Chapter 1
Summary and Policy Options

INTRODUCTION

The average U.S. resident will need ambulance service at least twice in his or her lifetime and for some of these patients, delays in receiving emergency care will contribute to death or permanent injury. The one-quarter of Americans who live in rural areas, which occupy four-fifths the country's land area, face special problems in receiving emergency care. It is difficult to deliver emergency medical services (EMS) to widely dispersed populations quickly and in small rural communities, there may be less than one emergency call a day. This relatively low volume of calls may mean that a rural ambulance service cannot support itself financially and that rural EMS providers have difficulty maintaining their specialized skills. The time it takes to reach emergency patients may always be longer in some rural areas than in urban areas because of distances between services and rural residents. Although problems relating to population dispersion are not easily amenable to intervention, many of the problems rural EMS providers are having in delivering EMS care can be alleviated with additional resources and system-wide planning.

Well-organized EMS systems are widely recognized as essential components of medical care. For rural residents for whom no local hospital is available, EMS may be particularly important in helping residents to achieve physical access to health care. Emergency medical services cannot replace basic primary care services, but when medical emergencies occur, a well-organized EMS system can offer rapid medical assistance and transportation to a facility equipped to handle the emergency.

Emergency medical services include the personnel, vehicles, equipment, and facilities used to deliver medical care to those with an unpredicted immediate need outside a hospital and continued care once in an emergency facility (128).[1] EMS *systems are* usually organized at the State or regional level to provide coordinated delivery in an appropriate geographic area (62). The primary goals of an EMS system are to:

- provide immediate medical assistance at the scene and while in transit;
- provide rapid transportation to a medical facility;
- have a coordinated, tiered level of hospital care so that the most seriously injured or ill patients are quickly triaged to specialized facilities for their care, while the less severely injured or ill patients are cared for at less specialized facilities.

Comprehensive EMS systems have been shown to save lives and reduce disabilities (76,128). Among the EMS system components that are required are:

- quick public access,
- on-the-scene emergency care personnel,
- rapid transportation,
- physicians trained to provide EMS care and supervise prehospital care,
- different levels of hospital care for treatment of patients with emergent conditions ranging from ''urgent care' to life-threatening trauma, and
- EMS surveillance systems to facilitate system evaluation.

A well-organized EMS system may enhance health care access, but evidence suggests that not all States have developed EMS systems that extend to rural areas. What characterizes EMS systems is their variability. Per capita expenditures for EMS in 1988 ranged from a low of 2 cents in Ohio to nearly $14 in Hawaii (57). As of 1986-87, only two States, Delaware and Maryland, had statewide access to EMS services through a 911 telephone number, while 21 States had only partial 911 EMS access (105). A

[1]Some include rehabilitative care in the definition of an EMS system. While OTA recognizes the importance of the continuum of care required for many EMS patients, rehabilitative care is not specifically discussed in this report.

few States have directed the care of the seriously injured to designated trauma centers, but others do not designate specialized facilities and lack regionalized systems of trauma care. Some States have developed model EMS systems that integrate urban and rural services, while others have isolated, poorly organized rural EMS systems with limited resources.

In the 1980s, EMS services have increasingly become a State responsibility. In 1988, over 80 percent of State EMS funds derived from State or local sources. Federal funding of State EMS activities is limited to support through the Preventive Health and Health Services Block Grant program (administered by the Department of Health and Human Services (DHHS)) and through the Department of Transportation's (DOT) National Highway Traffic Safety Administration (NHTSA). In 1988, $13 million of DHHS's block grant funds were spent by States on EMS, while DOT distributed nearly $5 million for EMS through its State and Community Highway Safety Grant Program (section 402 program) (24,57).

Federal EMS expenditures have declined sharply in the last decade. Following passage of the 1973 EMS Systems Act, about $30 million were spent annually on EMS. In the early 1970s, EMS systems were found to be underequipped, poorly staffed, and fragmented. Many EMS services were provided by funeral homes, and prehospital care providers often lacked basic medical skills. The EMS Systems Act resources were targeted to rural areas because they were more likely to be lacking resources than urban areas.

