

Several factors may adversely affect the delivery of emergency medical services (EMS) in rural areas. This section first describes how the changing rural health care environment affects the delivery of emergency medical services. Second, problems in providing rural emergency medical services are described as are interventions that may help to overcome them.

THE CHANGING RURAL HEALTH CARE ENVIRONMENT

In some rural areas, a decline in the economy has occurred at the same time as major changes in the U.S. health care system. These changes include 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). Making adjustments to the new national health care environment is difficult for many rural health care systems because they are small and lack diversification. Many rural hospitals that have not diversified and made other transitional changes are now financially vulnerable. Since 1981, nearly 550 rural hospitals have closed (61). In some cases, hospital closures do not adversely affect access to care and are appropriate (e.g., when a small community has more than one hospital and services are duplicated). However, in communities with only a single hospital, hospital closure means that access to hospital-based care is lost and ready access to emergency care is diminished.¹

Health care is inaccessible in some rural areas because of shortages of health care personnel. Six percent of rural counties (142 of 2,393 nonmetropolitan counties) have no physicians (111) and approximately one-quarter of rural residents live in areas that are federally designated health manpower shortage areas (HMSAs).² 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 there is no hospital or other resources that attract providers (111). In some areas, personnel shortages have been exacerbated by di-

minished support from Federal programs such as the National Health Service Corps (111). Furthermore, rural areas have been adversely affected by the increased cost of medical liability insurance coverage, especially for physicians providing obstetric care (28).

RURAL HEALTH CARE SYSTEMS

Access to well-trained personnel, essential equipment, and facilities in rural communities without a local hospital or physician may sometimes be achieved through cooperation with neighboring communities with medical resources. As the availability of health care services diminishes in rural areas, EMS providers may be left assuming new responsibilities. There may be an increased demand for nonemergency transportation to hospitals and demand for urgent primary care services (e.g., delivering babies). Anecdotal evidence suggests that when a community hospital closes, the local EMS system has a higher number of calls that are nonemergent in nature (103) and there are delays in EMS response times (134). In these communities, the EMS system may need to reorient to provide some urgent care or to coordinate with local providers to make such care available. Rural EMS providers are having difficulty providing EMS services even without these additional pressures. Problems in public access to EMS, prehospital care, and medical response are described in the next section, as are some potential solutions to these problems.

Public Access to EMS Systems

Sparse population, large, remote, or inaccessible service areas, poor weather and road conditions, and limited access to communications may delay detection and reporting of a need for emergency care. An automobile accident occurring along an infrequently traveled rural road may not be detected for hours. When such an accident is detected, access to the EMS system may be further delayed because phones or other forms of communication are not available. Installation of emergency call boxes along major rural highways, and use of automobile cellular phones³

²HMSAs are counties, parts of counties, or specific facilities with one or fewer physicians per 3,000 or 3,500 population (45 FR 75996).

³Reliable cellular telephone networks are not yet widely available (136).

⁴The two States with statewide 911 coverage are Delaware and Maryland (105).

and citizen band radios, could improve public access in the case of motor vehicle crashes (64,82).

A coordinated communications system that includes a widely recognized method to call for help, such as telephoning 911, facilitates a quick and appropriate EMS response. Trained dispatchers can elicit information about the event and can quickly marshal needed resources. Appropriately trained dispatchers can also tell the caller what to do until trained EMS personnel arrive (129). When there is more than one EMS number in a community, confusion over what number to call may result in response delays. As many as 85 emergency numbers were listed in the Greenville, North Carolina phone book, covering 17 exchanges (52). Several EMS agencies in north-central Florida report that some residents in their service areas have to use long-distance to call them by telephone (75).

Universal access to emergency care via 911 has been mandated in 14 States, but statewide 911 access to EMS services is actually available in only two States (table 4-1) (105).⁴ Twenty-nine other States are at least half-covered by 911 access (table 4-1) (105). About two-thirds of States report having a statewide plan available for EMS communications (table 4-1),

Many rural areas lack central access and dispatch systems and those with such systems often have old equipment that needs to be replaced and upgraded (82). Furthermore, there is variability in the quality of EMS dispatching that could be improved by agreeing on dispatch standards or protocols and by implementing dispatcher training programs (82). Only six States report that they certify EMS dispatchers or telecommunicators (104).⁵

Access delays may also occur when the public does not know how to contact the local EMS system. Public education can be effective in improving EMS-related knowledge. Nebraska's EMS public information program, for example, appears to have been successful in educating the public on how to access the EMS system and how to provide some

basic emergency care. According to a statewide survey, as many as 83 percent of adults knew the telephone number of the ambulance/rescue service, over half of the adults had taken first-aid courses, and 37 percent had completed CPR training. In addition, virtually all of the secondary schools were teaching CPR (30). Many States, however, lack adequate EMS public education. A 1987 survey indicated that four State EMS organizations had no involvement in public education efforts.⁶ In the remaining 47 jurisdictions that did have a public education effort, 20 self-evaluated their public education programs as minimally effective, 23 considered their programs moderately effective, and only 4 States rated their educational programs as highly effective (106).⁷

EMS response time, the time elapsed from notification of an emergency to EMS arrival at the scene, tends to be longer in rural than urban areas. In the case of motor vehicle fatalities, the average response time for rural areas (as defined by DOT) is almost twice that of urban areas (11 v. 6 minutes) (123).⁸ In many cases, the critical "golden hour" is exceeded because of delays in detection and EMS response time.

Response times can be reduced if an EMS communication system is in place and emergency vehicles can be dispatched from the field (e.g., redirected when returning from another call). EMS communications are hampered in many rural areas by radio "dead spots" that occur because of the limited range of radio signals or because of geographic barriers. Available radio frequencies allow communication between a central base station and an ambulance (or other receiver in the field) that are 20 to 30 miles apart. To reach beyond these ranges, mechanisms to repeat or relay the signal must be used (129).

Thirty-one States reported that some rural areas of their State lacked EMS radio system coverage (82). Communications equipment such as VHF and UHF relays, radio-telephone switching systems, microwave relay, and cellular telephones can overcome

⁴The two States with statewide 911 coverage are Delaware and Maryland (105).

⁵Twenty-four States and the District of Columbia reported that they did not certify EMS dispatchers or telecommunicators. [Information was unavailable on dispatch certification from the remaining 20 States (104).]

⁶The four States with no EMS organization involvement in EMS public education were Arizona, Delaware, Louisiana, and South Dakota.

⁷The four States that rated their programs as highly effective were Indiana, Montana, New Mexico, and Pennsylvania (106).

⁸Reporting of on-scene arrival times is incomplete. These data are limited to the 37 States that reported fatal crash scene response times 80 percent of the time or more in 1987 (123).

⁹In the future, mobile satellites may be used to improve rural EMS communications (82).

Table 4-I-State EMS Communications, 1986-87

State	Statewide plan available for EMS communications system	Legislation mandating 911	Authority for 911	Percent of population with access to EMS service		
				911	7-digit number	Multiple numbers
Alabama	Yes	No	Local	60	40	0
Alaska	No	No	Local	85	10	5
Arizona	Yes	Yes	State	90	NA	NA
Arkansas	Yes	No	Local	10	70	0
California	Yes	Yes	Local	90	NA	NA
Colorado	Yes	No	Local	80	0	20
Connecticut	NA	Yes	State	65	35	0
Delaware	Yes	No	Local	100	NA	NA
District of Columbia	No	Yes	State	10	NA	NA
Florida	Yes	No	State	89	NA	NA
Georgia	Yes	No	Local	60	100	NA
Hawaii	Yes	No	Regional	95	5	0
Idaho	NA	No	Local	50	45	5
Illinois	NA	No	Local	50	45	5
Indiana	NA	No	Local	40	45	5
Iowa	Yes	No	Local	NA	NA	NA
Kansas	Yes	No	Local	70	30	0
Kentucky	NA	Yes	State	33	10	57
Louisiana	NA	No	Local	NA	NA	NA
Maine	NA	No	Regional	50	50	0
Maryland	Yes	Yes	State	100	NA	NA
Massachusetts	Yes	No	Local	39	0	61
Michigan	NA	Yes	State	45	NA	NA
Minnesota	NA	Yes	Local	90	10	0
Mississippi	Yes	No	Local	50	50	0
Missouri	Yes	No	Local	65	35	0
Montana	NA	No	State	NA	NA	NA
Nebraska	Yes	No	State	90	0	10
Nevada	Yes	No	Regional	80	10	10
New Hampshire	Yes	No	Local	30	5	65
New Jersey	Yes	No	Local ^a	27	0	73
New Mexico	Yes	No	Local	70	15	15
New York	Yes	No	Local	65	10	25
North Carolina	Yes	No	Local	31	55	14
North Dakota	NA	No	Local	32	68	0
Ohio	NA	Yes	NA	30	70	0
Oklahoma	Yes	Yes	Local	7	93	0
Oregon	Yes	Yes	State	90	5	5
Pennsylvania	Yes	No	Local	45	40	15
Rhode Island	Yes	Yes	State	NA	NA	NA
South Carolina	Yes	No	Local	35	30	35
South Dakota	Yes	No	NA	60	25	15
Tennessee	Yes	No	Local	50	30	20
Texas	Yes	Yes	State	20	60	20
Utah	No	No	Local	80	10	10
Vermont	Yes	No	Local	15	85	0
Virginia	NA	No	Local	79	16	5
Washington	Yes	No	Local	80	20	NA
West Virginia	Yes	No	Local	15	25	50
Wisconsin	Yes	No	Local	41	30	29
Wyoming	NA	No	Local	90	4	6

