to Diagnostic Radiology and Radiation Therapy

BY: Ken Taylor

The discussion in this meeting centered on the feasibility of the use of 600 S.F. of Radiation Therapy space in Diehl Hall for Neurology. Dr. Leavit would like to retain that space as part of his research facilities and has done some remodeling in the area. An adjustment in the assigned space for Radiation therapy and Diagnostic Radiology was made which permitted the 600 S.F. to be retained by Radiation Therapy.

FILE	X 4.13
	X 4.14
BD	X

This redistribution of space was part of a larger reallocation of Department of Radiology space. The former Department of Radiology with its divisions of Diagnostic Radiology, Nuclear Medicine, and Radiation Therapy has been reorganized into two new departments, Radiology Department including Diagnostic Radiology and Nuclear Medicine, and Therapeutic Radiology. The original departmental space which accommodated research and administrative areas, is redistributed to these two new departments. A table for this redistribution is included as part of these notes.

U. OF MINN.

DATE:

H. G. S. P.	
P. P. & D.	
H. S. - COOD.	X
H. S. A. E.	
H. J. S. A.	
LERCH	
MAIN	
FL	
C. D. M.	

KT/kb  
14 December 1970

PH. SANDRO	X
R. MULHAUSEN	X
E. GEDGUDAS	X
N. LEAVITT	X

1 December 1970  
 15 October 1970  
 1 July 1970

PHASE 1 SCHEMATIC PROPOSAL

Existing	Additional	Total	Existing to Vacate	Existing to Remain	Additional New	Additional Remodeled
4.12 Radiology Department						
6,585	3,080	9,585				
Mayo 1				398		581 (2.4)
Mayo B1				294		420 (4.3)
Mayo 2				1,112		
Diehl 1				3,333		1,999
VFW B				1,448		
4.13 Diagnostic Radiology- Nuclear Medicine						
16,796	7,897	24,693				
Mayo 1				2,744		
Mayo 2				11,699		5,347
VCHH 1				2,353		
UNIT BC 1					2,500	
4.14 Radiation Therapy						
2,993	2,056	5,049				
Mayo 1				2,993		
Powell 1						2,056
4.15 Department of Surgery						
10,020*	4,310	14,330				
Mayo B1				2,629		195
Mayo 5			2,258	714		
Diehl 1			1,127	1,182		947
305 Union Street			1,097			
510 Washington			1,337			
UNIT BC 11					4,575	
UNIT BB					3,638	
UNIT A 11					450	

\* Transfer 612 SPN to 4.19 Urology in Diehl F130

PHASE I PROGRAM FOR RADIOLOGY SHOWING REDISTRIBUTION OF 4.12 DEPARTMENT OF RADIOLOGY SPACE.

1 December 1970  
15 October 1970  
1 July 1970

PHASE 1 SCHEMATIC PROPOSAL

Existing	Additional	Total	Existing to Vacate	Existing to Remain	Additional New	Additional Remodeled
4.12 Radiology Department			(REDISTRIBUTED TO 4.13 AND 4.14)			
6,585	3,080	9,585				
Mayo 1				398 <sup>①</sup>		581 <sup>②</sup>
Mayo B1				294 <sup>③</sup>		420 <sup>④</sup>
Mayo 2				1,112 <sup>⑤</sup>		
Diehl 1			521 <sup>⑥</sup>	2,312 <sup>⑦</sup>		2,424 <sup>⑧</sup>
VFW B				1,448 <sup>⑨</sup>		1,999
<b>RADIOLOGY DEPARTMENT</b>						
4.13 Diagnostic Radiology						
Nuclear Medicine						
<del>16,796</del>	<del>7,897</del>	<del>24,693</del>				
19,356	7,634	26,990				
Mayo 1				2,744		1,112 <sup>①</sup>
Mayo 2				12,811 <sup>⑤</sup>		1,518 <sup>③</sup>
VCIH 1				2,353		5,347*
VFW B				1,448 <sup>⑨</sup>		
UNIT BC 1					2,500	
DIEHL 1						2,424 <sup>③</sup>
<b>THERAPEUTIC RADIOLOGY</b>						
4.14 Radiation Therapy						
<del>2,993</del>	<del>2,056</del>	<del>5,049</del>				
5,805	2,637	8,442				
Mayo 1				2,993		581 <sup>②</sup>
Powell 1						2,056
DIEHL 1				2,812 <sup>⑦</sup>		

NOTES ON REDISTRIBUTION OF 4.12 PROGRAM

- ① MAYO B185, B186, B187 TO 4.13 RADIOLOGY DEPARTMENT
- ② MAYO B139, B140, TO 4.14, THERAPEUTIC RADIOLOGY
- ③ MAYO B127-6, B127-19 TO 4.13 RADIOLOGY DEPARTMENT
- ④ MAYO B115, B116 TO 4.13 RADIOLOGY DEPARTMENT
- ⑤ EXISTING MAYO 2 SPACE NOW HOUSING ADMINISTRATION TO 4.13 RADIOLOGY DEPARTMENT
- ⑥ EXISTING DIEHL L106 TO 4.8 PEDIATRICS DEPARTMENT
- ⑦ EXISTING DIEHL 1 SPACE EXCEPT L106 TO 4.14 THERAPEUTIC RADIOLOGY
- ⑧ ADDITIONAL DIEHL 1 SPACE TO 4.13 RADIOLOGY DEPARTMENT
- ⑨ EXISTING VFW B SPACE TO 4.13 RADIOLOGY DEPARTMENT

\* CLINICAL EXPANSION FOR RADIOLOGY DEPARTMENT MAYO B285, B289, B207, B209

15 December 1970

15 October 1970

1 July 1970

PHASE 1 SCHEMATIC PROPOSAL

	Existing to Vacate	Existing to Remain	Additional New	Additional Remodeled
4.12 Radiology Department (Space Reassigned to 4.13 and 4.14)				
4.13 Radiology Department *				
19,356 7,634 26,990				
Mayo 1		2,744		
Mayo 2		12,811		1,112
VCHH 1		2,353		
VFW B		1,448		
UNIT BC 1			2,500	
Diehl 1				2,424
4.14 Therapeutic Radiology**				
5,805 2,637 8,442				
Mayo 1		2,993		581
Powell 1				2,056
Diehl 1		2,812		
4.15 Department of Surgery				
10,020 4,310 14,330				
Mayo B1		2,629		195
Mayo 5	2,258	714		
Diehl 1	1,127	1,182		
305 Union Street	1,097			947
510 Washington	1,337			
UNIT BC 11			4,575	
UNIT BB			3,638	
UNIT A 11			450	

