



*Bulletin* of the

University of Minnesota Hospitals  
and  
Minnesota Medical Foundation



Maternal Mortality Study

BULLETIN OF THE  
UNIVERSITY OF MINNESOTA HOSPITALS  
and  
MINNESOTA MEDICAL FOUNDATION

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## I. PROBLEMS OF A MATERNAL MORTALITY STUDY

Donald W. Freeman, M.D.

The purpose of this paper is to describe briefly the Minnesota Maternal Mortality survey, including the methods of case finding and study, a resume of some of the survey's results, and a discussion of some of the general problems involved. Detailed studies of maternal deaths were started in New York City in the early 1930's because of dissatisfaction felt by many over existing maternal mortality rates. These had shown little change since 1915 when the National Office of Vital Statistics first made them available. The rate varied in the years 1915 to 1935 from about 6 to about 8 per 1000 live births. The mortality studies made it obvious that most maternal deaths could be prevented if adequate medical care were given. Publication of the results of these studies aroused great interest as well as controversy and led to the organization by many local societies and groups of maternal mortality committees. A substantial and progressive decrease in maternal mortality rates has occurred since the mid 1930's, probably partly as a result of the influence of the maternal mortality studies which followed organization of these committees.

In Minnesota, detailed studies of all maternal mortalities in the state have been carried out in 1941-42 and continuously since 1950. All women who died of whatever cause while pregnant or in the following three months are included in the study. Deaths from chorionepithelioma are also included in the year in which death occurred. One of three trained obstetricians goes as soon as possible to the site of the death and collects all significant data from the physician and hospital concerned. These data are put together, summarized and evaluated for accuracy, completeness, cause of death, responsibility for death and preventability of death. The summary is then checked by members of the Department of Obstetrics and Gynecology

and is presented to a meeting of the members of the Maternal Mortality Committee of the Committee on Maternal Health of the Minnesota State Medical Society. The Mortality Committee makes final decisions on policy and on such matters as cause of death, responsibility for death, and preventability. In the determination of preventability and physician responsibility, the Committee is more strict when the physician is or claims to be a trained obstetrician and when the events took place in a large, well equipped hospital. Considerable leeway is allowed for the physician's judgment when he has made reasonable efforts to collect diagnostic data and used reasonable care in implementing his decision. A summary of the Committee's findings and conclusions is sent to the physician involved. The funds necessary for the study have been made available from the Children's Bureau of the federal government through the Minnesota State Department of Health.

### Results

Some of the more interesting information turned up by the studies is shown in Tables 1, 2 and 3. The data in table 1 show that the maternal mortality rate both in Minnesota and in the United States as a whole is now less than 1 per 1000 live births and that the drop in rate appears to be continuing. The gross rate in Minnesota in 1951 was approximately one-third that of 1941-42. Other highly significant changes occurring in that ten-year interval are shown in tables 2 and 3. In 1941-42, almost three-fourths of the deaths were considered preventable, while in 1950 and 1951, only about one-third and two-fifths respectively were preventable. (Table 2) There has been an increase in the percentage of deaths associated with pregnancy, but due to non-obstetric causes from 17% in 1941 to 31.6% in 1951, (Table 3) indicating that the obstetric problems are being handled much more efficiently. Table 4 contains the details regarding cause of death as determined by the Maternal Mortality Committee in the cases studied in 1951. It will be seen that hemorrhage was by far the leading cause of death.

Toxemia was only slightly more important than anesthesia as a cause of death and was equalled by pulmonary

embolism. Infection as a contributor to maternal mortality is becoming almost non-existent.

Table 1

	Number deaths	Number births	Gross mortality rate per 1000 live births***	Minn. Maternal Mortality rate per 1000 live births****	U.S. maternal mortality rate per 1000 live births****
1941-42	112	55,293	2.03	1.8*	2.8*
1950	68	76,074	0.89	.6	0.83**
1951	57	80,099	0.71	.3	0.71**

\* Average for 1941 and 1942

\*\* Unofficial

\*\*\* Including all maternal deaths from whatever cause. These are the Maternal Mortality Committee's gross figures.

