

University of Delaware
Disaster Research Center

MISCELLANEOUS REPORT
#23

DELIVERY OF EMERGENCY
MEDICAL SERVICES IN DISASTER

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Delivery of Emergency Medical Services in Disasters*

A Study by the

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APPENDICES

- A. Field Instruments
- B. Data Coding Scheme
- C. Other Writings and Reports from the Study

A. Field Instruments

In the following pages, we attach reduced size copies of most of the major field instruments we used in our study. It should be noted that all instruments used by field workers are guides or outlines and are not to be thought of as a set of questions or directions which were to be mechanically asked or followed.

- I. The basic interview guide used in the baseline studies.
- II. The general field instrument used to establish hospital involvement in actual disaster situations, and if involvement was found, the nature of the areas to be probed.
- III. The general field instrument used with first responders and other organizations and groups involved at the actual disaster site(s).
- IV. The general field instrument used to establish which groups were involved in transporting victims in actual disaster situations, and if involvement was found, the nature of the areas to be probed.
- V. The general field instrument used to establish which groups were involved in coordinating the EMS disaster response, and if involvement was found, the nature of the areas to be probed.
- VI. The general field instrument used with almost every agency or group involved in some way in the EMS response.
- VII. The general field instrument used as a check by field workers to insure that they had obtained overall data for each disaster event.
- VIII. The basic observational and interview guide used in potential mass casualty-producing situations.

- C. Other Writings and Reports from the Study
 - 1. Papers presented at meetings
 - 2. Published articles and monographs
 - 3. Pending and projected publications

1. Papers presented at Meetings

- Blanshan, Sue A.
1976 "An Open-System Perspective on Organizational Change: The Effect of Environmental Change on Organizational Structure." Paper presented at the North Central Sociological Association Meeting, May 6, 1976.
- Dynes, Russell R.
1976 "Delivery of Emergency Medical Services in Disasters." Paper presented at the Emergency Medical Services Bicentennial Meeting, May 10-12, Baltimore, Maryland.
- Dynes, Russell R.
1976 "EMS Delivery in Disasters." Paper presented at the Emergency Medical Services Bicentennial Meeting, May 10-12, Baltimore, Maryland.
- Dynes, Russell R.
1977 "Planning for Disaster Emergencies." Paper presented at the National EMS Evaluation Symposium, January 11-13, New Orleans, Louisiana.
- Golec, Judith A. and Patrick J. Gurney
1977 "The Problems of Needs Assessment in the Delivery of EMS." Paper presented at the Midwest Sociological Society Meeting, April 1977, Minneapolis, Minnesota.
- Taylor, Verta A.
1976 "Emergency Medical Systems Responding to Disasters: Part II." Paper presented at the Micro-Communications Workshop on EMS, June 1976, Columbus, Ohio.
- Tierney, Kathleen J.
1976 "Emergency Medical Systems Responding to Disasters: Part I." Paper presented at the Micro-Communications Workshop on EMS, June 1976, Columbus, Ohio.
- Tierney, Kathleen J. and Verta A. Taylor
1977 "EMS Delivery in Disasters: Preliminary Findings." Paper presented at the Annual Meeting of the American Public Health Association, October 30 - November 3, Washington, D. C.
- Worth, Marti F. and Janet L. Stroup
1977 "Some Observations on the Effect of the EMS Law on Disaster-Related Delivery Systems." Paper presented at the Midwest Sociological Society Meeting, April 1977, Minneapolis, Minnesota.

Wright, Joseph E.
1976 "Coordinating Emergency Medical Services in Mass Casualty
Disasters: The Ideal Versus the Reality." Paper presented
at the Annual Meeting of the American Public Health Association,
October 17-21, Miami Beach, Florida.

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- 1977 "A Time Model: Hospital Organizational Response to Disaster." Disasters: Theory and Research. E. L. Quarantelli (ed.). London: Sage Publications. 173-198.

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- 1977 "The Prevalence and Effectiveness of Centralized Medical Responses to Mass Casualty Disasters." Mass Emergencies 2: 189-194.

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- Blanshan, Sue and Karen Daugherty
"Hospital Response in Disaster: The Xenia, Ohio Tornado, April 3, 1974."
- Gurney, Patrick J.
"Factors Affecting Distribution of Victims in Mass-Casualty Situations."
- Gurney, Patrick J. and Judith A. Golec
"That's Not the Way We Planned It: An Analysis of EMS Casualty Distribution in Disasters."
- Johnson, Quinten T.
"Dysfunctional Overlap of Two Federal Health Care Policies."
- Quarantelli, E. L.
"Private versus Public Medical Institutions: The Effect of Their Competition and Conflict on Developing EMS Disaster Planning."
- Quarantelli, E. L., Verta A. Taylor and Kathleen J. Tierney
"Delivery of Emergency Medical Services in Disasters."
Disaster Research Center Preliminary Paper No. 46. Columbus, Ohio: The Ohio State University.
- Quarantelli, E. L., Verta A. Taylor and Kathleen J. Tierney
"The Delivery of Emergency Medical Services in Mass Casualty Situations."
- Reynolds, Susan M.
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- Reynolds, Susan M. and Joseph E. Wright
"A Selective Literature Review of Disaster Medical Services."
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- Taylor, Verta A.
1974 "Hospital Emergency Facilities in a Disaster: An Analysis of Organizational Adaptation to Stress." Disaster Research Center Preliminary Paper No. 11. Columbus, Ohio: The Ohio State University.

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"EMS Delivery in Disasters." Disaster Research Center Preliminary Paper No. 32. Columbus, Ohio: The Ohio State University.
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- Taylor, Verta A. and Kathleen J. Tierney
1977 "The Provision of Emergency Health Care at Two Bicentennial Celebrations." Disaster Research Center Preliminary Paper No. 40. Columbus, Ohio: The Ohio State University.
- Tierney, Kathleen J. and Verta A. Taylor
"A Methodology for Evaluating Disaster-Related EMS."
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"Interorganizational Systems and Networks in Mass-Casualty Situations." Disaster Research Center Preliminary Paper No. 37. Columbus, Ohio: The Ohio State University.

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E.L. Quarantelli
Co-Director, DRC
Principal Investigator

PREFACE

It is only since World War II that serious attention has been given to the general problem of disasters and disaster planning in American society (Quarantelli and Dynes, 1977). However, the research and policy interest has been uneven, with some topics of social and behavioral sciences concern being more neglected than others (Quarantelli, 1978). Surprisingly, until the last decade, the providing of health services and health care in connection with disasters was an area to which few researchers or planners had attended, either as a research question or as a policy issue.

The ever-developing expansion of disaster research and the increasing attention paid to the problem of emergency medical services (EMS) led a few disaster researchers to start around 1970 to explore disaster-related aspects of the health area. Much of the initial work along this line was undertaken at the Disaster Research Center (DRC), a research unit of The Ohio State University involved in the study of the social and behavioral aspects of disasters since its founding in 1963. Throughout its history, the Center has been concerned with on-site research of the responses of groups and organizations to community-wide emergencies, in particular natural and technological disasters, having conducted about 350 field studies in the United States and other countries. In addition to studying organizational behavior during and after disasters, DRC has been interested in learning about organizational planning for community-wide emergencies.

In 1975, DRC was funded by the Health Resources Administration to undertake the first major, systematic and comparative study on the delivery of EMS in disasters. In the pages that follow, we summarize the resulting 28-month study. In the first chapter, we present background on the historical development of EMS in this country and indicate the current status of disaster EMS as mandated by federal legislation. In Chapter II, we examine prior research on the delivery of EMS in mass emergencies and set forth our three major research objectives, namely to come up with a description and analysis of the characteristics of, conditions for, and consequences of the delivery of EMS in disasters. Chapter III details the theoretical and conceptual framework that guided our research. In the next chapter, we outline the study design and analysis, indicating our field work and how we went about analyzing the data. Three following chapters are devoted to an exposition of our major findings as to the characteristics of, conditions for and consequences from providing EMS in mass casualty-producing situations. Implications of the empirical findings and the limitations of the study are discussed in Chapter IX. The concluding chapter provides a series of recommendations emanating from our work for disaster EMS policy, planning, practice and research implementation. The appendices include copies of major field instruments used, the data coding scheme employed in some of the quantitative analyses, and lists of other writings and reports resulting from our study.

Because of these other writings often presenting detailed and sometimes quantified examinations of specific questions and issues, the account in the pages that follow does not pretend to depict all aspects of our study. This account, however, is a final one for the work done in the sense that it does summarize our study design, the nature of the data obtained, the analyses undertaken, the findings and conclusions reached, and all other important aspects of the study. As such, any reader should be able to judge the value and usefulness of our research and to decide whether it would be worthwhile to pursue the more detailed and specialized reports.

Readers will note that the standard DRC policy of confidentiality has been applied to the relevant material in the following pages. That is, no person is ever identified by name, and no quotations cited and obtained in field interviews are attributed to any specific individual. Similarly, details about groups or organizations are not specifically identified unless the information is already public or readily available from some source other than DRC.

I.

INTRODUCTION

In this chapter, we selectively discuss the history of the provision of emergency medical services (EMS) in American society. Most of our attention is given to depicting the factors leading to EMS delivery coming to be defined as a social problem and the steps initiated to solve that problem. The chapter concludes with a brief characterization of the current EMS situation, with particular emphasis on the requirements and expectations regarding EMS in disaster situations.

Historical Background

In the last ten years, the quality and quantity of the medical care given in acute emergencies in the United States has come to be seen by a variety of interested parties as not only falling considerably short of what is desirable, but as amendable to particular changes to improve the situation. As is typical in the emergence of social problems generally (Mauss, 1975), certain influential groups in the society have highlighted the undesirable state of affairs, i.e., poor everyday provision of EMS, and they have mobilized resources to bring about a solution to the problem, i.e., have taken actions that have led to the development of comprehensive regional EMS systems.

However, as we will shortly indicate, the step of establishing EMS systems is now surfacing the additional problem of providing EMS in disaster contexts. This is somewhat unexpected, since the establishment of EMS systems in general was supposed to subsume a satisfactory handling of the more particular question of disaster EMS. But, as we will show in this monograph, that has not been the case.

To see how this has come about requires some historical understanding of the EMS issue in American society. Actually, until about a decade ago, little systematic public attention was given to the delivery of EMS. Before 1966, the federal involvement with emergency medical services was limited to the development of health resources and services in general (Report to the Congress, 1976). No specific programs and, consequently, no special funding existed to develop EMS. To be sure, for years there existed a subunit within the Department of Health, Education and Welfare (HEW) which, under various names, indicated an interest in EMS. However, this agency was minimally staffed, had very few appropriations and functioned chiefly as a liaison group to such national voluntary associations as the American Medical Association and the American College of Surgeons (Gibson, 1977:122). If anything, the federal role was downplayed, and local hospital administrators were seen as having the responsibility of taking the lead in achieving community-wide coordination of emergency care even when it was noted that "emergency services must be reorganized" (Owen, 1966:102). At the local level, prior to the 1960's, public agency also remained largely uninvolved by commercial concerns and in rural areas by funeral homes or volunteer fire departments (Gibson, 1977:122). Given very little participation by governmental agencies at any level as either regulators or major providers of emergency medical care on a day-to-day basis, it is not surprising that these groups showed almost no concern with trying to develop plans to provide EMS in disaster contexts or to work at improving EMS delivery in such situations.

The reason for lack of attention was not that good EMS were being provided. While the caliber of the services obviously varied greatly from community to community, it was constantly observed that many localities did not have adequately equipped vehicles, that ambulance personnel did not have proper training, that the dispatching of, communications with, and coordination of units was frequently poor, if not non-existent, that there were no regulations and standards relating to the operation of services, and that "few communities even recognize(d) the need for an emergency medical services committee to supervise the total activity" (Owen, 1966: 63). As to the receiving medical care organization, Gibson has observed that, in the time period being discussed:

the hospital emergency department was, in the main, seen as a financially and clinically embarrassing appendage to the hospital and one to which it was not thought that normal clinical and administrative standards could appropriately be applied (1977:121).

Thus, as has been frequently found in other areas of life, a poor or undesirable state of affairs does not immediately or automatically lead to much public attention, the definition of the situation as a social problem, or mobilization of resources to deal with the matter.

However, in the early 1960's, a number of factors spotlighted by certain interest groups converged in a facilitating social climate that led first to attention, definition of a problem and its solution, and then to action with respect to EMS. Among the factors at play were: massive increases in the nonurgent use of hospital emergency facilities; the decreasing ability of hospitals to use their attending staff in their emergency departments; the growing inability of funeral homes to continue to produce viable ambulance services; the unevenness of emergency care because of differential hospital use and access to specialized technological aids; and the rising incidents of accidental deaths, especially as a result of traffic fatalities. Testimony on health matters before Congressional committees in the last decade increasingly detailed the operation of these factors. But the groundwork for such public spotlighting had been prepared by earlier thought and discussion within a variety of interested non-governmental groupings and organizations.

Among those calling attention to the EMS area was the quasi-public group, the National Academy of Sciences, which organized a number of meetings and brought to the forefront some specific EMS issues. For example, starting in 1961, the Committee on Shock in the Division of Medical Sciences of the Academy initiated a number of steps designed to help reduce the severity of injury and the death rate from accidental trauma. Under the aegis of this Committee, a group was organized in May, 1963, to review the current stage of development and utilization of voice communication facilities, as applied to first aid treatment, transportation and admission to hospitals of accident victims. Under the name Ad Hoc Committee on Communication Services in Initial Care and Transportation in Medical Emergencies, this group in October, 1963, for instance, restated that its goal was that of encouraging better day-to-day communication so as

to insure maximum coordination in emergencies of any magnitude, examined data on accident morbidity and mortality, reviewed inadequate responses in four major civilian disasters, considered the assumption of authority at scenes of accidents, looked at the role police and fire departments should play in the transportation of accident victims, discussed notifications of hospitals and communication systems and control at times of mass emergencies, and concluded that coordination of communication was the issue to be resolved.

In the early 1960's also, a variety of national private associations with professional or related interest in EMS acted in ways to call attention to the area. For example, the Joint Commission Accreditation of Hospitals set forth certain standards that emergency departments needed for hospital accreditation. Still other groups, such as local committees on Trauma of the American College of Surgeons, surveyed community ambulances and emergency department services, pointing out deficiencies and making recommendations both as to legal ordinances and training to improve services. The Committee on Acute Medicine of the American Society of Anesthesiologists made recommendations, such as that communities should establish Emergency Medical Operations Centers to serve as communications and vehicle dispatching centers for everyday medical emergencies as well as for disasters, that there should be introductory and advanced training for ambulance attendants, and that hospitals should be categorized according to emergency and intensive care facilities.

These and other interest groups were important, not only in calling attention to, but also in helping to define the delivery of EMS as a social problem and indicating what solution might be available. Thus, these organizations not only publicly detailed EMS deficiencies, but encouraged public expectations about the lives that could be saved through improved EMS. For most of these groups, this desired goal was to be accomplished by "passage of a legislative mandate for federal involvement and funding" (Gibson, 1977:122). Thus, somewhat contrary to the historical U.S. governmental posture which had tended to see EMS matters as resolvable at the local community level, these other groups defined the matter as a national social problem and, as such, to be dealt with at the federal level.

A climax to these activities was the issuance in 1966 of what eventually became a landmark report by the Committee on Trauma and the Committee on Shock and special task forces of the National Academy of Sciences. In this statement, the magnitude of an undesirable state of affairs is first set forth:

In 1965, 52 million accidental injuries killed 107,000, temporarily disabled over 10 million and permanently impaired 400,000 American citizens at a cost of approximately \$18 million (Accidental Death and Disability, 1966: 5).

Having spotlighted the matter, the report summarizes a number of unfortunate factors, poor practices and serious deficiencies at various levels

of emergency care. Particularly singled out are weaknesses in emergency first aid medical care. The report urges a concerted attack on what it defines as a major health problem; the very subtitle of the report, significantly, being "The Neglected Disease of Modern Society." Included in this attack should be "major steps toward a total national effort" (1966:6) in the same way that concerted attacks for such health issues as polio, mental health, cancer and birth defects:

have been mounted by conduct of national conferences at the executive level, appropriation of funds by Congress, pooling of resources by lay and professional groups through voluntary health agencies, expansion of research, and implementation of programs at regional and community levels. (1966:5)

Overall, the report clearly calls attention to an unfortunate state of affairs, defines it as a national social problem and general advocates solutions that would involve federal government leadership and action.(1)*

The actions of the various professional and occupational interest groups, as well as scientific interest groups (2), all served to construct a consensual reality and to create a public moral judgment that the delivery of EMS was a societal problem that had to be addressed nationally. The mid 1960's was an appropriate time for any call for dealing with a social problem by mobilizing federal resources; partly the result of the larger trend in the American social system of moving in the direction of a more collectivist orientation by becoming a more service supported society (Moynihan, 1970). In any case, the activities on the EMS front were consistent with the belief at the time that national social problems of whatever kind could be solved by increased and direct federal interest, leadership and directives.

The first major move at the national level in the EMS area was the passage of the Highway Safety Act of 1966. This first federal program initiative required that each state have a highway safety program and mandated that standards, including those for EMS, be promulgated by the Secretary of Transportation and that states implement them by the end of 1968. Standard 11 on EMS details minimum requirements as to training, equipment, facilities, criteria procedures, planning and evaluation so as to insure that persons involved in highway accidents would receive prompt emergency medical care. Undoubtedly, this act did bring about some improvements in medical treatment and organization for responding to traffic casualties, but as Gibson notes, there is "not much evidence to suggest locally responsive variants of Standard 11 requirements" (1977: 123). While sanctions, by way of withholding federal highway construction funds, were available, more than a decade later not one dollar had been withheld from a single state for noncompliance with developing an EMS program and adhering to standards.

*Footnotes are so indicated and listed at the end of each chapter.

There were both direct and indirect unintended consequences of the highway safety legislation. Thus, it has been observed, "EMS was seen as targeted at highway accidents and as something that ended at the front door of the hospital" (Gibson, 1977:123). In part, also, it may have reinforced the legacy that speed of response was always crucial in EMS response and that the EMS system could always control its influx of patients. As we will document later, neither of these points are true for disaster EMS.

A more indirect, unintentional consequence of the highway safety legislation appears to be that it further spurred HEW, partly as a result of competition with the Department of Transportation, to make funds available for a variety of diverse and not well coordinated local EMS programs. In fact, some have viewed what happened between 1966 and 1973 as an instance of governmental programmatic incoherence and profligacy (Gibson, 1977: 123). We mention this because descriptions of the development of EMS frequently employ a linear unfolding of clear-cut sequential, or at least parallel and cumulative steps (see, for example, the diagram in Robert Wood Johnson Foundation, 1977:8-9). This does not recognize the bypaths, dead ends and abortive steps that are likely to appear in the development and establishment of any national effort to solve a social problem. (3)

The next major federal posture on EMS was exhibited in the setting up in 1972 of five EMS demonstration projects. They were intended to show and test the effectiveness of different system strategies and management intervention in reducing mortality and morbidity. (See Perlstadt and Kozak, 1977, for a description and an analysis.) However, reflecting the political decision making always involved in the handling of national social problems, Congress made no attempt to wait and learn from the demonstration projects. Instead, a new major federal initiative was launched in 1973 with the passage of a basic EMS law. This legislation is essentially the basis for the current national EMS program.

Just prior to its passage, a 1972 National Academy of Science report, in contrast to the implicit stand on federal intervention taken in the landmark 1966 report, explicitly stated:

It is recommended that the Office of the President express as a policy of the Administration concern for the magnitude of the problem of death and disability from accidents and sudden illnesses, and recommend action to be taken by the legislative and executive branches of the government to ensure optimum emergency care for every citizen who needs it.

Designate the Department of Health, Education and Welfare as the agency primarily responsible for delineation of administrative goals for a comprehensive emergency medical service system and for coordination of programs of all federal agencies designed to meet these goals.

Assure, in close cooperation with the Office of Management and Budget, that appropriate resources of all Executive Departments and agencies with roles and responsibilities related to emergency medical services plan their programs in this field in accordance with the programs and goals established by the Department of Health, Education and Welfare, and in a manner that avoids gaps, imbalances and duplications (Committee on Emergency Medical Services, 1972:6-7, italics removed).

This is about as clear a statement as could be made that the national social problem of EMS should be handled by a federal government. It is the end result of the championing of EMS by various interest groups so that the issue was noted, defined as a social problem, and seen as requiring federal action, or in the words of a key EMS official, "It was obvious that federal direction would be an essential catalyst for a national EMS system's development program "(Boyd, 1976:115). The climax after this was, of course, the passage of the Emergency Medical Services Systems Act of 1973 which we will now discuss.

The Current EMS Situation

By the early 1970's, the time was ripe for clear-cut action, or, in the words of a key figure in EMS planning and policy, "The EMS problem... identified in 1966...is now an accepted soluble nationwide medical problem" (Boyd, 1976:114). With the passage of the Emergency Medical Service Systems Act (EMSSS) of 1973, funds and mechanisms were provided for communities across the nation to establish emergency medical service delivery systems. The EMS Act:

mandated that the emergency medical care program funded with federal dollars must address, plan and implement a "system approach" for the provision of emergency response and medical care (Boyd, 1976:104).

Under the EMSS Act, comprehensive regional systems were to have adequate medical staff, emergency facilities, transportation equipment and other resources to provide needed emergency care to all persons in the system's service area. The system, which may serve several adjacent counties, was to be administered by a single public or nonprofit private entity. Requests for emergency care were to be handled by a central communication system that linked all of the system's resources.

Identified in the EMSS Act are 15 specific functions or activities which are required to be addressed when grant requests are made to the federal government for the purpose of establishing comprehensive, area-wide and regional EMS programs. The 15 functions (4) are:

1. The provision of manpower
2. Training of personnel
3. Communications
4. Transportation

5. Facilities
6. Critical care units
7. Use of public safety agencies
8. Consumer participation
9. Accessibility to care
10. Transfer of patients
11. Standard medical record keeping
12. Consumer information and education
13. Independent review and evaluation
14. Disaster linkage
15. Mutual aid agreements

For our purposes, two things are especially noteworthy about the EMSS Act--its interpretation and implementation. For one, there is a very strong emphasis on the notion of system. The "nonsystem" approach, in fact, is characterized by a top EMS official as having persisted prior to the Act due to a "combination of local ignorance, provincial prerogative and lack of guidance by the Federal Government" (Boyd, 1976:115). To some extent, we think that there is almost a naive belief among some EMS personnel in the determinative power of language so that, if a "system" approach is required, there will be a system, i.e., interdependent units so related that they somehow form a cluster or a whole that will have features that are more than the sum of the parts. As we shall note later, while our field studies of disasters were not focused on everyday operations, we had to take into account what existed in the EMS sector prior to impact. As will be detailed later, in the majority of situations studied, there was little in the EMS area that could be called a system in the full sense of the term, even though about half of the 400 state designated EMS regions had received EMSS Act funding in the first two years of the federal program. The absence of a genuine EMS system is doubly important because, as we will discuss, the EMSS Act makes a basic assumption about the EMS that will be delivered at times of disasters.

This brings us to our second point. One of the 15 specific functions mandated for every EMS system to be established is coordinated disaster planning. Implicit in the legislation is the assumption that the everyday EMS systems to be brought into being by the EMSS Act could be the basis for the provision of EMS in extraordinary mass emergencies or, in the language of the Act, during "mass casualties, natural disasters or national emergencies." (5) More specifically, the law states that the established EMS system must "have a plan to assure that the system will be capable of providing emergency medical services in the system's service area during" mass emergencies. Policy interpretations of the Act have specified that the EMS system must have links to the local, regional and state disaster plans and participate in exercises to test disaster plans at least biannually. Furthermore, EMS projects funded under either Section 1203 or Section 1204 of the Act are required to conduct a "disaster drill" during the second year of the grant. Thus, the newly developing EMS systems in the United States have been faced with not only having to provide disaster services, but also with having to plan for large scale mass emergencies.

The notion of linking the providing of EMS to comprehensive disaster planning, as indicated by the EMSS Act, is not a new idea. In fact, consideration of mass casualties in disasters was an important factor in the thinking of a number of key persons involved in the issuing of the now classic 1966 National Academy of Sciences report, Accidental Death and Disability: The Neglected Disaster of Modern Society. (6) The report itself recommends the

development of a center to document and analyze types and numbers of casualties in disasters, to identify by on-site medical observation problems encountered in caring for disaster victims, and to serve as a national educational and advisory body to the public and the medical profession in the orderly expansion of day-to-day emergency services to meet the needs imposed by disaster or national emergency (1966:29).

In discussing the care of casualties under conditions of natural disasters, there is a degree of ambiguity about the relationship of everyday EMS and disaster EMS. Thus, the report states that: "it is apparent that the problems of care of disaster victims differs from those of the care of individually injured persons in that they are concerned with unexpected expansion of first aid, rescue, communication, sorting, distribution, and medical care" (1966:28). This could be read to imply a qualitative difference between the two situations, and more than simply a difference in degree. On the other hand, the report goes on to say that:

no plan for emergency care in disaster is likely to succeed unless it provides for an orderly utilization of currently functioning facilities. For this reason, emphasis should be placed on employment of all elements of disaster services on a day-to-day basis so that they will be functioning smoothly when the load of casualties suddenly increases (1966:28).

The implication here seems to be that disaster EMS is primarily an extension of everyday EMS. The same implication can be read in the last clause of the sentence in the recommendation on establishing a medical disaster research center. (7)

At any rate, as the historical situation has developed and as EMS has lost its classification as a neglected public service (Sadler, Sadler and Webb, 1977), disaster EMS is coming to the fore both as something that must be delivered and as a problematic question, i.e., what are the problems associated with the delivery of disaster EMS? As regional or local EMS systems have come into being, they have developed both in common and in different ways. Their developments have been structured in the same way by the requirements of the EMSS law. At the same time, some variation is possible even within the law. For example, the organizational entity responsible for operating the system can vary; it can be a "county government, city government, state health department, civil defense agency, volunteers or multi-jurisdictional council organized specially for the task" (Special Report, 1977:4). But, however organized,

the newly established local EMS systems are mandated to have disaster linkages and, of course, they have to respond to mass emergencies. In addition, there are those localities where the EMSS Act has had little impact, and no local systems have been developed but where, nonetheless, disaster EMS demands at times arise.

Against this kind of historical background we have briefly sketched in this chapter, we prepared, and eventually undertook, a study of the delivery of EMS in mass casualty-producing situations. Some of the preparations for our study are detailed in the next chapter on the research background and our research objectives. There is no discussion in the following chapter of any literature published, DRC work done, or changes in emphasis in research strategies after our work was initiated. All matters that came into being after we had started our study are left for discussion in later chapters.

Footnotes

1. The next report does fall short of explicitly asking for direct federal government involvement except indirectly through such matters as recommending the establishment of a National Institute of Trauma. However, a parallel is drawn in the report to how other societal health care problems have been tackled, and they all have involved substantial federal government initiative, funding and action. Implicitly, the report is a call for equivalent federal government involvement in the EMS area.
2. Some of the groups involved are listed in Committee on Emergency Medical Services (1972:3-4).
3. Thus, despite the overall trend, a National Academy of Sciences report in 1972 could complain, "federal agencies have not kept pace with the efforts of professional and allied health organizations to upgrade emergency medical services" (Committee on Emergency Medical Services, 1972:4).
4. Each of the 15 is described in detail in Boyd (1976).
5. It is time that interpretation of the EMSS Act conclude that "the EMS system is not the regional health disaster organization" (Boyd, 1976:110). However, it is clear that the everyday EMS system is seen as the core of the EMS response during disasters; the only difference is that some additional inter-organizational linkages are seen as existing as a result of prior disaster planning. Furthermore, while this may be a liberal interpretation of the EMSS Act, our studies found that the more typical view at the local EMS level was to visualize the everyday EMS system as the system to respond at time of mass emergencies. Also, the actual working of the law in Section 1206 (XIV) of the EMSS Act states that an emergency medical services system shall "have a plan to assure that the system will be capable of providing emergency medical services in the system's service area during mass casualties, natural disasters or national emergencies." This does not seem to imply that the operative system at times of disasters is clearly something different from the everyday system.
6. This point is drawn from the senior author's involvement in some of the deliberations at the Academy preceding the issuance of the report.
7. Efforts to implement the recommendation took place in 1968-69, but necessary funding proved impossible to find. A full scale plan on the structure and functioning of such a center is detailed in The Committee on Trauma report (1967). An earlier reospectus for a proposed disaster survey center in the medical area had been drawn up in 1964 by the Committee on Disaster Medical Care of the American Medical Association (see Committee on Trauma, 1967: 5).

The later 1972 National Academy of Sciences report on comprehensive emergency medical services recommend the establishment of a National Center for Disaster Emergency Medical Services (Committee on Emergency Medical Services, 1972:32-34).

II.

RESEARCH BACKGROUND AND OBJECTIVES

There are two major discussions in this chapter. First, we briefly summarize the research literature as it existed up to 1975 when our study commenced. (1) The intent here is to show the general thrust of what had been examined with respect to EMS up to that time. Second, we note the earlier work DRC itself had carried on in hospitals and in the medical care area. This material is presented to show the starting base of the later DRC research on EMS. With the depiction of this research background, the chapter concludes with a succinct statement on the research objectives of the study reported in this monograph. Thus, this chapter should be read as depicting what we knew about, had learned about and wanted to discover about the delivery of EMS in disasters as of May, 1975, when our systematic research effort was initiated.

The Research Literature

Most disasters involve casualties; in fact, the number of killed and injured produced is the major basis for evaluating the event as a catastrophe. Thus, the medical health care area tends to loom large in the response to and the planning for large-scale disasters. A sizeable literature in medical and related publications has resulted from this involvement and interest. (See the references and bibliographies given in American Medical Association, Committee on Disaster Medical Care, 1966; Report on the Feasibility...1967; Garb and Eng, 1969, as well as the listings in Index Medicus.) There are discussions of all kinds about highly technical or strictly medical questions. In addition, there is one account after another of how a particular hospital reacted in a given disaster, and of the kind of disaster plans that should be, as well as are being, implemented. However, while this literature is valuable for many purposes, in the main it is of limited help in giving an overall understanding about the general nature of EMS in disasters and typical problems involved in delivery of EMS under extreme stress.

The more technical medical literature is concerned usually with the handling of specific medical problems; in particular, disasters and associated situations. Typical is an article in Archives of Environmental Health which deals with microbiological questions involved in wound infection among victims of a Lubbock, Texas, tornado (Gilbert, et al., 1973). While undoubtedly very useful for certain purposes, such discussions generally deal with only one particular historical incident, are almost always descriptive in nature, and focus on a specific technical problem, with little consideration given to how the medical treatment may be affected by the larger context of care giving and organization.

The literature on hospital responses per se is very anecdotal in nature. These kinds of reports are almost always limited to one hospital and come usually only from the perspective of one participant (e.g., see the typical articles that appear about disasters in different issues of such professional journals as Emergency Medicine, Bulletin American College of Surgeons, Hospital Management, Journal of Trauma, American Journal of Nursing, Hospitals, etc.). Little of this material is analytical or comparative; syntheses or overall points of view are seldom presented. The best accounts are simply good descriptive case studies (e.g., Taubenhuis, 1971); but many are close to what a

newspaper story would be about the response (e.g., "How St. Mary's Hospital, Athens, Georgia, Handled a Recent Tornado Disaster," Fechtel, 1973). Quantitative findings seldom appear except in very exceptional instances, such as now dated surveys on the Texas City explosion disaster (see Blocker and Blocker, 1959, Blocker, et al., 1959). Occasionally, some of the better items have been assembled together (e.g., Readings in Disaster Planning for Hospitals, 1973), but attempts to draw generalizations or to state principles other than at a very simple, descriptive level, are very rare.