\* Formerly Diagnostic Radiology - Nuclear Medicine

\*\*Formerly Radiation Therapy

# Unit D - Planning Notes



UNIVERSITY OF MINNESOTA  
TWIN CITIES

Department of Therapeutic Radiology  
Medical School  
Box 494 Mayo Memorial Building  
Minneapolis, Minnesota 55455  
(612) 373-8680

RECEIVED

FEB 4 1976

January 27, 1976

UNIV. OF MINN.  
HEALTH SCIENCES  
PLANNING OFFICE

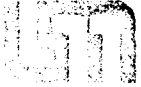
## MEMORANDUM

TO: Mr. Thomas Jones  
Dr. B.J. Kennedy  
Mr. Paul Maupin

FROM: Seymour H. Levitt, M.D. *SK*

UNIT "D" H.S. Minn.

Enclosed is the summary that we have received from our Physics section in regard to the future space and personnel requirements for the new Masonic Cancer Center Radiation Therapy area. Should there be any question about this, please contact me.



UNIVERSITY OF MINNESOTA  
TWIN CITIES

Department of Therapeutic Radiology  
Medical School  
Box 494 Mayo Memorial Building  
Minneapolis, Minnesota 55455  
(612) 373-8680

January 27, 1976

MEMORANDUM

To: S. Levitt

From: F. Khan/ G. Fullerton  
*FK* *G. Fullerton*

Per your request, we have reviewed the future space and personnel requirements of the Physics Section. We have based predictions on the following assumptions:

1. In addition to our present superficial x-ray, Co-60, 4 MV LINAC, and 13 MV LINAC machines, we will add two advanced therapy machines, a 20 MV LINAC and Fast Neutron Generator.
2. The Physics Section will continue to upgrade research and training efforts. The five year training program goal is to graduate one M.S. and one Ph.D. radiotherapy physicist per year.

I. Personnel Requirements

The increased work load envisioned will require addition of personnel. At present, the Physics Section consists of:

TABLE I  
Present Physics Personnel

<u>Position</u>	<u>Duties</u>	<u>Number</u>
Physics Director	Administer and supervise the Physics Section. Participate in clinical support, teaching, and training.	1
Staff Physicists	Conduct clinical physics program, and related teaching, research and training.	2
Secretary	Maintain physics files, student records, type reports, correspondence, etc.	1

<u>Position</u>	<u>Duties</u>	<u>Number</u>
Dosimetrist	Perform routine dosimetry calculations and set ups.	(1 has been requested)
Programmer	Maintain computer, write new programs, enter new data for dosimetry calculation programs.	1
Electronic Technician	Maintain LINACs and other electronics equipment.	1
Laboratory-Radiological Technologists	Make simulations, molds, compensators, shields, and patient set-ups.	2

The following new personnel would be needed:

TABLE II  
Additional (new) Physics Personnel

<u>Position</u>	<u>Duties</u>	<u>Number</u>
Staff Physicist	Physics support for clinical use of high energy LINAC, research on utilization of this unit.	1
Staff Physicist	Physics support for clinical use of fast neutron generator, research on utilization of machine for therapy and radionuclide production.	1
Dosimetrist	Routine dosimetry calculations for the two new therapy units.	1
Electro-mechanical technician	Supervise machine shop, support all therapy units by making modifications, shields, attachments, and assist in maintaining all units.	1
Laboratory-Radiological Technologist	Make simulations, molds, compensators, shields and set-ups for two new therapy units.	2

## II. Space Requirements

The following space would be necessary to accommodate the physics personnel and functions.

<u>Designation</u>	<u>Use and personnel accommodated</u>	<u>Area (Sq.ft.)</u>
Simulator-tomograph	Two lab technologists would work in this room simulating patient set-ups for the Co-60, 4 MV and 13 MV units.	350
Simulator	Two lab technologists would work in this room simulating patient set-ups for the 20 MV and fast neutron generator.	200
Mold room	All four technologists would use this room to make shields, compensators, patient immobilizers, etc.	180
Hot lab	Radium and radionuclide storage as well as space for blood irradiator.	150
Clinical Dosimetry	Working space for all staff, dosimetrists, and technologists working on calibration or special dosimetry. Would house calibration instruments, TLD reader, dosimetry phantoms, survey meter, etc.	200
Treatment Planning	Light boxes and tables for planning and preparing patient treatment charts. Desks for two dosimetrists and two technologists.	300
Computer Room	This room would house treatment planning computers and peripherals. Desks for computer programmer and two technologists.	300
Machine shop	Small machine shop (lathe, mill, band saw, jig saw, etc.) to provide close support for all units. Desk space for machinist.	400
Electronics Development	Electronics shop for support of LINACs and development of new instrumentation. Desk space for electronics technician.	250
Physics Office	Director's office	150
Staff Office	Ph.D. Physicist	120
Staff Office	Ph.D. Physicist	120
Staff Office	Ph.D. Physicist	120



<u>Designation</u>	<u>Use and personnel accommodated</u>	<u>Area (Sq.ft.)</u>
Staff Office	Ph.D. Physicist	120
Secretary Office	Space for physics secretary and files	150
Radiation Biophysics Research	Research on Phantom materials, development of phantoms for electron and neutron dosimetry, high LET therapy research. Desks for two graduate students.	200
Radiation Dosimetry Research	Solid state dosimetry research on TLD and TCD. Room would house annealing furnaces and ovens. Desks for two graduate students.	200
Radioisotopes Research	Lab would house radiation counting and handling equipment for dealing with radioisotopes produced in the neutron generator. Desks for two graduate students.	200
Tumor Localization Research	Work on CAT scanning, ultrasound scanning and thermography for tumor localization in treatment planning. Desk space for two graduate students.	200

### III. Summary and Recommendation

In summary the physics space required would break down as follows:

Clinical	1680
Support	650
Office	780
Research	800
TOTAL	<u>3910</u> Sq. ft.

