

CSF

SURGERY STUDY--
PATIENT TRANSPORTATION

368 - 67

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FROM: Community Systems Foundation

SUBJECT: Surgery Study - Patient Transportation

The first analysis geared toward the actual reduction of delays in the O.R. involved a detailed study of the patient transportation system.

The following report details some of the current problems which contribute to the late arrival of patients, and recommends changes which should reduce this problem in the future.

Yours truly,



Richard Friedland
Project Engineer

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BACKGROUND

The initial surgical report of August 30, 1966 indicated that in almost 35% of those cases in which the incision was delayed, the patient was late arriving in the O.R. The report also revealed the amount of time needed from the point when the patient was moved into the room until the incision could be made. These are summarized as follows:

<u>Case Type</u>	<u>Required Time Prior to Incision</u>
Laminectomy and Craniotomy	25 min.
Regular or "Other"	20 min.
D & C and Cysto	15 min.
ENT	10 min.

It was believed that a more detailed analysis of the orderly staffing and patient transportation procedures would aid in the elimination of patient delay. Such a study was started in April 1967.

SYNOPSIS OF FINDINGS

The reasons or causes of late patient arrival (average of 15.5 minutes/delayed case) fall into three basic categories:

- (a) not sending for the patient on time (4.4 minutes).
- (b) lag time once the patient is sent for and the orderly leaves (6.6 minutes).
- (c) delays while the orderly is retrieving the patient (4.5 min.)

While a fifteen minute delay by itself is not too serious, it must be remembered that these delays become cumulative as the day progresses. Thus, three consecutive cases, each delayed 15.5 minutes, means the third case starts more than 45 minutes late.

At the present, the average overall patient retrieval process (request made to patient enters room) averages 22 minutes. With better communications, this time can most probably be reduced to 15 minutes (29%).

Orderly staffing is difficult because of high turnover and absenteeism. No system can work smoothly with 50% of the staff absent or positions unfilled.

Elevator waiting time, which only affects 50% of the cases, average 1.4 minutes per elevator trip. Thus, it is not necessary to reserve an elevator for transportation of surgical patients.

The timing of the process for returning patients to the floors is not as critical as that of the retrieval process. Fewer delays are encountered during the return, and the only problem appears to be the unavailability of the recovery room orderly between 2:00 and 3:00 p.m.

SUMMARY OF RECOMMENDATIONS

1. Steps must be taken by the Personnel Department to determine the specific causes of orderly absenteeism and turnover. These causes must be eliminated before the implementation of any other recommendations is feasible.
2. The overall communications system relating to surgical cases needs improvement. Further study is needed in this area.
3. A minimum of four (4) persons (orderlies and/or technicians) is needed to transport the first (8:00 a.m.) group to the O.R. After 8:00 a.m., three persons should be able to perform the transportation function.
4. The slips requesting patient retrieval should be posted by 7:10 a.m.
5. The responsibility of sending for a patient should be transferred from the O.R. supervisor to the O.R. clerk.
6. Enforceable policies should be established to deal with surgeons who are late in arriving at the O.R. suite.
7. When delays occur which will affect the starting time of later cases, the O.R. clerk should call all of the surgeons to follow in that room and inform them of their adjusted boarded time and the specific reasons for the change.
8. A more specifically defined system is needed to indicate when a patient should be sent for. A chart and a magnetic bulletin board arrangement indicating at what time during a case the clerk should make the decision as to when to send for a patient are provided as possible solutions.

RETRIEVAL OF PATIENTS - PRESENT SYSTEM

A. 8:00 A.M. Cases

Between 7:00 and 7:30 a.m. "Request for Patient" slips, indicating the patient to be brought to the O.R., are posted on a bulletin board located in the "sterile" area of the suite. The orderlies and those technicians assigned to retrieving this first group of patients take a slip from the board, retrieve the patient, and leave for another. During this second study, 37% of the patients for the 8:00 cases were late arriving in the O.R. (average of 19 minutes late), indicating that the situation has not changed from that of a year ago.

B. Second and Succeeding Cases

Once surgery has begun, the general procedure is for the circulating nurses to keep the O.R. supervisor informed of the progress of each case. The supervisor then makes the decision as to when to send for the next patients and posts the aforementioned slips accordingly. In those instances when a surgeon follows one case with another, he will often instruct the circulating nurse to send for his next patient. Should the O.R. supervisor be busy with other duties, or an orderly be unavailable, or the surgeon be incorrect in his estimate of how long it takes to retrieve a patient from the floor, the next patient will be late arriving in the O.R. In 35% of the cases with delayed incision, the patient was an average of 15.5 minutes late.

