

---

# Planning for Emergency Medical Services in Boston

JOEL C. KLEINMAN, PhD, MARSHA M. TANNER, MPH, DONNA L. SOODALTER, BA,  
JEFFREY A. CUTLER, MD, MPH, and ROBERT J. WEISS, MD

EMERGENCY MEDICAL SERVICES have been the subject of numerous reports. Gibson and associates presented a bibliography in an earlier report (1). Study after study has pointed to the large increase in use of emergency rooms, as well as the large numbers of patients with nonemergency conditions who come to them. With the possible exception of reports on ambulance services, however, none of these studies (including the present one) have contributed to improvement of the emergency medical service system; one reason for this may be that reports on emergency services tend to ignore other components of the health care system.

The interdependence of the emergency medical system and other elements of the health care system should be evident. Inpatient admissions from the emergency room account for a substantial portion of all hospitalization. The lack of accessibility to primary medical care increases the number of emergency room visits, especially for nonemergency problems. Many emergency room visits require followup care in the outpatient department. Geographic coordination is also important.

As one facility implements changes, the repercussions will be felt in other facilities sharing the same population base. An example of this is the substantial decrease in the inpatient census of Boston City Hospital and the resulting need for transfer arrangements with other hospitals in Boston. The first test of this system resulted in an unsatisfactory response (2). Thus, studies concerning only one hospital are bound to have a limited impact on the system. Planning must encompass a well-defined, reasonably contained geographic area.

The development of an effective emergency medical care system eventually involves the development of a system of primary health care services that is accessible,

efficient, adequately financed, and sensitive to the prevention of illness as well as its cure.

In addition, as in other areas of health care, planning for emergency services and research dollars are often invested in the most dramatic rather than the most prevalent health care needs. For example, considerable emphasis is currently placed on equipping emergency vehicles with cardiac resuscitation units and training attendants to manage the cardiac patient en route to the hospital. While the new technology is indeed remarkable, the decision to allocate funds for such equipment should be based, in part, on the prevalence of cardiac conditions in relation to other problems facing the system and on more careful evaluation of the effectiveness of the innovation. Some of the data collected in this study relate to both of these issues.

When policymakers at both the State and local levels turn their attention to improving emergency services, a major barrier to the achievement of this goal is often the lack of areawide utilization data. At the time of this study, health planning efforts in Massachusetts had begun to focus upon improving emergency medical services. The Tri-State Regional Medical Program received a Federal grant for the planning and implementation of improved emergency medical services in Massachusetts, New Hampshire, and Rhode Island. In Massachusetts, Tri-State subcontracted with area comprehensive health planning agencies (CHP "b" agencies) to plan and implement regional programs. In addition, the Massachusetts Department of Public Health, with funds from the U.S. Department of Transportation, established the Office of Emergency Services. However, areawide data related to the use of emergency rooms were not available. Thus, the general purpose of the study was to describe the utilization pattern of emergency services in Boston in such a way

that informed planning for a system of emergency communications, transportation, and medical care in the city could proceed. A complete report of this study has been published (3). In this paper we highlight the results of the study which have manpower, cost, and service implications that should be considered in planning for emergency medical services.

## Methodology

Almost all emergency services in Boston are delivered by 11 institutions, the majority of which are teaching hospitals associated with 1 or more of 3 medical schools located in the city. Most of the hospitals report only the total number of daily visits to their emergency rooms. However, to plan efficiently, more detailed data are needed; for example, the residence of the patients so that need by geographic area may be determined; the patient mix in terms of degree of urgency of visits so that appropriate types of manpower are used; payment information so that financial problems can be anticipated; and mode of arrival so that the transportation system can be coordinated to the needs of the patients. Although most of this information was already available on the emergency room forms used by the hospitals, few of the hospitals used it to obtain an accurate profile of the population served.