\*\*\*\* Excluding deaths considered as non-obstetric on the basis of the definitions set down by the United States Bureau of the Census. This is the ordinarily reported maternal mortality rate as given by the Minnesota Department of Health.

Table 2

PREVENTABILITY OF MATERNAL DEATHS IN MINNESOTA  
Studies for 1941, 1950, and 1951, Respectively

	1941		1950		1951	
	No.	Percent	No.	Percent	No.	Percent
Preventable	82	73.2	22	32.4	24	42.1
Not preventable	27	24.1	45	66.1	32	56.1
Not determinable	3	2.7	1	1.5	1	1.8

Table 3

OBSTETRIC AND NON-OBSTETRIC DEATHS AMONG  
MATERNAL MORTALITY CASES IN MINNESOTA  
Studies for 1941, 1950, and 1951, Respectively

	1941		1950		1951	
	No.	Percent	No.	Percent	No.	Percent
Obstetric deaths	93	83.0	46	67.6	39	68.4
Non-obstetric deaths	19	17.0	22	32.4	18	31.6

\* \* \*

Table 4

## PRIMARY CAUSES OF MATERNAL DEATHS IN MINNESOTA - 1951 STUDY

Cause of Death	No.	Percent
Obstetric hemorrhage	13	22.8
Postpartum		
Lacerations of cervix and/or lower uterine segment with atony	9	
Intra partum	2	
Ruptured uterus	1	
Intra-abdominal hemorrhage (ectopic)	1	
Toxemia		
Eclampsia superimposed on hypert. vasc. disease	3	4
Eclampsia without pre-existing hypertension	1	7.0
Pulmonary embolism	4	7.0
Chorionepithelioma	3	5.2
Anesthesia	3	5.2
Spinal	2	
Inhalation	1	
Dehydration and electrolyte imbalance	3	5.2
Hyperemesis gravidarum	2	
Post cesarean section	1	
Infection	2	3.5
Septic abortion	1	
Generalized peritonitis of undetermined source	1	
Air embolism	2	3.5
Amniotic fluid embolism	1	3.5
Congenital heart disease with failure	1	1.9
Not determinable	3	5.2
Shock of unknown etiol. (? G.I. tract hem.)	1	
Sudden death late labor (? amn. fl. emb.)	1	
Threatened abortion -- autopsy negative	1	
Non-obstetrical complications	18	31.6
Trauma	4	
Bulbar poliomyelitis	2	
Acute alcoholism	2	
Paratyphoid (chloramphenicol)	1	
Bilateral pneumothorax	1	
Probable rupture cerebral aneurysm	1	
Cerebral hemorrhage (hypersplenism)	1	
Pulmonary tuberculosis	1	
Malignant melanoma	1	
Carcinoma stomach	1	
Not determinable	3	
TOTALS	57	100.0

Accuracy of Reported Maternal  
Mortality Rates

The maternal mortality rate as ordinarily reported is the number of deaths of women ascribed to certain complications of pregnancy, childbirth and the puerperium per 1000 live births over a given time, usually one year. The cases are found through death certificate reports. A decision must then be made as to whether the death should be included in the calculation of the maternal death rate or be excluded as unrelated etiologically to the pregnancy and, therefore, "non-maternal". This decision must be arrived at on the basis of the meager information which appears on the usual death certificate.

The Minnesota Study has shown that rates so arrived at are likely to be grossly inaccurate. First the individual making out the death certificate often neglects to indicate that the patient was pregnant or was in the post partum state. In Minnesota reports of

deaths associated with pregnancy have reached the Committee through death certificates, direct reports from hospitals and physicians involved, from a variety of other occasional sources and finally by cross-matching all death certificates of women aged 15 to 45 with the birth certificates. Hospitals in the state are required to report directly to the State Health Department all deaths associated with pregnancy and/or in the three-month period post partum immediately when they occur. Thirty-two deaths were found by means of special efforts at case finding as against 93 deaths reported in the usual manner from death certificates (Table 5). Many of the unreported deaths were so called non-maternal deaths, but others were not. There is obviously a large source of error here. The error in Minnesota under circumstances of the present study is probably at a minimum. The abortion group in which a birth certificate is not required remains unchecked, and an occasional death occurring in an undelivered patient may be missed.