^aLegislation pending.

ABBREVIATIONS NA = information not available.

SOURCE: The National EMS Clearinghouse, "State EMS Office: Communications Programs and Disaster Preparedness," The Council of State Governments, Iron Works Pike, Lexington, KY, 1988.

these dead spots but are often too expensive for rural communities (82). In addition to equipment costs, there are training and maintenance costs associated with the systems (82).

Radio frequency congestion is hampering EMS communications in many areas. The congestion occurs because many public safety services (e.g., police, fire, local government, highway maintenance, and forestry conservation) share radio spectra. A special emergency radio service spectrum exists, but it is crowded with unrelated and nonemergency medical licensees. In 1987, 40 States reported having EMS radio communication interference problems (105). The National Association of State and Emergency Medical Services Directors has recom-

mended that the Federal Communications Commission (FCC) establish a new radio service dedicated to EMS communications (71). Rural EMS communications-related problems and potential solutions presented at the March, 1989 "National Rural EMS Needs Workshop" sponsored by the National Rural Health Association, are summarized in box 4-A.

Prehospital Care

Prehospital care includes all care provided to an emergency patient prior to arriving at a hospital. The care may be provided by any of a number of different types of providers, ranging from accident bystanders trained in first aid or CPR to highly trained emergency medical technicians (EMTs). Fire and

Box 4-A—Rural EMS Communications: Problems and Potential Solutions as Presented at the "National Rural EMS Needs Workshop," March, 1989

Problems	Solutions
<ul style="list-style-type: none"> • Public access to EMS services is hampered by poor communications systems. . The public is uninformed about accessing the EMS system. . Many rural EMS communications systems are old and outdated. . Rural areas have many radio "dead spots." . EMS radio frequencies are congested in some rural areas. . EMS communication are not always planned and coordinated with other emergency services. . EMS communications vary in quality by State and area. . What EMS communication systems are most suited to certain rural environments is unknown. 	<ul style="list-style-type: none"> . Develop central access/dispatch systems (e.g., 911). . Install emergency call boxes along major rural highways. . Institute public education campaigns. • Improve and upgrade EMS radio communications systems. . Expand coverage to wider areas through VHF and UHF relays, microwave relay, radio-telephone switching systems, and cellular telephones. Investigate use of mobile satellites. . Federal Communications Commission (FCC) should designate additional exclusive VHF and UHF frequencies for EMS. . Coordinate EMS services with local hospitals, FCC-designated frequency coordinators, disaster response, public service agencies, and local, regional, and State EMS planning agencies. . Develop consensus standards for EMS communications equipment, radio frequencies, and dispatch centers. Establish standardized EMS communications protocols in each area or region under physician medical control and direction. . Provide technical assistance and training to upgrade quality. • Provide quality assurance programs for EMS communications operations. . Conduct research on the cost-effectiveness of different types of EMS communications systems.

SOURCE: National Rural Health Association, "National Rural EMS Needs Workshop," March, 1989, proceedings published in *JEMS*, June 1989. Sponsored by the National Rural Health Association,

police department personnel may provide prehospital care in addition to other services, such as extricating victims of motor vehicle crashes and controlling or preventing fires at the scene of an incident. Prehospital care may be provided at the scene of the emergency and while in transit to a hospital or trauma center. Among the factors that effect the quality of prehospital care are:

- the training of those administering care;
- the availability of transportation and of medical equipment during transport;
- communications between prehospital providers and hospital-based providers; and
- the existence of protocols for the type of medical assistance offered and the transfer of patients to an appropriate level of care.

Prehospital Care Providers

First Responders—When EMS response times are long because of an area's remoteness, road conditions, or lack of EMS resources, community members can be trained as "first responders" to deliver basic EMS care. First responders administer first aid, cardiopulmonary resuscitation (CPR) or other interventions until the ambulance (or aircraft) arrives at the scene. (See box 4-B---description of prehospital care providers and their level of training) (104). At least 42 States and the District of Columbia officially recognize first responders as providers of emergency medical services (104).

Nationwide, over 100,000 first responders have been trained and certified (see table 4-2) (104), but States have used different models to deliver this care. Some first responder programs rely on police, fire, or medical personnel within the community, while others rely on trained community volunteers. In some areas of rural Vermont, for example, "off-duty" rescue personnel (known as "jump crews" can be summoned to an emergency via two-way portable radios from their home or other remote location to provide basic and intermediate life support until an ambulance arrives (51). Here, the first responders are highly trained and experienced. However, it may be difficult to find volunteers that have time for both first response and ambulance duties. In Idaho, quick response units (QRU) made up of trained volunteers have been organized throughout the State to offer basic life-support level service (7). First responders have been

used to provide advanced first aid and emergency care in rural Georgian communities that lack both a resident physician and an ambulance service. Their response times of 4 to 5 minutes compared favorably to the average ambulance response time of 20 minutes (69). Publications and courses are available for farm families and workers that provide emergency procedure instructions for bystanders of farm accidents (67).

Emergency Medical Technicians—Ambulance crews staffed by emergency medical technicians (EMTs) offer most prehospital care. In urban areas the EMTs are usually paid, while in rural areas approximately three-quarters of rural prehospital EMS providers are volunteers (7). In some "frontier" States characterized by sparse population settlement (e.g., Idaho), about 90 percent of EMS prehospital personnel are volunteers (7). Without volunteers, many rural communities would be unable to support an EMS system. Some rural counties have no trained EMT providers. These communities rely on providers whose training is limited to first aid (45).

In general, rural EMS volunteer providers **do** not have as high a level of training as urban providers. (See box 4-B for a description of the types of prehospital care providers and their level of training.) Most rural EMTs are "Basic EMTs" and can provide noninvasive procedures such as first aid, maintaining an adequate airway, administering oxygen, and CPR. In some States, Basic EMTs are permitted to perform more advanced skills such as maintaining intravenous (IV) lines. An average of 134 hours of training are required to become a basic-level EMT (104). A basic EMT may acquire additional specialized training to treat patients with cardiac arrest due to ventricular fibrillation, with defibrillator. (See ch. 5 for a more complete discussion of emergency cardiac care.)

Paramedics have the basic skills of an EMT but are also trained in Advanced Life Support (ALS). ALS-trained paramedics can start IV lines, give medications, and intubate a patient whose upper airway is blocked (see box 4-B. responsibilities of EMS personnel), Paramedic training usually involves about 750 hours (104). More than two-thirds of States certify an intermediate level EMT (sometimes called intermediate EMT or EMT-n).¹⁰ Their

¹⁰Thirty-eight States and the District of Columbia recognize intermediate level EMTs (104).

Box 4-B—Prehospital Providers**First Responders**

First Responders are persons trained to provide initial care for patients suffering injury or sudden illness until EMS providers arrive. Trained First Responders can assess patients, provide basic life support, and render care that is necessary to prevent medical and injury-related problems from becoming a threat to survival. First Responders are trained to provide care using only a minimum of equipment and generally do not transport patients. On average, first responder training involves 44 hours (104).