Funding through the 1973 EMS Systems Act is credited with having provided incentives for regions to plan and upgrade EMS services. Many communities used EMS Act funds to improve their communications systems, train EMS prehospital providers, and regionalize care. However, the goal of the EMS Act—to blanket the country with high-quality EMS programs—was not met before its demise in 1981. In 1981, a number of categorical programs, including EMS, were folded into a block grant program. With the advent of the block grant program, EMS spending declined and has not yet risen to spending levels of the late 1970s (128).

With new evidence that EMS systems are fragmented and lacking resources, several Federal initiatives have been proposed to bolster State EMS systems and target resources to rural areas. How limited Federal resources can be used to improve rural EMS systems is the subject of this report. The report describes the availability and distribution of EMS resources (e.g., personnel, transportation, facilities) and discusses Federal EMS policies that affect these resources, but does not specifically address Federal EMS reimbursement policies. This report is based, in part, on a May 1989 Rural EMS workshop (cosponsored by DOT and OTA) and on background papers prepared for the workshop. (See app. A, list of workshop participants.)

EMS IN A RURAL CONTEXT

The past decade has witnessed major changes in the U.S. health care system, including both how health care is paid for (e.g., implementation of prospective hospital payment in the Medicare program) and how health care is delivered (e.g., a shift to outpatient services). In some rural areas[2] a decline in the economy has accompanied these changes, making it difficult for many rural health care systems that are small and lacking diversification to adjust to the new health care environment. Since 1981, nearly 550 rural hospitals have closed (61). In communities with only a single hospital, hospital closure has meant that local access to hospital-based care is lost and ready access to emergency care is diminished.

[2]While there are numerous ways to define rural areas, (his report defines rural areas as those areas not designated as Metropolitan Statistical Areas (MSAs). Definitions of rural areas are reviewed in OTA's staff paper, "Defining 'Rural' Areas: Impact on Health Care Policy and Research," published in July 1989 (50).

Many rural areas have difficulty recruiting and retaining physicians, nurses, and other health care personnel because of the heavy demands of rural practice (e.g., longer hours, no backup) or because the area lacks a hospital or other resources that attract providers. In some areas, personnel shortages have been exacerbated by diminished support from Federal programs such as the National Health Service corps.

Access to well-trained personnel, essential equipment, and facilities in rural communities that lack a local hospital or physician may sometimes be achieved through cooperation with neighboring communities that have medical resources. If the availability of health care services diminishes in rural areas, EMS providers may have to assume new responsibilities. There may be an increased demand for nonemergency transportation to hospitals and for urgent primary care services (e.g., delivering babies). Rural EMS providers are having difficulty providing EMS services even without these basic problems in the health care system. Some specific problems of rural EMS systems are:

- Many rural areas have sparse and dispersed populations that are far from care. Poor roads, or the absence of roads, can delay EMS transport.
- Public access to EMS is compromised by antiquated communications equipment. Universal access to EMS by telephoning 911 is desirable but lacking in many rural areas. Some rural residents must make long-distance telephone calls to obtain emergency assistance. Some rural areas do not have telephone service.
- Radio "dead spots"[3] and crowded radio frequencies interfere with essential communications between rural ambulance crews and hospital-based physicians.
- There are shortages of prehospital care providers, many of whom are volunteers. Available rural prehospital care providers often have a less advanced level of training than their urban counterparts. Training and continuing education opportunities are not available in many rural areas.
- Rural EMS providers have difficulty maintaining specialized skills because of a relatively low volume of EMS calls. There are few innovative teaching strategies being used to overcome this problem.
- There are few rural physicians trained to provide medical supervision of local EMS operations.
- Rural EMS providers often rely on old ambulances and ambulance equipment. Air medical transportation to rapidly access specialized care is not readily available in some rural communities.
- Rural hospital emergency room physicians and nurses often do not have advanced EMS training. Rural hospitals may not have developed EMS protocols that designate the roles and responsibility for EMS among rural EMS providers. The role of the community or local hospital within regionalized systems of special care, such as trauma systems, has not been well established.
- Rural areas often lack the resources needed to address EMS problems.

