

UNIVERSITY OF MINNESOTA

Medical Bulletin

OFFICIAL PUBLICATION OF THE

UNIVERSITY OF MINNESOTA HOSPITALS

THE MINNESOTA MEDICAL FOUNDATION

AND THE MINNESOTA MEDICAL ALUMNI

ASSOCIATION

IN THIS ISSUE:

Patient Attitudes

Renal Failure

NUMBER

VOLUME XXX

University of Minnesota Medical Bulletin

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April 1, 1959

NUMBER 11

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Staff Meeting Report

A Study of Student Perception of Patient Attitudes*

Rena E. Boyle, R.N., Ph.D.†

During the past decade we have made much progress in selecting students interested in the health fields, and academically able to achieve success, who will graduate and take their places in one of the many areas open to them. Although these students have had similar courses and experiences, and have been taught the importance of the psychological and emotional aspects of illness, they differ markedly in their relationships with patients and in their awareness of patients' attitudes. But these differences are not limited to student groups, for professional medical people also vary in their ability to look at hospital practices and personnel from the viewpoint of the patient.

This study was undertaken because of the author's interest in the differing attitudes expressed by acquaintances in the field of nursing. In this study a technique has been sought for measuring the ability of the student nurse to recognize the importance and satisfaction ascribed by her patient—directly or indirectly—to selected aspects of hospital care. This research has *not* been concerned with determining the student's ability to recognize the patient's underlying needs and motivations nor her proficiency in planning for the patient's total care; nor has any attempt been made to evaluate the student's technical skill in carrying out selected nursing procedures.

PARTICIPANTS

Schools and Hospitals

The seven schools and nine hospitals which cooperated in the study were:

1. The Harrison S. Martland Medical Center and School of Nursing, Newark, New Jersey (a city hospital).

*This report was given at the Staff Meeting of the University of Minnesota Hospitals on March 13, 1959.

†Nurse Consultant, Division of Nursing Resources, Public Health Service, Department of Health, Education, and Welfare; formerly Associate Professor, School of Nursing, University of Minnesota

2. Northwestern Hospital and School of Nursing, Minneapolis, Minnesota.

3. Massachusetts General Hospital and School of Nursing, Boston, Massachusetts.

4. Newton Wellesley Hospital and School of Nursing, Newton Lower Falls, Massachusetts.

5. Seattle University School of Nursing and Providence Hospital, Seattle, Washington.

6. University of Minnesota School of Nursing and Hospitals, Minneapolis, Minnesota.

7. University of Washington School of Nursing, and King County, Swedish, and Virginia Mason Hospitals, Seattle, Washington.

Students and Patients

The major participants in the study were 386 students enrolled in the four diploma- and three degree-granting programs, and the 290 patients whom they selected.* All students assigned at the time to medical and surgical wards participated in the study. The 282 first-year students† were distributed among the seven schools, but the 104 seniors were enrolled in only four of them, since three schools did not have seniors on medical or surgical wards during this period.

The method of selecting patients presented a problem throughout the study. Optimally, the investigator would have controlled the selection of patients and would have specified the number of days or hours the student was to be assigned to care for the patient. The rapid discharge of patients, however, and the practices of both hospitals and schools made such control impossible. Consequently, the students were asked to select the patients whom they "knew best," and only indirect evidence indicates that the patients did not present unlike problems to students.

Instructors, Head Nurses and Supervisors

Other participants were 41 instructors and 58 head nurses and supervisors who completed the questionnaires used in one part of the study.

Interviewers

Graduate students were employed to interview students and patients. Eleven were majoring in the fields of psychology, sociology, or

*Since in some instances a patient was selected by more than one student, the number of students exceeds the number of patients.

†The term "first-year student" refers to students having their first year of clinical experience. In the diploma programs, these students were freshmen; in the degree programs they were sophomores or juniors.

human relations, and thirteen were in nursing. In Minneapolis and Boston both men and women, nurses and non-nurses served as interviewers. In Seattle the interviewers were nurses. The author was assisted in Newark by a psychologist from the Division of Nursing Resources, while in Seattle and Boston, two Public Health Service nurses were assigned to help with the study. The interviewers introduced the study to the patients, gave directions for the card sort, recorded pertinent comments of the respondents, and assisted the students in their selection of patients.

In retrospect it seems remarkable that we actually completed a study which depended on the careful planning of so many people. In each instance the Directors of the Schools of Nursing and Nursing Service arranged for the author to plan in advance with the faculty and nursing service personnel. These Directors discussed the proposed study with the hospital administrators and medical personnel and arranged for scheduling group and individual conferences with students. And in addition, it was they who made the interviewers feel that they were welcome in the schools and hospitals and later made it possible for the author to return and discuss some of the findings.

BASIC QUESTIONS AND ASSUMPTIONS

Although the focus of the study was the development and use of a technique, the following questions and assumptions have been explored in the processes of collecting and analyzing data:

Recognition of Importance

1. Do students differ in their ability to recognize the importance attributed by patients to selected aspects of hospital care?

If such differences exist, it is assumed that they will be reflected in differences in the scores earned by first-year and senior students (a) in the same school and (b) in various schools.

2. Do students differ in their ability to recognize the importance ascribed by their patients to items relating to: (a) the environment, (b) physical care, and (c) information and "assurance"?*

If differences exist, it is assumed that they will be reflected in the percentages of students who overestimate or underestimate the importance of each of these areas to their patients.

3. To what extent does the student's response for her patient reflect her own attitudes rather than those of her patient?

*The term "assurance" refers to actions or events which may afford the patient a feeling of confidence or security.

4. To what extent do students' responses for their patients reflect the attitudes of teachers and supervisory personnel rather than those of the patients?

5. Does the percentage of agreement between student and patient responses remain constant for each of the four response categories (Very Important, Important, Less Important, and Not Important)?

6. What is the relationship between recognition of importance, as indicated by the "Importance" Score, and the student's: (a) high school rank, (b) grades in nursing courses, (c) rank in clinical practice, (d) opportunities to know patients, and (e) hours of clinical practice?

Recognition of Satisfaction

1. Do students differ in their ability to recognize patient satisfaction?

If differences exist, it is assumed that they will be reflected in the "Yes-No" scores earned by first year and senior students (a) in the same school and (b) in various schools.

2. What relationship exists between "Importance" scores and "Yes-No" scores?

Types of Patients Selected by Students

1. How do the interviewers describe the patients?

2. How do the students describe the patients?

METHODS USED IN COLLECTING DATA

After exploring various approaches and developing the first instruments, we conducted a pilot study during the fall of 1956. This phase of the study provided opportunity to pretest the items which seemed to be usable in the form of a card sort, to devise ways of analyzing data and scoring responses, and to plan for the later stages of the study. The methodology and analysis of data which are described in the following pages were based on this earlier study.