Emergency Medical Technicians (EMTs)**Emergency Medical Technician-Basic**

EMTs provide emergency medical care, and stabilize and transport patients expeditiously to the hospital. They use supplies and equipment normally carried in an ambulance. The typical EMT-basic is trained using the DOT National Standard Curriculum for Emergency Medical Technicians-Ambulance (114 hours). Basic EMT responsibilities include:

- . assessing a patient's condition;
- . maintaining an adequate airway;
- administering oxygen;
- performing cardiopulmonary resuscitation (CPR);
- . hemorrhage control;
- immobilization of fractures and dislocations; and
- . basic rescue-extrication techniques.

Basic EMTs may also acquire additional skills such as use of the automatic or manual external defibrillator and become certified as an EMT-Defibrillators or EMT-Ds. On average, acquiring defibrillation skills involves 18 hours (104).

Emergency Medical Technician-Intermediate

The EMT-Intermediate has acquired certain advanced skills in addition to the EMT-Basic skills, which permit the EMT-Intermediate to initiate and continue emergency medical care under the direction of a physician, including the recognition of medical problems and initiation of appropriate invasive and noninvasive therapy (i.e., IV lines, limited medications). Many EMT-Intermediates are trained using the DOT National Standard Curriculum (40-55 hours of classroom) but there is much variation in the scope of practice of these providers from State to State.

Emergency Medical Technician-Paramedic

The EMT-Paramedic has acquired extensive skills in advanced life support (ALS) to provide prehospital emergency care working under both written and/or verbal standing orders of physicians. Most EMT-Paramedics are trained using the DOT National Standard Curriculum (700-1000 hours) but there is much variation in the number of hours required to complete the course.

Advanced Life Support (ALS) Skills Include:

- . IV therapy including peripheral and central venous lines;
- . cardiac care including monitoring, manual defibrillation, and advanced pharmacology; and
- . advanced airway management including intubation.

SOURCE: DOT, NHTSA, John Chew, 1989.

Basic-level skills are augmented with some ALS-level skills (68).

EMTs and paramedics are certified to practice by States, or by regions within States. EMTs practicing

advanced life support skills must work under the license of a physician (i.e., they cannot work independently).¹¹ Although there are standardized EMT and paramedic curricula,¹² there are about 36 different types of EMTs practicing throughout the

¹¹An exception to this is Wisconsin, where basic EMTs and paramedics are licensed (104).

¹²The National Standard Curriculum has been developed and is published by the Department of Transportation, National Highway Traffic Safety Administration. There are seven standard curricula for the following EMS professionals: Dispatcher; emergency vehicle operator; EMT-Ambulance; EMT-Intermediate; EMT-Paramedic; EMS Instructor; Air Medical Crew (24).

United States (97).¹³ If number of hours in training is an indicator of level of skills acquired in training, there are dramatic differences in skill levels. The number of training hours required of basic EMTs ranges from 104 in California to 315 in Hawaii. Paramedics are trained in 185 hours in Pennsylvania and 2,278 hours in Vermont (Vermont requires a 6-month internship) (104). Despite the variation in hours of training required by States, most training programs adhere to the National Standard Curricula and meet or exceed established behavioral objectives (24).

Certification requirements for volunteer EMS providers vary by State. Alabama, for example, exempts its EMS volunteers from certification (90). EMT certification requirements may even vary within a State. In California the regulatory authority for EMTs rests with local government, so requirements may vary by county. Some States will certify EMTs who are certified by other States or registered with the National Registry of EMTs.¹⁴ EMTs need to be periodically recertified, usually every 2 to 3 years (104).

In many rural areas the pool of potential EMS volunteers is reported to be getting smaller as economic conditions have made it more difficult for rural residents to have the spare time required for volunteer activities (112). It may be especially hard to get volunteers for daytime shifts (60). The availability of prehospital providers varies by State. Alabama has less than 1 EMT per 10,000 population, while South Dakota has nearly 5 per 10,000 (see table 4-2) (104). Nationally, there is a shortage of trained paramedics, and ambulance services in rural areas often cannot afford to hire those that are available (39). The availability of paramedics also varies markedly by State; Mississippi has less than one paramedic per 100,000 population while Florida has nearly 5 paramedics per 100,000 residents (see table 4-2) (104).

Potential disincentives to become trained as an EMT include the costs of initial training and recertification, inaccessibility of training, concerns regarding liability, and fear of contracting conta-

gious diseases such as AIDS. The problem of providing volunteer EMT training in rural areas may be alleviated with mobile EMT courses, correspondence courses, or courses adapted to VCRs for home use. Despite evidence of prehospital personnel shortages, few States provide financial assistance to train prehospital providers. According to a 1986 survey, only three States financially support their first responder trainees, 12 States support EMT trainees, and 5 States support paramedic trainees (104).¹⁵

The relatively small populations that characterize rural areas mean a low volume of emergency cases. In the face of low volumes, it is difficult for the rural prehospital providers, especially those trained at the paramedic level, to maintain their skills. Rural EMS providers could maintain and improve skills through additional inservice training, locating EMTs and paramedics in local emergency rooms,¹⁶ periodic case critiques by medical advisers, and training EMTs in such intermediate skills as advanced airway management, IV therapy, and/or defibrillation (i.e., upgrade the basic EMT to the Intermediate-level EMT).

An example of an innovative continuing education training program adapted to the needs of rural providers is the Idaho EMS Mobile Trauma Training Unit. Rural EMTs have an opportunity to maintain or upgrade skills through training programs that emphasize application of practical skills. In 1984, the mobile unit made training available to 150 rural communities throughout Idaho, providing trauma skills training for about 2,000 EMTs (10).

Idaho has also offered continuing education programs to EMS personnel throughout the State via a "telelecture" program. Through teleconferencing, lectures by EMS experts have been "attended" simultaneously by as many as 1,000 EMS personnel in 71 classrooms widely dispersed throughout the State (9). The system operates at relatively low cost but is dependent on a sophisticated statewide communication system, which includes mountaintop stations connected by microwave links to regional hospitals and to the Idaho Statewide EMS

¹³Much of the variation in types of EMTs occurs because States have adopted very different standards for intermediate-level EMTs.

¹⁴ Twenty five States and the District of Columbia use the National Registry of EMTs' examination as the basis of certification. An additional six States accept National Registry examinations in lieu of their State examinations. State policies dictate the ability to obtain cross-State certification. The National Registry of EMTs facilitates cross-State certification (110).

¹⁵Forty-seven States responded to the survey.

¹⁶Oregon has implemented a grant-funded, week-long urban "externship" program for rural EMTs (137).

Table 4-2—Currently Certified Prehospital Providers by State, 1986-87

State	1986 total population (in 1 000s)	Number of certified prehospital providers ^a							Prehospital provider (per 10,000) ratio to population	
		First responder	EMT	EMT-D	EMT-I	EMT-CC	Paramedic	First responder	EMT	Paramedic
U.S.	24,1078	4,093 ^m	363,691 ^c	5,254 ^m	17,733 ^e	9,894 ⁱ	41,295 ^y	0.47	1.51	0.17
Alabama	4,052	NR	3,000	NR	1,215	NR	1,607	NA	0.74	0.40
Alaska	534	NA	2,100	NA	500	250	100	NA	3.93	0.19
Arizona	3,319	NR	NA	NR	NA	NR	NA	NA	NA	NA
Arkansas	2,372	NR	3,672	NR	25	NR	243	NA	1.55	0.10
California	26,981	NR	27,375	NR	NR	600	3,750	NA	1.01	0.14
Colorado	3,267	NA	10,141	NR	NR	236	717	NA	3.10	0.22
Connecticut	3,189	5,000	9,800	NA	800	NR	570	1.57	3.07	0.18
Delaware	633	1,200	100	NR	NR	NR	NR	1.90	0.16	NA
D.C.	626	NA	575	NR	37	NR	49	NA	0.92	0.08
Florida	11,675	NA	21,473	NR	NR	NR	5,567	NA	1.84	0.48
Georgia	6,104	NR	4,000	NR	NR	732	1,592	NA	0.66	0.26
Hawaii	1,062	NA	310	NR	NR	NR	180	NA	0.29	0.17
Idaho	1,002	NA	NA	NA	NA	NR	NA	NA	NA	NA
Illinois	11,552	NA	15,822	NR	837	NR	4,325	NA	1.37	0.37
Indiana	5,504	3,000	10,200	NR	240	NR	749	0.55	1.85	0.14
Iowa	2,851	4,574	5,816	1,244	811	NR	658	1.60	2.04	0.23
Kansas	2,460	NR	5,438	NA	98	NR	522	NA	2.21	0.21
Kentucky	3,729	NR	8,000	NR	NR	NR	NA	NA	2.15	NA
Louisiana	4,501	NA	NA	NR	NA	NR	NR	NA	NA	NA
Maine	1,173	NA	NA	NR	NA	NA	NA	NA	NA	NA
Maryland	4,463	8,000	12,000	NR	NR	1,800	350	1.79	2.69	0.08
Massachusetts	5,832	50,000	11,500	150	300	NR	600	8.57	1.97	0.10
Michigan	9,145	NA	7,000	NR	600	NR	1,600	NA	0.77	0.17
Minnesota	4,214	16,360	13,007	NR	171	NR	966	3.88	3.09	0.23
Mississippi	2,625	NR	1,500	NR	124	NR	88	NA	0.57	0.03
Missouri	5,066	NA	4,862	NR	NR	NR	1,600	NA	0.96	0.32
Montana	819	1,400	2,000	200	NA	NR	NA	1.71	2.44	NA

