

# Alteration of Emergency Room Usage in a Family Practice Residency Program

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A patient education program was instituted that emphasized the importance of telephoning the physician prior to making an emergency room visit and defined an inappropriate visit in simple terms. The purpose of the program was to reduce the percentage of nonurgent or inappropriate emergency room visits each month. A total of 3,825 emergency room visits were reviewed. The percentage of inappropriate visits dropped from 29 percent in the control period to 18 percent in the patient education period ( $P \leq .001$ ). This included significant decreases in the four major reimbursement groups: self-paying ( $P \leq .005$ ), group insurance ( $P \leq .001$ ), Medical Assistance ( $P \leq .01$ ), and Medicare ( $P \leq .01$ ). Also during the patient education period there was a trend toward increased telephone calls prior to emergency room visits.

Concern over the increasing number of emergency room visits for conditions that did not warrant emergency treatment has been expressed in several countries including the United States,<sup>1-3</sup> Great Britain,<sup>4-6</sup> and France.<sup>7</sup> In the United States the total number of emergency room visits increased 400-fold from 1940 to 1955<sup>8</sup> and continues to escalate. The number of patient visits to emergency rooms in the United States between 1962 and 1976 increased from 20 million to 77 million.<sup>9</sup> Several studies have enumerated the reasons for this rise,<sup>10,11</sup> such as the immediacy of care, no primary care physician, or the unavailability of the patient's physician. Another potential reason not documented in the literature is the notion that the cost of an emergency room visit is more frequently reimbursed by health insurance.

It has been suggested that patient education programs stressing the benefits of continuity of care might decrease the number of nonurgent emergency room visits, but no specific studies have been done.<sup>12</sup> Therefore, the present study was designed with the following purposes: (1) to determine whether a patient education program could effectively reduce the percentage of inappropriate emergency room visits, and (2) to determine whether the type of reimbursement for the emergency room visit is a factor in the efficacy of such a patient education program.

The hypotheses were (1) that a patient education program could reduce the number of inappropriate emergency room visits, and (2) that the patient education program would be less effective in third party payment groups.

## Methods

Emergency room visits of patients under the care of residents and faculty in the Cedar Rapids

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Family Practice Residency Program were studied. This program is located in a city of approximately 110,000 with two hospitals, St. Luke's Methodist Hospital and Mercy Hospital, having 640 and 403 beds, respectively. The Family Practice Center office is open from 8:30 AM to 5:00 PM Monday through Friday. Patient encounters at other times were handled by the family practice resident on call in either hospital emergency room. The resident on call answered all Family Practice Residency Program patient calls when the office was closed.

In January 1980 a group discussion of the problem of inappropriate emergency visits resulted in the institution of the following policy. First, concerted effort was made to remind patients to call the resident on call before coming to the emergency room. Second, emergency room visits for problems present on weekdays for longer than 24 hours without worsening were defined as inappropriate. Since the office was not open on weekends, emergency room visits for problems beginning after the office was closed on Friday through Monday morning were considered appropriate. Third, when an inappropriate visit occurred, the patient was given immediate feedback by the resident on call. The resident physician also explained such advantages of using the emergency room appropriately as having the physician available for important emergencies and avoiding the inconvenience of an unnecessary trip to the emergency room. Furthermore, the importance of calling before coming to the emergency room and the advantages of continuity of care with the patient's personal physician were emphasized. Fourth, the words "inappropriate visit" were recorded on the emergency room record and later transferred to the patient's office chart problem list. The patient's personal physician was later notified and could also explain the appropriate use of the emergency room to the patient either by phone or during the next office encounter. A one-page memorandum explaining the correct use of the emergency room was available for either physician to give the patient.

Every emergency room record during the control period listed the duration of the illness. Every emergency room visit record during the study period listed (1) the duration of the illness, (2) whether the patient called, and (3) whether the visit was appropriate. In some instances the resi-

dent physician on call felt a visit was inappropriate for reasons other than the duration of the illness. However, the duration of the problem without worsening was the only criterion used in this study. Copies of every emergency room visit record were reviewed at the end of the study period. In addition, the percentage change in total number of visits to both hospital emergency rooms and to the Family Practice Center during the two periods were compared.

The following data were analyzed by a Student's *t* test for correlated samples. First, the mean percentage of inappropriate visits plus or minus the standard error of the mean (SEM) for each month from February through September 1980 (the study period) was compared with the mean percentage of inappropriate visits plus or minus SEM for each month during the corresponding period in 1979 (control period). Second, emergency room visits were divided into five reimbursement groups: Medical Assistance, self-paying, group insurance, Linn County Health (county assistance program for the impoverished), and Medicare. The mean percentage of inappropriate visits for each group were compared for the two periods. Finally, the percentage of telephone calls prior to coming to the emergency room for each month were compared during the study period.