Information from three States (New York, Texas, and South Carolina) suggests that in both rural and urban areas emergency medical services are more likely to be required for medical conditions (e.g., heart disease and respiratory distress) than for trauma. Two of the most common types of EMS care, EMS cardiac and trauma care, illustrate the special problems of delivering EMS services in rural areas.

Cardiac Care

Providing cardiac EMS care quickly is essential but difficult in many rural areas. In the case of cardiac arrest, cardiopulmonary resuscitation (CPR) must begin within 4 minutes and definitive care within 10 minutes of the arrest (1 16). Rural EMS systems are at a disadvantage in

[3]Some rural areas are outside the range of available radio equipment.

treating cardiovascular emergencies, because they often lack paramedic prehospital providers, who are much more successful than basic-level emergency medical technicians (EMTs) in treating cardiac arrest (52). However, some rural communities have improved emergency cardiac care by implementing 'bystander' education or "first responder" programs to improve the chances that CPR or first aid will be administered quickly and will continue until the ambulance arrives, and by training EMTs to use automatic external defibrillators. Automatic external defibrillator are particularly well suited to the needs of rural areas because they are easy to use, and because the skills needed to use them do not deteriorate even if the procedure is not performed often (100).

Not all rural communities, however, have the resources or conditions that would permit effective use of defibrillator by EMTs. If communities are small, community members are not trained in CPR techniques, and response times are 10 minutes or more, a community should direct its resources to improving these conditions before instituting an EMT defibrillation program (1 15). Defibrillator are relatively inexpensive, but training and system-wide supervision of prehospital defibrillation programs may not be. To improve rural EMS cardiac care, bystander and first responder training programs could be implemented; where feasible, EMS response times could be reduced; and physicians, nurses, and EMTs could be trained to supervise and implement EMT-defibrillator programs.

Trauma Care

Injuries[4] occur with nearly equal frequency in urban and rural areas but tend to be more severe in rural areas. Injury-related mortality is higher in rural areas, but basic information is lacking about when, where, and why rural injury and injury-related deaths occur.

Because time to definitive care is such a crucial factor in determining the trauma patient's outcome, higher trauma-related mortality might be expected in rural areas due to delays in detection and response times. In some remote rural areas, delays are unavoidable, but response times may be improved by increasing the number of available ambulances, improving air medical services, or changing the placement of ground or air transport.

Reducing delays to care can also be accomplished by shifting the onset of emergency treatment from the hospital to the prehospital period. Evidence suggests that a "scoop and run' approach is advisable in urban areas, but enhancing the trauma skills of rural EMTs to provide more care during the prehospital phase (without prolonging the time to reach the hospital) might improve trauma outcomes in rural areas. Rural basic-level EMTs could be trained in intermediate skills and become certified to provide more advanced trauma care (i.e., become intermediate-level EMTs), although if they were so trained they might have trouble maintaining their skills and it is uncertain whether trauma-related mortality and morbidity would improve.

Severely injured rural patients should often be evaluated and stabilized expeditiously in the community hospital, and then triaged to the nearest trauma center (21 ,54). According to the American College of Surgeons, hospitals treating trauma should, at a minimum, have emergency medicine physicians available in the hospital around the clock. However, 24-hour physician coverage is often unavailable in rural hospital emergency rooms, and available physician and nursing staff may not have advanced trauma care skills. Improving the training of both emergency room nurses and physicians would improve rural trauma care, as would implementation of trauma protocols that help ensure that a physician and other necessary personnel are available by the time a trauma patient arrives at the hospital.