The disaster planning literature is mostly of an exhortatory nature, indicating what ought to be, rather than setting forth what actually exists (e.g., typical is the article by Rowal, 1970, which is about four hospitals joining together in planning a city-wide disaster alert, or the survey reported by Dressler, et al., 1971, on the attitude of physicians towards participating in mass casualty care programs). In recent years, the perspective presented has sometimes been from the overall viewpoint (e.g., as in Wagner, 1966, on community disaster planning); more often the focus is on particular subsegments of the medical care system (e.g., as in the American Hospital Association document on Disaster Management: A Planning Guide for Hospital Administrators, 1971); or on particular types of personnel (e.g., Disaster Nursing Preparation, 1965, aimed at training nursing students and with more of a nuclear catastrophe orientation than a peace-time disaster concern). Some writers who have produced a series of interesting publications in this area (e.g., Jackson, 1964, 1966, 1967; Kennedy, 1962, 1963, 1965) have not distinguished usually between planning for large-scale emergencies and everyday emergency treatment problems. Occasionally disaster planning is noted in literature referring to situations outside of the United States (e.g., Failey, 1969; Zietkiewicz, 1971).

Post-disaster writings about plan operations in actual emergencies are not only less frequent than those about planning, but are also usually single descriptive case studies (e.g., Foster, 1967; "The Day the Earth Shook," 1971; Coolidge, 1971). The literature on activities in disasters outside of the United States is also of the case study nature (e.g., Whittaker, et al., 1974). General implications are almost always left unsaid in such reports.

The civil disturbances of the late 1960's in the United States also evoked some planning surveys (e.g., Survey Report...1969). A few accounts appeared of actual hospital operations during such disorders (e.g., Beam, 1965; Walt, et al., 1967; and Roeschlaub, 1968) and recently there have been some descriptions of hospital operations in civil disturbances elsewhere in the world (e.g., see Rutherford, 1973, on Northern Ireland). Implicitly, although seldom explicitly, it is noted that such kinds of community emergencies evoke different hospital responses along certain lines than do natural or technological disaster situations.

There is, of course, a great mass of literature on EMS care which has increased substantially in the last few years. Included in this series of practical guides. (See Committee on Emergency Medical Services, 1968, 1970 and U.S. Department of Transportation, 1969, 1970 and 1971.)

Many of the general studies on this topic have taken survey form, with a major one being an examination of emergency medical services in the Chicago area (Gibson, et al., 1971). The intent was to provide an accurate description of the various emergency rooms' technical facilities, personnel characteristics, and types of treatment offered. The report details problems associated with the transportation of patients to emergency rooms and problems of communication and coordination between hospital emergency rooms, between hospitals, and between ambulance services and the emergency rooms. In this, as well as in more modest surveys (e.g., Kimball, 1968, on the necessity for a coordinated communication network, or in the 50 or so local surveys of EMS cited in Gibson, et al., 1971: 402-404) the focus is on practical realities of emergency room operations, a detailing of immediate problems associated with its functioning, and a proposing of a set of guidelines to facilitate the efficient functioning of the emergency room.

But these kinds of surveys are not really disaster-oriented (and most do not pretend to be). They do not generally deal with community-wide crises involving the massive influx of victims that will necessitate concurrent, if not simultaneous, responses by the total hospital complex or even by all the hospitals in a given locality. An implicit assumption is that emergency room operations in disasters probably differ only in degree rather than in kind from everyday operations, an assumption which we shall later question on the basis of our own studies in disasters. (2) Unless such an assumption is made, the surveys of EMS tell us much about everyday hospital operations, but may be limited in the lessons that they will provide for disaster responses.

Unfortunately, there are no major surveys of emergency room, let alone total hospital or medical care system responses in large-scale disasters. There are some studies of emergency rooms which do deal with disaster situations. But, as is typical of much of the literature, they examine only one particular emergency room, and often are concerned with detailing the hospital plan that was in effect and indicating what went wrong or right when the plan was activated. Prevalent concerns seem to be with: (a) problems of coordination with emergency units, police, fire and other agencies involved in the disaster; (b) problems of communication, especially as regards accurate information on the number and types of casualties; (c) problems of internal emergency room administration, particularly as regards adequate triage of incoming casualties, and sufficient coordination of emergency room personnel; and (d) more medically-oriented problems, e.g., types of medical supplies needed, types of injuries one might expect, and the like. Interestingly, while many of the writers seem to sense that the problems encountered in disasters are not quite the same as in everyday operations, practically none explicitly call attention to that possibility. In part, this failure may be a consequence of the fact that, as in the instance of the first type of literature alluded to, the studies are descriptive in nature and case studies of particular instances at best.

The more research-oriented social science literature is even less informative. A scanning of theory and research in the medical sociology area, which is rather substantial, uncovered very little on disasters, regardless of whether attention was focused on hospitals (e.g., Georgopoulos, 1972; Freidson, 1963),

on EMS (e.g., Roth, 1972), on medical care generally (e.g., Altman, Anderson and Barker, 1970; Scott and Volkart, 1966), or the medical care system (e.g., Arnold, Blankenship and Hess, 1971). Seldom, if at all, are allusions ever made to disaster situations, let alone any discussion or extended analysis.

In fact, social science research in the medical care area at times of disasters is almost non-existent. The bulk of the material consists of the descriptive reports put out by the Disaster Research Group of the National Academy of Sciences in the late 1950's. (See Rayner and Williams, 1956; Rayner, Raker and Wallace, 1956; Rayner, 1958; and Raker and Friedsam, 1960.)

Thus, despite an apparent large body of relevant literature, in actual fact, there is little knowledge grounded in solid and comparative data about hospital activities and the delivery of EMS in disasters. The situation in the middle of 1975 differed little from 1967, when, after an exhaustive examination of the problem, The Task Force on Medical Disaster Surveys of the Committee on Trauma, Division of Medical Sciences, National Research Council-National Academy of Sciences, reported that "catastrophes have not been properly studied in a systematic fashion," (1967:3) insofar as the organization and delivery of health services is concerned and that "all but a few areas relating to emergency and disaster medical care should be the object of a more intensive investigation and evaluation" (1967:22). The absence of appropriate studies, of course, is partly attributable to the lack of much continuous research on disasters in the social and behavioral sciences except for the studies undertaken by DRC. (3)

Earlier DRC Research in the Hospital-EMS Area

From 1963 to 1975, DRC undertook more than 270 field studies, including over 150 of actual disaster situations, most of them involving natural agents such as hurricanes, floods, tornadoes and earthquakes. The prime focus of the research was on the responses and problems of major local community organizations in the immediate emergency period. Thus, we looked at such groups and agencies as police and fire departments, the civil defense office, the Red Cross and the Salvation Army, public works departments, local governmental agencies, etc., and at such activities and functions as emergency planning, warning, search and rescue, communications, interorganizational coordination, etc. (4)

We were not able to give anywhere near the equivalent attention and effort to studying hospital activities and EMS in disasters. As far as DRC was concerned, the explanation of the relative neglect of this important area was simple enough. None of our prior research grants and contracts permitted any continuous, large-scale and systematic effort to study hospital operations or the delivery of EMS during times of extreme community stress. The functioning of hospitals and the extending of EMS in disasters or other community stress situations are obviously important practical and theoretical matters, but the interests of our research sponsors were not specifically in that direction. Thus, there was a major void in our knowledge about one type of key emergency organization, hospitals, and a major function, emergency medical care, in situations of major community disasters.

However, while DRC had not engaged in systematic studies, it had developed some familiarity about what happens in this general area at times of disasters. In order to understand overall community responses to disasters, as well as how other emergency organizations react to crises, of necessity we had to obtain some information about the problems of hospitals and EMS activities in disaster situations. This enabled DRC in the first seven or eight years of its existence to do a few isolated case studies (e.g., after a major explosion in Indianapolis, after an earthquake in Anchorage, Alaska, and after tornadoes in Jackson, Mississippi, and Oak Lawn, Chicago; DRC has also looked at hospitals in civil disturbances such as those in Detroit and Columbus) and write some impressionistic essays about matters in this general area (e.g., Kennedy, 1967; Drabek, 1968:91-109, 134-141; Stallings, 1970; and Quarantelli, 1970).

Around 1972, it was decided that DRC had accumulated enough impressionistic observations about these problems that they might serve as bases for future research. By impressions, we mean such things as the following. Hospitals are not well integrated into overall community disaster planning. Few hospitals are really prepared for sudden disasters. Hospital disaster plans often exist only on paper and are seldom carried out as detailed at times of catastrophes. Initial responses are often of an ad hoc nature, with the effectiveness of the response seeming to depend frequently on the ability of the nursing staff on duty to handle the onset of great demands. Planning for the use of ambulance services to bring casualties to the hospitals at times of disasters is seriously deficient. First aid stations established outside of a hospital context are generally not used and may drain medical personnel away from other localities where they could be used. Field hospitals seldom can be established quickly enough to serve any major useful purpose. Most emergency rooms quickly get overloaded, with their personnel often working rather autonomously with regard to the rest of the hospital response. Available blood and drug supplies are usually adequate, but appropriate tagging material frequently is exhausted quickly. Decision making occurs at lower levels in the administrative and professional hierarchy than is usually the case during routine times. Volunteers, even non-regular hospital medical personnel, often create more problems than they solve. Information about disaster situations and casualties often is available at the emergency room, but does not get to other organizational personnel requiring it in the hospital. Emergency room and related triage activities often result in less than acceptable medical treatment judged by everyday standards. Both intra- and inter-hospital linkages existing prior to the disaster seem crucial factors in determining the kind and efficiency of the general medical-hospital response. Overall, there are frequently serious problems in the coordination of the medical-hospital response in a community which often stem from an overabundance, rather than from a lack of personnel at the time of the disaster.

The above are simply random examples of a series of unsystematic observations DRC had made during its field studies. However, we did not feel we had an adequate picture of the actual range and patterns of these and related phenomena at times of disasters. The impressionistic observations suggested some probabilities, but, at best, these were only guiding hypotheses and far

from anything that could be characterized as well-grounded empirical generalizations. We felt we were only beginning to get a descriptive picture of the typical patterns of hospital activities and delivery of EMS at times of catastrophes.

More important, we knew little about the conditions and circumstances associated with differential responses within and between hospitals and about what factors most contributed to the efficiency and effectiveness of the delivery of EMS. The impressionistic observations offered, at most, only limited clues about what might be involved. In other words, given the incompleteness of empirically-grounded and systematic data even of a descriptive sort about responses, we could not and did not have a theoretical framework which might suggest what conditional variables or dimensions would be important to examine in a systematic way.

In order to increase this descriptive base and to start developing a theoretical framework, DRC in 1972-1975 initiated two things. In conjunction with, but of necessity secondary to other higher priority research goals, we moved towards somewhat more systematic field work on hospitals and EMS and began to make explicit a theoretical framework.

To help in developing the framework, we initiated pilot studies during non-disaster times at a few hospitals in eight cities around the country (Los Angeles, New Orleans, Memphis, Oklahoma City, Dayton, New York, Columbus and Miami). The object of these studies was to obtain a picture of the structure and functioning of hospitals, especially their emergency room and services, during normal times — what we call Time 1. Details were obtained on how the hospitals and their emergency rooms and services were planning to change during a disaster — what we call Time 2. Using some of the data from three of the cities studied, a preliminary working paper to begin to explicate a theoretical model was produced (Taylor, 1974) to examine the adaptation of the emergency services and facilities of hospitals to changes in their capability-demand ratios in planned or actual disasters as compared with routine times (i.e., in Time 2, as compared with Time 1).

At the same time that this more theoretical work was being undertaken, an effort was made to increase our data base regarding patterns of response in actual disasters. Our earlier isolated case studies had suggested that the study of single hospitals at times of disasters was not the most fruitful approach to the problem. We were particularly interested in finding a situation where the total hospital complex in a community was differentially affected by a disaster. A limited opportunity to study such a situation occurred in Wilkes-Barre, Pennsylvania as a result of the flooding from Hurricane Agnes in 1972. The five hospitals in the community were rather differently affected, with two of them having to be evacuated within an eight-hour period. In this study, we concentrated both on the initial responses during the emergency, as well as what effect the disaster had in the subsequent 18 months on disaster planning, emergency room operations, etc., in each of the five hospitals. The field work on this study was completed early in 1974, and the analysis made has been reported elsewhere

(Blanshan, 1975). One major conclusion of the research was that significant long-run hospital organizational changes could not be understood apart from the larger community context.

Thus, by early 1974, DRC had moved into a second phase in its examination of hospitals and EMS in disasters. After years of rather random impressionistic observations and isolated case studies, we had moved to more systematic data gathering on complexes of hospitals in communities and at least one field study of the overall hospital response in one community in an actual disaster.

However, there were some limitations even in this second phase of our research. We were able to find out very little about EMS rendered outside of the hospitals, and we never really examined the overall medical care response outside of Wilkes-Barre in the surrounding area. Also, for a variety of reasons, the flood situation did not create as many casualties as most other kinds of disasters do, and there was never any major influx of victims into hospitals. In addition, since the research was undertaken as a "tag along" study secondary to other higher priority studies, the field instruments used did not receive the kind of pre-testing they should have undergone. Thus, while the Wilkes-Barre study is probably, even at present, the most systematic overall examination of hospital responses ever undertaken by social scientists in any given disaster, the work was short of the kind of systematic, comparative and analytical research that would be ideal.

A very good opportunity for such a kind of study presented itself when a series of tornadoes hit the Louisville, Kentucky, Cincinnati, Ohio, and Xenia-Dayton, Ohio area on April 3, 1974, killing hundreds and injuring thousands. It had been our hope to make an intensive and extensive study of the hospital responses and the delivery of EMS in these three areas. The focus was to have been on the problems encountered, the solutions attempted, the lessons learned and what pre-disaster factors, as well as trans-disaster circumstances, affected the offering and delivery of medical treatment during these large-scale community emergencies. The intent was to make a systematic, comparative examination of the health care system responses in the three major metropolitan areas involved. The end object was to have been a description and analysis of what occurred in each system, the developing of a theoretical model explaining those occurrences, and a drawing of practical implications applicable to hospital and EMS planning. While funding for the projected work was never obtained, the exercise in developing a research proposal was very useful in designing the eventual study reported in this monograph.

DRC, on its own, did undertake two exploratory field trips each in the Louisville and Cincinnati areas, focusing on such problems as inter-hospital relationships, factors affecting the differential mobilization and involvement of hospitals in the overall responses, and general problems of emergency rooms given large increases in demands for services. It was observed, for example, that, despite an intricate radio network between hospitals in Cincinnati, two of them were not able to divert victims away from other hospitals when an attempt was made to stop patient inflow. Communication was never really adequately developed with other emergency organizations in the area, leaving the health care system uncertain what the overall demands would be on their

facilities. The telephone call-up system for staff members specified in disaster plans broke down completely in some cases, and it was discovered hospital emergency plans did not take into account what should be done with routine visitors massed in the building during regular visiting hours when the possibility of the hospital itself becoming impacted appeared.

Unlike Cincinnati, the medical care components in the Louisville area were not linked together in a functionally significant way. Thus, the overall medical response was not integrated among the hospitals involved or between the hospitals and other emergency organizations. One key hospital, for instance, tried for hours to communicate with the local civil defense office to obtain an overall picture of the situation and to see if they could offer assistance elsewhere. Two independent and seemingly unnecessary efforts were initiated to provide EMS in temporary field operations. Public misinformation about the closing down of one hospital circulated for hours before the erroneous announcement by mass media could be corrected.

In the Xenia-Dayton area, a typical range of problems surfaced. For example, there was a maldistribution of victims to hospitals, a seemingly unnecessary discharge of non-disaster-related patients from some hospitals, the absence of key and superficial medical treatment, an uncoordinated and confused effort to establish a number of first aid stations, disagreements between organizations over providing EMS in shelters, the giving of EMS by probably not fully qualified or trained medical personnel, a total neglect of possible preventive mental health activities right after impact (5), the un-called for dispatching of a mobile field hospital which never located anywhere, a general lack of information by most hospitals about demands on their emergency services that could have been anticipated, and so on through the usual range of difficulties that appear at times of disasters.

On the other hand, there were some positive aspects about the response and the giving of EMS. For example, there was the very quick activation of disaster plans and the mobilization of personnel by many hospitals, the quick communication link established as a result of prior planning in the impacted area, the seeming effective use of helicopters to transport victims, the good training manifested by some para-medical and rescue unit personnel manning ambulances, the fairly adequate compilation of lists of where patients in distant hospitals had been sent, and the handling of a massive number of victims by the local 173 bed hospital in Xenia that treated and released at least 468 victims and admitted 34 others in the first 12 hours and treated more than 250 and admitted 9 others in the ensuing 18-hour period. (6)

As noted, through time, DRC expanded its research into the emergency medical care area in disasters. We went from a focus on single hospitals to looking at the complex of hospitals involved in impacted communities. The range of our coverage was expanded from primarily intrahospital response to an inclusion of other components involved in the delivery of EMS, such as ambulance services. We moved from a concentration of the immediate trans-impact period to a broader look at pre- and post-impact conditions as they affected EMS. Finally, we prepared to conduct a three-system comparative study, since it seemed the next logical research step. While this projected research could not be undertaken, the work preparing for and gathering some preliminary data

did provide the core for what we eventually did and report on in this monograph, i.e., the start by DRC in 1975 of a systematic and comparative study of the delivery of EMS in relatively large-scale, sudden mass casualty-producing situations in the United States. Our focus was on an examination of most such events which occurred in the country over a 22-month period. In addition to studying actual disasters, we conducted more limited studies on pre-planned events with high mass casualty potentials, such as the 1976 Bicentennial Celebrations or the Mardi Gras, as well as on the disaster EMS planning and everyday operations in some disaster-prone American communities.

DRC Research Objectives in This Study

This new research, using our earlier work as an initial base for developing a research design, sought answers to three basic questions.

1. What are the characteristics of the EMS delivered in disasters?

Through this question, we aimed to find out and to describe the relevant features and patterns of the medical and supporting services delivered in mass emergencies. What, where, how, why, for whom and by whom are EMS provided in times of disasters?

2. What are the conditions associated with the providing of EMS in disasters?

This question was intended to identify the general factors or circumstances, internal and/or external to the EMS sector, which could account for what happened in the planning for and the providing of disaster EMS. What kinds of pre-and post-disaster elements affect disaster EMS?

3. What are the consequences of the delivery of EMS in disasters?

We posed this question to ascertain the nature of the manifest or latent learning that occurs as a result of attempts to provide disaster EMS. Do actual disaster experiences have effects on the community medical care sectors involved?

These were the three basic questions that initiated our study. As in all research, however, they became more refined in the process of the conceptual and theoretical developments which precede any data gathering. The end product of this development is the subject of the next chapter.

Our overall goal was to arrive at an empirically grounded description of the typical and atypical characteristics of EMS response in actual and potential disasters, and also to advance an analytical explanation of the factors or conditions responsible for what occurred, and what, if any, effects or consequences there tended to be for the EMS sector in impacted communities.

Footnotes

1. For other DRC analyses and discussions of the research literature, see Worth and Stroup (1977) and Reynolds (1977).
2. This is discussed in the next chapter.
3. For recent summaries of the work done in the disaster area by social and behavioral scientists, see Miletic, Drabek and Haas (1975), Quarantelli and Dynes (1977) and the book edited by Quarantelli (1977). Recent research findings in the area are reported regularly in two professional journals, Mass Emergencies: An International Journal of Theory, Planning and Practice, by Elsevier Press, and Disasters: The International Journal of Disaster Studies and Practice, published by Pergamon Press.
4. For work done by DRC, see, in addition to the above sources, the American Behavioral Scientist issues, edited by Quarantelli and Dynes (1970), and Dynes and Quarantelli (1973), as well as the planning manual prepared by Dynes, Quarantelli and Kreps (1972), and the annotated bibliography compiled by Quarantelli (1976).
5. This is discussed at length in Taylor, Ross and Quarantelli (1976).
6. For a description and analysis of the activities of this hospital, see Blanshan and Daughtery (forthcoming).

III.

THEORETICAL AND CONCEPTUAL FRAMEWORK

In this chapter, we set forth the theoretical and conceptual framework used in our study. First, we discuss the rationale for using an open systems perspective, or theoretical framework, then follow with a section on the specific concepts employed to describe and analyze the key dimensions of the EMS systems empirically examined. A graphic depiction of the theoretical and conceptual framework which guided our data gathering and analysis concludes the chapter.

Rationale

There are several possible points of attack on the problem of the delivery of EMS in disasters. (1) Our preference, as already expressed regarding the study we had projected for the research on EMS delivery in the three areas hit in the April, 1974, tornadoes, was to start with the notion that the delivery of EMS involved the response of a medical care system. Our research initially assumed that, since the overall task of providing EMS in disaster situations requires the coordinated work of many organizations, groups and individuals, the delivery of emergency medical care in mass casualty events could be viewed as the response of one particular kind of system, namely, an open system. According to this perspective, all groups involved in the various phases of victim care in disasters are seen as interfacing and acting in a more or less integrated fashion to deliver EMS, with the activities involved being affected by the social environment or larger social context in which they occur.

There are a number of reasons why we used a general systems theoretical framework. For one, it had proved useful in many other areas of disaster response studied by DRC, and it was also suggested by observations made in our earlier studies of hospital responses. Thus, this perspective paralleled the approach used by DRC in the study of other aspects of community disaster response, i.e., the reaction of the set or organizations collectively termed the "political system." The response of isolated governmental entities at the local community level cannot be understood apart from their relationship to same-level and higher level political entities. Similarly, our prior research on hospitals suggested that the overall efficiency and effectiveness in the handling of medical casualties in a disaster depended on how well the local medical care system responded as a whole. It was less dependent on how well individual hospitals were prepared for casualties than how capable the medical care system as a whole in the community was in preventing a disproportionate distribution of large masses of casualties in only two or three hospitals within the local system. The relationship between the different subunits of the system, which is a system characteristic, was what made the difference, or at least we could so hypothesize. Thus, the earlier DRC work pushed us in the direction of viewing EMS in disasters as being delivered by one of a set of community systems that could become active in the pre-impact, or Time One, and the post-impact, or Time Two, disaster setting.

Use of imagery from the general system's perspective required that we pay the closest attention not to the structure or functioning of specific and official EMS system subunits, such as particular hospitals, but that we look at the overall structure and functions involved in the delivery of EMS as a whole.

This suggests that it would be more useful for us to establish the configuration of all those involved in the providing of disaster EMS, rather than to identify only the formally designated EMS subunits, such as the hospitals. Put another way, a system perspective forced us to look at all those entities that stood in some actual relationship to one another in providing EMS, whether or not this relationship was an intended or an official one. The cluster of relationships, or linkages, between units is what is crucial in a system perspective, not how it got to be that way.

An open systems imagery was also reinforced by earlier DRC work. It is sometimes rather difficult to understand the behavior of given organizations in a system unless the environment or larger context of the system is taken into account. A parallel can again be drawn to other DRC studies. Variation in delivery of warning messages of disaster threats to the general public is, to a considerable extent, a function of the larger context provided in warning, but it is almost always variations in the larger one, the mass media, that account for variation in the delivery of warning messages. Studies focused on the more "obvious" system, since it initially issues warnings -- the organizations of the National Weather Service--would miss accounting for most of the actual variations in the delivery of warning messages (see McLuckie, 1970). The environmental context of the system involved sometimes is a very crucial aspect that needs to be examined in order to understand the services delivered.

Thus, we were inclined, when we initiated our study, to assume that to understand the EMS response, we needed to take into account the external setting as well as the internal factors affecting the involvement of components of the EMS system. In fact, adoption of the notion of open systems implies that explanation of the functioning and dynamics of the system is to be sought primarily in the environment or social context in which the interrelated organizations operate. To a great extent, this means looking at interorganizational relationships, especially between units from different systems. This suggests that it is more useful to look at, for instance, the dynamics of the relationship between the existing EMS system and other emergency organizations in the community than to focus upon, for example, the structural properties of a single subunit, such as the degree of centralization of authority in a hospital. This general view is supported by the earlier DRC research which obtained information on the structure and functioning of hospitals--especially their emergency rooms--under both everyday and disaster conditions. More in-depth studies were later made of the providing of medical care in the wake of major disasters such as the Wilkes-Barre flood and the 1974 wave of tornadoes in Ohio and Kentucky. The work undertaken showed that the internal workings of hospitals during disasters could not be fully understood without taking into account the larger social context which affected the location and transportation of victims and their entry into the community medical care complex.

Finally, the notion of approaching the delivery of EMS as a system response was congruent with the perspective that has developed in the medical care area itself. The label of system is somewhat differently applied. Thus, Gibson (1972) visualizes the emergency medical services in ordinary times as forming

a social system within the wider health care system. Georgopoulos (1972:10) suggests treating the hospital as a complex and problem-solving social system. Howland talks of the "community health-system model" (1970:11). Webb (1969) discusses the "emergency medical care system." And Scott notes that "movement from closed to open system models now occurring in the parent discipline of organization theory has yet to make its impact on the analysis of hospital organization with full force, but there is little doubt that it will during the next decade" (1972:142). This seemingly growing use of a system approach in the health care area is, of course, a part of the more general trend, whether in the biological sciences (see Miller, 1965) or the social sciences (2) (see Buckley, 1967; Gross, 1967) to conceptualize their basic phenomenon in systemic terms. But, while there may not yet be full consensus, the notion of looking at the delivery of health services as something being provided by a "system" had attained very wide currency in the health care disciplines in the mid-1970's. Perhaps most indicative of all of the standing of the term was the fact, as indicated earlier, that the EMS law itself in title and in substance explicitly and consistently talks of the development of system.

Three additional points need to be noted regarding our theoretical approach to the problem of our study. First, the open systems perspective was used as a framework and not to derive a set of specific hypotheses to be tested. (3) The framework indicated what should be looked at in our data gathering efforts and suggested what conditional variables or dimensions might be important in data analysis aimed at explaining the observed characteristics of the EMS planning or response in mass emergencies. As such, our theoretical framework was more of a guide for identifying and explaining phenomena than it was a set of propositions that could be either empirically denied or supported.

Given the lack of sheer factual knowledge about disaster-related EMS before our study, this theoretical stance represented a significant advance over anything previously attempted. As indicated earlier, EMS research had failed to contribute even good detailed descriptions of the social processes and behaviors that take place within the everyday EMS system, let alone how these may alter in time of disaster, and, understandably, even less what might account for the changes. As also noted before, despite a burgeoning EMS literature, methodical research of a comparative nature on the functioning of hospitals, related EMS groups, and the overall effort to provide EMS in disasters and other mass casualty situations, had never been attempted before we set up our study. In other words, as of 1975, there had not been a single study on any EMS system response as a system in any disaster. Our research, by its very employment of an open systems perspective, was to change this.

Second, for purposes of gathering data on preparations for and actual delivery of EMS in disaster situations, we initially proceeded as if there were an existing EMS system in place in the localities studied. However, the existence of a system was not taken as given but treated as problematical in every individual particular case we examined. That is, while we approached

every event and situation studied with the guiding notion that there might be a functioning system, its actual existence and the form it took was not a matter of theoretical predetermination, but what the empirical data showed after we looked at the phenomena.

As we shall detail later, we found only a few fully developed EMS systems, more instances of community organization in the medical care area that seemed to have the form of complex networks rather than clear-cut systems, and some cases of mostly separately existing, non-linked, and basically independent emergency health groups within the same geographical area. However, it proved easier to see this by working with the conception that ideal type EMS systems existed in the localities studied and noting then how far short that which prevailed was compared with the ideal.

Third, we did not automatically assume that the EMS delivered in disasters was necessarily provided by the formal or established EMS system. We also left as a matter of empirical determination the nature of the social organization operating at times of mass emergencies. This is contrary to what is frequently assumed in the EMS literature. For example, Safar states that "disaster medical care is now considered merely a preplanned (and usually surprisingly well improvised extension of everyday emergency medical services", 1974:15). This is but an explicit statement of the very widespread view that disaster EMS is primarily an extension of everyday EMS. The system perspective we adopted in our research did not assume this was necessarily the case; in fact, by failing to openly take the widely and commonly held position, it implicitly suggested that the opposite might be true. As it was, the more we proceeded in our research, the more we expected and the more we found a discontinuity between everyday EMS and disaster EMS, a point which we shall discuss in more detail later.

Key Dimensions

The key to the open systems approach lies in the specific concepts it uses to describe and analyze the processes and behaviors of systems. These processes and behaviors can be visualized along a variety of different dimensions. Of necessity, this includes conceptualizations regarding the characteristics, the conditions and the consequences of the phenomena. For our research purposes, an EMS open system can be envisioned as (a) a set of social units or components, (b) carrying out some complex of activities or tasks in a (c) more or less coordinated or integrated fashion. Such a system being open is influenced by factors (a) within and/or (b) outside the system, but the latter conditions are more likely to be important than the former. Finally, there may be both (a) direct and (b) indirect effects as a result of the operations of the EMS system at a time of disaster. The various concepts we used to capture these different dimensions will now be discussed.

A. Characteristics

In employing the open systems perspective to describe the characteristics of the social system that provided EMS care in the situations studied, we

used three major concepts: (a) components; (b) task areas; and (c) modes of integration.

To speak of a system is to suggest a set of units or elements that are actively interrelated and that operate, in some sense, as a bounded entity, i.e., there is some kind of boundary, however vague. Thus, in looking at the EMS area, the components are the parts or subunits primarily involved in the delivery of EMS, that is, the organizations or groups comprising the system. During Time One, or in a pre-impact period, the officially related, formal units constitute the day-to-day or established EMS system. In Time Two, or the post-impact period, the components again are the groups involved in the delivery of disaster EMS; however, they may not be the same organizations that make up the established EMS system. To the extent that the configuration of components in Time Two is different from the constellation of formal components in Time One, there is an emergent rather than established EMS system. Such a conceptualization proved useful for descriptive and analytical purposes in other DRC work, especially research on the delivery of mental health services in disasters (see Taylor, Ross and Quarantelli, 1976), and therefore we used it in our study of EMS.

All systems undertake activities to carry out specific objectives or goals (Levine and White, 1961; Dynes, Quarantelli and Kreps, 1972). Thus, the EMS system can be seen as undertaking certain tasks in an effort to provide EMS. Task areas specify what is done for whom, the activities engaged in by the components of the system for the recipients of its services. So the delivery of EMS in disasters can be best conceptualized as involving a number of separate but interrelated sub-tasks that together comprise the complex core of activities involved in rendering emergency medical care. These major sub-tasks are: (1) search and rescue; (2) transportation; and (3) treatment.

The phrase "search and rescue" has reference to the hunting for and the finding of disaster victims who seem to require medical aid. As we shall see later, this is a sub-task that in disasters often falls outside of the operations of the established EMS system. "Transportation" refers to the taking of disaster victims to a specific locale, usually a hospital, for regular medical treatment. The transporting of victims, as we will observe later, is not always undertaken by established EMS components; in fact, sometimes this task area is handled almost exclusively by non-medical personnel, often partly by civilians, as compared to emergency organization personnel. "Treatment" refers to the medical care received by victims and is, at times, carried out by non-medically trained personnel.

Part of the reason for, at this point in the monograph, even hinting at our later findings regarding tasks is to stress that our conceptual tools merely indicated what should be looked at and did not suggest the nature of the findings. Thus, we wanted to ascertain who carried out certain necessary EMS tasks and, therefore, we studied what groups and organizations actually performed the tasks. Whether these components were part of an established EMS system or involved new elements of an emergent EMS system was a matter of empirical determination, not of conceptual definition. Put another way, in looking at tasks, we studied whoever carried out relevant activities at

times of disasters and not just the established components that might be thought to have the major responsibility for the tasks. In this respect, our study of EMS was operationalized more around the concept of tasks than it was around the concept of components. (4)

A system, by definition, implies some sort of linking relationship among the parts or pieces. Thus, our approach to EMS systems on this point was that there were modes of integration, a relationship between the component parts of the system. We sought to determine the nature and extent of the integration binding the components comprising the responding EMS system. This required us to look at the degree of interdependence or coordination exercised by the set of system components interacting to provide emergency medical care. It forced us to identify whether the control and communication structures of the operating EMS system was formal or informal and to establish the extent to which such structures produced a centralized or decentralized response in the course of the system components carrying out overall goals or objectives of providing disaster EMS.

