A Systems Development Guide for Emergency Medical Services:

A Systematic Approach to Funding and Administration

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Oklahoma Office of Rural Health
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The Rural Hospital Performance Improvement (RHPI) Project supported the development of this tool and is funded by the Office of Rural Health Policy, HRSA, DHHS through a contract with Mountain States Group, and a subcontract to Oklahoma State University.

Report prepared as part of the Mississippi Delta Project
(Rural Hospital Performance Improvement Project)

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Table of Contents

Chapter I. Planning the Emergency Medical Services System 1

EMS Agenda for the Future 2
15 Components of an EMS System 2
The Vision 2

A Systematic Approach to EMS 6

The EMS Council - An Advisory or Decision Making Group 7
HIPAA Compliance 7
Do You Need an EMS Council and a Privacy Task Force 9

Chapter II. Basic Life Support: Walking Before You Run 10

Components of a Basic Life Support System 11
Manpower and Training 11
Transportation 13
Communications 15
Hospital Facilities 16
Continuous Quality Improvement (CQI) 18

As the BLS System Matures 19

Chapter III. Advanced Life Support: Moving Toward the Ultimate in Emergency Care 21

Components of an Advanced Life Support System 22
Manpower and Training 22
Transportation 23
Communications 23
Facilities – Critical Care Designation 24
Medical Control 24
Continuous Quality Improvement (CQI) 25

A Checklist for Your EMS System 26

Chapter IV. First Responders: Where Do They Fit In? 27

Who are First Responders? 28

Chapter V. Organization of an EMS: A State and Systems Overview 29

Systems Organization 30
Level of Care 30
Type of Operation 30

Type of Ownership 30
Table 1. EMS Systems by Level of Care, Oklahoma EMS Providers, 2002 31
Figure 1. Map of Oklahoma Emergency Medical Services, 2002 31
Table 2. EMS Systems by Type of Operation, Oklahoma EMS Providers, 2002 ... 32
Table 3. EMS Systems by Type of Ownership, Oklahoma EMS Providers, 2002 .. 32

Oklahoma Selected Services – Organizational Data 32
Table 4. EMS Systems by Level of Care, Selected Oklahoma EMS Providers, 2002 33
Table 5. EMS Systems by Type of Operation, Selected Oklahoma EMS Providers, 2002 33
Table 6. EMS Systems by Type of Ownership, Selected Oklahoma EMS Providers, 2002 33

Oklahoma Selected Studies – Call Data 33
Table 7. EMS Systems and Calls by Type of Entity, Selected Oklahoma EMS Providers, 2002 34
Table 8. Total and Average Population of EMS Services by Type of Entity, Selected Oklahoma EMS Providers, 2002 34
Table 9. EMS Calls by Age of Patient and by % of Population, Selected Oklahoma EMS Providers, 2002 34
Table 10. EMS Calls by Day of Week, Selected Oklahoma EMS Providers, 2002 34
Table 11. EMS Calls by Time of Day, Selected Oklahoma EMS Providers, 2002 35
Table 12. EMS Calls by Type, Selected Oklahoma EMS Providers, 2002 35

Summary 35

Chapter VI. Estimating Costs of an Emergency Medical Services System 36

First Responder Systems 37
Table 13. Recommended Items in First Responder Kit 38
Summary – Costs for a First Responder System 39

Expensing the EMS System 40
Capital Costs 40
Summary – Vehicle and Equipment Costs 40
Figure 2. Types of Ambulances as Described in KKK-A-1822 Specifications 41
Summary – Communication System Costs 42
Summary – Building and Building Furnishing Costs 43
Annual Capital Costs 43
Figure 3. An example of a Floor Plan for an EMS Building 44
Summary – Annual Capital 45
Operating Expenses 45
Table 14. License Fees 45

Table 15. Annual Vehicle Operating Expenses 46
Summary – Annual Communication System Costs 47
Summary – Medical Expenses 47
Table 16. Labor 48
Table 17. Annual Personnel Expense for One Crew Member 49
Table 18. Annual Salary Expense for One Individual 49
Table 19. Volunteer Pay Systems – Nominal Fee Methodologies 50
Table 20. Building Operating Expense 52
Summary – Operating Expenses 53

Summary 54

Chapter VII. Funding Options 55

Table 21. Summary of Funding Options 56

Summary 59

Chapter VIII. Example EMS System Case Studies 60

Estimating Costs of Funding Delivery Systems 61

Case Study – First Responder Service 61
Form 1. Estimating the Annual Cost of a First Responder System 62