A 9-day period (March 4–12, 1972) which included 5 weekdays and 2 weekends was selected for the study. Two source documents were used: (a) log sheets maintained by each emergency room and (b) medical records. Where necessary, three or four additional questions were attached to the emergency room forms to obtain comparable data from all the hospitals. The basic sociodemographic data were collected for all 10,200 visits during the period. No attempt was made to determine the number of patients from the number of visits, since it was assumed that the number of patients with more than one visit during the short study period would be negligible.

---

□ *Dr. Kleinman was associate, Harvard Center for Community Health and Medical Care, and assistant professor of biostatistics, Harvard School of Public Health, when this paper was prepared. Ms. Tanner is district manager, Health Care Services, Blue Cross of Massachusetts. Ms. Soodalter is research assistant, Harvard Center for Community Health and Medical Care. Dr. Cutler is assistant professor, Department of Preventive Medicine, Medical College of Wisconsin. Dr. Weiss is associate director, Harvard Center for Community Health and Medical Care, and associate dean for health care planning, Harvard Medical School.*

*This research was supported by a grant from Tri-State Regional Medical Program, by National Institute of Health Research grant No. 5 P16 HS00472 from the National Center for Health Services Research and Development, and by the Office of Community Health, Peter Bent Brigham Hospital. Tearsheet requests to Dr. Joel C. Kleinman, 9207 Topeka St., Bethesda, Md. 20034.*

Fourteen college students and hospital employees coded the information on the emergency forms. At a meeting held before March 4, all procedures were explained to the coders by the investigators. The coders remained at the same hospitals throughout the sample period. During the first few days of the study an investigator accompanied each coder to each hospital and answered any questions that arose. The completed code sheets were collected daily. Periodic checks were made at all hospitals throughout the sample period.

To describe the medical parameters of emergency room use, a classification system was devised, similar to one presented by Perkoff and Anderson (4). This system is based primarily on presenting complaint with urgency rated as one of three categories: (a) emergency—needs medical attention immediately to avoid possible loss of life or permanent harm, (b) urgent—needs medical attention within a few hours to avoid possible loss of life or permanent harm or needs medication for pain (other than aspirin), or both, or (c) nonurgent—all other conditions. Although these definitions are imprecise, more precise ones could not be applied and would not be appropriate owing to lack of knowledge of outcomes. They are intended as guidelines for physicians reviewing emergency room cases with data limited to presenting complaint, duration, age, and diagnostic impression.

A sample of 1,120 records was selected for classification. Two physicians (Cutler and Weiss) were each given a copy of the 1,120 emergency room records for coding urgency and presenting problems. Discrepancies occurred in approximately 30 percent of the cases, and these were discussed and resolved by the physicians. The discrepancies resulted mainly from difficulty in reading copies of the records and from multiple complaints by patients.

It was not possible to classify every visit in the sample based on all the information required. For example, chest pain can be rated only with duration information. Thus, if information was missing, we noted this but rated the visit in the highest category for that problem. If complaint was not available, other information (for example, diagnosis) was used to classify the probable presenting complaint; of the 1,120 records in the sample, 176 or 15.7 percent lacked information needed for complete classification. Duration and complaint accounted for more than 90 percent of the records with missing items (33 missing complaint, 128 missing duration).

The effect of missing complaints would account for a change of at most 2 percent in the problem distribution. The effect of missing duration, temperature, or blood pressure is reclassification of some urgents as non-urgents and some emergencies as urgents. If all the records with missing information had been classified in the lower urgency category, the distribution of urgency would have been 13 percent emergency instead of 15 percent, 48 percent urgent instead of 57 percent, and 39 percent nonurgent instead of 28 percent.

An independent check of the classification was provided by the data from the General Practice Unit at Peter Bent Brigham Hospital. Patients were triaged from the emergency room to the unit by a nurse who decided that their conditions did not require emergency care. The records of the General Practice Unit were indistinguishable from those of the emergency room; therefore, the physicians who were classifying urgency were not influenced by the nurse's classification. The results showed that no patient seen at the unit was classified in the emergency category by the physicians. This independent check provided a rough validation of the classification presented here as well as the nurse's classification.

