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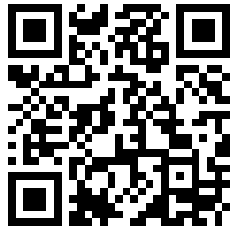

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Emergency Medical Services

Recommendations for an approach to an urgent national problem

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Proceedings of the Airlie Conference
on emergency medical services
Airlie House, Warrenton, Virginia
May 5–6, 1969

CONFERENCE SPONSORS:
Committee on Trauma,
AMERICAN COLLEGE OF SURGEONS
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AMERICAN ACADEMY OF ORTHOPAEDIC SURGEONS

Support and assistance provided by the Division of Emergency Health Services of the U. S. Department of Health, Education, and Welfare's Health Services and Mental Health Administration.

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Acknowledgments

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Contents

Papers presented at the Conference

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Introduction

A major environmental problem is apparent in the statistics of the National Safety Council showing that accidents in 1968 injured 50 million Americans, killed 114 thousand, temporarily disabled 10.8 million, and permanently impaired 400 thousand. For a number of years, the incidence in each category has tended to rise annually. Trauma is the leading cause of death between the ages of 1 and 37.

Accidental deaths in 1968 occurred on the streets and highways, in the home, in offices and factories, and in recreational areas. Fifty-five thousand deaths were caused by motor vehicle accidents alone.

In the light of these data, the prevention of accidents assumes maximum importance. The responsibility for preventive measures is shared by many groups—industrialists, engineers, legislators, educators, and physicians, including health officers. There is need to involve the entire community in accident prevention through a coordinated central effort. Physicians, in particular, must be increasingly involved in community efforts aimed at preventing accidents.

Moreover, acute illness among Americans carries a high incidence of mortality. In 1968, 575,540 deaths from arteriosclerotic heart disease occurred, including heart attacks of varying severity. This figure represents 33 percent of all deaths for that year. Authorities on heart disease are certain that many lives can be saved if expert cardiopulmonary resuscitation is available promptly. Experience in coronary intensive care units in hospitals all over the country substantiates that opinion.

Pediatricians are of the opinion that effective emergency care of pediatric emergencies will save many lives. Appropriate treatment rendered promptly will save many additional lives from poisonings of various kinds.

The services of allied health professionals, particularly emergency medical technicians (ambulance attendants), are invaluable in rendering emergency care simply because the services they perform cannot be provided by physicians or any other group. Physicians and nurses are in short supply and cannot be expected to rush to the scene of an accident or illness. Others, therefore, must be trained to administer life-saving measures to the acutely ill and injured and transport them safely to a medical facility.

The purpose of this Conference was to bring together, for a discussion of all aspects of emergency medical services, representatives of all those groups which are currently involved in efforts to improve these services. The Conference also sought to formulate some basic definitions of emergency care, and to establish workable guidelines for rendering emergency medical services. The material collected in these *Proceedings* has been agreed upon by the participants and represents a multi-disciplinary, initial effort to meet the requirements of today, and to plan for the future.

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The nature of the problem of emergency medical services

Once a serious injury or illness has occurred, emergency medical services are usually necessary. Such services include first aid or emergency care at the scene of the accident or illness, transportation to a hospital while emergency care is being continued, and capable medical care in the emergency department of the hospital. Some 300,000 allied health personnel (ambulance attendants) are now involved in providing emergency medical services. Many of these attendants, however, are available on a part-time basis only, and the training they have had is usually inadequate. The need for more and better trained allied health professionals in this area of emergency care is acute. Associated needs include capable instructors to provide programs of training, as well as equipment and communication devices on ambulances for effective emergency care and transportation of the injured or acutely ill.

Current deficiencies in emergency medical services in the United States stem from many causes. In the early days of this country, a model system of emergency ambulance services was never recommended, leave alone established. Such services emerged haphazardly, locality by locality, in various ways, and, in too many instances, were ineffective especially by present day standards.

Ambulance services usually were performed by the local mortician as a public service. Hearses were the only available vehicles which could serve as an ambulance, and, therefore, the public often looked to the local mortician for transportation of the acutely ill or injured. Even now morticians provide some 50 per cent of the ambulance services in this country, although providing this service is becoming increasingly difficult for them. A mortician's ambulance service has usually suffered financial loss. Now, the National Highway Safety Bureau's requirements for emergency medical services, and the application of wage and hour laws to ambulance personnel have made the economic problems for a mortician rendering such service even more acute. Many morticians are therefore abandoning emergency ambulance service, and many others would like to do so for obvious reasons.

Other types of ambulance service—some highly efficient, others much less efficient than desirable—have developed in various localities. These include volunteer ambulance corps, commercial ambulance services, fire department or police department services, and services connected with and administered by hospitals. Each has appeared to offer distinct advantages to certain localities across the country.

One or more deficiencies often appear in each of the types listed above. The vehicles themselves frequently are far less than satisfactory. Few ambulance personnel have received adequate training. At times the vehicles lack the necessary equipment for emergency care, even though it is easily obtainable. Central dispatching and control of all ambulances in the area is seldom arranged, and two-way radio communications between the ambulance, the dispatcher, and the hospital emergency department is rare.

While the emergency departments of hospitals have improved in the past decade, the quality of medical care for the acutely ill or injured in these departments is at times less than adequate. While the equipment of emergency departments is usually good, a knowledgeable and skillful medical staff is frequently lacking. Particularly, in hospitals across the country, an unreasonable delay frequently occurs between the arrival of the patient at the emergency department and his examination and treatment by a physician.

Data are needed on various facets of emergency medical services. No information is available from records made during transportation of the sick or injured that will allow an estimate of the number of patients who have died or whose conditions became

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worse because they were inexpertly handled. No documented information about unsuitable ambulances or equipment, or untrained attendants, exists. Communication gaps defy description. Meaningful data in all of these areas are crucial.

A dominant cause of current deficiencies in emergency medical services is the apathy of the general public toward the magnitude of the problem of accidental death and disability, and toward deaths from acute illness which are preventable. Unfortunately, a similar apathy is present among physicians, legislators, and officials responsible for the solution of community problems. All segments of the population must be aroused and informed of present practices and deficiencies in emergency medical services, and of ways in which optimal emergency care and transportation of the injured or ill can be assured.

In addition to public indifference and a shortage of well trained personnel, insufficient research in the field of trauma is a major cause for concern. Although trauma is the fourth leading cause of death for all ages, and the first for persons between ages 1 and 37, and although it is the prime cause of disability, the national research effort in trauma is small.

The magnitude of the problem

The magnitude of the total problem is well described in *Accidental Death and Disability: The Neglected Disease of Modern Society*, published by the Division of Medical Sciences, National Academy of Sciences-National Research Council, Washington, D.C., September, 1966. Pages 8 and 9 are quoted here verbatim with full credit to its authors and publisher.

Deaths

"Accidents are the leading cause of death among persons between the ages of 1 and 37; and they are the fourth leading cause of death in all ages. Among accidental deaths, those due to motor vehicles constitute the leading cause for all age groups under 75. Since 1903, when the 'horseless carriage' toll assumed significance, there have been more than 6,500,000 deaths from accidents in this country, over 1,690,000 involving motor vehicles. In 1965, the accident death toll was approximately 107,000, including 49,000 from motor vehicles, 28,500 at home, and 14,100 at work. Deaths from traffic injuries have increased anually; 10,000 more were killed in 1965 than in 1955, and the increase from 1964 to 1965 was 3 percent. Seventy percent of the motor vehicle deaths occurred in rural areas and in communities with populations under 2,500.

"Despite increasing mechanization, death rates from work accidents in manufacturing have decreased in the past 33 years, from approximately 37 accidental deaths per 100,000 workers in 1933 to a rate of 20 per 100,000 in 1965. This reduction is due largely to education, training, and surveillance of industrial workers, and elimination of hazardous machinery in industrial plants. Similar efforts should be directed to the increasing millions of drivers and to vehicles.

"The tragedy of the high accidental death rate is that trauma kills thousands who otherwise could expect to live long and productive lives, whereas those afflicted with malignancy, heart disease, stroke, and many chronic diseases usually die late in life. Thus many more millions of productive man-years are lost owing to deaths from accidents than from chronic diseases among older persons.

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"The human suffering and financial loss from preventable accidental death constitute a public health problem second only to the ravages of ancient plagues or world wars. In one year alone, vehicle accidents kill more than we lost in the Korean War, and in the past 60 years more Americans have died from accidents than from combat wounds in all of our wars. In the 20-year period from 1945 through 1964, there were over 97,000 accidental deaths among military personnel, predominantly caused by motor vehicles.

Disability

"The total number of nondisabling injuries treated at home, in doctors' offices, in outpatient clinics or in emergency departments is unknown. In 1965, disabling injuries numbered over 10,500,000, including 400,000 that resulted in some degree of permanent impairment. It is estimated that the number of United States citizens now physically impaired by injuries is over 11 million, including nearly 200,000 persons who have lost a leg, a foot, an arm, or a hand, and 500,000 with varying degrees of impaired vision.

Costs

"In 1965, accident costs totaled about $18 billion, including wage losses of $5.3 billion, medical expenses of $1.8 billion, administrative and claim settlements of $3.6 billion, property loss in fires of $1.4 billion, property damage in motor-vehicle accidents of $3.1 billion, and indirect cost of work accidents of $2.8 billion. The total annual appropriation for conducting the war in Vietnam.

Medical Load

"The care of accident cases imposes a staggering load on physicians, paramedical personnel, and hospitals. Approximately one of every four Americans suffers an accident of some degree each year. Of the more than 52,000,000 persons injured in 1965, although many were treated at home or at work, most received medical attention in physicians' offices or in outpatient or emergency departments of hospitals. It is estimated that in 1965 more than 2,000,000 victims of accidental injury were hospitalized; they occupied 65,000 hospital beds for 22,000,000 bed days–and received the services of 88,000 hospital personnel. This exceeds the number of bed-days required to care for the 4 million babies born each year or for all the heart patients, and it is more than four times greater than that required for cancer patients. Approximately 1 of 8 beds in general hospitals in the United States is occupied by an accident victim."

The climate for solution—Why an Airlie Conference?

Although the state of emergency medical services in most areas of the country is deplorable, these services would be even worse were it not for the efforts of several voluntary organizations, the vision of a few scattered urban areas which have seen the need and responded, the activities of the Division of Emergency Health Services of the U.S. Public Health Service, and the activities which resulted from the inclusion of a Standard on Emergency Medical Services in the program of the National Highway Safety Bureau.

The Committee on Trauma, American College of Surgeons, for many years has

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made efforts to improve the quality of emergency medical services by holding training courses for ambulance attendants in many parts of the country, by developing the widely accepted list of *Minimal Equipment for Ambulances*, and by establishing a set of *Standards for Emergency Ambulance Services*. Each year, for the past eight years, the Committee on Injuries of the American Academy of Orthopaedic Surgeons has arranged a series of superior training courses which were held in strategic areas throughout the country. The International Rescue and First Aid Association and its Volunteer Rescue Squads, and The National Ski Patrol have conducted training programs for their personnel on a continuing basis.

On their own initiative, but probably stimulated by knowledgeable physician-citizens, Baltimore, Louisville, Jacksonville, and several other cities have established effective systems of emergency medical services.

In adopting Standard 11 on emergency medical services, the National Highway Safety Bureau has stimulated interest in this subject in most states. Some action directed toward improvement has been taken in each state, but none has a statewide system which meets the realistic requirements of Standard 11.

Numerous problems exist for all groups who have made efforts to improve emergency medical services. What type of ambulance service (volunteer, hospital, commercial ambulance company, fire department, police department, mortician) is preferable for cities of various sizes, and what type for rural areas? How should the service be financed? What should be included in the curriculum content of training courses for ambulance attendants? What should be the length of the course? What training aids are advisable for such courses? What should a well trained and skilled ambulance attendant be called to distinguish him from poorly trained personnel? Should the American National Red Cross Advanced First Aid Course or its equivalent be a prerequisite for training courses for ambulance attendants? By what standards should the capabilities of hospital emergency facilities or hospital emergency departments be categorized? What actions might lead toward improved emergency medical services throughout the country?

To seek answers to these questions, the Airlie Conference was organized by the Committee on Trauma, American College of Surgeons, and the Committee on Injuries, American Academy of Orthopaedic Surgeons. The participants were chosen because of their experience and expertise in one or more areas of emergency medical services. They included, besides representatives of the Committee on Trauma and the Committee on Injuries, representatives of the American Medical Association; the National Academy of Sciences–National Research Council; the Division of Emergency Health Services, U.S. Public Health Service; Regional Medical Programs, HEW; National Highway Safety Bureau, Department of Transportation; the Ambulance Association of America, and the International Rescue and First Aid Association. The workshop or task force format was used, with each participant involved in the deliberations of one of four task forces. All task force reports were presented, discussed, revised, and finally approved by action of the participants meeting as a unit at the last session of the Conference.

This report includes the task force reports in their final form, and a summary of the formal actions taken by the Conference.

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Program

Conference on emergency medical services

May 5–6, 1969, Airlie House, Warrenton, Virginia

Co-Sponsors: American College of Surgeons, Committee on Trauma, American Academy of Orthopaedic Surgeons, Committee on Injuries

Program Directors: OSCAR P. HAMPTON, JR., M.D., American College of Surgeons
CHARLES V. HECK, M.D., American Academy of Orthopaedic Surgeons

Conference Whip: FLOYD H. JERGESEN, M.D.

Monday, May 5, 1969

FIRST PLENARY SESSION

Presiding: CURTIS P. ARTZ, M.D., *Chairman*, Committee on Trauma, American College of Surgeons

Introductions: MURDOCK HEAD, M.D., PRESTON A. WADE, M.D., GEORGE T. AITKEN, M.D., GEORGE E. SPENCER, JR., M.D.

Purpose of the conference and arrangements for meeting goals. FLOYD H. JERGESEN, M.D.

An overview of the planning, organization and management of ambulance services in the United States. JOSEPH K. OWEN, Ph.D.

The efficient city emergency medical system—myths and reality. JOHN M. WATERS

The importance of ambulance design to emergency care. KENNETH F. KIMBALL, M.D.

Ambulance equipment: standards necessary for ideal emergency care and communications. J. CUTHBERT OWENS, M.D.

SECOND PLENARY SESSION

Presiding: GEORGE E. SPENCER, JR., M.D., *Chairman*, Committee on Injuries, American Academy of Orthopaedic Surgeons

Role of the American National Red Cross in training ambulance attendants. ROBERT M. OSWALD

Training emergency medical technicians. J. D. FARRINGTON, M.D.

Training aids. WALTER A. HOYT, JR., M.D.

The adequate emergency facility. ROGER T. SHERMAN, M.D.

Ambulance and emergency department records. PETER SAFAR, M.D.

Registration, certification and re-certification of ambulance attendants. PETER SAFAR, M.D.

Selected emergency facilities in the urban community. ROBERT J. FREEARK, M.D.

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Tuesday, May 6, 1969

REVIEW OF TASK FORCE REPORTS

Presiding: GEORGE T. AITKEN, M.D., *President-elect*, American Academy of Orthopaedic Surgeons

TASK FORCE 1—Ambulance services. KENNETH F. KIMBALL, M.D., *Moderator*

Discussion

TASK FORCE 2—Personnel and education. WALTER A. HOYT, JR., M.D., *Moderator*

Discussion

TASK FORCE 3—Emergency facility. J. CUTHBERT OWENS, M.D., *Moderator*

Discussion

TASK FORCE 4—Administration. IRVIN E. HENDRYSON, M.D., *Moderator*

Discussion

SUMMATION FLOYD H. JERGESEN, M.D., *Conference Whip*

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Task forces assignments

Task Force 1–Ambulance services

Vehicle design
- Operation
- Equipment
- Personnel
  - Relationship of profession to personnel

Records

Types of ambulance services
- Fire Department
- Police Department
- Hospitals
- Mortuary
- Franchise
- Volunteers

Type or types applicable to:
- City 300,000+
- City 100,000–300,000
- City 25,000–100,000
- Rural

Task Force 2–Personnel and education

Training
- What is required for duties

Training aids
Certification and re-certification
Continuing education
Economics as they apply to advances in the field
Role of community colleges

Task Force 3–Emergency facility

Categorization of facilities
Staffing—professional
Equipment available
Procedures available
Review of standards
Centralized facilities within urban area
Expansion capability at time of disaster
Emergency room
- Staffing
- Ability to perform anywhere in system
- Records

Task Force 4–Administration

Community councils
Recruiting, practice drills
Public education
Coordinating the entire program, i.e., who is responsible for what-when-how, financing, administration, etc.

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Summary of conclusions and recommendations of the Airlie Conference on Emergency Medical Services

TASK FORCE 1–AMBULANCE SERVICES

The emergency ambulance should be adequately equipped and should be manned with trained personnel to respond effectively to any emergency due to injury or acute illness.

The medical profession must assume greater responsibility for the training of ambulance attendants (emergency medical technicians), and must fully recognize that they function as a direct extension of the medical care team.

Records kept by emergency medical technicians and emergency department personnel of their initial evaluations and the services they have rendered are an integral part of the patient's record. This information should accompany the patient's hospital chart throughout treatment and become part of his permanent record.

For quality control, a periodic review of patient care provided by all involved personnel is advised.

Where the volume of emergency cases is sufficient to justify a full-time emergency ambulance service, emergency care should be the sole duty of the members of the ambulance organization.

Ambulance service is divided into three basic categories:

1. Municipal (fire department, police department, hospital-based, or an independent service employed by the municipal government)

2. Commercial—Profit or non-profit (hospital-based, ambulance company, or mortician)

3. Volunteer

The base of operation for the ambulance is not necessarily determined by the location of the agency controlling the service. Basing the ambulance at a hospital is desirable and advantageous.

TASK FORCE 2–PERSONNEL AND EDUCATION

The following educational prerequisites must be met by ambulance attendants (emergency medical technicians):

1. A raw recruit must be at least 18 years old and must have successfully completed four years of high school education or its equivalent.

2. The American National Red Cross Standard and Advanced Courses or their equivalents must have been completed prior to basic training as an emergency medical technician.

The growing importance of emergency medical services justifies a professional training comparable to that of other existing technical medical personnel. Individuals who qualify for this occupation through standard certification should be known as *Emergency Medical Technicians* (EMT's). This term should be reserved for those who have received adequate education, have passed an examination based on the educational program, and have achieved certification.

The curriculum content of training programs for emergency medical technicians is outlined in Appendix A to the report of Task Force 2 (page 24).

Continuing education is an important factor in keeping emergency medical technicians abreast of new developments in their field.

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Specialty training is essential for improving emergency care and for the technician's professional and economic advancement.

The development of a certifying organization for emergency medical technicians and, ultimately, its administration must be controlled by physicians. The Council on Medical Education of the American Medical Association should be consulted about this matter, and asked to submit specific recommendations.

TASK FORCE 3–EMERGENCY FACILITY

Staffing of hospital emergency departments is recognized as a major problem. A physician should be in charge of each emergency department (with the designation of "chief"). Emergency department physicians should have multiple skills.

The categorization of hospitals by quality and extent of emergency services should be included in the *Standards* of the Joint Commission on Accreditation of Hospitals, and a registry of the hospitals according to their categorization should be maintained by the American Hospital Association.

The following recommendations are pertinent to categorization:

1. Each hospital should assess, develop, and test its emergency facilities according to a community-wide plan.
2. Emergency medical care should be planned through a community, state, and/or regional council. When community, state, or regional planning indicates certain hospitals may not require an emergency facility, such absence of an emergency facility should not be construed as a breach of standards for licensure or accreditation.
3. Major emergency facilities should be established on a regional basis. Once these facilities have been designated and are linked by a communications network including ambulance dispatchers and ambulances, the other hospitals in that region should not be required to meet the standards for major emergency facilities set by the Joint Commission on Accreditation of Hospitals.
4. Hospitals should be categorized as mentioned above according to standards recommended by national organizations such as the American College of Surgeons, the American Academy of Orthopaedic Surgeons, the American Heart Association, the American Society of Anesthesiologists, the American Academy of Pediatrics, the National Academy of Sciences-National Research Council, and the Joint Commission on Accreditation of Hospitals.

Nurses, allied health personnel, and emergency medical technicians must receive better training, assume greater responsibilities, and have authority in emergency care.

The Emergency Department in the Hospital, a manual of the American Hospital Association published in 1962, should be re-edited and republished.

Each hospital medical staff should assign physicians to conduct a systematic audit of the following records:

1. Emergency department charts.
2. X-ray service, with particular attention to delays in obtaining films and to films of inadequate quality, both of which may jeopardize a patient's welfare.
3. DOA's and deaths occurring within twenty-four hours of admission to the emergency room. Personnel should be de-briefed immediately after these occurrences have been recorded.

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No changes in the structure or operation of an emergency department should be determined for any hospital until its emergency department records have been adequately audited.

Emergency departments are urged to develop a method of reporting all accidents to health authorities capable of studying and establishing measures which will prevent such accidents.

Appropriate standards must be developed which will assure that uniform signs carrying an "emergency medical aid" symbol and indicating the location of the nearest licensed hospital will be erected along all controlled-access and interstate highways.

TASK FORCE 4–ADMINISTRATION

Emergency medical services must be recognized as a vital and continuing part of the health care of the American people. This is a service to which every citizen is entitled. Emergency health service is in fact a logical and acceptable "third service," complementing the services rendered by fire and police departments, and should be managed as such.