Case Study – Basic Life Support Volunteer Service 63
Alternative Revenue Sources – BLS Case Study 65
Conclusion 66

Form 2. EMS System – Estimating Capital Costs 67
Form 3a. EMS System – Estimating Annual Operating Costs for Vehicles 68
Form 3b. EMS System – Estimating Annual Operating Costs for Building/Medical/Communications/Liability Insurance 69
Form 3c. EMS System – Estimating Annual Operating Costs for Personnel/Benefits 70
Form 3d. EMS System – Estimating Annual Operating Costs for "Other Expenses" 71
Form 4. EMS System – Summary Costs 72
Form 5a. EMS System Revenues – Estimated User Fee Per Call 73
Form 5b. EMS System Revenues – Estimated Mileage Fees 74
Form 5c. EMS System Revenues – EMS District Mills 75
Form 5d. EMS System Revenues – Sales Tax 76
Form 6. EMS System – Possible Funding Options 77

Chapter IX. Effective Administration: A Key to A Viable EMS Program 78

Chapter X. Available Resources and Services 81

References 83

Appendices

Appendix A. Essential Equipment for Ambulances
Appendix B. Amortization Factors
Appendix C. Forms for Estimating Costs of EMS Systems
Appendix D. BLS Case Study Call Tables
Appendix E. Resources

CHAPTER I.

Planning the Emergency Medical Services System

EMS Agenda for the Future

During the past 30 years, emergency medical services (EMS) in the United States have experienced explosive development and growth. Yet initiatives to create a system to provide emergency medical care for the nation's population began with limited knowledge about what constituted the most efficient processes for delivering ideal resources to the spectrum of situations encountered by contemporary EMS. The "15 Components of an EMS System" below were a part of the genesis of the EMS we know today. In 1996, a multi-disciplinary group, under the leadership of the National Highway Traffic Safety Administration, expounded on these components and developed the *EMS Agenda for the Future*.

15 Components of an EMS System

- Manpower
- Training
- Communications
- Transportation
- Facilities
- Access to Critical Area Units
- Utilization of Public Safety Agencies
- Consumer Participation
- Accessibility to Care
- Transfer of Patients
- Standard Medical Record Keeping
- Consumer Information – Public Education
- Review and Evaluation
- Disaster Planning
- Mutual Aid Agreements

The Vision

Emergency medical services (EMS) of the future will be community-based health management systems that are fully integrated with the overall health care system. The EMS will have the ability to identify and modify illness and injury risks, provide acute illness and injury care and follow-up, and contribute to treatment of chronic conditions and community health monitoring. This new entity will be developed from redistribution of existing health care resources and will be integrated with other health care providers and public health and public safety agencies. The EMS will improve community health and result in more appropriate use of acute health care resources. EMS will remain the public's emergency medical safety net.

To realize this vision, the *EMS Agenda for the Future* proposes continued development of 14 EMS attributes. Please note that this list is similar to the components of an EMS system listed previously. These attributes are a modernized expansion.

The 14 EMS attributes are:

1. Integration of Health Services
2. EMS Research
3. Legislation and Regulation
4. System Finance
5. Human Resources
6. Medical Direction
7. Education Systems
8. Public Education
9. Prevention
10. Public Access
11. Communication Systems
12. Clinical Care
13. Information Systems
14. Evaluation

The *EMS Agenda for the Future* provides a vision for pre-hospital EMS. Achieving such a vision will require deliberate action and application of the knowledge gained during the past 30 years of EMS experience. You will see that the EMS of the future will be more than merely an emergency transportation service. The EMS Division at the state level and at the local EMS District levels are the workhorses of the national *Agenda*. An understanding of the *Agenda* will help the local decision-makers understand the reasoning behind some of the EMS legislation and regulation. If pursued conscientiously, the *Agenda* will be an achievement with great benefits for all of society. The goals associated with these 14 attributes follow.