Many States have attempted to regionalize trauma care by designating or identifying hospi-

[4]Injury and trauma are synonymous terms.

tals according to their level of trauma care services. Most rural hospitals do not meet the requirements of even the lowest level of trauma care but nonetheless have an important role to play in providing trauma care in rural areas. Developing specific trauma care guidelines for rural hospitals might prove helpful to rural providers and clarify the rural hospital's role within the trauma care system. A system that integrates all levels of hospital care within a State promotes regionalization and is likely to improve rural trauma patient outcomes.

Research **Needs**

Before implementing programs to improve rural trauma outcomes, it would be useful to know more about the causes and consequences of rural trauma, where along the continuum of care deaths are occurring (e.g., during the prehospital or hospital phase), and whether these deaths are potentially preventable. Implementing programs without such information may lead to inefficient use of limited resources (24). To begin to understand where, along the continuum of care, resources could be targeted to improve the outcome of rural trauma patients, population-based studies need to be conducted in rural areas. Ideally, hospital discharge data would be examined so that the types of care and outcomes of patients that both live and die could be evaluated.[5] Because hospital discharge data may not be readily available, studies of trauma deaths could be conducted to see what proportion of them are preventable. Studies of preventable mortality will shortly be conducted with support from the Department of Transportation (24).

Research is also needed to evaluate the effectiveness of specific EMS interventions now commonly used. The evaluations must take place in both urban and rural areas, because some evidence suggests that some interventions that are inappropriate in urban areas may be effective in rural areas. Initiation of fluid resuscitation for patients who have lost a lot of blood, for example, is not indicated for patients in urban areas that are within 20 minutes of a trauma hospital but may be appropriate in rural environments where time-to-care may be longer.

The relative effectiveness of public education and law enforcement in improving injury rates in rural areas is another area worthy of investigation. Some practices of rural residents probably contribute to higher injury-related mortality. Only 25 percent of rural residents, for example, report using seat belts all or most of the time while driving, as compared to nearly *40* percent reported by urban residents. Public education, the enactment of State laws to require seat belt use, and enforcement of existing laws could contribute to lower injury-related mortality and morbidity.

The present impetus to improve EMS systems centers on the adequacy of trauma care. While trauma care is an important component of EMS care, the adequacy of nontrauma-related EMS services needs to be examined as well. There appears to be an excess of deaths among trauma victims in rural areas, but it is not clear to what extent these deaths are preventable through medical interventions. It may be that targeting resources to prevention may be more effective in reducing fatalities than improvements in trauma centers. EMS care is more likely to involve patients with medical conditions such as cardiac arrest and strokes than trauma, and in the case of sudden cardiac arrest, rural mortality might decline with EMS systems improvements such as implementing EMT-Defibrillator programs. Whether patients suffering from cardiovascular emergencies might benefit from other system-wide changes, such as more regionalized care, is uncertain. A few States have verification and designation standards for cardiac care facilities, but most do not.

OPTIONS FOR FEDERAL POLICY

While some problems associated with delivering EMS care in rural areas to widely dis-

[5] The Sensitivity Index Project, funded through DOT's National Highway Traffic Safety Administration, links statewide computerized crash reports with patient hospital records. This allows investigators to correlate factors such as EMS response time and seat-belt use to patient outcomes (53).

persed populations may seem intractable, many rural EMS problems can be resolved with additional targeted resources and effective planning and management. Among the most salient problems confronting rural EMS systems are:

- EMS personnel shortages;
- inadequate advanced training opportunities for available EMS providers;
- a lack of medical supervision of local EMS operations;
- antiquated equipment (e.g., communications equipment);
- poor public access to EMS; and
- an absence of regionalized systems of specialized EMS care, such as trauma systems.

The Federal role in supporting State EMS programs has waned in recent years, but evidence of serious impediments to quality EMS care in rural areas argues for an increased Federal role. Providing EMS services is largely a State and local government responsibility; Federal resources have never been consistently available or sufficient to rely on for EMS operations. Limited Federal resources might, however, successfully be used to:

- promote training of EMS providers,
- facilitate the development of national consensus guidelines or standards for prehospital EMS providers and EMS facilities,
- provide technical assistance to States,
- support EMS-related research and demonstration projects, and
- provide incentives for States to implement planning efforts.