Our overall conception was that if we were able to obtain information on the components, the tasks, and the modes of integration involved in the planning for or the providing of disaster EMS, we should be able to describe the characteristics of the potential or actual responding EMS system. If we were able to depict the relevant units, activities and kinds of relationships prevalent in a Time One period in a community, we would be describing the established EMS system. On the other hand, to describe the characteristics of the Time Two, or emergent, EMS system which comes into being to respond to a particular mass casualty event meant we were identifying the social units that, integrated in some way, carried out the major sub-tasks of search and rescue, transportation and treatment in attempting to meet the overall goal of providing disaster EMS. The two systems just depicted are, of course, not the same; the latter is not merely an extension of the former. At least our research took the view that there would be a difference.

Our view about what we would find with respect to the delivery of EMS in disasters was heavily influenced by an earlier DRC study on the providing of mental health services in disasters. In this earlier study, we found the established mental health system was superseded after the disaster by an emergent mental health system (Taylor, 1976). Therefore, when our research of EMS was launched, the most general hypothesis guiding our data gathering was that there was going to be a difference in the operative EMS systems in Time One and Time Two. We hypothesized that an emergent system, i.e., a social system with new and different interacting components, would come into being to provide medical care to disaster victims. Therefore, establishing what set of components constituted the system that carried out the overall tasks of disaster EMS and how they were integrated with one another became an empirical question to be examined in each disaster we studied.

B. Conditions

An analysis of the conditions for any social phenomena rests on two questions: (1) What is it that is being explained, and (2) What prior set of phenomena account for what is to be explained? The first, in technical terms, is the explananda and the second is explanantia (Wallace, 1969: 3). The fundamental requirement of explanation is to show a link between the explananda and the explanantia, or between two sets of behavioral phenomena.

The explananda in our study, that which has to be explained, is of course, as indicated above, the characteristics of the emergent EMS system at times of disasters. That is, we need to account for the change in components, tasks areas and modes of integration from Time One to Time Two. Why do particular characteristics generally emerge rather than other possible ones?

The search for the "causes" of any social phenomena is an exercise in mysticism and fails to recognize that "casuality is a property of theoretical systems rather than of the world" (Mullins, 1974: 4). Nevertheless, it is not amiss to attempt to seek out those prior sets of conditions that are associated or correlated with some later kind of social behavior, as long as it is recognized that the order found in any social phenomena is ultimately imposed on it by the conceptual apparatus through which it is viewed (Taylor, Ross and Quarantelli, 1976: 198).

Such an analysis of the explanantia could take many forms. However, in view of the relatively exploratory nature of our research, the formulation we used is a relatively simple one. (5) An open system perspective assumes that the behavior of any open system is the result of not only internal system processes but external dynamics as well. In fact, the latter is generally viewed as more important. Open systems do not function in isolation. They are embedded in a much larger social setting or environment that consists of physical elements, culture, other organizations or systems. That the behavior of any open system cannot be understood unless it is considered within the context of its environment has been well documented (Buckley, 1967, 1968; Warren, 1967).

Since the disaster has the potential of significantly altering both internal system processes and the external environmental factors impinging on the system, the conditions, or circumstances, that account for the kind of EMS system emerging in mass casualty situations can be seen as originating either from within or outside the boundaries of the normal, everyday EMS system. Thus, the EMS system that evolves to provide disaster services can be viewed as being the result of both: (1) pre-impact internal conditions -- i.e., factors preceding the disaster; and (2) post-impact conditions that become operative as a direct result of the disaster event. (6)

Among the pre-impact internal conditions we conceptualized as being important were: (a) system resources, and (b) system relationships. These are not the only factors that can be operative, but these were the ones which seemed significant to examine, given the role they played in other situations examined by DRC. Among the post-impact conditions that we conceptualized as important were: (a) the difficulties in carrying out needs assessments after impact; (b) the

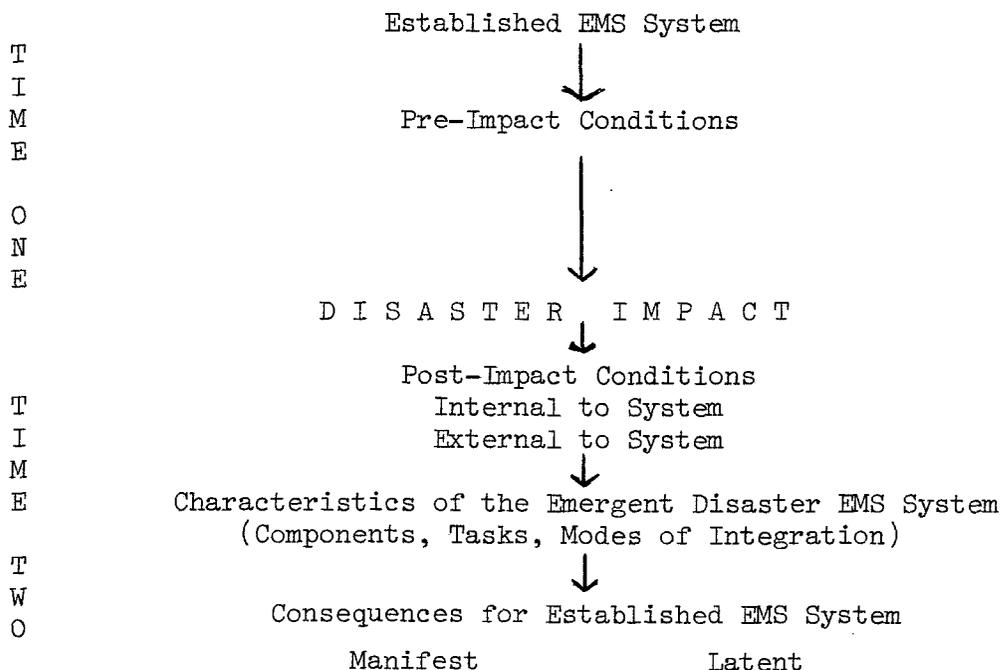
limitations of the established EMS system in organizing the EMS response; (c) the socio-cultural values which stress speed in response; (d) external agent generated factors, i.e., those related directly to the disaster agent itself; and (e) response generated factors, i.e., those related directly to the social response itself to the disaster. This latter distinction between agent and response generated conditions is a conceptual distinction which has proved powerful in an analytical sense in other DRC studies (Dynes, Quarantelli and Kreps, 1972: 9-13).

C. Consequences

Finally, the consequences of the delivery of EMS in mass casualty situations were examined to determine whether the established EMS system was in any way affected as a result of having experienced a disaster. More specifically, our study sought to ascertain whether there were any: (1) manifest effects--consequences for other system characteristics or processes not directly related to disaster preparations or response, such as changes in the relationships between system components.

Data Gathering and Analysis Framework

The theoretical and conceptual framework which guided our data gathering and analysis can be graphically depicted as follows:



FOOTNOTES

1. The more general question, of course, is how to approach the providing of any services in a disaster. For a discussion of how the delivery mental health services in disasters can be analyzed, see Taylor (1976).
2. See Buckley (1968) and Katz (1971) for expositions of theoretical frameworks and models in the social sciences, with particular emphasis on "system" notions.
3. Some of the ideas from our theoretical perspective were used as guiding hypotheses to develop our research design. However, it would be misleading to imply that we devised specific propositions prior to initiating our data gathering or simply set out, in a deductive way, to test them as hypotheses. Our procedure was much more in line with that advocated by Glaser and Strauss (1967) in The Discovery of Grounded Theory.
4. For example, while we typically made an initial reconnaissance of all general hospitals in the community around the disaster site, no follow-up studies were made of those hospitals only minimally or not directly involved in the disaster EMS response.
5. For how complex an analysis of the conditions associated with delivery systems can be, see Taylor, Ross and Quarantelli (1976).
6. Later in the monograph, for expositional purposes, we discuss disaster-specific activities in between our discussion of pre-and post-disaster conditions.

IV.

STUDY DESIGN AND ANALYSIS

In this chapter, we discuss three important aspects of our study design and analysis: first, the kind of data required for our research objectives; then the nature and quantity of the data we actually gathered; finally, the kind of data analyses that were undertaken.

Data Requirements

Apart from some re-examination of already gathered DRC material on hospitals and EMS in mass emergencies, (1) the major focus of our research was on the obtaining of new data on the delivery of EMS in disasters. The combination of our need for comparative data on sudden mass casualty-producing events, together with our use of an inter-organizational, open-systems theoretical perspective, dictated a distinctive field research strategy. Essentially, four things were required.

1. Since the general theoretical framework was that of a system, it was necessary that we conduct a series of studies and not just an isolated case study here and there, however in-depth the examination. What had to be understood was not the historical happenings in one community but the common elements in a number of different health care systems and their deliveries of EMS in different disasters. A series of studies in different contexts was necessary. Moving away from the isolated and single case study would also make it easier to reach a definitive answer regarding the question of whether disaster EMS and everyday EMS are different in degree (which is often taken as a given) or whether the difference is one of kind (as we posited). With a series of intensive and extensive studies, it would also be possible to make a comparative analysis of different kinds of conditions responsible for different characteristics of EMS delivered in disasters. Knowing the conditions and characteristics in given systems, it would then be possible to trace the consequences. Thus, we would be able to go beyond descriptive and only cross-sectional pictures of different system responses to particular disasters and to advance an analysis of the general dynamics of health care system responses to different kinds of general stress situations as presented by catastrophes and collective stress situations.

Our research objective was to arrive at generalizations about EMS in disasters rather than to describe particular or unique aspects of mass casualty-producing events, thus we examined a large number and wide variety of cases with some variability, both as to disaster agent and EMS system characteristics. This variability was dictated by the events that happened rather than by any sampling procedure. That is, we simply took, as an event to study, almost every actual mass casualty incident in the United States over a 22-month period that involved more than two or three dozen victims. (2) Thus, difficulties inherent in sampling events were circumvented.

Our choice of possible mass casualty situations and everyday EMS system operations could not be as straightforward. Instances of the latter were picked primarily on the basis of their seeming high potential for disasters because of the number of people involved. For example, when it was forecast

that millions of people would assemble, both in Washington and Philadelphia, to attend Bicentennial Celebrations around the Fourth of July, the situations became candidates for us to study. Also, since both of these situations had no historical precedent, we thought it wise to look also at massive gatherings with some prior history, such as the Kentucky Derby in Louisville, Kentucky, and the Mardi Gras in New Orleans, Louisiana. Selection of everyday EMS systems for study was guided by rather practical considerations. Large communities known to be vulnerable to a variety of disaster agents and whose EMS systems were at various stages of development were chosen. We were, of course, limited in picking both potential high mass casualty-producing situations and everyday EMS systems by the need to conserve our resources to study actual disaster events, the number of which could not be known before the expiration of the 22-month time period in which field work was undertaken.(3)

2. Since our focus was on studying the responses of the disaster EMS system as a whole, we had to obtain information about the structure and functioning of all groups and organizations involved in the handling of disaster victims. As to EMS system components, even before launching any field work, we had decided to include automatically in every disaster event we studied all general hospitals in the community, as well as all public or private ambulance services in the area. Identifying and contacting these organizations proved relatively easy in practice. Any field operational problem of where to draw a line as to the inclusion of any group for study was eased considerably by our early discovery that an initial series of phone calls to all potentially involved hospitals or ambulance services usually allowed a quick screening and locating of which had been involved in disaster EMS. Field operations were also considerably facilitated, as will be discussed later when we set forth our empirical findings, by the fact that almost always only a very small handful of local hospitals ever got involved in the delivery of EMS in the disaster studied. The actual involvement of ambulance services was more complex, but almost always DRC was able to establish a fairly clear picture of their activities with respect to EMS.

The identifying and locating of all other groups besides hospitals and ambulance services in the giving of EMS in a disaster was a far more complicated matter. The specific groups or agencies that would be involved varied somewhat from disaster to disaster, but, from our research viewpoint, necessarily included all those fairly directly participating in searching for victims, transporting casualties and giving first aid. Organizations that tended to undertake such activities included police and fire departments (subcomponents other than their ambulance services), sherrifs' departments, the State Highway Patrol, the National Guard and other military units, formal search and rescue groups, the coroner's office, the local civil defense agency, and the local Red Cross chapter. In the main, DRC concentrated on such of the groups as were early responders, especially at the disaster site, and all who were heavily involved in whatever the disaster EMS tasks were in the particular incident being studied.

Within the various groups we contacted, care had to be taken that the different knowledge and perspectives about the EMS activities undertaken were tapped and that, in particular, we avoid obtaining only the "official" agency position about the EMS response.

Therefore, research instruments were prepared and used for in-depth semi-structured interviews with: policy, operations and other line and staff personnel, such as organization and medical disaster planners; providers of ambulance and other transportation services; dispatchers, radio operators and other EMS communicators; hospital administrators, physicians, nurses, and other medical staff; EMS technicians, and security officers, public safety and other emergency organization officials. We avoided strictly random sampling of such personnel, since such randomness would have made it impossible to study interaction chains, communications about decisions and policies, or interorganizational relationships. Instead, we picked our respondents and informants on the basis of their involvement in the EMS activities and the relevance of their positions, as indicated by our research objectives. A "snowball" technique of tracing possible interviewees was often used.

Persons chosen for interviewing were sometimes treated as respondents, sometimes as informants. Following a fairly well-established distinction in the interviewing literature (Dexter, 1970), persons are treated as informants when they are interviewed to obtain information about their organizations or groups or their observations of other groups and organizations; persons are treated as respondents when they are asked about their own behaviors and actions in a situation. To the extent that our research interest was in organizations as part of an EMS system, rather than in the personal behavior of specific individuals, a majority of the individuals we interviewed were treated as informants. However, to the extent that we were interested in the dynamics of certain events, we did approach some of our interviewees as respondents.(4)

In the potential high mass casualty situations and in our studies of everyday EMS operations, the same general field research thrust was employed. That is, we focused on the components of the established EMS systems and their tasks and modes of integration with other units, as well as on trying to ascertain some of the conditions that accounted for the characteristics of the system we were examining. There was selectivity as to what we chose to study by way of groups and organizational personnel. However, while the choice in disaster situations was dictated by actual involvement in the disaster EMS, the selection in these other non-disaster instances was guided by what was indicated in disaster plans or other relevant considerations.

3. Since our interest was in general patterns rather than in historical aspects of particular mass emergencies, comparable data had to be gathered. This was accomplished by: asking similar questions of certain job incumbents in every event studied; and using checklists to insure that the same documentary material and statistical information were obtained for disaster and normal EMS operations.

The interview guide used in our field work (see the Appendices to this monograph for a copy) was intended to tap comparable major dimensions for which we felt we required data. As can be seen from the guide, we asked questions which tapped system and behavioral dimensions in the events we examined. A consequence was that, in practically all the disaster events covered, it was possible to reconstruct how the vast majority of casualties who reached hospitals were found, transported and treated in the process of being given EMS. Concurrently, standard information was routinely obtained about such matters as overall community disaster plans, interorganizational linkages, agency experiences with mass emergencies and other factors that might affect the effectiveness and efficiency of EMS responses in mass emergencies. Overall, we aimed at obtaining a quantity and a quality of data that would be such as to allow, in the final analytical phase of the study, a significant examination of the applicability of the open systems perspective to the delivery of EMS in disasters.

The choice of our questions in our interview guide was dictated mostly by our theoretical notions, as set forth in the previous chapter. However, what we asked was also partly influenced by what we knew prior to the EMS study about what we might find in a mass emergency. For example, much of the literature in the EMS area makes assumptions that are either unwarranted or meaningless in a mass disaster context. For example, under everyday circumstances, the time it takes patients to receive EMS treatment can be taken as a partial measure of the effectiveness of the EMS operation. Such a measure is, however, relatively inapplicable in most mass casualty situations because, for reasons specific to disasters and discussed later, the less seriously injured patients will generally arrive at or be brought to hospitals before the more seriously injured victims. Thus, in considering what data should be gathered, we had to set aside certain guiding assumptions about everyday EMS and had to work with what was different in disaster EMS. The new ways of looking at the phenomena required looking for different kinds of information. Consequently, for instance, data regarding process variables, like overlapping service or conflicts among EMS organizations were given higher priority in the study than outcome variables, like morbidity rates. Both kinds of information ideally should be obtained, but without some knowledge of the former, at least according to our theoretical predilections, there can be only sheer speculation about what might be affecting the latter. Overall, then, we sought data on the delivery of EMS in disasters that could be significantly and meaningfully compared across a series of mass casualty events.

4. We thought it important that, whatever the data collected, it should be significant and relevant, rather than that it took one particular form or another. We would have been forced to this position, even if we had not started with it because we were forced to operate in a field with an acceptance of the fact that there was a relative lack of availability of valid data of certain kinds. When we started our research, ideally we could have conjured up all kinds of solid data, especially of a statistical sort, that would be highly pertinent to our research goals. However, earlier DRC studies on hospitals and related health care matters had alerted us to the strong possibility that, along certain lines, particular

information simply was not going to be found. Our new and more systematic EMS research quickly confirmed our worst fears. Early in the study, we found that EMS record keeping, and especially disaster-related EMS record keeping, is either non-existent, incomplete or of a non-standardized nature. Emergency room departments seldom had full records on total number of persons treated, symptoms noted or final diagnoses made, especially during the height of the influx of disaster victims. This meant that it was virtually impossible to use these sources of data in any systematic, quantifiable way.

We tried to compensate for this data problem in several ways. We sometimes reconstructed important informational details through other means. For example, we were sometimes able to ascertain all the vehicular means, ambulances and otherwise, by which victims were brought to hospitals and, from that, were able to estimate how many and when casualties arrived at hospitals, even though these organizations themselves had no good records on the matter. More important, observational data obtained on-site by DRC field personnel became invaluable for obtaining primary data, for assessing the reliability and validity of data obtained by other means, and for gathering information about the reality as opposed to the ideal of EMS delivery in high demand situations. To accomplish this, DRC field coverage was initiated within 24 hours of actual disaster impact; in pre-planned potential mass casualty events, researchers were dispatched to the areas weeks before, as well as during, the events themselves.

Using the criteria discussed above, we carried out field studies in 44 communities spanning 17 states, the District of Columbia, and the U.S. Virgin Islands. Often more than one field trip was made to a community so that full information could be obtained concerning EMS operations in pre-and post-disaster settings. Baseline, or Time One, studies to gain information on EMS disaster planning and normal EMS operations took place in six disaster-prone U.S. communities. There were five on-the-spot studies of potential high mass casualty pre-planned events. Studies of Time Two operations, or the EMS response, occurred in 29 mass casualty incidents. Included in this last category were 11 natural disasters and 18 technological disasters, with disaster agents including tornadoes, floods, dam breaks, transportation accidents, fires and explosions, and toxic leaks. Localities impacted ranged from small towns to major metropolitan areas, and the study caught communities in the full range of EMS development, from those with only the most rudimentary capabilities to those with complex and well-established EMS systems.

A more specific breakdown of the field studies follows:

List of Events Studied

1. Baseline Studies

Omaha, Nebraska, August 18, 1975
 Los Angeles, California, August 20, 1975
 San Francisco, California, August 25, 1975

New Orleans, Louisiana, April 12, 1976
 Louisville, Kentucky, August 18, 1976
 Boston, Massachusetts, May 17, 1976

2. Preplanned Events

Mardi Gras, New Orleans, Louisiana - February 27, 1976
 Kentucky Derby Celebration, Louisville, Kentucky - May 1, 1976
 Bicentennial Celebration, Philadelphia, Pennsylvania - May 25, 1976

Bicentennial Celebration, Washington, D. C. - May 27, 1976
 Mardi Gras, New Orleans, Louisiana - February 18, 1977

3. Actual Disasters (5)

Floods - Wilkes-Barre; June 26, 1972
 Tornado - Xenia, Ohio; April 3, 1974
 Tornado - Canton, Illinois; July 23, 1975

Subway Car Collision - Boston, Massachusetts; August 1, 1975
 Bus Crash - Tiffin, Ohio; August 15, 1975
 Chlorine Gas Explosion - Niagara Falls, New York; December 14, 1975

Explosion - LaGuardia, New York; December 29, 1976
 Multiple Car Pile-Up - Syracuse, New York; January 2, 1976
 Train Crashes - Chicago, Illinois; January 9, 1976

Explosion Fire - Fremont, Nebraska; January 10, 1976
 Nursing Home Fire - Chicago, Illinois; January 30, 1976
 Tornado - Cabot, Arkansas; March 29, 1976

Tornado - Canton, Mississippi; March 30, 1976
 Plane Crash - St. Thomas, Virgin Islands; April 27, 1976
 Ammonia Tanker Explosion - Houston, Texas; May 11, 1976

Flood - Teton Dam, Idaho; June 5, 1976
 Tornado - Lemont, Illinois; June 13, 1976
 Plane Crash - Philadelphia, Pennsylvania; June 23, 1976

Explosion - Queens, New York; November 21, 1976
 Chlorine Gas Threat - Baton Rouge, Louisiana; December 10, 1976
 Train Wreck - Birmingham, Alabama; January 16, 1976

Carbon Monoxide Gas Explosion - Opelika, Alabama; January 28, 1977
 Train Crash - Chicago, Illinois; February 4, 1977
 Tornadoes - Birmingham, Alabama; April 4, 1977

Plane Crash - Atlanta, Georgia; April 5, 1977
 Floods - Southeast West Virginia; April 7, 1977
 Floods - Eastern Kentucky; April 8, 1977

Floods - Western Virginia; April 9, 1977
 Night Club Fire - Southgate, Kentucky; May, 1977

At the completion of the field work, research had taken place in about 200 hospitals and with an equal number of other groups. Approximately 600 formal, mostly tape recorded interviews, were conducted and perhaps twice as many informal contacts were made with personnel of emergency organizations. Extensive documentary data, such as disaster plans, afteraction reports and critiques, emergency department logs, medical statistics, operational manuals, minutes of emergency meetings, organizational charts, communications records, etc., numbering into the hundreds of items, were obtained and hours of direct and indirect field observations were made.

Overall, cooperation with DRC personnel was excellent. Information was obtained from all groups approached, and almost no respondent or informant refused to be interviewed or to provide data by mail or long distance phone call at a later time. Many persons approached volunteered information above and beyond what they were asked. Comments about self and other EMS organizations seemed to be candid and honest. Very few factual inconsistencies showed up in the reports or accounts of different informants or respondents. If there are any problems with the research being reported in this monograph, they do not reside in either the willingness to cooperate or in the time given by those we approached. As indicated earlier, certain data, such as emergency room records at the height of victim flow into the hospital, were incomplete and some even missing; our failure to obtain such information stemmed from reasons other than the assistance we were given in our field operations.

Data Analyses

The substantial amount of data collected during the course of the field work posed some data processing problems. For example, there were hundreds of tape recorded interviews, only a small percentage of which, for budgeting reasons, could be transcribed. The observational data, in turn, often existed only in the rough notes of the DRC field observers. Some of the large number of documents garnered during the study were hundreds of pages in length.

However, some of these problems had been foreseen even before the research started. Consequently, several steps were taken early in the data gathering stage to try to keep data manageable for analytical purposes. For one thing, a brief case study was written up for almost each event and situation studied; only a very few instances of field work were not subjected to such a descriptive analysis. The case study was collectively put together by the field team members who had participated in the field work and was generally done within a week or so after the team returned to DRC. Most case studies were four to five pages in length and provided general background about the event, discussed the nature of the disaster and the community in which it took place, had a section detailing the EMS response, which almost always listed hospital involvement, number of patients received and admitted, etc., provided a number of general, often evaluative observations about EMS activities, and concluded with a statement about the field operations, including a summary about the quantity and quality of field data obtained.

While these case studies were based largely on the preliminary impressions and perceptions of the field team members, they did provide continuous feedback on how well the study design was being implemented and whether the research objectives were being met. Certain changes were made in the DRC field operations as a result of some early impressions derived from the case studies (e.g., the use of the aforementioned phone survey of all hospitals and ambulance services in the disaster impact area so as to narrow the number of organizations that would have to be examined in depth). In addition, there were some relative modifications in emphasis insofar as research objectives were concerned (e.g., greater attention being paid as the work went on to ascertain the characteristics of the EMS system, and less concern expressed with trying to trace the full range of consequences).

Besides the qualitative case study analysis, a major quantitative analysis was also undertaken aimed at ascertaining the more specific characteristics, conditions and consequences associated with disaster EMS. We subjected two dozen of the actual disaster events to a highly systematic analysis. These events were systematically compared with respect to a series of practical and theoretical system variables on which DRC had relatively standardized data.

A coding scheme was used to quantify and analyze such general dimensions as hospital response, transportation response, transportation modes, disaster

site data, non-hospital medical response, previous disaster experience, general community EMS information, history of EMS in the community, centralization and specialization of EMS response, and relevant inter-organizational communications and other linkages. Within each general category, other more specific information was quantified and analyzed. As only one example, key variables influencing hospital responses were coded and quantified. Among these categories were:

Disaster Plan: Existence, activation, termination, etc.

Casualties: Total, nature of injuries, admitted, transfers, DOA's, etc.

Patient Flow: Duration, modes, first arrivals, most serious arrivals, mode of arrivals, numbers arriving by different means, etc.

Hospital Notification: How, content of message, information from disaster site, etc.

Disaster Impact on Hospital: E.G., loss of different utilities, damage to hospital installation, necessity of evacuation, etc.

Adequacy of Resources: Personnel, equipment, supplies, etc.

Change in Hospital Activities: Record keeping, surgery, x-rays, counseling, security, communications, medical diagnoses, etc.

Hospital Characteristics: Relationship to disaster site, location, occupancy rate, categorization, funding source, etc.

Emergency Room Characteristics: Staffing, communications, shifts, etc.

The complete coding scheme is presented in the Appendices to this monograph. Most of the research findings set forth in the next three chapters were derived from this quantitative analysis.

In addition, EMS delivery in disaster-prone communities and pre-planned high mass casualty events were comparatively analyzed to isolate what distinguishes EMS planning and response in these situations from that occurring in actual disaster events. Also examined were special questions or topics such as the effectiveness of the EMS law on disaster-related delivery systems (Worth and Stroup, 1977); problems of needs assessment in EMS delivery (Golec and Gurney, 1977); EMS disaster coordination associated with the distribution of victims; jurisdictional difficulties in providing disaster EMS (Neff, 1977); and the impact of different EMS configurations on disaster responses (Wright, 1977). Additionally, two full case study analyses examined in detail the intrahospital responses in two massive disasters, as already noted in footnote 1 to this chapter.

From the work undertaken with these data requirements, data gathering and data analyses, what did we conclude about the delivery of EMS in disasters? The next three chapters highlight our major conclusions, the empirical findings from our research effort.

FOOTNOTES

1. The results of this re-examination are not generally reported in this monograph, but in other DRC publications by Blanshan (1977) and Blanshan and Daughterty (1978).
2. The other six months of the study were spent in preparing for the field work or in analyzing the data.
3. As it turned out, because the number of actual disaster events over the 22-month period was somewhat less than we had anticipated, we had unexpended funds for field studies, even at the conclusion of the research. With prevision not granted to human researchers, we could have undertaken more studies of potential high mass casualty pre-planned events. In fact, if we were to do the work over, we simply would schedule more studies of pre-planned events because, as we note later, they should be used as the prototypes for research into the delivery of disaster EMS.
4. Actually, since the distinction between informant and respondent rests on what is reported rather than the reporter, the same person could be both an informant and a respondent in the same study. Some of the persons we interviewed, therefore, were both.
5. While both the Xenia tornado and the Wilkes-Barre flood occurred before the start of our specific research on the delivery of EMS in disasters, data on that topic which we had earlier gathered had not been fully analyzed. In our research proposal, we indicated we analyze that earlier data for the later study, and we did do so.

V.

RESEARCH FINDINGS: CHARACTERISTICS OF DISASTER EMS

In this and the following two chapters, we present our major research findings. (1) In this chapter, we discuss the characteristics of disaster EMS. After setting forth some illustrative case studies and a general overview, detailed attention is given to an examination of three key dimensions of EMS disaster characteristics as these were conceptualized earlier: (1) the tasks undertaken in connection with disaster EMS; (2) the components involved; and (3) the modes of integration in the EMS disaster response.

Case Studies and Overview

To describe and analyze the characteristics of the EMS delivered at times of disaster necessitates, for purposes of exposition, a discussion of specific elements or aspects. However, such an approach tends to obscure somewhat the whole, the general picture, or tendencies that may not be the total sum of the parts. Therefore, we will first present three short illustrative case studies of disasters and then report briefly some general formulations before noting our findings about specific aspects of disaster EMS.

The disasters described are neither dramatic, massive catastrophes nor minor, everyday accidents. Instead, they are examples of the more typical kinds of disasters that the average American community is likely to experience. The illustrative material is taken from a mass transportation disaster, a natural disaster and a technological disaster and involve mass casualty-producing events in three different types of community settings. (2)

Case I. Public Transportation Mishap

This incident occurred on the boundary between a major northeastern metropolitan and a smaller university town. The accident involved a rear-end collision among three rapid transit trains in a tunnel during the evening rush hour. There were no deaths as a result of the accident; however, approximately 141 persons suffered injuries in the mishap and were taken to four hospitals within the city. The most extensive injuries were fractures of the extremities and of the skull, but most of the injuries were of a minor nature. Sixteen were admitted to hospitals.

A large volume of equipment and manpower responded to the emergency call. Patrol cars from three police departments, two rescue units from the city fire department, and a unit from the university town fire department were present at the site. In addition, a total of 19 ambulances representing several public, private and volunteer ambulance services responded to the scene of the mishap.

Police and fire department personnel were primarily responsible for rescuing the crash victims, many of whom were not seriously injured but required assistance in making their way to the tunnel entrance. Once the victims were removed or assisted from the tunnel, the more seriously injured were

placed in ambulances or police squad cars and were taken to the nearest hospital (Hospital A), located several blocks from the crash site. There was little evidence of any effort to triage or treat victims at the scene. City fire department emergency medical technicians (EMT's) did manage to administer first aid to the more seriously injured, but, for the most part, victims were simply transported as soon as they emerged from the tunnel entrance. A large number of the crash victims were ambulatory and, once assisted from the wreckage, made their way to nearby Hospital A. Six or seven vehicles, only three of which were ambulances, were used to transport the injured to four area hospitals.

There was no overall coordination of EMS activities at the scene of the incident. Representatives of each of the three police departments present at the scene were unable to agree even after the event which department was responsible for the overall direction of police rescue operations. In addition, there was no one in charge of directing the distribution of victims to the various hospitals in the vicinity.

One result of this lack of coordination was that Hospital A received around 125 victims, the majority of the casualties. This overloading of one hospital was due, in part, to the massive onslaught of ambulatory patients who walked the several blocks to the hospital; however, most of the victims transported by police and ambulance vehicles were also taken to Hospital A. Since the majority of the injuries were minor in nature, the demand placed upon the emergency room was one of volume rather than seriousness. The hospital opened its overnight ward and also used an adjacent clinic building to handle the incoming casualties. Nevertheless, the very fact that many of the injuries were minor also meant that these victims could easily have been transported to one of the other eleven hospitals in the vicinity. Only five of the injured were admitted to Hospital A.

In addition to the lack of coordination at the crash site, a breakdown occurred in the emergency communications network. According to plan, the city hospitals are to be notified of all mass casualty incidents by means of a central radio network---one of three available in the area run by three different agencies. In this particular incident, the notification system failed to function properly. Hospital A's initial awareness of the accident began when the first seven patients arrived at the emergency room entrance. Twelve more patients arrived before official notification was received via the central radio network. Two other area hospitals picked up enough information so that they activated their disaster plans, but they had little knowledge of what was going on at the disaster site or of the overload at Hospital A. Sixteen other hospitals in the city, including some fairly close to the disaster site, never got involved in the EMS response.