Table 5

	<u>No.</u>	<u>Percent</u>
Total maternal deaths (1950 and 1951)	125	100
Cases found from death certificates (with or without preliminary report from physician, hospital, etc.)	93	74.4
Sources other than death certificates	32	25.6
Cross match of death with birth certificates	17 - 13.6%	
Others	15 - 12.0%	

The exclusion of "non-maternal" deaths from reports from maternal mortality rates further increases the inaccuracy of these reports. This exclusion violates a basic principle in the use of statistical reporting that all material involved in a study be reported as a gross figure. The division into maternal and non-maternal groups must be car-

ried out more or less arbitrarily on the basis of a half-dozen odd words on the death certificate. This study has made it obvious that in the absence of a detailed study of each maternal death, such a division is actually impossible. The gross inaccuracy of unchecked death certificate information is shown in part in Table 6. A number of types of errors

were uncovered. A positive diagnosis was often shown on the death certificate when none was possible. There were six deaths (10.3%) in 1951 in which the cause of death could not be determined on careful examination of the details and in spite of the fact that three had complete autopsies. A specific but unjustified cause of death was given on the death certificate on all six. A patient whose death certificate showed epilepsy as a cause of death actually died of post partum hemorrhage. Another whose death certificate showed the cause of death as pulmonary embolus actually died of air embolism from air pumped into her veins under pressure through an empty transfusion bottle. Careful examination of the data obtained has led the Committee to change the death certificate diagnosis in 27.2% of the cases in 1950 and 1951. The inaccuracies involved in relying on unchecked death certificate information are then compounded by dividing deaths into maternal and non-maternal groups. The difficulties involved here can be illustrated by some examples. A pregnant woman was

in an automobile accident and was admitted to a hospital where she died of shock some 12 hours later. This would be reported as a non-maternal death and would be listed with traffic fatalities. Actually, autopsy revealed that the physician had missed a ruptured uterus which might well have been treated. Two psychotic pregnant patients were hospitalized and discharged with a known risk of suicide. Both did commit suicide, one by drowning and one by throwing herself under a train. Both would have been prevented and the responsibility was obviously the obstetrician's. Many less obvious examples could be cited where the influence of the pregnancy on the outcome is impossible to assess accurately. Rather than to attempt division of deaths into maternal and non-maternal groups, it would seem more logical to report as maternal mortalities all women who died of whatever cause while they are pregnant or in some arbitrarily determined period of time after completion of the pregnancy. Following this, for one reason or another, separate groups could be set up.

Table 6

	<u>No.</u>	<u>Percent</u>	<u>No.</u>	<u>Percent</u>
Total maternal deaths (1950, 1951)			125	100
Death certificate correct and complete in all details	33	26.4		
Death certificate correct in all details reported	<u>37</u>	<u>29.6</u>	70	56
Death certificates incorrect			55	44
Death certificate incorrect as to cause of death			34	27.2

The Limitations and Values of a Detailed Maternal Mortality Study

One of the limiting features of the study is the fact that the patients who die represent a selected sample of the general obstetric material and are un-

likely to be a fair sample. It is more likely to be loaded with patients who have had the poorest obstetric care, since all of the patients died. The significance, therefore, of the fact that only small numbers of the patients who died had adequate care is not clear. It

is believed that this inadequate care is not representative of routine obstetric care in Minnesota but this is not known. A study such as this yields little or no information in other fields involving obstetrics where information is badly needed. These include such things as the effect of obstetric handling on the fetal outcome and information concerning maternal morbidities which do not lead directly to the patient's death.

There have been many real advantages from the study. It has supplied information which has changed the emphasis of both undergraduate and post-graduate teaching. Many individual physicians have had errors pointed up and there is reason to believe that these will not be repeated by the person concerned. The inefficiency of the present coroner system in Minnesota has been made obvious. The study has shown that accouchement forcé, inappropriate use of oxytocics during labor, and delayed and inadequate replacement of blood have been responsible for the majority of deaths due to hemorrhage. Inadequate hospital records have turned up in a surprisingly large number of instances. Far too many hospitals do not insist upon routine history taking, physical examination, pelvic mensuration and basic laboratory workup.