The general analysis of patient transportation, as related to the O.R., revealed the following facts regarding the current retrieval of patients:

1. Excluding the first hour of the day, there is an average elapsed time of 6.6 minutes from the time the patient request slip is posted until the orderly takes the slip to go for the patient. This average lag increases to 8.3 minutes when the first hour is included (see appendix A, page 17).
2. Including delays encountered after the orderly leaves for the patient, the average total patient retrieval time is 11.9 minutes (see graph, appendix A, page 18). Included is elevator waiting time, which averages 1.4 minutes per elevator trip and involves 50% of the cases. There are insignificant variances by hour of day, indicating there is no need to reserve an elevator for the O.R.
3. From the time the patient enters the O.R. suite until his chart work is complete averages 3.5 minutes.

Thus, from the time a patient is requested until he may be wheeled into an operating room currently averages 22 minutes.

CAUSES OF LATE PATIENT ARRIVAL

The reasons a patient is late arriving in the O.R. can fall into three major categories:

- A. Not sending for the patient at the proper time.
- B. A lag from the time a patient is requested until the orderly acknowledges the request.
- C. Delays affecting the normal retrieval process once the orderly has left for the patient.

It was originally believed that this last cause was the most significant reason for the delay of surgery by the patient. For that reason, it was analyzed in depth, but was actually found to be less important than the other two and more difficult to correct. For this reason, the section on Patient Retrieval - Current In Process Delays appears near the end of the report.

O.R. ORDERLY STAFFING DURING STUDY

The O.R. budget calls for a day shift staffing of four orderlies. On weekdays during the study, the staffing of the 7:00 a.m.-3:30 p.m. group ranged from one to three orderlies, and there was an additional orderly available from 9:30 a.m. to 6:00 p.m., except for two days. This variance was caused by both absenteeism and the lack of qualified applicants to fill open orderly position(s).

Before any changes are made in the procedure for retrieving patients, the reasons for absenteeism and high turnover should be investigated. This investigation should include independent, confidential interviews by the Personnel Department with the supervisors and orderlies, as well as an in-depth analysis of current labor supply problems. Steps must be taken to minimize the causes of general absenteeism and turnover in the orderly group.

PATIENT RETRIEVAL - PROPOSED SYSTEM

By sending for the patient on time, and reducing some of the delays after the request for a patient is made, the majority of delayed cases due to late patient arrival can be eliminated. It is not practical to expect that all delays in the patient retrieval process can be eliminated, but the effects of these in-process delays can be negated if the extra time is accounted for when requesting a patient. It is, however, believed that the total patient retrieval process can be reduced from the current 22 minutes to 15 minutes with better communications (reduction of 29%):

A. Lag time between posting of the request and the orderly leaving for the patient	3 minutes
B. Retrieval time	10 minutes
C. Completion of chart work	<u>2 minutes</u>
	15 minutes

8:00 A.M. Cases

Based upon the standards set forth in the original study, the following is the order of retrieval and times the 8:00 cases should be in the various operating rooms:

A. Craniotomies and Laminectomies	- 7:35 a.m.
B. Other or Regular Cases	- 7:40 a.m.
C. Cysto and D & C	- 7:45 a.m.
D. ENT	- 7:50 a.m.

The slips for the first cases should be posted by 7:10 a.m. in the above order, and the patients sent for regardless of whether or not the surgeon is in the hospital. The only exception should be if a surgeon (or his office) calls the O.R. to inform the personnel that he will be late. An administrative decision must be made as to what should be done if the surgeon is late in arriving. More will be said on this in the next section.

In order to have all of the first patients in the O.R. on schedule, a minimum of four persons is required for their retrieval. The following schedule would ensure proper timing and eliminate the need for staggering the starting times of the first cases (letters A-D denote case type):

<u>Person 1</u>	<u>Person 2</u>	<u>Person 3</u>	<u>Person 4</u>
7:10-7:25 (A)	7:10-7:25 (B)	7:10-7:25 (B)	7:10-7:25 (B)
7:26-7:40 (B)	7:26-7:40 (B)	7:26-7:40 (C)	7:26-7:40 (D)

The above mix of cases was that found to be most common in analyzing past schedules. Two cases of Type A were not found for 8:00 a.m. Should such a situation occur, the above person #2 should retrieve the second patient of Type A at 7:10 a.m.