It is in these areas that States continue to need Federal leadership (112).

Federal Initiatives in EMS Training

Option 1: Congress could fund the Department of Health and Human Services (DHHS) to provide assistance in improving the supply and level of skills of rural prehospital and hospital-based EMS providers. Increased Federal assistance could include support of EMS training and continuing education programs, and State recruitment and placement programs.

Rural areas are suffering shortages of prehospital care providers and are dependent on volunteer providers who tend to have less advanced training than their urban counterparts. Rural hospital-based nurses and physicians may not have specialized training in EMS care, but nonetheless provide essential services to EMS patients. Federal assistance to EMT, primary care, and nursing training programs could improve the general availability of EMS providers. EMT programs that are accessible to rural residents could be targeted, because shortages of rural volunteer EMTs are particularly acute. As the cost of EMT training and certification can be a deterrent for volunteers, States could be encouraged to subsidize training with Federal assistance. Providing assistance to State recruitment and placement programs could also improve the availability of EMS providers in rural areas.

Federal resources could also be directed to EMS continuing education that is accessible to EMTs, nurses, and physicians already practicing in rural areas. Making continuing education courses in emergency medicine available to rural providers could effectively improve the rural hospital's EMS medical response and the quality of the rural community's EMS system. Increased support for EMS-related training and continuing education could be administratively handled through. for example, the Health Resources and Services Administration's Bureau of Health Professions. Many professional and nonprofit organizations are involved in EMS-related training, but there is no Federal agency that monitors the availability or content of EMS training.

Option 2: Congress could require DOT to reevaluate the standard curricula for prehospital EMS providers.

Although there are recognized shortages of prehospital care providers, the specific set of

EMS skills required in rural and urban settings is uncertain. A reexamination of prehospital care training and curriculum is justified because there is considerable controversy surrounding the effectiveness of some standard prehospital interventions in both rural and urban settings. The standard curricula for prehospital providers, developed by DOT, could be reevaluated in light of the unique characteristics of rural EMS providers (i.e., most are volunteers) and the demands of rural EMS practice. DOT (NHTSA) is sponsoring a development conference on EMS training in early 1990 where both trauma and nontrauma EMS training requirements will be discussed. DOT could change the standard curricula for first responders, and for basic, intermediate, and paramedic-level EMTs, but EMT-Defibrillator training would fall outside of DOT's authority. DOT's conference on prehospital EMS provider responsibilities and training might help clarify what should be included in EMT curricula and might help reduce the extreme differences in training that currently exist.

Federal Guidelines or Standards

Option 3: **Federal legislation could facilitate the development of national consensus guidelines or standards for prehospital EMS providers.**

There are about 36 recognized levels of prehospital care providers across the Nation, and training requirements and levels of responsibility vary markedly by State. The American Society for Testing and Materials, a voluntary standard development organization, has published standards for some EMS personnel, but these have not been widely used. Federal legislation could ensure that national consensus guidelines or standards for prehospital EMS providers be developed following the National Development Conference on EMS training, sponsored by DOT, which is to be held in early 1990.

Option 4: Federal legislation could facilitate the development of national consensus guidelines or standards for specialized EMS facilities, such as trauma centers. Such guidelines or standards might delineate the role of small rural hospitals in EMS **care.**

Some proposed Federal EMS legislation ties receipt of EMS grants to adherence to a State plan that includes trauma facility designation according to national standards. Proponents of national trauma facility standards argue that few States have EMS systems that meet essential criteria, including facility standards, established by professional organizations (i.e., American College of Surgeons, American College of Emergency Physicians) and that such standards are required to assure EMS quality.[6] Opponents of EMS initiatives tied to facility standards argue that States have very diverse EMS needs and that imposing a national standard would provide little flexibility.