It is clear that much information of real practical value can be obtained from this type of study which is not evident from the usual methods of case finding and reporting. Proper application of this information can lead to improved obstetric care and to increased safety for mothers.

#### Conclusions

1. The continuing statewide Minne-

sota Maternal Mortality Study is described.

2. A brief summary of some of the results of the studies of 1941-42, 1950 and 1951 are presented.
3. Maternal mortality data as ordinarily collected and reported are not accurate since the statistics on which they are based are inaccurate.
4. It is suggested that exclusion of so-called non-maternal deaths from gross maternal mortality rate reports be discontinued.
5. Some of the values and limitations of a maternal mortality study are briefly discussed.

#### References

1. Maternal Mortality Committee, Minnesota State Medical Association: Minnesota maternal mortality study, July 1, 1941, through June 30, 1942. Minn. Med., 27: 475-481 and 557-562, 1944.
2. Maternal Mortality Committee of the Committee on Maternal Health of the Minnesota State Medical Association. Minnesota Maternal Mortality Study. Minnesota Medicine, 36: 609-622, June, 1953.
3. Maternal Mortality Committee of the Committee on Maternal Health of the Minnesota State Medical Association. Minnesota Maternal Mortality Study. Minnesota Medicine, 37: 131-135, February, 1954.



## II. MEDICAL SCHOOL NEWS

### Coming Events

- May 3 - 5 Continuation Course in Radiology for General Physicians  
May 6 E. Starr Judd Lecture; "Surgical Aspects of Splenic Disease;" Dr. Warren H. Cole, University of Illinois; Owre Amphitheater; 8:00 p.m.  
May 6 - 8 Continuation Course in Surgery for General Surgeons  
May 10 - 15 Continuation Course in Electrocardiography for General Physicians  
May 17 - 22 Continuation Course in Proctology for General Physicians  
May 20 Medical Six O'Clock Dinner; Main Ballroom, Coffman Memorial Union; 6:30 p.m.  
June 3 Luncheon for Senior Medical Students sponsored by the Minnesota Medical Alumni Association; Junior Ballroom, Coffman Memorial Union; 12:30 p.m.

\* \* \*

### Continuation Course

The University of Minnesota will present a continuation course in Electrocardiography for General Physicians at the Center for Continuation Study, May 10 to 15, 1954. Emphasis will be placed on practical experience in the interpretation of electrocardiograms. Each registrant will have an opportunity to read approximately 20 tracings under the supervision of the teaching staff. Separate interpretation sessions will be held for those who consider themselves "beginners" in electrocardiography. Each registrant will receive a set of reproductions of electrocardiograms demonstrating the more common abnormalities which he may keep for further study and reference. The faculty for the course will consist of members of the staff of the University of Minnesota Medical School and the Mayo Foundation.

\* \* \*

### Faculty News

Dr. John L. McKelvey, Professor and Head, Department of Obstetrics and Gynecology, was the guest of the University of Kansas School of Medicine on April 19 and 20. He delivered the annual Porter Lecture series. His subjects were "Laurence Sterne as a Doctor Sees Him" and "Carcinoma of the Vulva."

Several members of the Department of Physiological Chemistry attended the meeting of the American Society of Biological Chemists in Atlantic City. Those attending included Doctors Wallace D. Armstrong, C. P. Barnum, S. L. Cohen, Leon Singer, Charles Carr, H. R. Gutmann, and Ada Simon.

The Department of Radiology and the Division of Radiation Therapy were hosts on April 6 to Dr. H. E. Duggan, Director, Department of Radiology, University of Alberta Hospital, Edmonton, Alberta.

Doctors Wesley W. Spink, E. B. Flink, and Robert B. Howard, of the Department of Medicine, attended the meeting of the American College of Physicians which was held in Chicago from April 5 to 9.

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III.

