Increased Health Care Costs Associated With ED Overcrowding

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The overcrowding of emergency departments (EDs) with inpatients results in an increased average inpatient length of stay; therefore, overcrowded hospitals have increased costs per patient. All admissions through the ED to our institution for 1988, 1989, and 1990 were reviewed. These admissions were analyzed based on whether they had spent less than 1 day or more than 1 day in the ED, after they had been admitted to the hospital and were waiting for a bed assignment. Analyses were performed for the five medical diagnosis-related groups, with the highest volumes of admissions via the ED. All categories were reviewed on the basis of whether or not the payor was Medicare. This was a retrospective data analysis of 3 years worth of hospital and ED length of stay. There was no intervention. The total number of patients admitted via the ED for 1988, 1989, and 1990 was 26,020. In 1988, 19% of admissions via the ED spent more than 1 day in the ED. The total hospital length of stay for this 19% was 11% longer than for the group who reached an inpatient bed on the first hospital day. In 1989, 32% of admissions via the ED remained in the ED for more than 1 day and had a 13% increase in total hospital length of stay. In 1990, 25% of admissions via the ED spent more than 1 day in the ED and had a 10% increase in total hospital length of stay. Inpatients who remained in the ED after admission had a greater average length of stay than those who were promptly transferred to inpatient units. This increased length of stay means an increased cost per patient; the overall impact for this 490-bed hospital was $6.8 million during the 3-year study period. (Am J Emerg Med 1994;12:265-266. Copyright © 1994 by W.B. Saunders Company)

Overcrowded hospitals have become a national phenomenon. The crisis has had its impact primarily on urban hospitals, but almost every state has reported at least one temporary crisis in overcrowding.[1]

In Connecticut, the number of hospital beds is controlled by the state. Some believe that by limiting the number of hospital beds, costs can be contained, ie, if less patients are admitted to hospitals, then less money will be spent on hospital reimbursement. We believe there may be an optimal occupancy rate for efficient hospitals, perhaps 85%. The overcrowding phenomenon has led to occupancy rates well above 90%. And because all hospital beds are not interchangeable, perhaps the ideal occupancy is 85% of each type of bed. Many physicians blame the overcrowding phenomenon on a specific bed type shortage, eg, there are not enough monitored beds.

The study hypothesis was that there is a cost to overcrowding. This study was undertaken because the authors believed that hospital overcrowding leads to inefficiencies that increase the overall inpatient length of stay, adding to the total cost of delivering care.

METHODS

This retrospective review examined 26,020 admissions during a 3-year period. All hospital admissions through the ED were reviewed. Admissions via our ED from January 1, 1988 through December 31, 1990 were included in this study. Data were obtained from the hospitals computerized database and billing system. Statistical analysis was performed using the two-tailed *t* test.

The actual cost of caring for a patient ($800 per day) was derived by dividing the entire cost of funding to the hospital by the total number of patients days during the 3-year period. This $800 per day per patient was used to calculate cost differences.

An approximation had to be made regarding a "day" in the ED, because our data were based on the billing computer. Therefore, less than 1 day and more than 1 day in the ED reflect whether or not a patient who was admitted was still present in the ED at midnight. Inpatient days at our institution are counted by the midnight census whether the patient is in the ED (and admitted) or whether the patient has been admitted to an inpatient bed. Total inpatient length of stay includes the time a patient spent in the ED after being admitted.

RESULTS

Table 1 shows the ALOS (average length of stay) for each of the three years. All patients were then divided into two groups based on how long they had remained in the ED before reaching an inpatient bed. The initial division of patients into these two groups implied that there was substantive information contained in the change in length of stay (ΔLOS) data. Statistical analysis was performed using a two-tailed *t* test.

The number of excess patients days in the group of patients who spent more than 1 day in the ED was calculated from the increment in hospital LOS and the number of patients who spent >1 day in the ED. This was derived from Table 2. There were 8,455 excess patient days during a 3-year period in our hospital associated with being held overnight in the ED waiting for a bed.

DISCUSSION

The problem of hospital and ED overcrowding has been reported in both the lay press and in the medical literature.

TABLE 1. ALOS for Patients Admitted via the ED

Year	No. of Patients	ALOS
1988	8,314	10.84
1989	8,514	11.93
1990	9,192	11.72

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TABLE 2. Excess Patient Days

Year	Total No. of Patients <1 day in ED	ALOS	Total No. of Patients >1 day in ED	ALOS	ΔLOS	Significance
1988	6,765	10.63	1,549	11.77	1.14	$P < .05$
1989	5,813	11.44	2,701	12.95	1.51	$P < .0001$
1990	6,855	11.30	2,337	12.56	1.13	$P < .0001$

Time Magazine's cover story, "EMERGENCY! Do You Want to Die?" focused on this crisis and its impact.[2] Both the emergency medicine literature and other significant journals within the medical community have documented both the general impact and specific causes and consequences.[3,4] Regional conferences and meetings have been called to seek solutions. The medical community and the political governing bodies have been drawn into this debate.

The impact has been felt in our nation's EDs in which the presence of patients for whom no hospital beds can be found creates a de facto ward and critical care unit in a space designed to evaluate and treat emergencies.[5] The effect of this phenomenon is that emergency admissions wait longer and longer to reach appropriate hospital beds, whereas new patients wait longer and longer to have their problems evaluated. Some patients seeking emergency care leave without being evaluated as a consequence of overcrowding-related extended waiting periods.[6,7] Overcrowding results in an unintended rationing of the access to emergency care.

A review of a large sample of admitted patients established a relationship between overcrowding (patients held overnight in the ED) and hospital length of stay.

This retrospective study did not allow determination of the original bed request from the ED. One could speculate whether the commonly held theory that monitored intensive care beds are the bottleneck is relevant. Patients in this study were waiting for both intensive care and nursing floor beds.

In this study, we found 8,455 excess hospital days as a result of the inefficiencies of overcrowding. This amounts to $6,788,144 in the 3-year study period, based on an actual cost of $800 per day per patient.

There is a significant increase in the average length of stay for patients who spend their first night in the ED because of hospital overcrowding. The reasons for this are open to speculation. Hospital overcrowding has a cost. There is cost in the quality of patient care, in the quality of the patient experience, and a large financial burden.

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