

# Evaluation of Emergency Room Triage Performed by Nurses

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*An evaluation of the nurse triage system at a large municipal hospital's emergency room is presented.*

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## *Introduction*

Many publications over the past few years have documented the fact that metropolitan hospital emergency rooms are faced with the problem of treating the full spectrum of health care needs, ranging from routine primary care to dramatic medical emergencies. Studies suggest that one-third to one-half of the patients who use emergency rooms can be classified as having non-urgent conditions.<sup>1-11</sup> In a study by Weinerman, 25 per cent of the interviewed subsample considered the emergency room as their usual source of medical care.<sup>2</sup> Clearly, the increasing use of emergency rooms for primary care reflects a community need for medical facilities.

The emergency room, however, or any one facility cannot effectively respond to this full range of needs. Rendering primary care in an emergency room setting is more costly in terms of equipment and personnel—and many problems are better handled in a more relaxed atmosphere. Also, an overload of non-emergency cases may result in increased and unacceptable delays in rendering prompt care to true emergencies.

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The system of emergency room triage, which has been in use for some time in busy urban hospitals, is a possible solution for dealing with the problem. Weinerman describes the triage function: "To provide immediate brief medical evaluation of all incoming patients, determination of the general nature of the problem, the trend of service needed and the appropriate referral."

Traditionally, the triage decision is made by a physician,<sup>2, 12</sup> but nurses have also done emergency room triage.<sup>13-17</sup>

At the Bronx Municipal Hospital Center (BMHC) over 50,000 patients are triaged each year by specially trained triage nurse professionals. A study was undertaken in 1972 and 1973 to evaluate the functioning of the nurse triage system at the Bronx Municipal Hospital Center.

## *Training of the Triage Nurse*

The emergency room triage nurses at the Bronx Municipal Hospital Center were trained only after a minimum of 1 year of general experience in emergency nursing with a minimum of 3 months of emergency room experience at our institution.

The formal training program consisted of a series of 32 lectures covering the common presenting chief complaints as determined by a preliminary survey.

These talks centered about the differential diagnosis of the presenting complaint concentrating on prognostically serious entities. For each entity there was a brief review of the normal physiology and pathophysiology. In addition, pertinent physical findings were discussed and demon-

strated. Finally, each diagnostic decision was weighed according to a system of triage notations as follows:

#### **Definition of Triage Classification**

- I A patient with a life-threatening emergent problem
  - IA Must be seen by the emergency room physician
  - IB Can safely wait up to 2 hr for emergency treatment
- II A patient with an urgent problem, although not life-threatening, but has the potential for becoming so, if not treated expeditiously
- IIA Must be seen on the same day of presentation always—not necessarily in the emergency room
- IIB Must be seen within 5 days in the appropriate outpatient department area
- III Patients with chronic, minor, or psychosomatic complaints should receive a routine clinic referral as available

During the didactic portion of their training, the nurses gained practical experience by spending time each day observing the triage process as performed by senior emergency room personnel. The final 6 weeks of their training consisted of graduated independence in making triage decisions under the supervision of senior emergency room personnel.

The entire training program was carried out on a half-time basis over a period of 3 months.

#### *Methodology of Evaluation Study*

At the Bronx Municipal Hospital Center, the triage nurse, seated in the entrance to the emergency room, routinely evaluates each patient who wishes to be seen and completes a "triage slip," specifying the patient's name, complaint, and the facility to which he must go for treatment. During the study period, January, 1973, a copy of each triage slip and additional information identifying the patient were collected for the equivalent of 2 weeks. The design appropriately reflected the days of the week and various shifts. Data were collected only during hours when the screening clinic was open (8 a.m. to 9 p.m. daily); during the night hours significant triage options were not available.

A sample of 500 was chosen from the 2003 triage slips, using a table of random numbers. The sample was stratified by triage disposition, i.e., the treatment facility that the triage nurse had decided upon, as follows: 100 patients sent to the emergency room; 250 patients sent to the general medical walk-in clinic; 100 patients sent to a particular specialty outpatient clinic; and 50 patients sent to facilities outside BMHC (Board of Health or the municipal hospital in the patient's home district).

A pre-study had been conducted to determine the relative percentages of the groups. The study sample was stratified in these proportions so that there would be an adequate representation for each group. When appropriate, the figures presented here will be weighted to reflect the actual population that was triaged.

Of the 450 patients seen in BMHC 360 (75 per cent) of the charts were located. Telephone follow-up suggests that 90 per cent of the patients whose charts were not located did

go to some facility at BMHC for treatment. None of these patients were admitted to BMHC within the succeeding 3 months. Of the 50 patients sent out of the hospital, 27 were successfully contacted by telephone or mail.

