
Hospital Location as a Determinant of Emergency Room Utilization Patterns

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ALTHOUGH EMERGENCY ROOM USE has grown dramatically since World War II, the exact reason for this growth is not clear (1). It is common knowledge that the utilization patterns of emergency room (E.R.) patients have changed over the years (2-4). Again, however, the exact nature of this change is not well defined. For example, the literature generally shows that patients with psychiatric conditions (5-10) and those with nonurgent conditions (11-13) have contributed greatly to the rise in emergency room use. However, the possible relationship between the psychiatric status of a patient and the degree of urgency of the patient's case has not been examined (14). Nor has this possible relationship been examined in hospitals at different locations, although patients' E.R. utilization patterns vary by hospital location (15-17). Nearly all the information collected about emergency room use has been from individual hospitals and has resulted from analysis of the emergency services of a single hospital. Few studies have involved the E.R. populations of several hospitals, so that direct comparisons between emergency room utilization at different locations have seldom been possible.

We therefore undertook an examination of the demographic characteristics and utilization patterns of patients in three E.R. populations at different locations. The psychiatric versus nonpsychiatric status of the patients and the degree of urgency of their E.R. visits were examined in relation to each hospital's location. Two specific questions were addressed: How are the

demographic characteristics and utilization patterns of E.R. patients associated with a hospital's location? To what extent are the degree of urgency of the patient's case and the patient's psychiatric status and E.R. utilization pattern associated with the hospital's location?

Methods

Hospital settings. The three hospitals studied are within a 50-mile radius of each other. They were chosen based on census tract information showing that they are located in three diverse socioeconomic areas. One hospital is in an urban area, a second is in a residential area, and a third is in a downtown area.

The urban hospital is a 500-bed, private, acute care, nonprofit institution located in an area of low SES (socioeconomic status) with a population of 2 million. This hospital has an inpatient psychiatric unit and is the institution through which indigent patients are admitted to two State hospitals located in the city. It is also a receiving unit for an Emergency Medical Service. Adjacent to its emergency room is an outpatient clinic, open from 9 am to 5 pm, to which patients are admitted by appointment only. During 1979, approximately 30,000 patients were treated in the emergency room.

The residential hospital is a 700-bed, private, acute care, nonprofit facility located in a middle SES residential area of a smaller industrial city of 220,000 population. It has an inpatient psychiatric unit and maintains a large paramedic program. An outpatient clinic, which is open during the daytime and admits patients by appointment only, is located nearby. A unique aspect of this hospital is that several smaller hospitals in the surrounding area refer their emergency cases to its emergency room. Further, this hospital

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serves a wide geographic area (partly rural) with its ambulance service. Approximately 47,000 patients were treated in its emergency room in 1979.

The downtown hospital is a 55-bed, private, acute care, nonprofit institution located in an industrial area with a population of 675,000. Like the other two hospitals, this institution has an inpatient psychiatric unit and a large paramedic program in which paramedics are trained in the hospital emergency room. A telephone number that can be called for paramedic service is frequently aired on various radio stations. A unique aspect of this hospital is that a pediatric facility is one block away. Approximately 3,000 patients were treated in its emergency room in 1979. As in the case of the other two hospitals, an outpatient clinic is located nearby, which is open in the daytime and admits patients by appointment only.

In each of the three hospitals, the staffing patterns for physicians and nurses are similar. All three hospitals have a full-time E.R. medical director, and all supplement physician coverage of the emergency room by hiring moonlighting physicians. The staffing patterns of the nursing personnel at the three hospitals differ in that at the urban hospital all direct patient care is given by a registered nurse, since no licensed practical nurses or paramedics are employed, whereas both licensed practical nurses and paramedics provide direct care in the residential hospital and the downtown hospital.