When the physicians classified presenting problems and urgency, they also indicated the primary contact and secondary consultant needed for each patient in order to provide guidelines for manpower planning.

The charts of every 5th emergency room patient admitted as an inpatient and every 10th one not admitted were selected and classified according to the system described. The different sampling fractions were used to increase the precision of the estimate of the proportion of emergency patients. A comparison of various characteristics of the sample with the entire patient population indicated that the sample was representative. The sampling errors resulting from the estimates presented in the following section were very small—on the order of 1 percent. More details on methodology have been presented in the earlier paper (3).

The project was completed in 10 months at a cost of less than \$20,000. The major components of the cost were key punching, \$500; data processing \$1,400; coding data from the emergency room records \$2,700; one full-time and one part-time research assistant, \$8,600; and two part-time project coordinators, \$5,000.

Generalization of the results based on the 9-day period in March to the entire year should be made cautiously. Seasonal variation (especially weather and vacation periods) may affect the patient mix at the emergency room as well as the total number seen. These data should be interpreted as indicators. It is essential to collect similar data periodically for planning and evaluation. The limited study period, however, is not likely to affect the basic thesis of this paper, which is that planning for emergency medical services must be done on a citywide or regional basis and must include planning for the entire health care system.

## Results

During the 9 days studied, 10,200 visits were made to the 11 hospital emergency rooms surveyed. Extrapolation of this figure for the entire year gives an estimated 395,000 emergency room visits in the city of Boston. Three of the hospitals (Boston City Hospital, Children's Hospital Medical Center, and Massachusetts General Hospital) accounted for 60 percent of the visits.

Table 1 shows the estimated proportions of emergency, urgent, and nonurgent visits in each hospital. On the whole, 15 percent were emergencies, 57 percent urgent, and 28 percent nonurgent. The range in patient mix among hospitals was large: from 7 to 22 percent emergencies and 11 to 61 percent nonurgent (excluding the General Practice Unit at Peter Bent Brigham Hospital).

The urgency mix found in this study is similar to that reported elsewhere. For example, Udelson (5), using the same classification system proposed by Kleinman and associates (3), found 13 percent of visits were emergencies, 54 percent were urgent, and 33 percent nonurgent in North Shore (Mass.) emergency rooms. Using different methods of classification, Gibson and associates (7) (in a 1969 Chicago survey) reported 10 percent emergencies, 45 percent urgent, 35 percent nonurgent, and 10 percent scheduled. Weinerman and associates, in a New Haven study in 1964 (6), classified 6 percent of the cases as emergencies, 36 percent as urgent, and 56 percent as nonurgent.

Of the 12 most common presenting conditions which follow, trauma was the largest category among the 10,200 visits. However, only 19 percent of the trauma cases were classified as emergencies and 11 percent as nonurgent. From data not presented here, we found that only 3 percent of the total number of visits were because of fractures, and 4 percent were for head injuries (including minor lacerations).

<i>Presenting condition</i>	<i>Percent of visits</i>
Trauma . . . . .	29.0
Cold, cough, sore throat . . . . .	8.6
Abdominal pain . . . . .	7.1
Localized painful swelling or infection . . . . .	4.2
Earache . . . . .	3.6
Genitourinary problem . . . . .	3.5
Followup or scheduled care . . . . .	3.4
Skin problem, rash . . . . .	3.2
Wheezing, difficulty breathing . . . . .	3.0
Nausea, vomiting, or diarrhea . . . . .	2.9
Chest pain . . . . .	2.8
Vague or otherwise undefined . . . . .	2.8
All others (24 different categories) . . . . .	25.9

The presenting condition and urgency were used to provide physician manpower guidelines. The detailed list of suggested primary contact for each condition is given in our earlier report (3). Of the 10,200 visits, an internist or a pediatrician was required for 56 percent, a surgeon for 38 percent, a psychiatrist for 2 percent, an obstetrician-gynecologist for 1 percent; for the remaining 3 percent, the type of physician was unknown. A secondary consultant, most often a surgical specialist, was required for only 12 percent of the visits. Some variation occurred among facilities regarding appropriate manpower, but the overall impression of a large proportion of visits requiring an internist remained; this finding is especially important because emergency rooms are usually staffed primarily by surgeons—at least one hospital's emergency room was staffed entirely by surgeons.

