

THE EFFECTIVENESS OF VARIOUS HEALTH PERSONNEL AS TRIAGE AGENTS

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ABSTRACT: The effectiveness of pediatricians, pediatric nurse practitioners, registered nurses, and receptionists in the performance of triage in the pediatric acute care clinic of a large, urban hospital was assessed. Approximately 888 nonscheduled patients were seen during the course of 24 clinic sessions. Of these, 1.5% presented emergency problems, 9.6% had urgent needs, and 88.9% had problems of a non-urgent nature. No significant difference between the groups performing triage was found in the amount of time the patients with urgent and non-urgent problems spent in waiting; physicians and pediatric nurse practitioners performed significantly better than did the registered nurses and receptionists in referring patients to the appropriate provider and in referring patients to specialty clinics.

In this study, the best triage agents appear to be the physicians and pediatric nurse practitioners; no significant difference was found between these two groups. However, receptionists and registered nurses have been demonstrated to be capable of performing triage safely, and the factors that make pediatric nurse practitioners and physicians better as triage agents are economic, i.e., saving the clinic physician's time. Therefore, considering the salary differences between the groups, receptionists may be the most cost-effective agents in certain clinics.

The rapid increase and concentration of urban populations have placed a greater demand on inner-city hospitals to meet the health care needs of communities. Medicare and Medicaid have made health care more accessible financially for many but have added to the burdens inner-city hospitals face. In addition, there has been a growing tendency among the few private physicians who practice in the crowded urban areas to refer patients with "off-hour" complaints to hospital emergency services.¹ As a result, a large proportion of the patients cared for in the emergency service areas today present problems that are not actually emergencies. This situation has made it increasingly difficult to identify and treat those patients with real emergency complaints.²⁻⁵

In an attempt to solve the problem of emergency care and to provide a more efficient system for the delivery of care to those with non-urgent problems, the triage system has been utilized in many hospitals.⁶ *Triage*, which is derived from the French word for "sorting out", involves the initial

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evaluation and selected referral of patients to the appropriate health resource. It is a technique that has been used to identify and initiate the prompt management of seriously ill patients, to avoid any unnecessary congestion in a clinic area, and to assist all patients to obtain the kind of care best suited to their needs.^{1,7,8}

The success of the triage depends upon the skills and capabilities of the person who handles it. This individual must be able to distinguish the various degrees of seriousness of illnesses and must be knowledgeable about all facets of the outpatient facility. These skills have traditionally been associated with the physician, and many individuals still believe the physician to be the best triage agent. Others argue, however, that using a physician in this manner is not cost-effective nor is it sufficiently intellectually stimulating.

It is possible that nurse practitioners, nurses, or receptionists, that is, persons who have been specifically trained for the task, may be effective triage agents. Nurse practitioners have proven to be effective providers of health care⁹⁻¹² and have been readily accepted by patients.¹³ In many clinics, registered nurses have been effectively used in the performance of triage and some clinics have reported success with nonprofessional, skilled persons who were trained on the job.⁶

Little data exist on the comparative abilities of various health professionals to perform triage effectively.¹⁴ Russo and associates have shown that the triage evaluations made by pediatric nurse practitioners (PNPs) agreed with those of pediatricians 84% of the time.¹⁵ There were two significant differences: the pediatric nurse practitioners were more diligent in recording patient problems and the pediatricians anticipated the need for roentgenograms and laboratory studies more effectively. However, to our knowledge, there has been no study reported that simultaneously compares the triage capabilities of physicians, nurse practitioners, registered nurses (RNs), and receptionists. The current pressing need to provide cost-effective health services would be helped by such an investigation.

This study evaluates the comparative effectiveness of pediatricians, pediatric nurse practitioners, registered nurses, and skilled nonprofessionals (receptionists) in performing triage in the pediatric acute care clinic of a busy, urban hospital.

METHODS

The pediatric clinic of Columbia-Presbyterian Medical Center was the site for our study. The clinic receives over 45,000 general, nonscheduled patient visits annually.