The procedure for evaluating the chart was as follows: There were four physicians who participated in the evaluation. All were working in hospitals other than BMHC. Prior to the evaluation, the physicians were given information about the functioning and the facilities available for treatment.

Each chart was reviewed by two physicians from the panel of four. The physicians were required to independently fill out a questionnaire using the information from the patient's chart and the triage slip which contained information on the presenting symptom and triage decision. The charts were in various degrees of completeness, accuracy, and neatness, as is the case in a busy hospital. The key question on the evaluation form was: "Knowing all the facts, where do you think the patient should have been seen?"

If the two physicians did not agree on the answer to the key question, a third independent evaluation was done by one of the remaining two physicians, to break the tie.

The physicians were asked to make their decision concerning the appropriate disposition based on outcome variables, such as final diagnosis, rather than on process variables, such as diagnostic techniques used.

Other information about the final disposition of the patient after treatment and about triage nurse-patient communication was also collected.

Auxiliary studies on presenting symptoms and nurses' attitudes were also performed.

#### *Results*

##### **Distribution of Triage Decisions**

It was found that 43 per cent of the patients who came to the emergency room were triaged to be treated in the emergency room. Forty-six per cent of the patients were sent to the screening clinic, which is a general medical walk-in clinic, and 8 per cent were sent to outpatient specialty clinics. The data were collected during hours when the screening clinic was open. This compares favorably with findings from other studies, previously mentioned, where 50 to 60 per cent of the cases seen in the emergency room were reported non-urgent.

A pre-study had been conducted 4 months earlier and similar results were obtained at that time, as shown in Table 1.

##### **Evaluation Results**

The following definitions were employed. A correct triage decision was one in which two evaluating physicians agreed that the patient would receive the most appropriate care at the facility to which the nurse had sent the patient. A mistriage occurred when two evaluating physicians agreed that the patient's condition was an emergency and should have been treated in the emergency room as opposed to the screening clinic or two evaluating physicians agreed

that the patient had to be seen by a doctor on the same day as opposed to being sent home with an appointment for the next day. An uptriage was a case in which two evaluating physicians agreed that a patient seen in the emergency room had a condition which was not an emergency and that the patient could have received good care in the screening clinic.

The evaluation revealed that 80 per cent of the patients were correctly triaged, 17 per cent were uptriaged, and 3 per cent were mistriaged. Table 2 displays these data according to triage disposition.

While 3 per cent mistriage may seem a small error rate, it could represent a considerable actual number of patients. On the other hand, it should be noted that one-half of the group of mistriaged patients consists of those sent to the screening clinic while two evaluating physicians agreed they were emergency cases and the other half consists of patients who were told to go to the screening clinic on the following day, while the evaluators agreed that the patient should have been seen on the same day.

Clearly this group included a spectrum from simple inconvenience for the patient to a possibly important error.

For example, one patient complaining of a sore throat and cold was given an appointment to the screening clinic for the next day. The evaluators believed the patient should have been seen the same day, despite the overcrowding in the screening clinic. When he returned the following day he was seen, treated, and released. On the other hand, there were two cases where patients were sent to the screening clinic and then admitted to the hospital. The potential danger lies in the fact that the patients may not have gone to the screening clinic, although the triage nurse had directed them to do so. In these two cases, however, the extra delay involved in going to the screening clinic was the prime danger caused by the triage mistake. Upon examining the final dispositions of these 12 mistriaged patients after treatment, we found that five were treated and released, three were referred to specialty outpatient clinics, two were admitted to the hospital, and two pregnant women, who had been triaged to be treated in the delivery room, were finally admitted (Table 3). The evaluators believed that these women should have been seen in the emergency room, although they were seen immediately in the delivery room area.

**TABLE 1—Distribution of Triage Dispositions January, 1973, and September, 1972**

Date	Facilities to Which Patients Were Triaged									
	Emergency room		Screening clinic		Outpatient dept. specialty clinic		Outside facility		Total*	
	Row %	No.	Row %	No.	Row %	No.	Row %	No.	Row %	No.
January, 1973	43	858	46	928	8	163	3	54	100	2003
September, 1972	44	445	41	415	11	109	4	45	100	1014

\* In January, 1973, the study period was equivalent to 2 weeks and in September, 1972, the study period was 1 week. Data were collected daily, during the hours that the screening clinic was open, 8 a.m. to 9 p.m.