Three-quarters of the States have developed, or are developing, some type of trauma facility verification or designation program, but most adapt standards (like those developed by the American College of Surgeons) to meet State or regional needs. Developing national voluntary guidelines or standards might be preferable to mandatory standards in light of States' diverse needs.[7] A consensus development conference, such as those sponsored by the National Institutes of Health, might provide a forum whereby national consensus guidelines or standards could be developed with advisement from profes-

[6]Recognizing that facility standards might not be appropriately applied in all areas, legislators have included provisions whereby a State could get a waiver of the proposed trauma facility standards after public notice and hearings.

[7]Existing Federal regulations recommend that Federal health and safety programs use national voluntary consensus standards (1 CFR Chapter 3 - 1978). The Office of Management and Budget Federal standards policy also recommends the use of national voluntary consensus standards (Circular A-119 of November 1982).

sional medical organizations and State and local officials.[8]

Some argue that the imposition of facility or system standards is premature in some areas and that such standards will doom many areas' programs to failure. Any guidelines or standards that are developed could be phased in so that resources could first be used to improve training and to upgrade communications and other equipment. This would help to ensure that when standards were imposed, personnel and equipment-related criteria could be met. Some opposition to the imposition of facility designation criteria and triage protocols may be alleviated through public and provider education.

Federal EMS Technical Assistance

Option 5: Congress could fund DOT and DHHS to augment technical assistance to State EMS offices.

The ability of States to provide technical assistance to EMS providers needs to be improved, especially for those States with large underserved rural areas. Specific types of technical assistance include:

- development of communications systems;
- enhancement of management skills (e.g., billing procedures, personnel practices);
- promotion of public education (e.g., raise public awareness of EMS system, injury prevention);
- delivering air medical services in rural areas;
- development of statewide or regional EMS surveillance systems and reporting practices; and
- implementation and adherence to quality assurance programs.

In many of these areas, Federal expertise is available to assist State EMS program directors. EMS-related technical assistance to States is currently available through DOT's National Highway Traffic Safety Administration. NHTSA assembles a team of technical advisors that may include experts in such areas as rural EMS delivery, data gathering systems, trauma systems, and the development of legislative proposals.[9] The assessment team makes recommendations to the States after comparing the status of EMS in the State to EMS system standards established by the assessment team (126). The scope of technical assistance offered by DOT extends beyond highway safety issues and is offered when requested by a State's EMS office. DOT supported the development of a computer simulation program for rural EMS system design that, if adapted to the microcomputer, could be a useful adjunct to providing technical assistance.[10]

The Centers for Disease Control (CDC) also has a technical assistance program through its Division of Injury Epidemiology and Control. CDC can offer technical assistance in many EMS-related areas such as injury surveillance, but there are areas of expertise that are lacking, such as EMS systems development. Less than one-half of State health departments report having injury reporting/surveillance systems and when data sources are available, States do not always use them (47). As EMS planning and quality assurance are facilitated by such surveillance systems, this appears to be an area where States may benefit from technical assistance.

Several tools are available for EMS systems to evaluate their performance. One method involves comparing a system's prehospital services for trauma patients to the experience of other EMS systems. A database that includes the experience of many providers can be used to develop norms or a "yardstick" against which they can compare their patient survival experi-

[8]The American Society for Testing and Materials (ASTM) has had several task groups addressing the development of a national consensus on guidelines for EMS facilities (ASTM Committee F30), but representatives of professional organizations such as ACS and ACEP no longer participate because of concerns about the appropriateness and applicability of the ASTM process to the field of EMS (53,63).

[9]EMS advisers assembled by DOT have provided assistance to eight States this year and plans are to extend assistance to eight more in calender year 1990 (24).

[10]This computer simulation model is described in app. B.

ence *(88)*. Such a database is central to the Major Trauma Outcome Study. Here, data on trauma patients from over 100 hospitals are analyzed to establish norms (e.g., mortality, complications) by cause of injury and injury severity (23).

