Analysis of a Hospital Ambulance Service

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MANY LARGE general hospitals in the United States, especially municipal hospitals, have for years provided an active ambulance service. Prior to World War II a member of the house staff, usually an intern, rode the ambulance on each trip. Although the medical attendants provided a primitive form of home care, the ambulance was used primarily for emergency transport service. Use of an ambulance to transport patients with nonurgent illnesses or minor injuries was actively discouraged.

Since World War II, however, the staffing pattern of hospital ambulance services has changed. Medical house officers no longer are routinely assigned to ambulance duty. Nonmedical attendants with various degrees of skill and training are now ambulance team members with the highest level of technical skill. Yet most persons assume that the function of ambulance service has not changed in the last 20 years. The few studies of hospital ambulance services have focused on the equipment in the ambulance or the training of ambulance personnel without exploring the functional patterns of hospital ambulance services today (*1–4*).

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This study was made to determine the current function of the Boston City Hospital ambulance service. The hospital administration continued to staff, equip, and regard its ambulance service as an emergency service. This concept was also shared by medical staff. As administrators of the emergency floor, we gradually came to feel that emergency transport was but a minor function of the hospital ambulance service.

Methodology

This study is based on a review of the Boston City Hospital ambulance service records during the 10-week period December 1, 1965, to February 10, 1966.

The service consists of six modern, well-equipped ambulances staffed by a driver and a medical aid man. Medical aides have taken a course equivalent to the Red Cross first aid course and are given additional inservice training by professional hospital personnel. Administratively, aides are attached to the hospital transportation office, a division of the emergency medical services. They are periodically assigned to assist on the emergency floor to become reacquainted with emergency medical procedures. A physician or nurse is assigned to the ambulance only in the event of a disaster or at the specific request of the police, but these instances are infrequent. This service, the only hospital-based ambulance service in Boston, is citywide.

In addition to the hospital ambulance service, the police department provides an emergency transport service using its multipurpose vans. These vehicles contain a stretcher and blanket,

but not the sophisticated equipment of the ambulances. Police assigned to these vehicles have had first aid training provided by their department. Police also transport ambulatory patients and those with minor injuries in their cruisers.

Private ambulance companies in the city are not considered part of the emergency service because they are usually not called to emergencies by police, hospitals, or the public.

The factors which determine if a person is transported by hospital or police ambulance are unrelated to an overall plan. It depends on which ambulance service is called, and both telephone numbers are in the telephone directory. Police ambulances can bring patients to the emergency facilities of a number of hospitals, but more than half their patients are brought to Boston City Hospital. The police vans are more likely to be called for street accidents than are ambulances because police at the scene of the accident are likely to radio for the van already cruising in the area.

When a call requesting a hospital ambulance is received, the dispatcher obtains the name, age, sex, address, and complaint of the patient.

This information is recorded on a slip given to the ambulance aide. While the aide rides with the patient, he completes a hospital admission record. Study data were derived from these standard hospital records. During the 10-week study period 1,296 ambulance trips were made. Every third record was used for study, providing a sample of 432 records.

For study purposes use of the term "urgent" was based on the physician's evaluation as noted on the patient's emergency floor record. A medical condition which required medical attention within 6 hours was considered urgent. The terms "accident" and "nonaccident" were also taken from the evaluation and were defined by the patient's own description of the incident leading to the emergency facility visit.

Findings

Of the 432 ambulance trips analyzed, 88 percent (380) involved residents of Boston. The few trips made for nonresidents were primarily in emergencies such as motor vehicle or street accidents. Most patients who used the ambulance service lived on or near the ground level.

Floor of residence	*Number of trips*	*Percent of trips*
Ground	160	37
First	124	29
Second	72	17
Third or higher	44	10
Not specified	32	7
Total	432	100

There was a slight predominance of calls for females—222 calls (52 percent) for female patients in contrast to 190 calls (44 percent) for males. The patient's sex was not recorded on 20 records (4 percent). Only 12 percent of ambulance calls were for Negroes (table 1).

The ambulance service was used primarily to transport adults, especially geriatric patients (table 1). Children were rarely ambulance passengers.

Three-quarters of the ambulance trips were for distances of 6 miles or less (table 2). Only 1 percent of the ambulance trips were for distances more than 10 miles from the hospital, and 16 percent were for distances between 7 and 10 miles. These longer trips, almost invariably made to transport a patient from the Boston City Hospital to another institution or to bring a patient from an affiliated facility, required the longest time to complete (table 2). Most ambulance trips (61 percent) required less than 45 minutes.