Table 4-2-Currently Certified Prehospital Providers by State, 1986-87--Continued

State	1986 total population (in 1,000s)	Number of certified prehospital providers						Prehospital provider (per 10,000) ratio to population		
		First responder	EMT	EMT-D	EMT-1	EMT-CC	Paramedic	First responder	EMT	Paramedic
Nebraska	1,598	NA	7,500	NA	NA	NA	NA	NA	4.69	NA
Nevada	963	NA	NA	NA	NA	NR	NA	NA	NA	NA
New Hampshire	1,027	1,200	18,000	750	300	NR	140	1.17	17.53	0.14
New Jersey	7,619	NA	9,200	NR	NA	NR	1,112	NA	1.21	0.15
New Mexico	1,479	500	2,600	NA	360	NR	240	0.34	1.76	0.16
New York	17,772	NA	27,940	NA	2,026	2,554	1,385	NA	1.57	0.08
North Carolina	6,333	NA	14,742	114	1,424	256	985	NA	2.33	0.16
North Dakota	679	298	1,776	143	29	NR	41	0.44	2.62	0.06
Ohio	10,752	NA	NA	NR	NA	NR	NA	NA	NA	NA
Oklahoma;	3,305	NA	2,310	150	300	NA	225	NA	0.70	0.07
Oregon	2,698	2,600	4,202	350	1,300	400	680	0.96	1.56	0.25
Pennsylvania	11,888	3,243	23,199	NR	NR	1,704	2,868	0.27	1.95	0.24
Rhode Island	975	NA	1,300	110	520	490	12	NA	1.33	0.01
South Carolina	3,377	NA	3,160	NR	227	NR	853	NA	0.94	0.25
South Dakota	708	NA	3,500	NR	7	NA	61	NA	4.94	0.09
Tennessee	4,803	2,400	6,078	NA	NA	NA	695	0.50	1.27	0.14
Texas	16,685	9,857	19,230	NR	1,316	NR	4,466	0.59	1.15	0.27
Utah	1,665	NR	3,818	100	1,718	NR	276	NA	2.29	0.17
Vermont	541	NA	1,225	1,229	383	NA	28	NA	2.26	0.05
Virginia	5,787	NA	NA	NR	NA	NA	NA	NA	NA	NA
Washington	4,462	1,261	8,848	404	NR	NR	665	0.28	1.98	0.15
West Virginia	1,918	NA	9,872	NR	765	872	175	NA	5.15	0.09
Wisconsin	4,785	2,500	13,400	250	650	NR	525	0.52	2.80	0.11
Wyoming	507	700	2,100	60	650	NR	30	1.38	4.14	0.06

Note **NA**=indicates Information not available

NR =provider category not recognized/certified by State.

^aPrehospital providers can hold more than one certification in some States (e.g., certified as a paramedic and an EMT) and therefore the total number of prehospital providers by State cannot be determined from this table.

^bFirst responders—eight States do not recognize first responders. An additional 25 States do, but did not provide information.

^cEMT—all States recognize EMTs. Seven States did not provide information.

^dEMT-D—28 States do not recognize EMT-Ds. An additional 9 States do, but did not provide information.

^eEMT-I—11 States do not recognize EMT-I. An additional 11 States do, but did not provide information.

^fEMT-CC—33 States do not recognize EMT-CCs. An additional 7 States do, but did not provide information.

^gParamedic—2 States do not recognize paramedics. An additional 9 States do, but did not provide information.

SOURCE: National EMS Clearinghouse, "Training and Certification of EMS Personnel," January 1989.

Communications Center (8). At the present time, few other States are using teleconferencing or computers for training.

Given the time and cost of training, it is important to retain as many volunteer EMTs as possible. There is little information, however, about how long volunteers remain in service. In West Virginia, where volunteer EMTs have to be recertified at least every 2 years, the average stay for an EMT is a little over 2½ years (90). In Colorado, 15 percent of EMTs do not become recertified. Surveys of volunteer prehospital care providers suggest that among the most important factors that lead them to leave EMS service are: economic conditions in rural areas; fear of personal risk; and costs associated with volunteer work (62). Professionalization of volunteer EMS services and management training may resolve some other factors that lead volunteers to drop out, namely interpersonal conflicts, and the stress and burnout associated with EMS work (11 2).

Providing workers' compensation for duty-related injuries and protection from liability might help retain experienced rural EMS volunteer providers. New York provides compensation coverage for almost 400 volunteer squads. following passage of the Volunteer Ambulance Benefit Law (90).¹⁷ Volunteer fire fighters and EMTs would receive a tax credit of \$100 dollars under a Wisconsin bill that was recently introduced (Wisconsin, Assembly Bill 2). On the Federal level, the Volunteer Protection Act (H.R. 91 1), currently under consideration by Congress, encourages States to grant certain volunteers (such as those volunteering for nonprofit EMS departments) immunity from personal civil liability. Box 4-C summarized some of the problems related to maintaining qualified prehospital care providers in rural areas identified at the March 1989 National Rural EMS Needs Workshop.

Transportation

EMS transport may be difficult in rural areas because of small, widely dispersed populations, geographic barriers, and inclement weather. As definitive care is often located in distant cities, one approach to decreasing time to definitive care is to

improve the rural EMS transportation system. Rural transport may be improved through better organization of existing ground-based resources and by using air medical transport services.

Ground Transportation

Nationally, there are over 12,000 ambulance services with nearly 35,000 ambulances (108). Most States have developed regulations and standards for the design of ambulance vehicles and equipment used by EMS personnel, and for various EMS services and personnel (108). Emergency vehicles may be classified as Basic Life Support (BLS), Advanced Life Support (ALS), or Mobile Intensive Care Units (MICU), depending on their equipment and staffing. The proportion of ambulance services staffed by basic EMTs, intermediate EMTs, or paramedics varies by State. In North Dakota, for example, only 3 of 130 ambulance services are staffed by paramedics. In contrast, more than one-half of ambulance services in Florida, Missouri, and West Virginia are staffed by paramedics (108).

Rural areas with no EMS prehospital system, or independent but under-utilized systems, may consider linkage models to provide or improve services. Smaller population centers can be grouped into EMS service areas and share resources. Recognizing that complete ALS-level ambulance service coverage was neither practical nor financially feasible in rural northeast Missouri, EMS planners developed a "nodal" concept of EMS. As shown in figure 4-1, BLS and ALS ambulance services are evenly distributed throughout the region to promote access to ALS care and to achieve an ambulance response time of 30 minutes or less. Most of the region is within 15 to 20 miles of EMS service, but ALS response times will likely exceed 30 minutes in some areas within the region (39).

Air Medical Transport

Rural areas that lack roads or are far from hospitals are especially dependent on air medical transport services when medical emergencies occur. There are currently over 200 U.S. air medical programs that transport approximately 140,000 pa-

¹⁷Only Massachusetts, Rhode Island, South Carolina, and Wisconsin report using teleconferencing as part of the training process. Maryland and South Carolina report using computers for training (104).

¹⁸Volunteer firefighters already had compensaon coverage.