Federally Sponsored EMS Research and Demonstration Programs

Option 6: Congress could fund DOT and DHHS to augment their EMS research and demonstration programs and encourage the investigation of EMS problems unique to rural areas and providers. The research efforts of DOT's NHTSA and DHHS's National Center for Health Services Research and CDC could be coordinated to address a broad range of outstanding research questions.

EMS research and development efforts came to a virtual standstill following the demise of the EMS ACT in 1981. Under the EMS Systems Act (section 1205), the National Center for Health Services Research (NCHSR) was responsible for EMS applied research. The results of the NCHSR research conducted in the mid seventies has greatly influenced EMS practice and has been useful to rural providers. NCHSR-supported research showed, for example, that defibrillator could be effectively used by prehospital providers on patients suffering out-of-hospital cardiac arrests.

CDC, through its Division of Injury Epidemiology and Control, has recently established five Injury Prevention Research Centers and has funded over thirty 3-year research and demonstration projects.[11] DOT has a small research and development budget, but, these resources are used to investigate highway-related concerns. Additional funds could be used to expand and coordinate the research capabilities of NCHSR, DOT, and CDC.

Although these efforts are noteworthy, there are numerous outstanding EMS research questions with direct relevance to rural areas that are not being adequately addressed. These include such basic questions as, ''is the demand for EMS different in rural as opposed to urban areas?' The results of such research could guide curriculum revisions and the development of any new prehospital provider standards or guidelines. Demonstration projects with an evaluation component could answer questions on the relative cost and effectiveness of innovative teaching strategies, such as home instruction using videocassette recorders for EMT training or rural emergency room nurse and physician continuing education. Such instruction might help to solve some of the EMT shortages experienced in many rural areas and improve the skill levels of existing rural providers.

Federal Incentives for Planning and EMS Systems Development

Optimally, EMS systems have ongoing, dependable State support. Several States have achieved self-sufficiency through innovative funding strategies (e.g., special funding through motor vehicle fees), but many State's EMS programs are underfunded and lack coordination. To promote State EMS system development and planning, existing Federal EMS program support could be augmented or new Federal EMS programs established.

Option 7: Congress could augment support of existing Federal programs that address EMS, namely the DHHS Preventive Health Block Grant Program and DOT's State and Community Highway Safety Grant Program. Consideration could be given to earmarking funds within these grant programs for EMS.

The DHHS Preventive Health Block Grant Program

States can use block grant money for a variety of purposes, and investment in EMS cannot be assured without earmarking some portion of the DHHS block grant for EMS. Earmarking would

[11] The grants were distributed among five major elements of injury control: epidemiology, prevention, biomechanics, acute care, and rehabilitation (27). Two of the funded projects relate to farm and rural injuries.

be helpful in those States that have not given high priority to EMS system development; but it would also mean that States with well-developed EMS systems would be required to expend Federal block grant funds on EMS rather than on other State priorities.

Augmenting current Federal EMS-related programs has the advantage of administrative ease and offers a flexible approach for States with diverse needs. States could use the additional block grant funds to invest in communications equipment and improve training opportunities within the State. A disadvantage of using this approach is that it would be difficult to impose any Federal EMS standards (e.g., designation of facilities) or to tie funds to the implementation of a State EMS plan, because under the block grant program the State has the discretion to use funds as it sees fit. Another disadvantage of this approach is that it is difficult to target Federal funds to States with identified EMS problems or, within States, to rural areas.

DOT's State and Community Highway Safety Grant Program

Augmenting DOT's State and Community Highway Safety Grant Program could be a more effective way to promote EMS system development than augmenting the DHHS Preventive Health Block Grant Program. Unlike DHHS, DOT makes EMS money available to States to implement a State Highway Safety Program that includes EMS. DOT has established EMS guidelines for States to follow in developing their highway safety program. With evidence that the chances of being seriously injured or dying if involved in a motor-vehicle accident are two to three times higher in rural than urban areas, there is a need to involve State highway safety programs and transportation experts in EMS systems development. DOT's program contains elements needed to promote EMS system development, but DOT's focus is on highway safety and trauma care. DOT's EMS guidelines are, however, generalizable to most emergency care (e.g., there are provisions for EMS training and emergency vehicle requirements).