Prior to the beginning of a one-year pediatric nurse practitioner training program in September of 1973, the triage of patients had been

TABLE I
Group Summary Data

Group	Total Referred		Direct Specialty Referral		Direct to House Officer		Inappropriate Referrals		Inappropriate to Isolation		*Total Seen by House Officer		Time Spent Waiting	
	n	%	n	%	n	%	n	%	n	%	n	%	Urgent Time (min.)	Non-Urgent n
Receptionist	216	0	—	45	20.8	24	11.1	3/6	1.4	31.9	23	52.8	192	48.2
Registered nurses	216	8	3.7	74	34.1	17	7.8	4/7	1.8	41.9	19	49.7	186	54.6
Pediatric nurse practitioner	245	23	9.4	78	31.8	15	6.1	0/5	0	37.9	25	51.1	190	57
Pediatrician	211	25	11.8	52	24.6	18	8.5	0/0	—	33.1	19	37.2	165	51.1

*Percentage sent directly to house officer plus the percentage of inappropriate referrals who were ultimately seen by the house officer.

performed by the receptionists. During the nine months before this study, triage responsibilities were shared by the receptionists and pediatric nurse practitioner students who later took part in this study after graduation from the program.

The performance of triage involves evaluating all nonscheduled patients upon their arrival at the clinic: a brief history is taken and a cursory physical examination is performed. The examination consists primarily of inspection; occasionally an otoscope, flashlight, or stethoscope is used by the health professionals (M.D.s, P.NPs, and R.Ns) who are doing the triage. Receptionists do not perform examinations. The patient is then referred to one of the several types of health care providers who function in different areas of the clinic. These providers include: (a) The clinic physicians who care for those children who have relatively minor problems. These patients require minimal care and time. (b) The pediatric nurse practitioners, who may also care for children from the same pool as the clinic physicians, but the pediatric nurse practitioners perform a more comprehensive and time-consuming service that includes health counseling. (c) The house officers who care for the children with more serious problems and for those children who require a greater amount of physician time. Patients who have been evaluated by the staff physicians or the pediatric nurse practitioners and who are found to have a problem requiring more intensive physician care may be referred to a house officer.

Children with contagious diseases are directed to an isolation area for care. All triage agents, except receptionists, may directly refer a patient to a specialty clinic without checking with a staff physician.

Triage Agents

There were four groups studied:

1. Three physicians, all of whom are board-eligible pediatricians and who normally function as clinic physicians. They work on a part-time basis and had been with the clinic for at least one year before the study began.

2. Three pediatric nurse practitioners who had graduated from a one-year pediatric nurse practitioner program, in which four months had been spent primarily in a classroom setting and eight months had been spent in caring for patients in the pediatric clinic where this study took place. Among other things, they had been trained to evaluate and treat children with minor illnesses, such as infections of the upper respiratory tract, otitis media, and impetigo, under the supervision of a physician.

3. Three registered nurses who had worked in the pediatric clinic performing traditional nursing services, for periods of at least one year.

4. Three receptionists who had performed triage in the pediatric clinic for at least 18 months. However, the triage was not their only function; they were also responsible for registering patients, calling for charts, making appointments, and answering the phone.

Each individual worked from 9:30 a.m. to 1:30 p.m., which is one of the daily peak periods for patient inflow.¹⁶ The first phase of the study took place during July, which is a relatively slow period. The second phase occurred in February, a relatively busy period. The members of each group were randomly scheduled to serve on different days because patient load varies with the day of the week, i.e., Mondays and Fridays tend to be busier than other days.

Study Population

Only nonscheduled patients were included in the study. This decision excluded all children who had been given appointments to specialty clinics or were seen for follow-up appointments with one of the clinic physicians or pediatric nurse practitioners.

Measurements Used of Triage Agent Effectiveness

Four parameters of effectiveness were measured:

1. *Waiting time.* We measured the time the patient presented at the triage desk to the time he was seen by the appropriate provider and recorded it with the aid of a punch clock or a notation of the time made by the provider. The provider's watches were synchronized with the punch clocks. Waiting time was recorded for all patients whose medical needs were categorized as follows:¹⁶

Emergent: The patient requires immediate medical attention. The disorder is acute and potentially threatens life or function.

Urgent: The patient requires medical attention within a few hours; the disorder is acute but not necessarily severe, and there is danger to the patient if he does not receive prompt attention.

Non-urgent: The disorder is minor and non-acute; the patient might require attention in a few days or weeks, might be managed by telephone consultation, or might not require any medical attention at all.

The appropriateness of the categorization of each patient was determined by a panel of three pediatricians, using previously determined guidelines, who retrospectively reviewed data sheets compiled from the patients' charts. Each data sheet contained the patient's age, temperature, chief complaint, diagnostic tests ordered, diagnosis, and therapy.