In addition we would suggest that a general teaching laboratory for the department should be included. This laboratory should be general in nature so that Radiation Physics, Radiation Safety, and Radiobiology demonstrations or experiments could be performed. It could be used for teaching medical students, residents, and biophysicists. We suggest an area of 300 square feet.

We also suggest that the size of the Conference Room/Library should be at least 500 square feet. This would allow meetings including the entire staff, residents and technicians.

Memo - S. Levitt  
January 27, 1976

Page 5

You will note that the above recommendations are in general agreement with Enviro-Med. Report No. PD-389 (March 14, 1974). We do recommend small increases in office space (180 sq. ft.) and research space (240 sq. ft.) that are due to expansions in the research and training programs not planned in 1974. We also suggest a teaching laboratory (300 sq. ft.) not included in 1974 and an increase of 200 sq. ft. in the 1974 area (300 sq. ft.) allotted to the conference room.

November 12, 1971

TO: James Brinkerhoff and Lyle French, Co-Chairman  
Design Coordinating Committee

FROM: John H. Westerman, Chairman, Long Range Planning Committee

SUBJECT: Status Report on Long Range Planning for Clinical Facilities

At the request of Paul Maupin, the enclosed report is an attempt to bring the Design Coordinating Committee up to date on the status of Long Range Planning for Clinical Facilities.

The report is divided into two parts. Part I includes Background Information, the Hospitals 1973 Legislative Building Request, and a statement on the impact of the new Certificate of Need legislation (S.F. 1523-1971) and rules and regulations.

Part II consists of previously published and updated reports, and reference to other reports. This part includes the June 1970 Clinical Facilities report with an updated hospital appendix.

The planning strategy for the hospital has been consistent since 1964 and developed along the following guidelines:

1. The hospitals supported the concept of developing enrollment capacities in each of the academic units as a first priority.
2. The demand for hospital services would be generated in part from the projected assignment of health sciences students to hospital programs. In part, the demand originates from the numbers of clinical faculty, and in part from utilization of services from referred and non-referred patients.
3. The 1964-1974 growth of students and faculty, coupled with demonstrated functional obsolescence of the existing Mayo Tower units, should constitute a case for building a new replacement facility by 1979.
4. Hospital services need to be viewed on a programmatic basis, not on a geographic facilities basis.

Additions to these guidelines comes in the nature of developing a more comprehensive program to serve as a model for all health science units and to respond to the role of a regional health center.

We would urge the Design Coordinating Committee to take the following action:

1. To establish a high priority for clinical facility master planning funding by the 1973 legislature.
2. To begin the Master Planning program, a Health Sciences Clinical Facility Planning Committee be appointed to develop major planning guidelines and policies. These guidelines and policies would then be referred to the appropriate individual unit planning group for development of this program. Consultation on site, operational costs, and other studies as identified by the planning groups should begin immediately.
3. Continuing dialogues with the Legislative Building Commission, Veterans Administration Hospital officials and area-wide planning authorities should be initiated to further define program content and scope.

## BACKGROUND INFORMATION

Replacement and enlargement of ambulatory care facilities has been given highest priority by the Clinical Facilities Planning group. Age, poor functional relationships, and inflexibility of the present outpatient facilities were compelling reasons for establishment of this priority. Additionally, health care in the future is expected to focus primarily on treatment of patients in the ambulatory setting. Building B-C as part of the first phase of the Health Sciences facilities program is designed to provide space for the new ambulatory care center and for the supporting departments of Medical Records, Business Office and Admissions.

Of necessity at this time is the need to plan for replacement of inpatient facilities. Obsolescence, space constraints, the need to provide an adequate physical environment for patients and other physical and functional deficiencies as outlined in this and earlier reports require a firm commitment toward completion of this program. A reasonable planning time frame beginning today would indicate that even completion of a first phase of new construction within this decade would be difficult.

The units of the Health Sciences rely on a critical mass of patients in University Hospitals for undergraduate and graduate educational programs. New inpatient facilities are necessary to insure continuance of this patient base which provides the opportunity for students to learn through involvement in the care of patients. Fees received from these same patients support many of the programs of the Health Science units. Difficulties in use of the present physical facilities for educational programs are magnified by the lack of adequate conference rooms, classrooms and teaching space at the patient's bedside. Obsolescent electrical and mechanical services severely inhibit educational units of the Health Sciences to grow and to provide the modern services necessary so that students may train in a setting similar to that of their future practice.

The hospitals are faced today with capital decisions on such major programs as nutrition, central air-conditioning, development of new intensive care units and a new dialysis unit. The lack of a firm master plan and a time frame for replacement of present facilities makes the decision on such programs extremely difficult. It is a prime responsibility of the Health Sciences Center to provide physical facilities so that the expanded teaching programs of its units may be adequately accommodated. In addition, the University of Minnesota Hospitals, as a tertiary care center for the region, has the obligation to provide clinical facilities which adequately support the programs encumbant upon an organization with such a mission.

The following pages are intended to provide background information for those involved in clinical facility planning.

October 28, 1971

To: Mr. Paul Maupin, Health Sciences Planning Coordinator

From: John H. Westerman, General Director, University Hospitals

Subject: Clinical Facilities Building Request for Presentation  
to the Legislative Building Commission

The need for new clinical facilities at the University of Minnesota Health Sciences Center has been documented in planning reports produced by various faculty groups since the early 1960's. These reports point out the functional and physical obsolescence of present facilities, the need to provide clinical facilities which will adequately permit expansion of the multi-disciplinary teaching concept now characteristic of educational programs in the Health Sciences Center, and space needs for clinical teaching of an expanded Medical School class. Modern physical facilities are necessary to keep University Hospitals in a strong competitive position with its regional counterparts to insure the continuance of a patient base for both the clinical teaching effort and the faculty salary support derived from patient care fees. Since 21 of 33 patient stations are in facilities constructed prior to 1929, and 7 stations are now almost 20 years old, it was the conclusion of the study groups that an immediate move towards replacement and modest expansion in size of clinical facilities is imperative. Operating room facilities are obsolete and badly in need of electrical upgrading, the Radiology and Clinical Laboratory Departments have expansion needs beyond present capacity, and most of the other support and ancillary services of the hospitals have similar space constraints. Electrical and mechanical services to these old buildings are of such nature that they cannot now support the modern equipment and human needs that are essential for the operation of a modern health science center clinical facility and for efficacious medical care. Because the needs have now reached the acute state we are proposing a program toward complete replacement of the present clinical facilities within the next six to eight years. We therefore request:

1. \$450,000 to permit beginning clinical facility planning through the schematic phase.