In many trips there was no delay in picking up or depositing a patient. In 60 percent of the ambulance trips (259) there was a delay in pick-

Table 1. Use of Boston City Hospital ambulance service, by patient's race and age

Patient	Number of trips	Percent of trips
Total	432	100
Race:		
White	340	80
Negro	52	12
Chinese	8	1
Not specified	32	7
Age (years):		
Less than 1	0	----
1–5	3	1
6–12	3	1
13–18	13	3
19–44	49	11
45–65	120	28
Over 65	212	49
Not specified	32	7

Table 2. Distance one way, duration, and time of departure of ambulance trips, Boston City Hospital

Characteristics of trips	Number of trips	Percent of trips
Total	432	100
Distance (miles):		
Less than 1	44	10
1–3	152	35
4–6	132	31
7–10	68	16
More than 10	4	1
Not specified	32	7
Duration:		
10 minutes	8	2
10 to 20 minutes	50	11
20 to 30 minutes	112	26
30 to 45 minutes	95	22
45 minutes to 1 hour	84	19
1 to 1½ hours	51	12
1½ to 2 hours	8	2
More than 2 hours	8	2
Not specified	16	4
Time of departure:		
8 a.m. to noon	136	32
Noon to 4 p.m.	128	30
4 p.m. to 8 p.m.	56	12
8 p.m. to midnight	48	11
Midnight to 4 a.m.	12	3
4 a.m. to 8 a.m.	20	5
Not specified	32	7

ing up or depositing the patient of only 5 to 10 minutes, and in 7 percent (30) the delay was 5 minutes or less. Only in one-third of the ambulance trips was more than 10 minutes spent in receiving or depositing a patient at his home or resident medical care facility.

The use of the siren was determined by the ambulance aide. Aides are instructed not to use a siren unless there is an emergency indicating a need for speed. The siren was used in only 69 of the 432 ambulance trips (16 percent).

Thirty-two percent of the ambulance trips (table 2) were made between 8 a.m. and noon. Another 30 percent occurred between noon and 4 p.m. Twelve percent occurred between 4 p.m. and 8 p.m., and 11 percent from 8 p.m. to midnight. Only 8 percent of the calls were recorded between midnight and 8 a.m. The departure time of 7 percent of the calls was not recorded.

Only 120 trips (28 percent) were classified as emergencies, while 280 trips (65 percent) were considered nonurgent. For 7 percent of the trips this information was not recorded. Few patients transported by the ambulance service were accident victims—40 patients (9 percent) were in accidents in contrast with 392 who were not. Of the 40, not all were seriously injured. Six patients had lacerations, 32 had fractures or joint injuries, one multiple injuries, and one another type of injury.

However, more than half the patients, 240 or 56 percent, were transported by stretcher. Sixty patients (14 percent) were transported by wheelchair. The ambulatory status of 32 patients was not recorded.

A minimum of first aid was given patients by the ambulance attendants. Attendants gave oxygen to four patients, put splints on two patients, inserted airways into two, and applied a dressing to one before bringing him to the hospital.

Almost as many patients were transported from the hospital as to it (table 3). One-fourth of all trips were between hospitals, usually between chronic disease hospitals and the general hospital. One-third of the incoming and four-fifths of the outgoing trips were between the hospital and other medical care facilities. Some patients, especially those on incoming trips, were critically ill at the time of transfer. This was often true of nursing home patients sent to the hospital because of complications which developed while they were in the nursing home.

Discussion

At Boston City Hospital the ambulance service provides primarily a transport system for ill patients rather than an emergency transport

Table 3. Use of Boston City Hospital ambulance service, by destination of trip

Destination	Number	Percent of incoming or outgoing trips	Percent of total trips
To hospital	204	100	48
From home	131	64	31
From another hospital	24	12	6
From nursing home	49	24	11
From hospital	196	100	45
To another hospital	82	42	19
To home	43	22	10
To nursing home	71	36	16
Not specified	32		

service for patients with traumatic injuries. The hospital has been regularly purchasing expensive ambulances and equipment on the assumption that it was running an emergency ambulance system, when in fact, the police vehicles, which have a minimum of emergency equipment, handle more traumatic emergencies.

This indicates a need for a study of police systems for transporting patients and may even open up the question of whether emergency ambulances in an urban area need the expensive equipment advocated by many. We feel that the Boston Police Emergency Transport System is doing a satisfactory job without extensive equipment. We feel that training emergency personnel should have priority over purchasing equipment and that in municipal systems where the tax dollars are limited, it is better to spend money on equipment for emergency facilities than for ambulances.

The question of the patient's location was asked to test the authors' hypothesis that difficulty in getting up and down stairs was a factor in determining whether a patient called for an ambulance or used private resources to reach the emergency floor. Our hypothesis was not confirmed. There was no excessive use of ambulance service by upper-story residents.