**TABLE 2—Triage Disposition by Physicians' Evaluation of the Triage Decision**

Evaluation	Facilities to Which Patients Were Triaged								
	Emergency room		Screening clinic		Outpatient dept. specialty clinic		Total		Weighted Col %
	Col %	No.	Col %	No.	Col %	No.	Col %	No.	
Correct triage	64	58	92	184	96	68	86	310	80
Uptriage	36	32	3	5	1	1	11	38	17
Mistriage	—	—	5	10	3	2	3	12	3
Total	100	90	100	199	100	71	100	360	100
Weights*	45		47		8				

\* These weights reflect the distribution of triage dispositions in the actual population, among patients seen in BMHC. For example, 45 per cent of patients presenting to the emergency room were triaged to be treated in the emergency room (after certain adjustments relating to available options), but in our stratified sample  $90/360 = 25$  per cent were patients seen in the emergency room. Thus, we need to give more weight to the triage to the emergency room than is reflected in our stratified sample. Each percentage then was multiplied by its appropriate weight and summed. Thus, the 80 per cent of correct triage decisions was obtained as follows:  $(64 \times 0.45) + (92 \times 0.47) + (96 \times 0.08) = 80$ .

### Reasons for Triage Error

Various possible reasons for making triage errors were explored. Do some symptoms present greater difficulty in making the triage decision? As shown in Table 4, one-third of the mistriaged patients complained of abdominal pain or gastrointestinal problems. This is statistically significant ( $p < 0.05$ ). Also, this finding confirms the results of an auxiliary study in which the triage nurses were asked to rate various presenting symptoms on how difficult they were to triage. Extra caution and additional training will help to ameliorate the problem of triage abdominal pain. The two patients who were mistriaged to be treated in the screening clinic and then admitted to the hospital had complained of epigastric pain.

Is there a communication gap between nurse and patient? This is really a 2-fold question. First, do patients present the same complaints to the nurse and to the doctor; and second, does the nurse listen to what the patient has to say without prejudging?

The evaluators had the treating physician's description of the patient's problem on the chart and the nurse's description on the triage slip. We hypothesized that there

would be a higher rate of disagreement between the physician's and the nurse's description of the patient's symptoms among mistriaged patients. As shown in Table 5, this is not necessarily the case: among the correctly or uptriaged patients, the descriptions agreed 84 per cent of the time and disagreed 5 per cent of the time, and there was insufficient information 11 per cent of the time, while among mistriaged patients the percentages were 75 per cent, 0 per cent, and 25 per cent, respectively. Although the number of mistriaged patients is small, the figures do not suggest that poor nurse-patient communication is a critical cause for triage error.

### Proper Utilization of Emergency Room Facilities

Even with the triage system in operation, 36 per cent of the patients seen in the emergency room were considered to have been non-emergent cases regarding final diagnosis. This, however, does not necessarily suggest undue caution among the nurses making the triage decision since physical examinations as well as sophisticated diagnostic tools were used to determine that these patients were non-emergent. Also, it is an obvious failsafe mechanism to triage up rather

**TABLE 3—Final Disposition of Patients by Physicians' Evaluation of the Triage Decision**

Final Disposition	Correct Triage		Uptriage		Mistriage		Total	
	Col %	No.	Col %	No.	Col %	No.	Col %	No.
Treated and released	60	185	55	21	41	5	57	211
Referred to outpatient dept. clinic	30	93	37	14	25	3	31	110
Admitted to hospital	2	5	—	0	17	2	2	7
Other	9	27	8	3	17	2*	9	32
Total	100	310	100	38	100	12	100	360

\* These two patients were triaged to be treated in the delivery room and were seen immediately. However, in the opinion of the evaluators, they should have been seen in the emergency room.

**TABLE 4—Various Presenting Symptoms by Physicians' Evaluation of the Triage Decision**

Presenting Symptom	Correct Triage		Uptriage		Mistriage		Total No.
	Row %	No.	Row %	No.	Row %	No.	
1. Headache, dizziness	100	19	—	0	—	0	19
2. Ear, nose, eye complaints	89	17	11	2	—	0	19
3. Breathing difficulties	98	57	—	0	2	1	58
4. Chest pain	93	13	7	1	—	0	14
5. Abdominal pain	84	31	5	2	11*	4	37
6. Genitourinary complaints	60	3	20	1	20	1	5
7. Skeletal complaints	79	34	19	8	2	1	43
8. Trauma	80	39	18	9	2	1	49
9. Dermatological problems	90	9	—	0	10	1	10
10. Gynecological problems	92	54	5	3	3	2	5
11. Other	74	35	24	11	2	1	47
Total	86	310	10	37	3	12	360

\* Abdominal pains were mistriaged more often than the other presenting symptoms ( $p < 0.05$ ).