Box 4-C—EMS Prehospital Personnel: Problems and Potential Solutions as Presented at the “National Rural EMS Needs Workshop,” March 1989

Problems	Solutions
<ul style="list-style-type: none"> . There are shortages of volunteer EMS providers in rural areas. . The level of training of rural prehospital providers is substantially below that of urban providers. . The EMS standard training curricula does not always reflect the needs of rural areas. . Rural EMS providers frequently lack guidance from physicians. 	<ul style="list-style-type: none"> . Outreach to high school groups, the elderly, ethnic minorities and other groups traditionally not involved as EMS volunteers. . Make EMS training more accessible to rural residents by using alternative instructional modes such as videotapes and correspondence courses. . Assure the availability of instructors in rural areas by recruiting and training rural practitioners as trainers. Alleviate financial burdens of becoming an EMS volunteer by providing tax credits, training scholarships, or liability insurance. . Provide financial incentives for rural EMS providers to upgrade their skills in the form of training scholarships, and tax breaks. . Develop programs to allow rural prehospital providers to maintain skills through such devices as accident simulation. . Conduct research to determine the knowledge required to carry out EMS field operations. . Provide specialty courses suited to the needs of the rural provider (e.g., farm rescue). . Designate responsibility for medical control. Provide physicians charged with medical control responsibilities appropriate training and orientation. Develop medical control consensus standards.

SOURCE: National Rural Health Association, “National Rural EMS Needs Workshop,” March, 1989, *Proceedings Published in JEMS*, June 1989. Sponsored by the National Rural Health Association.

tients a year, but evidence suggests that air medical services are unavailable in many rural areas.

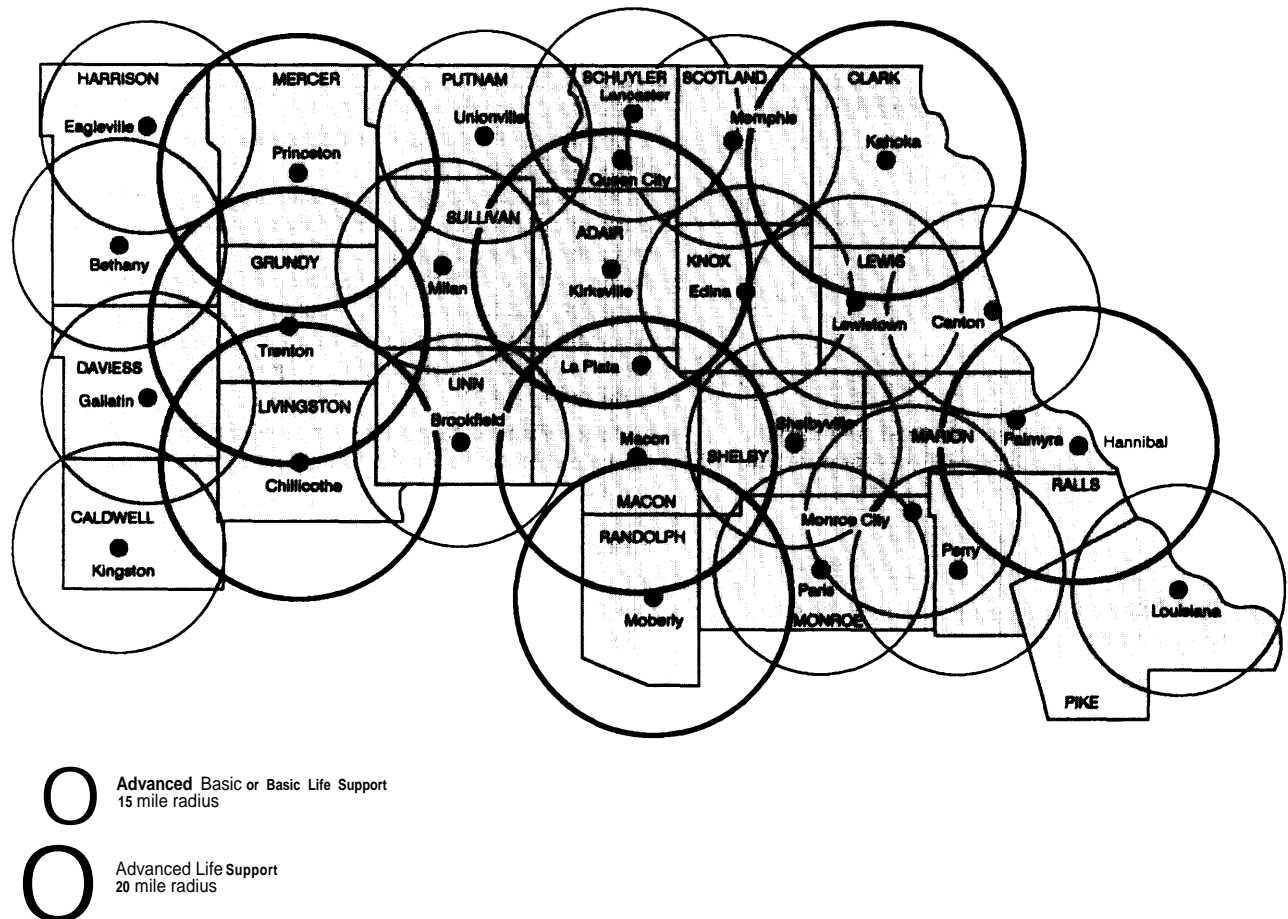
Air medical programs use both fixed-wing aircraft (airplanes) and helicopters. Airplanes or helicopters are used in interhospital transfers of critical patients, such as heart disease patients and newborns requiring intensive care. Helicopters are generally more suitable than airplanes for transporting patients from an accident site to a hospital because of their flexibility in landing at a scene and at a trauma center. Geography and weather conditions such as heavy snow storms may, however, limit the use of helicopters. About 80 percent of helicopter transport services are hospital-based, 10 to 15 percent are offered through public agencies, and the remaining

are offered through the military (MAST)¹⁹ or are privately run (29).

Helicopter service augments the ground ambulance program and should be used in instances where time, distance, medical personnel need, or scene isolation warrant it (97). Air medical services are usually based at urban tertiary care hospitals. The service area extends about 150 miles beyond the air medical base which generally includes rural areas. It may, however, take a helicopter as long as 90 minutes to travel 150 miles. Fast airplanes are usually used for longer transports. Sparsely populated States such as Alaska, Texas, Arizona, Montana, and Wyoming rely primarily on airplanes for their EMS transports. In other areas, most EMS air transport is provided by helicopters (97).

¹⁹MAST stands for Military Assistance to Safety and Traffic. Since 1969, 29 MAST programs have augmented some civilian EMS systems with military helicopters. MAST serves many rural areas (91).

Figure 4-1--A Nodal Concept of EMS for Rural Northeast Missouri



SOURCE: East, S. and Tenbrink, T.D., 1989 (see ref. 39)

Many helicopter-transported patients are trauma patients, but only 15 to 25 percent of helicopter transports emanate from the scene of an accident—most (75 to 85 percent) are interhospital transports (56). Many trauma cases are initially transported by ground ambulance to a community hospital where the patient is resuscitated and stabilized before being transferred to tertiary care via helicopter.

The number of helicopter medical transport services has increased rapidly in the last 20 years following successful experience with helicopter transport during the Vietnam war. The availability of air medical transport, however, varies widely by State (see table 4-3; and figures 4-2 and 4-3). An estimated 20 percent of the population lack air medical coverage, and the greatest voids are in rural areas (97). Maine, Vermont, and New Hampshire

lack helicopter transport but have programs that border their States. Some evidence suggests that providers in rural areas delay requesting helicopter transport when it is needed (41).

A few areas in the country may have too much coverage. Missouri, with 2.7 helicopters per million population has 3 times the national average (.9 per million) and health planners have suggested that there be a freeze placed on acquiring new helicopters (65).