1. Integration of Health Services

- Expand the role of EMS in public health
- Involve EMS in community health monitoring
- Integrate EMS with other health care providers and provider networks
- Incorporate EMS within health care networks' structure to deliver quality care
- Be cognizant of the special needs of the entire population
- Incorporate health systems within EMS that address the special needs of all segments of the population

2. EMS Research

- Allocate federal and state funds for major EMS systems research
- Develop information systems that provide linkages between various public safety services and other health care providers
- Develop academic institutional commitments to EMS-related research
- Interpret informed consent rules to allow for clinical and environmental circumstances inherent in conducting credible EMS research by all those responsible for EMS structure, processes, and/or outcomes
- Designate EMS as a physician subspecialty, and a subspecialty for other health professions
- Include research related objectives in the education processes of EMS providers and managers
- Enhance the quality of published EMS research
- Develop collaborative relationships between EMS systems, medical schools, other academic institutions, and private foundations

3. Legislation and Regulation

- Authorize and sufficiently fund a lead federal EMS agency
- Pass and periodically review EMS enabling legislation in all states that supports innovation and integration, and establishes and sufficiently funds an EMS lead agency
- Enhance the abilities of state EMS lead agencies to provide technical assistance
- Establish and fund the position of State EMS Medical Director in each state
- Authorize state and local EMS lead agencies to act on the public's behalf in cases of threats to the availability of quality EMS to the entire population
- Implement laws that provide protection from liability for EMS field and medical direction personnel when dealing with unusual situations

4. System Finance

- Collaborate with other health care providers and insurers to enhance patient care efficiency
- Develop proactive financial relationships between EMS, other health care providers, and health care insurers/provider organizations
- Compensate EMS on the basis of a preparedness-based model, reducing volume-related incentives and realizing the cost of an emergency safety net
- Provide immediate access to EMS for emergency medical conditions
- Address EMS relevant issues within governmental health care finance policy
- Commit local, state, and federal attention and funds to continued EMS infrastructure

5. Human Resources

- Ensure that alterations in expectations of EMS personnel to provide health care services are preceded by adequate preparation
- Adopt the principles of the National EMS Education and Practice Blueprint
- Develop a system for reciprocity of EMS provider credentials
- Develop collaborative relationships between EMS systems and academic institutions
- Conduct EMS occupational health research
- Provide a system for critical incident stress management

6. Medical Direction

- Formalize relationships between all EMS systems and medical directors
- Appropriate sufficient resources for EMS medical direction
- Require appropriate credentials for all those who provide on-line medical direction
- Develop collaborative relationships between EMS systems and academic institutions
- Develop EMS as a physician and nurse subspecialty certification
- Appoint state EMS medical directors

7. Education Systems

- Ensure adequacy of EMS education programs
- Update education core content objectives frequently enough so that they reflect EMS patient health care needs
- Incorporate research, continuous quality improvement, and management learning objectives in higher level EMS education
- Commission the development of national core contents to replace EMS program curricula
- Conduct EMS education with medical direction
- Seek accreditation for EMS education programs
- Establish innovative and collaborative relationships between EMS education programs and academic institutions
- Recognize EMS education as an academic achievement
- Develop bridging and transition programs
- Include EMS-related objectives in all health professions' education

8. Public Education

- Acknowledge public education as a critical activity for EMS

- Collaborate with other community resources and agencies to determine public education needs
- Engage in continuous public education programs
- Educate the public as consumers
- Explore new techniques and technologies for implementing public education
- Evaluate public education incentives

9. Prevention

- Collaborate with community agencies and health care providers with expertise and interest in illness and injury prevention
- Support the Safe Communities concept
- Advocate for legislation that potentially results in injury and illness prevention
- Develop and maintain a prevention-oriented atmosphere within EMS systems
- Include the principles of prevention and its role in improving community health as part of EMS education core contents
- Improve the ability of EMS to document injury and illness circumstances

10. Public Access

- Implement 9-1-1 nationwide
- Provide emergency telephone services for those who cannot otherwise afford routine telephone services
- Ensure that all calls to a Public Safety Answering Point (PSAP), regardless of their origins, are automatically accompanied by unique location-identifying information
- Develop uniform cellular 9-1-1 service that reliably routes calls to the appropriate PSAP
- Evaluate and employ technologies that attenuate potential barriers to EMS access
- Enhance the ability of EMS systems to triage calls and provide resource allocation that is tailored to patient's needs

11. Communications Systems

- Assess the effectiveness of various personnel and resource attributes for EMS dispatching
- Receive all calls for EMS using personnel with the requisite combination of education, experience, and resources to optimally query the caller, make determination of the most appropriate resources to be mobilized, and implement an effective course of action
- Develop a certification program for emergency medical dispatchers
- Promulgate and update standards for EMS dispatching
- Develop cooperative ventures between communications centers and health providers to integrate communications processes and enable rapid patient-related information exchange
- Determine the benefits of real-time patient data transfer
- Appropriate federal, state, and regional funds to further develop and update geographically integrated and functionally-based EMS communications networks
- Facilitate exploration of potential uses of advancing communications technology by EMS