Cases Scheduled After 8:00 A.M.

The determination of a procedure for retrieving subsequent patients is more complex than the procedure for the initial cases. To ensure more proper timing, it might better be handled by the O.R. clerk rather than the O.R. supervisor. This would require:

1. Better communications between the individual rooms and the O.R. desk as to current case status.
2. Moving the bulletin board from its current position inside the O.R. suite to an area by the O.R. office.

3. An additional method of notifying the orderlies as to when to go for a patient, such as a flashing light.

The following matrix should be used as an aid for sending for subsequent cases:

TYPE OF CASES IN PROGRESS

<u>TYPE OF NEXT CASE IN ROOM</u>	<u>LAMINECTOMY OR CRAINIOTOMY</u>	<u>OTHER OR REGULAR</u>	<u>D & C OR CYSTO</u>	<u>E.N.T.</u>
Laminectomy or Crainiotomy	40 min. prior to boarded time or end of case	40 min. prior to boarded time or end of case	40 min. prior to boarded time or end of case	40 min. prior to boarded time or end of case
Other or Regular	35 min. prior to boarded time or end of case	35 min. prior to boarded time or end of case	35 min. prior to boarded time or end of case	35 min. prior to boarded time or end of case
D & C or Cysto	30 min. prior to boarded time or 10 min. prior to end of case	30 min. prior to boarded time or 10 min. prior to end of case	30 min. prior to boarded time or 10 min. prior to end of case	30 min. prior to boarded time or 10 min. prior to end of case
E.N.T.	25 min. prior to boarded time or 10 min. prior to end of case	25 min. prior to boarded time or 10 min. prior to end of case	25 min. prior to boarded time or 10 min. prior to end of case	25 min. prior to boarded time or 10 min. prior to end of case

As stated above, communications play an important role in smooth, punctual patient flow. The O.R. clerk should know the nearness to completion of cases in progress, especially as they approach the first time mentioned. Boarded times will have to be adjusted based upon the time of completion of the preceding cases. For example, assume that the first case in Room #1 overran the estimated time by 30 minutes. The second and succeeding cases would have their boarded times delayed by 30 minutes. Further assume that the second case in Room #1 falls in the "regular" case category to be followed by a D & C. The O.R. clerk should check the status of the "regular" case at 30 minutes prior to the adjusted boarded time for the D & C. If the case has less than 10 minutes to completion, she should send for

the D & C patient. If not, the circulating nurse should notify the clerk when the case is 10 minutes from completion, at which point the D & C patient should be sent for and the nursing unit notified that the orderly is on his way.

Rather than the matrix, a magnetic schedule board similar to that shown in Appendix B, page 19, might be considered. The board itself is made of thin metal with a line for each room, separated by wood runners. The blocks are of masonite or thin wood covered with a plastic that can be written on with a wax pencil. Magnets are attached to the back of the block. There are two arrows, one at each end of the block. The one on the right indicates the boarded or adjusted boarded time, while the one on the left indicates the time to send for the patient. Four length blocks would be needed for the four different groupings of case type (Laminectomy and Crainiotomy, Regular, D & C and Cysto, E.N.T.), with the arrow on the left at the proper distance from the boarded time for the requesting of the patient. Adjustments in boarded time could simply be made by moving the blocks and immediate indication of the following surgeons, etc., is available.

The writing of case information on the blocks could be done in the morning and this board could replace the current schedule board. It should, however, be located in or by the O.R. office.

A decision must be made for those instances when the surgeon is not in the hospital. The surgeon need not be in the O.R. until approximately 10 minutes prior to the scheduled start of his scrub, which is usually 5 or 10 minutes after the patient should be sent for. This decision should be written and strictly adhered to so that there is no room for any arbitrary decisions by the O.R. clerk; thus, leaving her blameless for any penalties imposed upon the surgeon. One possible

solution is to allow a short grace period of 5 or 10 minutes for the surgeon to arrive at the hospital, after which he would be rescheduled on a "time available" basis. A second possibility would be to retrieve the patient on schedule and return him to his room if the surgeon does not arrive on schedule.