All agencies supporting emergency medical services financially must be informed of the need for improved funding. This Conference hereby urges immediate increases in all funds expressly identified for use in the area of emergency medical services.

Community emergency care advisory councils have considerable value as workable and constructive instruments for improving the emergency care system at state and local levels.

Making standard first aid training by the American National Red Cross or its equivalent a requirement for initial licensure to operate any vehicle on land, sea, or in the air is encouraged.

A Presidential Commission should be established promptly to evaluate the current status of emergency medical services in this country, relate the findings to the health needs of the public, and make recommendations for the improvement of these services.

Conference action

The Conference chairman, Dr. Floyd H. Jergesen, was instructed to take the steps necessary to implement the recommendation for a Presidential Commission and to appoint an ad hoc committee to include, but not to be limited to, some participants in the Conference to work under his direction for this purpose. He and his ad hoc committee were authorized to bring the recommendation for the Commission to the attention of an appropriate advisor to the President of the United States.

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Complete text of task force reports

TASK FORCE 1–AMBULANCE SERVICES

KENNETH F. KIMBALL, M.D., *Moderator*

Ambulance

The Task Force looks forward to the publication of the report of the Highway Research Board of the National Research Council entitled *Ambulance Design Criteria.* The Task Force reviewed a preliminary copy of this report in which physicians, expert ambulance operators, and automotive design engineers have translated the medical requirements for ambulance design and equipment into design criteria which, through the ingenuity of ambulance builders, will incorporate the requirements for space, installed and portable equipment, and motor vehicle safety of the National Highway Safety Bureau's *Standards.* Such an approach gives promise to the production of an emergency ambulance not only suitable for the highly trained emergency medical technician of today, but also for physicians who might be called to the scene. The emergency ambulance recommended is adequate not only for the treatment of the seriously injured or acutely ill at the scene and in transport, but also provides space for light rescue tools and for new resuscitation, monitoring, and communication equipment as it may be developed.

The Task Force concurs in the recommendations of the National Research Council that the emergency ambulance should be well equipped and manned with trained personnel to respond effectively to any emergency due to injury or acute illness. While other types of vehicles may be used to transport patients, vehicles used to move non-emergency patients and special-use vehicles, such as mobile operating rooms or mobile coronary units, should not be termed ambulances unless they are fully equipped and provide space to cope with all types of emergencies.

Personnel

The medical profession must assume greater responsibility for the training of the emergency medical technician and fully recognize that he functions as a direct extension of the medical care team. He must, therefore, be highly trained to independently administer care to the full extent of his training and ability and, through direct communication with physicians, be guided in carrying out procedures now performed under direct supervision in emergency departments.

Records

Records kept by the emergency medical technicians and the emergency department personnel concerning their initial evaluations and services rendered are an integral part of the patient's record. Forms should be succinct and contain only pertinent information. The form, or a copy, should accompany the hospital chart throughout treatment of the patient and become a part of the permanent record. Statistical review, especially since the advent of the computer, makes the need for a standard form more important than ever. To allow for easy study of care, response times, and the delineation of problem areas, development of such a form and its adoption by all emergency medical services units is encouraged.

A periodic review for quality control of patient care provided by all involved personnel is advised. The recording of use of alcohol or drugs by a patient, and suggestions as to better management of such a patient, can present a legal problem. Therefore, a method of advising the involved parties to provide constructive criticism and

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corrective action must be sought. This would perferably be a two-way exchange of information. It is recommended that legal advice be obtained to determine how this may be defined.

Types of ambulance service

Where there is a sufficient volume of patients to justify full time emergency service, emergency care should be the sole duty of the members of the ambulance organization. Where volume does not justify full time employment of an emergency ambulance service, it may of necessity have to be undertaken as part of the professional duties of fire, police, hospital, mortuary, or other workers. However, training qualifications and excellence of service must remain the same for both types of personnel.

There are three basic categories of emergency ambulance service:

1. Municipal (fire department, police department, hospital, or an independent service employed by government)
2. Commercial—Profit or non-profit (hospital, ambulance company, or mortuary)
3. Volunteer

The base of operation for the ambulance is not necessarily determined by the location of the agency controlling the service. Wherever possible, emergency medical technicians should operate the ambulance from a hospital to afford them maximum opportunity for special training, and to make their services available to the other intra-hospital facilities (related to acute illness or injury) when they are not engaged on a specific ambulance call. Such personnel must not be considered as replacements for normal emergency department staffing but should be used to augment the staff of the emergency department.

In many areas, in order to provide adequate ambulance service, the community must be willing to offer financial support and/or exclusive franchise. This franchise must carry with it acceptance of local government regulations. Frequent inspection is an integral part of such regulation and should cover vehicles, personnel, and operation of the service.

The size and population of each community will determine the type of system best suited for providing its emergency medical services.

Method of implementation

Various publications are available on this subject. The following reports, produced through support by the National Highway Safety Bureau, are available frum the National Document Center, Clearinghouse for Scientific and Technical Information, Springfield, Virginia 22151. The cost is $3 for each report.

1. *Highway Safety Program Manual for Emergency Medical Services*, Vol. 11.
2. Stanford Research Institute, Preliminary Guidance Document: *Emergency Medical Services Survey and Plan Development.*
3. National Association of Counties, Research Foundation Reports: *Description and Analysis of 18 Proven Emergency Medical Care Systems.*
4. Dunlap and Associates Report: *Economics of Highway Emergency Ambulance Service.* Two volumes at $3 each.

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TASK FORCE 2–PERSONNEL AND EDUCATION

WALTER A. HOYT, JR., M.D., *Moderator*

Initial discussion

The most important step yet to be accomplished in the drive to upgrade emergency medical services is the formation of a standard program of education of the highest quality for ambulance attendants (emergency medical technicians). Such a program must encompass meaningful tests for screening recruits, training courses designed to fulfill the needs of all the students, and an acceptable mechanism for certification. In addition, the basic format must include continuing education requirements, advanced training courses fashioned to create specialists, and physicians to teach and coordinate training programs in the field of emergency medical services.

These are the primary objectives in the field of emergency medical services, and Task Force 2 unanimously agreed to support them.

The members of the Task Force reviewed the educational programs currently in use in the field of emergency medical care. In most instances these courses have had a significant impact on the student and have improved his overall performance. While these courses have jointly contributed to a mutually accepted core curriculum for adequate personnel training and have devised some effective techniques for training the student in emergency medical skills, a complete nationwide program worthy of endorsement has not been produced.

Weaknesses–Current training programs

Certain weaknesses of current training programs were discussed in an effort to profit by them and avoid their recurrence in future planning. Weaknesses especially emphasized include:

1. Inadequate number of course hours and lack of opportunity for practicing skills.
2. Wide variation in content of the courses.
3. Inconsistent and ineffective presentation of material by some instructors.
4. Lack of effective teaching aids and reference material.
5. Absence of a certifying mechanism.

From this discussion, the members of the Task Force concluded that personnel training in emergency care is an orderly process and comparable to preparation for other paramedical vocations. Primary objectives are to teach all essential skills, and to make certain that the training leads to demonstrated competence in these skills. Noteworthy characteristics of this educational process are:

1. The level of the educational process must be "pitched" to the learning capacity of the prospective student.
2. The physician and lay instructors must be knowledgeable in modern emergency medical techniques and understand the most effective means of creating enthusiastic student response.
3. Although factual information serves as the basis for action, unnecessary and unrelated presentations of material which is confusing and noncontributory must be eliminated.
4. The techniques for determining the quality of the program need to be de-

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veloped by disinterested experts and used by all instructors in order to assure the validity of the educational programs.

No major obstructions seem to exist which might prevent rapid development and implementation of this type of program. Experts, particularly physicians, stand ready to develop the mechanisms for providing this program and to assure its validity. Once this has been accomplished, these men and the medical organizations they represent must wholeheartedly support efforts to coordinate programs at the local, state and national levels.

Essential prerequisites

1. A raw recruit must be at least 18 years of age and must have successfully completed four years of high school education, or its equivalent.
2. The American National Red Cross Standard and Advanced Courses, or their equivalent, must have been completed prior to basic training as an emergency medical technician.

Vocational status and title

The growing importance of emergency medical services justifies a professional status comparable to that of other existing technical medical services. Individuals who qualify for this vocation through standard certification should be known as emergency medical technicians (EMT). This term should be reserved for those who have received adequate education, passed an examination based on the educational program, and achieved certification. Any subsequent change in status should be designated by a sub-title of the general classification "Emergency Medical Technician."

Curriculum content

The essential subject material recommended by the Task Force is included in Appendix A (page 24).

The basic training must be geared to two general classifications of individuals. The first are the raw recruits who have had no previous experience, and the second includes individuals such as medical corpsmen, current employees of emergency care services, active volunteer rescue personnel, certain members of fire and police departments, and attendants primarily concerned with industrial and emergency room care. Reference is made to Appendix B (page 25) which indicates that the initial qualifying process for certification will differ for these two groups in the length of the course but not in its content. In-hospital training sessions are an exceedingly valuable portion of a curriculum. How they are to be provided must be determined by local circumstances.

Professional conduct with regard to dress and ethics should be a part of the initial basic training.

Continuing and advanced education

Continuing education is an important factor in keeping the emergency medical technician "up-to-date". Because opportunities and facilities vary greatly throughout the country, several different methods need to be developed. "On-the-job" continuing education of the preceptorial type is recommended. A student-teacher ratio of 1:1 is preferable. Weekly formal in-hospital sessions supervised by a physician, and weekly review periods supervised by experienced lay instructors and including both didactic and practice periods have proven to be successful in many communities. Finally, short, concentrated, three- to four-day review courses will fulfill the needs of many

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emergency medical technicians by reinforcing their knowledge and skills as well as exposing them to new information and developments.

Specialty training is essential for improving care and should provide advancement in stature and income. All major areas of emergency medical service should be programmed for specialty education.

There is a growing need to include in the training program certain diagnostic and therapeutic techniques heretofore assumed to be too difficult for anyone other than a qualified physician. The members of the Task Force acknowledge the need for broader horizons and recommend that such measures as electrocardiographic interpretation, intravenous fluid therapy, monitoring blood pressure, pulse rate, and breathing volume, tracheal intubation and care of the intubated patient (suctioning), and pleural drainage be programmed and carefully implemented under supervision. It has not yet been determined which techniques must be controlled by a physician, either directly or via radio with (or without) the help of telemetering.

Criteria for certification and administration procedures pertaining to emergency medical technicians

The development of a certifying organization and, ultimately, its administration must be controlled by physicians. Inasmuch as the Council on Medical Education of the American Medical Association has developed mechanisms for the certification of similar paramedical groups, the Task Force recommends that the Council be consulted and asked to submit recommendations. Re-evaluation of certified personnel is important, and in many instances will be provided best by continuing education courses given at regular intervals. Mandatory continuing education merits study but is not recommended at this time.

In the early stages of certification, the Task Force points out, many individuals will undoubtedly request certification based on past experience and training. Many of these persons will probably be exceptionally well qualified, and will be experts in the field of emergency care. The Task Force fears that standards will be seriously lowered if such individuals are awarded certification without completion of a formal review course. A certifying examination should be an absolute requisite for anyone seeking recognition as an emergency medical technician (see Appendix B, page 25).

Physicians in each community are in the best position to observe deficiencies in performance, unethical behaviour, etc. It is the responsibility of these physicians to document such deficiencies, recommend disciplinary action, and advise changes in training technique in order to prevent their recurrence.

Types of personnel

The raw recruits will have had no experience in emergency care other than that provided by the Red Cross Standard and Advanced Courses. They should show evidence of aptitude and motivation as prerequisites to further training.

A large number of individuals will have had some experience and training in emergency care. Current employees of ambulance services, volunteer rescue squads, members of fire and police departments, former medical corpsmen, and emergency room attendants in industry and hospitals comprise this category. In many instances these individuals have demonstrated outstanding ability in emergency care. Qualities of leadership, intelligence, and motivation should be recognized in all of them, regardless of their background. By the same token, they must be urged to avail themselves of opportunities for refresher training and certification, and ultimately for advancement in title and stature.

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Special recommendation

A central source providing information about the various teaching techniques, and furnishing teaching aids, is urgently needed to encourage the widest possible distribution of both information and material. A national lending library is therefore recommended. This library should be supervised by physicians and supported by all individuals and organizations able to contribute both information and material.

Conclusions

Limitation of time prevented the Task Force from touching upon many important aspects of this program of education. It is assumed that future task forces will complete this mission and develop a program in detail. Textbooks, lesson plans, audiovisual aids, realistic mannequins, and the administrative organization for teaching, certification, and surveillance are matters which must be studied by task forces composed of the most knowledgeable individuals available. These task forces must work hand in hand to avoid duplication and to assure the best possible result.

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Appendix A

Curriculum content for training emergency medical technicians

I. **Basic orientation**

II. **Anatomy and physiology**
- The skeletal system
- The muscular system
- The nervous system
- The respiratory system
- The circulatory system
- The abdomen
- The digestive system
- The genito-urinary system
- The eye
- The skin
- Topographic anatomy

III. **Surveying the ill or injured**
- Vital signs
- Preliminary observations

IV. **Conditions that threaten life, and emergency techniques**
- Airway obstruction and hypoxia
- Respiratory arrest and respiratory resuscitation
- Cardiac arrest and closed chest cardiac resuscitation
- Bleeding and control of bleeding
- Shock, including IV therapy

V. **Injuries**
- Soft tissue injuries
- General concepts of fractures and dislocations
- General principlies of splinting
- Fractures and dislocations of the upper extremity
- Fractures and dislocations of the lower extremity
- Fractures and dislocations of the neck and spine
- Injuries to the skull and brain
- Injuries to the head, face, and neck
- Injuries to the eye
- Injuries to the chest and back
- Injuries to the abdomen
- Fractures of the pelvis and injuries to the genitalia
- Burns

VI. **Injuries resulting from man's environment**
- Cold exposure
- Heat exposure
- Radiation exposure
- Electrical hazards
- Drowning
- Explosions
- Poisoning

VII. **Medical emergencies**
- Unconscious states—coma, convulsion, delirium
- Heart attack
- Stroke
- Diabetes
- The acute abdomen
- Asthmatic states
- Communicable disease
- The disturbed and unruly patient

VIII. **Neonate and childhood problems**
- Emergency childbirth
- Special problems of newborn and childhood

IX. **The scene of the emergency**
- The accident scene
- Moving the sick or injured

X. **Transportation**
- The ambulance
- The helicopter and other transport vehicles

XI. **Rescue**
- Extrication from automobiles
- Extrication other than from automobiles

XII. **Driving and communications**
- Defensive driving
- Traffic control
- Communications
- Reports and records
- Medical—legal problems
- Communicating and relating to the hospital, and continuing patient care

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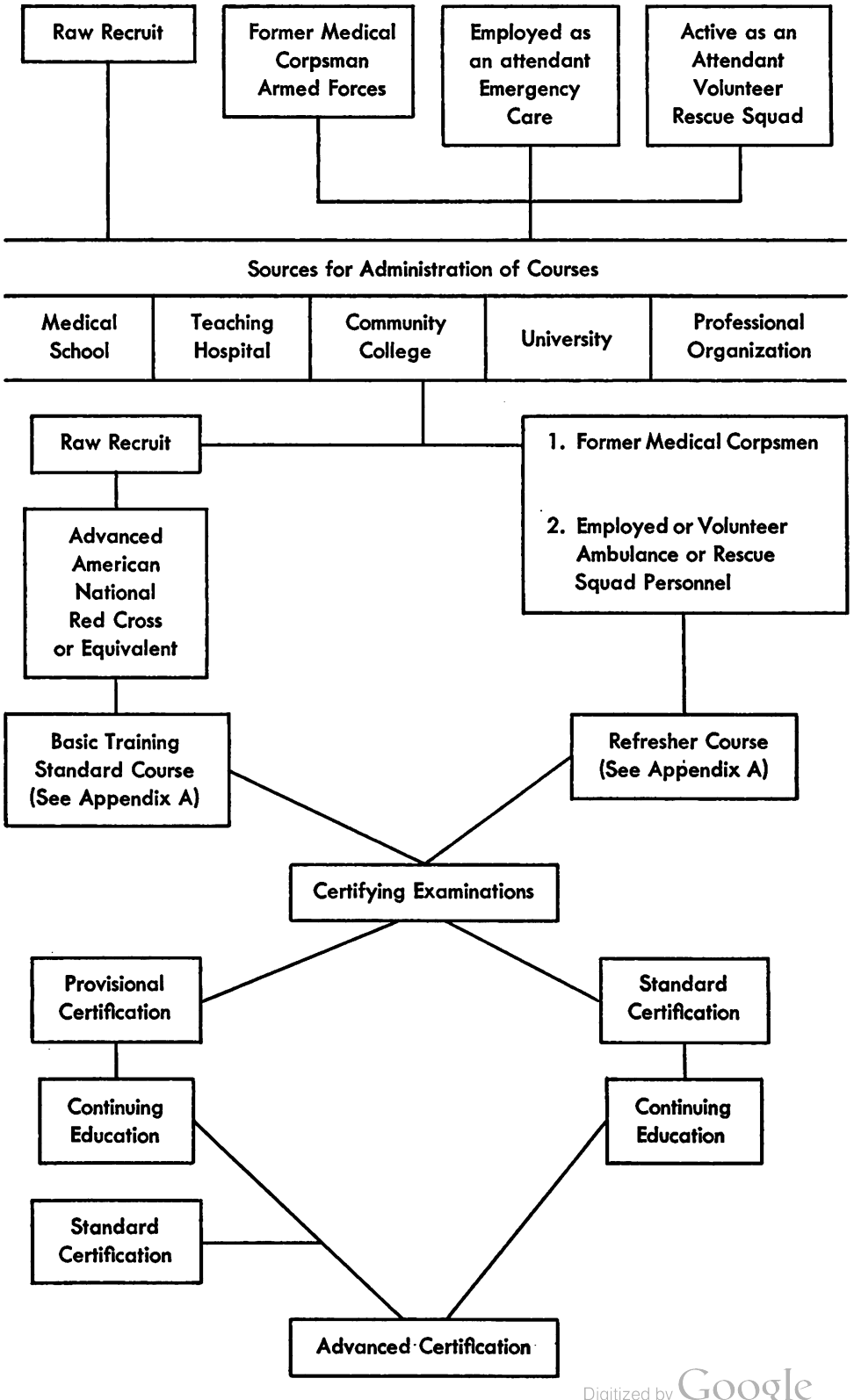
Appendix B
PLAN FOR EDUCATION OF EMERGENCY MEDICAL TECHNICIANS



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TASK FORCE 3–EMERGENCY FACILITY

J. CUTHBERT OWENS, M.D., *Moderator*

The task force discussed categorization. Recognizing that several responsible organizations have wrestled and continue to wrestle with this problem, the task force recommended that each of these groups adopt a uniform approach to it. Eventually, the various categories must be based upon the following criteria: staffing, equipment, facilities, communications, access, capacity, geographic area, and potential for expansion in times of disaster and civil disorder.

The task force recommended the establishment of the following categories:

Category I–Major emergency medical center

The major emergency medical center has an emergency department staffed by physicians around the clock. In addition, the hospital itself is staffed by physicians at all times. Staff physicians representing all specialties are on call and are available when called from either outside or within the hospital.

Category II–Emergency center

An emergency center presupposes a hospital staffed by physicians on a 24-hour schedule. The physicians in the hospital are available to the emergency department when called. Staff physicians representing all, or nearly all, specialties are available for calls from outside the hospital.

Category III–Standby emergency medical facility

A standby emergency medical facility presupposes a hospital which is staffed by nurses 'round the clock, and which has on call, outside the hospital, a physician who, after a patient's arrival at the hospital, will be available as promptly as can be reasonably expected.

Category IV–Emergency referral service

An emergency referral service exists when a health facility employs on all shifts a non-professional person who is thoroughly familiar with the procedures for referring patients to the nearest and most appropriate emergency facility.

The task force recommends that this designation of categories be incorporated in the accreditation standards of the Joint Commission on Accreditation of Hospitals, and that a registry of categorized hospitals be maintained by the American Hospital Association.

The task force recognized that the staffing of emergency departments is a major problem whose solution depends on the size of the community and the hospital. The task force recommends, however, that a physician be in charge of each emergency department (chief of emergency department).

The genesis of the full time emergency department physician was exhaustively reviewed. The task force recommends that the emergency department physician be knowledgeable and skilled in the following spheres:

1. Administration.
2. Triage.
   a. Emergency—life threatening and non-life threatening
   b. Urgent
   c. Elective

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3. Management of life-threatening emergencies.
   a. Cardiopulmonary resuscitation (American Heart Association standards)
   b. Tracheal intubation, cricothyreotomy and tracheostomy
   c. Arrythymia—recognition and control
   d. Pleural and pericardial drainage
   e. Control of hemorrhage
   f. Shock—including intravenous fluid replacement
   g. Venous cutdown and arterial puncture
   h. Control of convulsions
   i. Management of poisoning
   j. Gastric intubation
   k. Urinary bladder catheterization
4. Definitive treatment as provided by the hospital medical staff.
5. Teaching and training of medical, nursing, and allied health personnel, including emergency medical technicians.