A random number table was used to select 50 appropriate and 50 inappropriate emergency room records. These records were then evaluated as appropriate or inappropriate by another physician independently using the study criterion. This random selection was used as a measure of the reliability of the initial evaluations. The validity of the definition of an inappropriate visit was ascertained by comparing the definition with those used in previous studies. The completeness of the data collected was verified by reviewing a computer financial printout that listed the total number of family practice patient visits to the emergency room each month.

## Results

Table 1 illustrates the overall increase in the number of visits from the control period (1979) to the study period (1980) in each of four patient populations. There was a small increase in emergency room visits for the total community as well

**Table 1. Comparison of the Office and Emergency Room Visits During the Study and Control Periods**

	February-September 1979 (Control)	February-September 1980 (Study)	Increase During Study Period (%)
Family Practice Center office visits	14,056	14,339	2.4
Family Practice Center emergency room visits	1,891	1,934	2.2
Total emergency room visits (St. Luke's Hospital)	43,540	44,174	1.5
Total emergency room visits (Mercy Hospital)	39,309	40,346	2.6

as for the Family Practice Center patient visits to both the office and to the emergency room.

The mean percentage of inappropriate visits (18 percent  $\pm$  4 percent) during the study period was significantly lower than the mean percentage of inappropriate visits during the control period during the previous year (29 percent  $\pm$  5 percent) ( $P \leq .001$ ). Figure 1 illustrates the mean percentage of inappropriate visits for each set of corresponding control and study months. Table 2 illustrates that statistically significant decreases in the percentage of inappropriate visits were observed in four reimbursement groups: Medical Assistance, self-paying, group insurance, and Medicare.

The percentage of telephone calls prior to an emergency room visit rose during the patient education period from 15 percent in February 1980 to 23 percent in September 1980. Ninety-two percent of the 100 randomly selected emergency room visits were given the same appropriate or inappropriate evaluation by the author and another physician by independent analysis.