A card sort and questionnaire were used to collect the data needed to answer the foregoing questions. The card sort was used with both students and patients, the patient responding for himself and the student responding for the patient. The cards were sorted in such a way as to indicate both importance and satisfaction.

Description and Use of the Card Sort

The card sort items provided a common stimulus to both patient and nurse and limited the number of response categories, thus making

it possible to measure the extent of agreement between the respondents. In constructing the items, it was necessary to use words that would have similar meaning to patients and to nurses, to avoid items that might cause the patient to be fearful of future treatments or care, and to sample information that the student could normally obtain while caring for patients.

The 34 items of the card sort sampled three aspects of hospital care: environment, both physical and social; physical care; and information and assurance. Sample items from each of the three respective areas are: "The room or ward is quiet;" "The nurses rub my back often enough;" "The doctors tell me the truth about my illness."

After the student had selected the patient, the interviewer asked her to respond to each item as she thought the patient would respond. The items were printed on 3 by 5 cards, and for the first sort the student answered either "Yes" or "No" to each item. (e.g., "Will Mr. Jones say that, "The room or ward is quiet?") After this, the student was given a second set of cards on which the items were worded as incomplete sentences (e.g., "To have the room or ward quiet"). The student was instructed to place each card in one of four sections of a box, the sections being labeled: Very Important, Important, Less Important, or Not Important. The interviewer asked the student to evaluate the items in the following manner: "How important would it be to Mr. Jones to have the room or ward quiet?" and the student sorted the items as she thought Mr. Jones would sort them. Having responded to both sorts as she thought the patient would respond *that day*, the student then answered other questions regarding the selection of the patient, her liking for him, and the number of opportunities which she had had to know the patient.

The interview with the patient was usually completed the same day as was that with the student. The patient responded as he felt "today" and he too sorted the items for "Yes" or "No" and then for importance. At no time did the same interviewer talk with the student and with the patient whom she had selected.

Use of Questionnaires

"*If I Were A Patient*": Before leaving each school, the students who had participated in the study met as a group and checked the items in questionnaire form. But this time each student was asked to imagine *herself* as a patient and to decide how important each item would be to *her*.

"Most Patients": Following the use of the card sort with students and patients, the instructors responded to the items in questionnaire form. They were asked to estimate the importance of each item to "most" medical and surgical patients in their hospital.

At a still later date head nurses and supervisors on medical and surgical wards in five of the hospitals completed the questionnaires as they thought "most" of the patients on their wards would respond.

ANALYSIS AND STATISTICAL TREATMENT OF DATA

Scoring of Responses to Card Sort

Each student's answers were compared with *those of the patient whom she knew best*. Hence, instead of one set of correct answers for the "Importance" sort and another set of correct answers for the "Yes-No" sort, the only right answers for each student were the responses of her own patient.

The "Yes-No" or "Satisfaction" Score: The score for this sort is a percentage score based on the total number of times the student anticipated correctly the "Yes-No" answers of the patient.

The "Importance" Score: In scoring the Importance sort, the student was given a score of 3 if her response matched that of the patient; a score of 2 if her response did not match that of the patient but did recognize the general feeling expressed; and a 0 if her response and that of the patient fell in opposite halves of the scale. To illustrate:

Very Important	Important	Less Important	Not Important	Score
Patient & Student				3
Student	Patient			2
	Student	Patient		0

The total possible number of points for the Importance sort was 102.

Comparison of Student With Faculty and Head Nurse Response

In order to compare the actual responses of the patients with: (1) the combined responses of the students, (2) the faculty answers for "most" patients, and (3) the responses of supervisory personnel for "most" patients, an arbitrary value was assigned to each of the four Importance categories. (Very Important—4, Important—3, Less Important—2, and Not Important—1). It was then possible to compute the mean value assigned to each item by each group of respondents.

Statistical Treatment of Data

Comparisons made within and among schools required various statistical techniques. Analysis of variance was employed to test the homogeneity of groups both within and among schools with respect to the "Importance" scores earned by the students. Chi square tests were used in instances involving two or more frequency distributions. All chi square values were calculated using the *number* rather than the *percentage* of students agreeing with their patients.

Tests of significance were employed when the null hypothesis was assumed. Differences that might occur as a result of sampling variation alone either 5 per cent or less of the time or 1 per cent or less of the time are noted in the tables to which they apply. Differences are referred to as "significant" if they satisfy the 1 per cent level of confidence.

FINDINGS

Although all the data have not yet been analyzed, it is possible to present many of the findings and to suggest answers to some of the questions raised at the beginning of the study.

Findings Relating to Recognition of Importance

1. There were significant differences among the mean scores earned by students in the various schools (Table 1).

TABLE 1
IMPORTANCE SCORES* EARNED BY 386 STUDENTS
IN SEVEN SCHOOLS OF NURSING†

School	Number of Students	Mean	Range	SD
All Schools‡	386	61.9	40-87	8.9
A	34	60.3	41-83	10.1
B	59	61.5	43-78	7.8
C	89	59.9	44-78	7.5
D ₁	14	64.1	45-87	10.0
D ₂	22	65.1	49-82	9.9
D ₃	16	64.4	40-77	9.3
E	20	69.5	55-81	7.8
F	57	63.9	45-80	7.6
G	75	59.7	42-81	9.3

*Scores derived by comparing student's responses for her patient with the patient's responses on the "Importance" sort.

†Using analysis of variance, it is necessary to reject the hypothesis that there are no significant differences among the mean scores of students in the various programs. (The calculated value of F is 4.56 whereas the corresponding value at 1 per cent point in the F Table is 2.51.)

‡Students enrolled in school D are assigned to three hospitals (D₁, D₂, D₃) for nursing experience.

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2. Differences in the "Importance" scores between first year and senior students were not significant (Table 2).

TABLE 2
IMPORTANCE SCORES* EARNED BY
FIRST YEAR AND SENIOR STUDENTS

First Year Students				
	N	Mean	Range	SD
All Schools†	282	62.1	40-87	9.2
A	34	60.3	41-83	10.2
B	41	62.6	48-78	7.5
C	59	59.7	44-78	7.8
D	52	64.6	40-87	9.7
1	(14)	(64.1)	(45-87)	10.0
2	(22)	(65.1)	(49-82)	9.9
3	(16)	(64.4)	(40-77)	9.3
E	20	69.5	55-81	7.8
F	30	63.4	48-78	7.8
G	46	59.2	42-81	9.8
Senior Students				
	N	Mean	Range	SD
4 schools	104	61.2	43-80	8.1
B	18	59.2	43-71	7.1
C	30	60.3	48-74	7.0
F	27	64.4	45-80	7.9
G	29	60.3	43-80	9.8

*Scores derived by matching student's responses with patient's responses on the Importance sort

†Students enrolled in school D are assigned to three hospitals (D₁, D₂, D₃) for nursing experience.