Case II. Tornado.

At approximately 5:30 p.m. on a Sunday afternoon, a tornado struck a small unincorporated area next to a small town about a dozen miles away from a major midwestern city. Roughly 240 homes, about three quarters of those in

the area, suffered damage, from minor to total destruction. Three persons were killed, 59 others were eventually taken to three area hospitals, and an unknown number of other persons received treatment at first aid stations. While most of the injuries were minor in nature, there were some fracture cases and a few head and back injuries. Sixteen persons were admitted to a hospital; the remainder were treated and released.

The stricken locality being unincorporated meant that there is no local safety agency with undisputed jurisdiction over all emergency situations. Ostensibly, the county sheriff's department has a legal responsibility to protect life and property in the locality, and the state police are responsible for patrolling the state highways in the area. Fire protection for the unincorporated locality is provided by several nearby fire departments belonging to surrounding small municipalities. The adjacent small town has a volunteer fire group that also provides ambulance service with trained EMT's. There are also several hospitals located in surrounding communities, with the closest being about 10 miles away. Thus, the available emergency resources for the community are adequate but must come from the outside.

On the night of the tornado, the county sheriff's department, the state police, a unit of forest rangers, and officers from four surrounding local police departments responded to the disaster impact call sent out over the statewide police emergency radio network. Fire equipment and ambulances were sent in from ten local volunteer fire departments, only some of which had trained paramedics, and civil defense units from five communities provided additional personnel and equipment. However, there was no order to the dispatching of all these vehicles, since there was no overall disaster planning, no central dispatching point, and no noticeable EMS system.

At the disaster site, confusion prevailed as volunteer ambulances, fire and police vehicles, and civil defense equipment from surrounding areas converged on the disaster site. The small town fire chief attempted to coordinate the dispatch of ambulances with victims, but ambulance personnel apparently transported any victims they were able to locate on their own or to whom they were directed by a police official. However, no real agreement was ever reached on who had the overall responsibility for coordination at the disaster site. After about an hour, a command post with a portable communications unit was set up outside the impacted area by the sheriff's office and the State Highway Patrol. The command post changed locations the first few hours and, subsequently, the State Patrol brought its communications van to the command post. The closest civil defense office had a problem of access to the stricken locality since a crucial bridge was impassible due to tornado damage, but the civil defense units did allocate men and equipment to provide power and light, search and rescue, and aid stations. Initially, search and rescue was handled by the local fire departments, but during the night, they were joined by the State Patrol.

Communications were complicated, involving different sets of agencies and various jurisdictional levels. Furthermore, only the State Patrol had the capability of communicating by radio to other agencies, including hospitals. Some of the volunteer fire departments also had radio contact with ambulances and hospitals, but that was not true of the sheriff's office or civil defense.

Two of the hospitals were notified officially via their hospital-to-ambulance radios that a tornado had touched down, although one already knew as a result of monitoring a weather radio channel. The first tornado victims arrived at the last hospital by private vehicles, which were later followed by ambulances. At least five patients were taken to one hospital because the ambulance drivers were more familiar with it in terms of everyday EMS activities. Personnel at the hospital receiving the majority of casualties were unable to contact any officials at the impact scene who could provide information concerning numbers of casualties. As a result, after activating its disaster plan, the hospital staff prepared for 150 patients but received only 23. The other two hospitals never put their disaster plans into effect.

Case III. Chemical Explosion.

This disaster, involving a railroad tank car which contained a highly volatile chemical liquid, occurred at a chemical plant located in a medium-sized northeastern city. When exposed to air, this liquid is converted into a gas which, if inhaled, produces severe respiratory difficulties. Highly concentrated or prolonged exposure to this gas results in pulmonary edema, congestive heart failure, and death. The explosion occurred on a Sunday evening when the number of employees present at the plant was at a minimum. However, the chemical vapor cloud produced by the explosion affected persons in an area up to three miles from the explosion site before it dissipated.

Four persons were killed in this incident. Though all four were in close proximity to the tank car at the time of the explosion, they died from gas inhalation rather than from the actual blast itself. The vast majority of the approximately 100 persons who suffered some form of injury as a result of the explosion were taken to two area hospitals out of seven available, where they were treated for gas inhalation. Only 25 persons were injured seriously enough to be admitted to a hospital, while the remainder were treated and released.

This case involved a two-location mass casualty incident. The initial explosion occurred within the city limits and was handled by the city EMS agencies; however, the vapor cloud also produced a large number of casualties in the surrounding county that were handled by the county EMS agencies.

Within the city itself, the agencies responding to the explosion included the city police department, the city fire department, and all three of the city's commercial ambulance companies. The city police department was primarily responsible for controlling traffic around the plant area, but was relatively inactive in rescue operations at the site of the incident. The first agency to respond to the scene was the city fire department. In addition to extinguishing a fire ignited by the explosion, fire department personnel administered oxygen to victims awaiting transportation to the hospital.

Transportation of the injured was handled by the three commercial ambulance companies in the city, which, according to normal operating procedures, receive

calls through the city fire department on a rotating basis. In this case, one of these companies did not receive the official call to respond until one hour after the explosion had occurred. However, having heard the initial report of the explosion over the police radio, this company had already dispatched all of its available vehicles to the scene. The three ambulance companies sent a total of seven ambulances to the explosion site. Ambulance personnel established an aid station near one of the plant gates, where, as victims were brought out of the plant, they were given oxygen before being transported to the hospital. Cooperation and coordination of activities among the ambulance personnel was good due to preexisting professional and informal ties among the staff of the three companies. The senior EMT present at the scene was in charge of triage and treatment activities.

All of the the victims from the plant itself and those persons in the immediate vicinity of the plant who were overcome by fumes were taken to the same hospital. This hospital activated its disaster plan and treated a total of 57 persons, 16 of whom were admitted. This hospital had not been notified, nor officially informed of the nature of the incident, nor of the type of gas involved, nor of the number of casualties they might expect to receive. Most of the information the staff did receive came from the victims themselves or through contacts with ambulance personnel during the course of the emergency. The hospital was in a peak emergency situation for approximately three hours.

Twenty minutes after the explosion occurred, the county fire control center received a call for ambulances from a shopping center approximately three miles from the plant. This shopping center was the second site of the mass casualty incident, as persons leaving stores to go to the parking lot were quickly overcome by the gas. Most of the stores in this center were closed; only a food store, a movie theatre and a bowling alley being open at the time. The county fire control center dispatched rescue trucks and ambulances from four volunteer fire companies to the shopping center and alerted two hospitals in the county, only one of which was actually used. The 21 ambulance companies in the county have 33 vehicles.

The county fire control dispatcher was aware of the explosion and the resulting vapor cloud and therefore sent emergency vehicles equipped to handle gas inhalation victims. Victims from the shopping center were taken to a second hospital outside the city, where a total of 38 persons were treated, nine of whom were admitted. The casualties were similar in nature to those within the city, although the respiratory difficulties were generally less severe. While this hospital had been informed by the fire control center that the victims were suffering from gas inhalation, they were not informed of the chemical properties of the gas. Members of the hospital staff recognized the odor of the gas on the victims' clothing, however, and initiated treatment on the basis of their own observations. This hospital's disaster plan was never activated.

Although the EMS agencies in the county were aware of the explosion and emergency situation in the city, the city EMS agencies were generally unaware of the situation in the county. None of the city ambulance personnel had any knowledge of the situation in the county until one of their dispatchers advised

them not to take any victims to the county hospital because it was nearly filled to capacity. After the initial emergency period at the plant was over, the seven city ambulances remained sitting idle at the plant gate for several hours instead of being sent to the county to provide assistance there after the initial emergency period at the plant was over. In addition, there was a lack of ambulance coverage for the remainder of the city during the peak emergency period at the plant, with only one ambulance being in reserve.

In this situation, the lack of a central county-wide communications network—despite six different radio networks for EMS— or an EMS plan meant that the city and county EMS agencies were largely engaged in independent operations. While the county EMS agencies were aware of the problem in the city, representatives of these agencies indicated that they would not respond to a call within the city unless requested to do so. The city EMS agencies and, in particular, the city ambulance companies, would have provided assistance to the county but were largely unaware of the situation. There is no capability in either the city EMS system or the county EMS system for direct hospital-to-hospital or ambulance-to-hospital radio communications.

With these specific descriptive case studies providing some empirical flavoring, we now turn to a more detailed overall analysis of the specific dimensions involved in disaster EMS. In general terms, what stands out about what is done by whom and how, insofar as disaster EMS is concerned? That is, what is generally noteworthy about the EMS-related tasks undertaken by components integrated in some way in post-impact of the Time Two period? This is the general question that the next few pages attempt to answer from our research.

What is done has several distinctive general characteristics. For one, some of the necessary tasks undertaken are related to the very nature of disasters and, thus, are different from what occurs in everyday EMS. Therefore, search and rescue is a disaster task generally initiated immediately after impact in an effort primarily to find all the injured.(3) It almost always entails looking for an unknown number of possible casualties whose specific locations and health status are also unknown. It usually is a large scale but uncoordinated operation undertaken by untrained individuals and groups where EMS personnel, if they participate at all, typically play a minor role. This contrasts sharply with everyday EMS, where, among other things, an ambulance is simply dispatched to a known place for a single individual or a few traffic accident casualties. In the disaster situation, however, it is search and rescue which generates the victims or the prime input into the operative EMS system, whatever it may be.

To the extent that disaster victims are transported as soon and as quickly as possible to a hospital, this differs little from everyday EMS situations in which ambulances are used. But in most disasters there are many more potential patients found in search and rescue than can be transported at once. This implies use of triage, but such sorting and selection occurs only in a minority of instances and not with all casualties. Also, in disasters,

patients are transported to hospitals in a variety of ways, often by untrained civilians, and are not brought in through an established EMS system. Furthermore, in the everyday situation, the arrival of even a very critical patient will not place great stress on a normal hospital emergency room. In contrast, disaster victims, because of the convergence of the numbers transported in, may create great demands on even the best prepared of emergency rooms. The transporting of many potential patients, even if major medical treatment is not eventually actually necessary, is itself a disaster task which creates a different situation than do everyday EMS actions.

In the overwhelming majority of cases, any medical treatment disaster victims get is provided almost exclusively in a permanent hospital setting. In contrast, everyday EMS is sometimes given by individual medical practitioners; at other times, it is delivered in the course of picking up and transporting the stricken person to the hospital, as well as in emergency rooms. But disaster EMS treatment is very rarely the result of the actions of physicians or nurses at a disaster site, except in rare instances of happenstance when medical personnel are at the scene of a disaster as it happens. Even rarer, at least in American society, is medical care delivered from a field hospital or other temporary health facility at or near the disaster site. Thus, medical treatment is generally a disaster task carried out in a hospital. (4)

Standing out even more sharply than the tasks undertaken is the composition of the components involved in delivering disaster EMS. Time One, or pre-impact EMS system components, are seldom the responding system components in disasters. A carryover of the everyday EMS system into the system undertaking relevant tasks at times of mass emergencies occurs rarely, and only under unusual circumstances such as spatial-temporal factors discouraging general public convergence in combination with a well-developed community EMS system which has had realistic and practical disaster planning. Far more frequent is an emergent EMS system that appears in mass casualty situations which may be composed of elements of the everyday EMS (sometimes linked in non-regular ways), plus some other emergency organizations and non-emergency groups within and outside the directly impacted community. In fact, examining the groups and organizations which carry out the complex of tasks comprising the medical response in disasters reveals that in a large majority of the events we studied, the emergent disaster EMS system was different from the pre-impact or established EMS system. Furthermore, as we will discuss later, in some disaster situations, especially in larger communities, the emergent EMS response took more of a network rather than genuine system form.

But whatever organized form the EMS disaster response takes, it is generally not highly coordinated, much less centralized. For coordination between multiple components there has to be substantial and valid communications. However, information flow in the EMS sector during mass emergencies tends to be partial and inadequate. There is almost no feedback among the linked components. Message flow between the organizations involved in the EMS response is usually limited and incomplete. Intragroup communication is often inaccurate and distorted. Thus, the integration of the emergent EMS system in disasters tends to be relatively weak.

Our most general guiding hypothesis when we initiated our study was that there was going to be a difference in the operative EMS systems in Time One and Time Two. This supposition was generally confirmed by our research. Certainly, the components which make up the responding EMS complex are somewhat different from those involved in the established patterns for delivering everyday EMS. There are differences also in necessary tasks undertaken, as compared with everyday EMS, and the integration of the emergent EMS system would appear to differ in some ways from that which prevails in more routine times. Overall, our research shows that a new social system, with different components that relate only with difficulty, often comes into being to carry out disaster-affected EMS tasks.

Disaster Tasks

Search and Rescue (SR).

Our major research conclusion is that there is a widespread tendency for SR activities to be performed by groups and individuals outside the everyday, established EMS system. Our more specific findings about the EMS-relevant aspects of SR were derived from the research we undertook on disasters with the following features. In but four percent of the events studied there were 25 or less injured; in 33 percent of the incidents, there were more than 100 injured. In only one fifth of the situations were there no deaths. Two or more different disaster sites were involved in 29 percent of the events looked at.

1. Almost irrespective of what other organizational personnel are present soon after disaster impact, the more systematic form and greatest amount of SR is performed by members of fire departments. Thus, in 17 out of 27 separate disaster sites where we were able to analyze SR activities, fire personnel took part. Police officers were involved in about a third of the cases, and citizen volunteers somewhat a little less. These figures obscure somewhat the fact that the very first SR is undertaken by the immediately impacted population. This was established a long time ago by disaster research (Marks, et al., 1954). This is important because taking it into account, and accepting that fire personnel carry a major load of the organized SR means that discovery, initial examination and first movement of the injured in disasters is done by persons not normally connected with any EMS system. Some fire personnel in some localities are part of the everyday EMS systems, and some fire officers have had varying degrees of EMS training (5), but it is clear that the injured found in SR operations are typically and usually first handled by persons with little understanding or knowledge about the nature of the injuries, etc.

2. Even when medically trained personnel are among the first responders, they will not usually be in charge of the SR or in control of the disaster site. In almost half, 17 out of 27, of the cases we analyzed, an EMT or someone with medical training was among the very first from an organized group to arrive at the disaster site. However, in only a minority of cases did a medically trained person take any kind of major directive control. In several instances we studied, an EMT assumed initial control but it was almost

by default since he was superseded upon the arrival of a ranking fire or police official. Finer analysis indicated that in only a third of the cases did a medically trained person have a major role in directing SR or exercising site control. In the other two-thirds of the instances, either no one or persons without medical training assumed major responsibility. Thus, apart from the general handling of disaster victims by non-medically trained personnel, there is also the fact that EMS personnel do not typically have much say in what goes on during SR or in the matter of site control.(6)

3. SR initially takes place in loosely structured situations with uncertain exercise of authority. In about half of the cases we studied, there was some organized effort to SR, although at a maximum SR occurred in no more than a third of the cases according to any pre-designated plans. Both of these figures probably overestimate the structuredness of activities and the degree of plan implementation that occurred. Looked at from the other side, in probably the majority of disasters, SR is an emergent response which develops an organized form only as it proceeds. Exercise of authority over SR or disaster sites also tends to be somewhat unclear. Fire or police organizations often seem to assume control implicitly and informally. Furthermore, there is not always agreement on who is in charge of operations at an impacted site. We found three cases where different agencies claimed, after the emergency period was over, that they had exercised sole control over the same SR and disaster site. There is reason to believe that at the time of the emergency, different organizations believed they were the only ones exercising overall control of the situation. All of these observations indicate that at the very end of a possibly long EMS link back to a hospital, in the typical mass emergency there is often no explicit authority or control over SR or disaster site. This fact alone, apart from others of equal importance, means that the input of victims into the EMS system, whatever it may be, cannot be smooth or predictable, at least the way disaster SR is typically handled in contemporary America.

4. There is little communication from the disaster site or the locale of SR to hospitals or any central EMS system point. In less than a third of our cases was there any contact between a disaster location and a hospital or an ambulance. Even when there was communication, there was little of it and it did not seem to contribute to any coordination of the EMS response. Often the communication that exists is not very informative. For example, general information regarding possible total numbers of victims, types and severity of injuries — the kind of information which implies the need for specialized treatment modes — is virtually non-existent. Overall, hospitals receive far more relevant information from arriving victims or ambulance drivers than they do from any direct communication from the SR site. Put another way, meaningful feedback from the disaster site to the responding EMS system or the hospital components is minimal, even when there is any communication at all, which is in the minority of cases. And, of course, if the information is erroneous as in the following example, some communication can be worse than none at all.

Nine minutes after a tornado hit at 3:18 p.m., an ambulance was dispatched to the scene by the communications center of

the EMS. The EMT on the ambulance was told to observe, ask questions and report back. When interviewed, this EMT said, "As you just go around and see, everything had been levelled. I asked a couple of questions of people that were there and in their right senses. I estimated 150 people as being hurt. I radioed in and told them to send everything available---it's a big one."

This assessment was made in two minutes, and ambulances arrived from all over the state. According to the EMS project director, this estimate was totally wrong. "Outside ambulances weren't needed, we had three times more than we needed." Many of these ambulances got flat tires and blocked the roadways. (Golec and Gurney, 1977: 175).

5. Estimates of casualties are almost always on the high side during SR operations. Initial needs assessment at the disaster site tends to be inaccurate for a variety of reasons: extensive visible material damage which leads to the assumption of mass casualties; uncertainty over geographic scope of impacted areas with projections that may be much larger than they actually are; the perceptual shock of seeing sometimes badly mangled bodies, etc. Furthermore, in many cases, the initial assessment is the one which remains. Often the EMS system is originally advised by a lay person with a story which is generally vague and almost always grossly exaggerated. This message activates the system to respond and sets expectations of a casualty count of significant magnitude. Frequently, this count is a wild guess, and the magical process of numbers magnification is set in motion. This number is picked up by radio and television, circulated among agencies through rumor networks and is accepted as reality. The magnitude of the overestimation of casualties can be in the order of 10 or occasionally even many times more than the actual final figure. (7) Thus, the responding EMS system not only has typically little direct feedback from disaster sites, but there is a tendency for it to acquire "misinformation" implying high EMS needs and demands. Ongoing information is rarely, if ever, received through official EMS channels. Most information concerning the magnitude of the casualty situation comes either through mass media reports or via rumor networks -- patients seen in the ER, ambulance attendants, police officers, etc. -- which rarely have any factual basis.

6. Invariably, little actual triage occurs in connection with SR activities in disasters. Reports of triage occurrence are not uncommon and ran as high as 55 percent in the cases we studied. Our data in this respect shows an interesting discrepancy between reports of triage at disaster sites and what our finer analyses of victim data indicated, and that is, little triage occurs. If by triage at the disaster site is meant appropriate assessment and sorting of all casualties according to the seriousness of their injuries (Mills, 1976:209-217), that did not happen often in the mass emergencies we studied. But the presence of uniformed medical personnel seems to suggest to onlookers or those involved in SR that some sort of evaluation and selection of victims is made, even though it is not. To the extent triage is performed, it seems to be done most often

by EMT's. However, it is clear that even EMS personnel themselves, in stating that triage was performed, use the word in a loose fashion so as to cover almost any handling of victims on their part. (8) Often what is done is the evaluation of the condition of an individual patient rather than of the mass casualty situation as a whole. Again, this is not triage in the accepted medical sense. Thus, far less triage actually occurs at disaster sites than is generally reported by persons involved in SR.

Non-medically trained first responders, poor communications, inaccurate needs assessment, lack of triage and other factors mentioned above all contribute to problems in the EMS response to disasters. But the problems are compounded beyond the SR stage. This is because transportation and distribution of victims of mass emergencies also leaves much to be desired and is not conducive to the highest quality medical care.

Transportation.

Our major research conclusion about EMS-related transportation in disasters is that it is almost invariably uncoordinated. Our more specific findings discussed next are based on an analysis of the transport of at least 3,500 actual disaster victims to hospitals, as well as on other information from several hundred organizations actually or potentially involved in such transportation. We also had some data on the participation, again actual and potential, of around 450 ambulance or rescue company vehicles in several dozen disasters.

1. Disaster victims typically arrive at hospitals by a variety of means. In our study in an analysis of 75 different hospitals where it was possible to identify the mode of arrival of the first disaster victims, the following means were used: ambulances, 54 percent; private automobiles, 16 percent; police vehicles, 16 percent; helicopters, 5 percent; buses/cabs, 4 percent; walk-ins, 4 percent. While these figures refer only to first arrivals, it is the very rare disaster in which at least several modes are not used. The convergence on disaster sites by all kinds of organizations and individuals is followed shortly by a convergence on hospitals by a number of these same groups and persons, in addition to the concurrent transportation to hospitals of the injured themselves, assisted by relatives, friends and/or neighbors. A crucial implication of this is that hospitals involved in an EMS disaster response receive patients in all sorts of unplanned ways, and the patient flow is essentially not under the control of the EMS system. Equally as important, by the time victims are transported from disaster sites, there is little that hospitals can do but accept them for treatment. At that point, disaster victims are within the EMS system, albeit not in any coordinated way.

2. Disaster victim transportation is more likely to be by public rather than private agencies. This general statement, while supported by our data, does obscure the fact that some very large private ambulance companies operate in cities and metropolitan areas, and thus on a percentage basis more private rather than public vehicles may be involved if disasters hit those localities. Because our research covered a time span which included

a number of mass casualty situations in major communities with large private ambulance companies, we actually found 53 percent of all responding ambulances were from private organizations who frequently are not well integrated with the public sector. But if the figure is computed on a percentage basis for events rather than total number of ambulance-like vehicles sent to disaster sites, publicly financed transporters are more likely to be used in disasters. (9) However, only about half of the transporting vehicles used by public agencies were actual ambulances. This is partly accounted for by the strong tendency, especially for police departments, to load victims into whatever vehicles are handy and to send the injured off to hospitals. In one situation studied, police officers loaded twelve, nine and five injured persons into three separate non-ambulance vehicles and these were the first to arrive at a hospital. Neither the private organizations' often strained relationship with the governmental health sector, nor the frequent tendency of public agencies not to use ambulances makes for efficiency and effectiveness in the EMS response to a disaster.

3. The larger the disaster, the more likely transporters are from outside the local impacted community. In most of the events we studied, there was a greater probability that both volunteer and formal transporters from other political jurisdictions outside the impacted community would be involved. To some extent the involvement of more distance resources is a function of the perceived greater needs in a large mass casualty situation. Thus, in one incident we studied, at least 65 ambulances alone, leaving aside other vehicles, converged on what was mistakenly seen as a situation possibly involving casualties in the high hundreds. However, the greater convergence in major mass emergencies also appears to be simply a function of mass media coverage of such events. Some transporters come mostly because they accept stories on radio or television about the number of probable injured, a figure, as we had indicated earlier, that tends to be over-estimated in most disasters. Involvement of more distant and unfamiliar transporters in some kinds of disasters can considerably disrupt whatever local community disaster planning may be and make transportation coordination almost impossible.

4. Potential transporters unsystematically converge on disaster sites relatively quickly. The median response time for transporters in all disaster events we studied was approximately 4.5 minutes. A mean average of 15.5 minutes indicates that sometimes response can be considerably delayed, but such slowness is unusual and might be attributable to such matters as blocked highways, an operative factor in two thirds of the disasters we studied. Transporters are about equally likely to be notified officially by police or EMS dispatchers, and little less often by fire dispatchers. However, we did not find sources of official notification to be associated with variation in response time. In only about one half of the instances studied did the transportation response occur according to any predesignated formal plan or directive. Rather, ambulance and other volunteer and unofficial transporters often converge on the scene in an unsystematic and uncoordinated fashion. Organizations with many victim-transporting units were inclined to delay sending all their vehicles, but agencies with 10 or less units typically dispatched

80 percent or more of them. Among other consequences, especially in smaller size communities, this tendency leaves very little for non-disaster EMS coverage in the rest of the area. Overall, disasters precipitate a hasty but rapid flood of transporters towards the disaster site.

5. There are usually more transporting vehicles at the disaster site than are used for moving victims. We found that the average mean number of ambulance or rescue companies alone was 4.39 in the disasters studied. Mass emergencies characterized by widespread mass media coverage and availability of a large number of responding units--both mostly metropolitan areas phenomena--are especially prone to over-response situations. In these situations, a great majority of arriving units transport no victims and add to the convergence problem. In major disasters particularly, later waves of arriving ambulances are used relatively little to transport victims. Overresponse situations are obviously unplanned and are very difficult to bring under control. As a key EMS dispatcher in one massive disaster said about dozens of unused ambulances, "If I don't have any control over where the units come from in a mess like this, it's pretty hard to know who to tell to go back home."

6. Speed of response appears to be the dominant concern in transporting victims to hospitals in almost all disasters. As noted earlier, at the very best, less than half the casualties are transported from a disaster site by ambulances or properly equipped rescue vehicles. Other transportation is provided by public safety personnel or civilians who often start to remove the injured to hospitals before many ambulances are on the scene. American civilians seem to have internalized a belief that any injured person ought to be rushed to the hospital. The orientation of safety personnel is to emphasize restoration of normal patterns, prevention of crowd formation, resumption of traffic flow, and minimization of community disruption, all leading to an emphasis on swift evacuation of casualties. Speed is also emphasized when the primary responders are EMT's or ambulance attendants. This philosophy is based on the criteria of efficiency and effectiveness used in "normal" times; a rapid response rate from call to arrival and from arrival to hospital. Consequently, on the part of practically every group involved, the transporting of disaster victims is treated as a task which should be done as soon and as quickly as possible.

7. Although there are some patterns to the transporting of disaster victims to hospitals, they are not the result of following either pre-impact plans or impact time directives. There are always a number of options available in crisis situations. Thus, where and how to transport victims, and who will do so when, is a matter of choice and decision. Our field studies, for example, found only one disaster event in which there was but one hospital in the general area of the impacted community. Yet, typically, one hospital tends to have transported to it an inordinately large number of casualties, the most seriously injured and the DOA's. This hospital is often one which transporters are familiar with

on an everyday basis. Another pattern is for the less seriously injured to be transported to hospitals before more serious cases. Part of this stems from lack of triage during SR and part from the fact that "walking wounded" are normally more accessible to first responders and transporters immediately after impact. Furthermore, not only ambulances but all transportation resources that normally converge on a disaster are subject to low utilization. Besides what has already been mentioned on this point, we found a statistical mode of one transportation run per organization and the almost total absence of multiple runs by the same vehicle, especially in urban areas. Furthermore, while hospitals and other medical complexes comprise about 85 percent of the runs, in seven percent of the cases we examined and excluding DOA's, dead bodies were carried by transporters using ambulances or rescue vehicles. None of this bespeaks of much planning or direction in the transporting of victims to hospitals at times of disasters.

Treatment.

As just noted, there is a very great tendency to transport victims unsystematically but as quickly as possible from the disaster site to hospital facilities rather than to triage and stabilize them. However, instead of solving problems in the EMS response, this focus on the hospital frequently magnifies them. The medical treatment provided is partly structured by the earlier stages in the EMS process.

1. First aid activity is just as likely to occur as not at the time of the aftermath of a disaster, but it often is not provided at the time of initial SR. In half of the cases we studied, some kind of organized first aid was provided, (10) almost always at a single first aid center. Organizations staffing this center typically include the Red Cross and other service groups, as well as private agencies and individuals, and specialized entities such as hospital first aid teams and members of the coroner's office. It was most common for two or more of these groups to staff the first aid centers. It was also typical for these centers to be located in shelters which had been established some time after disaster impact and almost always after initial SR was over. That these centers usually maintain contact by phone or radio with a hospital or fire department is another indication that they are semi-permanent arrangements, not a temporary emergency activity. Thus, in many respects, the giving of first aid on any scale or in a systematic way is more of a feature of a later point in Time Two, often at the start of the recovery period, than it is of the immediate post-impact period when most SR occurs.

2. There is a pattern to the volume of casualties flowing through hospital emergency rooms (ER). At least three tendencies can be identified. As to time of onset, first casualties typically arrive within the first half hour after disaster impact. Most casualties are transported to the hospital over a relatively short time period, i.e., duration of patient flow is usually one to three hours. Finally, the peak of casualty flow when the largest number of victims arrive at the ER is within one and one and a half hours after the disaster has occurred.

For example, in a disaster which occurred at 7:39 p.m., 56 casualties were brought to the hospital between 8 and 9:30 p.m., with the largest number arriving at about 9 p.m. Sometimes there may be more than one peak flow of casualties. This seems to depend upon how many victims are transported in the first one or two vehicles to arrive at the hospital. In one case we studied, 26 casualties arrived early in a few vehicles and were followed by the later more typical peak in patient flow. These patterns in time, duration and peak clearly set certain limiting circumstances for the carrying out of the treatment task in providing disaster EMS.

3. The less severely injured in disasters tend to be treated first at hospitals. In our studies, we found that the severely injured may arrive any time over the duration of the casualty flow, although they tend to be brought in later, whereas the less severely injured are more likely to be concentrated in an early phase of patient flow. The ambulatory casualties and those with relatively minor injuries arrive before the more serious cases when taxis, buses, private cars, vans and police squadrons transport the less severely injured in relatively large numbers at one time. In one disaster studied, a commercial bus dropped between 60-70 ambulatory victims at an ER. Ambulances usually transport the more severely injured with few people in each vehicle, usually only one person. Also, those severely injured who require extrication tend to be brought for treatment later than the less severely injured. A large number of ambulatory cases arriving early can create serious problems in that an ER may become badly overcrowded, resulting in confusion in the efforts to provide treatment. Similarly, when attention is being paid to early arrivals at a hospital, it is easy for the more seriously injured cases brought in later not to be noticed immediately or to be given delayed treatment.

4. On the whole, the very large majority of victims given hospital medical treatment in a disaster do not need extensive or intensive medical care. Put another way, most EMS delivered at times of disasters is of the simpler kind requiring no great amount of facilities or specialized equipment. There can be exceptions in some particular disasters, as there are often some critical medical cases in most disasters. In talking of the typical pattern this should not be overlooked, especially with regard to hospital treatment. (11) However, overall the more typical hospital disaster task is the provision of simple examination and treatment to many people. It may be also true that the everyday emergency departments in most hospitals deal largely with non-emergency cases--an 80 percent or higher figure is often cited for outpatients in ER (Boyd, 1976:105). But whereas the everyday EMS system does not seek out non-emergency cases, the disaster EMS system mobilizes considerable resources and efforts in an attempt to bring within the system all conceivably injured victims. In fact, the effort is usually successful. Thus, in the typical American disaster EMS is provided primarily to non-seriously injured casualties.

5. There is a considerable range and an emergent quality to much of what is done in hospital processing and treatment of disaster victims. Triage may be attempted. In one hospital, separate entrances were set up for ambulatory and for more critical cases. But in another hospital, as casualties were transported in, 45 minutes went by waiting for the arrival of a trained person to initiate triage. More typically, in other hospitals, we found that there were only informal, sporadic and partial attempts to perform triage. In still other hospitals, treatment was simply given to whomever attending medical personnel found in their "line of sight." Tagging procedures may also be instituted. Different ways are attempted to develop color coding, making carbon copies and assigning non-medical personnel to the task so that there is some record of treatment given. Additional staff may be brought to give direct treatment and to provide necessary supporting services. Personnel are sometimes kept past their quitting times. Unusual handling of potential patients may be established. In one hospital, we found that before they received any other ER attention, 110 of 120 casualties received were processed directly through the X-ray department of the hospital. Normal work patterns may also be altered. Physicians sometimes are asked to forego the luxury of treating according to specialty, and it is obvious that nurses not infrequently give medical treatment beyond their professional and legal rights. These and other examples that could be cited illustrate the range of variations which occur and that are in contrast to everyday EMS treatment-related activities. What emerges is sometimes the result of disaster planning, but far more often it is generated by situational contingencies in the hospital setting. In other words, in the face of numbers of disaster victims brought to the hospital for treatment, and in the absence of, or even despite, formal disaster plans, action is taken to give EMS care. There is neither passivity towards nor the rejection of disaster victims, although both in principle are possible, and, in some cases, might actually be appropriate.