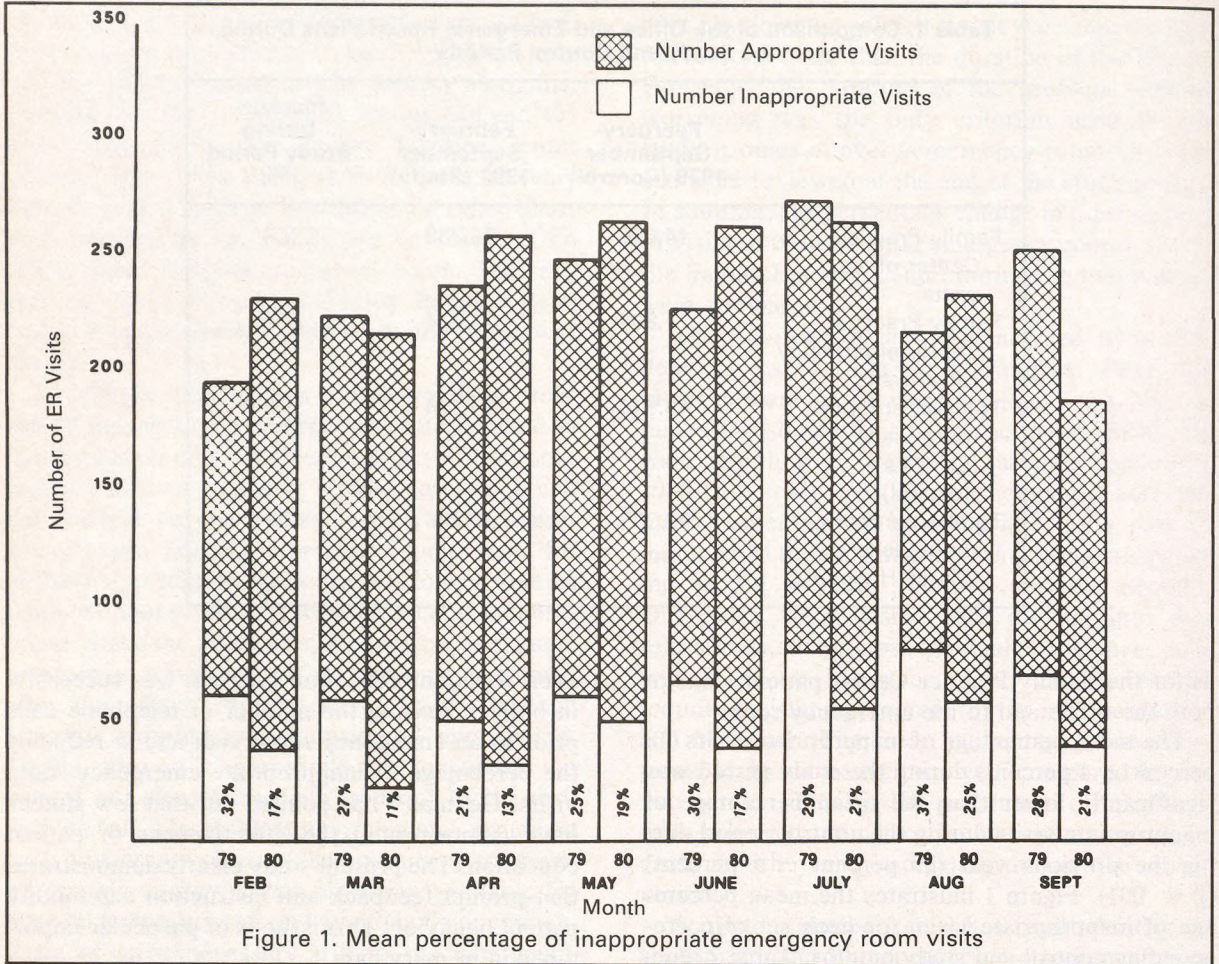
## Discussion

White and O'Connor<sup>13</sup> observed no appreciable differences in the number of inappropriate visits between patients who were self-referred and those referred by their physician. In this study, how-

ever, a patient education program was successful in both increasing the number of telephone calls prior to an emergency room visit and in reducing the percentage of inappropriate emergency room visits. Geyman<sup>14</sup> has pointed out that few studies have demonstrated the effectiveness of patient education. The present study clearly demonstrates that prompt feedback and instruction can modify patient behavior. This issue is of particular importance in primary care.

It is difficult to choose objective criteria concerning the appropriateness of a patient visit. The duration of the patient's illness without worsening was chosen as the criterion for this study for three reasons: (1) The criterion has been used in other studies<sup>15</sup>; (2) this criterion was easy to understand—it did not require the patients to have an extensive medical background; (3) it was an objective criterion, requiring little interpretation in data analysis, since the duration of illness was always recorded at the time of the emergency room visit.

Alternatively, Kluge et al<sup>16</sup> classified emergency room visits by the severity or immediacy of the problem. Although in the present study it appeared that there were no differences in the severity of problems during the two study periods, it is possible that the results of the study may have been different in some ways had another criterion for an inappropriate visit been used.



	1979 (%)	1980 (%)	Range of Total Emergency Room Visits per Month	Significance
Medical Assistance	30.6	21.6	40-125	P ≤ .01
Self paying	30.1	12.8	12-39	P ≤ .005
Group insurance	28.0	15.1	36-109	P ≤ .001
Linn County Health	22.9	26.0	0-6	NS
Medicare	34.0	10.5	2-15	P ≤ .01

Several limitations are recognized in this study. First, the specific manner of presentation and content of the patient education information varied to some degree with each resident on call, although guidelines were given. Second, there were variations in the patient information given by the patient's personal physician after the episode. Third, although all residents in the program saw patients in the emergency room after hours, the majority of cases were seen by first-year residents. The same guidelines were given to the new first-year resident group that began in July 1980. It is possible that the resident groups varied in their degree of enthusiasm in patient education. However, the month-to-month percentage of inappropriate visits were consistent, suggesting no effect when a new group of residents began. Fourth, the control and study periods were not concurrent in order to simplify the study procedure for the resident physicians involved. There were, however, no obvious differences or variables during the control and study periods other than the patient education program. Fifth, although there was a significant drop in the percentage of inappropriate visits, the total number of emergency room visits increased slightly during the study period. As shown in Table 1, this increase occurred in the total community emergency room utilization as well as in the Family Practice Center office setting, which would suggest there was nothing unique related to the Family Practice Center patients' increased total use of the emergency room. It is conceivable that the total number of appropriate emergency room visits increased during the study period because patients called more often and were given easily understood definitions of appropriate emergency room use. Given the study definition of "appropriate," however, the authors believe these visits were justifiable. Sixth, because all the visits were reviewed by one person, the question of subconscious biasing of the data might be raised. However, the 92 percent concordance between the author and second reviewer of the 100 randomly chosen charts and the marked difference occurring each month in the percent of inappropriate visits between the two periods negates that possibility.

In a study from the Cedar Rapids Family Practice Residency Program in 1979, Nelson et al<sup>15</sup> found that Medical Assistance patients used the emergency room more frequently than other pay-

ment groups. It is interesting to note that the patient education program was as effective in modifying the behavior of this payment group as it was with the other reimbursement groups.

## Conclusion

The first hypothesis of the study was that a patient education program could effectively reduce the percentage and number of inappropriate emergency room visits. The study demonstrates this goal can be accomplished.

The second hypothesis was that the patient education program would be less effective for patients who did not directly pay for their health care costs. This hypothesis was not supported by the results. The patient education program was effective in decreasing the percentage of inappropriate visits in the four major reimbursement groups.

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