Data collection. Data for the study were collected by several methods. Under a National Institute of Mental Health grant, two of us (S. L. J. and L. Y.) each spent approximately 1 or 2 days per week over a 10-month period in one of the three emergency rooms. Thus, our personal observations and conversations with the patients and staff, as well as the patients' own observations, were important data sources. Also, the hospitals' records were a source of quantitative data.

By systematically drawing 240 patients' records from each of the three hospitals, we obtained a total sample of 720 records of E.R. visits for examination. This sample size permitted estimation of the differences in the percentages of patients possessing any given characteristics with a standard error not exceeding about 2 percent.

At all three hospitals, E.R. records were filed separately from inpatient records and stored alphabetically within a time period. Inpatient records also were available if the patient had been admitted for inpatient service. Since at times the inpatient record was used to obtain additional information about the inpatient stay, one question asked each patient upon admission to

the E.R. room was whether or not he or she had been admitted to the hospital as an inpatient.

To arrive at a systematic sample of E.R. visits, the available records at each hospital were divided into 26 subsets (1 subset per alphabet letter), and a table of random numbers was then used in conjunction with the local telephone directory to determine the number of records to sample from each alphabet subset. Using a random start, we obtained a systematic sample within each subset. From each E.R. patient's records, the presenting problem, demographic information, and the pattern of emergency room use were then recorded.

Classification system. Based upon examination of each record, two raters who were familiar with the way the emergency rooms operated coded independently each patient visit on two variables: (a) the degree of urgency of patient's condition and (b) whether the patient could be considered to need psychiatric intervention, and if so, what type of deviant behavior was manifested. Those patient records that could not be coded as clearly representing a psychiatric or a non-psychiatric case were coded as "questionable." All information was recorded on a standard form so that the data for the three hospitals could be standardized.

The criteria of Lavenhar and associates (18) were used to describe the degree of a patient's case. Their definitions of emergent, urgent, or nonurgent are as follows:

Emergent: Condition requires immediate medical attention; time delay is harmful to patient; disorder is acute and potentially threatening to life or function.

Urgent: Condition requires medical attention within a few hours; there is possible danger to the patient if medically unattended; disorder is acute but not necessarily severe.

Nonurgent: Condition does not require the resources of an emergency service; referral for routine medical care may or may not be needed; disorder is nonacute or minor in severity.

Classification of a patient's visit as psychiatric or nonpsychiatric was more difficult than classifying it on the basis of urgency. The presenting behaviors of psychiatric patients are so widely distributed among diagnostic categories that a diagnosis per se may have little relevance to the patient's behavior. We found the traditional psychiatric classifications (19-21) to be inadequate.

The three classifications of deviant behavior we used to describe the patients who came to each of the three hospitals' emergency rooms in need of "psychiatric intervention" are based both upon S.L.J.'s work and observations in the three emergency rooms and

Table 1. Percentage distribution of demographic characteristics and type of payment of patients visiting three emergency facilities

<i>Patients' demographic characteristics and type of payment</i> ¹	<i>Urban hospital—low SES (N = 240)</i>	<i>Residential hospital—middle SES (N = 240)</i>	<i>Downtown hospital—Industrial setting (N = 240)</i>
Age (years):			
1–20	35	44	10
21–40	37	35	55
41–60	20	13	22
61 and older	8	8	13
Race:			
White	22	90	77
Black	78	10	23
Sex:			
Male	42	57	47
Female	58	43	53
Marital status:			
Single	59	54	33
Married	25	35	49
Widowed or divorced ..	16	11	18
Type of payment:			
Insurance	36	72	70
Welfare	41	12	14
Medicare	7	5	10
Self-pay	16	11	6

¹Chi square test of the association between the hospital and its patients' demographic characteristics $P < 0.01$.

upon her conversations with E.R. personnel. In this classification system, which is described in more detail elsewhere (9), the three classes of deviant behavior are exemplified by:

1. The patient who is a victim of assault, such as child abuse, husband abuse, wife abuse, rape, or a gunshot or knife wound.
2. The patient who manifests psychosomatic symptoms, such as tension, nervousness, anxiety, or headache.
3. The patient who manifests bizarre behavior. The etiology of this behavior may be psychiatric illness, the influence of either alcohol or drugs, or a temporary crisis.