In some rural areas, there may be inadequate access to air medical transport services because the low volume and high costs of providing the service are deemed “uneconomical” by privately run air medical services. Sometimes service is inadequate because regionalization is lacking. Several programs

have, however, successfully extended service into rural areas using satellite placement of aircraft. The Missouri Staff for Life program at the University of Missouri, Columbia, for example, has located one of its helicopters at a satellite location 62 miles south of the host facility at a rural level II trauma center. Satellite placement improves access to transport in southern Missouri, where over half of the program's patient volume is generated. Satellite placement was tried in northern Missouri but was not feasible because of relatively low patient volume and a lack of local providers that could staff the helicopter. Northern Missouri is now served by a fast aircraft located in Columbia (97). The Flight for Life Program in Milwaukee, WI has also used a satellite helicopter 50 miles south of the host facility to improve response times in rural areas. Arizona and Illinois have achieved statewide access to air medical services through a merger of public and private air transport services. Here, aircraft are used for both air medical and law enforcement purposes (97).

As helicopter services have proliferated, questions have arisen regarding their costs, appropriate utilization, and safety. Helicopters cost from 1 to 2 million dollars each and operating costs average about \$650,000 per year (97).²⁰ Surface ambulances, in contrast, cost about \$75,000 and operating expenses average under \$200,000 (97). The average number of patient transports per aircraft is 300-500 patients per year with optimal utilization at 500-700 transports (97). With these costs and necessary volume, small rural communities cannot reasonably acquire their own helicopters. However, in many rural areas, helicopters are the only way to receive needed emergency medical care quickly. Some rural areas have a sufficient volume of cases to be served by private air medical companies. Where volume is insufficient, States could help ensure that services are available to rural areas by encouraging State and private cooperative agreements, by promoting off-site placement of helicopters where feasible, utilizing MAST resources where available, or through subsidies.

Medical Control

The quality of prehospital care may be compromised if 'medical control' is not provided. Medical control requires adequate communications systems

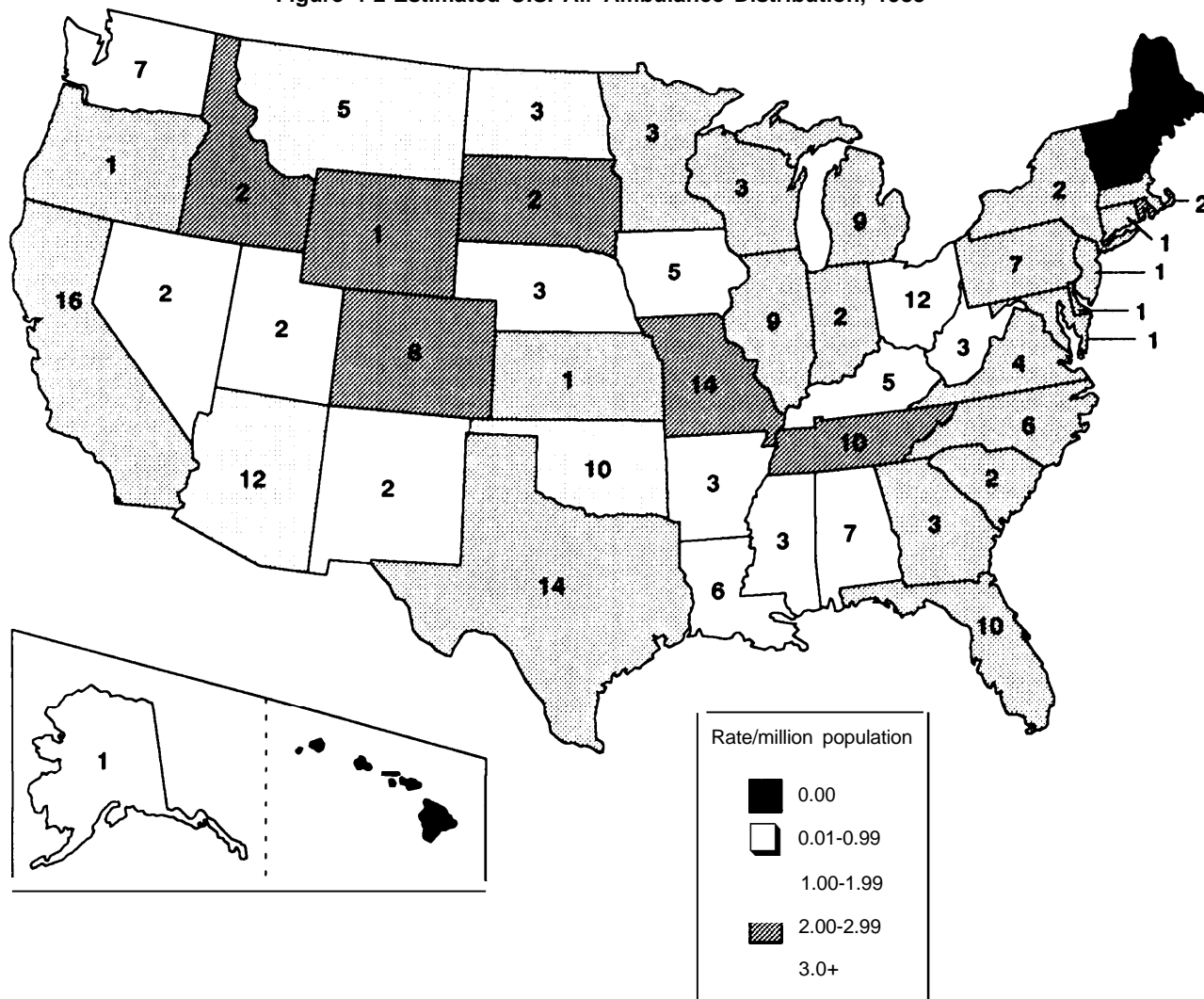
Table 4-3-Ratios of Helicopters*to Population by State, 1988

Rank order	State	1987 population	Number of helicopters	Rate/ million
1	Montana	809,000	5	6.18
2	North Dakota	672,000	3	4.46
3	Arizona	3,386,000	12	3.54
4	Oklahoma	3,272,000	10	3.06
5	South Dakota	709,000	2	2.82
6	Missouri	5,103,000	14	2.74
7	Colorado	3,296,000	8	2.43
8	Tennessee	4,855,000	10	2.06
9	Wyoming	490,000	1	2.04
10	Idaho	998,000	2	2.00
11	Nevada	1,007,000	2	1.99
12	Alaska	525,000	1	1.90
13	Nebraska	1,594,000	3	1.88
14	Iowa	2,834,000	5	1.76
15	Alabama	4,083,000	7	1.71
16	D.C.	622,000	1	1.61
17	West Virginia	1,897,000	3	1.58
18	Washington	4,538,000	7	1.54
19	Louisiana	4,461,000	6	1.34
20	Kentucky	3,727,000	5	1.34
21	New Mexico	1,500,000	2	1.33
22	Arkansas	2,388,000	3	1.26
23	Utah	1,680,000	2	1.19
24	Mississippi	2,625,000	3	1.14
25	Ohio	10,784,000	12	1.11
26	Michigan	9,200,000	9	0.98
27	North Carolina	6,413,000	6	0.94
28	Texas	16,789,000	14	0.83
29	Florida	12,023,000	10	0.83
30	Illinois	11,582,000	9	0.78
31	Minnesota	4,246,000	3	0.71
32	Virginia	5,904,000	4	0.68
33	Wisconsin	4,807,000	3	0.62
34	Pennsylvania	11,936,000	7	0.59
35	South Carolina	3,425,000	2	0.58
36	California	27,663,000	16	0.58
37	Georgia	6,222,000	3	0.48
38	Kansas	2,476,000	1	0.40
39	Oregon	2,724,000	1	0.37
40	Indiana	5,531,000	2	0.36
41	Massachusetts	5,855,000	2	0.34
42	Connecticut	3,211,000	1	0.31
43	Maryland	4,535,000	1	0.22
44	New Jersey	7,672,000	1	0.13
45	New York	17,825,000	2	0.11
46	Vermont	548,000	0	0.00
47	Rhode Island	986,000	0	0.00
48	New Hampshire	1,057,000	0	0.00
49	Maine	1,187,000	0	0.00
50	Hawaii	1,083,000	0	0.00
51	Delaware	644,000	0	0.00
Total:		243,399,000	226	—
Averages:			4.43	0.93

*Number of helicopters is based on Association of Air Medical Services (AAMS), formerly the American Association of Hospital Based Emergency Air Medical Services (ASHBEAMS). Some nonhospital based helicopters (e.g., public safety services) were excluded from these counts.

SOURCE Missouri Health Facilities Review Committee, "Missouri Air Ambulance Report—1989," January 1989.