**Table 1. Estimated proportions of emergency, urgent, and non-urgent visits to emergency rooms and 1 general practice unit in 11 Boston hospitals, March 4–12, 1972**

Hospital	Percent of visits			Total number of visits
	Emergency	Urgent	Nonurgent	
Beth Israel	14.7	57.4	27.9	742
Boston City	15.1	56.2	28.7	3,058
Carney	20.9	60.5	18.6	865
Children's	11.4	54.6	34.0	1,499
Faulkner	14.0	74.7	11.3	363
Massachusetts Eye and Ear	8.8	73.7	17.5	582
Massachusetts General	18.8	51.9	29.3	1,395
New England Deaconess	11.6	27.0	61.4	136
New England Medical	6.9	48.3	44.8	358
Peter Bent Brigham	19.1	66.9	14.0	500
Peter Bent Brigham - General Practice Unit	33.3	66.7	195	
St. Elizabeth's	22.0	57.3	20.7	507
<b>Total</b>	<b>15.0</b>	<b>57.0</b>	<b>28.0</b>	<b>10,200</b>

The large variation among the hospitals in the proportions of emergency and nonurgent patients and the types of presenting problems indicate that a stratification of function of emergency rooms already exists to some extent. A more rational distribution of patients to emergency rooms and other more appropriate facilities may result if this stratification is formalized. In addition, such specialization may result in more efficient use of physician manpower.

Age and sex were important determinants of utilization. The following utilization rates by age and sex were calculated by use of the 1970 census counts for the city of Boston in the denominators and emergency room visits during the 9-day period by Boston residents only (74 percent of all visits) in the numerators.

Age (years)	Male	Female	Total
Under 5	25.6	28.1	26.8
5–14	12.3	11.3	11.8
15–34	12.6	13.4	13.1
35–64	9.9	6.3	7.9
65 and over	7.8	4.7	5.9
<b>Total</b>	<b>12.4</b>	<b>10.8</b>	<b>11.5</b>

The under 5 age group had the highest utilization (27 per 1,000) while the over 65 group had the lowest (6 per 1,000). The differences between males and females were statistically significant beyond the .05 level only for these two age groups ( $P < .001$  in both cases—assuming that denominators were constant and the numerator had a Poisson distribution).

The over 65 age group had the highest rate of visits classified as emergencies, and the under 5 group had the highest nonurgent rate. In addition, males exceeded females in the proportion of emergencies for nearly every age group.

The patient's source of payment also differs considerably among the hospitals (table 2): 36 percent of the patients at the Peter Bent Brigham Hospital and at Boston City Hospital reported no third-party payment, while only 2 percent of those in Deaconess and 5 percent in Faulkner were in this group. Children's Hospital had high proportions of patients using welfare or Medicaid coverage. If patient transfers from overcrowded to less-used facilities are to become feasible, financial planning is needed. Hospitals with high proportions of patients covered by private insurance may be unwilling to participate in a transfer plan which increases their proportion of patients with no third-party coverage unless adequate reimbursement is guaranteed.