6. Very poor records are usually made of the medical processing and treatment of disaster victims, especially when a hospital receives a large number of them. To the extent that patients have been treated in the field or en route to the hospital, such information is likely, if at all, to be conveyed orally to ER or other hospital personnel by the persons themselves or accompanying individuals. Tagging of patients in most mass disasters we studied is highly erratic, unsystematic and often is abandoned after a while -- sometimes for a very simple reason such as a shortage of tags. It is rare, even in disasters not involving many casualties, for many records to be kept for victims treated for minor injuries. In many instances of mass casualties, rarely is any total count made, let alone any enumeration of the kinds of injuries found, treatment given, by whom, etc. In one very large disaster we looked at in depth, the hospital had a rough count of nearly 500 victims treated and three dozen admitted solely because the public relations director had his staff personally ask the milling masses of people in the crowded corridors whether they had received any kind of treatment from the hospital. (12) The general absence of detailed and systematic record keeping in mass emergencies, except for treatment given to serious cases admitted to hospitals, has all kinds of implications ranging from problems of cost billings and insurance collection to the

difficulty of making any evaluations of the quality of medical care given and the possible efficacy of abbreviated treatment procedures. The Accreditation Manual for Hospitals states, "A medical record shall become an official hospital record" (1976:73). If there is one thing our research can conclusively determine, it is that this rule is simply not followed in the typical large mass-casualty disaster. The typical hospital does not collect reliable records of the EMS care given to disaster victims at the time of treatment, particularly if there is a large number of them. (13)

Components Involved

A major overall finding from our study is that the system configurations of the components involved in Time Two, or the disaster EMS systems, are rather different from the configurations of Time One, or the established EMS systems. More specifically, there are additional components in the responding EMS disaster systems which are not part of the established systems in the same communities for delivering everyday EMS. In mass emergencies also, there is considerable underutilization and inequity in the use of EMS component resources. In situations of mass casualties, too, there is differential involvement of subparts within the particularly active EMS components.

1. New groups are typically a part of the EMS delivery system in disasters. A number of different components usually are involved in the EMS disaster response such as first responders, transportation groups, hospitals and coordinating entities. But we found that many of those responding to mass casualty events are new groups or organizations not normally a part of the established EMS system. For example, our study established that about half of the first responders carrying out SR and transportation of patients were not a part of the ongoing established EMS system. Likewise, we observed that coordinating elements which assumed control over patient-related care and distribution at the site were more likely to be safety personnel than to be medically trained EMS groups or personnel. Thus, knowing the composition of the established EMS system in the community does not allow a good prediction of all the components which comprise the emergent EMS system at times of disasters. Furthermore, these new elements in the EMS response are usually involved, not because of prior planning, but because of other factors. They emerge, as we shall discuss later, because of situational contingencies.

2. Many established EMS components are not involved in disaster EMS. This is the converse of the finding just discussed above. Our research indicates that in the majority of cases, most established EMS components in an area do not participate directly in a disaster response, the exception usually being in small communities with only one or two hospitals and other emergency elements. At the other extreme, in large metropolitan areas, the great majority of the total regular EMS components are usually not utilized at times of disasters. For example, although the figure refers only to hospitals, in one disaster with 298 casualties, only eleven of the 105 hospitals in the surrounding region were used. Even

in massive disasters, while there is an increase in the number of established EMS components in the EMS disaster response, most remain uninvolved. If involvement is measured not by actual victim utilization of component resources, but by such indicators as hospital mobilization, activation of disaster plans or the dispatching of ambulances or vehicles to a disaster site, the figure of involved EMS components from the Time One system would be higher, but many still will remain outside the disaster EMS response.

3. In disasters, there is a marked underutilization of hospital components from the established EMS system or what is available in the area. Far fewer hospital components take part in the EMS response than could potentially be involved or than would be the case on an everyday basis. Thus, in our study, where the data allowed a reasonable analysis, we determined that only 108 hospitals out of 515 available within a 25-mile radius from a central point of disaster impact, were used. Narrowing our focus more sharply to the local everyday EMS system showed that in only about half of the disasters did a simple majority of the hospitals in the system receive even one disaster casualty. This actual conveys a better impression of use of EMS resources than is the case because, as we shall discuss later, a simple utilization criteria masks the very large inequity in the distribution of patients to hospitals which participate in the EMS response. Underutilization of available system components is associated with an unequal distribution of patients between those few hospital system components involved in the response; in the majority of instances we studied, over one-half of the casualties ended up clustered in one hospital. But the important point here is that in almost every disaster, it is extremely likely there will be substantial unused hospital resources. In the typical mass emergency, a large majority of the hospitals in the area will not become even minimally involved.

4. There usually is inequity in the distribution of victims among EMS hospital components at times of disaster. (14) The hospitals in the communities we studied had bed occupancy rates running from 60.4 to 96.2 percent, but averaging around 80 percent. Thus, potentially almost all the hospitals which could have been involved in the disaster EMS response could have received and admitted disaster victims with relatively little difficulty. Certainly any given established EMS system had within its totality hospital components with considerable bed capacity beyond everyday demands. However, from our research, we were able to estimate that in 63 percent of the disasters studied, the vast majority of casualties were treated in but one or two hospitals. In a number of these cases, only one hospital or two handled all of the victims from the disaster. In fact, although obviously dependent on a number of factors, our research showed that typically one hospital receives an inordinately large number of disaster victims. One of our case examples illustrates the point. As discussed by Golec and Gurney (1977), in a community which experiences more than one mass casualty situation per year and which has an extensive and well developed EMS system,

of a total of 140 casualties seen in a hospital ER, 125, or roughly 90%, were taken to one hospital out of a total of 17 in the community. The remaining 15 were distributed among three other hospitals. This occurred despite the fact that

the goal of this system is to prevent the overloading of any single hospital. A central communications center, with each hospital's ER capabilities and bed census on hand, was to redirect patients away from overloaded hospitals. Furthermore, the network was to notify the hospital of the disaster, but according to hospital officials, it did not. Apparently, communications, and therefore coordination, broke down (1977:172).

The picture described is not untypical. For example, in other mass emergencies: 266 casualties were treated in but four hospitals out of 43 in the area; 141 casualties were treated in four hospitals out of 41 in the area; and 381 casualties were treated in but 12 hospitals out of 78 in the area. Occasionally there may be equity of victim distribution, as occurred in one disaster with 146 casualties. Eleven hospitals respectively treated 31, 27, 16, 11, 10, 10, 10, 9, 9, 9 and 6 victims. At the other extreme in another mass casualty event, six hospitals participated in the EMS response but one of them alone handled 160 of the 176 victims. Overall, the picture is clear. There is a basic inequitable distribution of casualties in disasters which is independent of such factors as under-utilization of hospital resources, number of hospitals in the community, or bed capacity.

There is a seeming tendency for the hospital closest to the disaster site to be the one to which the most patients are taken. Thus, we found that in 75 percent of the disasters studied, the closest hospital received more than 50 percent of the cases. In 46 percent of the mass emergencies, the closest hospital received more than 75 percent of the victims. However, the factor of proximity is clouded by the fact that EMT's and ambulance attendants tend to go to the hospital with which they have the closest rapport during normal times. Our data does support the notion that the more that ambulances are involved in the transport of disaster victims, the more likely there will be inequity of distribution of casualties among hospitals. Thus, familiarity may be more important than proximity in leading to the overloading of one hospital in the typical disaster. (15)

5. The hospital which is the focus of victim convergence tends to exhibit a distinctive flow and casualty pattern. Typically, one hospital receives not only the largest number of casualties, but the most severely injured as well. For example, in a disaster we studied, one hospital received 40 out of the 51 casualties, admitted 30 with 28 of them judged serious or critical; the remaining 11 victims taken to four other hospitals were diagnosed as not serious enough to admit. Our analysis of the number of casualties admitted out of the total treated found a range of from 5 percent to over 60 percent, with an average figure of less than 20 percent. This average is actually high in the impression it creates, for it includes many cases — probably more than half — who were often kept overnight simply for observation and were clearly not critical. Nevertheless, the one hospital that is the focus of victim convergence admits almost always the majority of casualties which become bed patients in hospitals in Time Two. As well as receiving the most severely injured and the largest number

of casualties, one hospital also typically receives the most victims dead on arrival (DOA's). Illustrating this was the instance we examined where one hospital received 25 of a total of 45 casualties, all of the serious and critically injured, and 10 out of the total of 12 DOA's in the disaster. Overall, the pattern exhibited which we have just described suggests that categorization of hospital services, (16) even in EMS systems where it exists, is all but totally ignored in a disaster situation.

6. Loss of hospital capability seldom occurs in disasters. Such problems as may surface in the EMS response of hospitals are in the main not the result of the loss of lack of capabilities. Interruptions or loss of power or water supply or damage to the hospital installation itself was very rarely encountered in our research. Furthermore, in almost none of the disasters we studied was there any major lack of resources at the hospital level, be it personnel, supplies, equipment or facilities. For example, only two percent of the hospitals we looked at reported a shortage of personnel for handling the EMS response; many, in fact, indicated that they had more regular staff and volunteers than they could effectively utilize. Inadequate supplies were a problem for only six percent. While in some future disasters, it is realistic to assume that the capabilities of some hospitals involved in the EMS response will be impaired, it seems clear that in the typical American mass emergency, seldom will hospital capability become a major problem. (17) Instead, disasters create additional demands on the internal operations of hospitals. Some of the demands which can surface were discussed earlier under point 5 with regard to treatment, i.e., the need for triage, the necessity to tag patients, the requirements for additional staff, atypical medical procedures, and unusual work patterns, etc. Very occasionally, the nature of the casualties may present distinctive demands, such as the hospital we studied which suddenly received 53 disaster victims, nearly all of whom required treatment for smoke inhalation. Whatever they are, it is usually the demands on the organization that is the problematic issue affecting most hospitals in trying to provide disaster EMS; loss of resource capability very seldom is the issue.

7. A hospital, in its EMS response to a disaster, will be both differentially involved and have some of its subcomponents carry out different tasks than they normally do in Time One. The ER is the sole entry point and major focus for medical treatment in a hospital providing disaster EMS. Because of the focus on this point, it is easy to overlook the differential involvement of various units or subparts of the hospital in its EMS response. Some offices, such as those involved in billing or medical records, will not operate at all at the height of the emergency. About a third of the hospitals we studied suspended some of their normal everyday activities. Other departments, such as maintenance or housekeeping, may or may not have to accelerate their normal work depending on the nature of the disaster and the hospital involvement in it. But two parts of the hospital almost necessarily have to change their routines if there is any large ingress of patients. In contrast to everyday EMS, disaster EMS generates the need for security and traffic control. The uncoordinated convergence on the hospital means that internal and external security and traffic flow

measures have to be imposed. Even when done, they frequently are not enough to bar outsider accessibility to the ER area or ease staff accessibility to the hospital grounds. In like fashion, the public relations or information office of a hospital is faced in Time Two with a situation rather different from everyday operations. Mass media personnel, families of victims, the Red Cross and other relief agencies, public safety groups - all for different reasons - require details about the victims the hospital treats. About a quarter of the hospitals we studied reported problems in providing such information.

Similarly, some hospital personnel often carry out functions or play roles different from that which they have in everyday operations. The sudden convergence of casualties at a hospital often leads, at least, to consideration about the possible selective discharging of Time One non-critical patients. Many times, contrary to normal practice, nurses make the initial decisions concerning such discharges. Teaching hospitals which receive casualties tend to use their student nurses or medical students to help out with EMS treatment, although lack of familiarity with the physical facility and hospital procedures are hindrances to the effective use of such persons. This kind of shifting around of hospital personnel usually helps in the hospital effort to provide disaster EMS, but sometimes without planning, there can be unfortunate consequences. In extreme instances, regular hospital patients may be neglected because of the attention given to disaster EMS, a possibility compounded by the almost total failure of hospital disaster planning to consider the question of regular patient care during precipitous mass-casualty events. In one case we studied, several staff members left a coronary care unit (CCU) to render services to disaster victims in the emergency department; there were two fatalities in the CCU that same night, and informants at the hospital attributed the deaths directly to this lack of supervision.

The examples we have given have been to illustrate the point that a hospital in a disaster is less likely to react in the same unitary fashion that it does in everyday operations. Also, as noted earlier, there is an emergency quality to the processing and treatment of disaster victims. Just as there is differential response of EMS components at the system level at times of disaster, so there is differential response of subparts within particularly active EMS components in the same kinds of crisis situations.

Modes of Integration

Our major research conclusion about modes of integration is that centralized EMS responses in disasters are very rare happenings. More specifically, EMS responses in mass emergencies are not highly coordinated, much less centralized. Such integration of response as occurs is usually along network rather than system lines, is provided by emergent communication linkages, and not the result of the exercise of authority or of control. But EMS interorganizational or intraorganizational information flow is generally poor in disasters.

1. Centrally coordinated EMS responses in disasters are very rare. We found extremely few disaster events where all EMS subtask responses were actually coordinated by some single unit. Perhaps 10 percent of our cases has a notably centralized response. Search and rescue, transportation of victims and medical treatment might occasionally be called for by disaster plans as tasks to be fully integrated by some one coordinating unit, but this does not occur as a rule in American community disasters. In fact, overall coordination of the EMS response is rarely high, much less centralized in some way. If the former is lacking, the latter is all but impossible, although the converse is not necessarily true, as we found in our work and as will be discussed later.

There are three kinds of situations where a centralized EMS response in disasters is particularly rare, for example, in large metropolitan communities. Wright (1977b:190), in an analysis of DRC data, suggests that in contrast, a centralized response is more likely as the complexity of the EMS resource base decreases-- a feature of small towns. Furthermore, if the disaster incident is quickly and widely focused on by radio and television, the probability of centralized EMS response is also low. This is understandable, for mass media attention contributes greatly to the convergence phenomena, to the bringing to the disaster site non-integrated Time One and non-local EMS components. Too much centralization of the EMS response is also unlikely in localities with little prior interorganizational experience on the part of EMS and related groups. Conversely our work indicates that good Time One interorganizational coordination in the established EMS system can be an indicator of a probable centralized disaster response. Among the worst of all possible situations therefore, is a widely publicized disaster in a metropolitan area with poor Time One integration of the established EMS system.

The notion of a centralized coordination of the emergency medical response to disasters is frequently advanced as an ideal. Holloway (1971:591), for example, notes that "a central coordinating point where information can be received, evaluated, decisions made, and action taken" is necessary if the resources required for the "disaster scene response, transportation, and hospitals" are to be tied together to produce an overall satisfactory EMS response. Furthermore, a partial analysis of some of our data did find, as this is measured by reports from EMS personnel of subjective overload and by an objective index of severity allocation (Wright, 1977), that if the EMS response is centralized, it is more

likely to be effective. But centralization just does not occur except in EMS responses in occasional disasters.

2. There is typically little attempt or actual exercise of authority or control over the EMS response in disasters. Not only is there usually no centrally coordinated EMS response in mass emergencies, but additionally there is seldom any control structure or unit present which has the authority, responsibility, or willingness to coordinate collectively or individually, the organizations conducting rescue, transportation and treatment. Our research found that in about half of the cases studied there was no evidence of any effort at overall control of the disaster EMS response. In other cases, efforts were rarely successful. Far from attempting to seize power, almost all organizations involved in large scale emergencies avoid even any semblance of taking charge. This is a pattern which was initially observed a long time ago by disaster researchers in areas other than the health area (Quarantelli and Dynes, 1977a).

Part of this reluctance to assume control, as we will discuss shortly, stems from the absence of meaningful disaster plans which would legitimate some EMS--involved component in taking overall control. Even in such crisis situations as we examined, there is hesitance to take command of a range of personnel or groups over whom normally there is no such power in Time One. Thus, such general coordination of the EMS response as exists in disasters does not normally come from the exercise or imposition of authority.

In addition, not only is there typically no central component which coordinates the activities of the system components performing the major EMS subtasks, there is also little authority exercised to coordinate the activities of organizations performing the same subtasks. For example, as we noted when reporting on our findings about SR, there usually is little explicit authority or control at the disaster site, and in half the events we studied no authority at all was exercised. Similarly, in only about a third of the disasters we looked at, was there any overall attempt to coordinate the distribution of casualties to hospitals. This does not mean that within given organizations the normal chain of command is not followed. Invariably we find lower ranking police officers following the orders of higher ranking police officials, fire officers obeying their commanders, etc. But since the EMS tasks in disasters tend to involve participants across organizational lines, a situation is created where a member of one organization would have to assume authority over a member of another organization if overall or partial coordination were to be achieved. But such efforts at control are attempted only infrequently, so coordination of even the same EMS disaster tasks has to be achieved through methods other than the exercise of authority.

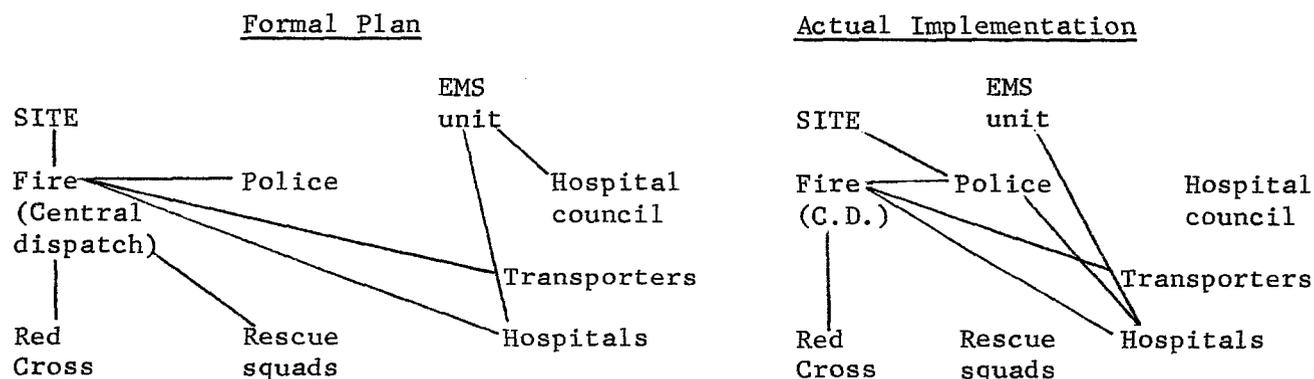
3. Most coordination of actual disaster EMS is not planned. This is true in several senses. Many communities do have overall disaster plans. In our research, 44 percent of the localities, including all the large cities we studied, had a formal interorganizational plan for the giving of EMS. However, more than a fourth of the plans made no distinction between disaster EMS and everyday EMS. In those localities, even if attempts had been made to follow

the planning guide, no success could have been achieved because of the qualitative differences between the providing of regular services by the established EMS system and the delivery of services by the emergent EMS system. In actual disasters, therefore, while some communities have paper plans for a coordinated response, they have no planning in any real sense because of their basically incorrect assumption about the nature of EMS in mass emergencies.

Furthermore, some plans, while recognizing the distinctive character of disaster EMS, are rather limited in scope--calling for the coordination of only two or three emergency agencies such as police and fire, or hospitals and ambulance companies, for example. A further limitation is that many, if not most, plans are concerned only with EMS components which normally respond to emergency situations within the political boundaries of a given community. But mass casualty situations do not always occur conveniently within community boundaries. They may and often do occur at locations that mark the division between two jurisdictions or between a community and a surrounding unincorporated area of a county or township. When this occurs, several different police departments, and ambulance companies may respond to the scene, and hospitals in two or more localities may receive patients. Just as there are frequently no plans for extensive interagency coordination at the community level, there are even fewer plans for overall coordination at the county or state level in such situations. Thus, when a mass casualty incident occurs at a location where the jurisdiction of emergency agencies overlap, coordination of activities more often occurs in an ad hoc fashion, rather than according to some predesigned arrangement.

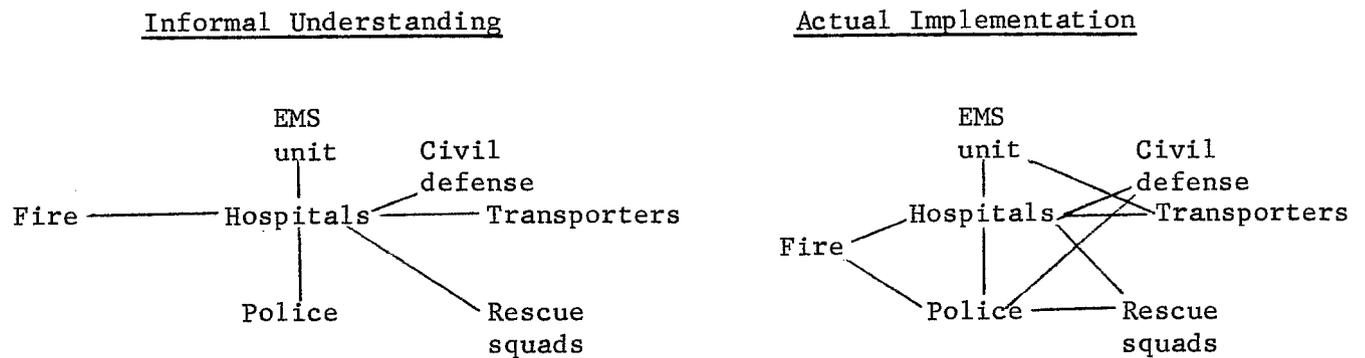
Finally, in some cases where either informal understandings or formal plans do exist, neither may be implemented or followed in a disaster context. Something of the discrepancy that can occur between planning directives and actual organizational behavior is graphically depicted below. The diagrams indicate the planned communication linkages between EMS components and the actual communication links made when a disaster occurred.

This first case involves a disaster in which there were 194 casualties brought to 13 hospitals in the community.



As can be seen, the police had communications with the disaster site rather than the fire department. The rescue squads and the hospital council were never in communication with any other EMS component, and the police were communicating with five of the thirteen hospitals directly when according to the plan they were not to have any contact at all.

The second case involves a disaster with 62 casualties where the hospitals informally were supposed to play the central role in communication and coordination.



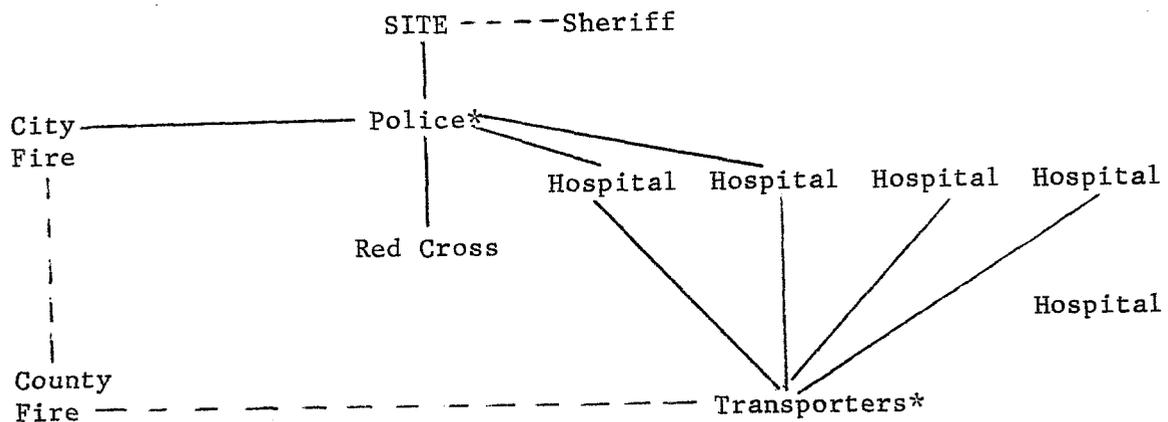
As can be seen, instead of all communications proceeding through the hospitals, which then could coordinate the EMS response, many of the EMS components established direct contact with one another in the disaster. However, this is one of those very rare situations where the hospitals had communication with all other relevant EMS responders.

In general, because the communication pattern usually deviates from the planned or expected, the anticipated coordination of disaster EMS does not occur. In our work we found that irrespective of whether the established Time One EMS systems had communications capabilities, in only 21 percent of the disasters studied was the predesignated communications plan actually followed.

4. Such overall EMS coordination as exists in disasters, tends to exhibit a network rather than a system form. The notion of system implies some sort of relevant connection between all component parts. However, our research found that a more typical pattern was for linkages to exist only along certain lines between some components engaged in different disaster tasks and between some components within the same EMS subtask area. This mode of overall response integration is characterized by some communication links between search and rescue units and transporters and treatment organizations, as well as some communication between similarly task-oriented groups, e.g., hospitals providing EMS. Put another way, there typically do not exist links between all relevant responding EMS components, but only selective ties among some which take a network form.

The existence of communication does not necessarily imply the existence of coordination, a point we will discuss in more detail later. But communication linkages are necessary for coordination and usually with the existence of the former there is some degree of the latter. However, because the two processes are not equivalent, an EMS response which only involves linkages of this kind tends to be relatively weakly integrated. The weakness of the integration is almost always compounded by the absence of some of the responding EMS components from the network linkages.

A graphic depiction of an actual example of network linkages is given below. The disaster was one involving around 120 casualties, five of the thirteen hospitals in the area, two police and two regular fire departments as well as transporters from a private ambulance company, three volunteer fire departments and three volunteer ambulance companies. Of all the organizations listed, all but the hospitals had personnel at the one disaster site.



*communications among own units

_____ main lines of communication

----- peripheral lines of communication

As can be seen, full and direct communication linkages did not exist among all involved groups. Some components were not tied in to others and there were some secondary rather than primary links. However, most components were part of network chains. Consequently, the coordination in this disaster, while relatively adequate for the situation, did not create a high degree of overall integration in the EMS response (a fact which we also established from other field data). While the specific links between components will vary, the network pattern illustrated above is similar to what appears in the EMS response in many disasters.

5. Only limited integration of EMS subtask areas exists in most disasters. This is an extension of the point we have just discussed about the existence of

communication networks in the EMS response in disasters. While centralized EMS system responses were very rare in the disaster events we analyzed, network responses reflecting some centralization of subtask areas such as rescue, transportation or treatment, occurred more frequently. This is a relative comparison and the degree of integration found should not be overestimated. Nevertheless, there was some evidence of coordination of the EMS subtasks whether they were considered at a case study level or in more general terms. For example, in a four-case study analysis of DRC data it is reported that:

There was no overall coordination of EMS activities at the scene of any of the four incidents. The minimal coordination which did occur tended to develop among certain clusters of agencies, such as between police and fire departments or between commercial and volunteer ambulance services. This limited coordination of efforts generally resulted from previous experience in other situations or emerged spontaneously during the course of the emergency. There was no evidence of on-site coordination following along the lines of any pre-established plan of operations (Neff, 1977:186).

At a more general level our research found the victim distribution among hospitals was a partial function of community size, which in turn reflected some integration in the effort. In smaller communities where day-to-day communication and coordination is good even when there is no formal EMS system, the transportation of victims is relatively coordinated when a disaster occurs. (18)

On the other hand, in many disasters there is very little coordination of any kind. In one limited analysis we undertook attempting to establish the degree of integration in the EMS response, we found that in half of the events examined, there was very little evidence of the actual coordination of any organization by another organization. Many of the organizations were in contact with one another directly or indirectly, but communication does not automatically translate into coordination. Actually in almost all cases, there were not even full communication contacts. We found in our work on 19 disasters which could be analyzed for this purpose, that there were no communities where transportation-based communication linkages were complete. At least one group was left out of contact with the other components of the emergent EMS system. There were only two communities out of the 19 examined in which all the hospitals involved in the EMS responses were linked in the communications network. Thus, while there is some integration of EMS subtask areas in many mass emergencies, in the main it is usually of a limited sort.

6. Inter and intraorganization information flow about the EMS response is poor in most disasters. Apart from communication gaps (e.g., site-to-hospital) and overlapping communication contact points in network chains, there is the fact that in many cases the content of information is either incomplete or inaccurate. For example, 45 percent of the responding hospitals in our study did not receive any additional information whatsoever after the first message about the occurrence of a disaster; in 65 percent of these cases the initial

word received was so general as to be not particularly helpful. That is, other than indicating a disaster of some kind had happened, and perhaps the kind of agent involved, there was no information provided about the possible number and kinds of injured, the location and scope of the disaster site, etc.

Intergroup radio messages in particular can often be incorrect, although practically any interorganizational communication in disasters can become confused. This stems from a combination of factors such as lack of understanding of technical or semi-technical terms, failure to attach time references to information provided, little or no knowledge of actual communication audience, and distortions induced by message overloads. When these matters are coupled with inexperience in using the communication equipment on an everyday basis, lack of trained communicators, and non-standardized communication procedures, the adequacy and validity of the information flow can be of a rather low level. Any system, including an EMS one has to have appropriate information input and processing if it is to work effectively; such an interorganizational information flow can seldom be assumed to be present as EMS relevant components attempt to cope with many disasters.

Within organizations, particularly large ones such as hospitals, the information flow is often similarly poor. Key administrative and operational personnel frequently have little idea of the overall situation facing the hospital, may often not communicate with one another, and thus sometimes there will be inconsistent if not contradictory decisions with regard to hospital activities. Information about the disaster and its victims may be accumulated at the ER, but not reach top hospital officials. Non-medical hospital support staffs such as security, maintenance and housekeeping -- often crucial for hospital mobilization of all necessary resources--may also fail to be given proper direction, all of which results in the compounding of difficulties, e.g., convergence of vehicles and persons leading to massive traffic jams both within and just outside the hospital that are uncontrolled by staff personnel.

Without full and correct information flow, there can be no valid communication. Without appropriate communications, coordination of efforts suffer. If there is weak coordination there can at best be only a loosely integrated response. At both the EMS component or system level, this is frequently the character of the situation which prevails in the EMS response to disasters.

With this discussion of modes of integration we conclude the general detailing of our research findings on the characteristics of the delivery of EMS in disasters. In the next chapter we present an analysis of those conditions or factors which seem responsible for the disaster EMS characteristics just described.

FOOTNOTES

1. No attempt is made to present all our quantitative findings. A number of the more technical analyses are presented in other publications or projected writings which are listed in the appendix.
2. The cases described are updated and slightly revised versions of those presented by Neff (1977) in an earlier analysis of the incidents.
3. The dead are searched for, of course, but less time priority is given to finding them, since nothing can be done for the dead, in contrast to those still alive. For discussions of handling the dead, see Hershiser and Quarantelli (1976) and Blanshan (1977).
4. We shall later show the very substantial differences between the number of victims treated in hospitals after disasters and those actually admitted to the same hospitals, implying something about the medical treatment required and given. Here we merely want to stress the hospital setting.
5. The chances of victims being searched for and found by trained fire personnel is relatively low. For example, in one city we studied in which there had been a disaster, out of 2,400 fire officers, only 340 were qualified EMT's, and 220 qualified paramedics.
6. This must be seen against the fact that ambulance attendants also are not often well trained. Thus, a 1973 report noted that out of more than 200,000 ambulance attendants in the country, only 65 percent were trained to the level of advanced first aid courses as given by the American National Red Cross, 25 percent had less training than given in those courses, and 10 percent had no training at all in first aid (U.S. Senate, 1973:25).
7. There can be instances also of underestimations. For example, one hospital which treated 28 severely burned casualties, as well as 12 other patients, received a call from an anonymous source telling them to expect a "few burns." However, overestimation of casualty figures is far more frequent than underestimation.
8. Not only the term "triage," but also other widely used terms such as "first responders," "EMS system," etc., are given different referents even by EMS personnel. This not only indicates a lack of consensus in the area, but makes it necessary that researchers be cautious about too quickly accepting common terms at "face value." The "face value" is clearly not the same for all.
9. Given that only about one-fourth of the ambulance service in the country is provided by a local unit of government (U.S. Senate, 1973:25), this finding suggests private groups are more likely to dispatch vehicles to disasters.