The racial distribution of patients using ambulances reflected that of the general population, but not that of the hospital service area. The fact that Negroes did not use ambulances in proportion to their use of the hospital is of interest. Dialogue between hospital administrators and local community leaders suggests that this was probably due to sociological factors associated with group identification rather than patient need or hospital policy.

The predominance of ambulance calls for females can be explained several ways. A large percent of the patients using the emergency facilities were alcoholics, who were usually males who arrived at our hospital via the police rather than the hospital ambulance service. Another large group of persons using the hospital were nursing home patients. These patients were predominately female and usually arrived at the hospital in a hospital or private ambulance.

Approximately one-third of the emergency patients are children, but ambulances were seldom used to transport children. This lack of use indicates that the ambulance was called when other means of getting to the emergency floor were lacking. Children can be carried, unlike equally ill adults.

The ambulance attendants are not permitted to transport ambulatory patients. This policy is followed to avoid letting a patient who may have a myocardial infarct walk. Thus, the 14 percent of patients transported in wheelchairs included persons who otherwise might be considered ambulatory.

The shift in the major function of the Boston City Hospital ambulance service, from emergency care to patient transport, indicates the changing role of the modern urban emergency floor. We wish to stress that nothing in this study applies to rural areas, where differences in time, distance, and sociocultural factors are considerable. We believe that our findings in Boston could be duplicated by studies of other municipal hospitals and urge that such studies be undertaken.

The modern municipal hospital must have at its disposal a chronic or extended care facility so that its beds for acutely ill patients can be used properly. Many patients cannot go home because their homes do not have the supportive facilities needed for recuperation. The use of the hospital ambulance service to free such beds by transporting patients to extended care facilities is a characteristic of municipal hospital service. While private hospitals can easily send patients home, the municipal hospital must use its own resources to compensate for the environmental inadequacies of its patients.

We also feel that studies such as this by any hospital with an ambulance service would provide information of great value for future program planning, as well as for allocation of funds.

In spite of the fact that the ambulance service of the Boston City Hospital is not an emergency patient transport service, it does play an important supportive role in the delivery of medical care. Its outgoing trips serve as a link in an informal patient care system between the hospital and a variety of other medical care facilities. On its incoming trips the ambulance brings patients to the hospital who need hospital services. More than two-thirds of the pa-

tients who arrived at the hospital through its ambulance service are sick enough to be admitted to the hospital.

Disposition of patients	*Number*	*Percent*
Admitted to hospital	141	69
Referred to outpatient department	29	14
Returned home	32	16
Dead on arrival	2	1
Total	204	100

Summary

An analysis was made of the ambulance attendant's record of every third trip made by the Boston City Hospital's ambulance service during the 10-week period December 1, 1965, to February 10, 1966. Of 1,296 trips, 432 were analyzed.

This study revealed that the hospital's ambulance service played only a minor role in the transportation of emergency patients. Only 120 ambulance trips were emergencies, while 280 were nonurgent. More often than not, emergency service was provided by the police department.

The ambulance service did, however, play an important role in the medical care system. It provided an essential transportation link between various medical care facilities and the city hospital (one-fourth of all trips were between hospitals). In this way it supported an unofficial system of progressive patient care, making it possible for the general hospital to discharge patients who otherwise would have difficulty in leaving the hospital. It also served to create an important service link between nursing homes and the hospital.

Patients brought to the hospital by the ambulance service were usually ill, even those not classified as emergency cases. Two-thirds of the 204 patients arriving by hospital ambulance were admitted to the hospital.

This study indicates the value of analyzing a hospital ambulance service. The information gained can be useful in planning for the purchase of ambulance equipment, as well as for the training of ambulance personnel. Likewise, this type of information can be used in planning for a more effective use of the ambulance service.

REFERENCES

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Monthly Total Hospital Expenses Exceed $1 Billion

Hospital expenses for treating inpatients and outpatients in March 1967 were $1.03 billion, a 20.3 percent increase over the expenses for March 1966. *Hospitals*, journal of the American Hospital Association, reported that total expense per patient day was $54.05, a 15.8 percent increase over March 1966, and payroll expense per patient day was $33.40, an 18.8 percent increase over March 1966.

These figures are based on data from a scientific sample of 628 hospitals selected from a universe of 5,736 community short-term hospitals. This universe represents 80.5 percent of all hospitals, 43.5 percent of all hospital beds, and 91.8 percent of all admissions among registered hospitals.

March is the midpoint in the hospital reporting year. In a projection of expenses for the year ending September 30, 1967, the American Hospital Association estimated total expense per patient day at $57.93 and payroll expense per patient day at $36.90.