More than half the patients in the study were discharged without followup, nearly 30 percent were referred to the hospital's outpatient department, and 11 percent were admitted as inpatients. Forty-three per-

**Table 2. Percentage distribution of patients' sources of payment for visits to 11 Boston hospitals**

Hospital	Medicare or Medex	Medicaid	Welfare	Blue Cross, Blue Shield	Other Insurance	Multiple sources	None	Unknown	Total visits
Beth Israel	9.7	1.2	12.9	32.2	20.5	1.6	18.7	3.1	742
Boston City	2.2	1.1	38.3	12.2	9.3	2.0	31.9	3.0	3,058
Carney	8.0	1.5	19.2	34.0	23.7	1.3	10.5	1.8	865
Children's	.5	36.5	16.4	21.9	11.0	2.7	11.0	.1	1,499
Faulkner	3.6	3.3	1.4	49.0	27.8	4.7	4.7	5.5	363
Massachusetts Eye and Ear	5.2	1.2	6.4	39.7	22.5	3.4	18.4	3.3	582
Massachusetts General Hospital	7.4	1.1	9.1	24.1	17.5	3.8	24.7	12.2	1,395
New England Deaconess	8.8	.7	2.2	45.6	28.7	11.8	2.2	.....	136
New England Medical	5.9	7.0	28.5	23.7	19.0	.8	11.5	3.6	358
Peter Bent Brigham	7.8	.2	22.4	21.6	4.0	5.4	35.6	3.0	500
Peter Bent Brigham - General Practice Unit	3.1	.....	25.6	23.6	1.5	2.1	35.4	8.7	195
St. Elizabeth's	5.7	1.4	9.7	39.1	25.0	1.0	16.6	1.6	507
<b>Total (by source)</b>	<b>4.6</b>	<b>6.6</b>	<b>21.2</b>	<b>24.3</b>	<b>15.1</b>	<b>2.6</b>	<b>21.7</b>	<b>3.9</b>	<b>10,200</b>

cent of those admitted were classified as emergencies. The following table shows the proportion of emergency room patients admitted and the admissions from the emergency room as a proportion of all admissions during the study period for each hospital. Nearly 30 percent of all admissions to the 11 hospitals during the study period were admitted from the emergency room.

Hospital	Patients admitted		Percent of total admissions
	Number	Percent	
Beth Israel	121	16.3	30.2
Boston City Hospital	329	10.8	54.6
Carney	90	10.4	37.8
Children's	69	4.6	25.5
Faulkner	35	9.6	25.7
Massachusetts Eye and Ear	2	.3	.9
Massachusetts General Hospital	262	18.8	38.0
New England Deaconess	42	30.9	11.4
New England Medical Center	27	7.5	10.2
Peter Bent Brigham Hospital <sup>1</sup>	77	11.1	24.1
St. Elizabeth's	49	9.7	14.0
Total	1,103	10.8	28.5

<sup>1</sup>General Practice Unit and emergency room combined.

The high proportion of inpatient admissions from the emergency room emphasizes the need for financial planning because payment for this aspect of hospital service, not just emergency room visits, is involved. The impact of inpatient admissions from the emergency room also depends on the length of stay of such patients. It was not possible to collect this information in the present study, but such data should be collected in the future.

## Residence Patterns

One-fourth of the patients resided outside of Boston. The home address of each patient residing in Boston was identified by census tract. The census tracts were combined into the 15 health and welfare areas in Boston. Table 3 shows the total number of emergency room visits to the 11 hospitals, utilization rate per 1,000 population during the study period, and patient mix for each health and welfare area. The utilization rate ranged from 6 per 1,000 in West Roxbury to 24 per 1,000 in South End. A number of factors contribute to the large variation in utilization rates: sociodemographic variables, accessibility (in terms of transportation and distance) of the emergency room, use of emergency rooms outside the city, and availability of other sources of health care.

East Boston illustrates the effect of a neighborhood health center. The East Boston Neighborhood Health Center operates a 24-hour, 7-day emergency service. If the visits to that facility were included in the emergency room utilization rate, the rate would almost triple. However, the proportion of nonurgent visits to hospital-based emergency rooms from East Boston was the highest of all areas. Even when neighborhood health centers are available for limited hours, there is evidence (7,8) that their registrants decrease their use of emergency rooms.