2. \$ (to be determined by University Planning) to provide site acquisition funds for purchasing the apartment building immediately East of Powell Hall. This request is based on the assumption that consultant studies which will be completed within the next six to eight months confirm the Powell Hall site for the new clinical facility.

It would be our intention to request of the 1975 legislature funds to complete the program, (which will be then well defined) a new University Hospital. Self-generated capital, Hill-Burton funds and federal grants would supplement state funded capital if available.

We would further request support from the legislature to provide funds to upgrade electrical and air-conditioning service to the present hospitals so that we may operate at minimal levels until such time as new clinical facilities are occupied. This request would be part of the health sciences electrical-air-conditioning program.

JHW:dl

Health Sciences Clinical Facilities as They Relate to Concepts of  
Community Need and Requirements of Certificate of Need Law and Regulations

University Hospitals have, since 1966, taken an active and often leadership role in promoting and supporting community-wide planning for coordination of hospital services development. This effort which began as a voluntary endeavor under the Metropolitan Hospital Planning Agency has now become a legally sanctioned endeavor within the Metropolitan Council. Certificate of Need legislation became law in the 1971 session of the State Legislature. Our location within the metropolitan area places our future building and program changes under the purview of the Metropolitan Council (legally) and its subordinate Metropolitan Health Board (functionally). In essence, this means that any construction, remodeling, equipment purchase or lease which costs \$50,000 or more and which extends or expands the scope of services must be reviewed by the MHB; approval recommended by the MC; with final authorization and issuance of a Certificate of Need by the State Board of Health. Our needs can no longer be independently determined without concern for metropolitan and State needs for service.

The Certificate of Need law and regulations do specify "the fact that a health care facility serves more than a local area constituency or population or is engaged in educational or research activities shall be taken into consideration in the decision making process with respect to any proposal". Except for this one somewhat general provision, our programs will be reviewed in like manner as any other hospital.

On June 9, 1971 the Metropolitan Health Board adopted guidelines for development of Hennepin County General Hospital and the Metropolitan Medical Center. By the same action these guidelines were adopted as interim policy for all hospital services development within the seven counties until such time as the Health Component of the Metropolitan Development Guide is adopted. The major implications of these guidelines for the Health Sciences are as follows:

1. The architecturally integrated MMC/HCGH health center serves as an example and model for development of health services delivery patterns which are highly cooperative, flexible and innovative.
2. Since the community pays for all available services, the public must be protected against expenditures based on the needs of individual institutions when overall community needs can be met at lower costs.
3. Bed needs shall be met by minimum construction of new beds and maximum use of accessible beds already available to the community.



4. Bed needs shall be calculated on the basis of current and historic demand for services using a standard of 90% occupancy for medical/surgical beds and 80% occupancy for pediatric and obstetric beds. Additional beds needed shall be judged on the basis of community, teaching and medical center needs.
5. Special services which meet demonstrated needs and which are supportive of medical education programs must be encouraged.
6. More universal prepaid health insurance will likely result in teaching programs organized around groups of physicians who are committed to medical education and who also have, as individuals and groups, primary and/or major patient care responsibilities.
7. Needed beds and services which are organized and operated in support of medical education programs shall have priority over non-teaching beds and services, other things being equal.

The decision making process will occur within the framework of these guidelines, but in many respects, decisions will be made within a political construct of competing interests. One of the Health Sciences major tests will come in making a case for a critical mass of balanced services on the East Bank Campus when, from a pure community service needs perspective, these services already exist at more convenient locations for patient access. The test of past demand for services will also require a strong case for replacement of the present number of existing beds and even more so for any bed increases.

June 23, 1970

TO: Mr. Hale Champion, Vice President, Planning and Operations  
FROM: John H. Westerman, Director and Chairman, Long Range Planning Committee *JHW*  
RE: Report Concerning the Future of Clinical Facilities on the  
East Bank site

On behalf of the Long Range Planning Committee members, we are happy to submit to you our report concerning the future of clinical facilities on the east bank site. In addition to providing responses to the charges you have raised, the committee has outlined advantages and disadvantages of various alternatives. In addition to our 16 man committee representative of all the health science units and Gillette and V.A., we have shared this report with the various educational and governing committees within each of the health science units. For example, in the Medical School area this report has the endorsement of the Medical Staff Hospital Council, Council of Clinical Sciences and the Educational Policy Committee.

We cannot overemphasize the significance of the decision facing the University. Either it continues to plan for orderly growth to meet the requirements of the students, faculty members and patients within the University complex, or it will face inevitable decay and decline and, through inactivity, extinguish a great asset of the state. This does not mean that a high density development on the east bank is the only alternative for the clinical facilities within the University setting. It does mean the University must provide for a viable core of clinical growth or consider abandoning the clinical facilities business. It would be a far greater service to the people of the state to operate a Harvard-type medical school without any University hospital than to operate a hospital under insurmountable handicaps.

JHW/sds



March 12, 1970

TO: John Westerman; Chairman  
Allyn Bridge  
Richard Ebert  
Mary Lou Freeberg  
Lyle French  
Edward Humphrey (V.A.)  
Hugh Kabat  
Alfred Michael (Children's)  
Robert Mulhausen

Severn Olson  
Peter Sammond  
Richard Varco  
Robert Vernier (Cardio-Vascular Research)  
Robert Winter (Gillette)  
Hugh Peacock, ex officio  
C. Thomas Smith, Jr., ex officio

FROM: Hale Champion, Vice President for Planning and Operations

SUBJECT: Coordination of Development Proposals.