10. Reports of unorganized or isolated cases of meaningful first aid being provided in disasters are very rare. Other disaster studies in the past similarly have not noted many cases (Quarantelli, 1970).
11. The general thrust of our research suggests less than maximum efficiency and effectiveness in disaster EMS for the typical majority of non-critically injured victims. A clear implication is that there is even less efficiency and effectiveness in disaster EMS for the more severely injured patients. While our study did not and could not make technical evaluations of the medical care given, comments of our health personnel informants and respondents indicated that a number had reservations about the quality of the professional treatment given to seriously injured victims in the mass casualty situations in which they were involved. It would be very unfortunate if a recognition that the typical disaster involving primarily non-critical cases led to a lack of planning for the rarer, but still not unknown, instances where ER's have to deal suddenly with many seriously injured patients.
12. Because DRC had a general population survey of the impacted population in this particular case, it was possible to conclude that the hospital probably underestimated the number of persons it treated for minor injuries. To the extent that an educated guess can be made, it is possible that other hospitals may also underestimate the actual number of persons they treat for minor injuries. So the initial overestimation of casualties discussed earlier in this monograph may be partly counterbalanced by a later underestimation of numbers of victims actually treated. However, this is at present a matter for which there is very little evidence, much less any well-rooted in empirical reality.
13. After the immediate emergency is over, such as the next day, many hospitals do attempt and do put together written records of their EMS disaster activities, including numbers treated, etc. But these records are often built on the recollection of some of the hospital personnel involved, and are not derived from information obtained at the time patients were treated, as is typical of everyday EMS procedures.
14. We operationalized inequity as one hospital receiving more than 50 percent of all the known casualties.
15. Given the data we had, it proved impossible to disentangle the relative weights of proximity and familiarity in affecting patient distribution to hospitals. However, there were some indications that everything else being equal, familiarity is more important than proximity in affecting the distribution.
16. For an annotated bibliography on the question of the categorization of hospitals in connection with EMS, see the booklet issued by the U.S. Department of Health, Education and Welfare (Division of Emergency Medical Services, 1976).

17. This observation might appear to be just an accidental consequence of the fact that almost no hospitals were directly impacted in the disasters we looked at in the 22 months of our field work. However, the historical record suggests that it is rather rare for hospitals to be damaged or destroyed or otherwise made non-functional in American community disasters. In fact, hospitals seem to be more subject to internally-located disasters such as fires and explosions than they are to community-wide impacting disaster agents.

Actually, in one of the two historical case studies we conducted on the Wilkes-Barre flood, we did examine in depth two hospitals which had to be completely evacuated. In such rare situations — usually involving a flood agent — there is loss of capability which has very major effects on hospital EMS capability. For some of the problems involved in Wilkes-Barre, see Blanshan (1975), although her focus is more on long-run organizational change than it is on short-run adaptation.

18. For a further analysis see Wright (1977b).

VI.

RESEARCH FINDINGS: CONDITIONS ASSOCIATED WITH DISASTER EMS

In this chapter we analyze the major conditions associated with the delivery of disaster EMS. There is first a brief discussion of what needs to be explained and the analytical explanatory dimensions that were used. The rest of the chapter is divided into two parts. The operative pre-impact conditions are elaborated, and then the post-impact conditions are examined. The chapter concludes with a very short overview of the relationship of all the factors that affect the delivery of EMS in disasters.

Explanada and Explanatia

The explanada or that which needs to be explained is, of course, the characteristics of disaster EMS as detailed in the previous chapter. But, while our research findings about the characteristics are many, in a somewhat oversimplified way they can be reduced to two basic observations: the existing EMS system, or whatever organized arrangement there may be for everyday operations, does not generally provide the necessary services at times of disasters; and there is an emergent EMS system that at least attempts to deliver the services required at times of mass emergencies. The Time One set of EMS components, integrated in a particular way and engaged in certain EMS tasks, is mostly replaced in Time Two by a different configuration of components differently related to one another and undertaking different EMS but disaster-affected tasks.

What accounts for the difference from Time One to Time Two? That is the general question we attempt to answer in this chapter. More specifically, why do most everyday EMS hospital components typically not get involved in disasters? What is the reason for the participation at Time Two of new groups or non-local EMS components? Similar questions can be asked about changes and alterations in tasks and modes of integration. What accounts for the particular patterns of search and rescue, transportation and treatment observable in mass emergencies? Why does the communication and coordination and, thus, the integration of the emergent EMS system take the form it does? These and other questions explicit and implicit in our research findings about the characteristics of the delivery of EMS in disasters need answering.

In general terms, we account for what we observed in our study by other behavioral phenomena. That is, we see the characteristics of disaster EMS as resulting from certain social conditions or factors, those conditions that make existing EMS systems inoperative in disasters and generate the emergence of new EMS systems to function at times of mass emergencies. Analytically, we sought our explanatia or explanations along two basic dimensions: that of time and of system source of influence. Along one line, we asked what were the pre- and post-impact conditions or circumstances in which the EMS systems operated? Along another, we asked what were the internal and external factors operating on the EMS systems involved? In other words, we found the characteristics exhibited in the delivery of disaster EMS to be the result of two sets of conditions: pre- and post-impact conditions; and post-impact conditions that originated either from within or outside the boundaries of

the established or everyday EMS system. It was the interaction between these conditions that gave rise to the emergence of the disaster EMS system responding in situations our research examined. Thus, we argue that there are general patterns involved relatively independent of particular accidental or historical circumstances and over and above particular personalities in any given case.

In the following analysis we do not even pretend to account for every specific finding reported earlier. We were able to describe many particular characteristics and variants of them as a result of our examination of tasks, components and modes of integration. However, a number of our specific findings were inductively derived and had not been anticipated. These kinds of findings, having not been expected, meant that we had not always gathered data relevant to an explanation of some of our empirically derived observations. But, the ensuing analysis does attempt to explain our more general observations and represents what we believe are the major conditions affecting the delivery of disaster EMS.

However, while it is fashionable to plunge quickly into explanations of phenomena, prudence dictates that first it be clearly established what is being explained. If we had gone along with popular views, common sense notions, and widespread ideas within the EMS sector itself, much of our effort would have been to explain mythological or non-existence phenomena. For, as we have shown in earlier chapters, on the basis of our research we have suggested there is much unknown and misunderstood about the very nature of disaster EMS and its basic characteristics. Thus, our research effort and analysis concentrated first on establishing the characteristics of EMS in disasters. The task of analyzing the conditions involved in the EMS disaster response could only come after this had been accomplished. One consequence is that our analysis of conditions at this time is not as complete or as systematic as is our description of the characteristics of disaster EMS. (1)

Pre-Impact Conditions

A distinction between pre- and post-impact conditions is primarily an analytical distinction. However, in the context of our analytical procedures, those antecedent factors more removed in time prior to disaster impact we treat as pre-impact conditions. We found that there were certain internal features of the existing EMS system that might affect the EMS response in disasters. Particularly important among these were the EMS system resources. Since every social system exists in some sort of larger social setting, it is not surprising that we found Time One system relationships or interorganizational relationships important to what occurs in Time Two. Finally, we considered that communities provide a large setting for the intersystem relationships within them. As it turned out, community features in themselves, such as prior disaster experiences, size, etc., did not prove to be as important as the other two factors in explaining the characteristics of EMS in disasters. Thus, no findings are reported on this condition.

System Resources

Resources can be categorized in many ways. For our purposes we drew a distinction between material and non-material resources. The former includes personnel, equipment, funding and similar items. The latter has reference to disaster plans.

Our analyses show that planning, or more accurately, its lack, is responsible, to a considerable extent, for the incapability of the existing EMS system to deliver services in disasters. On the other hand, the prime effect of other Time One system resources seems to be that they have an influence on the degree of centralization of the EMS response in mass emergencies.

1. Few community health care systems have undertaken realistic overall planning for handling large numbers of casualties. In part, this is because of an assumption made, as we found in over half of the communities we studied, that an EMS system that functions adequately during normal times will also do so in disasters.

But our research findings have now strongly documented the fact, if there was any doubt before, that everyday and disaster EMS are simply not two points on the same continuum. Mass emergencies create demands that differ qualitatively, as well as quantitatively, from everyday EMS demands. For example, disasters can produce large numbers of "walking wounded" who, while not necessarily requiring the services of a hospital ER may nevertheless intensify demands by converging on hospitals. Indeed, convergence of press, relatives, medical personnel, etc., presents a major problem in disasters, as opposed to normal EMS delivery. Another distinction between everyday and disaster EMS is that the former is designed to function with great speed in meeting the specialized problems of sick and injured individuals, problems such as cardiac arrest and multiple trauma. In large scale disasters, the medical problems of casualties tend to involve different degrees of urgency, so the speed of the response may not be crucial to effective operations; instead, the overall coordination of the response--among hospitals, between first responders, hospitals, and transporters, for example--becomes the essential task.

But coordination requires realistic preplanning. Realism demands the projected situations in which the plans are to be applied are the actual situations that will develop in Time Two. Planning that makes unwarranted assumptions of the kind indicated cannot be realistic.

2. In general, little attention and low priority is placed on planning for disaster EMS. There are, we found, isolated and scattered pockets of interest in the development of EMS planning for mass emergencies. However, such attention and enthusiasm are exhibited only by a few officials and EMS systems here and there. Overall, disaster planning is viewed as neither very salient nor very important in the typical community EMS sector. The issue does not stand out, if there is any awareness at all, and little priority is given to the matter in the daily activities and the plans for future action of existing EMS systems.

There are a number of reasons for this general state of affairs. An important one is that, in the majority of the localities we studied, there was often little resembling an EMS system for everyday purposes. To be sure, in many of these communities there were planned and organized ways of providing EMS. In fact, about four-fifths of all the areas in which we worked had some such arrangements. In a number of these places, too, the term "system" was applied to such social organization for delivering EMS as did exist. About 58 percent of the localities we studied reported meetings among persons involved in EMS delivery to discuss EMS matters. But to accept the indicated figures or the cited reports as indicative of the existence of systems, in the sense of interrelated parts forming some cohesive whole, is to be misled by surface aspects. It is one thing to have EMS components relating in an effort to provide some systematic everyday EMS; it is another to have a community EMS system. The former exists in many places, the latter in very few localities. Furthermore, the relationship of everyday EMS organized activities and disaster EMS planning is also often problematic. For example, a limited DRC analysis found that in seven cities there was a fairly elaborate radio or dedicated telephone line technology, connecting at least the major hospitals, the ambulance dispatch, and one safety force (police or fire). However, four of these communities with this kind of technology did not have an inter-organizational EMS disaster plan.

Actually, in interview comments to DRC personnel, some respondents and informants indicated that they did not see an operative system in their areas regardless of document claims or the health sector official position. In fact, a partial indication that often no real EMS system existed was the widely held view that if effort and resources were to be expended, they ought to be directed at improving the everyday EMS arrangement rather than devoted to a special problem such as disaster EMS. This view coupled with the belief that disaster EMS is merely an extension of everyday EMS, does destroy the motivation of many to work on disaster EMS.

3. A limited view of planning for EMS is taken in most community health care systems. Planning for disasters per se has a degree of acceptance in the medical care area even though it is not given much attention or high priority. Only two hospitals of over a hundred we studied in some detail did not have a disaster plan, and over 60 percent of the other hospitals had conducted a disaster drill using their plans in the six-month period before our contact. However, it was clear that in the majority of cases, the plan described what the individual hospital should do were it to become involved in a mass casualty situation; few hospitals are involved in multi-hospital planning for disasters. The individualistic approach to hospital

disaster planning is deeply rooted in the health care area.

In many cases planning tends to be limited in another respect too; often it is visualized primarily as creating improvements in technology. For example, in the area of EMS communications, there often is little recognition that at times of mass emergencies effective communications are most likely to occur where organizations have already established cooperative relations in planning and operations. The existence of many radios or even a radio network cannot bring into being a workable division of labor where one does not exist, and it is the latter not the former which becomes crucial during disasters. After-action reports, disaster critiques, disaster drills, are all marked by a frequent overlooking of such a simple point. Overall, disaster EMS planning is limited both in scope and nature. In a basic sense, there is remarkably very little disaster planning at the EMS system level.

4. In most communities there is little knowledge and understanding of EMS systems and their disaster problems. Even in communities where there are systems or partial systems, there is often widespread ignorance about the organized EMS sector, even on the parts or components within that organized arrangement for providing services. Lack of knowledge of other non-EMS organizations and community disaster planning is similarly extensive in the EMS sector. In many areas the health institutions are divorced from contact with most of the other groups involved in disaster planning or response. The converse is also true. For example, the civil defense offices that in most communities have primary responsibility for overall disaster planning often have little interaction or knowledge of the medical health area (Dynes and Quarantelli, 1977b). We also found that in the EMS world there is a prevailing misconception about the unreliable behavior of humans under extreme stress.

This kind of ignorance, lack of knowledge, and misconception all contribute to a prevalent attitude in the EMS area of either faith or fatalism insofar as mass emergencies are concerned. On the one hand, there is, among some parts of the health care sector, faith that necessary assistance will be forthcoming from somewhere in circumstances of extremely high EMS demands and that someone else has thought about the problem. On the other hand, there is a fatalistic notion among some EMS officials in some communities that all disasters are so unique or that some disasters are of such a nature that there can be no effective community response. The indicated attitudes do not lead local personnel to assign high priority to EMS disaster planning, but instead encourage a belief that if everyday arrangements cannot be used, ad hoc measures will be enough or all that can be done in mass emergencies.

In the thinking of some EMS officials is the belief that the real problem in disaster EMS is the mobilization of enough resources at times of mass emergencies. As one ER supervisor said after experiencing a tornado disaster, "if it is well stocked, if it's set up properly, a hospital should be able to handle any disaster with a minimum amount of obtaining of anything. It

should be there to begin with." Such an opinion, and it is not an isolated one, shows little understanding about what actually is needed for the EMS response in most disasters.

5. Material system resources are related to centralization of EMS response in disasters. However, our study established that the relationship was not a simple or an obvious one. We found that the size and complexity of the established EMS system's resource base, in the sense of personnel and equipment, did affect the probability of a centralized response. However, the presence of a larger number of resources made a centralized response less likely. For example, as discussed earlier, where an abundance of transporting units are available, convergence of ambulances to the disaster site often occurs with no coordination of any kind. Also, in major metropolitan areas having dozens of available hospitals, more often than not the majority of casualties are transported to one or two hospitals, clearly indicating a lack of coordination and centralization of the response. Conversely, in smaller communities with at least minimal material resources, both coordination and centralization of the EMS response is more likely to occur.

Our analysis suggests one possible explanation for this finding. It is that EMS systems richer in material resources do not coordinate well during normal times, because it is not as crucial for adequate service delivery. Therefore, they are not able to effect a centrally coordinated response in mass casualty incidents. Conversely, as the complexity of the resource base decreases, a centralized response is more likely. Since a scarcity of material resources requires cooperation across a wide range of activities on an everyday basis, such systems are more likely to continue their cooperative relationships in the disaster context as well. Such cooperation is important, for centralized responses, where actualized, do seem to achieve effectiveness in EMS delivery, where effectiveness is defined as relative equitable distribution of seriously injured patients among several EMS system hospitals.

System Relationships

Relationships between and among different social entities can be conflictive, competitive or cooperative. Usually, of course, the relationships consist, in varying degrees, of all three. However, if one dominates and consequences can be substantial.

The analysis of our data indicated rather conclusively that EMS sectors in most communities are racked by conflictive relationships. The conflicts with the local EMS system, and between it and other community sectors, are major factors in preventing, hindering and otherwise precluding the establishing of good EMS disaster planning. These conflictive relationships, therefore, are a second order condition related to the incapability of the existing EMS system to deliver services in disasters.

1. Attempts to develop EMS disaster planning almost invariably exacerbate existing conflicts within and between the local health care area and other community sectors. Our research found that political considerations, in the broad sense of the term, enter into all aspects of EMS planning and response, even in connection with disasters. Self-interested organizational actions based on city/county, public sector/private sector, and other jurisdictional distinctions are common. Examples of EMS matters over which various interest groups differ include: participation by private hospitals in publicly controlled EMS systems; categorization of hospital emergency departments; the use of telemetry and the rendering of certain forms of treatment to victims by EMT's or paramedics on site or during transport as this relates to the possibility of later legal action and the issue of patient accessibility to care. Also, even though there may be consensus about the need for funds, communities frequently divide on whether to accept or reject federal monies for the design and operation of EMS systems, since the issue of federal involvement in local affairs is a highly debatable one in many localities. The consequences of such conflicts run from the exclusion of organizations from relevant planning meetings to open charges that one set of EMS components is attempting to take away some EMS related matter from other groups. For example, in one very large city the county medical society, viewed as a "lobbying organization" by the fire department that controlled many of the ambulances in the area, was simply not invited to a post-impact critique of a major disaster operation in the area. In still another metropolitan area, private hospital officials accused the public medical sector of using an effort to unify and centralize the EMS ambulance services as a cover to "snatch" and to "steal" patients from them to fill empty beds in public hospitals.

2. EMS jurisdictional problems unsolved on an everyday basis do not get resolved in disasters. Disasters seldom occur neatly within politically convenient boundaries, meaning that organizations from a number of different EMS systems may respond to any mass casualty event. Yet in only about one-fourth of the localities examined by our research was there anything that resembled disaster planning on a regional basis. Unless pre-impact disagreements over jurisdictions have been settled by prior planning, they may result in absence of coordination, confusion in EMS delivery, and less than satisfactory patient treatment. For example, in one community DRC studied, the two key hospitals had a long standing dispute despite the efforts of EMS people to put together some type of agreement between them that one hospital would handle trauma cases and the other coronary cases. Thus, when the disaster occurred, one hospital did not call the other even though the disaster plan called for the first hospital to coordinate and tabulate casualty figures. As the key official involved said, "Our basic system there was to call over the emergency radio to X General Hospital and Y Hospital. I had neglected Z Hospital, and that was brought to my attention by their public relations person . . . and I began to count them also." On the basis of the disaster events DRC studied, we can conclude that long standing jurisdictional conflicts will rarely, if at all, be effectively settled during a disaster; they require adjudication in earlier planning. (2)

These and similar kinds of disputes frequently result in a lack of inter-organizational cooperation, which can prevent or hinder EMS disaster planning or its implementation. Sometimes when disasters occur, whatever the paper plans, the underlying antagonisms, often magnified in the planning process, can affect a disaster response more than the magnitude of the overall resources available to the health care system. Time One conflict can reduce the extent to which resources, such as EMS expertise, communications equipment, and transportation vehicles are used effectively when required in Time Two.

Post-Impact Conditions

As just indicated, certain pre-impact conditions, if present, are likely to make it difficult for the existing EMS system to respond in many mass emergencies. When these are coupled with certain post-impact conditions, the likelihood of an emergent EMS system in disasters is considerably enhanced. Essentially, we found a number of factors in Time Two that seemed to operate in this facilitating way. There are conditions internal to EMS systems important in creating a selective imbalance between disaster demands and established EMS system capability. In addition, there are other, especially situational, contingencies external to the EMS system, that can play a part in the EMS response in mass emergencies; some of these are agent generated.

Internal

Our analysis indicates that, in the face of the increased demands in a mass casualty producing situation, there is often no appropriate established system response immediately possible. The existing EMS system is unable to carry out needs assessment or to organize the interorganizational response called for in the situation. Therefore, substantial discrepancy, reinforced by socio-cultural values, exists between the demands of the disaster event and the EMS capabilities available and normally used for everyday purposes.

1. The existing EMS system usually cannot carry out appropriate needs assessment at times of disasters. The effectiveness and efficiency of EMS delivery systems depend in part upon an accurate assessment of emergency needs and an equitable distribution of victims among EMS components. In fact, the majority of community mass casualty and hospital disaster plans we have examined implicitly or explicitly assume that needs assessment will be undertaken. However, as a DRC analysis reports, "few plans actually specify who has the responsibility for such assessment, exactly how needs assessment at the site is to be done, and what criteria are to be used (Golec and Gurney, 1977: 169). The key notion of triage in disaster EMS incorporates the notion of needs assessment and attests to its importance. The negative consequences of failing to assess emergency needs at the disaster site are eventually experienced by hospitals. As we indicated earlier, for various reasons, in American society hospitals are seen as almost the only place for the giving of medical treatment.

The assessment of needs is only one side of the equation in arriving at some approximation of the total magnitude of a disaster in terms of EMS for any given community. The other side of the equation is some estimate of the current capabilities of the hospitals. The magnitude of the EMS demands on the system depends upon the extent and severity of health needs relative to the resources the hospitals can provide. Obviously, an equitable distribution of casualties among hospitals would reduce the demands upon any given hospital and would increase the efficiency and effectiveness of delivering EMS to disaster victims. What is less obvious is that an equitable distribution of patients presupposes a prior needs assessment at the disaster site. Consequently, it is the hospitals that experience the most severe effects when on-site needs assessment is neglected.

However, accurate assessment of needs requires temporary site stabilization so that an evaluation can be made. To accomplish this, either action at the site must be halted or victim removal must be controlled according to the severity of the casualty. Clearly, this necessitates that those making the assessment have control over activities and information. (3) But such control and centralization at the site rarely occurs for the various reasons mentioned earlier. In the absence of that, needs assessment cannot be done properly and victims are very likely to be maldistributed to hospitals. Consequently, while an existing EMS system often has overall capability for handling all disaster needs, one or two hospitals within it will have excessive demands placed upon them. Thus, a selective imbalance between demands and capability often exists in the EMS area after a disaster.

2. The ability of the established EMS system to organize the EMS response at times of disasters is usually limited. Research has long shown that disasters, from their very nature, are situations requiring many organized efforts to deal with the range of problems of aid, relief, rehabilitation, etc. that are generated (Wenger and Parr, 1969). Such problems cannot be met by isolated individual or small group efforts. They require large scale and organized attempts to bring help and assistance. The same is true with regard to EMS problems. If there are mass casualties, a mass and organized response is necessary. Usually enough EMS resources can be mobilized. Not infrequently, part of the problem is that many components are mobilized for disaster tasks but remained unorganized. While it is very difficult to get estimates of ratios of helpers to helped in most disasters, there is some evidence that the ratio is a function of the magnitude of the disaster. Thus, in one case, we were able to estimate that a chain reaction traffic pile up involving approximately 60 vehicles and almost 120 victims brought over 40 emergency vehicles and over several hundred emergency personnel to the disaster site. Whatever the ratio, the important point is that major EMS demand situations provoke major EMS resources response.

In itself a massive response of resources is not necessarily a problem if it is organized. Such organization by the existing EMS system is what

frequently fails to occur in disasters. There are a number of factors involved in this. There can be lack of available interorganizational expertise within the system to coordinate the EMS response. The ways by which an established EMS system coordinates its activities on an everyday basis can be good predictors of the ways by which coordination will be exhibited by the disaster response system. However, the occurrence of a major mass casualty disaster can affect the availability of normal means of coordination. As we will indicate later, the situational contingency of the time of disaster impact can be important. The availability of senior organization officials who carry major responsibilities for coordinating the medical response is more likely during the day than during the evening. Indeed, we found that centralized responses were as likely as not when mass casualty incidents occurred during the day shift, but centralized responses occurred only in a minority of instances when disasters happened during the evening shift.

However, far more important is that the existing EMS system is not accustomed to coordinating on the scale and for the problems that arise in a major disaster. The delivery of EMS to victims of isolated accidents, small fires, heart attacks, falls, etc., takes place each day on a routine basis throughout the country. In the vast majority of cases to which the existing EMS system responds, only one, or at most three or four victims require treatment simultaneously. There may be busy nights or certain peak hours during which rescue units and ambulances respond to one call after another and hospital staff work continuously, but, for the most part, the established EMS system handles emergencies involving only a handful of victims at any one time (Neff, 1977: 179).

There are also other situations in which we are interested, i.e., the mass casualty event. There are not only more victims who are thought to need attention but also many more organizations and agencies involved in the EMS response. The nature and number of the injured is frequently unknown for a long time. The search and rescue and the transporting of victims is often undertaken by elements which have converged from outside of the existing EMS system. All the other complicating factors discussed in this and the previous chapter are also present. (4) Clearly if the EMS operation is to be carried out smoothly and efficiently, there has to be coordination of the various involved groups and their personnel and accurate assessments of the total situation.

Such a large scale coordination involving a number of uncertain elements is not what existing EMS systems have to deal with on an everyday basis. In principle, disaster plans ought to allow a transition from Time One to the mass casualty situation in Time Two. However, as we have noted, most EMS planning in connection with disasters is based on wrong assumptions. Thus, existing EMS systems can neither use the familiarity of everyday operations nor the standby plans for mass emergencies to mobilize and coordinate the needed EMS response in disasters.

3. Socio-cultural values for quick EMS response are very strong in disasters. Underlying many of the individual and group actions undertaken at times of disaster impact are socio-cultural values of American society that place a great premium on quickness of action for injured persons. From the disaster site on, there is considerable emphasis on finding, transporting and giving hospital treatment to victims as quickly as possible.

At the disaster site the uninjured victims and the first responders tend to react to the situation in ways that seem "appropriate" to them but may not be congruent with an effective EMS response. Appropriateness is not seen as triage or stabilization but as movement of victims found by SR to the most proximately perceived hospital facility. This is likely to be the case even when the responders are safety organization personnel unless they happen to have had EMS training (although even the latter status is no assurance that the response will be different, especially if these personnel are not a functioning part of the everyday EMS system). Also, even when on-site triage occurs, it tends to be limited to an assessment of the conditions of specific individuals rather than being an evaluation of the mass casualty situation as a whole. Furthermore, even EMS transporting vehicles or their personnel, in the main, are not responded to as making available at the disaster site any medical expertise, judgment of priorities in care to be given, or even temporary field treatment. In many respects, those involved do not act as if there is an EMS system around; it appears that only hospitals are visible to them. Thus, almost irrespective of who does it, transport of disaster victims to a hospital is treated as the prime goal at the disaster site.

Among the consequences of lack of rushing victims to hospitals after adequate on-site triage are: the overcrowding of emergency departments; the initiation of treatment for the less seriously injured in the ER; the treatment or admission of casualties simply because of their disaster involvement rather than because of the severity of their injuries; the delay in treatment of the more severely injured. This rendering of hospital emergency care to patients who do not require it, sometimes at the expense of victims who do, is partly because of the emphasis on speed of response even though coordination is really the much more important question. To a substantial extent, this emphasis reinforces the neglect of needs assessment, the poor coordination in most disaster events, and the selective overall use of a few hospitals.

External

Social systems vary in the extent to which they operate in a routine, planned manner or, conversely, are affected by situational factors. Our research clearly indicates that the EMS system that comes into being in disasters is influenced more by post-impact situational factors than by routinized or by pre-impact institutionalized factors. Situational

contingencies resulting from such matters as time of impact, location of disaster sites, amount of convergence, and kind of information available, can all help to assure that the EMS system which is operating in mass emergencies is not likely to be the one that functions in a community on an everyday basis. Neither is the disaster EMS system likely to be the one designated by a formal plan unless that plan takes into account some of the situational contingencies indicated.

Agent Generated

1. The time of day of impact can be a major situational contingency in the EMS response. In itself the time of day as to whether it is night or day, morning or afternoon, etc. is relatively unimportant. What is important is that communities systems, and organizations operate on social as well as chronological time. That is, availability of personnel is dependent to a considerable extent on such matters as work shifts, work hours, nonworking days, etc. that are all related to the rhythms of social life. Thus, the time of day when a disaster initially impacts can be a very influential situational contingency. For example, when disasters happen during non-waking hours, coordination of response is slower to develop because of the lack of availability of key personnel. On the other hand, if there is little probability of the convergence of non-EMS transporters, as might occur during an early Sunday morning, there is greater chance that the disaster response of the EMS system will follow a predesignated formal disaster plan. Also when disasters strike during shift changes in hospitals and there is a double staff on duty, high demands on the hospital do not present the same kind of problems they ordinarily would.

Many technological and some natural disaster agents are related to social time. In general, the relationship is such in most cases as to increase the probability of great convergence as well as the number of possible mass casualties. In many cases, too, the timing is such that experienced organizational and system personnel are not always readily available, e.g., almost half of all the events we studied clustered in the period from 3 p.m. to 8 p.m., which encompasses the evening shifts in many EMS system components.

2. The location of disaster sites can be important in EMS responses. The number of sites and the relationship of the disaster impact zone to transportation routes are situational factors that can influence coordination of EMS response and victim distribution to hospitals. When there is more than one site, as was true in nearly three out of ten disasters we studied, the coordination and centralization of the EMS response is less likely. In fact, there probably is a progressive relationship between a greater number of separate points of disaster impact resulting in casualties and lack of EMS coordination. As such, diffuse disasters are more problematical for EMS systems than are focalized disasters.

However, some focalized mass emergencies, such as transportation or explosion disasters, may be as problematical for an effective EMS response, although for other reasons. If a focalized disaster occurs in a densely populated area, there is likely to be little coordination of the EMS response. There are likely to be more first responders; there is greater probability of greater convergence; it is more likely that a larger number of hospitals are available, etc. in such situations. This, can, and often does, result in loss of control at the site, more problems of coordination, and greater likelihood of maldistribution of victims among available EMS system hospitals.

Response Generated

1. The EMS response to the disaster is also influenced by conditions arising from the social response itself. The response-generated condition that seemed to have the greatest impact on the providing of EMS in the events studied was the convergence of components from outside the established EMS system into the EMS response. For example, as noted earlier, victims are often transported to hospitals by personnel and groups with no connection whatsoever with the everyday EMS system. This pattern is common even in areas where sophisticated central dispatching procedures and facilities exist. Thus, less severely injured patients typically arrive at hospitals before more seriously injured cases. Decisions about patient transport and distribution, when made by first responders who do not have medical training have obvious consequences for the hospital phase of disaster care. Intra-hospital activities are often adversely affected by the sudden and uncoordinated influx of large numbers of disaster victims. In the worst of cases, we found that regular hospital patients were neglected because of the attention given to disaster EMS, particularly since most hospital disaster plans fail to consider the important question of how they are to conduct regular patient care during precipitous mass casualty events. Additional complications generated by convergence could be illustrated but it would merely repeat what has been said a number of times already.

Overall, convergence plays a dual role. It tends to undercut the ability of the existing EMS system to function in disasters and it increases the need for an emergent EMS system to take over. Since convergence is outside of the control of any existing EMS system and to an extent probably is uncontrollable in almost any disaster situation, it is almost certain to be a factor in any major disaster with large numbers of casualties.

2. There is always considerable difficulty in having adequate communications between and among the diverse elements involved in the EMS disaster response. Because of the inability to implement whatever planning there is, and because of the convergence of multiple groups on disaster sites, establishing and maintaining lines of communications about EMS activities in a disaster are especially problematical. Information flow is uncertain, erratic, often

inaccurate and marked by little corrective feedback. To function adequately, EM systems require adequate communication input. This is absent on a system-wide basis in many disasters. Because the flow of information between system components is a major method of achieving coordination, lack of sufficient lines of communication between responding components is one of the major ways in which established EMS components are excluded from the emergent disaster EMS system.

Hospitals in particular are late among the EMS components in learning or being informed a disaster has happened, the nature and number of casualties, and when the incident is over, insofar as casualty flow is concerned. Thus, hospitals usually have little knowledge of how much and how long will be the demands on them in the situation. In actual fact, our study showed that demand time for those we studied ranged from 20 minutes to as long as 19 hours with an average demand time of 4.5 hours. However, as disasters unfold, the key EMS components where medical treatment is given often have extremely little knowledge about what to expect immediately, a situation not conducive to effective mobilization and organization of an EMS response.