3. Students' estimates of the importance of items to the patients whom they knew best were closer to the importance assigned by their patients than were the estimates of either the instructors or head nurse supervisors.

This, more than any other piece of evidence, tends to validate the card sort methodology used in this study. If students had been responding or guessing in terms of what "most" patients want, their estimates should have been no closer to the responses of the patients than were the estimates of the faculty and supervisory personnel.

Data collected in five of the nine hospitals from 152 first-year students, 48 seniors, 24 instructors, and 58 head nurses and super-

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visors showed that in each institution the students' estimates were closest to the responses of the patient, the head nurse-supervisor responses came next, and the instructors' estimates were farthest from those of the patients. Only in the area of physical care did the head nurses' estimates come closer to the patients' than did those of the students. In this area, the estimates of the head nurses in three hospitals were the closest. In all situations the head nurse-supervisor and instructor groups assigned a higher value to physical care items than did the patients, whereas the students in the five schools attributed less importance to these items than did the patients.

4. When students did not agree with their patients, they were more apt to *overestimate* the importance which patients would ascribe to the area of "environment" (Table 3).

TABLE 3
STUDENT ESTIMATE OF
IMPORTANCE OF ENVIRONMENT TO PATIENT

Environment				
School*	No.	Per cent Agreeing	Per cent Under-estimating	Per cent Over-estimating
All Schools	386	38.7	25.7	35.6
A	34	35.3	27.3	37.4
B	59	38.7	22.0	39.3
C	89	35.1	20.7	44.2
D ₁	14	41.4	23.6	35.0
—D ₂ †	22	44.1	32.3	23.6
D ₃	16	36.9	18.1	45.0
E	20	42.5	22.0	35.5
F	57	38.9	30.7	30.4
—G†	75	35.7	34.7	29.6

*Students enrolled in school D are assigned to hospitals D₁, D₂, D₃, for nursing experience.

†Chi square value is significant at the .01 level for this distribution of response.

Students in hospitals D₂ and G reversed this distribution of response by underestimating the importance of a larger proportion of these items.

Environment: The items sampling the area of environment relate primarily to the social environment of the patients. Most frequently overestimated in importance were communication items such as the following: "To have the nurses take enough time to talk with me," or "To have the nurses talk about things which interest me." Both during the interviews and in talks a year later, the students stated

that these items were important to all patients and that these were the things which had been stressed throughout their nursing training. Some students seemed almost indignant to learn that the patients felt that these items were less important than they did. A few of their comments are relevant:

"These all refer to talking. We think we'd be bored just lying in bed, but maybe if we were ill we wouldn't want it so much."

"It's stressed so much just 'to talk', and we feel we're neglecting the patients if we're not able to."

"We've had so much emphasis on the psychological and emotional care all the way through, but the words we use aren't the ones you used in these questions."

In considering the general response pattern, the following questions might be raised: Do students confuse 'just talking' with conversation with a purpose? Are these the responses of young teenagers who find it difficult to conceive of people not wanting to talk? Do students feel less confident of their skill in this area, yet having been taught that communication is important, do they then overestimate the importance of these items to their patients?

Physical Care or Self Activity: Students tended to *underestimate* the importance of these items when they disagreed with the patient (exception D₃). (See Table 4.)

TABLE 4
STUDENT ESTIMATE OF IMPORTANCE OF
PHYSICAL CARE OR SELF ACTIVITY TO PATIENT

School*	No.	Physical Care or Self Activity		
		Per cent Agreeing	Per cent Under-estimating	Per cent Over-estimating
All Schools	386	43.7	32.1	24.2
A	34	41.2	31.8	27.0
B	59	42.2	31.8	26.0
C	89	40.9	30.7	28.4
D ₁	14	45.4	33.8	20.8
D ₂	22	50.4	33.1	16.5
-D ₃ †	16	44.3	21.0	34.7
E	20	50.5	27.7	21.8
F	57	41.0	37.7	21.3
G	75	37.8	39.5	22.7

*Students enrolled in school D are assigned to three hospitals (D₁, D₂, D₃) for nursing experience.

†Chi square value is significant at the .01 level for this distribution of response.

Their comments indicated that they expected the patients to appreci-

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ate both the 'busyness' of the nurse and the nurse's judgment of what was important. Illustrations of this are:

"Most patients are up a lot and don't need luxury care, and the patients who are real sick don't even want to turn for a backrub."

"We think in terms of whether the patient needs immediate attention and who can best wait. The patient can't judge this and maybe thinks it more important—to have the nurse come promptly—than it really is."

"Even though nurses' ideas have changed about nursing, maybe the public's haven't."

"The patients understand we're busy and they say, 'Don't bother to give me a backrub,' so we think it's not important to them. I can't understand why they still say it is important."

One wonders if students feel guilty because they cannot give the quality or type of care they would like to give, and hence need to underestimate the importance of these items to patients. Or again, is this the difference between the viewpoints of healthy and of sick people? Since these are the activities that students can perform, one might also question how the student regards them. Do they perhaps seem more menial, and consequently hold less prestige to the student than do the items previously mentioned?

Information and Assurance: When students were not in agreement with their patients, they *underestimated* a larger percentage of responses; this is true of all but the students in schools D₃ and E, who *overestimated* a greater proportion of responses when they did not agree with the patients (Table 5).

TABLE 5
STUDENT ESTIMATE OF IMPORTANCE TO PATIENT OF
INFORMATION AND "ASSURANCE"

Information and "Assurance"				
School*	No.	Per cent Agreeing	Per cent Under-estimating	Per cent Over-estimating
All Schools	386	40.6	32.1	27.3
A	34	38.9	30.8	30.3
B	59	39.1	30.5	30.4
C	89	37.6	30.2	32.2
D ₁	14	38.5	31.3	30.2
D ₂	22	43.4	40.2	16.4
-D ₃ †	16	44.7	23.6	31.7
-E†	20	43.5	24.6	31.9
F	57	40.6	39.1	20.3
G	75	39.0	38.2	22.8

*Students enrolled in school D are assigned to three hospitals, (D₁, D₂ D₃) for nursing experience.

†Chi square value is significant at the .01 level for this distribution of response.

The items in this area most often underestimated by the student were those relating to the patient's feeling of confidence or security. Some of these items elicit the patient's feeling of dependence on persons or events outside of the hospital (his family, friends, religion, financial status); other items reflect the security contributed by hospital personnel (the knowledge that the nurse observes patients when they are sleeping, or moves very ill patients out of the ward.)

The students' remarks revealed that they had less knowledge of patients' attitudes about these items and that they were reluctant to discuss such matters with patients. Some of their own uncertainty is apparent in their comments:

"In class this was stressed a lot, and the minister and priest told us how important this was to patients. Frankly, I was very disappointed when I didn't see any of it emphasized in the hospital."