²⁰Airplane transportation services generally operate at 25 to 40 percent of the cost of helicopter services because most airplane services are not dedicated solely to air medical transportation and operating costs are lower (97).

Figure 4-2-Estimated U.S. Air Ambulance Distribution, 1988^a

Average of 4.3 Air Ambulance Units per State and an average of 0.93 per million population

^aNumber of helicopters is based on Association of Air Medical Services (AAMS), formerly the American Association of Hospital Based Emergency Air Medical Services (ASHBEAMS). Some nonhospital based helicopters (e.g., public safety services) were excluded from these counts.

SOURCE: The Missouri Health Facilities Review Committee, "Missouri Air Ambulance Report," January 1989.

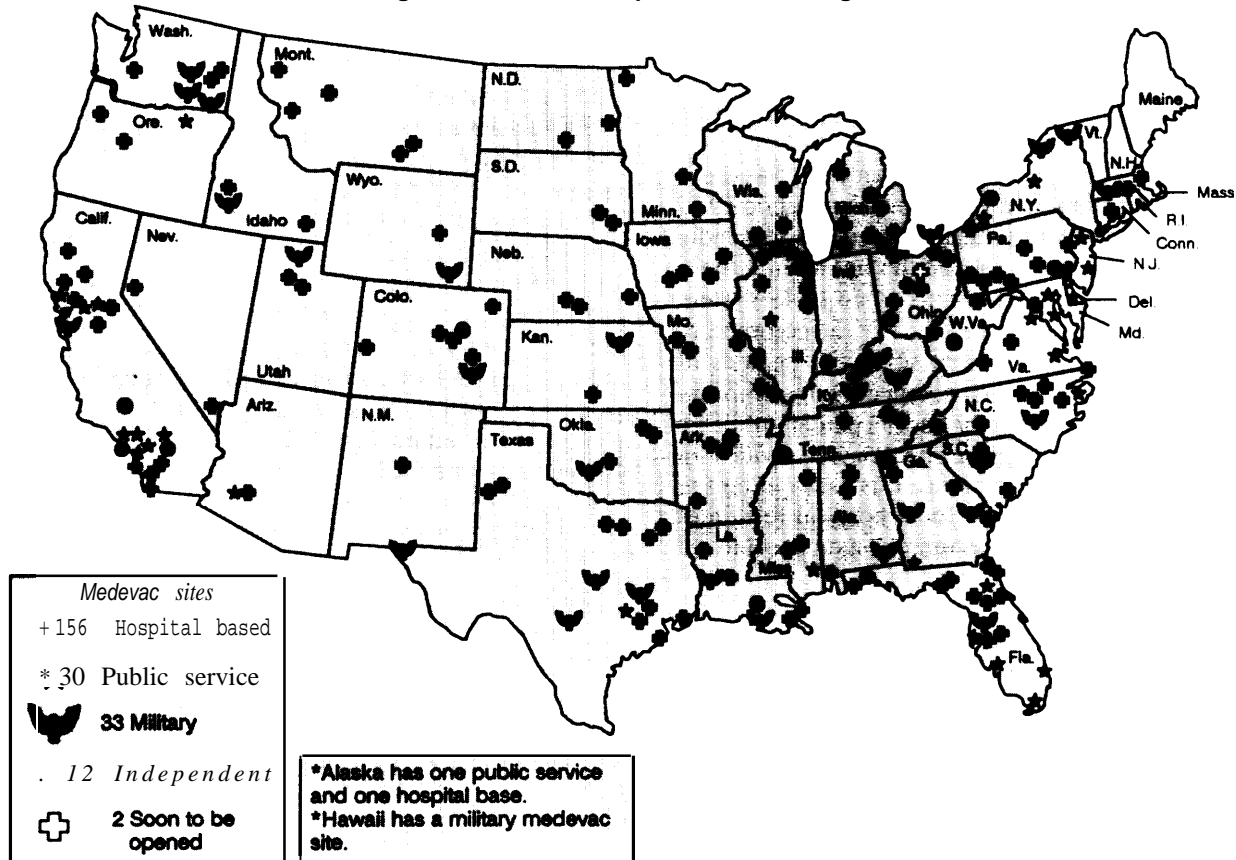
and commitment from the medical community. It is sometimes difficult to get rural physicians to provide medical guidance in the form of practice guidelines (off-line medical control) and on-scene and transport medical advice via radio (on-line medical control). Many emergency room medical directors in rural hospitals are not EMS specialists and therefore could benefit from training and orientation regarding

their medical control responsibilities (82).²¹ Consensus standards for medical control may be particularly useful in rural areas.

Prehospital providers may need advice regarding where to take an emergency patient. As the triage decision is often critical to patient survival or death, the highest available level of medical expertise should be brought into the triage decision-making

²¹A training course for physicians on the provision of medical control for EMS is under development by the American College Of Emergency Physicians (ACEP) (63).

Figure 4-3--U.S. Helicopter Medevac Programs



Two hundred and thirty-one helicopter ambulance services are run in 46 States and the District of Columbia by hospitals, the military and State and local police-and rescue services as of 1987. At least 19 additional programs are scheduled to start by early 1988.
SOURCE: A. Schneider, *Rescue at Risk*, The Pittsburgh Press, 1987.

process. This responsibility is usually assumed by the local emergency department physician (5). Some areas have designated trauma or critical care centers and explicit triage policies (see discussion in ch. 5). In other areas, policies dictate that patients be taken to the nearest hospital. Critical trauma patients may be transported to a trauma center after being stabilized at a local hospital, but in some cases immediate transport to the trauma center is required. It is especially important that medical control be available to prehospital care providers when triage patterns are not explicit.

Fear of litigation may discourage some physicians from providing medical control to the local EMS system. As of 1987, 18 States had enacted legislation that protects physicians from civil liability when

they assume EMS medical control responsibilities (109).

Medical Response

Although many of the events precipitating the need for EMS occur at the same rate in urban and rural areas, the level of hospital care required to respond to emergent events is not equally available. Because large numbers of people are concentrated in urban areas, the specialized services required to care for the most acutely ill and injured patients can be maintained. In rural areas, however, emergent events occur infrequently, making it economically difficult to maintain a tertiary-level facility. Furthermore, it is difficult for rural EMS providers to maintain specialized skills when they are infrequently used. When faced with emergencies that require services

beyond those available in the local health care system, rural communities must have a system in place to stabilize and transport patients. Integration of levels of care or a referral systems approach to EMS are, however, nonexistent in many rural areas.

While access to specialized services, such as those available in a trauma center, is central to a good EMS system, local resources must be adequate to handle the majority of EMS cases that do not require these specialized services. Most calls to an EMS system can be appropriately handled at a community hospital. For example, about 90 to 95 percent of trauma cases can be treated adequately at a community hospital (5), while only 5 to 10 percent of cases are critical and require more specialized services. In the evaluation of EMS systems, it is as important to examine the availability of local hospital resources as it is to examine access to more distant specialized resources, such as trauma centers.

When a rural area has a community hospital, it almost always (98 percent) has an emergency room but rarely has a trauma center (see table 4-4).²² In general, there are few specialized emergency physicians (i.e., Board-certified emergency physicians) and nurses in rural hospitals. Instead, physicians and nurses tend to be generalists who must provide care in all of the various hospital specialty areas. They provide care in the emergency room if and when a patient presents there. These providers may not only lack the specialized training required to appropriately manage emergency patients, but they often do not have the opportunity to frequently practice necessary EMS skills and maintain proficiency (53,63). Making continuing education courses in emergency medicine available to physicians practicing in rural areas could effectively improve the community hospital's EMS medical response and improve the quality of medical control of the community's EMS system.

EMS treatment delays may occur in rural hospitals because rural emergency departments are often not staffed by a physician 24 hours a day. In Idaho, for example, only 9 of the State's 48 hospitals have 24-hour physician coverage (108). Many rural hospitals have trouble paying for 24-hour emergency

room physician coverage and opt for rotating, on-call coverage (87).