A basic assumption in this classification system is that not every patient in need of some type of psychiatric intervention is necessarily mentally ill. Patients experiencing a crisis, for example, may need only temporary external assistance to supplement their internal resources. The point is that at the time the patient comes to the emergency room that patient is considered to be in need of psychiatric intervention.

We had to code a number of the patient records as questionable because the patient's condition could not be clearly described as psychiatric or nonpsychiatric. The following record of an E.R. visit is an example.

A 17-year-old black, single mother brought in her 4-month-old son, stating he was not breathing well. The small child was in no obvious distress. When asked how long the child had experienced difficulty breathing, the mother responded, "Ever since he was born." The child was examined and no symptoms found. The mother and child were sent home with instructions for follow-up care in the clinic.

Based upon clinical observations in the emergency room, we speculated that this mother lacked confidence in her childrearing skills, had no family physician, and needed reassurance that her child was healthy. Thus, she made the E.R. visit out of extreme anxiety and the need for emotional support.

Following is an excerpt from the record of another patient whose psychiatric status could not be determined and whose record was therefore coded as questionable.

A father brought in his 6-year-old son, who reportedly has fallen while playing with a neighbor. The child has a fractured right arm. The child had been brought in 2 months earlier for a severe burn on the left side of his face.

A note had been made in the record that the child was very subdued during the emergency room visit and that there was a cluster of bruises on his buttocks; the possibility of child abuse was mentioned.

For each classification of coding described, an inter-rater reliability was assessed as the percentage of agreement between the two independent coders. Their agreement as to which records should be coded psychiatric versus nonpsychiatric versus questionable was 94 percent; as to the kind of deviant behavior, 96 percent; and as to the degree of urgency, 94 percent. Those patient records about which the raters disagreed were discussed and subsequently placed in one category or another by mutual agreement.

Results

Demographic status by hospital. Patients within each hospital were stratified by age, race, sex, marital status, and method of payment (table 1). The percentage for each stratum was based on the total patients served in each emergency room (240). Patients in the three emergency rooms differed on each of the stratified variables ($P < 0.01$ by the chi square test of association). Although an exact comparison was not possible, it appeared that based upon census tract data for each stratified area, differences in the distribution of patient characteristics at each hospital reflected differences in the locations of the hospitals. Thus, each hospital's E.R. patient population seemingly reflected the locale in which the hospital was situated.

Patients in the downtown hospital were more likely to be older, patients in the urban hospital were more likely to be black, and patients in the residential hos-

Table 2. Cumulative percentage distribution of lengths of stay of patients visiting three emergency facilities, by urgency of visit

Upper limits on length of stay (hours)	Urban hospital—low SES		Residential hospital—middle SES		Downtown hospital—Industrial setting	
	Emergent or urgent (N=160)	Nonurgent (N=69)	Emergent or urgent (N=218)	Nonurgent (N=11)	Emergent or urgent (N=215)	Nonurgent (N=25)
0.5	4	9	11	18	1	8
1.0	21	28	24	36	13	28
1.5	35	41	42	55	22	36
2.0	50	55	57	64	34	44
3.0	63	65	72	64	53	64
4.0	71	71	76	64	68	72
6.0	76	75	78	64	73	80

pital were more likely to be male. The differences in the marital status of patients in the three hospitals reflect the differing ages of their patients. In the downtown hospital, patients were likely to be older and also were more likely to be married, widowed, or divorced than were patients in the other two hospitals. Patients of the urban hospital differed from those of the other two hospitals in that they were less likely to have insurance and more likely to be receiving welfare payments. The urban hospital's patients were also more likely to be self-paying—an indication of a lack of insurance or of welfare payments.