"Patients don't usually talk to us about religion. I think they associate a minister with death, and if the minister comes they think they're going to die."

"If I were a patient, I'd be a little 'shook up' if a minister came in."

"It's so very controversial we just don't talk about religion."

"Perhaps some of our older patients might have financial difficulties, but most patients here are on the county and we feel it's not so important to them."

"They could be afraid to show us they're afraid to be in the same room with a dying patient."

"Some patients might know it was selfish to want to have a very sick patient moved, so they won't say this to us."

"We aren't on the wards when they have visitors, but if it were very important to see their family they'd say so."

"They know it would interfere with the nurses' schedule to have someone stay after visiting hours, so, of course, it isn't important to them."

Could it also be that the above are "nuisance" items to the nurse, and that since they interrupt her work they are not considered important to patients?

5. Except for School G, the differences between freshmen and senior responses *were not significant* for any of the three areas. In School G however, the freshmen students underestimated a significantly greater proportion of patients' responses in all areas than did the senior students. (Chi square values were significant at the .01 level for each of these areas.)

6. The extent to which the students' responses for their patients reflected the attitudes of the students rather than those of their patients differed greatly from one school to another.

The coefficient of correlation was used to show the extent of agreement between the "Importance" scores (based on the student's agreement with her patient) and the "Student for Self" scores (based on agreement between the student's response for her patient and her responses to the questionnaire, "If I Were A Patient"). The correlation between scores earned by students in all schools was $r = .366$, whereas the range was from $r = .167$ to $r = .647$.

7. The percentage of agreement between student and patient does not remain constant for each of the four response categories. Students agreed with 42 per cent of the patient responses when patients said that the items were Very Important; 45 per cent of the Important responses; 35 per cent of the Less Important; and 20 per cent of the items classified by the patients as Not Important.

8. For the present, no attempt will be made to discuss the relationship between "Importance" scores and the variables of high school rank, rank in clinical practice, and opportunities to know patients. The analyses of these data are incomplete.

Findings Relating to Recognition of Patient Satisfaction as Measured by the "Yes-No" Sort

It is possible to state quite conclusively that the "Yes-No" sort does not reflect the patient's true feeling about the existing situation or his satisfaction with care. Evidences of this are:

1. Patients would often say that the nurses did not do the thing indicated by a "Yes" response, yet would insist on placing the card with the "Yes" cards. (e.g.: The nurses take enough time to talk with me—"No, not really, but I know how busy they are, so I guess it's 'Yes'.")

The students in turn would sometimes make comments similar to those of the patients, and contrary to the actual situation. (e.g.: "No, the nurses don't come promptly, but I think he'll say they do. He likes the nurses and knows how busy we are.")

2. The proportion and distribution of "Yes" responses seemed to support the feeling that the sort is biased in a direction favorable to hospital personnel. Patients sorted 84 per cent of the items as "Yes."

When the nurse or doctor was the subject of the sentence, less than 15 per cent of the patient responses were "No." Twelve of the thirty-four items were worded in this way. When the patient or other people were the subject of the sentence, the percentage of "No" responses increased markedly. The "No" responses ranged from 16 to 62 per cent for 10 of the 18 items stated in this manner.

3. There was no significant relationship between the "Importance" and "Yes-No" scores earned by the students. The mean correlation for students in all schools was $r = .051$, and the range was from $r = .032$ to $r = .312$.

Findings Relating to Patients

These findings are based on information collected in 1958, and though comparable information is not available for the patients interviewed in 1957, there were no obvious differences between the two groups.

Of the 153 patients interviewed in 1958, 85 were women and 68 were men. Half were medical patients and half were surgical. Four-fifths of the patients were more than 40 years old, and two-thirds had had previous hospital admissions.

The interviewers' ratings indicated that the patients were willing to participate and that it was relatively easy to talk with them, although a few patients appeared to be fatigued by the interview. Most patients seemed interested and volunteered some information but asked few questions and demonstrated a somewhat compliant attitude. The selection of the patients by the students in itself may have eliminated patients who would have been less willing to take part in the study. Perhaps of even more significance is the evidence that it is possible to carry on this type of interviewing within the general hospital setting.

The students most frequently described their patients as pleasant, friendly, cooperative, and compliant. They also pictured the patients as helpful and undemanding.

Thirty-six of the students said that they liked their patient "Some," while 167 indicated that they liked their patient "Very Much." It is somewhat surprising to note that the mean "Importance" score earned by students who liked their patients "Some" is considerably higher than the mean score earned by those who liked their patients "Very Much."

Students did not select patients who were unpleasant or demanding or who presented nursing problems. A few students stated that they had read the patient's chart, while many said that they had not done so.

GENERAL COMMENTS

Although the present study has been primarily concerned with the development of a technique to obtain comparable information from students and patients, the implications of certain findings should

stimulate the thinking of both faculty and hospital personnel. The following questions might warrant further consideration:

1. What experiences might enable the senior student to develop further her skills of communication and observation?

2. How can faculty members become better acquainted with the patients who are assigned to students for care? How can faculty and supervisory personnel determine which students need additional assistance in gathering relevant information about patients?

3. How can students be helped in translating the concepts learned from teachers and texts into meaningful activities with patients?

4. If these are the patients whom students know best, how much information do they have about patients whom they know less well?

If future studies were contemplated, the refinement of the card sort or questionnaires would make it feasible to include other groups of nursing personnel and to control the selection of patients. Certainly it would be both fascinating and useful to know which group of hospital workers is best able to recognize the attitudinal differences among patients.

In pursuing this research, the author found helpful the recent works on nurse-patient relationships.¹⁻⁵

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Staff Meeting Report

Treatment of Renal Failure:

A Review of Nine and One-Half Years' Experience of
the Artificial Kidney Team at the University of Minnesota*†

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The management of patients with acute renal failure is frequently a trying ordeal requiring patience, hard work, and constant supervision by the medical and nursing staff. The objective is to keep the patient alive and in the best possible condition until adequate renal function returns. This presupposes a potentially reversible renal lesion. The prognosis is worse if acute renal failure is associated with infection, surgical intervention, the stress of an accompanying illness, tissue necrosis, or obesity.

Bywaters¹ described the clinical and pathologic features of crush syndrome, while Lucké² reported that similar ischemic lesions of tubules could be produced by several etiological factors and suggested the term "lower nephron nephrosis." Oliver³ showed that the proximal convoluted tubules are involved as often as the distal ones.

The present management of patients with acute renal failure is based on the work of Kolff,⁴ who introduced the first workable artificial kidney and recently, the disposable coil kidney. It also reflects the thinking of Merrill,⁵ who advocated dialysis as an adjunct rather than a measure of last resort; Strauss,⁶ who emphasized limiting fluid requirements; and Borst,⁷ who stressed the need for dietary restrictions.