The task force discussed standards of emergency care and made the following recommendations:

1. Each hospital should assess, develop, and test its emergency facilities according to a community-wide plan.
2. Emergency medical care should be planned through a community, state, and/or regional council. When community, state, or regional planning indicates certain hospitals may not require an emergency facility, absence of an emergency facility should not be construed as a violation of standards for licensure or accreditation.
3. Major emergency facilities should be established on a regional basis. Once these facilities have been designated and are linked by a communications network including ambulance dispatchers and ambulances, the other hospitals in that region should not be required to meet the standards for major emergency facilities set by the Joint Commission for the Accreditation of Hospitals.
4. Hospitals should be categorized as mentioned above, according to standards recommended by national organizations such as the American College of Surgeons; the American Academy of Orthopaedic Surgeons; the American Heart Association; the American Society of Anesthesiologists; the American Academy of Pediatrics; the National Academy of Sciences-National Research Council, and the Joint Commission on Accreditation of Hospitals.

Additional recommendations

The Task Force holds that nurses, allied health personnel, and emergency medical technicians must receive better training, assume greater responsibilities, and possess authority in emergency care. Moreover, the Task Force recommends that the manual of the American Hospital Association entitled *The Emergency Department in the Hospital*, which was published in 1962, be re-edited and re-published.

The Task Force discussed the possible expansion of the emergency department and arrived at the conclusions and recommendations following.

Today's hospital is the traditional center of support for a community's emergency medical services. Since the emergency department is logically the focal point of a community's coordinated emergency medical service, this unit must be prepared to

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expand responsibilities, personnel, and facilities when disasters or civil disorders strike the community. However, expansion will fail to develop in an orderly manner unless coordination, communication, and counseling in respect to both internal and external emergency services are already an established policy and a matter of day-to-day performance.

In respect to records, the Task Force recommends that physicians specifically assigned to this task conduct a systematic audit of:

1. Emergency Department charts
2. X-ray Service, with particular attention to delays in obtaining films and to films of inadequate quality, both of which may jeopardize a patient's welfare.
3. DOA's and deaths occuring within twenty-four hours of admission to the emergency room. Personnel is to be de-briefed immediately after these occurrences have been recorded.

The Task Force recommends that no changes in the structure or operation of an emergency department be determined for any hospital until its emergency department records have been adequately audited; that emergency departments develop a method of reporting all accidents to health authorities capable of studying and establishing measures which will prevent such accidents; that appropriate standards be developed which will assure that uniform signs carrying an "emergency medical facility" symbol and indicating the location of the nearest licensed hospital will be erected along all controlled-access and interstate highways, and that the "emergency medical facility" symbol which is accepted be adopted by the World Health Organization and used internationally. Finally, the Task Force recommends that the *Standards* of the Joint Commission on Accreditation of Hospitals include the requirements for administration and treatment which must be met before a patient in the status of a life-threatening emergency can be transferred from one hospital to another.

TASK FORCE 4–ADMINISTRATION

IRVIN E. HENDRYSON, M.D., *Moderator*

The charge to Task Force 4 was to consider the administrative problems of emergency medical services. Taken in aggregate, these problems concern a consideration of community councils; public education; the responsibility for what-when-and-how; financing, and "pulling everything together."

Having established this proposition, the task force reviewed the practical problems inherent in establishing community councils, and the reasons for their success or failure in changing local emergency medical service systems. Interestingly enough, it is evident that where groups responsible for community planning are strong, the concept of grafting emergency medical services (and proposed solutions to their problems) onto the existing community structure has proved workable and produced visible accomplishments. In communities where this concept is not completely understood, or where it does not exist, many problems arise in creating the council on emergency medical services as a free-standing unit designed to accomplish desired goals and objectives. The Task Force recognizes that such a council remains a most effective organizational structure to change and improve emergency medical services at the local level.

The Task Force agreed that emergency medical services must be recognized as a

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vital and continuing part of the health care of the American people. This is a service to which every citizen is entitled.

In establishing this concept, the Task Force recognized that the citizens themselves also have a responsibility for the improvement of emergency medical services, and that the total effort cannot be exerted by the health professions alone. Moreover, public attention must be focused to a greater degree on the present inadequacies of the emergency medical services system, the inadequate methods of financing it, and the lack of coordination at all levels of government to effect meaningful change.

Emergency health service is in fact a logical and acceptable "third service" (in addition to fire and police protection or service). Consequently, all types of emergencies should be considered as belonging together, and managed accordingly. This concept must be presented and explained to the public and the profession by means of a definite educational effort. It should be recognized that the definition of a medical emergency rests with the person initiating the call for emergency medical service, and that this definition must remain unchallenged until the first screening has taken place by a member of the health professions.

Beyond these considerations it is evident that the financing of the emergency medical services system in this country is totally inadequate on all levels. It is suggested that its support by the Congress has, at best, been minimal. The severe budgetary restrictions experienced by the Division of Emergency Health Services, U.S. Public Health Service, and the National Highway Safety Bureau, Department of Transportation, in the field of emergency medical services may indeed deny the growth of the embryonal improvements that have been made to date.

There are no simple solutions to this array of problems. However, within the administrative context of these problems, we believe it is essential that this Conference adopt the following recommendations:

1. That all agencies financially supporting emergency medical services be informed of the need for improved funding, and that this Conference urge immediate increase in all funds expressly identified for use in the area of emergency health services.
2. That this Conference reiterate the value of community emergency care advisory councils as workable and constructive instruments for improving the emergency care system at state and local levels.
3. That this Conference encourage standard first aid training by the American National Red Cross, or its equivalent, as a requirement for initial licensure to operate any vehicle on land. sea, or in the air.
4. *That a Presidential Commission be established promptly to evaluate the current status of emergency medical services in this country, relate the findings to the health needs of the public, and make recommendations for the improvement of these services.*

Conference action

The Conference chairman, Dr. Floyd H. Jergesen, was instructed to take the steps necessary to implement the recommendation for a Presidential Commission and to appoint an ad hoc committee to include, but not to be limited to, some participants in the Conference to work under his direction for this purpose. He and his ad hoc committee were authorized to bring the recommendation for the Commission to the attention of an appropriate advisor to the President of the United States.

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Text of papers

presented at the Airlie Conference on emergency medical services

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An overview of the planning, organization and management of ambulance services in the United States

JOSEPH K. OWEN, PH.D.*

In this country today, ambulance services are a multi-million dollar per year business. On the basis of data available to us from surveys of not especially typical states, we cautiously estimate that there are 22,000 ambulance services in the United States. Assuming an average of two ambulances to a service, and five attendants to an ambulance, we have some 44,000 ambulances and 220,000 attendants. Nearly 50 percent of these ambulance services are operated by funeral directors, but these handle only 10 to 15 percent of the total calls.

Thus, while we know that the national investment in ambulance services is large, we have only a vague and rather disquieting idea of the return the American people are getting for their money in terms of the prevention and control of disability and death.

Federal legislation

Only recently has any federal legislation been enacted that had an appreciable effect on ambulance operation.

Three laws in particular influenced, or are beginning to influence, the operation and equipment of ambulances:

The Minimum Wage Law.
The Medicare Act and its subsequent modifications.
The National Highway Safety Act of 1966.

Interestingly, the Minimum Wage Law is the only one of the three that is actually regulatory in its effect on ambulance operation, although Congress was not specifically concerned with ambulances when it enacted the law. Presently, as the courts have interpreted it, the Minimum Wage Law requires that ambulance attendants be paid a minimum rate of $1.60 per hour. This has increased the cost of ambulance operation, particularly for those ambulance services that have depended upon untrained low-paid attendants. As a result, increasing numbers of these services are going out of business. This does not, I should add, always have a detrimental effect on the provision of ambulance services. In many ways, it proves quite the contrary.

Minimal standards for ambulance equipment and attendant training were established under Medicare. Ambulance operators must meet these standards to qualify for reimbursement for their services from Medicare funds.

The National Highway Safety Act of 1966 was one of the results of the President's Committee for Traffic Safety which played a pivotal role in focusing national attention on the problems of traffic safety and emergency health services.

The portion of the National Highway Safety Act germane to our discussions here provides the Department of Transportation with legislative and financial authorization to improve and expand emergency medical services in the states, particularly ambulance services, as they relate to highway accidents. Two sections of the Act are of special importance from our point of view:

- Section 402, which authorizes Grants-in-Aid to support special studies, demonstrations, and, in certain cases, operations—including the purchase of ambulances, and

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- Section 403, which authorizes the Department of Transportation to conduct and support research.

Standard 4.4.11, entitled "Emergency Medical Services," has been developed by the National Highway Safety Bureau, Department of Transportation, to provide the states with guidelines for surveys, evaluations, demonstrations, and improvement of ambulance services.

Elements of planning

In planning, or evaluating, ambulance services at the local or, indeed, any level, seven basic elements must be considered. These elements are: 1. Public awareness; 2. Manpower and training; 3. Communications; 4. Vehicle design; 5. Equipment; 6. Local ordinances and regulations, and 7. Hospital relationships.

1. Public awareness

Ideally, citizens should be trained in first aid and know how to render necessary emergency care to themselves and those around them. As a practical matter, they must at least know how to obtain professional assistance. The source telephone number for such assistance should be permanently listed in telephone directories. Some communities have installed, and others are now considering installing, a single telephone number system wherein one brief, easily memorized number is used for all emergencies.

It is equally important for an efficient ambulance service to obtain public understanding, acceptance, and support. If an ambulance service has the public fully behind it, many of its problems in personnel, equipment, and plant can be solved, and false or unnecessary calls can be kept to a minimum.

2. Manpower and training

The development of trained manpower for ambulance services is a rapidly evolving and expanding activity. Historically, the voluntary and government-operated ambulance services have taken the lead in training and, in doing so, have relied heavily upon American National Red Cross training manuals. In general they have conducted both standard and advanced first aid training.

At a somewhat more ambitious level, many training courses for ambulance attendants have been conducted by local Committees on Trauma of the American College of Surgeons. The American Academy of Orthopaedic Surgeons also has conducted a great many training courses in recent years.

Nevertheless, the shortage of trained manpower is still one of the major stumbling blocks to the upgrading and improvement of ambulance services in the United States. There are a number of reasons for this. One of the most important is the high rate of turn-over in ambulance personnel, particularly among services operated by funeral directors and other proprietors.

It is important to note that federal laws, with exception of the Minimum Wage Law, authorize only the establishment of criteria, guidelines, and standards. While reimbursement or awards of grants-in-aid may depend on meeting these criteria, intended to promote good practice when human life is at stake, the federal government does not actually regulate, license, or otherwise control ambulance services. This has been and remains a state and/or local responsibility.

Another factor is the general lack of professional status for the occupation of ambulance attendant in the United States. Surveys indicate that trained manpower is less of a problem in volunteer and governmental (city and county) ambulance service operations.

Training to date has been conducted primarily by local support. However, other

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sources of support are available from the Office of Education, Department of Health, Education, and Welfare, and other federal agencies. But, oddly enough, they are not being utilized to any great extent. Ohio is one of the few states to have tapped this source. More than 15,000 emergency personnel have been trained through a vocational program conducted by the Ohio State Department of Education.

3. Communications

Communications is an area in which careful and detailed planning is of paramount importance. Studies of methods of improving ambulance service communications generally result in the advocacy of central dispatch systems. There is a great deal of activity in this area, both conceptual and actual. The concept of a combined central dispatch system for medical emergencies, fire, and police has received a great deal of attention. Such systems have been established in a number of communities, although only on an informal and simplified basis. The vast majority of communities, however, has a long way yet to go in establishing fully coordinated two-way communications between central dispatch, ambulances, and hospitals. Unfortunately, the single emergency telephone number, central dispatch, and the need for a system of sifting out non-emergency calls, are still developing concepts.

It may be that development of model communications systems adaptable to varying geographic and demographic circumstances, and the establishment of funding mechanisms to subsidize their adoption by communities, will be necessary to solve this problem.

The picture is not entirely black. The state of Nebraska has begun to establish a coordinated system of communications between hospitals and ambulances throughout the state. Microwave systems are being established in a number of metropolitan areas. An initial "Consultation on Implementation Concepts for the Single Emergency Telephone Number" has been held. A recent study performed by the Institute of Public Administration and Teknekron for the Department of Housing and Urban Development and the Department of Transportation, and carried out by several electronics companies, indicates that it might be possible to have a Public Urban Locator Service (PULSE) to locate objects and people anywhere in the city, with an accuracy of 50 feet, at a rate of 10,000 per second.

The Highway Emergency Locator Plan system has been advocated in a number of communities, and the future holds a great deal of technological promise. In Boston, a pilot Telediagnosis project has been installed which provides audio-video-telemetry communication between an emergency facility at Logan International Airport and the emergency department of Massachusetts General Hospital, thus providing extension of physician coverage to the airport facility. Mobile medical telemetry on site and in transit, limited thus far to the transmission of E.C.G. systems, has been installed in Miami and Los Angeles. The practicability of mobile coronary care units and intensive care units is currently being explored.

4. Vehicle design

The report of the President's Committee on Traffic Safety emphasized heavily the inadequacy of emergency vehicles generally in use. There have been a considerable number of experiments in emergency vehicle design, and quite a few new and, in general. more satisfactory vehicles have been constructed. We believe, however, that at least 70 percent of the ambulances presently in use in the nation still do not meet the minimum standards developed by the American College of Surgeons.

The Committee on Ambulance Design Criteria of the National Academy of Sciences-National Research Council is in the final stages of its study relating to the engineering aspects of emergency vehicle design. The NAS-NRC Committee on Emergency Medi-

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cal Services report, *Medical Requirements for Ambulance Design and Equipment*, is one of the documents being used by the Committee in its study.

5. Equipment and supplies

In 1964, the American College of Surgeons published a list of minimum equipment and supplies for ambulances. The list was revised in April, 1967, and is a useful guide for the evaluation of ambulance equipment. Many ambulance services—those operating on a voluntary, proprietary, or government basis—are making efforts to properly equip their vehicles. Reimbursement under Medicare, as I mentioned, requires that minimum equipment criteria be met. Department of Transportation Standard 4.4.11, as it is adopted by states wishing to qualify for grants-in-aid, will have a marked effect upon the status of ambulance equipment and supplies.

6. Local ordinances and regulations

It is ironic, considering that human life often weighs in the balance, that ordinances regulating the operation of ambulances are in effect in only a few American communities.

In 1962, the Joint Action Program consisting of the American College of Surgeons, the American Association for the Surgery of Trauma, and the National Safety Council, promulgated a *Model Ordinance for the Regulation of Ambulance Services*. This model ordinance received broad publicity, but has been accepted by only a few communities. In fact, our surveys have so far uncovered less than 100 municipal ordinances regulating services. Fortunately, the bulk of these are patterned after the model ordinance. Generally speaking, the adoption of the model ordinance insures inclusion of the necessary elements of an adequate community ambulance service.

The enactment of state laws effectively regulating ambulance operation has been slow to date. Initially, many states adopted statutes relating to the registration of emergency vehicles and their personnel. However, only a few states (California, Florida, North Carolina, Virginia) have adopted statutes which sufficiently regulate such elements of ambulance operations as necessary equipment, training, etc., to have any real effect.

The Department of Transportation Standard 4.4.11 includes guidelines for adoption of statutes and ordinances. It is likely that many states, after they survey their ambulance services and evaluate them, will enact statutes effectively regulating ambulance operations.

7. Hospital Relationships

The relationship of the ambulance service to the hospital can be the key to the success of an ambulance service. Although many hospitals discontinued ambulance services during the last 25 years, there is currently an interest on the part of many to reverse this trend. Logically, the hospital emergency department is the focus of community emergency health services. There is a vital need for closely coordinated efforts between ambulance services and hospital emergency departments.

The hospital provides an obvious base for training, although this is a problem when ambulance personnel turnover is high. In all too many communities, contingency agreements for exchange of equipment and supplies between ambulance service and hospital, when necessary to the patient's welfare, do not exist. Communications, as I pointed out earlier, are generally poor.

Areawide planning of emergency department services is now under study by many groups. Recommendations for categorization of emergency departments have been made, for example, by the Hospital Council of Southern California and by Dr. Oscar P. Hampton, Jr. in his special study of 21 hospital emergency departments in the St.

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Louis area. The National Academy of Sciences-National Research Council currently is under contract with the U.S. Public Health Service for a study of this concept and its potential benefit.

The Joint Commission on Accreditation of Hospitals is now developing a comprehensive checklist for the evaluation of hospital emergency departments. This list has been reviewed by various groups, including the Emergency Medical Services Commission of the AMA. Many of the items in the evaluation document bear on ambulance services.

Community councils essential

In every community, regardless of size, there should be a Community Emergency Health Services Council to coordinate all lay and professional activities necessary to first aid, transportation, emergency medical care, and definitive treatment of emergency medical cases and victims of accidental injury. This council should demand the highest possible efficiency in day-to-day care of emergency cases. It should also orginize a system to cope with local or national disasters.

The make-up of such a council will vary with the size of the community, but the membership should represent hospital authorities, physicians, county or state health departments, ambulance and rescue organizations, fire and police departments, municipal government, civil defense, and other appropriate officials. Voluntary health workers, civic leaders, and representatives of philanthropic groups should also serve as members or associates.

Necessity for high quality services recognized

The findings of a statewide study of ambulance services conducted by the Bureau of Police Sciences of the University of Iowa, entitled "Hospital-Based Ambulance Service", sets forth deficiencies and the need for upgrading services.

The report showed that 84.6 percent of the ambulance services in the state (60 percent of which are operated by funeral homes) responded to a mailed questionnaire form. Of the responses, 73 could not be used for several reasons. This number included 34 services which were going out of business during a two-month period.

Fifty-nine percent of the private operators and 53 percent of the public operators answered less than one emergency call a day. Other findings indicated:

- Almost a fourth of the private operators require 12 to 20 minutes to get the ambulance on the street at night.
- Thirty percent do not give first aid because "transportation in our business."
- Eighty percent do not have regular in-service training.
- Twenty-nine percent of the vehicles are station wagons, and another 29 percent are ambulances over 10 years old.
- Seventy-one percent do not have two-way radio.
- About 60 percent do not carry splints.

This picture of ambulance service is a serious one, but comparable in varying degrees to findings of studies in other states.

National trends in emergency health services

Economics

Authorities in the field of private ambulance services point out that a population of 10,000 people will generate one bona fide emergency ambulance call a day. The average funeral director-operated ambulance may get many more calls a day from 10,000

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people, but many may be "taxi trips". When people know, however, that they will be expected to pay a legitimate price for the service, the one day ratio holds.

According to cost records of some of the best managed private ambulance services in the United States, it costs about $30,000 per year to adequately operate one ambulance.

To plan and inaugurate a private ambulance service, the operator must anticipate an initial investment of anywhere from $12,000 to $18,000 each for two equipped vehicles, plus the cost of establishing a headquarters. To this must be added approximately $60,000 for adequately manning the two ambulances, and such other costs as depreciation, supplies, rent and equipment, laundry and uniforms, gasoline, oil and maintenance, telephone, radio, insurance, employee fringe benefits, and the many other items it takes to keep an ambulance service operating.

If only one ambulance is purchased, arrangement must be made with a neighboring service to provide back-up service. Knowledgeable people in the field say it takes more than one ambulance to cover the average community.

Private ambulance service leaders estimate that a family-type operation where a wife takes calls and dispatches the vehicles, using one-and-a-half ambulances, requires a minimum capital investment of $35,000. It would have a yearly operating cost of about $70,000.

It is evident it would take 2,800 ambulance trips—at $25 per trip—just to break even, or 3,000 ambulance trips per year to yield a $5,000 profit, assuming all the trips are paid for.

This averages out to 8.2 trips per day. Thus, in terms of community potential, it would take a community of 82,000 persons to make it possible for a private ambulance business to operate on a sound basis.

It is readily apparent, therefore, why so many private ambulance operators who inaugurate services in communities of 15,000, 20,000, or even 30,000 people fail.

The answers to the problem apparently are:

- City or county subsidy of private ambulance services.
- City or county police or fire departments providing emergency ambulance service as a "public utility."
- Formation of volunteer rescue and first aid squads to provide emergency service.

A very obvious problem in the emergency ambulance field through the years has been the initial cost of a vehicle and proper equipment. Previously, a new vehicle could cost from $10,000 to $18,000 depending upon the make of chassis, type of body, and desired equipment.

A new trend in the volunteer rescue and first aid field became apparent as early as seven or eight years ago. Many volunteer squads are provided a new station wagon each year for ambulance use by local automobile dealers who, in turn, are usually given a "Courtesy of Dealer" identification on the vehicle. In many instances, the squad also had one or more custom-built ambulances.

Knowledgeable squad leaders, however, became keenly aware of the need for a vehicle which would provide not only more head and work room, but would also have space for "light duty" rescue equipment used in the removal of persons trapped in wrecked vehicles and other emergency situations. They turned to panel trucks and the carry-all and travel-all vehicles. In many instances, the units themselves converted these vehicles into excellent ambulance light-duty rescue vehicles. Others, providing their own specifications, turned to vehicle conversion firms.

This trend led quite a number of conversion firms into developing this type of vehicle themselves. At least one nationally known private ambulance operator, for a

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number of years, has converted panel trucks into ambulances which have been used successfully in the several cities in which he operates.