Urgency and psychiatric status. The following table shows the percentage distribution of emergency visits within each hospital according to the degree of urgency ($P < 0.01$ by the chi-square test of association between hospital and degree of urgency).

Percent of total emergency room visits

	Urban hospital, low SES (N=240)	Residential hospital, middle SES (N=240)	Downtown hospital, industrial area (N=240)
Psychiatric status			
Emergent	3	3	4
Urgent	67	92	86
Nonurgent	30	5	10

Approximately the same percentage of E.R. visits at each hospital were classified as emergent. However, the patient population of the urban hospital's emergency room differed from that of the other two hospitals in that a greater percentage of its visits were classified as nonurgent ($P < 0.01$, $df = 4$, by the chi-square test of association). Conversely, a greater percentage of E.R. visits at the residential hospital and the downtown hospital were coded urgent. We (S. L. J. and L. Y.) observed that in general, the kinds of patients with emergent, urgent, and nonurgent visits were

similar in all three hospitals with one major exception. In the urban hospital, a greater number of the emergent or urgent visits involved violence such as rape, a gunshot wound, or a stab wound. This observation lends further support to the conclusion that the patient population of a hospital reflects its locale.

As the following table shows, the psychiatric status of patients making E.R. visits to the three hospitals also differed ($P < 0.01$, $df = 4$, by the chi square test of association). Again, the urban hospital was unique in that a larger percentage of its E.R. visits were classified as psychiatric than at the other two hospitals. Approximately the same number of visits at each hospital were classified as questionable in terms of psychiatric status. The chi square test of association between the hospital and psychiatric status was $P < 0.01$.

Percent of total emergency room visits

	Urban hospital, low SES (N=240)	Residential hospital, middle SES (N=240)	Downtown hospital, industrial area (N=240)
Degree of urgency			
Psychiatric	25	14	16
Nonpsychiatric	37	56	49
Questionable	38	30	35

Emergency room utilization patterns. Patients at the urban hospital were least likely, and patients at the residential hospital were most likely, to have had a previous E.R. visit ($P < 0.05$, $df = 2$, by the chi square test of association). The following table shows, by hospital, the differing circumstances of the patients' current E.R. visits, as well as the differing proportions of these patients who had previously visited the emergency room.

Percent of total emergency room visits

	Urban hospital, low SES (N=240)	Residential hospital, middle SES (N=240)	Downtown hospital, industrial area (N=240)
Patient's utilization pattern			
Had previous E.R. visit . . .	26	36	2
Circumstances of current E.R. visit:			
Brought by ambulance ¹ . .	9	10	15
Brought by police ²	11	5	4
Admitted to hospital ² . . .	10	3	17
Has family physician ² . .	37	80	72

¹ Chi square test of association between the hospital and the utilization pattern $P < 0.05$.

² Chi square test of association between the hospital and the utilization pattern $P < 0.01$.

On the current visit, patients at the downtown hospital were most likely to have been brought to the E.R. room by ambulance and least likely to have been brought in by police. Conversely, patients at the urban

Table 3. Cumulative percentage distribution of lengths of stay of patients visiting three emergency facilities, by psychiatric stress

Upper limits on length of stay (hours)	Urban hospital (low SES)			Residential hospital (middle SES)			Downtown hospital (Industrial area)		
	Psychiatric (N = 55)	Nonpsychiatric (N = 85)	Questionable (N = 89)	Psychiatric (N = 31)	Nonpsychiatric (N = 128)	Questionable (N = 70)	Psychiatric (N = 38)	Nonpsychiatric (N = 118)	Questionable (N = 84)
0.5	5	4	8	13	12	9	11	0	0
1.0	24	16	28	23	25	24	24	14	10
1.5	36	31	43	39	44	41	29	27	17
2.0	53	45	57	52	63	51	39	40	26
3.0	60	59	71	65	77	66	58	56	49
4.0	71	67	74	65	81	70	79	70	62
6.0	78	72	79	65	82	81	84	75	69

hospital were least likely to have been brought in by ambulance and most likely to have been brought in by police. Also, at the downtown hospital, patients were most likely to have been admitted as inpatients. The fact that only a few patients at the urban hospital had a family physician reflects this population's lower financial status. In contrast, most of the patients at the residential hospital and three-fourths of those at the downtown hospital had a family physician ($P < 0.05$ or $P < 0.001$ by the chi square test of association).