Acute renal insufficiency may be divided into three stages: (1) the anuric phase, which may last for days or weeks, during which 75 per cent of deaths occur. (Arbitrarily anuria is said to exist if the

*This report was given at the Staff Meeting of the University of Minnesota Hospitals on March 20, 1959.

†This study was supported in part by a grant from the Variety Club of the Northwest.

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urinary output is less than 100 ml.); (2) the diuretic phase, which also may last for days or weeks, during which 25 per cent of deaths occur; and (3) the recovery phase, lasting for weeks or months, after which renal function may fail to return to normal.

ANURIC PHASE

In making a diagnosis of acute renal failure, the possibility of obstruction of the urinary tract should be ruled out by catheterizing the bladder and renal pelvis. A unilateral retrograde pyelogram, using 3 to 4 ml. of contrast agent, may help to determine the cause of anuria. During the first 24 to 36 hours the role of dehydration can be assessed by intravenous administration of 1000 ml. of 5 per cent dextrose during a period of two and a half hours, with hourly determinations of the urine volume. If the urine volume fails to increase following infusion, the diagnosis of renal failure is justified.

Because of the susceptibility of these patients to infection, prophylactic isolation is indicated. There is no quantitative defect of gamma globulin, but a qualitative defect may exist. The well-known fact that uremic individuals tolerate homografts of skin longer than normal people is an indication of this reduced capacity to form antibodies.

Despite the increased susceptibility to infection, prophylactic use of antibiotics is contraindicated, for the advantages may be outweighed by the side effects and the changes in the bacterial flora. Those excreted by the kidneys accumulate. In the presence of active infection, however, antibiotics are clearly indicated.

The patient should be weighed daily. A weight loss of three-fourths to one and one-half pounds per day, depending upon the size of the individual, is unavoidable and harmless. The absence of weight loss means overhydration, which represents the most frequent error in management. The insensible loss of an afebrile patient weighing 70 kilograms is about 800 to 900 ml., depending upon the surface area. Each rise of one degree Fahrenheit above 99.6° increases the water loss by approximately 7 per cent. Some of the 800 cubic millimeters insensibly lost will be replaced through several endogenous sources of water: Approximately 130 ml. of preformed water is available through catabolism of cells. Furthermore, oxidation of each gram of protein and carbohydrate yields approximately one-half milliliter of water, and one gram of fat yields about one milliliter. Therefore, the available endogenous water may be 420 ml. or more, and only 400 ml. or less of exogenous water will be needed to replace the insensible

loss. Sometimes even this amount proves excessive. The total daily fluid intake of a patient with acute renal failure ordinarily should not exceed the losses due to gastric suction, diarrhea, emesis, and urine, plus 400 milliliters (insensible loss). If profuse sweating occurs, or if the patient is febrile, the fluid intake should be slightly higher. If, however, edema is present when the patient is first examined, limitation of fluids—even complete restriction for a day or two—is essential.

Such rigid reduction of fluid intake limits the caloric intake and its protein sparing effect; the blood urea nitrogen and serum potassium will rise rapidly because of the dehydration and increased catabolism. Orally administered fluids are preferred because of reduced danger of pulmonary edema and because of the higher potential caloric content per unit volume. Observation for edema of the sternum, flanks, inner aspects of the thighs, as well as of the sacral area and lower extremities, is mandatory once a day or oftener. Occasionally roentgenograms of the chest may reveal an unsuspected pulmonary edema; for some obscure reason these patients may be overhydrated even though clinical evidence of edema is lacking. Intravenous infusion at a rapid rate, or, at times, even at the usual rate, may produce acute pulmonary edema and cardiac decompensation, necessitating phlebotomy. The reasons for restricting fluids should be explained to the patient, when possible, and to his relatives and the nursing staff. If anorexia, nausea, or weakness precludes oral administration of fluids, intravenous feeding or gavage is necessary.

The caloric intake should suffice to retard catabolism and the rise of urea nitrogen, serum potassium, and other waste products. Unfortunately, this is not always possible, because the patient when first seen may be so overhydrated that the fluid intake must be restricted. Protein is contraindicated because of its potassium and nitrogen content. Fats are often poorly tolerated by the anorexic uremic patient. They may be given as Borst soup, butterballs (frozen and small enough to be swallowed), and as Lipomul.[®] In our experience the last agent, which provides four calories per milliliter, has been better tolerated than other sources of fat. We have had no experience with the intravenously administered fat preparations.

Carbohydrate is given as 80 per cent dextrose solution orally, but occasionally the concentration must be reduced to 50 per cent because of its unpalatability or because diarrhea has supervened. Popsicles of 50 per cent glucose flavored with extracts not containing potassium constitute an excellent source of carbohydrates. Orally administered solutions of carbohydrate can be given in greater concentration and,

in addition, yield more calories per unit volume than do intravenous solutions. Occasionally the fat preparations and 80 per cent glucose solutions will have to be discontinued because of diarrhea and vomiting. In such cases, a 20 to 50 per cent glucose or invert sugar solution may be administered through a polyethylene tube in one of the major veins. The danger of bacteremia from use of an intravenous catheter demands meticulous aseptic technique in its placement and maintenance; bacitracin ointment should be applied daily about the tubing.

If injury has been the primary factor in causing anuria, attention should be directed toward correcting any anatomical disturbances: Crushed limbs should be amputated, devitalized tissue debrided, and abscesses drained in order to remove large pools of catabolites.

A number of problems occur with renal failure. One of the most serious is *potassium intoxication*, as evidenced by electrocardiographic changes, and *hyperkalemia*. The rise of serum potassium may be slowed by insuring adequate caloric intake and by removing large pools of catabolites. Metabolic acidosis may accelerate the shift of potassium from the cells to the extracellular fluid. Hypocalcemia, hyponatremia, and acidosis tend to aggravate the toxic effect of hyperkalemia.⁸ Generalized weakness and decreased reflex activity are present. The electrocardiogram reveals peaking of the T waves, prolongation of the QRS complex and the PR interval, flattening of the P waves, increased depth of the S wave with slurring and depression of the ST segment, and terminally a sine wave suggesting ventricular flutter, which usually progresses rapidly to a straight line. Digitalis and calcium may mask these electrocardiographic changes.

Most of the ways of treating hyperkalemia are merely temporary expedients. An intravenously administered solution of 20 to 50 per cent glucose and regular insulin (1 unit for each 3 gm. glucose) deposits glycogen together with potassium and phosphates. Unless this solution is given continuously over a long period of time, it may produce alternating hyperglycemia and hypoglycemia, with glycolysis and release of potassium.⁹ A very slow intravenous drip of 100 ml. of 10 per cent calcium gluconate solution is most effective, but in the digitalized patient it predisposes to digitalis intoxication. Since sodium is antagonistic to potassium, 40 to 200 milliequivalents of sodium as molar sodium lactate, or 5 per cent sodium bicarbonate may be utilized. (The resulting danger of tetany will be discussed later.)