- Collaboration with private interests to effect shared purchasing of communication technology

12. Clinical Care

- Commit to a common definition of what constitutes baseline community EMS care
- Subject EMS clinical care to ongoing evaluation to determine its impact on patient outcomes
- Employ new care techniques and technology only after shown to be effective
- Conduct task analyses to determine appropriate staff configurations during secondary patient transfers
- Eliminate patient transports as a criterion for compensating EMS systems
- Establish proactive relationships between EMS and other health care providers

13. Information Systems

- Adopt uniform data elements and definitions and incorporate them into information systems
- Develop mechanisms to generate and transmit data that are valid, reliable, and accurate
- Develop information systems that are able to describe an entire EMS event
- Develop integrated information systems with other health care providers, public safety agencies, and community resources
- Provide feedback to those who generate data

14. Evaluation

- Develop valid models for EMS evaluations
- Evaluate EMS effects for multiple outcome categories
- Determine EMS cost-effectiveness
- Incorporate consumer input in evaluation processes

A Systematic Approach To EMS

Whenever an emergency medical service (EMS) system is discussed, it is often perceived as being the local ambulance service. However, ambulance service is only the transportation portion of a total EMS system. The EMS system creates a coordinated response to the immediate needs of the emergency patient.

A complete EMS system must include a coordinated working relationship with hospitals, public service agencies, and other providers of health care. Total care from the scene of an accident or the onset of sudden illness, through rehabilitation, and return to normal living should be the goal of EMS planners and implementers.

The EMS system must have strong continuous medical leadership. A physician is the leader of the EMS team. He/she directs and coordinates all elements of care. "Team care" requires cooperation at every level of the system and should be the goal of every EMS system.

EMS system development should remain in the hands of the local populace. There are no hard and fast rules because population, economics, and geography all present unique problems in establishing each individual EMS system. However, if the system is to be of lifesaving quality, standards for personnel training, vehicles, manpower, facilities, communications, and continuous quality improvement must be adopted.

The EMS Council - An Advisory or Decision Making Group

The following statement from the American Medical Association points up the need for an EMS council in a region contemplating improvement of their emergency medical services. "In all action programs, there is an innovator, a missionary - an individual or group involved - the man or men who see the urgency of the program as a personal responsibility and devote their time and energy to getting it underway. Whoever this initiating force may be, however, he/she must realize that an emergency care system will not work unless the organizations, agencies, and facilities, which must contribute to the system, are involved in the planning. The primary role of this leadership group should, therefore, be the establishment of a fact finding, planning, coordinating and advisory council broadly based in the community."

Council Membership

The council should be formed so that it best relates to the particular community. At least four groups should be included in the council:

- providers of health services (such as physicians and other health professionals);
- public agencies involved with health and safety;
- community leaders; and
- consumers, who use and pay for the system.

The size of the council is not as important as having members who are enthusiastic and willing to work towards the goal of an improved EMS system.

Council Functions

After determining the area to be served by the EMS system, the council's first task should be to survey the current status of emergency care in that area. From the survey, needed improvements in coordination of emergency resources can be identified. The survey can be divided into two parts:

1) the need for emergency care; and
2) the personnel and facilities currently offering such care.

Once the survey has been completed and analyzed, emergency care deficiencies will be known and needed improvements in the EMS system can begin.

The information found in Chapter V. "*Organization of EMS: A State and Systems Overview*" is representative of information that can be provided to the council to help them decide how to improve EMS in their area. Good records of current ambulance service plus an understanding of EMS system development are required to provide such information.

A final major function of the EMS council is to provide leadership and to appoint someone to be in charge of and to be responsible for the EMS system's activities.

HIPAA Complinance

Public Law 104-191, The Health Insurance Portability Act of 1996, commonly known as HIPAA, was published December 28, 2000 and required that providers get *consent* of the patient in order to use the patient's protected health information (PHI) to bill and share that information with other health care providers.

In August of 2002, the requirements were changed to only require that patients

acknowledge that they have been given *notice* of the organization's privacy policies. However, the required implementation data of April 14, 2003 remained unchanged. Even though consent to use the protected health information is no longer needed, EMS providers must instill in every person in the company that the privacy of the patient's health information must be protected and that they must be formal policies, procedures, and training established to assure compliance.