Interaction of Factors

The presentation of our analysis, although indicating some relationships and linkages between different conditions, has in the main treated them separately. In actual disasters, the various conditions interact with one another, reinforcing, neutralizing or contradicting one another depending on their nature in a given situation. A full analytical model would of course specify the various combinations and possibilities, but this is somewhat premature at this point given the way we conducted our study and analyzed our data. (5)

Nevertheless, some gross relationships have been noted or at least implied. There are two in particular we wish to make more explicit. One is that while both pre- and post-impact conditions are important in what occurs, they are somewhat different in the weight of their emphasis. In essence, the emergent EMS system is somewhat more influenced by the post-impact immediate factors or what we called the situational contingencies, whereas the established EMS system is somewhat more responsive to the preconditions of the situation in which it operates. This is consistent with what has been found to affect the non-responsiveness of established systems and the emergence of new systems for providing other non-medical kinds of services in disasters. (See for the delivery of mental health services, Taylor, Ross and Quarantelli, 1976: 244).

Finally, as Wright (1977a) in an analysis of DRC data notes, the mass casualty interorganizational situation has four significant interacting constraints. Thus, cultural values place a high premium upon urgency, and the goal of getting people to full treatment is given very high priority. Uncertainty

of impact occurrence in space and time makes advance preparations, at best, difficult, and insures the operational of situational contingencies. Mobilization of EMS resources, therefore, tends to depend somewhat on situational factors mitigated, to a degree, by everyday expectations about organizing EMS delivery. However, the coordination of the activities of multiple organizations involved in each subtask of the EMS response is handicapped by incomplete information, overloaded communication channels, and absence of agreed-upon relationships for either communication or coordination. The overall result is generally a failure of the existing EMS system to provide disaster services and the emergence of a new system which roughly ties together new EMS components in a weakly integrated effort to carry out the necessary disaster subtasks of search and rescue, transportation and treatment.

With this we conclude our presentation of our second set of research findings on the conditions associated with the delivery of disaster EMS. The next chapter discusses the last set of research findings and focuses on the consequences of the delivery of EMS in disasters.

Footnotes

1. However, analysis is continuing and will be reported in later publications, some of which are listed in the appendices.
2. Disasters do sometimes lead to a temporary setting aside of Time One disagreements and conflicts (Quarantelli and Dynes, 1976). However, they seem to have this effect less in the health care area than in other areas.
3. The imagery of centralized control, of course, is taken from a military context and is one underlying many discussions about different kinds of organized disaster responses outside of the medical area. Whether the imagery is totally applicable and whether "command and control" is as desirable in a civilian context can be argued (see Dynes and Quarantelli, 1977b) although it is probably more relevant to the EMS areas than most others.
4. In some ways the problems are somewhat similar to that encountered in other aspects of disaster response. For some of the complications in organizational communication and decision making in crises see Dynes and Quarantelli (1977a) and for different situations facing different parts of organizations under great stress see Brouillette and Quarantelli (1971).
5. A theoretical paper, specifying a theoretical model derived from our study is being prepared.

VII.

RESEARCH FINDINGS: CONSEQUENCES OF DISASTER EMS

In this chapter, we first consider the implications of some necessary limitations we set on our analyses of the consequences of the delivery of EMS in mass casualty situations. The major part of the chapter is given over to a discussion of some manifest and latent consequences we were able to establish in our research. There is a brief concluding section on some possible dysfunctional aspects as a result of the providing of disaster EMS.

Limitations of Analysis

A full functional inventory of the consequences of the delivery of EMS in mass casualty situations would be a rather massive undertaking. (1) It would require tracing all the short and long run effects, the unintended and intended results, the functional and dysfunctional outcomes, etc., of the giving of disaster EMS both within the EMS sector and outside of it in other institutional areas. This would be an enterprise of a magnitude beyond any reasonable hope of completion. Thus, even at the start of our study, we intended to confine our data gathering and analysis only to consequences generally within the medical care system itself and those of a relatively short duration, i.e., in practical terms only those effects which could be discerned within the time span of our field work. (2)

As it turned out, not only did we have to restrict the analysis as much as we had planned, but even more so. It was not possible to examine all ramifications of the providing of disaster EMS for all aspects of the health care sector. In specific terms, we have to limit ourselves to looking at certain key organizational and interorganizational features of the EMS delivery system as these were suggested by our theoretical framework. More particularly, our analysis looked primarily at three major clusters or sets of functional consequences: manifest, i.e., recognized and generally positive effects; latent, i.e., unrecognized but evident in the main positive outcomes; and dysfunctional results, i.e., those with seeming negative effects insofar as efficiency and effectiveness of the EMS disaster response was concerned. Within the manifest consequences, we looked mainly at effects on the community and organizational disaster planning of EMS components, how and to what extent learning occurred as a result of EMS delivery in mass emergencies, and what might inter-organizational and intersystemic diffusion of knowledge about EMS response. As to latent consequences, our focus was on new linkages forged between and among EMS components and on factors affecting barriers to more effective and efficient EMS response in any kind of mass emergency. Dysfunctional consequences were treated as those effects which appeared to work against implementing planning for mass emergencies or a recognition that there was a need for EMS disaster planning.

Restricting our data gathering was realistic and allowed a handling of possible specific consequences. However, our approach, given the way it proceeded, treated different outcomes of the delivery of disaster EMS as if they developed in isolation from one another. A limitation of our analysis, therefore, is that it could not fully take into account the

simultaneous operation of two or more consequences which could reinforce one another, mutually cancel one another, or pull in tangentially different directions. For planning and operational purposes, this approach does not provide the strongest insights, but, to a considerable extent, the analytical strategy followed was forced upon us by practical limitations of the time and effort which could be mounted in our research endeavor. Even within its limitations, our multifunctional analysis of the consequences of the delivery of EMS in disasters is the first large scale and systematic study of its kind ever to have been undertaken.

Manifest Consequences

1. If there is ongoing EMS disaster planning, the experience of a disaster is likely to accelerate that planning. Almost half of the locales we studied had instituted community-wide disaster drills involving EMS components. This represents a change from earlier patterns where drills, if conducted at all, tended to include only single components or at least only a few components without the involvement of the most relevant community organizations. It was noted some time ago in research studies that the hospital-medical sector in any given locality tends to plan and to carry out disaster drills rather independently of other public safety and emergency response units in the community (Quarantelli, 1970). Typical was a situation we looked at where the hospitals and Red Cross in a city of over a half million jointly conducted disaster exercises, but totally separately from the local police and fire departments, even though the latter provided almost all the EMS transportation on an everyday basis. Thus, the movement towards integration of the established EMS system with the disaster preparations of other local systems is a definite improvement over the past. However, it seems that it is not disaster experiences per se that are responsible for change. Rather, it is the combination of ongoing planning and a mass casualty experience that sometimes leads to acceleration of whatever planning is underway. The same general pattern has been noted in other disaster studies with respect to post-impact organizational changes in other institutional sectors (Anderson, 1966).

The involvement of the EMS sector with other community components and systems is doubly important because, as noted earlier, at times of disasters, the responding EMS system does not have full control over the flow of patients into the system. While community-wide disaster planning does not eliminate this problem, it cannot help but improve the interaction between other community components and the emergent EMS system at times of mass emergencies. If nothing else, pre-impact disaster preparations of the kind indicated sensitizes at a very minimum the non-medical health sector to the existence and operations of the EMS world. Except to some limited subsegments of some public safety agencies, this world is more foreign to other responding components in large scale emergencies than is generally realized. Time One contacts by the EMS system with at least some of the other community groups who are likely to engage in

SR and the transportation of victims means that the disaster time interactions might not be between total strangers and organizations who have no knowledge about one another's activities. (3)

Furthermore, disaster planning without realistic exercises can be worse than no planning at all (Quarantelli, 1977). To the extent that the EMS plans are tested in community-wide drills, any significant flaws or weaknesses in the planning should be revealed. However, for this to occur, it is necessary that the drills be more realistically carried out than is usually the case in exercises of hospital disaster plans. Such exercises are often instances of play acting walked through by unwilling or uninterested participants and from which no lessons can be or are learned. In those communities we studied in the wake of a mass emergency, the better disaster plans were being developed by those whose drills had approximated as closely as possible a real disaster situation, which in most cases were rather different from everyday EMS operations.

2. There is a tendency for disaster-impacted EMS response systems to attempt to learn from the experience. This tendency is, however, rather limited. Group critiques and afteraction reports of the EMS disaster response were carried out by about half of the communities we studied. However, in many cases, these self examinations were more intraorganizationally directed than they were aimed at examining the overall system. Thus, they constituted more instances of learning by a few system subcomponents than an evaluation of how the overall EMS response had been carried out and where weaknesses or problems had appeared.

Furthermore, seldom in such organizational self examinations were assumptions questioned or the basic response model, whatever it was, challenged. Thus, it continued to be assumed that the hospital should and would continue to be the major place where all casualties were to be treated. Similarly, if there had been convergence at the time of the disaster, solutions were thought of, for example, in terms of having more security guards available in the parking lot, and not in terms of whether the convergence might be diverted in some way. In our research, even in the worst handled EMS situations, we did not find a single case where the disaster experience led to a total reexamination of the organizational stance and planning for mass emergencies. To the extent that the experience was used, it was for very moderate reform rather than revolutionary change.

Nevertheless, several perceptual lessons are often derived from the critiques and in the afteraction reports. For one, it was often realized that the disaster plan had very seldom been followed to any great degree. In fact, it sometimes is discovered that key personnel either had not fully understood the plan or perhaps had never known their roles in it in the first place. More than once in the aftermath of a disaster, it was realized that the plan had been written in terms of

specifically named persons rather than organizational positions. Perhaps the most frequent and important discovery is that in a disaster situation, many factors are present that were not envisioned or not fully recognized in the Time One prepared plan, e.g., the massive convergence by non-medical personnel on the hospital, the appearance of the slightly injured before the more seriously injured, the inability of the hospital to obtain any reliable feedback from the disaster site, the presence of more than enough trained personnel but the lack of organization in their use, etc. To the extent that these and other matters are recognized and taken into account, a limited amount of organizational learning does take place in some EMS components after disasters.

3. Preplanned potential mass casualty events have not generally been used for disaster purposes so far. Many communities do not attempt to organize medically ahead of time even for preplanned large assemblages of people in a parade, celebration, political or religious ritual, festival, sport events, etc., where a potential for disaster from the sheer number of persons involved, is substantial. In these instances, as our work shows, the general assumption is made that the everyday EMS system or the existent disaster plan would take care of the situation if a mass casualty situation arose. Obviously in these instances there is no specific preplanning for these kinds of events. But, as far as we could ascertain, even where there is such preplanning, little extrapolation is usually made from the preplanned situation to other kinds of potential or actual disaster situations. In many respects, the events being discussed are treated as special events with the implication therefore that they have little comparability to other situations which might also involve mass casualties. Thus, in some localities, the regular disaster planning and the planning for the special events are treated as almost two distinct, separate kinds of phenomena for EMS purposes.

Yet our research suggests to us, if not to EMS personnel, that the preplanned EMS situations studied by DRC could serve as manifest prototypes for disaster EMS planning. Instead of being two distinctively different kinds of situations, the preplanned events and the actual disaster events generally have far more in common with one another than do everyday EMS situations and actual mass casualty incidents. The contexts for EMS operations are often rather similar. For example, in both situations there are usually blocked roads hindering vehicular movement and the transportation of patients, the need to continue to provide regular everyday EMS elsewhere, as well as EMS required by the event, and a high ratio of many victims with minor injuries compared to the presence of a few life-threatened cases. For a variety of reasons, the implications of these and other contextual similarities which could be mentioned between preplanned events and actual disasters have not been recognized.

Equally, if not even more important, is a general failure to recognize that the preplanned EMS response frequently has additional implications for disaster-related service delivery. Our examination of on-site triage

and treatment in preplanned events such as Mardi Gras and the Bicentennial celebrations indicate their effectiveness in relieving the distress of those sustaining minor injury and in lessening demands on ambulance services and hospital emergency departments.

Similarly, the EMS response in preplanned events also suggests that considerable effective preplanning for mass casualty situations can occur. It is simply not true, as some of our respondents and informants in the EMS area said, to paraphrase them, "When you have very large numbers of people in an unusual situation, you can't plan anything." The EMS success in handling casualties in the preplanned events we studied indicate that there can be both effective and efficient planning and response in actual and potential mass casualty situations. (4)

4. There are very few formal or informal means for manifestly learning about EMS operational problems and useful innovative solutions elsewhere. Organizational critiques and afteraction reports, as noted previously, are beginning to be more common and can contribute to learning from the group's own experiences. However, whatever organizational learning about disaster EMS may occur, there are few ways available for allowing others--apart from the group and in some cases the local EMS system involved--to learn from the disaster experience. To be sure, as indicated in Chapter I of this monograph, there is a body of EMS literature consisting mostly of anecdotal accounts and partial case studies which continually report on some of the experiences. But we ran across little evidence that most of this material gets to or is heeded by medical disaster planners, hospital administrators or EMS operational personnel. What is lacking are general mechanisms to enable different EMS systems to share relevant information about their problems and solutions in similar kinds of disasters.

Of course, sharing of experience would be worthwhile only if what is communicated is valid. As we have noted a number of times, our research indicates that this is not always the case. Even EMS systems and their personnel who undergo a disaster do not always fully understand the nature of what occurs, and may at times badly misinterpret their experiences. Furthermore, as also already noted, the EMS disaster response is frequently viewed in organizational rather than system terms.

However, assuming that sharing of disaster experiences is worthwhile, the fact is that appropriate social mechanisms and structures for diffusing relevant knowledge do not exist. In DRC studies of a few years ago on the transfer of knowledge on the handling of civil disturbances by police and fire departments, a significant difference was found between the two above mentioned groups (Kreps, 1973). Partly as a result of federal leadership and funding, an elaborate network and means for the diffusion of knowledge about police problems and solutions in riot situations developed and greatly contributed to the professionalization of American police forces. This was a major consequence of the civil disturbances of the 1960's. The same situation did not prevail among fire departments. Similar mechanisms and networks as the police had did not

develop and enable a nationwide diffusion regarding the experiences of fire organization in riots. Among fire groups, when compared with police, there were far fewer conferences and workshops, the writing and circulating of manuals and syllabi, and the use of publications in formal education and in-service training as a result of their experiences in the civil disorders. The EMS sector today is much closer to the situation of fire departments than it is to police departments insofar as mechanisms for learning about disaster EMS operational problems and useful innovative solutions are concerned.

Overall, there are few institutionalized means, except almost accidental ones, for organizations outside the local EMS system, even within the same community, to draw implications from a disaster situation. There are practically no methods available for sharing useful innovations and operational problems in EMS systems with other communities having similar disaster experiences. If manifest consequences of the delivery of disaster EMS are to be brought into being, such means have to be established.

Latent Consequences

1. Disaster or mass casualty-created EMS linkages sometimes have positive results in the EMS sector outside of the disaster area. In addition to the more direct effects we have just discussed, our research found disaster EMS experiences produced some rather unanticipated non-disaster related consequences for the systems having undergone them. Perhaps more important was the discovery that the establishment of disaster linkages among EMS components sometimes led to an increase in cooperative interaction among system subunits during normal times. This was often particularly evident in the preplanned events studied. New relationships, often involving new organizations, were operative in these settings and these relationships extended into everyday EMS activities.

We noted in the previous chapter that many local and established EMS systems are racked by disagreements, disputes and conflicts. However, sometimes as a result of trying to work together either in a preplanned event or an actual disaster, certain positive ties between EMS components are established or reinforced. This occasionally led to more cooperative and less hostile relationships on an everyday basis regarding matters which have nothing to do with disasters. Such an outcome is a latent consequence of working together on disaster-related EMS problems. It suggests that in evaluating the consequences of the delivery of disaster EMS, a wider perspective be used than simply a disaster-bounded focus.

However, this unexpected consequence of providing disaster EMS should not be overstated. In communities where relationships are very bad among the EMS system components, efforts to work together in a disaster or potential mass casualty situation may not have any noticeable consequences of a positive sort on intrasystemic ties. In one locality studied by DRC, the relationship between the public and private sectors of what

passed for an EMS system was so permeated with suspicion and lack of trust that, while individual hospitals were willing to cooperate with DRC and to provide directly to DRC some EMS data in connection with a preplanned event, many of the institutions did not want to have that same information become known to other EMS components. In other localities, cooperation at times of a disaster does not seem to have any effect on already poor everyday relationships. Thus, while there are circumstances where disaster or mass casualty-created EMS linkages may have favorable effects in the EMS area outside of disaster issues, it is far from a universal outcome.

2. Disasters magnify for some EMS personnel the generally poor record-keeping procedures in the EMS area. As noted now a number of times, the everyday tendency of EMS deliverers to give relatively little attention to standardized record keeping is even more marked in disasters. Many EMS personnel dismiss the matter of records as even less meaningful at a time of processing mass casualties. What is valued and acted upon is quite clear. To paraphrase a nurse in one disaster, "With bodies pouring in through the door, it didn't make much sense to try to obtain detailed information on everybody. On a daily basis, someone can get that kind of information, but when you've got a lot of patients coming in all at once, there's no one who can waste time on that kind of stuff." Thus, even the normal EMS record-keeping procedure is frequently set aside in emergency rooms at times of disasters.

However, we did find in our work that a few EMS officials came to realize, as a result of a disaster experience, that accurate and systematic record keeping is not only important in Time Two, but is just as crucial during day-to-day operations. They perceived, apart from the creation of difficulties with respect to victim identification and cost billing, that lack of records prevents any intelligent and systematic assessment of the quality of the medical care given. But equally, they understood that accurate and complete record keeping was necessary in Time one as well as in Time Two. If proper records are not kept on an everyday basis, there is not even the possibility of daily habits being carried over into a disaster context. Furthermore, if Time Two EMS is to be evaluated, it has to be measured against, or at least compared with, something, and a meaningful point would be everyday EMS activities. Finally, these same few officials perceived that much of what occurred in the providing of everyday EMS, given the paucity of records, rests in the realm of speculation and guesses. Thus, as a result of their disaster experiences, some EMS decision makers have been moved to press for the improvement of everyday EMS record keeping. The significance of this unexpected or latent consequence of providing disaster EMS should not be exaggerated, but to the extent it has occurred, it is an interesting outcome of delivering EMS in mass emergencies.

Dysfunctional Consequences

Because of the cultural values involved, the general providing of disaster EMS might be seen as having only positive or functional consequences, even recognizing that the effort to do so might not always be carried out

well. However, sociologists have pointed out for decades that the presence of good intents and motives does not necessarily mean that a functional outcome or the attainment of laudable goals and objectives is assured, and vice versa. This is merely another way of saying that a "good" personal or social entity may generate "bad" results and that a "bad" personal or social entity may produce "good" outcomes. The correlation between the nature of the entity may produce "good" outcomes. The correlation between the nature of the entity and the consequences is far from perfect. We find this also holds true for attempts to deliver EMS in mass emergencies. Some of the effects are dysfunctional or negative.

1. That an EMS response always occurs in disasters sometimes discourages greater attention to better planning. We did not find in our study, and we would not otherwise have expected to encounter, a disaster situation where there was not some kind of EMS response. The response often left much to be desired from the viewpoint of efficiency and effectiveness or whatever other criteria of goodness might be applied, but good or bad, there was always some sort of effort to provide EMS. This observation may seem obvious and insignificant. However, it is neither expected nor unimportant if certain matters are considered.

For one, that there is always an EMS response would not be predicted from some of the writings on the subject. In discussions of EMS and even in some impressionistic reporting of EMS delivery in mass casualty situations, the imagery of great confusion and widespread chaos presented sometimes conveys an impression of total collapse in the effort to provide services. But this is not the case at all. Just as human beings very seldom collapse in the face of great stress, similarly organizations and systems very rarely do so either, even in the midst of a community crisis. (5) Activity rather than passivity is the hallmark of human and group behavior at times of disasters (Dynes, Quarantelli and Kreps, 1972: 15-37). Some sort of organized effort to provide EMS always occurs, at least in American society. (6) It may be more or less organized, it may be slow or fast, it may be done well or badly, but something is always done by way of EMS when there are casualties.

This can be rather dysfunctional insofar as attention to disaster planning is concerned. EMS participants at the very worst see themselves as "muddling through," as not leaving victims unattended and as giving some attention sooner or later to anyone who needs critical care — or to paraphrase the words of one DRC respondent, "In time, we got to everyone who needed to be looked at." But it is not only that the situation is defined as one that is eventually handled in some way. This perception, which is a correct one at a certain level, is coupled with another fact. This is, as we have indicated a number of times, that for a variety of reasons the EMS system has no real capability to evaluate the quality of the medical care it gives at times of disasters. Thus, it becomes easy to overestimate the quality of the treatment provided. Or at least, there is nothing solid around to challenge a positive view about what was done at the time of the disaster. In a sense, almost no matter what happens, the EMS response can be seen as "succeeding," given the operation of the factors we have just indicated.

If there is any success, pressure to bring about change is removed, although clearly more is needed than pressure. But in most cases, one possible element for paying attention to better disaster planning is absent from the Time Two period. In certain other areas of disaster response, there remain visible signs that the response was ineffective or non-existent, but this is not an operative factor with respect to the EMS response.

2. It is very difficult for EMS personnel to recognize the qualitative differences between the everyday EMS system and the disaster EMS response. In our study, we found that a few key officials and operational personnel in some EMS systems are beginning to accept the fact that mass emergencies present EMS demands differently from those arising during normal operations. However, this kind of perception represents a very definite minority viewpoint. The vast bulk of EMS personnel in almost all systems just do not see a difference. The various factors responsible for this have already been discussed and need not detain us again.

However, it is the dysfunctional consequences of such a perception or misperception that we want to note here. Actually, there are a number of negative effects. Obviously, if there are no differences in the two situations, the existing EMS system can be used as the basis to meet a disaster situation. Disaster planning need merely extend what is planned for everyday operations. There is also no need to raise the question whether there is any alternative to hospital EMS treatment for most disaster victims. But if there is a difference between everyday and disaster EMS, then a radically different perspective needs to be taken towards current EMS policies, planning and practices. To the extent a difference is not recognized, this is very dysfunctional for disaster EMS.

This description and analysis of the consequences of the delivery of disaster EMS concludes the presentation of our research findings. We now turn to a discussion of the implications and limitations of our research before advancing some recommendations about what should be done with respect to the delivery of disaster EMS.

Footnotes

1. An example of the kind of functional inventory which can be attempted in an area is one spelled out by Wright (1964) for the field of mass communication.
2. While we could slightly expand the time range of our analysis by obtaining information on past factors which affected the contemporary EMS system or response we were considering, we could not in practice trace more than a 22-month period, the maximum length of our field work. In actual fact, we collected data over much shorter time spans since there were not many occasions when we could restudy a particular impacted community a long time after the disaster event. So we were limited even in studying short run effects.
3. In a study of local civil defense systems, Dynes and Quarantelli (1977b) found that normal time contact of any kind between the civil defense office and other community organizations was very important in giving the office saliency and legitimacy at times of disasters. The Time One contacts meant that Time Two interactions were therefore known both as to personnel and functions.
4. It is true that none of the preplanned events which we studied eventuated in a disaster situation, i.e., one with a sudden number of casualties. Nevertheless, the situations we looked at involved the potential processing of hundreds, if not thousands, of EMS patients. Furthermore, at another level there simply are a great number of situational similarities between preplanned and actual disaster cases.
5. There is a parallel view frequently expressed by persons unfamiliar or unexperienced with disaster behavior. Along one line, individuals are assumed to be dazed and disoriented by disaster impact and unable to respond. Along another line, organizations are seen as being overwhelmed by disaster impact and not able to mount a response. The evidence from disaster studies by social scientists in the last two decades clearly supports neither view. In fact, the data points in just the opposite direction. Those persons who experience disasters are not immobilized by even the most catastrophic of events. They are neither devoid of initiative nor passively dependent and expectant that others will take care of them and their disaster-created needs. In fact, disaster victims sometimes insist on acting on their own, as when they bring themselves or others to hospitals for medical care without waiting for the actions of any public authorities or formal agencies. Likewise, the same is true of local organizations in an impacted locality. If such groups had any viability in Time One, they will respond in some way in Time Two. The myths about the passivity of disaster victims and the inactions of agencies are widespread and deeply rooted, but are simply not true.

6. The extent to which an organized response occurs in massive catastrophes in underdeveloped countries is an open question so far. However, it should be noted that in many cases such geographic areas do not have much capacity to provide any kind of medical services on an everyday basis. A disaster may, therefore, not change anything but simply leave the situation as it was in Time One.

VIII.

IMPLICATIONS AND LIMITATIONS OF THE RESEARCH

In this chapter, we first consider the overall implications of our research findings and then indicate some of their limitations. This discussion is to set the stage for the recommendations presented in the next and last chapter of the monograph.

Implications

What are the limitations of our work? What can we conclude about the delivery of EMS in disasters? What sort of overall judgment about what we found is possible?

We did not conduct a standard evaluative study as such (See Weiss, 1972, for a discussion of evaluation research.) There was no measurement made of the extent to which EMS system goals were being met. Indirectly, our research involved an assessment of EMS delivery in disasters. The assessment of any delivery system can be made from a variety of different standpoints. In general, for the reasons given and as stated in Chapter IV, our approach was to focus on process rather than outcome indicators or variables. (1)

According to our research, the disaster EMS area shows a large number of crucial weaknesses and manifests a variety of serious problems. The area is marked by widespread lack of knowledge, both of disasters and of EMS systems operations. There is not even an understanding of the fact that disaster EMS is not delivered by the everyday EMS system. Much of the planning is either inadequate or based on incorrect notions. There is a failure to recognize the crucial fact that the outer boundaries of the emergent EMS system at times of disasters is represented by first responders who often are not EMS or related personnel; thus the system has little control on its most significant input, i.e., the flow of patients into the health care complex. Response at times of mass emergencies is characterized by lack of overall control and poor communication, resulting in maldistribution of victims and inefficient use of EMS personnel and facilities and with resultant gaps, overlaps, conflicts, etc., among the EMS components involved so as to make suspect the quality of the EMS health care provided. There is little appreciation of the central fact that many of these difficulties stem primarily from a lack of disaster time coordination and are not rooted in either the technology or the medical care skills available.

Though the everyday EMS system prepares for disasters, it is an emergent EMS system that actually responds at times of mass emergencies. When a disaster occurs, there is a mobilization of the regular community EMS components, personnel, facilities and resources, but these are joined--sometimes overwhelmed--by other providers of EMS services, often by elements totally outside of the health care and related area complex. After a disaster is over, even if the everyday EMS system attempts to learn from the event, it finds neither the social bookkeeping means, such as records, nor the social entity, such as the EMS system itself, capable of taking advantage of the lessons learned from the experience.

More than two decades ago in an impressionistic essay on "Emergency Medical Services in Disaster," Williams and Rayner said:

From the broad organizational viewpoint...the problem of medical services, like other services...is essentially a management problem of getting the right services and the right victims together at the right place at the right time...Supplies, transportation and communication are not enough by themselves. They are tools which require planning and organization (1956:659-660).

This is quite similar to our conclusion that the inefficiency and ineffectiveness in the delivery of disaster EMS is because the necessary planning and the required organization is generally absent when the disaster occurs. The emergent EMS system represents an informal effort to organize an appropriate collective response,(1) but it cannot help but fall short of what might be desirable.

We might conclude from the above quotation that current delivery of disaster EMS is not different from past service in disasters insofar as efficiency and effectiveness is concerned. What if comparison is made between current everyday EMS services and the providing of disaster EMS? Our study only examined the everyday or established EMS system indirectly. However, other analysts have made examinations or evaluations of present day delivery of EMS. Thus, a National Academy of Sciences recent report commenting on the deficiencies in the daily delivery of emergency care noted:

Emergency medical service is one of the weakest links in the delivery of health care in the nation...few at site of accidental injury or sudden illness are trained in the fundamental restoration of breathing, control of hemorrhage, or splintering of fractures. The majority of ambulances...are inadequate in space and equipment and are manned by individuals with inadequate training...Many ambulances lack radio communication even with their own dispatchers. Communications rarely exist between ambulance and hospitals so that most patients arrive at emergency departments without prior notification...(Committee on Emergency Medical Services, 1972:3).

The wording may be slightly different, but, obviously, many of the same general problems as we found in our study are being pointed to. The conclusion reached about daily EMS is a comparative one, i.e., "one of the weakest links in the delivery of health care." Our research suggests that disaster EMS is no better and probably worse in some respects, than everyday EMS. Using the above conclusion, we can say that, overall, the delivery of EMS in mass emergencies is not very good, either in absolute or relative terms.

It would be misleading to imply that this rather negative implication is all that can be drawn from our research. While the foregoing comments do paint a bleak picture of disaster-related EMS planning and operations, there are at least four positive aspects about EMS in mass emergencies that should not be ignored. We found instances in our field work where the EMS disaster response was reasonably efficient and effective, some harbingers of positive changes, and several vantage points for improving disaster EMS. Finally, desirable modifications in planning and responses in mass emergencies do not require new major financial expenditures, massive reorganization or the creation of new technologies.

In our field studies, we found few instances of disaster EMS that could be evaluated as "good" by almost any criteria. However, the important point is not the variety of good responses but the fact that they can occur. At minimum, it means that there is nothing intrinsic or inherent in the providing of disaster EMS that totally excludes the possibility of a good response. The absence of convergence, coupled with extensive Time One disaster planning, seem particularly crucial in generating such a response, although not the only factors involved. It may not be possible to generate these and other relevant conditions across-the-board at all times for all local EMS systems. But the evidence is that, at times and for some community systems, the ideal can be distantly approached. It is not an impossibility.

Our study did not last long enough to be able to assess methodically changes in EMS systems as a whole over time. In looking into the past history of the systems we studied, we discovered that some alterations in perceptions and behaviors had occurred. For example, key officials and operational personnel in a few EMS systems had recognized the fact that mass emergencies present EMS demands different from those presented during normal operations. In still other communities, disaster linkages among EMS components, as well as with other emergency organizations, are increasingly being forged. In some localities, too, community-wide disaster drills are being staged, a considerable improvement over no drills or those in the past which tended to involve only EMS components or maybe even only some of them.

Another positive indicator for the future was what our research discovered about preplanned EMS situations. Such planning leads to new relationships, often involving new organizations quite suited to the necessary tasks in these settings. A distinct emergent EMS system functioned quite adequately in caring for non-acute cases and in reducing demands on EMS components responsible for the care of true emergencies. There are clear implications of EMS delivery in preplanned events for disaster-related service delivery, although few have yet recognized them. In addition, our research noted that, contrary to the everyday EMS situation, the substantial majority of disaster victims do not have urgent medical problems and that, therefore, speed of response is not an overriding consideration. (2) However, coordination in the mobilization and use of all the required resources needed to cope with a mass casualty-producing event is a crucial matter. Attention paid to the issue of coordination in planning and in operations could improve considerably the efficiency and effectiveness of disaster EMS.

Our research also leads us to the conclusion that most confusion and gaps in EMS delivery in disasters can be ameliorated by means of better planning and organization among EMS system components. There is little to indicate that to prepare for a good disaster response will require the outlays of vast sums of money, the huge elaboration of a new EMS system structure, or the invention of new technical facilities or procedures. Of course, this is not to argue that more EMS resources are not needed in many communities; indeed, in some localities, the need for resources to train EMT's, to obtain properly designed ambulances, or to develop an adequate radio network is so great as to render ineffective even everyday attempts at EMS delivery. But even without additional resources, there is great potential for improving disaster EMS system responses if organizations learn about themselves and disaster behavior, if they plan together and with other relevant community groups, and if they give high priority to coordination of effort. There is no need to institute a brand new EMS program to improve disaster EMS; there is need to make alterations and changes of the kind implied and which we explicate in the recommendations advanced in the next chapter.