A schedule board similar to the one in the sterile area of the O.R. suite or the magnetic board mentioned above should be posted by the office and constantly be changed to reflect adjustments in boarded times based upon delays and underestimates of case times. Whenever there is an adjustment of subsequent boarded times, a call should be made to the following surgeons or their offices telling them of the change and the specific reasons for it. For example, tell Drs. B, C and D that their cases can be expected to start 30 minutes later because Dr. A. was late in arriving for his case. If names are used and explicit reasons given, peer pressure might aid in eliminating some of the other causes of delay in the O.R.

The entire communications setup in the O.R. is of great importance and should be given further study.

PATIENT RETRIEVAL - CURRENT IN-PROCESS DELAYS

There are six major factors which inhibit a smooth patient retrieval from the time a "slip" is posted until the patient arrives in the O.R.

- A. Stretcher not available in O.R.
- B. Chaperone not available on floor.
- C. Pre-op medication not given.
- D. Chart not ready.
- E. Patient not ready for other than pre-op medication.
- F. Other.

An analysis of these delays was performed for all nursing units. The tables below summarize the results of the analysis.

TABLE I
ANALYSIS OF DELAY FACTORS--ALL NURSING UNITS

<u>FACTOR</u>	<u>FREQUENCY OF OCCURRENCE</u>	<u>% OF ALL CASES OBSERVED*</u>	<u>TOTAL DELAY MINUTES</u>	<u>MINUTES PER OCCURRENCE</u>
Stretcher	19	8.8	36	1.9
Chaperone	10	4.7	15	1.5
Pre-op Med.	5	2.3	17	3.4
Chart	78	36.3	247	3.2
Patient	38	17.9	208	5.5
Other	<u>50</u>	23.2	<u>150</u>	3.0
	200		672	

*215 individual cases were observed. Of these, 142 cases encountered one or more (total of 200) delays while the orderly was proceeding with the retrieval process. Average time loss per delayed retrieval was 4.5 minutes.

As is indicated in Table I, the majority of the delays occur within the "Chart Not Ready", "Patient Not Ready", and "Other" groups. Table II reveals that the nursing stations on 3-N, 3-S and 6-N are generally the most frequent offenders.

While not revealed in the two tables, the following statistics should also be noted:

A. In ten instances, the patient was either being treated by a doctor or awaiting treatment by a doctor prior to surgery (average delay - 7.2 min.).

B. In three instances, the orderly had to wait with the patient at the Cysto Room until a doctor or nurse arrived (average delay - 6.3 min.).

C. In sixteen instances, delays were caused by the orderly himself, generally going to the wrong room or area (average delay - 2.7 min.). This could mostly be attributed to the inexperience of some of the orderlies during the study.

D. In twelve instances, the orderly had to rearrange furniture which was impeding movement of the stretcher (average delay - 3.3 min.).

While it is difficult to ascertain exactly why all of the delays occurred, many of them, particularly the "Chart Not Ready" delays, could be eliminated with better communication between the O.R. and the nursing unit. A greater effort on the part of the nursing staff is also needed, particularly on 3-N, 3-S and 6-N.

The aforementioned delays were also analyzed to determine if there was any significant variance by hour of the day. The results of this analysis were negative.

Since the average lag time from the posting of the slip until the orderly takes the slip is 6.6 minutes, and the average additional time per delayed trip is 4.5 minutes, it can then be concluded that there is an average delay in requesting the patient of almost 5 minutes per delayed case.