## Transportation Patterns

Three ambulance services provided transportation for 12 percent of the patients (table 4). Police runs (which include squad cars as well as dual-purpose vehicles) accounted for 7 percent (27,650 cases yearly), and the Boston Department of Health and Hospitals ambulances and private ambulances accounted for 3 per-

Table 3. Percent of visits to emergency rooms and 1 general practice unit in 11 Boston hospitals, by residence of patients in each of the 15 health and welfare areas

Health and welfare area	Percent of visits			Total visits		Utilization rate per 1,000 population <sup>1</sup>
	Emergency	Urgent	Nonurgent	Number	Percent	
Brighton	23.0	49.4	27.6	456	4.5	7.16
Back Bay	14.1	57.7	28.1	413	4.1	7.96
West End	6.5	61.3	32.2	126	1.2	9.26
North End	14.3	71.3	14.3	83	.8	7.49
Charlestown	28.0	56.0	16.0	132	1.3	8.60
East Boston	13.2	52.9	33.9	251	2.5	<sup>2</sup> 6.45
South Boston	15.2	53.2	31.6	527	5.2	13.69
South End	19.0	49.7	31.3	585	5.7	23.75
Roxbury	6.8	60.0	33.2	1,266	12.4	20.14
Dorchester North	11.9	55.4	32.7	1,581	15.5	15.62
Dorchester South	17.1	49.2	33.6	1,015	10.0	13.43
Roslindale	25.1	48.6	26.4	293	2.9	7.34
Jamaica Plain	3.6	73.2	23.2	333	3.3	10.01
West Roxbury	8.6	68.5	22.9	185	1.8	5.96
Hyde Park	22.5	72.5	5.0	236	2.3	6.19
Outside Boston	17.6	60.0	22.4	2,659	26.1	.....
Total	15.0	57.0	28.0	<sup>3</sup> 10,200	100.0	.....

<sup>1</sup> Area population based on 1970 census data.

<sup>2</sup> If the emergency service of the East Boston Neighborhood Health Center is included, the number of visits from East Boston becomes 682 and the utilization

rate becomes 17.53.

<sup>3</sup> Includes 59 for which patient residence was unknown.

**Table 4. Percent of emergency, urgent, and nonurgent visits, by method of transportation to 11 Boston hospitals**

Mode of travel	Percent of visits			Total visits	
	Emergency	Urgent	Nonurgent	Number	Percent
Car .....	13.5	56.4	30.1	5,668	55.6
Walk .....	10.6	62.9	26.5	709	7.0
Taxi .....	9.4	60.7	29.9	1,419	13.9
Public transportation ..	4.2	56.9	38.8	581	5.7
Private ambulance .....	40.1	47.9	12.0	326	3.2
Department of Health and Hospital ambulances	38.1	42.1	19.9	308	3.0
Police vehicle	31.5	58.6	9.9	684	6.7
Other .....	26.3	42.2	31.5	85	.8
Unknown .....	17.3	60.9	21.8	420	4.1
<b>Total .....</b>	<b>15.0</b>	<b>57.0</b>	<b>28.0</b>	<b>10,200</b>	<b>100.0</b>

cent each (11,850 cases yearly). Thus, 88 percent of the patients arranged for their own transportation. Of the patients arriving by ambulance, 35 percent were emergencies. More than half the patients in each urgency category arrived at the hospital by private automobile.

In addition, we found that of 30 patients in the sample presenting with chest pain, nearly 75 percent arrived at the hospital by private automobile, and only 15 percent used an ambulance or police transportation. Approximately one-third of these 30 patients had the pain for 2 days or longer. Hackett and Cassem (9) and Moss and co-workers (10) have reported average delays of more than 3 hours from the time of onset of symptoms before patients with myocardial infarction seek medical help. Hackett and Cassem (9) also indicated that one factor affecting delay is the patient's denial of his symptoms, a factor which is difficult to control even with public education programs. This information should be considered when planning the number of staff and ambulances with equipment to deal with cardiac problems.