Today, it is possible to purchase a well-equipped "conversion ambulance" for anywhere from $6,000 to $9,000, depending upon the specifications for vehicle and equipment set forth by the purchaser.

Profile of community operations

It is difficult to compare data from different communities because the methods used for surveys and analysis vary between communities. However, an overview of selected communities has been made of the following cities: Chicago, Illinois; Baltimore, Maryland; Charlotte, North Carolina; Columbus, Indiana; Petersburg, Virginia, and Pompton Lakes, New Jersey.

One figure for comparison is the ratio of ambulance calls to population. This varies from as low as one call for every 57 persons per year, to as high as one call for every 16 persons per year. An average might be one call per 25 people per year. The higher ratio seems to be in the larger metropolitan areas where, it appears, such services are more highly publicized and better known to the public.

Today's challenge

We hope that you, as leaders in the emergency health services field, will recommend an immediate action program to stimulate intensified effort at national, state, and community levels to improve ambulance services.

We hope, too, the presentations and the workshop sessions to follow will produce recommendations upon which this action program should be based.

I express my sincere appreciation to the staff of the Hospital and Ambulance Services Branch and others of the Division of Emergency Health Services who assisted in the preparation of this presentation.

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The efficient city emergency medical system—myths and reality

CAPTAIN J. M. WATERS, JR.*

Jacksonville is a city unique in many ways, the most notable being the recent "consolidation" of the city of Jacksonville and Duval County, in which the county was abolished, the city limits extended to the county line, and several sets of duplicating government officials replaced by one. Now, we have one mayor, one police department, one fire department, and a unified chain of command.

The creation of one government unit to replace many has not only greatly simplified government and avoided duplication and confusion. It has made us into the largest city in the world geographically—with an area of 848 square miles and a population of 525,000 people. It consists of dense urban areas, rural terrain, rivers and ocean, express highways, and city streets.

The city contains three large military bases and two colleges, with a third university in construction. The implication of this large group of sailors and students upon the incidence of auto accidents is clear. Jacksonville serves as the gateway to Florida for the entire East Coast and much of the Midwest, and out of state transient traffic is heavy. As a resort, the city and its beaches draw hundreds of thousands of visitors in the summer months. A large retired population contributes to the medical problems. Over 125,000 of the city's population are medically indigent.

In 1967, faced with a lack of ambulance service, the city took over emergency ambulance services. The fire department was directed to operate it, and a federal grant was obtained to assist in purchasing ten ambulances and operating them for the first year. This has resulted in a solution to the emergency ambulance problem in Jacksonville. Such service has been provided at a considerably lower cost than in other cities of similar size. When all ten ambulances are deployed, 90 percent of the citizens of Jacksonville will be within a seven-minute response time of quality ambulance service.

It generally has been agreed that an efficient highway EMS system must consist of communications, emergency care at the scene, transportation, and command and control. One big item was missing here—the physicians and hospital team, and the part they play in definitive medical care. This omission was a calculated policy of the National Highway Safety Bureau to avoid any implication that they were entering into the sacrosanct world of professional medicine. Omitting the hospital was an error, however, for without the definitive treatment, the rest is often meaningless.

Emergency room treatment in our nation's hospitals very often is inept and backward, as is a goodly portion of the country's ambulance service. The need for reform in these areas is great! I will go a step further. In the very near future in some areas, emergency medical technicians manning rescue ambulances are going to do their job of emergency care and transportation more proficiently than some emergency departments now providing the definitive treatment with which they are charged. While we municipal officials are searching for ways to improve rescue, care, and transportation outside the hospitals, the medical and hospital professionals need to do some deep soul searching.

Communications

The matter of communications in a city EMS system is no great mystery. The simple fact is that most calls for help come by phone into our Fire Department or Police Operations Centers, one of which promptly dispatches an ambulance. Our problem is greatly simplified since we went into a consolidated form of government, abolishing

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the county and small suburban towns. Therefore, all dispatching is done by one city Fire Department Operations Center. It is asinine to set up a special center to handle medical calls only. The already established center in any city, whether it be police or fire, can do a highly effective job of dispatching; after all, that is their 24-hour job.

We found that most of our citizens were not familiar with emergency telephone numbers, and usually called the operator for help. Delays sometimes resulted. To remedy this, we are sending out in our regular city electrical billings two gummed labels containing the number for fire and ambulance (same), police, and suicide control. We are urging that these be affixed to each phone in every home and business. This will give our citizens direct dialing service to the action people. In July, 1970, we are installing the 911 universal emergency number, but this does not invalidate the stickers on the phones; in fact, by dialing the number on the sticker, the screening switchboard used by the 911 number is avoided.

We have replaced all the old fire alarm pull boxes with emergency telephones. These are located on every other corner in our main city area. One simply opens the box, picks up the phone, and talks direct to the operations center. A light on a large wall chart in the center shows where the street phone is in use, so our men know the location immediately. By using these phones, we can dispatch police, firemen, ambulances, or auto repairmen to the caller. Our fire false alarm rate has dropped from 90 percent to less than 5 percent since we installed these phones. People simply cannot lie well over a phone while they are being recorded. An equally great advantage is that people can tell us in advance what the trouble is. In the old pull box days, an alarm pulled downtown required us to dispatch a full assignment of fire equipment prepared to deal with a large building afire, even though the trouble may have been only an auto with burning ignition wires. Now, we can respond appropriately.

We intend to add more of these street emergency phones, primarily in our ghetto areas, where most homes do not have phones, and a phone on the corner will provide emergency communications for the whole neighborhood. We also have these emergency phones at every cutoff from the main expressways. The highway department is putting up signs on these highways pointing out that emergency phones are at the exits. Furthermore, we have placed large signs over each phone to let people know they are for public use. Heretofore, many people though these phones were either the old pull-type fire alarms or were for police and firemen only.

The idea of placing emergency phones at one-mile intervals along major expressways is impractical. We simply can't afford it, and I doubt if we need it with phones at all the exits. Highway crashes are generally signaled by traffic piling up, and it is amazing how sensitive the people living along the road are to these. We quickly hear by phone from citizens living nearby, and we can dispatch police cars and ambulances. So, I worry less about delays in alerting on our highways in Jacksonville than I do about the delay in alerting by a 45-year-old man has who chest pains and spends several hours taking Alka Seltzers before collapsing.

In a couple of locations, notably on Highway 295 around the Maryland area of Washington, D.C., they have placed push button boxes, which are cheaper to install than telephones, at one-mile intervals. One pushes buttons marked "Police", "Service", or "Fire", and waits until the radio signal is received at a center and a patrol car is dispatched. In practice, the motorists do not wait, and over 30 percent of all calls are false alarms. The cost in dispatching patrol cars to investigate is tremendous, and the frustrations of the waiting motorists unmeasurable. This is a system that was fine in theory, but it falls flat in actual application. It has all the drawbacks of the old fire pull-alarm system, which is 50 years behind the new street phone alarm system we are using in Jacksonville.

There has been a great deal of talk also about the use of radios in taxicabs, fleet

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trucks, and municipal equipment for broadcasting radio alerts when there is a wreck or other trouble. Motorola sponsored one such program called "Community Radio Watch", and we participated in it in Jacksonville. The results have been mediocre, and it is doubtful whether a real need exists for an organization of this type. Persons traveling with two-way radios in their vehicles will radio their control center if they see something. However, the chance that a radio vehicle will come along at a time when needed is fairly remote. In eight months, though my car is radio equipped, I have reported one wreck and several stalled motorists that had not been previously reported. Radio cars can be put to far better uses than patrolling the roads in search of wrecks.

In essence then, nearly all alerting is going to be by phone, with a very small number of cases by radio.

Dispatching

Let me again stress that in a large city, ambulance dispatching should be handled by the Fire or Police Department Operations Center, depending on which department is providing the service. Even where municipal ambulances are not provided, and private ambulances are used, they should be dispatched for emergency calls by the city center. I favor the Fire Department Operations Center doing it because it doesn't have as many calls daily as does the police center. The runs of private ambulances on routine patient transfer calls is no real concern of ours. If it is an emergency run, however, we either dispatch them from the Fire Operations Center; or, if they have been called by a private party, they so inform us. Our policy is that the fire department is responsible for emergency ambulance service, although we may on occasion need backup from private operators.

When an ambulance is dispatched, a time record is kept on a running card punched by a time machine. All conversations, radio and telephone, are recorded on 24-hour tapes. The center has direct "red phone" connections with every emergency room in all city hospitals, and can quickly determine their load condition and readiness to receive patients. In serious cases, we alert the receiving hospital while the ambulance is still outbound, following this up with an estimated time of arrival when it is available. All of our ambulances have two-way radio communications, not only with the Operations Center, but with the emergency rooms of all the hospitals. This was an easily solved problem. We found that the hospitals all had a Civil Defense radio in each emergency room. We, therefore, put the Civil Defense frequency crystal on one channel in all of our ambulance radios, and we were in business. We perform a radio check with every hospital at a set time each morning. Then, the volume of the radio in the emergency room is turned all the way down, but the set is left on.

When an ambulance wishes to talk with an emergency room, the driver contacts the Operations Center which tells the emergency room via red phone, "Call Rescue Seven". The emergency room nurse then merely turns up the volume and calls to establish communication. Frankly, we have made little use of this system. Our men usually know what to do in first aid, and the Center can relay needed information quickly to the emergency rooms. However, we expect direct communications with the emergency room to gain momentum as our cardiac program progresses.

We feel that with our new $600,000 Operations Center, our regular and emergency phone systems, and a flexible and efficient radio system, our communications and dispatching problems are solved. For proof we can cite the satisfaction of our citizenry. The average response time in the city area—from call to the arrival of an ambulance—is less than five minutes. In remote areas where ambulance response time may be longer, we dispatch a fire engine company to render first aid until the ambulance arrives.

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Transportation

Our ambulances are not luxury jobs. Each is a practical cabin mounted on a one-ton Chevrolet chassis. Complete with equipment, they run about $12,500 each. Our last four, to be delivered in July, will be in full conformance with the *Medical Requirements for Ambulance Design and Equipment* of the National Academy of Sciences. In fact, we have exceeded the basic equipment requirements. From an economy viewpoint, these ambulances are winners. Not only are they cheaper, initially, than the large custom jobs, but every three years we simply insert a new chassis and have a new vehicle. We expect the cabin to last through three chassis. These ambulances have plenty of working space and ample storage space for both medical and extrication equipment. Our ambulance personnel carry all equipment except heavy extrication equipment.

The primary drawback of this type of ambulance is that it rides roughly on bad roads, and a fast run can be excruciatingly painful for a person with broken bones. In such cases, we always return at a slow speed without lights or siren. In fact, 80 percent of our return runs are made in this manner, for we emphasize treating and stabilizing the patient on-scene, and returning at a safe speed, whenever possible. Outbound we seldom have enough information to determine the seriousness of the case, and such runs are made with light and siren. We never forget, however, that running a red light makes us the responsible party should an accident occur. Street intersections are crossed at reduced speeds.

Emergency care

In Jacksonville, we have a long and intensive training program for rescue ambulance personnel, and we have long tenure with little or no turnover. Without the latter, we could not afford the training. The firemen have good pay, with exceptionally good working hours and conditions; so we keep them. To qualify for ambulance duty a fireman must be a volunteer, must have two years on the department with an excellent record, and must hold an American National Red Cross Advanced First Aid card. He then passes through five stages of training:

1. Review of advanced first aid procedures
2. Advanced procedures taught by 25 doctors
3. Extrication from autos, aircraft, and trains
4. Hospital training in ER's, intensive care units, and OB
5. Hospital training in emergency cardiac care

This program, we believe, is the most advanced of any in the country. In the beginning, much of it was done in the men's off time. When this became burdensome, and the men began seeking extra compensation, we began basing our ambulances at the hospitals, where the men could be trained on the job while between calls.

Our first trials of hospital basing have been an unqualified success, enthusiastically supported by both the medical staffs and the ambulance personnel. If there is one message to give, it is: base your ambulances at hospitals, while at the same time keeping them under control of the Operations Center for dispatching.

At some hospitals, our men sleep there; at others, they are there during daylight hours, returning to the fire stations at night. The emergency room staffs have been surprised not only at the ability of the ambulance personnel to help them in the emergency room but also at the rapidity with which the men absorb the training. In a city in which we have a severe shortage of doctors and nurses, the presence of two trained emergency medical technicians in the emergency room, when not on runs, has proven a boon. At the same time, our men are receiving excellent training; and, I might add, this is made possible only by the enthusiastic cooperation of our fine doctors and nurses, and the strong support of our medical society.

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I have every confidence in the ability of these rescue ambulance personnel of the fire department to handle nearly any situation. Twenty-nine babies have been delivered without mishap. I have accompanied them to attempted suicides by gas, acutely ill patients, heart attack victims, and many severe auto crash scenes. At these crashes, it is gratifying to observe the efficient way in which they go about their work. No one is moved until his airway is checked and until he is splinted and bleeding is stopped, with backboards inserted. In the words of our chief of rescue, "We do not extricate a seriously injured victim, we disassemble the car around him."

In most cases, the care at the accident scene is so complete that the trip to the hospital is at regular road speeds without siren or lights. Once at the hospital, the victim is kept on the special backboards until after X-ray, for X-ray will penetrate the material. In a few cases, arguments regarding this approach have ensued with the emergency room staff, but the word is getting around, and the procedure is accepted. We have tried the often-recommended Letterman system but found that our stretchers disappeared. We now keep spares at centrally located fire stations rather than at hospitals.

Upon arrival at an emergency room, the ambulance men assist as needed until the situation is under control, then fill out a complete report on a special pink form. Despite theories to the contrary, we find that emergency room staffs aren't too interested in what occurred before admittance. There is a green form which the emergency room is supposed to fill out confirming the final diagnosis and treatment, but here we run into opposition from most hospitals. They object because the form takes too long to fill out, and because the information subjects their people to being called into court to testify. We are attempting to overcome these objections by shortening the form and eliminating certain "liability" items. The filling out of long and numerous forms by busy professionals is an annoyance that needs dispelling. Future planning had best be based on a minimum requirement for this.

Another objection, I suspect, is to those things which occur daily and had best not be written down. While the usefulness of data in upgrading our operations, and in future research, is unquestioned, the kind of data that the NHSB recommends in its *Emergency Medical Services Survey and Plan Development* is another one of many myths. It simply won't work in a busy city EMS system. It is time we sat down and developed a realistic data system acceptable to the "troops" in the field. In Jacksonville, we feel that the data we are collecting are the maximum they will tolerate.

Private ambulances

In our city, we have a number of private ambulance services, including a number run by funeral directors. They, for the most part, are not interested in emergency service. Some funeral homes transport chronically ill patients to and from hospitals free, realizing they will get the funeral business later. I see nothing wrong with the practice, especially when it involves indigents. Florida is one of the few states that has an ambulance law, but it is a weak one. We realize that our private ambulance operators can afford neither the salaries nor the equipment to render service comparable to that given by our fire department rescue service. Yet, if they are going to engage in emergency service at all, we must insist on minimum standards. A tough new city ambulance law is now pending before the City Council, and I am confident that it will pass. It will be a major step forward in eliminating marginal and untrained operators, and we intend to enforce it strictly. Those remaining in the emergency business will do so under the supervision of the Department of Public Safety and the Health Department.

Despite the widespread criticism of private ambulance service, I have seen a number of fine services—well managed, well trained, and efficient. Private enterprise can give quality service if they have a franchise, a subsidy, and are under government inspec-

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tion. However, for sophisticated treatment, such as we describe later for heart attack patients, few private ambulance companies can afford the equipment or the highly paid personnel required, and such procedures must be carried out in our cities by government. We regard emergency ambulance service in the same category as police and fire protection. They make, in fact, more ambulance runs yearly than we do for fires.

Costs

To operate ten rescue ambulances, we require 66 men, a chief of the rescue branch, a training supervisor, and a secretary. Personnel services, including fringe benefits and pensions, total $595,481 yearly. Each private, for example, is paid $8,357 yearly, including benefits. Commodities total $22,986, and other direct costs total about $16,000. Each ambulance costs us $63,447 per year to run, 94 percent of which is for personnel. The predominant factor is personnel costs, and the great disparity between public and private salaries, is what separates private from public ambulance service. Yet, if we are to have quality, we must pay enough to get individuals of high caliber, and retain them.

Ambulance service costs, like all medical costs, are skyrocketing. We attempt to defray this in many ways. We charge $17.50 per run, and are planning to raise the fee to $22.50. Our collection rate, which is running at about 40 percent, must be raised, and we are looking for ways to do this. A subsidy from the NHSB of $11,890 per ambulance helps defray expenses. Lastly, as the number of runs increases, the cost per run decreases. We estimate that by 1970, we will be making 13,000 emergency runs yearly. The cost breaks down as follows:

Cost per run	$48.85
NHSB subsidy	9.15
Fee collected	9.00
Tax supported	30.70
Total	$48.85

Based on these figures, the total cost of operating a first-rate city emergency ambulance system in our city is 76 cents per capita.

Our figures are considerably below those given in the NHSB publication *Economics Of Highway Emergency Ambulance Services* and well below other cities of similar size. Most of this difference can be attributed to the difference in salary scales for firemen in southern cities as compared with those in the north. The NHSB study, while generally an excellent one, errs on the high side, in my opinion, in estimating costs of ambulance service and errs on the low side in estimating the number of ambulances required to serve a given number of persons. Almost certainly more ambulances are required to serve the 525,000 people in our 850-square mile city than would be needed for the same number of people in a city of 40 square miles. The number needed, and the money a city can afford to devote to the service, must vary with the peculiarities of each city.

Helicopters

Despite continual protests to the contrary, I picked up a reputation over the past few years as the man who advocated replacing ground ambulances with helicopters. Nothing could be further from the truth. I see little use for helicopters in a dense urban area, or where adequate and efficient ground ambulance service is available. If a ground ambulance can reach a patient in ten minutes, there is no need for a helicopter. On the other hand, I do see a need for helicopters in remote or inaccessible areas, and in transporting critically ill patients from outlying community hospitals to major medical centers.

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To determine the feasibility of this (which, long ago, the military determined for their people) for civilian use, I recommended in 1967 that arrangements be made for military helicopters from some 200 continental military bases to aid in severe civilian injury cases. This had long been done on an ad hoc basis. I wished to formalize agreements and operating procedures to eliminate long delays when time was pressing. During informal negotiations with the action officers of all services, general agreement was reached to go ahead on this project, and a letter was drafted to this effect. For reasons I have never yet been able to determine, this letter was shelved for over eight months in either the NHSB or Federal Highway Administration.

Finally, in early 1968, the President directed that a study be made and a demonstration project carried out on this very concept. A meeting of Assistant Secretaries from the various departments concerned was held, no technical experts were called in to tell what had already been done, nothing was ever accomplished, and I assume, that with the passing of the old administration, the matter is now dead. Only the commandant of the Coast Guard took action, issuing an order to his operational commanders to cooperate whenever possible with state authorities in aiding highway victims.

No one doubts that the helicopter can do a superb job of medical evacuation. The problem is one of costs. We cannot justify a helicopter just to evacuate highway injured. In certain localities, however, we can use one economically (800 hours yearly or more) if we use it for highway rescue, sea and land rescue, police and highway patrol, apprehension of lawbreakers, riot control, accident investigation, cardiac and inter-hospital transport, fire control (both urban and forest), photo missions, and administrative flying. These missions would be on a priority basis, with rescue as top priority. Until we utilize the helicopter on such a basis, with firm central control; or, until we can obtain use of military helicopters, I see little prospect of widespread and successful use of these machines in EMS.

Operation heartbeat—answer to the greatest threat

For the last couple of years I spent with the NHSB, my attention had been devoted to the highway victim and, as a result, trauma. For 20 years before that, in the Coast Guard, I had been concerned with aid to the distressed at sea and in the air. Naturally, when I came to Jacksonville, it was with visions of starting up vigorous programs in these fields. But when I asked for the vital statistics of the preceding year, it caused a realignment in my thinking, and a drastic change in perspective.

In 1968 in Jacksonville, 26 persons died in water accidents, 139 in traffic mishaps, and, far overshadowing these, 1,497 died of heart disease. Not only was heart disease by far the greatest killer of Jacksonville citizens, but in EKG tests of 10,000 citizens made by the Heartmobile of the American Heart Association in February, 1969, one of every three of our citizens tested showed signs of cardiac abnormalities. The greatest single life threat to a citizen in Jacksonville today is not the criminal on the street, nor fire in the home, nor death on the highway; it is an acute myocardial infarction.

Nationally, 500,000 persons yearly suffer myocardial infarction, and 25 percent of them die. Of these deaths, 60 percent occur outside the hospital. Inside the hospitals, the introduction of intensive care units, and improved therapy, have dramatically lessened the death rate for those patients who reach the hospital alive. Several of our hospitals have such units now. As their use increases, the number of cardiac deaths within the hospitals will decrease. The implication is clear that, as this occurs, the percentage of deaths outside hospitals will increase. It is conceivable that within a matter of years, three of every four deaths from acute heart attack may be occurring outside hospitals.

Nationally, the trend for three decades has been away from physicians treating patients in the home; the office or emergency room is used instead. This not only saves the

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time of physicians who are in short supply, but allows them to work in an environment where they have the facilities to properly diagnose and treat illnesses. Increased specialization has also dictated treatment in central medical facilities. One cardiologist, reflecting the prevailing attitude of physicians, recently remarked:

"If I suspect a cardiac condition, I will have the patient meet me at the emergency room. If I went to the home, I simply wouldn't have the equipment with me to properly diagnose and treat the patient. I would have to transfer him to the emergency room anyway."