UNIVERSITY OF MINNESOTA MEDICAL SCHOOL

WEEKLY CALENDAR OF EVENTS

Physicians Welcome

May 3 - 8, 1954

Monday, May 3

Medical School and University Hospitals

- 9:00 - 9:50 Roentgenology-Medicine Conference, L. G. Rigler, C. J. Watson and Staff; Todd Amphitheater, U. H.
- 9:00 - 10:50 Obstetrics and Gynecology Conference; J. L. McKelvey and Staff; W-612, U. H.
- 10:00 - 12:00 Neurology Rounds; A. B. Baker and Staff; Station 50, U. H.
- 11:30 - Tumor Conference; Doctors Hitchcock, Moore, and Stenstrom; Todd Amphitheater, U. H.
- 11:30 - 12:30 Physical Medicine Seminar; Aphasia-Speech Therapy; Frank M. Lassman; Heart Hospital Auditorium.
- 12:15 - Obstetrics and Gynecology Journal Club; Staff Dining Room, U. H.
- 12:30 - 1:30 Physiology Seminar; Some Effects of Maternal Nutrition on the Young; Max Schultze; 214 Millard Hall.
- 1:30 - 2:30 Pediatric-Neurological Rounds; R. Jensen, A. B. Baker and Staff; U. H.
- 1:30 - 3:30 Dermatology Hospital Rounds; H. E. Michelson and Staff; Dermatology Histopathology Room, M-434, U. H.
- 4:30 - Infectious Disease Rounds; Station 43, U. H.
- 4:30 - Public Health Seminar; 15 Owre Hall.
- 5:00 - 6:00 Physiology-Surgery Conference; Todd Amphitheater, U. H.
- 5:00 - 6:00 Urology-Roentgenology Conference; C. D. Creevy, O. J. Baggenstoss, and Staff; Eustis Amphitheater.

Ancker Hospital

- 8:30 - 10:00 Tuberculosis and Chest Conference; Auditorium.
- 2:00 - 3:00 Surgery Journal Club; Classroom.

Minneapolis General Hospital

- 9:30 - Pediatric Rounds; Richard Raile; Station K.
- 10:30 - 12:00 Medicine Rounds; Thomas Lowry; Station F.
- 11:00 - Orthopedic and Fracture Rounds; Drs. John Moe and Arthur Zierold; Station B.
- 11:00 - Pediatric Seminar; Erling Platou; Classroom, Station M.
- 12:30 - Surgery Grand Rounds; Dr. Zierold; Station E.
- 1:30 - 2:30 Tuberculosis Conference; J. A. Myers; Station M.
- 2:00 - Pediatric Rounds; Stations I and J.

Monday, May 3, (Cont.)

Veterans Administration Hospital

- 9:30 - Infectious Disease Rounds; Drs. Hall, Zinneman, Lubin and Sherman.  
1:30 - Cardiac Conference; Drs. Berman, Smith, Hoseth, and Wexler;  
Conference Room, Bldg. I.; Rounds immediately following conference.

Tuesday, May 4

Medical School and University Hospitals

- 9:00 - 9:50 Roentgenology-Pediatric Conference; L. G. Rigler, Irvine McQuarrie  
and Staffs; Eustis Amphitheater, U. H.  
12:30 - 1:20 Pathology Conference; Autopsies; J. R. Dawson and Staff; 102 Institute  
of Anatomy.  
12:30 - 1:30 Bacteriology Seminar; 214 Millard Hall.  
3:30 - Biophysics-General Physiology Seminar; 323 Zoology Building.  
4:00 - 5:00 Pediatric Rounds on Wards; Irvine McQuarrie and Staff; U. H.  
4:30 - 5:30 Clinical-Medical Pathological Conference; Todd Amphitheater, U. H.  
5:00 - 6:00 X-ray Conference; Presentation of Cases by University Hospitals Staff;  
Eustis Amphitheater, U. H.

Ancker Hospital

- 9:00 - 10:00 Medical X-ray Conference; Auditorium.