2. *Appropriateness of triage referral.* The referral was considered appropriate if the patient was cared for by only one provider. The referral was considered inappropriate if the patient required evaluation by more than one provider, e.g., if a patient was referred by the clinic physician or the pediatric nurse practitioner to the house officer, because the original provider considered the case sufficiently involved to warrant a more thorough investigation, but not that of a specialty clinic.

3 *Appropriateness of isolation.* If the ultimate diagnosis of the patient was a contagious disease and the patient had been sent directly to isolation from the triage area, it was appropriate. If the ultimate diagnosis was a contagious disease but the child had not been sent to isolation, or if the child was sent to isolation and did not have a contagious disease, it was considered inappropriate.

4. *Direct specialty referrals.* The number of patients referred directly to a specialty clinic by the triage agent was determined. These patients received no further care in the pediatric clinic that day.

RESULTS

Data for the individuals within each group of triage agents were analyzed; data for the groups are presented in Table 1.

A total of 888 patient visits were analyzed. Of these, 789 (88.9%) were non-urgent and included direct specialty referrals; 86 (9.6%) cases were urgent and 13 (1.5%) were emergencies.

Waiting Time

The average time spent in waiting was under an hour for all categories of patients in both study periods. There were no significant differences between the various triage groups in mean waiting times for urgent and non-urgent complaints.

There were not enough emergency cases to allow for statistical analysis. However, every child with an emergency problem in this study was sufficiently well managed by all triage agents to prevent any serious physical consequences.

Appropriate Referrals

Between 6% and 11% of the patients were inappropriately evaluated, regardless of who performed the triage function. The only statistically significant difference in the percentage of cases with inappropriate referrals to providers occurred between the pediatric nurse practitioners (6.1%) and the receptionists (11.1%) with $p < 0.05$.

Isolation Referrals

Pediatric nurse practitioners properly referred five patients to isolation; physicians saw no patients with contagious diseases that required isolation and placed none inappropriately in isolation. Receptionists improperly referred three (1.4% of the 888 patients seen) of six patients to

isolation. Registered nurses improperly referred four (1.8% of the 888 patients seen) of seven patients to isolation.

Direct Specialty Referrals

The numbers of direct referrals to specialty clinics were not statistically different when physicians (11.8%) and pediatric nurse practitioners (9.4%) are compared. However, physician and pediatric nurse practitioner performances in this area were significantly better than that of the registered nurses (3.7%), with $p < 0.01$. Receptionists were not permitted to refer patients directly to specialty clinics.

DISCUSSION

Types of Cases

Our finding that only 1.5% of the patients seen had problems of an emergency nature coincides well with the Russo group's study,¹⁴ performed in the pediatric clinic of another New York hospital, in which only 1.3% of the patients were categorized as having emergency problems. The small percentage of emergency problems resulted in an insufficient number of cases for statistical analysis. However the fact that no child with an emergency problem in this study suffered any serious physical harm, no matter who the triage agent was, suggests that all triage agents are capable of managing emergencies. However, further studies involving more patients with problems of this nature are necessary to evaluate this premise statistically. In our study, almost 89% of the patients had non-urgent complaints. This figure is markedly higher than that reported by Skudder and associates (42%)¹⁷ and Lee and associates (38%)¹⁸ in the studies they performed in the early 1960s and somewhat higher than the Russo 1974 figure of 69.6%.¹⁴ The higher figures probably reflect the marked rise in the use of acute care areas for routine care since the early 1960s.

Waiting Time

The waiting time for urgent and non-urgent cases did not differ significantly. This might not seem to be admirable; however the average waiting time of under one hour for both categories is well within our predetermined standard for an acceptable waiting period for urgent cases. The waiting time for emergency cases is difficult to evaluate because of the small number of patients with emergency complaints.

Appropriate Triage Referral

Each inappropriate referral results in a duplication of labor by two providers and the prolongation of waiting time for the patient. This increases congestion in a busy clinic, alters the smooth flow of patient care, and wastes valuable provider and patient time. Because the percentage of true emergencies seen in acute care clinics has decreased so markedly in recent years, the ability to refer appropriately may be the most valuable asset of a triage agent. It is usually advantageous to refer only a small number of patients directly to house officers, who have no option to refer except to specialty clinics. This practice allows them to spend more time with the patients who really require substantial care from a physician.