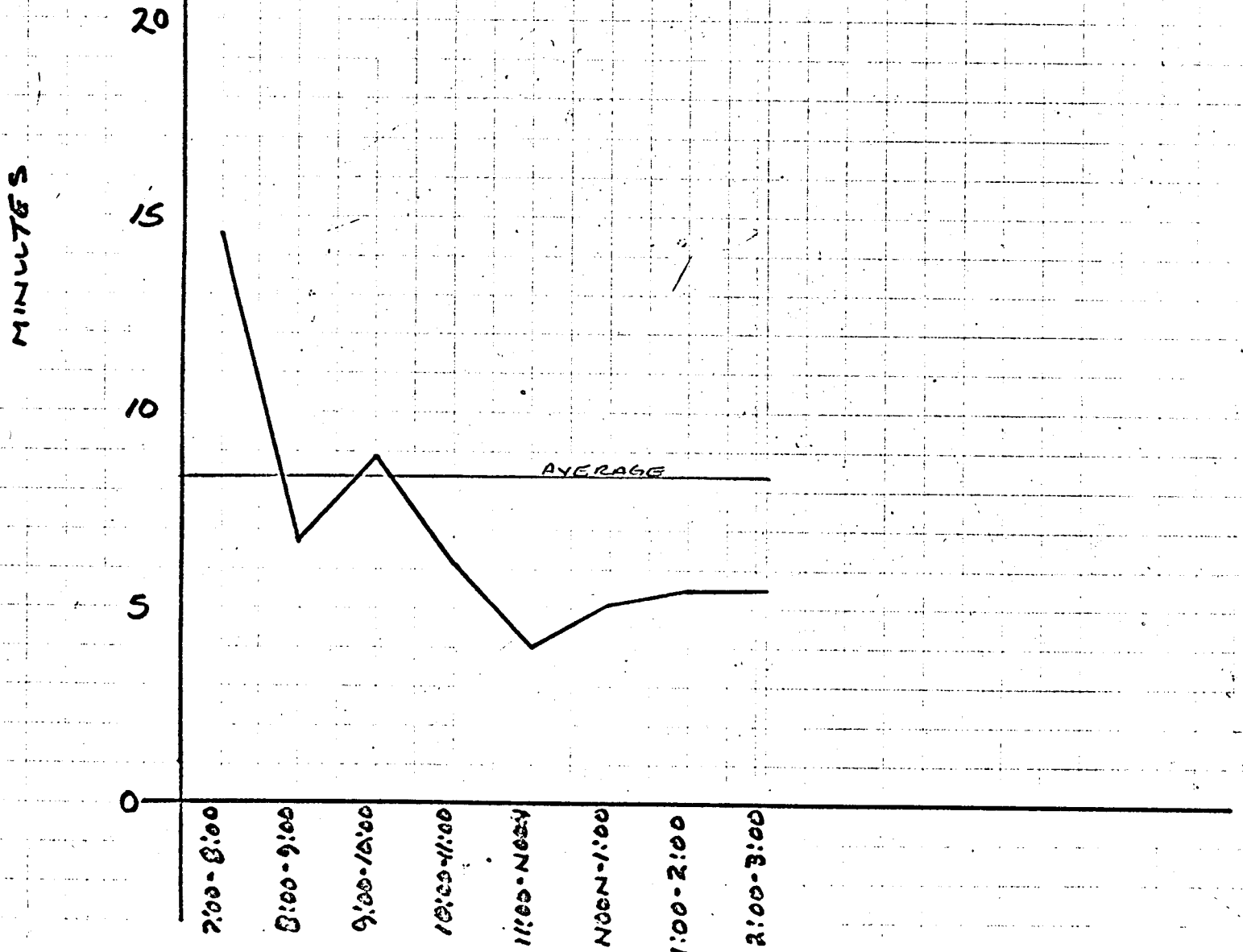
Patient Delivery from the Recovery Room

The timing of patient delivery to the floor from the Recovery Room is not as critical as that of his initial retrieval. Overall the average patient delivery time is just under 10.5 minutes.