Whenever patients had indicated that they had a family physician, the physician's name was recorded. It could thus be observed that most of the physicians at the urban hospital whom patients identified were staff physicians at the nearby clinic. In contrast, at the other two hospitals, a sizable proportion of the physicians whom the patients identified were staff members of the hospital. Such a result is significant, since observation at the residential hospital showed that a number of the E.R. visits there could be considered encounters with private physicians. That is, the patient called the private physician when he or she was in distress, and the physician would respond, "Go to the emergency room; I'll meet you there."

Table 2 shows the length of patients' stays in the emergency room in each hospital by the degree of

urgency of the visit. At the urban hospital, 4 percent of the patients whose visits were classified as emergent or urgent were discharged within a half hour or less. Within an hour, 21 emergent or urgent patients and 28 percent of the nonurgent were discharged. Although at each hospital there was a trend for nonurgent patients to be discharged in less time than emergent or urgent patients, this trend was not statistically significant by the Mann Whitney Wilcoxon test (22).

Table 3 shows the length of stays in each emergency room by the patient's psychiatric status—psychiatric, nonpsychiatric, or questionable. Since the lengths of stay of patients whose status was classified as psychiatric, nonpsychiatric, and questionable were similar, the patient's psychiatric status did not appear to be associated with the length of stay.

Table 4 shows that during each 4-hour period of the day, the percentage of patients admitted to the emergency room with urgent or emergent cases was similar at all three hospitals. Thus, the percentage of patients with visits coded as emergent or urgent did not differ by the time of the patients' E.R. admissions.

Table 5 shows the percentage of patients classified as psychiatric in relation to the time of their admission to the three emergency rooms. A consistent pattern of admission of a greater percentage of psychiatric pa-

Table 4. Number and percent of patients admitted to three emergency facilities at various times of day whose visits were classified as urgent or emergent

Time of day of admission	Urban hospital (low SES)		Residential hospital (middle SES)		Downtown hospital (Industrial area)	
	Number	Percent	Number	Percent	Number	Percent
1-4:59 am	19	74	24	92	19	79
5-8:59 am	27	63	12	100	22	77
9 am-12:59 pm	44	55	47	91	57	93
1-4:59 pm	59	64	44	100	54	87
5-8:59 pm	54	83	44	95	37	89
9 pm-12:59 am	37	70	67	94	51	98
Total	240	70	238	95	240	90

Table 5. Number and percent of patients admitted to three emergency facilities at various times of day whose visits were classified as psychiatric

Time of day of admission to emergency room	Urban hospital (low SES)		Residential hospital (middle SES)		Downtown hospital (Industrial area)	
	Number	Percent	Number	Percent	Number	Percent
1-4:59 am	19	42	24	13	19	25
5-8:59 am	27	37	12	25	22	23
9 am-12:59 pm	44	18	47	17	57	9
1-4:59 pm	59	19	44	11	54	9
5-8:59 pm	54	28	44	9	37	22
9 pm-12:59 am	37	22	67	15	51	20
Total	240	25	238	14	240	16

NOTE: Chi square test of association between percentage of psychiatric patients and time of admission $P < 0.01$.

tients at night could be observed at all three hospitals. At each hospital, more psychiatric patients were admitted to the emergency room between 9 pm and 9 am than between 9 am and 9 pm ($P < 0.01$, $df = 1$, by the chi square test of association).