Privacy Task Force

HIPAA clearly sets a national standard for privacy that goes beyond most health care providers' rules. In order to comply with the standard, EMS providers could establish a privacy task force within their agency that has the following responsibilities:

1. Learn the requirements of the rule.
2. Identify the patient information currently collected by the agency, how it is stored, who has access to it, how it is shared, and how it is used.
3. Develop written security standards for that information, including identification of the positions in the organization that have access to each specific piece of information (for example, billing information cannot be accessed by those who don't need it). Design patient privacy standards, patient consent forms, patient authorization forms, and business associate agreements. Designate the privacy official for the organization, and so forth.
4. Develop a formal privacy training program for all employees.
5. Develop a compliance program to ensure that the privacy policies are enforced on an ongoing basis.

An EMS provider could break down the privacy requirements as they apply to each phase of the ambulance process where protected health information is collected and communicated. This is a practical approach because it addresses how the privacy provisions must be addressed in a logical fashion. It addresses the relationships with agencies (e.g., dispatch centers, first responders, mutual aid providers, and receiving hospitals) that share PHI with your agency.

The EMS provider should be able to answer such questions as: Is the 9-1-1 dispatch center a covered entity or a business associate? Does the rule apply to volunteer ambulance services? Is a written business associate agreement needed with hospitals? Can patient information be transmitted over the radio? In addition to the typical situations that use PHI, the EMS provider needs to determine how to deal with the use of PHI in quality assurance, mass casualty situations, etc.

EMS providers need to answer more specific legal questions such as what constitutes "notice" versus "consent" versus "authorization." It must address the definition of personal representatives (people who can sign for the patient) – something very important to ambulance providers. They also must address what information can be shared with other agencies, e.g. the State EMS office, researchers, police agencies, the press, etc. Another important consideration is who reviews the patients' rights to see their medical records and/or controls others' access to their medical records.

HIPAA Summary

The privacy and security rules established under HIPAA *require* that ambulance

services establish new procedures that affect all phases of the operation. Those that do not open themselves up to not only losing their rights to bill Medicare, but also to potential civil litigation for violation of patients' privacy rights.

Do You Need an EMS Council and a Privacy Task Force?

These two entities could have the same membership. However, the EMS Council is designed to look at overall organizational needs and the Privacy Task Force is specifically looking at patients' protected health information.

CHAPTER II.

Basic Life Support:
Walking Before You Run

As in any system, elements of the EMS system must work smoothly together. More importantly, people who are involved in planning, developing, and implementing the system must function in a like manner – cooperating with each other – for effective and efficient EMS delivery.

A basic life support system is a minimum combination of interacting elements and personnel. It should have:

- Programs to train the citizen(s) in emergency care of the sick and injured and to inform the public how to summon an ambulance.
- Easy and quick telephone access by which the public can obtain aid rapidly within a designated geographical area.
- Coordinated dispatch of ambulances from the call receiving point on a 24 hour per day basis by dispatchers trained to analyze the severity of medical occurrences.
- A dedicated radio network that allows communications among ambulances, hospitals, physicians, and other medical and public safety resources.
- Ambulance personnel trained in emergency procedures who can stabilize the patient at the scene and maintain that stable condition while transporting the patient.
- Vehicles designed specifically for transport of the critically injured and sudden illness patient and adequately equipped with life supporting supplies to sustain the patient while en-route to the hospital.
- Physicians in charge of all medical operations and in control of medical decisions.

The above points were first made in a Robert Woods Johnson Foundation Special Report on EMS in 1977. And after a quarter-century, they still very succinctly sum up the major points necessary for a basic life support system.

Components of a BLS System

All of the components must be in place to form a complete, efficient EMS system of lifesaving quality. Of prime importance as building blocks for the system are:

- Manpower and Training,
- Transportation,
- Communications,
- Hospital Facilities, and
- Continuous Quality Improvement.

- Manpower and Training

Manpower and training are complete, equal, and separate components of the EMS System. Due to their close relationship, however, they have been combined here for descriptive purposes.

The basic life support system is dependent upon dedicated professionals working to provide quality emergency care 24 hours per day, 365 days per year. A single EMS Director should be responsible for management decisions and operations. An adequate number of licensed personnel are needed to make the system operate efficiently.

Emergency Medical Technicians (EMTs) are responsible for on-scene care. The emergency care continues through transport and should extend into the emergency department if requested. EMTs are required to be trained in basic life support procedures through a nationally standardized training course developed by the United States

Department of Transportation. The course is taught by certified EMS instructors and is supervised by a physician medical director. A minimum of forty (40) hours of clinical exposure during training within hospital emergency departments and ambulance services is required, in addition to 140 hours of classroom work. This not only prepares the neophyte EMT for his/her role in pre-hospital care, but gives him/her an insight into hospital emergency department procedures as well.