Coincident with presentation of your proposal for an advancement in time of a new University Hospital, four other proposals for development were brought before the Design Coordinating Committee. The other proposals, with which you are familiar, are a Children's Center, V.A. Hospital, Gillette Hospital, and the Cardio-Vascular Research Center. Considering the magnitude and diversity of these proposals, I would like this committee to review all of them in light of the following questions so that we can plan long term development in the Health Sciences on a coordinated basis. Only by approaching this in a holistic manner will we be able to make judgements as to the relative merits of each proposition.

Some of the issues that the committee should address are:

1. Do the proposals coincide with the goals of the Health Science units? Particular attention should be given to any redirection of mission that emerges from the Regents reaction to the report of the Committee on Governance. Is this the most appropriate way for the University to proceed in meeting society's expectations for training health manpower and improving the health care delivery system?
2. How can we define the need for such facilities in terms that relate to the health needs of the State of Minnesota?
3. What is the priority of demand for centralization of programs in the present area as opposed to programs which could as well be served by location elsewhere? This issue requires development of a rationale for affiliations and consideration of the feasibility of locating segments of University clinical facilities elsewhere. Can you delineate guidelines for these as well

as future proposals for development of Health Sciences facilities?

4. How would the expansion of programs affect organizational effectiveness? What assessment would you make of the impact on effectiveness and responsiveness due to this magnitude of centralization?
5. What is the total magnitude of development considering all proposals in light of the above (mission, need, appropriateness and organization)? Does the present site afford such development taking into account such matters as density, access and circulation?
6. Are there possibilities, programmatic and/or physical that would permit a planning compromise, e.g., a second center so situated that it would permit adequate interaction without overloading the present site? In the direction or vicinity of the new Hennepin County General Hospital? In the direction or vicinity of the Ramsey County Hospital? In some area beyond the University's present boundaries in the East Bank area?
7. Are the questions posed by the various new proposals for the East Bank separable and/or competitive? Should there be, e.g. a new Veterans Hospital rather than a new University Hospital or a new Children's unit? What is the relative priority ranking of each proposal as compared to the others?

I realize that this is a large assignment but these questions need to be answered before commitments are made for allocation of resources. If you think it appropriate, I will be happy to attend one of your meetings to elaborate on any of the above issues. It will be desirable if your report can be completed by June 1, 1970.

cc: Design Coordinating Committee

## INTRODUCTION

The Committee has reviewed the work of the clinical medicine and hospital task forces from 1965-68. The committee also studied the February 9th report of the Hospital Long Range Planning Committee and the reports from the Children's Center, Cardiovascular, Gillette and V.A. groups.

In response to Mr. Champion's charges, the Clinical Facilities Committee has developed a number of alternative approaches. Subsequent meetings led the Committee to the enclosed summary of findings and conclusions, which represent a reconciliation between health science objectives and planning realities.

If the report appears to be similar to earlier findings, it is because of the narrowing of alternatives as the work proceeded. Consider the following items:

- An entire new site is neither available nor economically feasible.
- Any plan will have to build on existing facilities.
- A centralized critical mass is the essence of a quality patient care, teaching, research center.
- It would be advantageous to have V.A. located near the campus. It would be significantly more advantageous to locate V.A. adjacent to University Hospitals.
- In recent years, health science students and faculty have become increasingly convinced that future care will be provided by a health care team. It is only in a center such as the University that the student can

become fully acquainted with all aspects of health care, i.e. the treatment of the "whole" patient.

The committee was more concerned about the long range future than the next five years. Thus the preference for locating V.A. on existing dormitory land is based on the idea that a commitment now could be met by the time construction starts in 9-11 years.

One major option that emerged is that of ownership. It is possible that through a different corporate structure, University Hospitals would be in a position to secure major capital financing immediately. The ownership option should be explored further by those knowledgeable in this area.

## SUMMARY OF FINDINGS

### Findings Related to Definition of the Problem

#### 1. The Problem

In its charge, the Committee was asked to consider five separate proposals for physical facilities to be located on the University East Bank campus. It should be clarified at the outset that these proposals do not represent new programs but existing ones. In fact, three of them, the University Hospital's proposal, the Cardiovascular Center proposal, and the Childrens' Hospital proposal represent amalgamation and development of programs presently ongoing at the University Hospitals. Similarly, while the Veterans' Administration Hospital and Gillette Hospital are not now on site nor are they part of the University Hospital's corporate structure, they are already an important part of the Health Science educational program. The five proposals can then be summarized as two general proposals:

- A. That given the fact that the Veterans' Administration and the Department of Welfare plan to rebuild the Veteran's Hospital and Gillette Hospital respectively, regardless of University action, and that since these two institutions are already heavily involved in the educational programs of the University they be relocated in new facilities on the University campus.
- B. That the University Hospitals, which includes the Cardiovascular center, Childrens' Center, as well as a host of other clinical programs, be replaced with new clinical facilities for reasons stated in the University Hospital's Long Range Planning Committee Report of February 9, 1970, which mainly relate to obsolescence and

economy of operation.

### Findings Related to Mission

#### 2. The Governance Report

The report on Governance presently before the Regents supports the idea of an expanded service role for the University clinical facilities both locally and throughout the state, particularly in relation to health care delivery systems.

#### 3. The Relative Roles of Service, Teaching, and Research

The Committee found it necessary to speak in terms of these different and important roles for the University and its clinical facilities, particularly in relation to the missions of other institutions. However, it should be emphasized that the roles, particularly those of service and education, are inextricably interrelated in that it is impossible to speak of clinical education without giving service nor service when students are present without providing education. It is also the strong belief of the clinical faculty that a strong research base will continue to be fundamental to the service and education programs of the University Health Sciences.

#### 4. Service Roles of the Proposed Hospitals

In addition to the shared responsibility for education the proposed institutions each have unique service roles to perform. The service component of the Veterans' Hospital program is determined by national and local Veterans' policy, that of Gillette State Hospital by the Department of Public Welfare and the State Legislature. The University Hospitals has a number of constituencies which it has traditionally served, but more importantly, must expand its service horizons to meet 1970 roles and commitments and also to develop a firmer financial footing.