Minneapolis General Hospital

- 9:30 - Pediatric Rounds; Elizabeth Lowry; Station J.  
10:00 - Psychiatry Grand Rounds; R. W. Anderson; Station H.  
11:30 - 12:30 Neurology-Neurosurgery Conference; Classroom, Station M.  
12:30 - 2:30 Dermatology Rounds on Clinic; Carl W. Laymon and Staff.  
12:30 - ECG Conference; Boyd Thomes and Staff; 302 Harrington Hall.  
1:00 - Tumor Clinic; Drs. Eder, Coe, and Lipschultz; Classroom.  
3:30 - Pediatric-Psychiatry Rounds; Jack Wallinga; Station I.

Veterans Administration Hospital

- 7:30 - Anesthesiology Conference; Conference Room, Bldg. I.  
8:45 - Surgery Journal Club; Conference Room, Bldg. I.  
9:30 - Surgery-Pathology Conference; Conference Room, Bldg. I.  
10:30 - Surgery-Tumor Conference; L. J. Hay, J. Jorgens and Donn Mosser;  
Conference Room, Bldg. I.  
1:00 - Review of Pathology, Pulmonary Tuberculosis; Conference Room, Bldg. I.  
1:30 - Combined Medical-Surgical Chest Conference; Conference Room, Bldg. I.  
2:00 - 2:50 Dermatology and Syphilology Conference; H. E. Michelson and Staff;  
Bldg. III.  
4:00 - Thoracic Surgery Problems; Conference Room, Bldg. I.

Wednesday, May 5

Medical School and University Hospitals

- 8:00 - 9:00 Roentgenology-Surgical-Pathological Conference; Paul Lober and L. G. Rigler; Todd Amphitheater, U. H.
- 11:00 - 12:00 Pathology-Medicine-Surgery-Pediatrics Conference; Todd Amphitheater, U. H.
- 12:30 - 1:20 Radioisotope Seminar; Some Aspects of Radioactive Iodine Diagnosis and Treatment; Vincent Paciotti; Underground Cobalt Unit, U. H.
- 12:30 - 1:30 Physiology 114C--Respiration; E. B. Brown; 214 Millard Hall.
- 1:00 - 2:00 Dermatology Clinical Seminar; F. W. Lynch; 300 North Clinic.
- 1:30 - 2:30 Physiology 114B--Transport Seminar; Nathan Lifson and M. B. Visscher; 271 Lyon Laboratories.
- 1:30 - 3:00 Pediatric Allergy Clinic; Albert V. Stoesser and Lloyd Nelson; W-211, U. H.
- 3:30 - 4:30 Dermatology Pharmacology Seminar; J. D. Krafchuk; 3rd Floor Conference Room, Heart Hospital.
- 4:30 - 5:50 Dermatology Infectious Disease Seminar; J. D. Krafchuk; 3rd Floor, Conference Room, Heart Hospital.
- 5:00 - 5:50 Urology-Pathological Conference; C. D. Creevy and Staff; Eustis Amphitheater, U. H.
- 5:00 - 6:00 Residents' Lecture; Hysterosalpingography; Roy Holly; Todd Amphitheater, U. H.
- 5:30 - 7:30 Dermatology Journal Club and Discussion Group; Hospital Dining Room.
- 7:30 - 9:30 Dermatology Pathology Seminar; Review of Interesting Slides of the Week; Robert W. Goltz; Todd Amphitheater, U. H.

Ancker Hospital

- 8:30 - 9:30 Clinico-Pathological Conference; Auditorium.
- 12:30 - 1:30 Medical Journal Club; Library.

Minneapolis General Hospital

- 9:30 - Pediatric Rounds; Henry Staub; Station I.
- 10:30 - 12:00 Medicine Rounds; Thomas Lowry and Staff; Station D.
- 12:00 - Surgery Seminar; Arthur Zierold; Classroom.
- 12:30 - Pediatric Staff Meeting; Classroom; Station I.
- 1:30 - Pediatric House Staff Seminar; Erling Platou; Station I.
- 1:30 - Pediatric Rounds; Erling Platou; Classroom, Station I.

Veterans Administration Hospital

- 8:30 - 10:00 Orthopedic X-ray Conference; E. T. Evans and Staff; Surgical Conference Room, Bldg. 43.
- 8:30 - 12:00 Neurology Rehabilitation and Case Conference; A. B. Baker.

Wednesday, May 5, (Cont.)