Again, our general view, although based on research rather than personal impressions, is not dissimilar to some of those who have approached the larger matter of EMS from a different perspective. Thus, Jelenko and Frey, commenting on the remarks of twenty-eight national leaders, mostly physicians involved in improving the organization and delivery of emergency care to the acutely ill and injured, state that most:

saw the deficiencies in current emergency care, not so much as the result of a lack of skill and technology necessary to deliver such care, but rather as the result of a lack of planning, coordination and organization of those elements necessary to effectively care for this patient population (1976:xi).

The convergence of the views of the leading practitioners cited with our research view about the overall EMS picture is of interest, although it is only fair to note that they were talking of EMS generally, whereas our conclusion is about disaster EMS specifically. Furthermore, some of our empirically-based findings are not totally congruent with all implicit or explicit beliefs of many practitioners, for example, that disaster EMS is but an extension of everyday EMS. Nonetheless, it does seem significant that the solution to the EMS problem, however particularly it may be seen, was perceived in both views to be sought by differently organizing the services involved.

It might be thought that, given the picture of disaster EMS we have outlined, there might be considerable spontaneous pressure and much effort at modification and innovation. This is not the case. At the present time, major changes in EMS system disaster planning and response are neither being undertaken nor are they probable unless certain steps, such as we recommend later, are forcefully implemented. Efforts at

change are not probable, as we see it, for two general reasons. First, major changes could only realistically occur if there is a willingness to make necessary modifications or alterations in existing structures or procedures. Such a willingness is not widely shared at present to any great degree in the EMS world. Second, major changes are very unlikely in any situation where the matter at issue is not salient. While it may occasionally be spotlighted, the question of disaster EMS is not in the forefront of issues plaguing the EMS area. It seems unlikely that disaster EMS will be given very high priority for attention and change in the near future.

There is little willingness in the EMS area to make major changes regarding disaster EMS. Efforts to alter existing arrangements normally are not undertaken if the parties involved do not foresee that different ways of doing things are possible. However, as we have implied throughout the monograph, relatively few officials and local EMS systems see possibilities, so there is little willingness to try.(3)

To be sure, research as we have undertaken it, or knowledge derived from research into disaster phenomena generally, if called to the attention of some, might open their perceptions of what might be possible. But solid knowledge of either disasters or disaster EMS is presently very scanty in the EMS area. Such beliefs as do exist regarding either mass emergencies or the delivery of services in mass casualty-producing situations are currently not very supportive of the notion that change is either possible or desirable.

But willingness itself, even if present, would not be enough. There must also be a capacity to implement desired changes; within the EMS area, such capacity exists only in limited quantity. As we have noted numerous times now, the emergency EMS system after disasters can exert only limited control on the patient flow or input into the system. Disaster situations are such as to preclude EMS system control over disaster victims' entry into the system, preventing total within system planning. As Williams and Rayner, in their impressionistic essay, said: "Perfect control and organization of the rescue effort is probably impossible" (1956:658). To the extent that this is true, the initial search and rescue, any possible triage, and how and when victims get transported to hospitals is out of the control of any prior planning activity. As we shall note later, this observation does not imply that nothing or very little can be done; it does, however, suggest that, apart from intent and willingness, there are outer limits to what can be planned ahead of time by the everyday EMS system to activate after disaster impact. The capabilities of any system can be altered deliberately and ahead of time just so much in the face of an uncertain source of demands on the system.

In addition, as stated earlier, there is little impetus for change, because disaster EMS is not that salient in the EMS or health care area generally. A single catastrophe involving hundreds of casualties, particularly if there were serious problems which came to public awareness in the handling of the injured, would undoubtedly, at the time of its occurrence, lead to

calls for immediate reform and change. But such horrendous kinds of mass emergencies are rather rare in American society, and, even when they do occur, seldom lead to any significant later follow-up to post-impact calls for action. Social science research does not support the notion that even major disasters automatically or always evoke organizational or system change (Anderson, 1969). If actual incidents seldom serve as a fulcrum for change, there is even less reason to believe that threat alone of a potential catastrophe, however massive, will generate much movement towards the initiation or alteration of preparations for disaster EMS.

Equally as important is the fact that the EMS area is racked with a variety of important political, legislative, administrative and operational problems (Jelenko and Frey, 1976). The area, as a policy matter of federal responsibility, has just recently survived U.S. Congressional action, but since only a three-year extension of the basic law was written, another struggle for survival will soon necessarily start. When the overall area itself has to fight for existence and support, when national implementation is so far short of what is mandated by law, and when local unwillingness to commit to regional EMS systems is more than apparent, what will be ranked high for attention and action will be but one subpart of a total and elaborate activity marked by confusion, disagreement and conflict. The disaster EMS problem does not have and reasonably cannot be expected to be given much priority in thinking and attention over other EMS questions and issues. Such an expectation would be totally unrealistic, particularly if efforts at change were left to spontaneous development, as is the situation at present.

Limitations

The implications that we draw from our research about the poor quality of disaster EMS and the unlikelihood of the initiation of much effort at EMS system change could be, at least tentatively, qualified. Our research, while comprehensive and by far the most systematic ever undertaken on disaster EMS, was limited in some respects. There were limitations both of design and execution. We initially did not have a clear-cut hypothesis for testing. We were mostly, although not totally, confined to studying such mass casualty events as occurred during the course of the 22 months in which DRC carried out field work. A tighter research design and a different set of actual disasters might have led us to feel we had a stronger or weaker base for some of our conclusions. (4)

Furthermore, it might be argued, and not without reason, that we did our studies as the regional EMS systems were being established, that our research was not on long established EMS systems, at least in the form they are intended eventually to assume under the basic EMS legislation. Young systems do have different characteristics than older ones; their shortlived past histories mean they are more subject to the vagaries of the immediate situation. Thus, we were looking at EMS systems that had not had a chance to become fully institutionalized and to develop

deep roots in the community. Therefore, it could be said that the results of our research are being somewhat unfairly extrapolated from young and new EMS systems to the more established and rooted EMS systems which will exist in many American localities in a few years.

Both points are probably true. There were limits to our research work; we did examine evolving systems. However, we would not expect substantially different results if more, but similar, research were undertaken or if we were to study now what would be more mature systems. For example, it is almost impossible to envision what disasters we could study where it would be possible for the EMS system to control disaster victim flow into the system. This is a factor inherent in the nature of disaster situations. Similarly, maturity of a system seems highly unlikely to change certain important EMS disaster aspects. For example, the age of a system would not seem to have any bearing on the fact that, in the vast majority of cases, an emergent EMS system will have to take over from the everyday EMS system at times of disasters. Again, this is a factor inherent, for the most part, in the nature of disaster situations. Thus, while the limitations of our study suggest cautions, they do not call for suspended judgment; even if the indicated limitations of our work were removed, our research observations, findings and conclusions would not likely vary much from what we have presented.

The need for more study cannot be used as an excuse for delaying attempts to bring about changes with respect to disaster EMS. In fact, there are at least four positive reasons why something should be done: EMS systems are here to stay; mass casualty-producing situations will increase in the United States; inaction is inconsistent with American definitions of a social problem; and whether something should or ought to be done, something can definitely be done.

Although the turmoil associated with recent extension of the basic EMS law might have suggested that the termination of the federal program was a real possibility, that was more appearance than reality. It is extremely rare in American society for something established by law on a national level suddenly to be terminated. National programs can change through time, they may be absorbed into others, but complete elimination is an almost unheard of ending. In fact, if Gibson's recent analysis (1977) is correct, the federal EMS program will almost certainly continue in the absence of evidence of its viability or documentation of its efficiency and even with little indication of solid local community support for the whole operation. Actually, there are signs that there is serious thought being given to using the EMS system as the keystone in the creation of a nationwide primary care delivery system (Boyd, 1976; Perlstadt and Kozak, 1977). This augers very strongly for a continuation of the program. If EMS continues, the mandate for disaster linkages is also very likely to continue; therefore, something can and should be done about what our research suggests is poor delivery of EMS in disaster situations.

Furthermore, the unlikely disappearance of EMS systems would not eliminate a problem of local EMS systems--mass casualty situations. Such situations will not only continue to surface, but studies appear to project a progressive increase of disasters in the future of the United States (White and Haas, 1975). Urbanized and industrialized societies have added technological hazards to the range of natural disaster agents to which they are subject; this is certainly true in the United States. The ways populations are differentially concentrated and subject to risks in present day societies also suggest bigger and more damaging disasters in the future (Cochran, 1972). Potentially, at least, the probability of a large mass casualty producing event increases annually in America. Given such trend projections, it appears reasonable to argue for attempting to improve efficiency and effectiveness in disaster EMS. The problem of mass casualties will not go away; if anything, it is likely to be even more of a problem in the future.

Also, as discussed in the first chapter, to the extent that the question of EMS delivery has become defined as a social problem in American society, societal values are supportive of efforts to deal with the problem. If there are solutions offered, attempts to apply them are facilitated (Tallman, 1976). In fact, advocates of changes in disaster EMS can argue that the present state of affairs cannot conscientiously be accepted as it is. Difficulties for which solutions are not apparent are supportable, but problems that seemingly can be dealt with implicitly call for action (Kituse and Spector, 1973). The social climate and public definition of general EMS as a social problem easily slips over to cover disaster EMS; thus, inaction is not seen as appropriate.

Finally, our research findings and what can be extrapolated from other similar situations indicate that some actions can be taken. Some worthwhile steps can be taken to improve disaster-related EMS policy, planning, practice and research implementation. Policies can be changed or made explicit. Planning can be intensified or improved. EMS disaster practices can be made better. Research findings can be applied. We state, by way of specific recommendations in the next chapter, some of the steps which, if taken, ought to lead to improvement in the delivery of disaster EMS.

Footnotes

1. An extended theoretical account and a descriptive treatment of the development of an emergent system in the delivery of mental health services after a disaster is presented in Taylor, Ross and Quarantelli (1976). For other descriptions and analyses of emergent phenomena in disasters, see Forrest (1977) and Stallings (1977). For more general discussions of emergent phenomena at times of crises, see Turner and Killian (1972), Weller and Quarantelli (1973), and Marx and Wood (1975).
2. This point of view can be contrasted with statements made in introductory remarks to a publication issued by the National Center for Health Services Research on Emergency Medical Service Systems Research Projects. "Emergency victims are characterized less by the kind of medical problem than by its urgency... The management of critical medical emergencies requires...that care be given promptly... The medical emergency stage...could arbitrarily be considered to have ended when...speed of response is no longer an overriding concern " (1977:4-5)
3. For an example of an exception, see Holloway (1977).
4. For instance, we were able to study few disaster situations where hospitals themselves were directly impacted.

IX.

RECOMMENDATIONS

Upon the basis of our research findings, in this chapter we make a series of recommendations with regard to future delivery of disaster EMS and EMS disaster systems. For purposes of exposition, these are divided into policy, planning, practice and research implementation recommendations.

Policy

The policy recommendations are the most important for, if changes are made in this area, there will be consequences in the other areas also. The converse is not necessarily true. By their very nature, policy changes are the most difficult to bring about and they tend to evoke the most resistances. In part, this is because such changes often require modifications in traditional views, the forging of new behaviors and the explicit recognition of something different.

1. For planning and operational purposes, HRA and other relevant agencies should explicitly recognize that there are qualitative differences between everyday EMS and disaster EMS.

This recommendation runs strongly against a basic assumption in the EMS area; namely, that disaster EMS is but an extension of everyday EMS. There still would be substantial problems in the delivery of disaster EMS even if this were true. (1) As we originally suspected when we started this study, and we we found amply confirmed by our research, everyday EMS and disaster EMS are not simply two ends of the same continuum. The difference between the two is not merely one of degree; it is a qualitative difference in kind.

To argue this recognition requires a counterbalancing of the historical thinking and practice in the EMS area. Such counterbalancing can only be achieved if influential and key federal agencies responsible for and heavily involved in EMS planning and operations consciously and explicitly point out this mistaken assumption brought over from the past. Without such leadership, any research findings about what is really involved in disaster EMS will have relatively little effect.

However, if the qualitative difference is accepted and legitimated as policy, it will be possible in the short run to have more realistic planning and practice in the EMS area. In the long run, the policy change will make for substantially greater effectiveness and efficiency in the delivery of disaster EMS. To continue to accept the old view is to mislead legislators, however unintentionally, and handicap even sincere administrators, weaken worthwhile planning, perpetuate poor practices and otherwise hinder the bringing about of major improvements in the delivery of disaster EMS.

2. Disaster EMS should remain linked to everyday EMS as it is in current basic legislation, but efforts should be made to require consideration of EMS in other disaster legislation and agency policy.

While disaster and everyday EMS are qualitatively different, there is a relationship between them. There would not be any logical, theoretical or

practical sense to attempt to develop disaster EMS as a separate and independent area of its own. Apart from the lack of political reality that would be involved in such an attempt, there is little justification for separate disaster EMS legislation. Disaster EMS should continue to be treated as an integral part of the overall EMS program area.

However, disaster EMS can be improved and put in a better position if it were not as isolated from other disaster laws and other federal agencies involved in disaster policy. That is, disaster EMS should be made salient and visible in related legislation and relevant key organizations. In fact, advantage should be taken of the probable upcoming restructuring of U.S. national disaster policies and emergency agency reorganization, so as to make disaster EMS important and part of the decision making process in other disaster-relevant agencies. The time for new linkings is during times of change; thus, the present may be a better opportunity than has or will exist for a long time.

The value to the disaster EMS area for moving in this direction is that it, like anything else, does not exist in a social vacuum. Any changes in the disaster EMS area are difficult if they are not reinforced and supported outside of the area itself. For example, the delivery of mental health services has been made a part of what can be thought of as the basic disaster law in this country, i.e., Public Law 93-288; in addition, the delivery of such services has been linked to the overall federal disaster response. This has helped the development of the delivery of mental health services in disasters tremendously. The delivery of disaster EMS is nowhere so recognized, and, if thought of at all in the overall response to a disaster, is seen as a separate area that is the responsibility and concern of others, since non-EMS areas do not have a very good picture of the everyday or the disaster EMS area. Disaster EMS can only gain by becoming better integrated into the overall federal disaster response; at the very least, it should attempt to become better recognized in policies and plans, especially at the federal level.

3. Preplanned EMS events, instead of everyday EMS, should be taken as the prototype of disaster EMS.

Little thought has been given, other than everyday EMS, to using a different prototype for disaster EMS. Much planning and practice implicitly assumes that the way to develop disaster EMS is to build on what is done by the established EMS system. As we have shown in our research findings, this is a false path to follow. Since, at times of disasters, the established EMS system is replaced by an emergent EMS system, the established system cannot be used as a meaningful prototype. What should be used for disaster EMS planning and practice should be different; that can be found in preplanned EMS events. The thinking and activities carried out in anticipation of a potential mass casualty event are more similar to what occurs in disaster EMS than everyday EMS. As such, this is a much more meaningful model to use than what is currently assumed.

There should be an explicit recognition of the value of preplanned EMS events for disaster EMS. Preplanned EMS events generally involve community

organizations outside of the local EMS system. Such events also tend to be seen as evoking operational demands on the EMS system that are different from everyday demands. Besides activating perceptions of differences in capabilities and demands, preplanned EMS events also generate a belief that traditional ways are not adequate for the EMS problems at hand and that new ways for dealing with them must be developed. These, of course, are also the elements involved in actual disaster situations. However, for preplanned events to be accepted as prototypes for disaster EMS requires that such events be seen not as exceptional cases but as the general principle to be followed. This is only likely to occur if the matter is treated as a policy question rather than a planning or practice issue. At all levels of the EMS area, we think it is necessary that key groups and top officials point out, assert and direct as much as possible that a major change be made in the accepted prototype for disaster EMS. Without explicitly recognizing the change and making it a policy matter, it is likely that preplanned EMS events will continue to be seen as exceptional incidents rather than general models for improving the delivery of EMS in disasters.

If this advocated policy change is accepted, one immediate consequence will be an encouragement and a legitimation, which does not now exist, to use preplanned EMS events to learn and to teach about disaster EMS. They will no longer be seen as special cases. Furthermore, those localities subject to relatively rare natural disaster agents will have real rather than purely hypothetical situations around which to plan. Finally, if our point of view, based on our research, is correct, there will be development of more realistic expectations about disaster EMS. The qualitatively different problems involved in the delivery of EMS in disasters, as compared to those facing everyday EMS, will have to be faced.

Planning

On the surface, planning recommendations in the disaster area would seem to be the easiest to implement. In the main, the values and beliefs of American society are supportive of general planning for almost everything, but especially for emergencies. On the other hand, planning is frequently seen as something too general to be of much use, given the specifics of an actual situation. Thus, while assent is often given to planning in the abstract, its value in the concrete sense is often denied. Therefore, it must be recognized that any recommendations regarding disaster EMS planning will usually encounter an ambiguous reception. Furthermore, implementation of planning is difficult to achieve for a variety of reasons, indirect positive consequences of planning are not always easy to recognize, and often there is no factual base of knowledge from which to plan.

1. Local disaster EMS planning must be closely linked to community wide and non-EMS disaster planning.

Disaster EMS planning should not be carried out solely as part of an EMS system activity. As we have stressed throughout this monograph, the emergent EMS system at times of disaster is different from the established everyday EMS system. Also, the conditions affecting the emergent EMS system often involve factors from outside the system itself. Therefore, to plan as if the

EMS system operations at times of disasters is a self-contained entity, independent of anything else, is to ignore the realities that exist. The EMS system is, of necessity, an open system; planning for the delivery of EMS in disasters must take this into account.

Realistic disaster EMS system planning must be part of overall community disaster planning. This involves more than the EMS sector knowing what other organizations plan to do at the time of a mass emergency, although that itself is important. What is crucial is that the EMS plan must be integrated with and be part of the total community plan. Too often EMS planning for disasters is undertaken independent of other groups, such as the public safety forces which might have some direct role in EMS delivery. Even the latter is not enough. To avoid unnecessary problems, members of the local EMS sector need to know what others are projecting and have their own plans linked to all others likely to be responding in a mass emergency. The overall coordination necessary at times of disasters necessitates such prior knowledge and integration.

But it is not only the possible coordination that is important if our recommendation for integrated community disaster planning were to be followed. Learning about what others are attempting to do and trying to make explicit what one will try often surfaces ambiguities, critical gaps, overlaps, not thought through difficulties, etc. Thus, if the EMS area were to link itself more closely to other local community disaster planning, it would probably help streamline and improve disaster EMS planning itself. Furthermore, attempts to integrate plans with others would also highlight the limits of the control the EMS system has over certain matters at time of disasters, such as the victim flow. There would have to be a recognition that the central components in the system, the hospital personnel, can themselves do relatively little about many of the medical demands that might be placed upon them at a time of disaster. Knowing that a problem exists, even if it cannot be directly solved, is better than a failure to be aware of the problem or its source. Pulling all these payoffs together, it is fairly clear that integrated community planning, incorporating disaster EMS planning, can be only generally beneficial for the EMS area.

2. Plans should reinforce indirect positive aspects of disaster linkages within the EMS system and between EMS and other sectors.

There is an understandable tendency to judge and evaluate disaster planning in terms of its direct consequences at times of mass emergencies. Disaster plans can also be judged in terms of other than their direct effects and whether they have impact on matters with which the plans are not manifestly concerned; plans can have indirect or latent consequences in unintended areas. Looked at in this way, there can be such benefits in disaster EMS planning. Linkages established for disaster purposes can help in everyday EMS system operations. If this is recognized, it can become an added inducement for planning for the delivery of EMS at times of disaster.

As we indicated in the first chapter, the federal legislation creating the EMS program nationwide calls for the establishment of "disaster linkages"

within the EMS system and between it and other sectors in society. What is not made explicit, and perhaps was not even recognized when disaster linkages were mandated, was that the more they become fact, the more likely they would feedback positively to the everyday EMS system. Such linkages can lead to increased cooperative interaction during normal times and serve as a corrective for conflictive relations that often exist in everyday EMS systems; e.g., concerning hospital categorization. If our analysis is correct, and our research does tend to support the view we are expressing here, disaster planning should be pushed not only for what it might accomplish at times of mass emergencies, but also because of the indirect consequences for EMS during normal times. In fact, the implication is that what is presently latent should be made manifest; i.e., there should be an explicit acknowledgement that disaster planning is worthwhile for the everyday EMS system in disasters.

To suggest what we have does not imply that coming together for disaster planning necessarily always creates consensus and harmony. But on an everyday basis, the established EMS system in most localities is wracked with disagreement and disputes. There are also differences of opinion between the EMS sector and other areas of society. However, in many, although not in all, cases, the ongoing conflicts can be ignored where the EMS components are not faced with a situation calling for immediate action, and where inaction is not likely to evoke a hostile public outcry. However, disaster events are somewhat different in that they are situations which do call for immediate response and to which the public is rather attentive. It is also not accidental that in preplanned EMS events, conflicts tend to be muted and played down. Therefore, there is some pressure for disaster planning and development of some agreements within the EMS system and between it and other sectors. We suggest that advantage be taken of this situation by emphasizing to the participants in EMS disaster planning that they should also take into account the positive, non-disaster consequences that can result from cooperative planning. In turn, the better the everyday relationships, the more they could improve projected relationships at times of disasters. On balance, it is difficult to see that a strategy of emphasizing positive indirect effects of disaster linkages would not have more advantages than disadvantages.

3. Mandatory higher priority should be given to systematic EMS record keeping.

As indicated at different points in this monograph, our research effort was considerably handicapped by the lack of adequate and systematic EMS record keeping. However, apart from the complications this lack generated for research, there is the even more important point that lack of records makes it very difficult to accomplish either retrospective evaluation or prospective planning. By this, we mean that it is impossible to look back at an EMS situation and to judge how well it was handled and what could have been done differently if some of the simplest factual pieces of information are lacking, such as the number of injured a hospital received or how many ambulances were involved in transporting casualties, or what first responders did when they initially found disaster victims. Similarly, it is equally difficult to project better disaster plans if the same kind of information

is not available. Among other things, the failure to have proper records also makes it easier for EMS personnel not to recognize the qualitative differences between everyday EMS and disaster EMS situation. In particular also, the absence of factual information obscures the total system problems in a disaster compared with the difficulties of particular subcomponents (e.g., a system mobilization that leads to resources not being used at the same time specific subcomponents are seeking those very same kind of resources). It is impossible to evaluate, to plan, to observe differences, to note that the whole is different from the parts, etc., when there is not factual base of knowledge.

Record keeping is a mandated EMS requirement. However, as we indicated earlier, many everyday EMS systems simply fail to have good records. At times of disasters the recording of information relevant to the situation often all but ceases. It is imperative that strong action be taken to insure the keeping of adequate records, that what should be done will actually be done. No one wants to increase paperwork per se for EMS or other organizations. But, as we have implied, a minimum amount of factual information is absolutely necessary for evaluation, planning, research and other justifiable purposes. But put another way, some of the duties of the EMS system cannot be done unless some systematic data is available. If this is so, it follows that mandatory record keeping should be given a higher priority in the EMS area.

This is not to ignore the difficulties in getting better information, especially at times of great organizational or system stress. A choice will have to be made: either the current situation, with massive blind spots about many crucial matters, will be continued; or there will be the implementation of a requirement that will insure obtaining information so judgments, plans, studies, etc., can be better made about the delivery of disaster EMS. This is a situation where certain highly valued ends cannot be attained unless some appropriate means are first brought into being to work towards those goals. In our judgment, improved planning for delivery of disaster EMS cannot be achieved unless a way is found to generate a factual base of knowledge about what does and does not happen in mass emergencies.

Practice

EMS practitioners, if they have had any disaster experience, tend to be open to suggestions that might improve delivery services. They recognize, often more intuitively than cognitively, that there might be better ways to do things. However, recommendations as to disaster EMS practices also run against resistance of different kinds. Organizations and people are used to doing many things in habitual ways; they tend to see research findings as at variance with their own personal routines and beliefs. It is a fact that implementation of many recommendations in the area of EMS disaster practices often involve serious practical difficulties, run counter to past views, or require seeing something different from the usual.

1. Needs assessment, on-site triage, and transportation of the injured should be done by appropriately trained regular emergency organizational personnel.

As a principle, the above recommendation has much in support of it. These tasks all need to be performed and would clearly best be done by trained personnel. Also, if possible, EMS participants should be the first responders at the disaster site, thus giving the emergent EMS system a measure of control over input (i.e., patients) into the system.

Implementing the recommendations, however, poses a number of practical difficulties. Substantial numbers of more police and fire officers would have to be given formal EMS training. Such training programs, of course, are well underway nationwide at present, but they would have to be considerably accelerated to insure a sufficient pool of trained personnel. Even if trained personnel were first responders, there would have to be clear understanding who would have the authority to engage in needs assessment and on-site triage. For a chance for this to occur, there would have to be extensive and realistic disaster planning. Appropriate transportation and distribution of victims to hospitals would be necessary. The degree of coordination and kind of communication necessary is not easily achieved, although preplanned EMS events show that, with imagination and initiative, the problem is not purely a matter of technology, nor is it insurmountable. Our overall view is that, while any implementation of the the recommendation is likely to fall short of the desired goal, some advances can be made. At least, these aspects of disaster EMS usually are now in disaster events.

2. Convergence on disaster sites and on hospitals cannot normally be stopped, so attempts should focus on channeling it along less disruptive lines.

As indicated earlier, elements external to the EMS system often have major effects on the delivery of EMS in disasters. One almost invariable element is the convergence of non-EMS personnel on both impact sites and hospitals. In the vast majority of instances, there are no practical ways of preventing the convergence, even though this can interfere with the delivery of EMS. Major efforts are sometimes expended to stem or block off this inevitable movement of people, vehicles and messages. Such endeavors are wasteful of time, energy and resources. It would be more useful to try to selectively direct vehicular and pedestrian traffic, for example, to and within hospitals. The attitude expressed here runs counter to the traditional view that takes as obvious that major attempts should be made to block convergence. The best that probably can be achieved is to make the EMS sector well aware that mass convergence will occur, to take the delays and confusion that will result from that convergence into account in the EMS disaster planning, and to try to direct convergence into less disruptive lines.

3. Efforts during disaster should be primarily directed at getting good overall coordination in the EMS response.

Related to the point just discussed is the fact that effectiveness of EMS response in disasters is not a result of swiftness of response or utilization of highly specialized technology. Sophisticated, expensive EMS technologies, such as telemetry, have undoubtedly improved everyday EMS delivery. Likewise, faster response times have improved the life-saving

capacity of EMS operations. However, what is far more important in mass emergencies is good overall coordination. Thus, efforts should be directed at achieving or attaining such coordination. Some of the coordination can be pre-planned. During the actual disaster itself, or in the immediate aftermath of impact, coordination can be facilitated by keeping it as a major objective. If overall coordination of the response--among hospitals, between first responders, hospitals and the transportation component, for example--is good, the efficiency and effectiveness of the delivered EMS will, necessarily, be good, too.

Research Implementation

The implementation of research in the EMS area requires not more general research, but rather the transfer and translation of what is known to potential users and the examination of specific research questions the answers to which would have direct applicability to policy, planning and practice. Much is known about disasters, and something is known of disaster EMS; what needs to be done is to get that information into the hands of users. There are also some specific questions about focused EMS topics which need to be examined in more detail before attempts are made to implement research findings on those matters.

2. Scientifically-based knowledge about disasters and disaster-related EMS should be diffused within the EMS sector.

There is, after a number of years of empirically-based studies, much understanding about disaster behavior in general. The literature has grown substantially, and there is solid, although uneven, knowledge about individual, group, organizational and community behavior at times of mass emergencies. However, little of this understanding and knowledge has gotten into the EMS sector, where many discredited myths about disaster behavior still prevail. There is also almost no grasp in a general sense within the EMS area about what research has, so far, found about disaster EMS. This should be expected, given that our research constitutes the only major study undertaken so far.

It is time that scientifically established findings about disaster and disaster EMS be made available to possible users. This diffusion of information should be done, and could be accomplished, through the involvement of knowledgeable disaster researchers in the holding of conferences and workshops, the circulation of publications, the writing of manuals and syllabi, and giving of talks and the building in of material in formal educational and in-service training of EMS personnel. This educational and training effort would probably be most effective if it were spearheaded by such an agency as HRA and involved such organizations as the American Hospital Association and the American College of Emergency Physicians.

A consequence of diffusing the indicated knowledge would be more realistic policies, plans and practices regarding disaster EMS. The range of effects could be substantial. On the one hand, we think stronger cases

could be made with legislators and administrators for the institution of different EMS policies. On the other hand, lives of disaster victims probably could be saved if operational EMS personnel knew better what to expect in disaster events.

2. Current gaps in knowledge should be filled by more specifically directed EMS studies.

While the general picture of what happens with respect to EMS in disaster situations is relatively clear, there are a number of more specific questions that have not yet been fully explored. (2) For example, there should be studies such as the following: evaluative medical research on disaster-related EMS; special disaster problems of very large metropolitan areas and widely dispersed rural EMS systems; factors specifically facilitating emergent EMS systems; and more intensive studies of preplanned EMS events. Such research would provide answers with an empirical base that now can be only matters of speculation and guess.

Conclusion

In another study on the increasing attention being paid to the providing of mental health services in the aftermath of disasters, we noted that what was happening could be seen as part of what has been called the "security orientation" of American society (Taylor, Ross, Quarantelli, 1976: 288-289). According to Meadows, this means that increasingly there are attempts to develop

new powerful engines of risk control into ever-new areas and levels of human and environmental hazards— to the collective hazards of illness, unemployment, emotional disturbances, physical hardship, and so on. Thus, there develops what we may call...an age of massive risk reduction institutions and agencies, public and private, collective and public. (1971:63-64)

The expansion of the EMS area itself and the efforts to provide EMS in disasters might be seen as a reflection of this attempt at risk control in the society. (3)

However, this same author interestingly goes on to observe:

These new measures and mechanisms for reducing risks can, and in fact do, in time, generate new risks of their own. As in all human history, so now problem-solving creates new problems. Indeed, one of the most important aspects of any local community in America today concerns the problems created by its own problem-solving agencies. (1971:64)

The disagreements within the EMS area generally, the difficulties associated with disaster EMS, perhaps are a reflection of how the attempt to deal with a problem in turn generates other problems.

Indeed, what is occurring with respect to EMS may simply be indicative of a central point about American society which Meadows phrases as follows:

One way of phrasing all this is to point out that in America security is indeed a dominant value orientation, that the security value has assumed many new and perhaps as yet many unfamiliar forms, and that the emerging problems of security lie in the frontier circumstances that we do not yet fully understand and therefore cannot yet effectively manage the complexities and intricacies of the relationships of our newly developing security forms and security norms to our overriding commitment to security as a dominant social value. (1971:64-65)

If this is the case, the study reported in the previous pages perhaps throws some light on this larger trend. Possibly this and similar studies will not significantly affect current trends, including manifestation of the security orientation. However, our research may contribute to an understanding of some of the phenomena involved in such trends. In this sense, the scientific knowledge acquired could possibly allow societal members to harness and direct such social processes in the future rather than let themselves be buffeted by and subjected to unknown forces as in the past. At least, that is our hope.

FOOTNOTES

1. There are many reasons why this would be the case, but the basic one is that, as a number of studies have shown, everyday EMS is itself relatively poor.
2. A programatic paper detailing worthwhile future research on disaster EMS is being projected by DRC personnel.
3. It might be objected that the parellel drawn to the delivery of mental health services in disasters is not exactly valid because of two reasons. It could be said that after disasters there have always been efforts to provide EMS, whereas there have not always been attempts to provide mental health services. This objection is valid only if it is not recognized that religion and religious functionaries provided the same kind of mental health service in the past, although under a different name. It might also be objected that if it is granted EMS service were attempted in the past, how is the present effort a reflection of the "security orientation" which presumably is a relatively recent phenomena? The answer here is that, just as in the mental health area, services in the past were delivered in an ad hoc way; now the effort to provide both EMS and mental health services is very explicit, systematic and the specific responsibility of certain institutional components. This does represent, to a degree, a difference from the past.