Logical as this reasoning is, it is cold comfort to the hundreds of thousands of Americans who will suffer heart attacks to realize that they must make it to a hospital on their own, or rely on an ambulance crew to get them there.

Because of the poor quality of ambulance services throughout the country, generally not only can long delays in response be expected, but the attendants may be poorly trained and incapable of rendering meaningful help. In many cases, they will not have even the minimum equipment required under today's lax standards.

A critical problem that has faced the Jacksonville Emergency Rescue Service in the past is how to deal with the hundreds of cardiac cases occurring in this city yearly. In the past (and even today in many cases of private ambulance transportation), the patient was hurriedly carted to the ambulance, an oxygen mask (if available) applied to his face; he was then rushed at breakneck speed to the nearest hospital, where often there was no one prepared to receive and treat him.

The Emergency Rescue Service has advanced far beyond this. We are, today, in stage one of a planned program of progression. All of our men are experts in cardio-pulmonary resuscitation (CPR). Our ambulances are equipped with resuscitators and oxygen. Our communications system is one of the finest in the nation; we can insure that the ambulance is directed to a hospital able to treat the patient, and that the hospital has advance warning of the arrival and nature of the case. In serious cardiac arrest cases, this provides as advanced a procedure as any allowed paramedical personnel today. But it is not enough.

Why is the emergency medical care provided today by our highly trained rescue personnel inadequate?

Writing in the *Journal of Chronic Diseases*, Nov.-Dec. 1966 issue, L. Kuller, reporting on 1,338 autopsies of sudden, unexpected "coronary deaths", found that contrary to popular opinion only 31 percent of the victims showed fresh thrombotic occlusion (clot in a main blood vessel). Commenting on this study, in an unpublished paper, Dr. Benson B. Roe, department of surgery, University of California School of Medicine, assumed that the remaining 69 percent had sustained a cardiac arrest from either asystole or ventricular fibrillation. In each case, the condition might have been effectively treated either by drugs given intravenously, or by electric shock applied to the chest by a defibrillator. Rescue personnel are not now trained or equipped to recognize fibrillation, nor are they trained to carry out corrective procedures. While they can carry out cardio-pulmonary resuscitation, and have done so in a number of cases, this method over a period of time usually results in progressive hypoxia and acidosis, and the chance of salvage declines steadily with delay in definitive treatment.

Definitive treatment can be given effectively in the field and in ambulances. This has been proven in a number of locales; but, to date, the treatment has been provided by physicians and nurses. The Royal Victoria Hospital, Belfast, Ireland; Waveney Hospital, Ballymena, Northern Ireland, and St. Vincent's in New York City are among facilities reporting on this procedure. A number of other groups are planning such facilities, or are experimenting with telemetry of EKG's from the field or ambulance to the hospital, so that physicians in the hospital can read an EKG and recommend further action to the rescue crew.

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One report on telemetry estimates that of 16 patients DOA, on whom telemetry readings were received, 11 may have been salvagable with proper therapy. The therapy, regrettably, was not available. At Waveney Hospital in Northern Ireland, of 95 heart attack patients transported not a single death occurred in transport. In many cases, undoubtedly, this was due to the presence of proper equipment and trained medical personnel. In all of these cases, however, physicians with proper equipment were operating in a relatively small area. These conditions do not prevail in Jacksonville, where we are faced with providing care to the largest city area in the world, with little likelihood of physicians accompanying the emergency rescue ambulance.

What have we done about the problem facing our city? The Department of Public Safety, which has had the closest cooperation from the Duval County Medical Society, appointed an advisory committee made up of some of the city's leading cardiologists to work with us on this matter.

A number of alternatives were explored by the committee. From these discussions, a plan was evolved to equip all ten of our ambulances with the necessary equipment and trained paramedical personnel to allow quick access to any location in the city where a citizen suffers a heart attack. An early plan to employ two large cardiac ambulances staffed by physicians and nurses was abandoned when it became evident that the time required for two centrally located vehicles to reach the suburbs would be excessive, and that, in any case, we could not provide properly qualified physicians for this service due to the acute shortage in the city.

It is agreed that if more definitive treatment were to be given cardiac victims outside the hospital, it would have to be by our rescue personnel. They would require not only special equipment but, more importantly, special training. This proposal was presented to the Executive Committee of the Duval County Medical Society, and after consultation with the American Medical Association, the Executive Committee has formally endorsed the program, contingent on proper training of the rescue personnel. The training syllabus and methods of training have now been developed by the Cardiac Advisory Committee.

This concept in medical care is a bold one. Already inquiries have been received from many parts of the country. To the more conservative, who have doubts about the wisdom of the program, it is well to remember that only two or three years ago, grave doubts were expressed as to the feasibility of utilizing nurses in intensive care units to administer definitive treatment to heart patients. Now, it is a commonly accepted practice. Its coming, however, was expedited by the shortage of physicians available to carry out this treatment. Such a shortage makes it imperative that we expedite the training and equipping of our rescue personnel to deal with cardiac emergencies outside the hospital.

At this time, over 30 of our rescue personnel are engaged in hospital training. To fully train a man for the type of work intended requires in excess of 200 hours. It has already become evident, however, that the high type of personnel we are utilizing learns the procedures very quickly. No man will be allowed to perform any procedure until he has been thoroughly checked out and certified by physicians. The amount of responsibility imposed on the rescue personnel will be gradually increased as their training progresses. We are now considering progressing in a five-stage program as follows:

Stage 1—This exists now. Use CPR, administer oxygen, transport to the hospital.

Stage 2—Rescue ambulances will be equipped with defibrillators and sealed medical kits for use by a physician only. The defibrillators used will have an oscilloscope to observe heart action. Crewmen will be trained to recognize fibrillation on the scope and to use the defibrillator, but will not

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do so until a physician is on the scene. The availability of this service and equipment will be made known to all physicians who may wish to go to the home of a patient. We also will request a physician in critical cases where CPR is started in the home or other location, and transport in an unstabilized condition is considered inadvisable. We do not expect many physicians to be available for this phase, and the overall change from Stage 1 may not be dramatic. However, some doctors have indicated they will participate, so that the crews may continue their training.

Stage 3—Four of our rescue ambulances will be equipped with radio telemetry equipment to telemeter an EKG to a hospital and talk with a doctor there on what action to take. On the radioed advice of the physician, the ambulance crew will electrically defibrillate the patient and apply CPR, oxygen, etc., as done in previous stages.

Stage 4—At this stage, crewmen will have reached the state of training where they themselves may determine fibrillation on the scope and, where indicated, will electrically defibrillate the patient without advice of a physician.

Stage 5—With no doctor on the scene, crewmen will carry out CPR and defibrillate when necessary. In addition, after consultation with a physician by radio, they will administer drugs as directed. At this stage, the rescue crewmen will be performing basically the same function in their portable IC unit as the nurse does in the hospital IC unit.

The extent of treatment will be determined by the patient's condition. In many cases, a cardiac victim can simply be transported to the nearest suitable hospital. In others, his condition may be such that an attempt to transport him would be fatal, and the rescue crew may be required to carry out the procedures described in Stage 5.

The training of the personnel will require time, and will be a continuing process. The equipment is being procured now. We expect to be in Stage 3 by October, 1969. We can only guess how many people will be saved by this program, but we believe the number will be considerable. If every patient we take into the ambulance with a detectable pulse and breathing can be kept alive until we reach the hospital, our program will be a great success. We believe this goal is attainable. We believe the chance is worth the $50,000 for special equipment for our ambulances, and the special crew training involved. Compare the cost of $51,000 for this city of over half a million with some other life-saving costs. For example, one heart transplant costs $30,000; the Coast Guard pays out $34,000 per person saved at sea; the Air Force cost per pilot saved in Viet Nam has been $48,000. If we save only one person, the equipment will have been paid for.

In summary, hundreds of our citizens are going to suffer heart attacks outside hospitals, and perhaps three out of four will die without medical help. Because doctors are in short supply, and because of their inability to give definitive treatment without equipment and outside the hospital environment, they will not go to the scene of the attack. The initial treatment during the critical first hour will have to be given by properly equipped, properly trained emergency medical technicians so that the patient can be delivered alive to hospital intensive care units, where chances of survival are high. We feel that this is the pattern of the future, and we intend to pursue it vigorously. We hope that in addition to being the "Bold New City of the South", and an "All-American City", Jacksonville will also become known as the safest place in the country in which to have an accident or a heart attack.

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The importance of ambulance design to emergency care

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It is self-evident that an ambulance must provide facilities for patient care, and be capable of moving any emergency patient.

Various task forces of the National Academy of Sciences-National Research Council have devoted considerable effort to studying this subject. The results of their studies, and their recommendations, will form the basis for much of this paper, with emphasis on the findings of the last NAS-NRC task force, whose report is not yet published. Because the volume of material relating to the ambulance is enormous, only the major items can be covered. A more detailed study should be developed at the Task Force meeting this afternoon. It is assumed that the ambulance under description is one to be manned by emergency medical technicians, to be described later this morning. Equipment and communications, in detail, also will be covered later.

Ambulances, for years, have been the step-children of funeral directors' vehicles, station wagons, or bus-type units. They have varied from the riduculous (which provided no room at all for resuscitative and life support measures) to the sublime (which were massive operating rooms on wheels). Little or no thought had gone into the training of the crew manning the vehicles, the medical requirements for life support measures during transit, and the economics of ambulance operation. Each unit "just grew like Topsy".

Accidental Death and Disability: The Neglected Disease of Modern Society, published in September, 1966, by the National Academy of Sciences, called attention to the magnitude of the problem. It stressed the importance of accident prevention, the need for qualified emergency first aid and medical care, and other problems relating to this important subject. The group's second publication, in April, 1967, was titled *Summary Report of the Task Force on Ambulance Services*. It included such representative comments as:

"Regardless of whether an ambulance is employed for elective transport or for emergency cases, the vehicle and its fixed and mobile equipment should be identical for either purpose, and the attendants should be fully qualified to cope with any emergency.

"There are no generally accepted standards for the competence of training of ambulance attendants. . . . More than fifty different courses of instruction are known to be offered throughout the nation.

"Vehicles used as ambulances may be classed as the hearse type, the modified cargo truck, and the modified station wagon".

The booklet also enumerated the desirable criteria for an ideal ambulance. It covered these items:

> Standard design—in order to keep cost reasonable. Standard color—for easy recognition nationwide.
> Standard rotating beacon—for the same reason.
> High speed is not essential—more people are killed by intersection accidents than are saved by rushing them to the hospital without adequate preparation.
> Good riding qualities—to prevent further injury to the patient during transport.
> Road clearance should be adequate—to allow for off-street operation and to prevent being blocked when used in disasters.
> Well insulated—both from noise and outside weather.
> Easily cleaned—to allow for cleaning after use, with rapid return to service.
> Fire, water, and chemical resistant lining—same reason.

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Safe inside design—to prevent further injury to the patient or the emergency medical technicians.
Well illuminated—to allow for life support activities at the accident site and during transit.
Adequate electrical system—same reason.
Protected windows—to prevent breakage, and to preserve the privacy of the patient inside.
Built in oxygen and suction—for life support.
Carry two litters—ideal-sized unit.
Partition between driver and patient compartment—for protection of the driver and vehicle with an unruly patient. Also to keep light coming from the patient compartment from reflecting on the windshield and bothering the driver at night.
Adequate head room to allow patient care en route—for obvious reasons.
Adequate equipment—obvious, if care is to be given.
Excellent communications—Vital for any emergency vehicle.

A further report from the same source, *Training of Ambulance Personnel and Others Responsible for Emergency Care of the Sick and Injured at the Scene and During Transport*, gave specific directions regarding the level of training and the abilities of personnel to be available on emergency vehicles of this sort. This, in turn, served as the basis for a fourt h publication in September, 1968, titled *Medical Requirements for Ambulance Design and Equipment*. This document set down the medical reasons for everything specified as important in an ambulance. It attempted to avoid telling how to do something and concentrated, instead, on pointing out why it should be done.

This booklet was the culmination of all the work done by previous task forces, with medical needs as the major consideration. Following its publication, still another task force was formed. It was composed of one or more representatives of the following categories: Traffic engineers, automotive engineers, physicians, human psychologists, communications experts, rescue personnel, ambulance operators, air conditioning specialists, and National Academy staff members. One by one they looked at all items from all standpoints, keeping in mind at all times the medical requirements for this vehicle. They compiled a system description of ambulance design and performance criteria. This report is not yet published, but much of the material can be presented in tentative form.

An ambulance is defined as a vehicle for emergency care which provides a driver compartment and a patient compartment to accommodate two emergency medical technicians and two litter patients so positioned that at least one patient can be given intensive life-support during transit. It is defined, also, as a vehicle which carries equipment and supplies for optimal emergency care outside the vehicle and during transport, for two-way radio communications, for safeguarding personnel and patients under hazardous conditions, and for light rescue procedures. And it is further defined as a vehicle designed and constructed to afford maximum safety and comfort for the patient, and to avoid aggravation of the patients' condition, exposure to complications, or any other threat to survival.

The report's objective is to detail the design and performance criteria essential for all ambulances, except those of the military field variety. Specific engineering data were developed to cover the acceleration, grade capability, speed, stability, and turning radius of the vehicle. This was done with thought to present highway laws, the requirements under various road and weather conditions and modes of operation of the vehicle, and reasonable manufacturing methods. The width of the vehicle was defined as less than eight feet, to allow it to be operated on any roads. Its height was kept

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under nine feet, six inches to allow for passage under all common overhangs. No maximum or minimum lengths were defined in order to permit maximum ingenuity of the engineers in packaging the contents of the vehicle.

An electrical system adequate for total twelve volt requirements was defined once requirements had been determined. A further requirement for 120 volts was suggested to allow adequate current for moving flood lights away from the vehicle, thus providing light in accident areas at night. A power source for metal cutting saws, monitoring equipment, etc. would also thus be readily available. All electrical circuits in the vehicle are to be equipped with automatic circuit breakers to avoid blown fuses and the necessity for resetting of "popped" circuit breakers.

The importance of ambulance markings anywhere in the nation is evident, for easy recognition at intersections and for easy spotting at the scene of an accident. Two colors most visible to the human eye are white, for visibility at night, and Omaha Orange, for visibility during the day. Thus, a basic color of white, with the trim and insignia in Omaha Orange, was suggested for the ambulance. The word AMBULANCE will be lettered on the vehicle in black. The flashing lights and rotating beacon are to be blue, because this color of light is most readily visible and least apt to be confused with signs and stop lights. The flashing beacon is to be interspaced with white lights which angle up and down, making the ambulance easy to see on the streets and from buildings as it moves down the street. It is recognized that in some states current laws would prevent the adoption of this color system at this time. However, the recommendations deal with the best possible system, and it is hoped that with education for the need, law changes will follow.

Because the entire purpose of the ambulance is to provide emergency care and transportation for the patient, the patient compartment is vital. The usual litter is 76 inches long. A minimum of 25 inches at the head, to allow for life-support activities, and 15 inches at the foot, to allow for extension of splints over the end of the litter, have been requested. The width of the compartment will depend upon the placement of the litters; however, it must be wide enough to provide space for the technician to perform external cardiac compression on a patient when he is an a right-angle kneeling position at the side of the patient. Minimum height of the patient compartment is to be 54 inches, with 60 inches desirable. This will allow for the giving of external cardiac compression when the patient is on the litter or on the floor.

Communication will be by two-way radio, reliable for a range of over 20 miles. There is to be provision for walkie-talkies, intercommunication and public address systems, and siren. Future use of telemetry seems likely, and space must be available for this equipment if desired.

Access to the patient compartment, as it relates to patient care, is defined. So, too, are the design requirements of the bulkhead, air conditioning system, and heating unit. Space is provided for basic medical equipment and for the basic light rescue equipment which should be on any ambulance when it is not immediately available from other sources. The vehicle will also carry basic equipment to secure the area of the accident, and to prevent further crash injury. The entire system is designed to meet—or, even, to exceed—federal motor vehicle safety standards.

An ambulance exists solely to provide emergency care at the scene of an accident and during transport to the hospital. For this reason, the medical criteria must dictate its design and construction. Many are concerned with the role being played by medicine in ambulance design today.

A rapid review of the development and definition of the design of an ambulance, and its importance to emergency care, has been presented.

To paraphrase a well known quotation, "It is better to light one little candle than to stand and curse the darkness".

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Ambulance equipment: Standards necessary for ideal emergency care and communication

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Public, private, and professional apathy has accounted for many of the shortcomings in emergency health services, but the means of getting the patient and the doctor together is becoming a public issue, especially when a medical emergency occurs. The medical profession must assume the leadership necessary to insure that the acutely ill and injured have medical communications available at the emergency site and en route to the hospital; that they have access to adequately equipped emergency vehicles; that they receive proper emergency care from well trained ambulance attendants; and that they receive safe transportation to a location where medical treatment is rendered. Otherwise, the medical profession need not criticize the fact that communications are frequently nonexistent, emergency care either is not provided or is impractical, and the ambulance service functions only as a lie-down taxi service.

Every study of ambulance equipment has revealed a lack of uniformity in the equipment available or used. A national study by Hampton in 1965 stated that only 174 of 900 community ambulances were sufficiently equipped to meet the minimal requirements set forth by the Committee on Trauma of the American College of Surgeons.[1] In North Carolina an ambulance survey revealed that only about 45 percent of the vehicles were equipped to do all the procedures listed.[2] Similar findings were noted in Colorado, Wyoming, Nebraska, California, and other states;[3,4,5,6,7,8,9] in fact, over 40 percent of the ambulance services were equipped with nothing more than oxygen. Even those cities and states with established model ambulance ordinances or laws were often found to be negligent in listing and inspecting required equipment and supplies.

National organizations involved in the improvement of ambulance services have agreed that an adequately trained ambulance attendant must have the equipment necessary to:

1. Care for the simple airway obstruction.
2. Institute proper cardiopulmonary resuscitation.
3. Control external or accessible hemorrhage.
4. Dress wounds
5. Immobilize fractures.
6. Transport the patient with maximum safety.

[1] O. P. Hampton, Jr., Present Status of Ambulance Services in the United States, *Bulletin of the American College of Surgeons* (July–August, 1965), pp. 177–178.

[2] R. R. Cudmus and J. H. Ketner, *Organizing Ambulance Services in the Public Interest*. Chapel Hill, North Carolina, 1965.

[3] J. C. Owens and W. D. Shaw, Ambulance Services in Colorado. *aiD—Journal of the Ambulance Association of America*, Vol. 4 (January–February, 1966), pp. 6–7, 10–11, 24.

[4] R. S. Parker and A. R. Olsen, Survey of Wyoming Ambulance Services, 1968. Cheyenne, Wyoming: Western Interstate Commission for Higher Education and Mountain States Regional Medical Program, 1968.

[5] D. G. Peterman, For Improvement of the Highway Accident Service System—A Quarterly Report. Lincoln, Nebraska: Office of the Adjutant General.

[6] I. West, G. Kleinman, E. B. Taylor, A. Majors and H. W. Mitchell, Speeding Ambulance Survey. *aiD—Journal of the Ambulance Association of America*, September–October, 1964.

[7] L. L. Shook, A Study of Iowa Ambulance Service. Iowa City, Iowa: Bureau of Police Science. The University of Iowa, 1968.

[8] Ambulance and Emergency Department Services in Maine. Maine, Department of Health and Welfare. Augusta, Maine, 1966.

[9] Summary Report of the Task Force on Ambulance Services. National Academy of Sciences, Division of Medical Sciences, Washington, D.C., 1968.

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7. Communicate directly with all personnel and organizations directly or indirectly associated with the patient's welfare.

Equipment required for area served

Ambulance equipment varies in relation to the type of ambulance necessary for the geographical area which it serves. Standards should be of higher caliber in rural and small communities than in the urban areas because rural emergency health care often presents problems not encountered in large communities, and because rural fatality and morbidity rates from accidents or illness are much higher due to delay in discovery, less adequate emergency treatment, more hazardous occupations and other activities, and distances to the nearest hospital. However, recent suggestions for improvement appear to be directed towards the larger communities. A sparsely populated area cannot justify a poor ambulance facility as being due to its small population when some of the nation's best ambulance services are located in rural and small communities.

Minimal equipment

A minimal equipment list was approved in 1961 and revised in 1966 by the Committee on Trauma of the American College of Surgeons.[10] The failure of this widely publicized list to be adopted at the "grass roots" level has been chiefly due to the lack of understanding that the patient's immediate care is more important than getting the patient to the hospital as soon as possible. Even when the minimal required equipment is available, it is not uncommon to note that the concept of transportation prevails over care of the patient. The use of certain pieces of equipment may also be controversial among attendants and physicians, especially when short distances are involved.