Veterans Administration Hospital (Cont.)

- 9:00 - Gastro-Intestinal Rounds; Drs. Wilson, Zieve, Hay, Brakel, Nesbitt and O'Leary.
- 11:00 - Gastroenterology Conference; Conference Room, Bldg. I.
- 12:30 - Medical Journal Club; Doctors' Dining Room.
- 12:30 - X-ray Conference; J. Jorgens; Conference Room, Bldg. I.
- 1:30 - 3:00 Metabolic Disease Conference; Drs. Flink, Schultz and Brown.
- 3:30 - Urology Pathology Slide Conference; Dr. Gleason; Conference Room, Bldg. I.
- 7:00 - Lectures in Basic Science of Orthopedics, Conference Room, Bldg. I.

Thursday, May 6

Medical School and University Hospitals

- 9:00 - 11:50 Medicine Ward Rounds; C. J. Watson and Staff; E-221, U. H.
- 11:00 - 12:00 Cancer Clinic, K. Stenstrom, A. Kremen and B. Zimmermann; Todd Amphitheater, U. H.
- 12:00 - 1:00 Medical Journal Club; Rheumatoid Arthritis; Jim Brown; 116 Millard Hall.
- 12:30 - Physiological Chemistry Seminar; Effect of Acid-Base Balance on Brain Function; John Logothetis; 214 Millard Hall.
- 1:30 - 4:00 Cardiology X-ray Conference, Heart Hospital Theatre.
- 5:00 - 6:00 Radiology Seminar; Early Roentgen Diagnosis of Left Atrial Enlargement; Charles Nice and C. William Hall; Eustis Amphitheater, U. H.
- \*8:00 - E. Starr Judd Lecture; "Surgical Aspects of Splenic Disease;" Dr. Warren H. Cole, Department of Surgery, University of Illinois, Chicago; Owre Amphitheater.

Ancker Hospital

- 8:00 - 10:00 Medical Grand Rounds; Auditorium.

Minneapolis General Hospital

- 9:30 - Neurology Rounds; Heinz Bruhl; Station I.
- 9:30 - Pediatric Contagion Rounds; R. B. Raile; Station K.
- 10:00 - Psychiatry Grand Rounds; R. W. Anderson and Staff; Station H.
- 11:30 - 12:30 Clinical Pathological Conference; John I. Coe; Classroom.
- 12:30 - 2:30 Dermatology Rounds and Clinic; Carl W. Laymon and Staff.
- 1:00 - Fracture - X-ray Conference; Drs. Zierold and Moe; Classroom.
- 1:00 - House Staff Conference; Station I.

\* Indicates special meeting. All other meetings occur regularly each week at the same time on the same day. Meeting place may vary from week to week for some conferences.

Thursday, May 6, (Cont.)

Veterans Administration Hospital

- 8:00 - Surgery Grand Rounds; Conference Room, Bldg. I.
- 8:00 - Surgery Ward Rounds; Lyle Hay and Staff; Ward 11.
- 8:30 - Hematology Rounds; Drs. Hagen and Fifer.
- 11:00 - Surgery-Roentgen Conference; J. Jorgens; Conference Room, Bldg. I.
- 1:00 - 3:00 Parasitology Conference; Amebae; F. G. Wallace; Conference Room, Bldg. I.
- 1:30 - 4:30 Infectious Disease Conference and Rounds; Wesley W. Spink; Conference Room, Bldg. I.