**TABLE 5—Physicians' Evaluation of the Triage Decision by Nurse-Patient Communication**

Presenting Symptom Recorded by Treating Physician and Nurse	Correct Triage		Uptriage		Mistriage		Total	
	Col %	No.	Col %	No.	Col %	No.	Col %	No.
Same	84	261	84	32	75	9	84	302
Different	4	13	11	4	—	0	5	17
Insufficient information	12	36	5	2	25	3	11	41
Total	100	310	100	38	100	12	100	360

**TABLE 6—Frequency Distribution of Various Facilities Appropriate for Treatment, by Evaluating Physician**

Evaluator	Facility							
	Emergency room		Screening clinic		Outpatient dept. clinic		Total	
	Row %	No.	Row %	No.	Row %	No.	Col %	No.
1	20	43	64	135	16	34	26	212
2	23	63	67	184	11	29	34	276
3	25	49	67	130	8	15	24	194
4	25	33	73	94	2	2	16	129
Total	23	188	67	543	10	80	100	811

than down if there is any doubt on the part of the triage professional.

It should be noted that if all patients were seen in the emergency room and there were no triage, over 70 per cent of the emergency room patients would have been non-emergent, based on their final diagnoses. The 70 per cent would consist of non-emergent triaged patients who were seen in the emergency room and the non-emergent triaged patients who were sent to the screening clinic and outpatient specialty clinics under the triage system.

#### Subjectivity in the Evaluation Process

The evaluators decided which cases were true emergencies based on their medical knowledge and their knowledge of the facilities at BMHC. However, it is clear that other, more subjective factors, such as attitudes toward pain, attitudes toward patient care, and degree of conservatism also influenced the evaluators' decisions.

In order to determine the effect of the subjective aspects of the evaluation on our results, we compared how frequently each physician chose each of the treatment facilities. As shown in Table 6, the evaluators individually indicated the emergency room as the appropriate facility in 20 to 25 per cent of their evaluations. This high degree of consistency among the four evaluators indicates that the result of each case evaluation was independent of which two of the four physicians were performing the evaluation.

There is more variation in the percentages for the screening clinic and the outpatient department specialty

clinics but the difference between these choices is less important.

#### Summary and Conclusions

A study was undertaken in 1972 and 1973 to evaluate the functioning of the nurse triage system at the Bronx Municipal Hospital Center. A stratified random sample of 500 patients who were triaged were followed up, using the patients' chart and the routinely used triage slip which specifies the patient's name, the presenting complaint, and the facility to which he must go for treatment.

Each case was independently reviewed by two of the four physician evaluators. The physicians were asked to answer the question using outcome variables, "Knowing all the facts, where do you think the patient should have been seen?" If the two physicians did not agree on the answer, a third independent evaluation was done to break the tie. The physicians showed consistency among themselves when we compared how frequently each physician chose each of the treatment facilities; the evaluators individually chose the emergency room in 20 to 25 per cent of their evaluations.

The results of evaluation confirm other reports that indicate that the emergency room has become the primary center for health care for a large number of individuals. We found that 43 per cent of the patients were triaged to be treated in the emergency room, 46 per cent in the screening clinic, and 8 per cent in the outpatient specialty clinics during the time when these options were available. With the triage system in operation, 36 per cent of the patients seen in the emergency room were considered to be non-emergencies; without the triage system probably over 70 per cent would have been non-emergent.

Ideally, the goal is to have an emergency room reserved to handle, with little delay, those true emergencies that require specialized personnel and equipment. And furthermore, patients seeking non-emergency care should be seen in an environment more suited to primary care where follow-up is available. Triage is a system that could help to achieve these goals.

There are a great number of problems associated with implementing a triage system in a large urban hospital, i.e., training, manpower, facilities, funds, and paperwork. Our evaluation of triage operating at BMHC, a New York City municipal hospital, revealed that 80 per cent of the patients were correctly triaged, 17 per cent were uptriaged, and 3 per cent were mistriaged.

The subgroup of patients who were mistriaged represents a very mixed group regarding seriousness of illness. One-half of these patients were treated within 24 hr and released or referred to specialty clinics for follow-up care. However, two patients who were sent to the screening clinic were admitted to the hospital. These two patients should probably have been seen in the emergency room to avoid delay. Also, there is the possibility that they may not have gone to the screening clinic, although they had been directed to do so by the triage nurse. This could have been potentially serious.

In order to improve the functioning of the system, a few possible causes of triage error were explored. It was found that presenting symptoms related to abdominal pain were those most likely to be mistriaged. This was the complaint of one-third of the patients who were mistriaged, including the two mistriaged patients who were admitted.

The triage system can clearly be very useful in directing patients to the facilities that can best treat them and in properly utilizing the available facilities. However, for effective operation of the system it is necessary to have properly trained triage personnel and an ongoing monitoring of triage errors with subsequent retraining as well as integrated, cooperating, generalized and specialized outpatient facilities.

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