Carboxylic acid exchange resins are of the sodium, hydrogen, or ammonium types: (1) The sodium resin in which sodium is exchanged

for potassium ion, seems preferable in cases of renal shutdown. (2) The hydrogen resin exchanges hydrogen ion preferentially for calcium, then magnesium, potassium, sodium, and ammonia, and frequently requires supplemental calcium. It is contraindicated in moderate and severe acidosis. (3) The ammonium resin releases ammonia and hydrogen ion, and hence increases the degree of acidosis; in the presence of hepatic insufficiency, it may result in ammonium intoxication. Therefore, it should not be used in renal failure due to diethylene chloride, carbon tetrachloride, or other hepatotoxic substances. The effect of these resins continues, with hypernatremia, increase in acidosis, or further removal of potassium, even after administration is discontinued. Hypokalemia in one instance became so severe as to require administration of potassium chloride. Therefore, when the serum sodium rises to 145 mEq/liter or the carbon dioxide falls to 17 mEq/liter, resins should be discontinued. The oral route is most effective, 15 gm. being dissolved in 90 ml. of 80 per cent sugar solution and given three to four times daily. Enemata containing 20 gm. in 175 ml. water three times a day can also be used. It is essential to include the fluids used in dissolving these resins in the total fluid intake. Obstipation and fecal impaction are common.

Digitalization, followed by dialysis with rapid reduction of potassium can result in digitalis intoxication (we have had one such experience). Potassium can be eliminated by catharsis with 25 to 50 per cent sodium or magnesium sulfate. Gastric and intestinal lavage have proved to be of some value in removing potassium. Although we have found intermittent peritoneal lavage more effective than continuous lavage, this method sometimes will not remove all perfusion fluid, to the detriment of the overhydrated patient.¹⁰ Exchange transfusions may be dangerous if the acute renal failure has been produced by incompatible blood; however, we have had no experience with this technique. The artificial kidney is most effective for removing excess potassium; indications for use of this apparatus will be discussed later.

Anemia may be due to hemolysis, toxic depression of bone marrow or to the "X-factor of Merrill." Transfusions are not necessary unless the hemoglobin drops below 6 gm. or the anemia is poorly tolerated by the patient. The use of packed red blood cells decreases the incidence of acute pulmonary edema.

Metabolic acidosis, with compensatory loss of the carbonic acid as carbon dioxide through the lungs, is caused by retention of fixed anions such as phosphates, sulfates, and organic acids. This condition need not be corrected unless the carbon dioxide combining power

drops to 15 mEq/liter, or unless Kussmaul respirations appear. Before correcting the acidosis it is advisable to give calcium gluconate. Most of the anuric uremic patients have a decrease in total calcium, but because the percentage of ionizable calcium increases with acidosis, tetany usually does not occur. As acidosis is corrected, however, the ionizable fraction of calcium decreases. Either one molar or one-sixth molar lactate solution containing 50 to 60 ml. of 10 per cent calcium gluconate, or 50 to 60 ml. of 10 per cent calcium gluconate followed by (not mixed with) 5 per cent sodium bicarbonate intravenously may be used. Overcorrection of the acidosis with sodium will, of course, produce pulmonary edema, convulsions, and hypertension.

Hypocalcemia can be corrected by the slow administration of 100 ml. of a 10 per cent calcium gluconate solution intravenously or by any of the various oral preparations of calcium. The correction of the hypocalcemia, however, may be only temporary. Since the calcium ion is antagonistic to potassium, a decrease in its concentration is in effect the same as a rise of serum potassium.

Anorexia may be controlled by 10 to 25 mg. chlorpromazine three times daily. However, one must be cognizant of its side effects, hypotension and hepatitis.

Hypertension is not a frequent complication, but severe forms do occur in renal artery thromboses and chronic glomerulonephritis. Ansolysen,[®] ½ to 2 mg. intramuscularly, has proved very effective in treating this complication during dialysis.

Convulsions, a very troublesome complication, occurs less frequently if patients are dehydrated. Short-acting barbiturates, such as sodium amytal, may be given intravenously in doses of 1½ to 3 grains; longer acting barbiturates are contraindicated since they are excreted by the kidneys. Calcium gluconate has proved to be of some value. Dilantin[®] 100 mg. orally or intravenously every three to four hours has not proved very effective in our hands, whereas paraldehyde 1 ml. intravenously (or 10 ml. in a liter of 10 per cent dextrose) is effective, especially in those individuals in a continuous state of convulsion. Since magnesium intoxication has been described in this clinical syndrome, the justification for using magnesium sulfate is questionable.

In the prophylaxis of *infection*, streptomycin is contraindicated because it is excreted by the kidney; hence in anuria accumulation results in damage to the eighth nerve. Cortisone has proved effective in several cases of subacute glomerulonephritis, but this hormone increases catabolism with a resultant rise in blood urea nitrogen and serum potassium; it may also cause hypertension and retention of fluid.

The *bleeding tendencies* are very poorly understood. They may be due to a platelet defect, increased capillary fragility, abnormal prothrombin consumption, elevated bleeding time, or some ill-defined coagulation defect.¹¹ Transfusions of fresh blood may be necessary, and on occasion dialysis may be of value.

Hypochloremia need not be corrected unless the serum chloride falls below 75 mEq/liter; its correction increases acidosis. *Hyperphosphatemia* contributes to the acidosis; Basaljel® (or Maalox®) one ounce four times daily prevents phosphorus from being absorbed from the intestinal tract. *Hyponatremia* is usually due to an intracellular sodium shift, overhydration, an extracellular water shift, or to some unknown factor. Correction to normal serum sodium levels may result in hypertension, convulsions, pulmonary edema, or tetany.

Acute heart failure is treated with short-acting digitalis preparations. Since they are excreted in the urine, only the digitalizing dose should be given. In our experience, the anabolic effect of testosterone has been of questionable value.

Shock is treated by the usual supportive measures; on occasion sodium bicarbonate or similar alkalinizing solutions may eliminate the need for vasopressors, since endogenous adrenalin is more effective in the presence of a relative shift in blood pH towards alkalosis.

Acute renal failure with symptoms of coma and decreased reflex irritability associated with a minimal increase of serum potassium and elevated serum magnesium level has been reported.¹² The increase in serum magnesium usually parallels the increase in the serum potassium. Thus it is difficult to attribute the electrocardiographic and clinical findings to magnesium intoxication alone because of the associated abnormalities of other electrolytes. Conduction defects, such as atrioventricular and intraventricular heart block, have been attributed to elevated serum magnesium. Dialysis and, theoretically, hydrogen phase carboxylic acid exchange resins are effective in reducing serum magnesium.