#### 5. Confluence and Conflict of University Role with Those of Major Affiliates Presently Ramsey County Hospital and Hennepin County General Hospital



share responsibilities for clinical training under the University Health Sciences education programs. It is expected that the responsibilities of these institutions for education will continue to develop. Likewise, as the University begins to redefine its role in terms of greater responsibility for patient care and service, it begins to share in greater measure the service roles of these hospitals. While each of these hospitals has its own governmental mission and form of control, there may be considerable benefit and economy to the State if the service and educational missions of these institutions were considered as a whole.

#### Findings Related To Education

##### 6. Clinical Facilities Serve All the Health Sciences

While the clinical facilities are important to the education of students in all the Health Sciences, the Medical School and its programs are the primary determinant of location and size of such facilities.

##### 7. Future Health Delivery Pattern Unclear

There is no unified opinion as to how medical and health care will be organized in the future. However, all speculation points to the need for more health professionals of all kinds. The committee has looked at request figures and health professional to population ratios and finds that the student increases projected by the various academic units to be justified.

##### 8. Relationship Between Need for Professional Manpower and Facilities

While it is impossible to draw a direct relationship between numbers of projected students and facilities required for their training, the Committee finds the numbers of beds proposed for the three hospital facilities to be appropriate for the projected numbers of students. Unknowns in this equation include the unpredictability of future scientific discovery, unpredictability of proportions of different health professionals required, unpredictability of curricular changes to keep educational method current, modifications in

clinical training which can be made under necessity.

#### Findings Related to Patients and Finance

##### 9. Research Funding on the Wane

The amount of support from the federal government for research, which, in turn, has heavily supported teaching faculty, is decreasing significantly.

##### 10. Need for State Referral Hospital Decreasing

With the increased number of specially trained health professionals practicing in the state and community and the wider roles assumed by community and county hospitals, the need for University Hospitals in its traditional role as a medical referral center is diminishing significantly.

##### 11. State Appropriations Not Increasing

There is little evidence that the State Legislature will be able to make up the funding deficiencies related to loss of research and referral support.

##### 12. Inappropriate Patient Mix

Another consequence of the referral decrease is that patients who are actually referred, have more complicated conditions creating greater unit costs at the University than at other institutions.

##### 13. Greater Dependence on Patient Fees

The faculty, required for expanding teaching programs, will have to rely evermore on patient fees for income.

#### Findings Related to Configuration and Site

##### 14. Centralization vs. Decentralization

The Committee has found a clear consensus on the part of the clinical faculties which places prime emphasis on the advantages of centralized clinical facilities at the site of the Health Sciences Center. The following benefits have been identified:

- a. Extensive interdisciplinary consultation and stimulation within the health sciences.
- b. The mutual support resulting from strong inter-relationship between the health sciences and the other academic units of the University.
- c. A comprehensive patient service.
- d. A comprehensive educational experience and environment for students from all the health sciences.
- e. Greater efficiency in the use of student and faculty time, elimination of commuting, reduction in scheduling problems.
- f. A faculty centrally located full-time can train more students per unit time than a larger faculty decentralized.
- g. Attraction of other first quality faculty members and residents to this type of setting.
- h. Centralization and economic utilization of expensive facilities such as biomedical library, specialized laboratories, classrooms, larger computers, and expensive diagnostic equipment.
- i. A clinical teaching environment at the least possible cost to the State.

#### 15. Density

The Committee considered at great length the problems of density which would be created by the centralization of the proposed facilities. A study by The Architects Collaborative, requested by the Committee, shows that facilities of the magnitude proposed can be accommodated on a site perimetered by Washington Avenue, the railroad tracks, River Road and Church Street at a density less than that proposed for Phase I of the Health Sciences development program. There is recognition that all this site may

not be available for some years, but the development could be phased gradually in accordance with availability and need.

#### 16. Preferred Site

Having placed a high priority on a centralized interdisciplinary base complex, members of the committee can only suggest that the University make every effort to make available for the clinical facilities land adjacent to existing and planned Phase I units. This would necessarily mean land parcels such as those occupied by Powell Hall and the undergraduate dormitories.

#### 17. Alternative Configurations

Alternatives to the centralized model have been considered. While each had advantages, none was considered nearly as appropriate as a centralized facility on the University campus. Locating all the clinical facilities on another site entirely such as at Fort Snelling would have the advantages of centralization but the disadvantages of being divorced from other University units negating the Health Sciences concept. Creating a second center near the University campus either to provide for all or a portion of the clinical facilities would have the disadvantages of decentralization without the advantages (facilities sharing, time conservation, etc.) of complete centralization. Nor would such a complex materially reduce density. Various configurations with differing amounts of dependence on community hospitals and satellite facilities have also been considered. The Committee believes these relationships should continue to be developed, but would emphasize that it does not see any of them taking the place of all or a portion of the proposed base complex.

## RECOMMENDATIONS

1. That the Veterans' Administration be invited to locate a new Minneapolis Veterans' Hospital on the East Bank of the University of Minnesota campus on a site contiguous to the future University clinical inpatient facility.
2. That Gillette State Hospital and the legislature be invited to locate a new Gillette facility in direct connection with future University clinical facilities at the University Health Sciences Center site.
3. That a new University Hospitals, including portions assigned to the cardiovascular program and consolidation of childrens' facilities, be constructed on the present Health Sciences Center site before the end of the decade.
4. That this facility be directly related to the new Unit BC outpatient facilities, the proposed Veterans' Hospital, the proposed Gillette facility, and any portions of the other existing facilities functionally useful.
5. That the architects be directed to develop a site plan encompassing the proposed facilities.
6. That a study be made of long range operational and capital financing approaches.
7. That the health sciences units project their clinical needs for primary, secondary and tertiary care levels.
8. That University Hospitals project primary, secondary and tertiary care programs in response to academic unit needs, existing affiliations and community needs.
9. That a Hospital Advisory Council, with members representing areas of the state, be appointed to help develop hospital programs.
10. That efforts be made to bring together major teaching units to explore areas of joint interest and potential cooperation in service and education.

## I. Assumptions and rationale related to projected financial statements

Consistent with the University of Minnesota Health Sciences mission report, the following assumptions have been made in order to plan and project usage for the next decade.

(1) The University of Minnesota Hospitals will remain as a tertiary care center but will also increase its primary care and secondary care capabilities.