Emergency room nurses are usually available until the physician arrives, and outcomes of patients with life-threatening emergencies may be improved by upgrading and maintaining their skills (93). A survey of nurses providing emergency room care in rural areas cites understaffing of emergency departments, underqualified nurses and physicians, a lack of continuing education programs, and the absence of statewide emergency standards as among the most serious problems facing rural emergency nurses (37). As of 1986-87, however, only Arizona, Illinois, and the District of Columbia had EMS offices that had set minimum standards for nurse emergency department practice. Furthermore, a 1986-87 State survey showed that few State EMS offices were conducting training programs for nurses (107).²³

An innovative approach to continuing education for rural EMS providers is the use of computer-based simulation programs similar to those used to instruct pilots. One such program includes a series of EMS patient-management problems designed to help physicians, nurses, and critical care providers sharpen their ability to make clinical decisions (43).

Regionalization

Many States have designated specialized facilities for the treatment of trauma, burn, or other types of emergency patients. Before designating facilities, States usually adopt standards for personnel and equipment that must be met before designation can occur. Some States "verify" facilities that meet the standard while others "designate" facilities that meet the standards according to the State's needs. Under the verification process, as many facilities as meet the standard may be used for specialized services. In contrast, under the designation process, facilities often compete to be designated (108). Facilities have been verified or designated for their trauma care, spinal injury care, poison centers, psychiatric services, burn centers, and cardiac care (108). Some States have triage criteria that specify when patients should bypass a nonspecialized hospital for a specialized one (see ch. 5). The presence of written agreements (sometimes called transfer agree-

²²Whether or not a hospital has a trauma center depends largely on the number of hospital beds. Nearly one-third of rural hospitals with 20010300 beds have a trauma center.

²³States EMS offices that were offering nurse training (or providing financial assistance for training) include Alaska, Illinois, Maryland, Massachusetts, Nevada, New Jersey, New Mexico, and Rhode Island (107).

**Table 4-4--Percent of Community Hospitals With EMS-Related Services
in Metropolitan and Nonmetropolitan Hospitals by Bed Size (under 300 beds), 1987^a**

Hospital location and bed size (number of hospitals)	Emergency department		Trauma center		Blood bank	
	Percent	Number	Percent	Number	Percent	Number
AMetropolitan:						
6-24 (22)	81.8	(18)	—	(0)	22.7	(5)
25-49 (122)	83.6	(102)	3.3	(4)	52.5	(64)
50-99 (363)	94.8	(344)	5.0	(18)	69.7	(253)
100-199 (693)	96.7	(670)	16.2	(112)	77.8	(539)
200-299 (571)	97.5	(557)	28.2	(161)	84.2	(481)
Total (1,771)	95.5	(1,691)	16.7	(295)	75.8	(1,342)
Nonmetropolitan:						
6-24 (183)	94.5	(173)	0.5	(1)	45.4	(83)
25-49 (753)	97.9	(737)	2.9	(22)	49.8	(375)
50-99 (831)	98.7	(820)	6.5	(54)	66.8	(555)
100-199 (526)	97.7	(514)	16.0		75.5	(397)
200-299 (132)	97.7	(129)	31.8	(42)	87.1	(115)
Total (2,425)	97.9	(2,373)	8.4	(203)	62.9	(1,525)

^aCommunity hospitals are defined as short-stay, non-Federal, nonspecialty hospitals.

SOURCE: OTA analysis of data from The American Hospital Association 1987 Annual Survey of Hospitals.

ments) between facilities providing different levels of care can expedite a rapid patient transfer and may save a rural hospital the cost of upgrading equipment and resources.

Social and Political Constraints on Rural EMS Development

Efforts to upgrade and regionalize rural EMS systems are sometimes impeded by social and political factors. Rural areas are frequently characterized by older, less affluent, and more traditional residents that may be less knowledgeable about the use and efficacy of emergency medical services, and be slower to accept new patterns of health care delivery. Rural residents have been characterized (even by rural residents themselves) as “parochial,” “fiercely independent,” distrustful of urban initiatives, and leery of control by State or Federal Governments (135).

A rural community’s desire for local control and autonomy is oftentimes antithetical to the effort to create coordinated, regional EMS systems. In one New England State, the desire for local autonomy was intense; each community, regardless of size, wanted its own physician, its own ambulance service, and its own hospital (135). This pattern is neither cost-effective nor conducive to the maintenance of skills by the volunteer ambulance attendants. It has led to an excess of vehicles, an enormous EMS training burden because of the large number of volunteers required to staff the service, a multiplicity of dispatch centers, a suboptimal distribution of vehicles, and a complicated coordination task (135).

In the mid-1970’s, the region received a large grant to establish a central communications center with 911 access for all emergency services. Although the central communications center was established, a 911 access system was not because of opposition from 19 volunteer fire chiefs who wanted to retain dispatch rights. Consequently, a system of central dispatch and 911 access remained elusive goals for this area (135).

Efforts to regionalize services have sometimes failed even when incentives such as free equipment are offered in exchange for cooperation. In one Pacific Northwest rural community, for example, local leaders decided not to request Federal funding to purchase much-needed EMS communications equipment, because they wanted to avoid restrictions attached to Federal funds for EMS even though the town could not afford the equipment.

Some rural communities oppose governmental regulation and intervention in the private sector operation of EMS services and there is often resistance to the passage of mandatory standards for EMS providers, vehicles, and facilities. Sometimes, resistance is simply due to the fact that local resources may be unavailable to upgrade the EMS system to meet new standards. Furthermore, national standards may be viewed as inflexible and not suited to the unique circumstances of rural areas. Without standards, however, there is wide variation in the quality of services available in rural areas. Some

local governments have agreed to subsidize a private ambulance service, but they often have not provided for performance standards, ambulance regulations, contracts, or other needed mechanisms of public accountability for the tax dollars provided (135).

What may appear to outside EMS observers to be a major improvement in the quality of prehospital care may not be perceived as such by local residents. In one small community, for example, the local funeral home (one of the last in the State still in the ambulance business) decided to withdraw from ambulance service provision in the face of increasing financial losses and the possibility of the passage of State ambulance regulations. A pair of experienced paramedics from a nearby metropolitan area took over the service and the town progressed rapidly from an inadequate, antiquated funeral home system to a well-equipped and well-staffed basic life support system with advanced life support capabilities. The public, however, missed the low rates charged by the funeral home (which had provided the service largely for public relations reasons), were unaware of the significant improvement in the quality of care, and did not understand why the paramedics spent so much time at the scene of the EMS incident (to stabilize the patient prior to transport). They much preferred the funeral home service.

One strategy that EMS leaders could use to ameliorate some of the rural constraints on EMS system-building and regionalization is public education regarding the importance of EMS and how EMS systems are organized. EMS leaders, for example, could make presentations at schools, city council meetings, senior citizen groups, civic clubs, and health fairs. They can also educate members of the local media concerning EMS issues, since the media can be an extremely effective means of raising the awareness of the public and elected officials.

The functions of State and regional EMS agencies and councils could be supported as they can serve as

a valuable technical resource for rural providers, advising them concerning financial management, liability insurance, and third-party reimbursement; providing training equipment and courses; and seeking out public and private financial assistance. A decentralized structure of county and regional councils may be effective in rural States marked by extreme local independence.

EMS leaders could attempt to capitalize on the competitiveness characteristic of rural towns and ambulance service providers. For example, if EMS leaders can persuade the members of a key volunteer squad of the need for training, and modern equipment and vehicles, their example is likely to pique the competitive spirit in neighboring squads, who may then follow suit. The dedication of rural volunteers is impressive and can be a valuable asset in building and maintaining an EMS system.

While there are examples of communities that have resisted EMS systems development, there are numerous rural communities that have developed model EMS systems.²⁴ In the rural Texas panhandle, for example, an EMS system has been developed to provide services in a 26 county, 26,000 square-mile area. The Panhandle Emergency Medical Services System (PEMSS) was originally federally funded, but it is now a nonprofit corporation sustained through fees paid by 56 ambulance services located within the region.²⁵ Membership dues provide for training programs, vehicle and equipment purchases, quality assurance programs, ongoing communications networking, and system evaluation.²⁶ Hospitals in the region are categorized according to level of care and there are comprehensive prehospital medical and transport protocols. The region has a single regional medical communications network that reaches throughout the Panhandles' vast area (58).

²⁴DHHS's Office of Rural Health Policy will complete some rural EMS case studies by early 1990 (32).

²⁵The PEMSS members pay \$0.17 per individual residing in the member's service area. Fees range from \$45 to \$36,000 per year (58).

²⁶PEMSS is controlled by a board of directors that governs the organization with advisement from a regional advisory committee (58).