The only statistically significant difference in inappropriate referrals among the various triage agents occurred between the pediatric nurse practitioners who referred 6.1% of their patients inappropriately and the receptionists who inappropriately referred 11.1% of their patients. This difference may have been the result of the pediatric nurse practitioners referring too many patients directly to house officers, which is evidenced by the figures that result from adding the percentage of patients sent directly to house officers plus the percentage of inappropriate referrals. This figure represents the percentage of patients actually seen by the house officers, since all inappropriately referred patients are ultimately seen by house officers.

A "sparing" of house officers is evidenced by the relatively smaller percentages of patients actually seen by them when triage was performed by receptionists (31.9%) and physicians (33.1%), compared with those seen when triage was performed by the pediatric nurse practitioners (37.9%) and registered nurses (41.9%). However, when one corrects for inappropriate referrals, which require the input of two physicians, the percentages reveal that actual physician contacts were: physicians 41.7%, pediatric nurse practitioners 44.4%, receptionists 47.6%, and registered nurses 50% (total of patients sent directly to house officers plus twice the number of patients inappropriately referred divided by the total number of patients evaluated). This shows that the percentage of patient contacts with house officers saved is made up by contacts with other physicians. In this study, it was impossible to determine the actual amount of time spent by each physician with each patient. In general, screening physicians spend much less time with patients, since one reason for referring to a house officer is based on the anticipated amount of time to be needed.

Appropriate Isolation Referrals

Children with contagious diseases, such as varicella, rubeola, and rubella, present a threat to other children and to pregnant mothers who are present in a clinic. This is especially true in our clinic because patients

waiting to be seen in the pediatric hematology-neoplastic clinic and obstetric clinic are seated in close proximity to the waiting area for the pediatric acute care clinic.

Physicians performing triage saw no children with problems that required isolation, and they did not isolate any children who did not require it. Pediatric nurse practitioners correctly isolated five children. Registered nurses incorrectly isolated four of seven children, or 1.8% of the total number of children evaluated by them. Receptionists inappropriately isolated three of six children, or 1.4% of the total number of children evaluated by them. The numbers are small; however, the performance of physicians and pediatric nurse practitioners appears to be better than that of the registered nurses and receptionists. On the other hand, in each case of inappropriate isolation a child with a noncontagious disease had been isolated, but no child who required isolation was allowed to sit in the general waiting area. In every case the error was conservative, and the only harm was the possibility of placing a child incorrectly in a room that had recently been inhabited by a child with a contagious disease.

Direct Specialty Referral

In triage, physicians and pediatric nurse practitioners were able to refer 11.8% and 9.4% respectively of patients to specialty clinics without involving any other provider in the clinic. Their performances were significantly better than that of the registered nurses, who directly referred 3.7% of the patients. Receptionists are not allowed to refer patients directly.

Clearly, the triage ability of physicians and pediatric nurse practitioners to manage approximately one out of ten patients results in a saving of provider time that can then be used with patients who require more care. In addition, it reduces congestion in the clinic and saves the patient's time.

It may be argued that the differences found between pediatric nurse practitioners and registered nurses is the result of the pediatric nurse practitioners' experience in triage prior to the study. It is more likely, however, that the direct referral capabilities of the pediatric nurse practitioners are a consequence of their expertise and confidence with physical assessment and diagnosis, two important skills that differentiate a registered nurse from a pediatric nurse practitioner. However, this premise must be studied specifically before a definite conclusion can be made.

Cost Effectiveness

The cost effectiveness of each type of triage agent may be evaluated as follows. In general, the clinic physician's salary is approximately twice that of the pediatric nurse practitioner, three times that of the registered nurse and four times that of the receptionist. Obviously, cost factors must be

considered when triage assignments are made. Because there is no significant difference between physician and pediatric nurse practitioner triage capabilities in this study, it is not worth paying twice as much to have a physician as triage agent. Further, because there is no significant difference between a registered nurse and a receptionist in triage capabilities, it is more cost-effective to have a receptionist as triage agent.

The real decision involves whether it is worth paying a pediatric nurse practitioner twice as much as a receptionist to refer patients more effectively to the appropriate provider in the clinic and to manage approximately 10% of the patients without having an input from other primary care providers. It may well be that in certain clinics the receptionists are the most cost-effective triage agents. The ultimate decision must be made by individual clinic administrators and be based on those factors pertinent to his or her clinic.

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