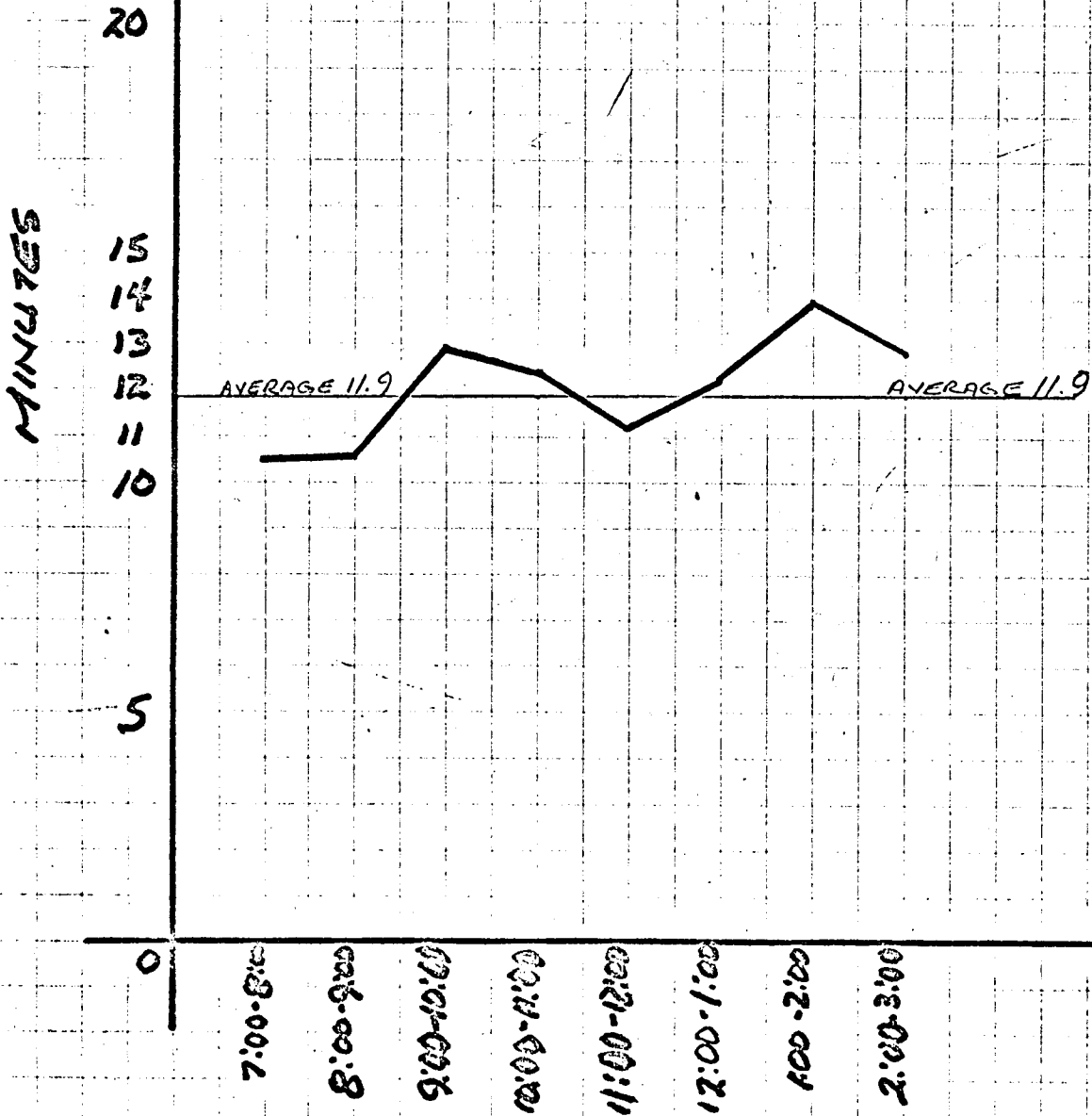
During the study, very few delays associated with patient delivery were observed. However, there were problems between 2:00 and 3:00 p.m. obtaining orderlies to bring the patients back to their rooms. The overall time lapse from the time an orderly was called for in the Recovery Room and the time he arrived averaged 6.3 minutes. The average time for the hour from 2:00 to 3:00 p.m. was 12.6 minutes versus 2.5 minutes for the rest of the day. Part of this can be explained by the generally heavier workload at this time for the Recovery Room orderly. (The Recovery Room is staffed by two orderlies with overlapping shifts - one from 9:30 a.m. to 6:00 p.m., and the other from 3:30 p.m. to 11:00 p.m.)

APPENDIX A

SURGERY
REQUEST FOR PATIENT
RETRIEVAL (SLIP POSTED -
SLIP TAKEN BY ORDERLY)
BY HOUR OF DAY
(IN MINUTES)



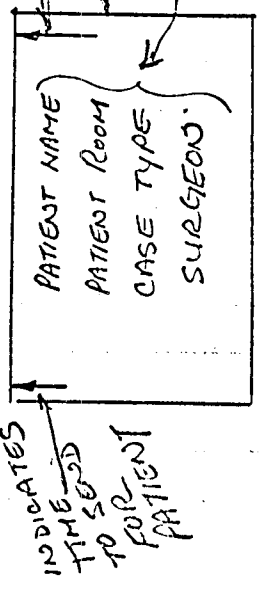
SURGERY
AVERAGE PATIENT RETRIEVAL
TIME BY HOUR OF DAY
(IN MINUTES)



APPENDIX B

	7:30	8:30	9:30	10:30	11:30	12:30	1:30	2:30	3:30	4:30
1										
2										
3										
4										
5										
6										
7										
CX570										

↑ PT NAME
Room #
CASE
SURGS



THIN STEEL BACKINGS

INDICATES BOARDED TIME
 PATIENT BLOCK WITH MAGNET ON BACK
 INFORMATION WRITTEN IN WAX PENCIL
 RUNNER APPENDIX B