Immediate care equipment within an ambulance should be commensurate with the training and ability of the attendant. Following is the minimal equipment required of all ambulances:

1. Hinged half-ring lower extremity splint with webbing ankle hitch.
2. Two or more padded boards 4–1/2 feet long by 3 inches wide, and two or more similar padded boards 3 feet long by 3 inches wide, of material comparable to four-ply wood, for coaptation splinting of fracture of leg or thigh.
3. Two or more padded 15-inch by 3-inch wood or cardboard splints for fractures of the forearm.
4. Short and long spine boards with accessories.
5. Oxygen tanks and masks of assorted sizes.
6. Hand-operated bag-mask resuscitation unit with adult-, child- and infant-sized masks. A unit which can be attached to an oxygen supply is preferred.
7. Simple suction apparatus with catheter.
8. Mouth-to-mouth, two-way resuscitation airways for adults and children.
9. Oropharyngeal airways.
10. Mouth gags made of three tongue blades taped together and padded.
11. Universal dressing, approximately 10 inches by 36 inches, packaged folded to 10 inches by 9 inches.
12. Sterile gauze pads.
13. Cylinders of 1-, 2- and 3-inch adhesive tape.

[10] Committee on Trauma, American College of Surgeons: Minimal Equipment for Ambulances. *Bulletin of the American College of Surgeons*, Vol. 52 (March–April, 1967), pp. 92–96.

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14. Soft roller-type bandages, 6 inches×5 yards.
15. Triangular bandages.
16. Safety pins, large size.
17. Bandage shears.
18. Several pillows.

Comments and suggested modifications

The cost of the items as listed is approximately $250.00. However, since almost all ambulances presently have some of the equipment, such as oxygen, the maximum cost to bring any ambulance service into compliance with a model ambulance ordinance or law need not exceed $150.00. Therefore, the objection by any community towards having a model ambulance ordinance or law because of the expense is unfounded; surely even the poorest community can afford a small outlay of its budget for the emergency care of the acutely ill or injured.

Comments and modifications of the items included in the minimal equipment list were made by well trained and experienced ambulance attendants.

Ambulance personnel are expected to be able to apply traction splinting for specific types of extremity fractures. However, no piece of equipment is more frequently discussed by ambulance attendants than the Thomas splint which they consider to be too large, too time consuming to apply, and not sufficiently versatile. They prefer the more expensive Hare Traction Splint which can be simply applied in a few minutes. Ambulance services that operate some distance from a medical facility more frequently utilize the Thomas Splint. Application of a traction splint is relative to the amount of training the attendant has received, the distance traveled, and the interest in the service exhibited by the local or receiving physician.

The Committee on Trauma did not consider the plastic inflatable splints as suitable to a "minimal" equipment list although they did approve their use for "fractures at and below the elbow joint or at or below the knee joint, provided that the splint is inflated by lung pressure only." Since this is a dual purpose piece of equipment and its application is simple, one seldom finds even a moderately well-equipped ambulance that does not have it available for use. Hospital emergency departments often comment on the improved condition of fractures since these splints have been introduced.

No field of immediate care handles fractures more frequently and adroitly than the National Ski Patrol. Many ambulance services can learn much from this well organized and closely disciplined organization, including the adoption and use of inexpensive and cleverly devised splints.

The use of short and long spine boards with accessories is rapidly becoming widespread.[11,12] The long board eliminates the use of a litter. These boards should be constructed of material which does not conflict with quality x-ray studies, and should be available for exchange in the hospital so that the patient is not moved off the board until examination including x-rays has been completed.

Bivalved scoop stretchers, which almost completely eliminate patient movement, are rapidly being added as additional equipment by a large number of ambulance services.

The hand operated bag-mask resuscitation unit is gradually replacing the long established expensive and often inefficient pulmotor resuscitative equipment. However, health authorities should advise fire department personnel to be receptive to sug-

[11] L. C. Kossuth, Vehicle Accidents: Immediate Care to Back Injuries. *Journal of Trauma*, Vol. 6 (1966), pp. 582–591.

[12] J. D. Farrington, Death in a Ditch. *Bulletin of the American College of Surgeons*, Vol. 52 (May–June, 1967), pp. 121–130.

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gestions that they discard their pulmotor equipment in favor of the bag-mask resuscitation unit.

The simple suction apparatus with catheter in the ambulance should be backed up by a portable system.

A recent innovation in the emergency care field is the availability of a bag-mask resuscitation unit and a portable suction apparatus in non-ambulance police vehicles. Law enforcement personnel often arrive at the scene of an emergency before the ambulance and could therefore institute respiratory resuscitation if necessary at an earlier time.

The large universal dressing has not been widely accepted due to the cost and poor availability. These dressings are recommended chiefly for burns. Since burns are not often localized to a specific area of the body, sterile sheets are more practical; however, the use of this type of dressing for padding of splints, and as a cervical collar when two dressings are folded lengthwise, justifies their presence.

Sterile gauze pads cost less than compressed bandages, but are less practical; the compressed bandage can be used for wound coverage and also for applying pressure to the bleeding site without any additional items such as roller gauze.

Ambulance services continue to use elastic bandages even though they are not a recommended item. This is one of the few items which hospitals will exchange with the ambulance service.

Recommended additions to Minimal Equipment list

Admittedly, the minimal equipment list is merely a "core" list, yet the equipment should include all the items necessary to handle even the most common life-threatening conditions.

A sphygmometer and a stethoscope are two essential items which should be available to all ambulance attendants. Even the least trained attendants should be qualified and capable of using these items which are used for monitoring blood pressure, confirming death at the scene, and, rarely, as a tourniquet.

Additional recommended items are a pen light; blankets and sheets; restraining devices which may serve as a substitute for the seat belt and shoulder harness; emesis basin, bed pan and urinal; an obstetrical kit (a necessary item for any emergency health service); a poison kit containing a universal antidote and syrup of ipecac; extra oxygen tanks to match each size mask utilized; a fluorescent coverall or coat with special pockets for equipment; carrying cases such as bags or boxes; and protective plastic sheets for use as stretcher or weatherproof covers. Items which are less often used but which are of benefit are antiseptic soap, sodium bicarbonate, ammonia inhalants, thumb forceps, manuals, sugar, matches, and a rubberized body bag.

Ambulance services which operate in close coordination with hospitals and physicians must include a sealed or locked doctor's bag; intravenous fluids; endotracheal tubes; tracheostomy set; a chest tube with a flutter valve; catheter; nasogastric tube, and intravenous needles and catheters.

A certain amount of extra equipment should be available in case of disasters. This would provide for at least some semblance of a mobile disaster storage vehicle. It is surprising that ambulance services are often not included in community disaster plans.

Equipment must have separate grouping and identification by labeling and by color code. Ingenious storage areas must be studied for each vehicle.

Rescue equipment

Items for rescue should include a shovel, wood saw, pry bars, a strong rope, jack, ax, metal saw, portable-power kit, wire cutters, and a small tool kit.

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A fire extinguisher, flares, flags, fuses, helmets, a bull horn, and thermos jugs are desirable.

Equipment seldom considered but sometimes essential are vinyl gloves, rubber shoes, extra eye glasses, and special quadrant maps of the geographical area which the ambulance service includes in its sphere of activity.

Ideal ambulance design and equipment

The medical requirements for an ideal ambulance and its equipment has recently been published by a special task force of the Committee on Emergency Medical Services of the National Academy of Sciences-National Research Council in Washington, D.C.[13] The document states that "its purpose is to relate to professional automotive engineers and manufacturers the requirements that must be incorporated in an ambulance if it is to satisfy the demands of the physician in terms of the emergency care for which properly trained ambulance attendants can be held responsible."

The ideal ambulance cannot be uniformly identical for all vehicles. What is logical for urban areas is frequently unsuitable for other areas. However, the basic requirements for design must meet all patients' emergency needs where possible, a factor not usually available in the vast majority of presently constructed ambulances.

A very important recommendation is the identification of ambulances. There should be a nationally uniform emblem (not the American Red Cross symbol), a universal color (not red or white), an intermittent audible warning signal (not a siren), and a flashing roof light (not red).

Documentation

Records are as essential as equipment and should include medical data as well as business information. Records should be kept in duplicate so that meaningful data may be collected for continual improvement of the management and care of the acutely ill or injured.

Ambulances should have a list of regional hospitals which gives information as to the type of hospital and the facilities and professional personnel available. The list should also include the specific equipment which ambulances may obtain from a hospital before transporting a certain type of patient.

Exchange of equipment with hospitals

The Letterman exchange system utilized by the armed forces for almost 100 years should be implemented in the civilian emergency health field. The system would require that hospital emergency departments stock selected emergency care implements and appliances. When they receive a patient with one of these items in use, the hospital provides a spare or replacement unit to the ambulance attendant. This eliminates an unnecessary movement of the patient, allows the ambulance to return to service quickly and fully equipped, and emphasizes community interest in coordinating emergency health services.

Classification of ambulance equipment

Classification of ambulance equipment should be studied, and recommendations widely publicized. A first aid kit of any size should be Grade IV; Grade III should have the minimal equipment list; Grade II should include far more than the minimal equipment plus intravenous fluids, tracheostomy tubes, etc., and Grade I should be a mobile intensive-care unit or mobile operation room. Ambulance equipment cate-

[13] *Medical Requirements for Ambulance Design and Equipment*. National Academy of Sciences, Division of Medical Sciences, Washington, D.C., 1968.

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gorization should closely match the principles and designated numerical grouping being prepared for the nation's hospitals. Rescue equipment could be similarly graded.

Classification is necessary for good communication because the physician not in attendance who is advising the emergency personnel frequently has no knowledge of the level of training of the attendants, the type of ambulance available, nor the grade of the equipment present at the scene of the emergency. Categorization of these three components of the ambulance service would prevent a fair amount of misunderstanding and misadvice.

Air ambulance equipment

Aircraft used for transportation of the acutely ill or injured should be equipped with the same items as required for land ambulances.

Communications

Few hospitals have radio communications with ambulances operating in their area. In fact, the medical profession is the only field of emergency services which does not have a radio network. This should be corrected by the development of a medical radio network with tie-in provision between a number of separate agencies not only locally but on a regional and national basis.[14]

Dispatch and en route to site. Ambulances must be required to have equipment for two-way radio communications between a central medical dispatching center, local general hospitals, police and other agencies or institutions indirectly or directly related to the patient's welfare. Confirmation of the vehicle's dispatch and arrival at the scene is essential for an efficient central dispatching and hospital emergency department.

Site. There is no area where specific care can be more dramatic and life-saving than at the scene of the emergency. The hospital can advise ambulance personnel as to immediate care of the patient and determine if a squad doctor or mobile medical team will be dispatched.

En route to hospital. Following immediate care of the patient at the site, when the ambulance is transporting the patient to the hospital, communication must be direct to the hospital or hospitals en route, not only for the patient's benefit, but also as a means of continuous education for the ambulance attendant.

Telemetry. Equipment which relays physiological data from the patient at the emergency site and en route to the hospital via radio is already available and permits personnel at the hospital to return interpretation and advice on the telemetry readings to the ambulance personnel.

Additional data may be sent from a tachograph installed in the ambulance, which will automatically record time of arrival, departure, speed, distance, time required for transportation, etc.

Television. Means should be explored for utilizing television cameras at the scene of an emergency. Cameras could relay to the hospital important information about the patient and the emergency environment. A possible means for doing this would be a helicopter hovering over the site with the equipment necessary to relay the audio-visual material to the hospital. This material could be recorded on videotape for educational and statistical purposes.

Medical net. If the state health department has been licensed for a health network close to the frequency used by the highway patrol and the sheriff's network, the ideal equipment advised by the Nebraska Plan is for the ambulance to have a basic two-way

[14] J. C. Owens, Emergency Health Services Require Efficient Communications System. *Journal of the American Hospital Association*, Vol. 43 (1969), pp. 71–72.

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radio with four channels.[15,16] The first channel is the health net on which the ambulance personnel may receive a call from or to any area in the state, including his home base, a physician, or a hospital. The second frequency is the sheriff's net on which the ambulance personnel may call the local sheriff or police and request necessary information or assistance. The third channel permits the ambulance to communicate with the state highway patrol and obtain similar information or assistance. The fourth position transmits on a common frequency and monitors the previous two channels. The sheriff or highway patrol answering locks into their assigned frequency.

The Nebraska System is designed for microwave; the state is divided into eight sections. Therefore, the ambulance personnel pushes one of the eight buttons for his sector and dials first the number of the sector he wishes to contact and then the three digits for the specific radio through which he desires to communicate.

Portable radio. An additional communication item required for the ambulance personnel should be portable radios for communication between attendants working at a distance from the ambulance.

Conclusion

Modern society expects the management and care of the acutely ill or injured to be regulated at all levels by standards established by official health organizations, societies, and agencies. Two of the levels of emergency health care which need immediate attention and control by the medical profession are in the fields of transportation and communications. Recommendations for improvement are forthcoming from a number of medical organizations, societies, and agencies such as the Committee on Trauma of the American College of Surgeons; the Committee on Emergency Medical Services of the NAS-NRC; the Commission on Emergency Medical Services of the AMA; the Committee on Acute Medicine of the American Society of Anesthesiologists; the Committee on Injuries of the American Academy of Orthopaedic Surgeons; The Department of Transportation; the United States Public Health Service, and other groups. However, in spite of the efforts of these groups in developing standards for training, progress in ambulance design and equipment continues to be painfully slow. It is hoped that efforts will soon show evidence of major progress at the "grass roots" level.

In no area of emergency health services could there be a greater catalyst to boost the delivery time of past, present, and future ideals in the transportation field than the improvement of emergency health communications. Here is an area which is practically nonexistent in the emergency field.

The standards presently needed for ideal emergency care and communications have been discussed. If these needs are not met in urban areas as well as rural and small community areas, some services will continue to operate a century behind the times, and the patient can only hope that the ideal ambulance service arrives to help him in his period of distress.

[15] D. G. Peterman, The Nebraska Plan: Communications—Coordinated and Consolidated. Lincoln, Nebraska, Office of the Adjutant General.

[16] K. F. Kimball, Ambulance Communications. Presented at World Congress on Motoring Medicine, Vienna, Austria, 1967.

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The role of the American National Red Cross in training ambulance attendants

ROBERT M. OSWALD*

There are a few general comments I would like to make before becoming specific regarding the role of the American National Red Cross in training ambulance attendants.

First, let me assure you that the Red Cross is responsive to improving the first aid knowledge and skills of the American people. Our concern and function in this nationwide educational operation is related to youth in schools from the 5th grade through the college level, to the average citizens in our communities, to special groups in business and industry, to police and fire personnel, to special groups such as the National Ski Patrol and bus drivers, and most certainly to those persons responsible for providing ambulance services. We have been performing these functions since 1910.

It is our desire to provide the most effective assistance possible to the medical profession in upgrading both the quality of training and the numbers of persons reached.

We also want to provide the highest level of first aid training possible based upon the extensive use of lay instructors.

It is our premise that under the guidance, direction and involvement of the medical profession the Red Cross has the ability and the operational capacity to teach lay individuals to respond effectively with skill and knowledge in meeting the immediate needs of the ill or injured. We also have experienced that a variety of levels of training based upon age, interest and occupational functions of individuals are needed.

The first aid skills and knowledge utilized by an ambulance attendant, such as maintaining an open air passage, artificial respiration, bleeding control, immobilization of fractures, basic rescue and extrication, transportation, and immediate care for oral poisoning can be taught to a level of effective application by lay Red Cross instructors. It should also be recognized that these instructors can provide significant assistance to physicians conducting training beyond currently defined first aid procedures.

I firmly believe that our experience has established that a well trained lay instructor can and does provide training as effectively as that conducted by others.

It does not appear to me that the first aid taught by a lay instructor needs to be repeated when a higher level of training is offered by a physician. This can and in some instances does result in an unnecessary waste of effort and time for the lay instructor, the physician, and the person taking the training. It has been my observation that we could all do much more to increase the quality or level of ambulance training and reach more people if we can use our resources to conduct those aspects of training for which we should assume specific responsibility. The magnitude of the training task certainly indicates a real need to use all resources as effectively as possible and to minimize unnecessary duplication.

To project in a general way the first aid training capacity of the Red Cross: we have approximately 75,000 trained instructors; we taught a total of 76,352 classes last year, and about 16,500 of these were advanced classes. We issued a total of one and one fourth million certificates, of which 242,000 were for advanced training.

We have some new items that are of importance to our training efforts, and I will quickly outline what these are.

Two new people are going to be responsible for the conduct of our first aid program in our national office.

* National Director, Safety Programs, American National Red Cross, Washington, D.C.

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The junior first aid course is now being revised. It will be redefined as basic first aid and will be written at the 5th grade level. The entire development of materials is now being researched by a professional education group. Over 25 school systems throughout the United States are assisting in a pretest of critical first aid concepts to determine what first aid is known or unknown to students. From this information, and by empirical research techniques, a series of ten programmed subject units will be defined along with instructor materials consisting of a teaching outline and visual aids. These materials will have a proven teaching quality. We will know they teach because each instruction element will have extensive tryout and revision using students and teachers as subjects. This course is to be used in the elementary schools and also for teaching those with a limited reading capacity. Units can be taught in any sequence and at any time in the school curriculum. Instructor training for teachers will be of short duration.

On May 2, 1969, the American Telephone and Telegraph Company provided the Red Cross full rights to use the standard first aid multi-media instructional system. This highly sophisticated educational system was developed during 14 months of intensive research at a cost of more than one-quarter of a million dollars for Bell System employees. The Red Cross was involved in all phases of the educational research that was conducted. We also trained Bell System personnel as Red Cross instructors in the use of the system, and Red Cross-Bell System certificates are issued to employees. This plan of teaching involves the extensive use of films, programmed student workbooks, and highly developed instructor materials for use in directing skill practice. This instructional system also is a known quality. We know it teaches in less time and functions very well because it was proven in testing with students and instructors. Over 50,000 Bell System employees have been trained using this method. We are most grateful to the Bell System for allowing us to use this excellent new instruction plan. There are only some minor revisions on film leaders and written materials that need to be made before we start using the materials as a second method of teaching standard first aid.

The current textbook is undergoing complete revision. We will have two new textbooks—one for the standard course and one for the advanced course. The standard text will be used to reach the adult population above the 8th grade. It will be divided into content units of instruction, will include numerous illustrations, and have an instructor's manual. It will be a second method along with the multi-media system for teaching the standard level of first aid.

The advanced text will be for teaching our highest level of first aid. It will also be developed in subject content units, will be well illustrated, and have an instructor's manual. Included will be emergency childbirth and basic rescue and extrication. The information for these textbooks has been provided to us by the National Academy of Sciences-National Research Council. We anticipate completion of the written material and illustrations in the next few months.

We are projecting the development of new films to supplement teaching the advanced course, and we will be determining possible educational research into improving instructional methods.

When the new textbooks and instructor materials are available for the Basic, Standard, and Advanced courses, we will hold a national training conference to introduce these materials to our professional staff. We will then retrain all first aid instructors in the country to use these materials. Retraining our 75,000 instructors is not an easy job, but it will be done. We are now in the process of retraining 133,000 water safety instructors in the use of new materials and will use this same technique for our first aid program.

There are a few points I would like to review in closing.

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The Red Cross is responsive to the first aid training needs defined by the medical profession, and has an operational capability to conduct a large-scale education effort.

We want to provide the highest level of training that lay instructors can be cleared to use. There is a need to avoid unnecessary duplication if we are to achieve the degree of training that is defined.

The production of new materials and updating the training of instructors is needed and feasible.

Continuing research to define new first aid techniques and educational methods is of great importance to a nationwide training system.

The Red Cross has been involved, along with many others, for a long time in an effort to conserve human life. I don't know what the situation would be today if these efforts had not been made, but it is very obvious that the situation would be much more critical.

The Red Cross wants to help. It knows how to help, and we certainly wish to be an effective part of the newly developing system of emergency care.

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Training emergency medical technicians

J. D. FARRINGTON, M.D., F.A.C.S.

Most of what may be said about training emergency medical technicians is found in the publication *Training of Ambulance Personnel and Others Responsible for Emergency Care of the Sick and Injured at the Scene and During Transport* published in March 1968 by the Committee on Emergency Medical Services, National Academy of Sciences-National Research Council.

During the past few years increased awareness has developed across the nation of the need to improve emergency medical services, and particularly to improve the training of those who first provide care for the critically ill or the injured. This increased awareness was stimulated to a great extent by another publication from the NAS-NRC, *Accidental Death and Disability: The Neglected Disease of Modern Society.*

Unfortunately, neither the medical profession nor the public appear prepared to pay the price necessary for such improvement: the profession in time it must spend in providing training courses, the public in funds necessary for improved vehicles, sophisticated equipment, and an adequate pay scale for personnel. A sufficiently aroused medical profession would solve the problem. Until the medical profession, on a community basis, takes the lead in organizing ambulance services, and in training ambulance attendants, improvement is unlikely, laws and regulations notwithstanding.

It is difficult to understand the reluctance in some areas to accept the idea that physicians should teach ambulance attendants (emergency medical technicians). After all, the activities of such personnel in the care of the critically ill or injured at the scene are nothing more than an extension of the arm of the emergency medical services of a physician. Why then should not physicians determine the design and equipment of the emergency vehicle and the training of the technician in what he should know and what he should be able to do? It seems logical having emergency care, from its inception, directed by physicians, rather than having the physician concerned only with medical care after the patient has been deposited on his doorstep. Physicians assume an active role in teaching other paramedical personnel, and should do so in the training of emergency medical technicians. The tasks of the physician at medical facilities will be simplified if the pre-hospital initial care is all that is desired.