Discussion

Although utilization patterns in the emergency room have been described in a great deal of the literature over the past several years, many study results are conflicting and even contradictory (16). For example, it was found that at one hospital the greatest volume of patients came in during the evening or on weekends (23), whereas in another hospital the busiest hours were in the daytime and during the week (24). In one study, also, the majority of patients came to the emergency room because of accident-related injuries, and their visits could be classified as emergent or urgent (25). At another hospital, the majority of E.R. patients had nonurgent conditions (11,12). Thus, several basic questions in regard to emergency room use remain unanswered.

Possible reasons for such divergent results become clear when hospital location is considered as a potentially influential variable in emergency rooms utilization patterns. In particular, we found hospital location to be associated with the following: the characteristics of the general population served by the emergency room, the health care utilization patterns of these patients, the percentage of psychiatric patients visiting the emergency room, and the degree of urgency of the E.R. patients' conditions. The three E.R. rooms studied differed greatly because each served different populations and in different ways.

The urban hospital emergency room served a population that was largely poor, black, and single and without health insurance coverage or a regular source of health care, such as a family physician. A propor-

tionately greater number of psychiatric and nonurgent patients sought care at this facility than at the other two hospitals. In this respect the emergency room served as "the poor man's doctor (11-12). In striking contrast, the emergency rooms of the residential and downtown hospitals served populations that were mainly middle class, white, and married and that had health insurance and a regular source of health care, such as a family physician. Patients at these emergency rooms were less likely to need psychiatric intervention and were more likely to have their visits classified as urgent. Thus, the results of our study support previous research showing that hospital location influences the kind of patient population that an emergency room will serve (15-17).

The study results also showed, however, that specific hospital organizational patterns influenced the utilization pattern of E.R. patients, even when those patients had similar demographic characteristics. For example, the residential hospital and the downtown hospital served similar patient populations, but the utilization patterns of their patients differed. First, a greater proportion of patients at the residential hospital had previously visited its emergency room, perhaps because physicians at this hospital often treated their private patients there after regular office hours. Thus, the emergency room served as an after-hours office for physicians affiliated with this hospital. A second differential pattern is that patients in the residential hospital were the least likely of the three patient populations to be admitted for inpatient care. A possible reason is that the residential hospital's emergency room serves as a receiving hospital for emergent and urgent cases from several smaller hospitals in the surrounding area. Thus, the needs of the larger community and the hospital's organizational patterns tend to shape the utilization patterns of the facility's E.R. patients. A third difference in utilization patterns is that the downtown

hospital's patients are most likely to be brought to the emergency room by ambulance. The explanation for this difference may be that although both of these hospitals have large paramedic programs, an emergency number for the downtown hospital is aired frequently on several local radio stations. Thus, people in distress are more likely to use this hospital's emergency service. Conversely, for the past 3 years, the residential hospital has sought to discourage any inappropriate use of its paramedic service.

In sum, we cannot talk about the emergency room or about the emergency room crisis (17), because one emergency room is not the same as another, and one standard model for dealing with E.R. issues will not work in every organization. The role that an emergency room assumes is shaped by the location of the hospital and the particular needs of its patient population and the community at large. This fact has implications for the way that each emergency room should respond to the population it serves in terms of staffing, referrals, and its relationship with any nearby outpatient clinic.

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SYNOPSIS

JONES, PAUL K. (Case Western Reserve University), JONES, SUSAN L., and YODER, LURA: *Hospital location as a determinant of emergency room utilization patterns. Public Health Reports, Vol. 97, September-October 1982, pp. 445-451.*

The use of the emergency rooms of three private, acute care, non-

profit hospitals was investigated in relation to each hospital's location. The emergency room of the hospital located in an urban poverty area served as the "poor man's doctor," whereas the emergency rooms of the two hospitals in more affluent areas served more traditional emergency room patients. Investigation showed

that even when patient populations were similar in demographic characteristics, the hospitals' locations influenced emergency room utilization patterns. Thus, one emergency room is not the same as another, and one standard model for dealing with emergency room issues will not work in every facility.