Friday, May 7

Medical School and University Hospitals

- 8:00 - 10:00 Neurology Grand Rounds; A. B. Baker and Staff; Station 50, U. H.
- 9:00 - 9:50 Medicine Grand Rounds; C. J. Watson and Staff; Todd Amphitheater, U. H.
- 10:30 - 11:50 Medicine Rounds; C. J. Watson and Staff; Todd Amphitheater, U. H.
- 10:30 - 1:50 Otolaryngology Case Studies; L. R. Boies and Staff; Out-Patient Department U. H.
- 11:00 - 12:00 Vascular Rounds; Davitt Felder and Staff Members from the Departments of Medicine, Surgery, Physical Medicine, and Dermatology; Eustis Amphitheater, U. H.
- 11:45 - 12:50 University of Minnesota Hospitals Staff Meeting; Benign Strictures of the Common Bile Duct; Joseph B. Aust and Richard L. Varco; Powell Hall Amphitheater.
- 1:00 - 2:50 Neurosurgery-Roentgenology Conference; W. T. Peyton, Harold O. Peterson and Staff; Todd Amphitheater, U. H.
- 1:30 - 2:30 Dermatology Grand Rounds; Presentation of Cases from Grouped Hospitals (University, Ancker, General and Veterans) and Private Offices; H. E. Michelson and Staff; Eustis Amphitheater, U. H.
- 2:30 - 4:00 Dermatology Hospital Rounds; H. E. Michelson and Staff; Begin at Dermatology Histopathology Room, M-434, U. H.
- 3:00 - 4:00 Neuropathological Conference; F. Tichy; Todd Amphitheater, U. H.
- 3:30 - 4:30 Dermatology-Physiology Seminar; J. D. Krafchuk; 3rd Floor Conference Room, Heart Hospital.
- 4:00 - 5:00 124 Advanced Neurophysiology Lecture; Werner Koella and Ernst Gellhorn; 111 Owre Hall.
- 4:30 - 5:20 Ophthalmology Ward Rounds; Erling W. Hanson and Staff; E-534, U. H.
- 5:00 - Urology Seminar and X-ray Conference; Eustis Amphitheater, U. H.

Ancker Hospital

- 1:00 - 3:00 Pathology-Surgery Conference; Auditorium.

Friday, May 7, (Cont.)

Minneapolis General Hospital

- 9:30 - Pediatric Rounds; Elizabeth Lowry; Station J.  
10:30 - Pediatric Surgical Conference; Tague Chisholm, and B. Spencer; Classroom, Station I.  
12:00 - Surgery-Pathology Conference; Dr. Zierold, Dr. Coe; Classroom.  
1:00 - 3:00 Clinical-Medical Conference; Thomas Lowry; Classroom, Station M.  
1:30 - Pediatric Contageon Rounds; L. Wannamaker; Station K.

Veterans Administration Hospital

- 10:30 - 11:20 Medicine Grand Rounds; Conference Room, Bldg. I.  
1:00 - Chest Pathology Follow-Up Conference; E. T. Bell; Conference Room, Bldg. I.  
2:00 - Clinico-pathological Conference; Conference Room, Bldg. I.

Saturday, May 8

Medical School and University Hospitals

- 7:45 - 8:50 Orthopedic X-ray Conference; W. H. Cole and Staff; M-109, U. H.  
9:00 - 10:30 Pediatric Grand Rounds; Eustis Amphitheater, U. H.  
9:00 - 11:50 Medicine Ward Rounds; C. J. Watson and Staff; Heart Hospital Amphitheater.  
9:15 - 10:00 Surgery-Roentgenology Conference; L. G. Rigler, J. Friedman, Owen H. Wangensteen and Staff; Todd Amphitheater, U. H.  
10:00 - 11:30 Surgery Conference; Todd Amphitheater, U. H.  
10:00 - 12:50 Obstetrics and Gynecology Grand Rounds; J. L. McKelvey and Staff; Station 44, U. H.  
11:30 - Anatomy Seminar; Effects of Yeast Diets on the Heart and Liver of the Mouse; John Shefeland; 226 Institute of Anatomy.

Ancker Hospital

- 8:30 - 9:30 Surgery Conference; Auditorium.

Minneapolis General Hospital

- 8:00 - Urology Staff Conference; T. H. Sweetser; Main Classroom.  
9:00 - Psychiatry Grand Rounds; R. W. Anderson; Station H.  
9:30 - Pediatric Rounds on all Stations; R. B. Raile.  
11:00 - 12:00 Medical - X-ray Conference; O. Lipschultz, Thomas Lowry and Staff; Main Classroom.

Veterans Administration Hospital

- 8:00 - Proctology Rounds; W. C. Bernstein and Staff; Bldg. III.  
8:30 - Medical X-ray Conference; Conference Room, Bldg. I.