Because of increased susceptibility to infection, the use of urethral and intravenous catheters should be avoided when possible. Sedation and analgesics should be used cautiously because they may depress respiration in the lethargic patient who is prone to pneumonia and atelectasis. Percutaneous needle biopsy of the kidneys may have diagnostic and prognostic value, but the danger of hemorrhage must be considered. This procedure probably should not be utilized unless acute renal failure lasts for more than two weeks. The usual nursing procedures (oral hygiene, frequent turning, and so forth) are observed.

DIURETIC PHASE

This phase may last for days or weeks. The blood urea nitrogen continues to rise despite the onset of diuresis because of the accumulation of urea throughout the body. Fluid replacement should be permitted to lag 6 to 12 hours behind urinary volume unless signs of dehydration appear. Exceeding urinary output may result in profuse diuresis with marked loss of electrolytes, thus making replacement difficult. A pronounced diuresis may represent overhydration, a delayed response to overloading with water, or the osmotic effect of the excess urea and solutes excreted in the urine. Occasionally during this period the oral intake must be supplemented with intravenous fluids and electrolytes. Early in the diuresis there is a decrease in the extracellular fluid volume and an increase in the intracellular fluid, with a decrease of total body water out of proportion to the loss of extracellular water.¹³

The excretion of 500 ml. of urine per day is usually sufficient to prevent any further accumulation of potassium in the body. One of our patients required 30 gm. of potassium chloride intravenously each day. During this phase of acute renal failure, sodium leaves and potassium re-enters the cells. A determination of 24-hour urinary excretion of Na^+ , K^+ , and Cl^- ions is of value in anticipating daily loss of these ions.

Dietetic restrictions may be removed during diuresis, although the early ingestion of protein may prolong azotemia and diuresis. Prophylactic isolation is discontinued. During this phase osmolality of the blood and urine are equal.

RECOVERY PHASE

Normal renal function may not return for weeks or even months, depending upon the cause of the acute renal failure. Tubular concentration is one of the last functions to return.¹⁴ Renal blood flow and inulin clearance are decreased, presumably because of diminished glomerular infiltration with diffusion of inulin back through the tubules. Tubular necrosis, with rupture of the basement membrane followed by abnormal epithelial regeneration, may obliterate entire nephrons, thus explaining the subnormal clearance values observed during recovery. Ability to concentrate the urine usually returns within 6 to 12 months, but clearance values may be permanently impaired in many patients; this is consistent with permanent renal damage of a mild degree. After several weeks or months, pyuria and microscopic

hematuria tend to disappear, but granular, hyaline, and cellular casts may persist for a considerable period. If the basement membrane of the renal tubule is intact, regeneration occurs.

Orally administered iron is of value in the treatment of anemia associated with reticulocytosis. Edema due to hypoproteinemia or increased vascular permeability ordinarily disappears after several weeks or months. Stiffness of the joints without any demonstrable roentgenographic findings may persist for several weeks.

Indications for dialysis on the artificial kidney are variable. In our studies, patients with acute renal failure following traumatic crush injuries or operations required more frequent dialysis than those with anuria due to other causes. The blood urea nitrogen is a crude index of the degree of uremia but does not provide any information concerning the accumulation of phenols, quinidines, potassium, and other toxic substances. Laboratory determinations which are helpful in assessing the necessity for dialysis include: a serum potassium greater than 7 mEq/liter which cannot be reduced by conservative measures; a blood urea nitrogen of more than 200 milligram per cent, and a carbon dioxide combining power of less than 14 mEq/liter which cannot be corrected. But clinical deterioration of the patient can occur in the absence of such laboratory evidence, and thus clinical signs can have even greater value in determining the need for dialysis. These clinical findings are: an increase in the pulse and respiratory rate with a decrease in the blood pressure, deep tendon reflex depression, coma, convulsions, and evidence of overhydration. Since clinical deterioration can only be observed by repeated examinations, it is advisable that patients with acute renal failure be transferred to an artificial kidney center after several days of acute renal failure, or if the use of the artificial kidney seems at all likely.

UNIVERSITY OF MINNESOTA HOSPITALS SERIES

During the past nine and one-half years, 90 patients with acute renal failure, nine with chronic renal insufficiency, and one with barbiturate intoxication were treated by the artificial kidney team.

In the series of acute renal failure, 32 patients are alive and 58 are dead. Nineteen of 31 treated conservatively and 13 of 59 who had dialyses are alive. Of the 58 who died, seven were in a terminal state on admission and died within several hours; two died during the dialysis; and 27 died of other diseases.

The patients are classified as follows: Group 1, postpartum; Group 2, fibrinoid diseases of the kidney; Group 3, toxins; Group 4,

postoperative and traumatic; and Group 5, unknown causes. In Group 1, four of seven patients treated conservatively and four of seven treated by dialysis are alive. Group 2 consists of 16 patients who had periarteritis nodosa or glomerulonephritis; five of eight treated conservatively and one of eight treated by dialysis are living. In Group 3 acute renal failure was produced by freon gas, quinine, ethylene glycol, carbon tetrachloride, and incompatible blood transfusions. All four patients treated conservatively and three of six treated by dialysis are alive. The fourth and largest group in our series contained those individuals who had severe crush injuries or unusually extensive operations; five of ten treated conservatively and five of 35 treated by dialysis survived. In Group 5, one of two patients treated conservatively survived, and three who had dialysis died.

Carboxylic acid exchange resins were given to 28 patients—the sodium phase to 22 of them, hydrogen or ammonium to three, and a combination of resins to the remaining three. In 20 of these patients the serum potassium was successfully reduced and the electrocardiographic changes showed improvement. The eight failures were attributed to insufficient amounts of resins used or to the large pools of catabolites.

A most disturbing complication was the bacteremia or septicemia which occurred 12 times in our series. In Group 1 an *Aerobacter aerogenes* septicemia and in Group 2 a coagulase *Staphylococcus* bacteremia occurred. In Group 3 there were three coagulase positive staphylococcus and one *Pseudomonas aeruginosa* bacteremias. Two *Proteus*, two coagulase positive *Staphylococcus*, one *Escherichia coli*, and one *Pseudomonas aeruginosa* bacteremia occurred in Group 4.

We feel obligated to mention the errors in the management of these patients. Nine should have had an additional dialysis. Amputation or debridement of damaged tissues in order to remove large pools of catabolites was not done soon enough in five patients, and they subsequently died. Rapid infusion of intravenous fluids or excessive blood transfusions resulted in acute cardiac decompensation in three patients, one of whom died. Of 28 patients who were overhydrated when first seen, 20 died. Three of 24 tracheotomies were complicated by postoperative bleeding, and one patient subsequently died of asphyxia.