No difficulty has been encountered in obtaining an adequate number of physicians who are willing to teach. Granted, all physicians cannot teach effectively; neither can all lay persons. There are, however, enough physicians who have a background in teaching; these physicians must be stimulated. This does not imply that there is no place for lay instructors in the training of emergency medical technicians. To the contrary, they can play a very important role, particularly in the demonstration and practice sessions. In the areas of non-medical activities, lay instructors are essential.

Everyone agrees that better training of those who provide initial emergency care for the critically ill or injured is necessary. To outline and develop any training program, the capabilities of the technician, from a medical standpoint, must be defined. Primarily, it is anticipated that the technician will be able to save lives. What, then, are the conditions which could be controlled, but which, nevertheless, cause the deaths of 20 percent of the total number of victims of critical illness or injury?
There are:

1. Correctable airway defects.
2. Respiratory depression and arrest.
3. Cardiac arrest.
4. Bleeding and shock.

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Here it is well to point out that we may be kidding ourselves as to the ability of technicians to save lives if we do not rapidly move toward training them in emergency intubation and the administration of intravenous fluids. Too many airway defects cannot be corrected without endotracheal intubation, and shock certainly cannot be treated adequately without I.V. fluids. Nurses in almost every state give intravenous fluids, and nurse anesthetists intubate patients every day. The assertion that these procedures are done "under the direction of a physician" overrides the legal objections. With the training aids available, and the in-hospital training now advocated, such training for EMTs should come easily. Such training is now being carried out in certain training courses, with anticipated success.

Regardless of the duration of a planned program, the curriculum should remain the same, although it should be expanded as the scope of the course increases. The capabilities which emergency medical technicians may be expected to achieve may be divided into three main categories:

1. **Capabilities in the care of life-threatening conditions**
   a. Establish and maintain a patient airway.
   b. Provide oxygen inhalation correctly.
   c. Provide intermittent positive pressure ventilation.
   d. Perform cardiopulmonary resuscitation.
   e. Control accessible bleeding.
   f. Treat shock with intravenous fluids.
   g. Provide care for patients with poisonings.
2. **Capabilities in the care of non-life-threatening conditions**
   a. Dress and bandage wounds.
   b. Immobilize fractures properly.
   c. Care of emergency childbirth and care for the newborn.
   d. Management of the unruly patient.
3. **Capabilities in areas of a non-medical nature**
   a. Rescue and extrication.
   b. Care of equipment.
   c. Use and maintenance of supplies.
   d. Knowledge in appropriate medico-legal problems.
   e. Emergency and defensive driving.
   f. Communications, verbal and written.

A look at the regulations and training requirements for other types of personnel providing services to the public is very enlightening when one considers the extent of training programs for emergency medical technicians. In Wisconsin, for instance, an apprentice barber is required to complete 1,248 hours of training in not less than nine months. A cosmetologist must complete 1,650 hours of instruction in not less than eight months, and a mixologist spends 40 hours learning to shake a cocktail properly. As late as 1968, only 14 states had any requirements regulating the training of ambulance attendants. Of these states, only eight specify the quality of the training, which is usually limited to American National Red Cross Advanced First Aid Course. The latter requires only 26 hours of training. One state's community college offers a curriculum for the training of ambulance attendants requiring only 20 hours.

Any course of training must offer a curriculum, lesson plans, and manuals. Many manuals are available at present, but none are of sufficient breadth. What is needed is an encyclopedia to which the technician may turn for the answer to any question concerning emergency care. The American Academy of Orthopaedic Surgeons is about to produce such a manual. I am certain that, when completed, it will be what so many of us have been waiting for.

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Several types of programs are necessary—basic, advanced, college-oriented, and refresher programs. The curriculum, as stated, will be virtually the same for everyone, only to be expanded in length and breadth as we move up the scale. The basic course must be such that, throughout the nation, those now providing emergency care will be able to obtain, in the immediate future, the level of proficiency it provides. Only a few technicians have already attained this level of knowledge. A number of such programs are being tested at present; their curriculum is almost identical, and all are ongoing programs of weeks' duration.

The basic curriculum shown below should consist of 72 hours of instruction given in 3-hour sessions over a period of 12 to 24 weeks. The extended period of training allows assimilation of the training material, reading and study between class sessions, and preparation for the next lesson. Interspersed with the lectures are review, evaluation, and question-answer periods. As a result of the experience gained in presenting this curriculum, changes have been made since its original publication.

Curriculum

Lesson 1—GENERAL INFORMATION AND ORIENTATION

- Objectives of training
- Dress and deportment
- Ambulance and equipment—care and maintenance
- Defensive and emergency driving

Lesson 2—GENERAL INFORMATION AND ORIENTATION

- Public relations and responsibilities
  - Patient
  - Family
  - News media
  - Religion
  - Authorities
  - Communications and reports
  - Legal problems
  - Sorting and its importance

Lesson 3—ANATOMY AND PHYSIOLOGY

Lesson 4—ANATOMY AND PHYSIOLOGY

Lesson 5—REVIEW AND EVALUATION, QUESTION-ANSWER PERIOD*

Lesson 6—CARE OF LIFE-THREATENING PROBLEMS

- Airway defects
- Pulmonary depression and arrest

Lesson 7—CARE OF LIFE-THREATENING PROBLEMS

- Cardiac arrest

Lesson 8—PRACTICE

- Inflatable mannequins
- Bag-mask resuscitators
- Manually triggered resuscitators

* This lesson was added recently because it was shown to be essential to the program.

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Suction apparatus
Intubation

Lesson 9—REVIEW AND EVALUATION, QUESTION-ANSWER PERIOD

Lesson 10—CARE OF LIFE-THREATENING PROBLEMS

Bleeding and shock
Pressure dressings
Intravenous fluids

Lesson 11—ACUTE MEDICAL PROBLEMS

Stroke
Heart attack
Convulsive disorders
Allergic reactions
Nosebleed
Acute alcoholism

Lesson 12—ACUTE MEDICAL PROBLEMS

Diabetes
Poisonings, including animal bites
Mentally disturbed and unruly patients
Internal bleeding
Unconscious patient (non-traumatic)
Communicable disease

Lesson 13—REVIEW AND EVALUATION, QUESTION-ANSWER PERIOD

Lesson 14—EMERGENCY OBSTETRICS, CARE OF THE NEWBORN: HEAD, EYE, AND BODY CAVITY INJURIES

Lesson 15—WOUNDS, BURNS, AND ENVIRONMENTAL INJURIES

Soft tissue injuries
Thermal injuries
Electrical injuries
Radiation injuries
Exposure to heat and cold

Lesson 16—FRACTURE OF THE LONG BONES

Lesson 17—FRACTURE OF THE SPINE AND PELVIS

Lesson 18—PRACTICE SESSION

Dressing, bandaging, and splinting

Lesson 19—LIFTS, CARRIES, USE OF LITTERS AND STRETCHERS INCLUDING MOVEMENT OF PATIENTS IN DIFFICULT AREAS

Lesson 20—EXTRICATION

Automobiles, buildings, wells, cellars, etc.

Lesson 21—PRACTICE SESSION

Lifts, carries, litters, stretchers, and movement of patients in difficult areas

Lesson 22—PRACTICE SESSION

Extrication from automobiles, etc.

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Lesson 23—PRACTICE SESSION

Extrication from automobiles, etc. (includes dressings and splinting)

Lesson 24—EXAMINATION

In addition, four sessions of in-hospital observation and participation in emergency, recovery, intensive care, and delivery room activities should be required.

A standard advanced course for EMTs has not been developed as yet. The curriculum content would be the same as that of the basic program, with the subject matter covered in more depth and the practice sessions increased. Two hundred to 300 or more hours would be required for such a program which, of necessity, would be continuous. At present few such courses exist. A course given in Pittsburgh under the direction of Dr. Peter Safar consists of 150 hours of lectures and laboratory work in basic sciences, 164 hours of clinical experience as an in-hospital observer and participant, 23 hours of clinical lectures, eight hours of lectures on ambulance services, and 16 hours of field practice, for a total of 361 hours.

The ultimate in training would be achieved through a two-year college-level program designed to produce a technician trained nearly as well as a diploma-registered nurse (the "working nurse"). The technician should earn nearly the salary of such a nurse. Again, such programs would use essentially the same curriculum, although the subjects would be studied in greater depth. Preferably, such a program should be offered at a medical center so that faculty, classrooms, training areas, and, it is hoped, well-organized ambulance services, adequately equipped with trained personnel, will be available for in-service training.

Refresher training is a necessity in certain areas, but not in all areas. Excellent refresher courses are well established and are conducted across the country by committees of the American Academy of Orthopaedic Surgeons and the American College of Surgeons. The curriculum is similar to that outlined for the basic course. They are of three and one half day's duration, including short practice sessions.

In urban areas, ambulance services with extensive day-to-day experience will be made aware of new developments in emergency care, and their personnel will be afforded continuing training, by means of critiques held with the medical staffs of the emergency departments of the hospitals they serve. Such sessions must be a part of any well-rounded emergency medical services system. Frequency of meetings depends on the experience and the nature of the ambulance runs. Unusual or mass casualties would call for special critiques; otherwise, they should be held weekly, semi-monthly, or monthly.

In rural areas, where the experience is limited, refresher courses are a necessity. Without frequent utilization of the knowledge gained in a training program, the rural-based technician becomes rusty and forgets details of care. The problem which arises here also besets the basic training programs for the rural-based technician: the refresher course must be provided for him in his own locality. Prescribed practice sessions, including occasional lectures and review sessions, will in most instances suffice and can be held regularly. In some sparsely populated areas in Iowa the ambulance is based at a hospital where the technicians work when they are not on an emergency ambulance run. This arrangement works well, and education is thus easily provided for the technicians.

A program of such magnitude appears to be, and is, an ambitious undertaking. Yet unquestionably, any of us, if injured, wants to be served by the best-trained ambulance attendants whose ambulances are well equipped but driven slowly.

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Training aids

WALTER A. HOYT, JR., M.D., F.A.C.S.

The following material is substituted for this presentation:

Printed material for instructors

A Curriculum for Training Emergency Medical Technicians. American College of Surgeons, Chicago.

Cardiopulmonary Resuscitation. A Manual for Instructors. American Hospital Association, Chicago.

Reference material for instructors

John Henderson, *Emergency Medical Guide.* Second Edition. McGraw-Hill, Blakiston Division. New York City.

First Aid, Diagnosis and Management. Edited by Warren H. Cole, M.D., and Charles B. Puestow, M.D. Appleton-Century-Crofts, Inc. New York City.

Emergency Victim Care and Rescue Textbook for Squadmen, 1965. Division of Vocational Education, State Department of Education, Columbus, Ohio. Edited and distributed by the Trade and Industrial Education Instructional Materials Laboratory, Ohio State University College of Education, Columbus, Ohio.

Printed material for students

The Wonderful Human Machine. American Medical Association, Chicago.

Training of Ambulance Personnel in Cardiopulmonary Resuscitation. American Hospital Association, Chicago.

Emergency Measures in Cardiopulmonary Resuscitation. American Hospital Association, Chicago.

Minimal Equipment for Ambulances. Committee on Trauma. American College of Surgeons, Chicago.

First Aid for Laryngectomees. American Cancer Society, New York City.

Reference material for students

Emergency Care of the Sick and Injured: A manual for law-enforcement officers, fire fighters, ambulance personnel, rescue squads and nurses. Edited by Robert H. Kennedy, M.D., 1966: Committee on Trauma, American College of Surgeons, Chicago.

Carl B. Young, Jr., *First Aid for Emergency Crews.* C. C Thomas, Springfield, Illinois.

Pennsylvania Ambulance Attendant Training Manual. Edited by Dan D. Gowings. Pennsylvania Department of Health, Harrisburg, Pennsylvania.

Audio-visual aids

Appropriate slide sets obtained locally.

Medical Self-Help. Lessons 1–11 (motion pictures). Available from U.S. Public Health Service, Atlanta, Georgia.

Breath of Life (motion picture). Available from American Hospital Association, Chicago.

Pulse of Life (motion picture). Available from American Hospital Association, Chicago.

Cry for Help (motion picture). Available from U.S. Public Health Service, Atlanta, Georgia.

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Equipment

Blackboard, chalk, and eraser.

Long and short spine boards.

Mannequins: Resusci-Anne; Thoracic cut-away; Anatomic-Anne. Clothes mannequin and moulages for simulated injuries (or equivalents of these mannequins).

Simulated or outdated blood.

Automobile front seat affixed to table (to demonstrate proper application of short board to sitting injured, and application of long board).

One of each of the items listed in *Essential Equipment for Ambulances* (American College of Surgeons, Chicago. 1970).

Inflated splint, blood pressure manometer, and two-way teaching stethoscope.

Roll of aluminum foil, 18 inches wide, for wrapping premature infant and for covering eviscerations and sucking wounds of the chest.

Doll, approximately 17 to 20 inches long, for practicing these procedures.

The adequate emergency facility

R. T. SHERMAN, M.D., F.A.C.S.*

In many hospitals, the total number of visits to the emergency department has increased more than 400 percent since 1958. Surveys show that nearly two-thirds of these steadily increasing visits to hospital emergency departments are for routine or non-emergency conditions. It is apparent that this trend will continue and that space, personnel, and facilities for management of these patients will have to be provided if the hospital is to maintain its responsibility to the community. Attempts to educate the population to utilize emergency facilities in a realistic manner have failed, partly because of decreasing house calls and more rigid adherence to office hours by physicians. Although this heavy influx of non-emergency patients complicates the delivery of services essential to adequate emergency care, provision for comprehensive management of true emergencies remains the primary function of the emergency department.

Over 90 per cent of the more than 7,000 accredited hospitals in the United States list emergency rooms as part of their facilities. Ostensibly, all of these emergency departments are comparable in terms of capability. Obviously, this cannot be the case. To be realistic, adequate emergency department care should include comprehensive management not only of major trauma and cardiac emergencies, but also of all other acute medical, psychiatric, and surgical conditions. In order to achieve this capability, highly sophisticated diagnostic and supportive equipment is necessary, not to mention an adequate supply of highly trained physicians, nurses, and technicians. Patently, these conditions cannot be met by even the majority of existing emergency departments.

Present day utilization of the closest emergency room by ambulance drivers, regardless of the facilities available, can no longer be accepted. To quote from *Accidental Death and Disability: The Neglected Disease of Modern Society*,[1] "There is the obligation to the severely injured patient as well as to the lone physician, to the small staffs of remote hospitals, and to institutions with minimal emergency department facilities,

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[1] National Academy of Sciences—National Research Council, Division of Medical Sciences, Washington, D.C. September, 1966.

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that the public be thoroughly informed of the extent of care that can be administered at emergency departments of varying levels of competence." Categorization of emergency departments indicating the level of care the patient might expect would be a most useful step toward improvement of emergency medical services.

A number of systems for categorization of emergency departments have been proposed, most of which are patterned after the classification published in *Accidental Death and Disability: The Neglected Disease of Modern Society*. It was not the intent of the committee preparing that report to recommend the categorization published, but only to describe the types of emergency units existing at the time of the report. The following suggested guidelines for categorization of emergency departments, which appear in the *Highway Safety Program Manual* are not definitive, and are subject to further refinement and alteration.

1. Class I Facility (Major Emergency Department)

Facilities. Fully equipped to render complex and comprehensive emergency care on the premises, as well as any required definitive care up to and involving rehabilitation. Diagnostic facilities constantly available for even the most specialized procedure. Blood bank available. Ready accessibility to special purpose operating rooms.

Staffing. Twenty-four-hour staffing by highly competent medical and hospital support personnel. Ready accessibility to all types of specialists on a 24-hour basis.

Scope of Care. Routinely capable of performing the most advanced surgical and medical procedures including cardiac surgery, the treatment of severe head, neck, and chest injuries, as well as major plastic surgical procedures.

2. Class II Facility (Limited Emergency Department)

Facilities. Equipped to deal with most life-threatening emergencies but not with highly specialized resuscitative and surgical procedures. Diagnostic facilities (laboratory and x-ray) and blood bank constantly available.

Staffing. Twenty-four-hour staffing by component personnel on premises or on call but lacking in some specialist services and medical support personnel.

Scope of Care. Equipped to deal with routine medical and surgical procedures but lacking in ability to accomplish some highly specialized diagnostic, medical and surgical procedures. Total needs for stabilization or care of the critically sick or injured may exceed the capabilities of the facilities and personnel.

3. Class III Facility (Provisional Emergency Unit)

Facilities. Emergency units in small or specialty hospitals, clinics, industrial plants, or public buildings with limited or modest first aid equipment. Diagnostic capability and supporting equipment may not be available.

Staffing. Limited to either full or part-time professional nursing coverage and only part-time physician coverage.

Scope of Care. Limited to treatment of minor conditions and emergency resuscitation. Capable of controlling external blood loss, maintaining airways, performing external cardiopulmonary resuscitation and similar procedures.

Categorization of emergency departments will have to follow carefully prepared standards for each type of facility. The standards should accurately reflect the capability of each unit. In addition, all ambulance personnel, police, and other persons employed in emergency situations must be familiar with emergency department categorization. Signs indicating the location and type of facility should be installed at appropriate locations throughout the community and on surrounding highways.

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Finally, methods for both internal and external surveillance of the level of care rendered by each facility must be established.

Emergency department care reflects not only the intrinsic facilities of a given unit, but also the capability of the entire hospital complex of which it is a part. It is increasingly evident that emergency departments should not be designed and equipped for autonomous function but to serve as adjuncts to the care of the emergently ill.

Suggested basic requirements for a Class I emergency department as defined above should comply with the following standards outlined by the American College of Surgeons:

Organization and Staffing. The emergency department should be located on the ground floor of the hospital, easily accessible from the main hospital. Equipment should be of the same quality as provided throughout the hospital. Textbooks, printed rules and regulations, and a poison manual should be available. A poison control chart and telephone number of the nearest poison control center should be displayed.

An Emergency Room Committee representing major medical services, hospital administration, and nursing should establish policy. One physician should serve as Director with responsibility to the committee for implementation of policies and supervision of professional services.

The emergency department should operate on a 24-hour basis. At least one primary physician should be assigned to the emergency department at all times. Another physician should be on second call. Specialists should be readily available when needed. Patients should be seen by a physician within 15 minutes of their arrival; resuscitation cases should be seen immediately.

Nursing staff in the emergency department should consist of at least one registered nurse and one nurses' aide present at all times. Additional nursing personnel should be available as need demands.

Every patient should have a record. Periodic review of records, deaths, and resuscitation procedures should be made.

In general, operations requiring general anesthesia should be performed in the operating suite.

Facilities. Specific areas in the emergency department should include an adequate entrance, a waiting room, police, press, and ambulance attendants' rooms, a registration area, and a nurses' and doctors' station. In addition, adequate space for work rooms, examining rooms, utility rooms and storage should be provided. Space for supporting units including x-ray, clinical laboratory and a doctors' on-call room are necessary. Finally, provision for specialized work areas including a surgery room, fracture room, and an area designated for resuscitation should be made.

Equipment. In addition to all of the necessary instruments and equipment for management of routine cases, specialized resuscitation equipment should be available. Basically, the equipment recommended by the Committee on Acute Medicine of the American Society of Anesthesiologists is quite practical and adequate.

1. Wall oxygen outlets (or mobile oxygen cylinders, on carts, with reducing values), flow meters, and delivery tubes.
2. Bag-valve-mask units with oxygen reservoir tubings.
3. Oropharyngeal and nasopharyngeal airways of various sizes.
4. Suction equipment.
5. Tracheal intubation kit including equipment for gastric intubation.
6. Emergency drug kit.
7. Injection/infusion kit including needles, syringes, catheter needs, stopcocks, venotubes, administration sets, blood substitutes (e. g., dextran 75 or 5% albumin, dextran 40, isotonic saline solution, dextrose in Ringer's

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solution), blood (type O, Rh negative—refrigerated), blood warmer, equipment for infusion under pressure.
8. Venous cut-down tray.
9. Separate crash cart with electrocardioscope (needle and disc electrodes), external/internal defibrillator with appropriate electrodes and battery-powered pacemaker.
10. Electrocardiograph.
11. Tracheostomy tray.
12. Thoracotomy tray for open chest cardiac resuscitation.
13. Pleural drainage tray (with trocars and catheters of various sizes; Heimlich valves or water seal drainage bottles).
14. Equipment for central venous pressure catheterization.
15. Equipment for arterial puncture and catheterization.
16. Tray for nerve blocks and local anesthesia.
17. Ventilating bronchoscope (all sizes, available in hospital).
18. Mechanical ventilator capable of producing assisted and controlled intermittent positive pressure ventilation with 100% oxygen, drug aerosols and heated mist, with airway pressures and tidal volumes readable.

All equipment should be suitable for adults, children, and infants. Respiratory equipment must have standard 15 mm. tracheal tube and 22 mm. mask connectors. Equipment should be checked daily by responsible personnel.