DOT'S grant program funds are now channeled to States through politically appointed State highway safety representatives. State DOT highway safety programs have been directed to coordinate their activities with State EMS offices, but there are still areas where there is a lack of coordination.

If additional support were available, many of the technical assistance, research and development, and training issues could be adequately addressed through interagency coordination and agreements. However, certain areas of expertise are missing from the current Federal EMS-related agencies, specifically in the areas of nontrauma-related EMS care and EMS systems development.

Option 8: Congress could establish a new EMS categorical grant program within DHHS.

Rather than augmenting current Federal EMS programs, a categorical grant program could be reestablished within DHHS to specifically promote EMS systems planning. The availability of grants to States could be tied to the development and implementation of a State EMS plan. Such a program would reestablish a strong Federal EMS presence within DHHS, which could be coordinated with DOT's EMS program. If such a presence were established, many problems related to coordination of current Federal efforts might be solved or mitigated.[12] If new Federal resources were directed to resolve some rural EMS system problems, methods to allocate resources to those areas most in need could help assure that limited resources are effectively used.

[12] There was an active Interagency Committee on EMS from 1974 to 1981. Since then, a Federal Interagency Committee on Emergency Medical Services (FICEMS) was chartered by the Federal Emergency Management Agency (FEMA) but there is a need for improved interagency communication, particularly in the areas of training, communications, and research and development (125).

Targeting EMS Resources To Rural Areas

Option 9: To accommodate the diversity of rural areas, any Federal EMS resources provided to States could be tied to implementation of a comprehensive State plan that addresses that State's rural EMS system problems.

Different approaches could be used to target Federal EMS resources to rural areas. Resources can go directly to rural areas, or they can be allocated to States based on a formula reflecting their rural population. Under the 1973 EMS Systems Act, grants could be made to any of 303 EMS service areas, some of them rural areas. Sometimes, only certain areas within a State were funded under the competitive grant process. The grant program promoted regional EMS planning but not necessarily statewide planning. If funds are to be directed to States and some funds are to be used to solve rural EMS problems, how to allocate those funds to 'rural areas is an important issue. An allocation formula might be based on the proportion of the population that resides in nonmetropolitan areas, population density, square mileage of the State, or another indicator of rurality. Each has its advantages and disadvantages.

The basis used for allocation can have a substantial influence on the distribution of funds. For example, over 80 percent of the Idaho population resided in nonmetropolitan areas in 1980, but that population numbered less than one million. Texas, on the other hand, had less than 20 percent of its population residing in nonmetropolitan areas but had more than three times the number (over **3** million) of nonmetropolitan residents. An allocation formula based on the proportion of nonmetropolitan residents might leave States with very large nonmetropolitan populations at a disadvantage. In other States, rural EMS problems may be related to the presence of large disadvantaged populations (e.g., those lacking in health insurance and with poor health status). In these States, an allocation formula based on the composition, as well as the relative size of the nonmetropolitan population (e.g., percentage of the population that is uninsured) might be more appropriate. In some ''frontier' 13 States, rural EMS problems can be directly related to large geographic EMS service areas that are sparsely populated. Here an allocation formula based on population density or dispersion might be appropriate.

There may be some rural areas where direct ongoing subsidies are required to maintain services. An EMS system is much like a public utility offering electric or water service, in that providing services becomes disproportionately more costly as the number of consumers declines and becomes dispersed over wide areas. Ongoing subsidies in such situations are not new; subsidies have been used to finance some rural electrification projects, and urban mail services subsidize the more expensive rural routes. Some communities can form cooperatives or linkages to broaden their service area and conserve resources, but other communities are isolated and cannot. Helicopters and airplanes may be used to transport some isolated patients to a medical facility, but these cannot replace an appropriate level of first response.

[13]The term "frontier" has been used to describe areas with six or less residents per square mile (50).