## Discussion

The first stage in rational planning requires goal specification. Before planning an emergency medical system for the city of Boston, the responsible parties must agree upon their goals. For example, is the system to be restricted to providing care on an episodic basis for true emergencies, or is the emergency medical system to provide entry for patients needing routine care into the entire health care system? A system designed for one of these goals might not be able to achieve the other goal efficiently. It should be clear from the characteristics of the emergency room patients in the present study that major planning efforts should concentrate on the management of the nonemergency patient.

We wish to stress again that the emergency medical care system cannot be isolated from the rest of the

health care delivery system. Effective solutions can derive only from cooperative planning among the components of the entire medical system in the city—hospitals, neighborhood health centers, and transportation and communication facilities. The 11 emergency rooms in the study vary significantly in terms of number of patients seen, patient mix, and source of payment. Planning the levels of services needed on a geographic basis and the appropriate facility to deliver each level of service is required. The high proportion of urgent and nonurgent visits indicates that conveniently situated major emergency centers with satellite emergency services or first-aid stations may be a sensible direction for the planning and coordination of emergency services.

The emergency service of the East Boston Neighborhood Health Center provides an example of a nonhospital-based health facility providing medical care on a 24-hour, 7-day basis. Only 8 percent of the patients seen during the 9-day period at this facility needed to be referred to a hospital emergency room. Evaluation of this facility in terms of costs, quality of care, and kinds of health care sought should provide useful information and a possible model for citywide planning.

Triage of patients at the emergency room also seems feasible, as indicated by the data obtained from the general practice unit at the Peter Bent Brigham Hospital. Patients presenting at Brigham's emergency room were first seen by a nurse and, during the hours of operation of the general practice unit, appropriate patients were triaged there; 195 patients were seen at the unit and 290 were seen at the emergency room. None of the patients seen at the general practice unit were admitted as inpatients, and none were classified as emergencies. Thus, the general practice unit relieved the emergency room of about 40 percent of its potential workload. The Beth Israel Ambulatory Center now in operation at the Beth Israel Hospital has a similar unit and has experienced a comparable reduction in its emergency room load.

The preceding are examples which seem to work. However, counter-arguments are always possible. For example, T. R. Willemain, assistant professor of Operations Research, Massachusetts Institute of Technology, pointed out in a personal communication (June 23, 1974) that "it is possible to deteriorate the level of service (as measured by average treatment delay) for emergency cases by uncoupling some emergency room resources and setting them up as a general practice unit." Thus, reorganization of the emergency service—for example, using house staff on the wards for backup on true emergencies—must accompany the institution of a general practice unit. Merely diverting resources to care solely for non-emergency patients may not be a satisfactory alternative.

These conflicting views again point to the need for more careful planning and evaluation. Gibson (11) has

outlined methods for evaluating emergency medical services and Willemain (12) has written a thoughtful critique of measures used in evaluating emergency services. However, as indicated earlier, planning and evaluation must be done on a citywide basis, and planning must begin with appropriate persons from the different health facilities agreeing on the goals of the system. This implies a need for one agency or institution to take responsibility for overall planning.

Merely adding an emergency services planning agency to the plethora of existing planning agencies will not bring about necessary changes in the system. The need for legislation which organizes all health planning activities and provides one agency with the authority to implement suggested changes is crucial to the development of adequate health services. It is only with both responsibility and authority that the planning agency can be truly accountable to the public.