Equally important to the basic considerations above, the back-up services available to the emergency department play a large role in determining classification of facilities. A Class I emergency department should require the following back-up services:

1. Complete blood bank service including immediately available low titer O Rh negative blood in or adjacent to the emergency department.
2. Operating room set up and ready to go with operating room personnel in the hospital at all hours and available in five minutes.
3. Surgical intensive care unit with adequate monitors, staffed on all shifts by nurses specially trained for this work. A physician above the intern level available in less than five minutes for intensive care unit consultation.
4. Sophisticated laboratory including blood gas determination at all hours.
5. Arteriogram capability with rapid cassette changer around the clock.
6. Separate coronary (cardiac) intensive care unit with adequate monitoring equipment, pacemaker insertion, and counter shocking capability for arrhythmias. Specially trained nurses on all shifts.
7. An on-call cardiopulmonary bypass team capable of short-notice bypass procedures.
8. Renal dialysis team.
9. Capable specialty consultants including anesthesia, orthopedics, urology, plastic surgery, neurosurgery, radiology, thoracic surgery, general surgery, internal medicine, cardiology, pediatrics, and obstetrics, available within minutes.
10. Psychiatric unit with facilities for the acutely disturbed.

Organization, direction, and staffing of these various back-up facilities, although beyond the scope of this outline, should be carefully considered.

Planning for Class II and III emergency facilities requires the same detailed approach to organization, facilities, equipment, and staffing if the concept of categorization is to realize its promise.

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Ambulance and emergency department records

PETER SAFAR, M.D.

The forms used by police ambulance attendants in Pittsburgh were found to be inadequate for providing retrospective information about the patient's condition and treatment. Ambulance report forms should become uniform on a nationwide basis to permit evaluation of the public health aspects of emergency transportation. Unfortunately, national forms are not yet available. Therefore, three forms (Tables 1, 2, and 3, page 72) were designed for use, on a trial basis, by the mobile, ICU-type ambulance service which is based at the Pittsburgh Presbyterian-University Hospital. The attendant must fill out the short form (Table 1) for all calls by checking appropriate items. If a life-threatening condition exists, the long form (Table 2) is completed, and in cases of cardiac arrest the Cardiac Arrest form (Table 3) must be completed. After completing the long form, the attendant is debriefed by the supervising physician (ICU fellow) and the case is discussed at a weekly seminar for all attendants. After debriefing the attendant, the physician adds a short narrative report. The ambulance forms become part of the emergency room records and the patient's chart.

The forms should be changed as necessary for computerized bookkeeping and for prospective studies, such as evaluation of the quality of patient care. A record of vital signs proved useful for long trips, such as transfers of patients from rural to city hospitals.

Sound-recording events in the ambulance has been proposed. The practicality of continuous sound-recording in an ambulance is doubted because deciphering the tapes is difficult and time consuming. Such tapes yield less information than immediate debriefing. The dispatching center should record all verbal communication, including conversation in the center, over radio and telephone, and should note the time when these communications took place. Recording on video tape the treatment of patients in the ambulance and in the emergency room deserves consideration for the purpose of studying and supervising the procedures of patient care.

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Table 1

SHORT PATIENT CARE REPORT FORM
FOR AMBULANCE CREW

Complaint #_____

Patient's Name_____ Age____ Sex ____ Log #_____

Ambulance dispatched to: _____ Date_____

Ambulance attendants on run:

1. _____ 3. _____
2. _____ 4. _____

How was complaint received? _____

TIME

Call received ____:____
Car Out ____:____
Arrive at scene ____:____
Leave scene ____:____
Arrive at hospital ____:____
Back in service ____:____

Before ambulance arrived, the patient received aid from:

☐ Nobody ☐ Public
☐ Lay bystander ☐ Employee
☐ Medically trained person
☐ Other_____

Aid consisted of: _____
_____

Upon observing the patient, the following were suspected or present:

☐ Airway problem
☐ Respiratory distress
☐ Chest pain
☐ Shortness of breath
☐ Unconsciousness
☐ Heart Attack
☐ Cardiac arrest
☐ Head injury
☐ Neck-back injury
☐ Chest injury
☐ Abdominal injury
☐ Flowing bleeding
☐ Spurting bleeding
☐ Wound longer than 4 inches
☐ Deep tissue exposed
☐ Suspected fracture
☐ Suspected internal hemorrhages
☐ Gunshot wounds
☐ Stab wound

IF ANY OF THE ABOVE WERE PRESENT OR SUSPECTED, PLEASE USE LONG FORM.

_____

When you arrived, how was the patient situated? (trapped in car, lying in bed, etc.)

_____

What was the patient's condition (breathing, conscious, wounds, etc.)

_____

_____

What did you do for the patient?_____

_____

Was the patient's condition on arrival at the hospital ☐ improved ☐ unchanged ☐ worsened ☐ don't know

Diagnosis at the hospital_____

Which hospital? _____

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Table 2

PATIENT CARE REPORT

Pt. Name _____ LONG FORM _____ FHE Log # _____

A.A. Completing Form: AMBULANCE CREW

_____

1. Were extrication methods needed?

☐ YES ☐ NO ☐ DON'T KNOW

A. Which type needed?

☐ light (hand tools or hands alone)

☐ medium (hand carried power tools)

☐ heavy (power driven tools or power shovel)

B. Was patient trapped?

☐ in motor vehicle ☐ building wreckage

☐ other_____

2. Status of Nervous System

A. The patient was ☐ alert ☐ stuperous ☐ comatose ☐ don't know

B. The pupils were:

☐ small ☐ mid-dilated ☐ widely dilated ☐ don't know

☐ equal ☐ right > left ☐ left > right ☐ don't know

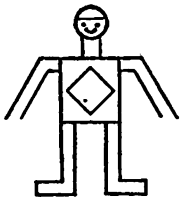
☐ reacting to light ☐ not reacting to light

C. Did the patient move all extremities?

☐ YES ☐ NO ☐ DON'T KNOW

If not, which did he not move?

☐ right arm ☐ left arm



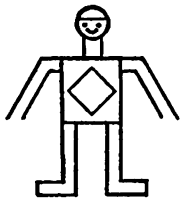
☐ right leg ☐ left leg

D. Did the patient have sensation in all areas?

☐ YES ☐ NO ☐ DON'T KNOW

If not, where did he have no feeling?

☐ right arm ☐ left arm



☐ right leg ☐ left leg

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Table 2—contd.

3. State of Respiratory System

A. Was the airway obstructed when you arrived?

☐ YES ☐ NO ☐ DON'T KNOW

If yes, which technique was used to open it?

☐ head tilt
☐ life saving grip
☐ oropharyngeal airway
☐ suctioning equipment
☐ wiping clean
☐ endotracheal tube

B. Was oxygen given?

☐ YES ☐ NO ☐ DON'T KNOW

If yes, which technique was used?

☐ plastic face mask
☐ elder valve
☐ cannula
☐ other
☐ Bag valve mask with
☐ oxygen delivery tube
☐ reservoir tube

C. Was the patient given positive pressure ventilation?

☐ YES ☐ NO ☐ DON'T KNOW

If yes, which technique was used?

☐ mouth to mouth
☐ mouth to S-tube
☐ bag valve mask
☐ other_____

Did the color improve?

☐ YES ☐ NO ☐ DON'T KNOW

Did the chest rise with inflation?

☐ YES ☐ NO ☐ DON'T KNOW

4. State of Cardiovascular System

A. Was the carotid pulse present?

☐ YES ☐ NO ☐ DON'T KNOW

B. Was the radial pulse present?

☐ YES ☐ NO ☐ DON'T KNOW

If yes, was the pulse rate

☐ >120 ☐ 80–120 ☐ <80

Was the pulse regular?

☐ YES ☐ NO ☐ DON'T KNOW

C. Color of skin and mucous membrane:

☐ normal
☐ flushed
☐ ashen (gray)
☐ pale
☐ cyanotic
☐ other _____

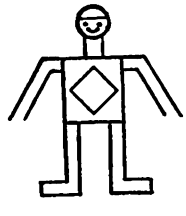
5. Were injuries present?

☐ YES ☐NO ☐ DON'T KNOW

If yes, complete the following:

A. Areas injured:

☐ head
☐ face
☐ eye
☐ neck
☐ back
☐ chest



☐ pelvis
☐ upper extremity
☐ lower extremity
☐ general, multiple
☐ non-wound injury
e.g. drowning, electrocution, etc.

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Table 2—contd.

B. What type of injury?
- ☐ open wound
- ☐ fracture
- ☐ closed trauma
- ☐ other _____

C. If wounds were present, check appropriate blocks:
- ☐ more than 4 inches long
- ☐ deep tissue exposed
- ☐ spurting bleeding
- ☐ flowing bleeding
- ☐ oozing bleeding
- ☐ suspected internal bleeding

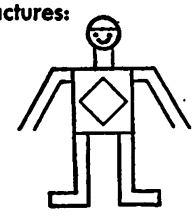
D. How was bleeding controlled?
- ☐ spontaneous
- ☐ pressure dressing
- ☐ other
- ☐ tourniquet

E. How were wounds dressed?
- ☐ 4×4
- ☐ ABD
- ☐ Kling
- ☐ universal dressing
- ☐ other _____
- ☐ no dressing

F. Were fractures present?
- ☐ YES ☐ NO ☐ DON'T KNOW

If yes, complete the following:

Location of suspected fractures:
- ☐ head
- ☐ neck
- ☐ back
- ☐ chest
- ☐ pelvis



- ☐ right arm
- ☐ right leg
- ☐ left arm
- ☐ left leg

Immobilization provided:
- ☐ wooden splint
- ☐ back board short
- ☐ back board long
- ☐ Hare splint
- ☐ inflatable splint
- ☐ improvised splint
- ☐ none
- ☐ other _____

6. General information:

A. Was external cardiac compression used?
- ☐ YES ☐ NO ☐ DON'T KNOW

B. Were drugs given in the field?
- ☐ YES ☐ NO ☐ DON'T KNOW

C. How was patient taken to ambulance?
- ☐ walked
- ☐ standard stretcher
- ☐ collapsible stretcher
- ☐ chair carry
- ☐ other _____

D. To which hospital was patient taken? _____

E. Diagnosis at hospital

_____

_____

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Table 2—contd.

7. Upon arrival at hospital:
the patient's condition seemed:
☐ improved ☐ worse ☐ unchanged ☐ don't know
Was airway maintenance still required?
☐ YES ☐ NO ☐ DON'T KNOW
Was positive pressure ventilation required?
☐ YES ☐ NO ☐ DON'T KNOW
Was cardiac compression required?
☐ YES ☐ NO ☐ DON'T KNOW
Was the patient more alert?
☐ YES ☐ NO ☐ DON'T KNOW
8. Narrative summary of attendant's remarks:

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Table 3

CARDIAC ARREST REPORT

This form is to be completed on every case in which cardiopulmonary resuscitation is used.

Patient's Name: _____ Age _____ Sex _____ Race _____

Home Address: _____ Telephone _____

Removed from address: _____ FHE No. _____ Police No. _____

How was call received:

_____

_____

_____

Approximate times:

call received _____

Ambulance dispatched _____

Ambulance arrived on scene _____

Ambulance started for hospital _____

Ambulance arrived at hospital _____

1. When was patient last noted to be conscious? _____
2. Did patient complain of any symptoms? Yes_____ No_____ Don't know_____
3. Was the patient known to have any heart or lung disease? Yes_____ No_____ Don't know_____
4. Was patient taking any medications? Yes_____ No_____ Don't know_____
5. Did the patient survive? Yes_____ No_____ Don't know_____

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Registration, certification and re-certification of ambulance attendants

PETER SAFAR, M.D.

The formation of a registry for ambulance attendants according to the model of the Registry for Inhalation Therapists* was initiated by the Committee on Acute Medicine of the American Society of Anesthesiologists at its May 22, 1968, meeting in Pittsburgh. This idea was recommended to and approved by the National Academy of Sciences-National Research Council, Committee on Emergency Medical Services, and the American Medical Association's Commission on Emergency Medical Services. The American College of Surgeons and the American Academy of Orthopaedic Surgeons also endorsed this plan. These national organizations felt that the AMA Commission is the appropriate agency to implement a board of schools and a registry for EMT's.

A meeting is scheduled for May 24, 1969, in Pittsburgh with the representatives of the Ambulance Association of America, The International Rescue and First Aid Association, and the National Ambulance and Medical Supply Association to stimulate their involvement and to promote the formation of a single professional representative, national organization. (Since the Airlie Conference, the AMA Commission at its meeting on May 25 acted favorably on this proposal and agreed to lead in this matter.)

Our tentative proposal, developed by my associate, Gerald Esposito, and me, was presented on May 24, 1968, to the Ambulance Associations, and on May 25, 1969, to the AMA Commission. It reads as follows:

"An American Registry of Emergency Medical Technicians (AREMT?) and a Board of Schools to advise the Council on Medical Education should be formed.

"*Definition of the Registry.* A national board for examination and certification of allied health personnel in emergency medical services—personnel involved in life-saving and life-supporting measures at the scene, during transportation, and in hospitals.

"*Goals.* To provide education, recognition, professional status, and quality control to allied health personnel involved in emergency medical services at the scene, during transportation, and in hospitals.

"There should be a Board of Registry and a Board of Schools (either the same or two boards with considerable overlap), the latter advising the AMA Council on Medical Education in its role of approving hospital-based schools for EMT's. The Registry would need to establish an examination and certification system. The Boards should attempt to unify ambulance personnel in a professionally oriented organization and may establish a journal.

"*General Information.*

"I. The National Board of Certification shall be a non-profit corporation. Sponsorship for this organization shall be sought from:

National Academy of Sciences-National Research Council
American Society of Anesthesiologists
American College of Surgeons
American Academy of Orthopaedic Surgeons
American Medical Association
American Association of Emergency Medical Technicians (to be formed),
or representative presently formed ambulance organizations.

* See: *Bylaws and Regulations.* American Registry of Inhalation Therapists, Chicago, Illinois, 1968.

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"II. The objects and purposes of the Board of Certification shall be:

"A. To advance the art and science of medicine by promotion of the understanding and utilization of the medical knowledge available to reduce morbidity and mortality caused by accident, injury, or life-threatening medical emergencies at the scene or en route to a medical facility.

"B. To assist in developing and maintaining educational and ethical standards in the provision of ancillary emergency medical services for the public good, for the advancement of medical care, and for the professional guidance of those certified by the Board.

"C. To establish standards by which the competency of these paramedical specialists under the prescription, direction, and supervision of licensed physicians may be determined.

"D. To prepare, conduct, and control investigations and examinations necessary to assess the qualifications of voluntary candidates for certification.

"E. To grant and issue certificates to those qualified at various levels of proficiency in clinical, didactic, and practical application of the knowledge and skill required for the different categories of certification as may be established by the Board.

"F. To implement any strategy necessary or desirable to accomplish the foregoing specified purposes.

"III. Each sponsoring organization shall appoint two members of the Board of Registry. In addition, the following organizations shall appoint one member each to the Board:

Ambulance Association of America
International Rescue and First Aid Association
The National Ambulance and Medical Supply Association
(They may form a future American Association of Emergency Medical Technicians)

"The Board of Registry may, at any time, admit to membership those additional organizations which, having presented their credentials, meet the Board's requirements for membership.

"IV. Responsibilities of the Board of Registry:

"A. The levels of and requirements for certification shall be established in accordance with the recommendations of the National Academy of Sciences-National Research Council. The Board, however, will retain the responsibility for additions, deletions, and modifications of the standards.

"B. The Board shall determine the qualifications for registration of a candidate at any and all levels.

"C. The Board shall establish and supervise examining procedures for oral, written, and practical testing.

"D. The Board shall establish a recertifying procedure. It should retain authority to require additional hours of training for each recertification.

"E. The Board shall publish an annual directory.

"F. The Board will be authorized to revoke registration or refuse recertification.

"G. A registrant may be admonished or censured or have his registration suspended or revoked by the Board for any of the following reasons:

1. Administering medical care other than that directed by physicians.

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2. Professional incompetence.
3. Unethical conduct.
4. Conviction of a crime involving moral turpitude.
5. Obtaining registration in a fraudulent manner.
6. Distribution of narcotics.
7. Alcoholism.

"There must be close coordination between those directing the schools for EMT's and those directing examination and certification (Registry).

"Several levels of training and certification will be required (see three levels described above.) The present fragmentation of training programs is wasteful and lacks quality control. A national program with local pilot projects testing increasingly higher levels of education and training should be considered.

"Schools and the registry must remain under the direction and control of physicians experienced in emergency care. The National Association of EMT's (to be established) must represent individuals, not organizations, on the basis of professional involvement and competence; be devoid of vested interests; be under the direction of allied health professionals, and rely upon the guidance of physicians experienced in emergency care.

"Approval of schools is expected to be under the auspices of the AMA Council on Medical Education; examination and registration under the auspices of the AREMT; and licensure, if we are to follow tradition, under the auspices of the state governments."

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Selected emergency facilities in the urban community

ROBERT J. FREEARK, M.D., F.A.C.S.*

The current direction of efforts to improve the health care of patients in the inner city may delay rather than further progress in the care of emergency victims. This seemingly contradictory state of affairs is an unhappy consequence of desperate efforts to correct a host of problems which have been long in existence and which are probably beyond solution through available resources.

Stated simply, the problems of emergency care in the inner city of Chicago are chiefly those of increased demand and decreasing supply. The former is a direct result of population shifts which brought greater numbers of indigent patients into the city. In addition, there is a maldistribution of these patients with respect to available hospital facilities. The rising expectations of the poor for a long awaited and recently promised improvement in health services has further increased the demand.

The "decreasing supply" reflects primarily an absolute decrease in the number of physicians willing to practice in the urban ghettos. It is further aggravated by trends toward greater specialization in medical practice, which reduce still further the number of practicing physicians, as well as of house officers willing and able to serve general, as opposed to specialized, health needs.

Caught in this "crisis in health care" are two groups with which I am concerned most. One is the staff of the large metropolitan hospital that exists primarily to serve the indigent. For years the medical and nursing staffs of these institutions have silently borne the major burden of the health needs of the inner city's poor. These staffs are characteristically overworked and under paid, and the gap between them and private hospitals is widening. A second "victim" is the critically ill or injured patient who, though a small and therefore silent majority, is in danger of "losing out" in the establishment of priorities in health care. Life-endangering injuries and illnesses are being largely ignored in the rush to provide comprehensive medical care, practice preventive medicine, or establish neighborhood health centers. Unless vigorous efforts are taken to stabilize the staffs of large "charity" hospitals and to assure continued improvements in the care of critically injured patients, people will continue to be mishandled, and one of the most effective resources for the care of the injured will be lost.

The city of Chicago has, I believe, unusually difficult problems in this regard. Its population of over four million people is served by 84 hospitals, each of which must, by law, operate an emergency room 24 hours a day. The flight of physicians from the city in general and its ghettos in particular have thrust the burden of total medical care for much of the predominantly black population upon five or six hospitals. For those private hospitals, all of which lack approved residency training programs, staffing of the emergency room with personnel having any degree of specialized skill has become virtually impossible. At night, such institutions become little more than a battalion aid station; of necessity, they transfer critically ill or injured patients to other facilities. Delays in treatment, unsafe transfers, substandard ambulances with unskilled personnel, and an almost total lack of modern communication systems form a pitiful pattern which, here as in any major urban center, is in critical need of reform.

The institution that receives most of these transfers is the Cook County Hospital. Police squadrons transfer to this hospital more than 1,000 accident victims each month from other hospitals in the city. The hospital is itself inundated by a host of non-emergency visits, as well as by a myriad of problems related to staffing and other matters.

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Its x-ray facilities are too frequently "tied up" with problems of backache and chest cold, and were until recently unable to assure a prompt and thorough study of such problems as the flail chest. A long established pattern of bringing the four "A's" (alcoholic, arrested, addict, aged) to this institution only further strains its capabilities.

In 1968, more than 350,000 visits were made to the emergency room of this 2,500-bed hospital. This represents one out of every three such visits to the 84 hospitals in the city. The scope of illness encountered is difficult to describe, but injuries resulting from personal violence predominate. Close to 25 percent of all the babies born in Chicago were delivered at Cook County Hospital; nearly one-third of these had received no prenatal care.

Recent efforts by the hospital to cope with these problems have met with some success and are offered as partial solutions to the problem. They include:

1. The employment, on an hourly basis, of senior residents to serve in the emergency room as Triage Officers with the specific assignment of "screening" all patients and reassigning non-emergent problems to outpatient facilities.
2. Establishment of a Trauma Center, with appropriate supporting services and staff, to which all accident victims thought to be in need of hospitalization are promptly referred. By rapidly removing this category of patients from the larger group of real and imagined "emergencies," improved care by those specially trained in their needs is achieved.
3. Establishment of an observation unit, principally for alcoholics suspected of head injuries. This unit has proven a satisfactory compromise between a policy of routine admission (allowing, because of excessive numbers, little care) or premature dismissal (inviting medicolegal consequences).

Much remains to be accomplished within this city's only facility providing acute care for indigent patients. An even greater reorganization of emergency services is required throughout the city. This reorganization should provide for trauma centers (of the type described above), strategically located throughout the city, in hospitals willing and able to staff them on a 24-hour-a-day basis. Increasing efforts are being made to reduce the nonemergent patient load by means of neighborhood health centers and expanded outpatient facilities in other institutions. It is hoped that these efforts by health officials will not lose sight of the fact that the needs of the critically ill and injured must take precedence over nonemergent problems, regardless of the pleas of the poor and others for general health services and preventive medicine. We cannot hope to solve all of the problems, but until increased numbers of health professionals are recruited and trained for, and assigned to emergency care, we must preserve the progress achieved thus far.

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