Fifty-nine patients had a total of 87 dialyses with either the Brigham modification of the Kolff kidney or more recently with Trav-enol's disposable Kolff kidney. One had five dialyses over a period

of 55 days, only to succumb to far advanced glomerulonephritis. One patient who sustained an electric shock had two dialyses during a 30-day period of anuria and oliguria and recovered. The youngest and the oldest survivors were 12 and 76 years of age respectively; both were in Group 4.

Our results during 1957 and 1958 have been most encouraging. Twelve of 15 patients treated conservatively and five of 16 who had dialyses are alive. In Group 1, two of three patients treated conservatively and one of two treated by dialysis are living. Of the six patients in Group 2, only the four who were treated conservatively are alive. In Group 3, two of three patients treated conservatively survived. In Group 4, three of four patients treated conservatively and four of 11 who had dialyses survived. One patient in Group 5 had several dialyses and died after 21 days of anuria; the other patient recovered after conservative treatment. One patient with barbiturate intoxication recovered after dialysis.

Nine individuals with chronic renal insufficiency treated with dialysis died. This treatment was indicated either as an attempt to improve the general physical condition prior to operation or to prolong comfortable life for a reasonable period of time. One child had three such dialyses as well as peritoneal lavage, only to die of intercurrent infection three months later.

SUMMARY

During the past nine and one-half years, 32 of 90 patients treated for acute renal failure survived. Twenty-seven of the 58 deaths were attributed to extrarenal causes. Seven patients were *in extremis* when first examined. The most common error in management is overhydration, which was present in 28 of our patients when first examined. Fifty-nine patients had 87 dialyses.

Indications for dialysis are: A blood urea nitrogen greater than 200 milligrams per cent, a serum potassium greater than 7 mEq/liter, a carbon dioxide combining power of less than 14 mEq/liter, electrocardiographic signs of hyperkalemia, and clinical deterioration as evidenced by a rise in the pulse and respirations and a drop in the blood pressure, depression of the deep tendon reflexes, coma, and convulsions. We regard dialysis as an adjunct rather than a measure of last resort in the treatment of patients with acute renal failure.

THE MEDICAL BULLETIN

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Editorial

The Scientific Method

The scientific method is the means by which the learned man categorizes and catalogues existing knowledge and by which he adds information to that which is known. This orderly process, in which information is accumulated, ideas formed, and finally from which theorems are proved, is vital for the advancement of our total body of knowledge.

It is necessary, however, that we evaluate all of these accumulated data as scientists rather than as ordinary men. The word science is derived ultimately from the word *scindere*, which means "to cleave," and as scientists we should be able to distinguish, separate, or cleave that which is true from that which is false. The scientific method yields knowledge deductively, and to increase our overall knowledge and to provide information which scientists elsewhere can use with assurance, we must of necessity avoid that type of false reasoning which argues *post hoc ergo propter hoc*.

All too often workers in scientific fields reach conclusions as to what their work will reveal before the work is commenced; their results are predetermined, and parts of the experiment are rejected if the data do not fit into the plan organized before the experiment is begun. There is no need to conduct such an experiment—it cannot even be called an experiment since it only tries to find data which will fit the logic-tight compartments of the brain of the investigator. This manner of conducting research cannot be called "scientific," although we must agree that it is a "method." It should hardly be necessary to point out the inherent shoddiness of such specious reasoning; it is misleading to other scientists who will read the published data from such a false experiment, but even worse is the fact that the man performing the experiment is either deluding himself or is frankly dishonest. The true scientist performs the experiment and reports results as they occur whether or not they fit the results as he had hoped they might occur.

A. S.

Medical School Activities

THOMAS O. SWALLEN, University of Minnesota Medical School Senior, received the first Mediclinics Scholarship — a \$1,000 award — at the University Medical School's Medical Sciences Day program on the campus on Saturday, April 25, 1959.

DR. STANLEY B. CROSBIE, Chief of the Medical Service, Grand Junction, Colorado, Veterans Hospital, has been appointed director of professional services for the Minneapolis Veterans Hospital. DR. HENRY L. VOGL, Manager of the Hospital, said Crosbie will be in charge of medical, surgical, psychiatry, neurology and laboratory services. Crosbie will also co-ordinate offerings of the University of Minnesota College of Medical Sciences with the hospital's resident physician and dental training program.

DR. JEROME T. SYVERTON, Professor and Head, Department of Bacteriology and Immunology, has been appointed to the Advisory Panel on Viruses and Cancer of the National Cancer Council and its Research Review Board for the period of February 1, 1959 to December 31, 1962. Dr. Syverton also was appointed Associate Member of the Commission on Enteric Infections of the Armed Forces Epidemiological Board for a two-year term.

DR. JAMES C. MELBY, Instructor, Department of Medicine presented a paper on Assessment of Adrenocorticotropic Activity with Bacterial Pyrogen in Hypopituitary States at the National Meeting of the American Federation for Clinical Research on May 3, 1959.

IN MEMORIAM

DR. CHARLES NORTON HENSEL, '08
St. Paul, Minnesota

DR. JOHN J. MCGROARTY, '07
Easton, Minnesota

Faculty Publications

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WEEKLY CONFERENCES OF GENERAL INTEREST

Physicians Welcome

Monday,	9:00 to 10:50 A.M.	OBSTETRICS AND GYNECOLOGY Old Nursery, Station 57 University Hospitals
	12:30 to 1:30 P.M.	PHYSIOLOGY- PHYSIOLOGICAL CHEMISTRY 214 Millard Hall
	4:00 to 6:00 P.M.	ANESTHESIOLOGY Classroom 100 Mayo Memorial
Tuesday,	12:30 to 1:20 P.M.	PATHOLOGY 104 Jackson Hall
Thursday,	11:30 A.M. to 12:30 P.M.	TUMOR Todd Amphitheater University Hospitals
Friday,	7:45 to 9:00 A.M.	PEDIATRICS McQuarrie Pediatric Library, 1450 Mayo Memorial
	8:00 to 10:00 A.M.	NEUROLOGY Station 50, University Hospitals
	9:00 to 10:00 A.M.	MEDICINE Todd Amphitheater University Hospitals
	1:30 to 2.30 P.M.	DERMATOLOGY Eustis Amphitheater University Hospitals
Saturday,	7:45 to 9:00 A.M.	ORTHOPEDICS Powell Hall Amphitheater
	9:15 to 11:30 A.M.	SURGERY Todd Amphitheater University Hospitals

For detailed information concerning all conferences, seminars, and ward rounds at University Hospitals, Ancker Hospital, Minneapolis General Hospitals, and the Minneapolis Veterans Administration Hospital, write to the Editor of the BULLETIN, 1342 Mayo Memorial, University of Minnesota, Minneapolis 14, Minnesota.