(2) During the next decade there will be a grouping of individual health organizations into large scale enterprises. It is generally felt that the University of Minnesota Hospitals will survive best in this arrangement rather than as a free-standing institution.

(3) The franchising of various hospital services will become more common. As a tertiary care center it is the hospitals' obligation to make its services more available to the rest of the system.

(4) Since the University Hospital will be diverse in terms of providing various levels of care, it will also respond to a variety of payment schedules including group and prepayment options.

(5) Future health care will be provided by a health care team in a centralized patient care, teaching and research center.

(6) The central University structure will be flexible enough to respond to changes made in the structural and financial organization of the Hospital.

## II. Background for new structure

For more than five years the faculties of the University of Minnesota Health Sciences have carefully considered objectives and programs for the future. The plan for physical development results from this collective effort. The Health Sciences Center must be expanded and developed physically in order to meet the academic, patient care, and other service objectives. The primary goal of Master planning for the Center is to provide an orderly and flexible framework for growth for the next twenty years and beyond through new construction and development for the existing complex.

The Health Sciences Center is responsive to the health needs of the state. This program is designed to meet the state needs of increased health manpower, provide for closer cooperative arrangements among members of the health science team, and provide the patient easy access to the comprehensive specialty-referral health care system.

Concurrent with the internal University effort the Hill Family Foundation, at the request of the University Board of Regents sponsored a comprehensive health manpower study for the upper Midwest. The principal recommendation of this study made available in June, 1966, called for expansion in entering classes for the University Medical and Dental schools at the earliest possible date.

Architectural planning began in fall, 1967, supported by a \$500,000 appropriation from the state legislature. In addition the architectural team has provided master plans for Health Sciences programs through the mid-1980's. Specific goals established for the architects include -

- a) Expansion to serve increased enrollments in Medicine, Dentistry, and other related programs.
- b) Improvement and conservation of existing facilities.
- c) A physical arrangement that supports and encourages interaction among Health Sciences units and between all of the units and the entire University.
- d) Flexibility in planning to adapt to future program changes.
- e) Provision for expansion to accommodate future needs.

The attached table summarizes the approximate costs of individual units as well as the possible sources of funding.



UNIVERSITY OF MINNESOTA  
HEALTH SCIENCES CENTER

Cost and Funding Projections - Phase I

<u>BUILDING</u>	<u>APPROXIMATE COST</u>	<u>SOURCES OF FUNDING</u>	<u>FUNDS ALREADY RECEIVED</u>
Unit A	\$45,077,646	NIH, State funds and gifts	NIH Grant \$22,400,000 State funds & gifts - remaining amount.
Unit B	\$5,500,000	Hill-Burton Health Manpower Health Resources Funds	---
Unit C	\$36,800,000	Hill-Burton Health Manpower Allied Health	---
Unit D (remodel)	\$900,000	Hill-Burton Health Manpower Health Resources Funds	---
Unit E	\$6,400,000	Hill-Burton Health Manpower	---
Unit F	\$12,700,000	Health Manpower	---
Unit L	\$3,400,000	Health Manpower	---
Remodel	\$10,660,000	Health Manpower Health Resources Funds Nursing, Allied Health Public Health	---
TOTAL	\$121,437,646	---	It is projected that Federal funds will cover 66 2/3% of costs of individual units and the remaining 33 1/3% will be covered by state funds and gifts.

SUMMARY OF TOTAL OUTPATIENT SPACE IN UNIT B-C of NEW STRUCTURE

Floor 1

Radiology	2520 Sq. Ft.		
Labs	3110		
Employee Health	676		
Medical Records	4660		
EKG	336		
Ortho Clinic	4660		
Proctology	1166		
Treatment Center	2930		
Social Service	970		
Surgery Clinic	4372	TOTAL	25,400 Sq. Ft.

Floor 2

Business Office	7530		
Admitting	2595		
Medical Records	4729		
Medicine Clinic	4294		
OPD Admin.	1876		
OPD Pharmacy	1575		
Nutrition	351	TOTAL	22,945 Sq. Ft.

Floor 3

Family Practice Clinic	7594		
OPD Admin.	654	TOTAL	8,248 Sq. Ft.

Floor 4

Pediatrics Clinic	4241		
Dermatology Clinic	3937	TOTAL	8,178

Floor 5

Neurology - Neurosurgery Clinic	4734 Sq. Ft.	TOTAL	4,734 Sq. Ft.
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Floor 6

OB-Gyn Clinic	4885		
Psychiatry Clinic	3927	TOTAL	8,812 Sq. Ft.

Floor 8

Audiology Clinic	4135		
ENT Clinic	4744	TOTAL	8,879

Floor 9

Eye Clinic	8805	TOTAL	8,805
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TOTAL OPD CLINIC SPACE UNIT B/C 96,001

NOTE: Hospital Dentistry Clinic will be located on the 7th floor of the new structure and will occupy 9784 square feet.

BASIC ASSUMPTIONS RELATED TO NUMBER OF PATIENT DAYS, OPD AND EMERGENCY ROOM VISITS

1. During the next decade, there will be an increasing emphasis in health care on prevention and ambulatory care. (re: HMO philosophy)
2. The service role of University Hospitals is to provide health care facilities equipment, and personnel to assist the Health Sciences professions in the patient care, education and research programs.
3. The completion of Unit B/C (outpatient clinics) and the development of the Family Practice Department and their programs as well as the programs of other services will increase the demand for the utilization of OPD clinics and the emergency room.
4. University Hospitals will maintain a core of 800-850 beds during the next decade.
5. Although the number of admissions will increase yearly, the average length of stay will continue to decline.
6. Estimates made for OPD visits were based on number of new patients, return patients, time in exam room for nurses and doctors were made by clinic directors.
7. With the completion of Unit B/C there will be an increase of 176% in space (25,000 sq. ft. to 69,000 sq. ft.)

PATIENT DAYS

Projections 1970 -80

1970-71	223,200
1971-72	224,850
1972-73	226,100
1973-74	227,150
1974-75	228,920
1975-76	230,140
1976-77	231,458
1977-78	232,750
1978-79	233,150
1979-80	234,360

OUTPATIENT CLINIC VISITS PROJECTIONS \*

1970-80

1970-71	134,629 vists
1971-72	142,706
1972-73	151,268
1973-74	160,344
1974-75	169,965
1975-76	186,965
1976-77	205,662
1977-78	226,228
1978-79	246,951
1979-80	265,224

\*Based on estimates given by various clinic directors.