### References

1. Gibson, G., Bugbee, G., and Anderson, O. W.: Emergency medical service in the Chicago area. Center for Health Administration Studies, Chicago 1970.
2. BCH plan to handle overload left patients needlessly waiting. Boston Globe, Jan. 9, 1974.
3. Kleinman, J. C., et al.: Emergency medical services in the city of Boston. Harvard Center for Community Health and Medical Care, Boston 1972.
4. Perkoff, G. T., and Anderson, M.: Relationship between demographic characteristics, patient's chief complaint, and medical care destination in an emergency room. *Med Care* 8: 309-323, July-August 1970.
5. Udelson, J. M.: Utilization of emergency departments in the North Shore health planning region. North Shore Health Planning Council, North Shore, Mass., Apr. 1, 1974.
6. Weinerman, E. R., et al.: Yale studies in ambulatory medical care: Determinants of use of hospital emergency service. *Am J Public Health* 56: 1037-1056, July 1966.
7. Hochheiser, L. I., et al.: Effect of the neighborhood health center on the use of pediatric emergency departments in Rochester, New York. *N Engl J Med* 285: 148-152, July 15, 1971.
8. Gold, M. R., and Rosenberg, R. G.: Use of emergency room services by the population of a neighborhood health center. *Health Serv Rep* 89: 65-70, January-February 1974.
9. Hackett, T. P., and Cassem, N. H.: Factors contributing to delay in responding to the signs and symptoms of acute myocardial infarction. *Am J Cardiol* 24: 651-658, November 1969.
10. Moss, A. J., et al.: Delay in hospitalization during the acute coronary period. *Am J Cardiol* 24: 659-666, November 1969.
11. Gibson, G.: Guidelines for research and evaluation of emergency medical services. *Health Serv Rep* 89: 99-111, March-April 1974.
12. Willemain, T. R.: The status of performance measures for emergency medical services. Operations Research Center, Massachusetts Institute of Technology, TR-06-74, Boston, 1974.

## SYNOPSIS

KLEINMAN, JOEL C. (Harvard Center for Community Health and Medical Care), TANNER, MARSHA M., SOODALTER, DONNA L., CUTLER, JEFFREY A., and WEISS, ROBERT J.: *Planning for emergency medical services in Boston. Public Health Reports, Vol. 90, September-October 1975, pp. 460-466*

The results of a survey of 10,200 visits to 11 Boston hospital emergency rooms during a 9-day period in March 1972 are presented. The survey was designed to provide data on emergency room use to permit more informed planning by public agencies concerned with improving areawide emergency medical services.

The 11 institutions surveyed provided virtually all of the emergency medical services in the city of Boston. A majority are teaching hospitals affiliated with one or more of the three medical schools in the area. Of the 11 hospitals, 3 accounted for 60 percent of all emergency room visits.

Survey data were extracted from emergency room log sheets and

hospital medical records of individual patients. Information collected included the residence pattern of patients within the geographic area, the patient mix by degree of urgency based on presenting complaints, mode of transportation to the hospital, and age and sex of the patients.

Only 15 percent of the 10,200 visits were true emergencies. Fifty-seven percent were classified as urgent and 28 percent nonurgent. The mix among the 11 hospitals ranged from 7 to 22 percent in the emergency category, and 11 to 61 percent in the nonurgent classification.

Trauma accounted for 19 percent of all admissions, with 3 percent attributed to fractures and 4 percent to head injuries. Fifty-six percent of the emergency cases required the services of an internist or pediatrician, 38 percent a surgeon, and 1 percent an obstetrician.

The highest utilization rate—27 per 1,000 population—was recorded for the under 5 age group. Although the 65 and older age group had the lowest

utilization rate of 6 per 1,000, this group had the highest rate of visits classified as emergencies. Children under 5 accounted for the highest proportion of nonurgent visits.

The survey revealed that 30 percent of all hospital admissions were from the emergency room. One in four emergency patients lived outside the city of Boston. A neighborhood health center and a hospital general practice unit reduced hospital emergency room workloads appreciably, even when they were open only during daytime hours.

Eighty-eight percent of all patients arranged for their own transportation, usually by private automobile. Of those arriving by ambulance, only 35 percent were classified as emergencies.

The survey data reinforce the conclusion that major planning efforts should be concentrated on the management of the nonemergency patient. The data also emphasize the need for a single agency to be responsible for overall planning for emergency medical services on an areawide basis.