EMERGENCY ROOM PROJECTIONS

1970-1980

1970-71	17,494
1971-72	19,243
1972-73	21,167
1973-74	22,437
1974-75	23,783
1975-76	25,209
1976-77	26,722
1977-78	28,325
1978-79	30,025
1979-80	31,826

UNIVERSITY OF MINNESOTA HOSPITALS  
INCOME PROJECTIONS  
1970-1980

	<u>1970-71</u>	<u>1971-72</u>	<u>1972-73</u>	<u>1973-74</u>	<u>1974-75</u>	<u>1975-76</u>	<u>1976-77</u>	<u>1977-78</u>	<u>1978-79</u>	<u>1979-80</u>
Inpatient	25,467,693	27,542,461	29,759,265	33,106,610	35,347,078	39,149,814	41,573,008	46,068,570	48,923,658	54,240,360
Outpatient	2,240,668	2,481,953	3,306,585	3,475,279	3,495,865	3,871,959	4,111,616	4,556,232	4,838,603	5,364,431
Appropriations	3,921,791	4,196,316	4,361,168	4,710,061	5,039,765	5,442,946	5,823,952	6,289,868	6,730,158	7,268,570
Auxiliary	<u>290,494</u>	<u>305,000</u>	<u>315,000</u>	<u>345,000</u>	<u>355,000</u>	<u>365,000</u>	<u>375,000</u>	<u>385,000</u>	<u>395,000</u>	<u>405,000</u>
TOTAL	31,920,646	34,525,730	37,742,018	41,636,950	44,237,708	48,829,719	51,883,576	57,299,670	60,887,779	67,278,361



UNIVERSITY OF MINNESOTA HOSPITALS

PROJECTIONS - OPERATING EXPENSES - 1970-1980

	<u>1970-71</u>	<u>1971-72</u>	<u>1972-73</u>	<u>1973-74</u>	<u>1974-75</u>	<u>1975-76</u>	<u>1976-77</u>	<u>1977-78</u>	<u>1978-79</u>	<u>1979-80</u>
SALARIES	21,280,082	23,169,691	25,619,872	18,694,256	30,415,912	34,065,821	36,109,770	40,442,949	42,869,525	48,013,868
FRINGE BENEFITS	1,926,030	2,118,633	2,330,496	2,563,545	2,819,899	3,101,888	3,412,076	3,753,288	4,128,616	4,541,477
SUPPLIES, EXPENSE & EQUIP.	<u>8,714,534</u>	<u>9,237,406</u>	<u>9,791,650</u>	<u>10,379,149</u>	<u>11,001,897</u>	<u>11,662,010</u>	<u>12,361,730</u>	<u>13,103,433</u>	<u>13,889,638</u>	<u>14,723,016</u>
TOTAL	31,920,646	34,525,730	37,742,018	41,636,950	44,237,708	48,829,719	51,883,576	57,299,670	60,887,779	67,278,361

Unit J  
July 12, 1973

Proposal/Agreement

for

Facility Planning and Financial Planning  
Services to be rendered by Herman Smith  
Associates, herein sometimes "Consultants"  
to University of Minnesota Hospitals, here-  
inafter Hospitals

**A. OBJECTIVE OF THE ASSIGNMENT**

1. To provide professional consultation and advice in future physical facility planning for the Hospitals' existing inpatient facilities.
2. To define the existing situation, future potential, need for renovation, upgrading and/or replacement of inpatient facilities currently in operation.
3. To develop a facilities program which will serve as a guide for future development of an architectural program for the existing facilities.
4. To conduct a Financial Capability Study to ascertain the amount of funding that is economically feasible to finance proposed programs.

**B. SERVICES TO BE RENDERED TO THE HOSPITAL**

1. Interview will be held with clinical and administrative department heads regarding their present programs and procedures and their estimate of the future facilities requirements.
2. The consultants will review the existing departmental programs to determine impact on current and future facility needs.
3. Existing space utilization and proximity relationships within the hospital and its related elements will be evaluated to determine their adequacy in carrying forward the adjunct or affiliated services for the present and for the adjacent future.

July 12, 1973

Proposal/Agreement for University of Minnesota Hospitals

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4. Review and survey existing facilities to:

a. Determine their adequacy in light of the following:

- (1) Facility obsolescence
- (2) Facility standards
- (3) Code deficiencies
- (4) Building efficiency
- (5) Building traffic circulation
- (6) Operating efficiency
- (7) Conformity to Joint Commission on Accreditation  
Physical Facility Standards
- (8) Conformity to Hospitals Licensing Act and requirements
- (9) Conformity with other generally accepted standards  
of hospital construction and design
- (10) Ability to accommodate present and future program-  
matic requirements as outlined in recent planning  
reports.

b. Recommend which facilities should be retained as is or remodeled.

c. Recommend which should be removed.

d. Recommend which should be vacated and used for other Health Sciences functions.

e. The recommendations on physical facilities will consider cost effectiveness.

5. Phasing priorities will be established for review by the Planning Committee and others as appropriate and a recommended phasing program will be prepared.

6. Based on specific space recommendations developed through the existing facilities program, the consultants will develop a

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Proposal/Agreement for University of Minnesota Hospitals

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gross dollar budget for construction, modernization and re-assignment of spaces, professional fees, permits and equipment costs, etc.

7. Budget will take into consideration the factors of phasing required within the project and the resulting escalation, dislocation and potential loss of revenue.
8. The capital budget will be developed in conformity with the budgetary constraints as developed through realistic projections of the Hospitals' gross financial capability and funding resources, and applicable wage/price (Phase III-1/2) guidelines.
9. A tentative report will be prepared and submitted documenting the information considered and conclusions and recommendations.

Following submission of the Report, meetings will be held with the Planning Committee for final review. Following these meetings the report will be finalized and submitted.

The report, although prepared for inpatient facilities of the Hospitals, will be prepared in light of the existing Health Sciences expansion program, the possible future construction of a new VA Hospital in close proximity, and the total State health care program.