EMTs are required to be licensed by most states. A written and practical skills examination is administered by the National Registry of EMTs as a prerequisite to applying for a state EMT license. Some states also require that EMTs complete an Emergency Vehicle Operator Course. Check with your state EMS office for licensing requirements.

Emergency Medical Dispatchers (EMDs) are the vital link between those calling for help and rapid emergency care response. The speed of the initial receipt and dispatch of the call is the only phase of the ambulance call that can be shortened. Once the ambulance leaves the station, the time for hurrying has passed. Dispatchers should answer the 911 and other emergency numbers and dispatch the appropriate vehicles and manpower. All dispatchers should complete the United States Department of Transportation dispatcher training course.

Additional training could be available for dispatchers; they could also be licensed EMTs or EMDs certified by the National Association of Emergency Medical Dispatchers. Through this training, EMDs can give a caller advice on immediate patient care until the ambulance arrives, can determine the severity of illness or injury, and dispatch appropriate resources based on the severity of the situation.

Rural areas may not be able to support this high level of trained dispatchers. One possible way would be through partnerships amongst multiple agencies (i.e. fire, police, and EMS). Another approach could be development of regional EMS systems to centralize dispatch. Regionalization could prove to be more cost and resource effective and could allow for the higher level of trained dispatch.

Incidentally, Medicare reimbursement rates are directly related to the quality of information obtained during the dispatch phase. Documentation is critical to obtain appropriate Medicare reimbursements. This makes the more professional EMDs all the more valuable.

Emergency Department Nurses and Physicians require specific training in emergency medicine so they can smoothly continue care begun at the scene. Hospital emergency departments have been classified at various levels according to their capabilities of delivering specialized definitive emergency treatment.

Physicians of the Community provide invaluable leadership for the entire EMS system. They may assist in the training of EMTs and emergency nurses and often assume leadership in developing emergency medical care. Ambulance Services and First Responder Agencies are required to have physician medical direction for consultation, protocol development, and continuous quality improvement.

Physician Medical Directors must be an MD or DO, should be board-certified in emergency medicine, and have broad experience in emergency care. The

physician medical directors work with all ambulance services to establish patient care protocols, assure continuous quality improvement of services provided, and to be available for on-line medical control, triage, diagnosis, and on-scene treatment, if necessary. In some states, the states require that the emergency medical personnel function at the direction of a physician medical director. A specialized certification training program is available for physician medical directors through the American College of Emergency Physicians. Continuing education is available through the National Association of State EMS Medical Directors.

First Responders are trained to provide emergency care before the ambulance arrives at the scene of the emergency. They are now recognized as a vital component of the EMS system. As a minimum, ambulance drivers should successfully complete the United States Department of Transportation national standard course for First Responders and be nationally registered as a First Responder. Rescue teams trained and certified as First Responders are desirable for EMS systems; they can provide professional emergency care and prepare the patient for transport prior to the arrival of the ambulance vehicle. First Responders whose duties include driving ambulances should complete an Emergency Vehicle Operator Course. Check with your state for specific requirements.

EMS Directors integrate all the components discussed above into one cohesive EMS system. The EMS Director is the individual in charge and is responsible for the overall operation of the EMS system, administration, and clinical segments.

Initial training to recommended levels of competence is not the only phase of training that must be discussed. A program of continuing education and refresher courses is necessary to maintain and advance the skill levels of First Responders, EMTs, and EMDs.

- <u>Transportation</u>

All ambulance vehicles must meet the Federal Specifications KKK-A-1822E. According to the Federal Specifications, the ambulance is defined as a vehicle for emergency medical care that provides:

- a driver's compartment;
- a patient compartment to accommodate an emergency medical technician (EMT)/paramedic and two litter patients (one patient located on the primary cot and a secondary patient on a folding litter located on the squad bench) so positioned that the primary patient can be given intensive life-support during transit;
- equipment and supplies for emergency care at the scene as well as during transport;
- two-way radio communication; and, when necessary, equipment for light rescue/extrication procedures.

The ambulance shall be designed and constructed to afford safety and comfort and to avoid aggravation of the patient's injury or illness.

The emergency medical care vehicles, include:

- chassis,
- ambulance body,
- equipment,
- devices,
- medical accessories, and
- electronic equipment

All of these shall be standard commercial products, tested and certified to meet or exceed the requirements of the Federal Specifications. The ambulance shall comply with all Federal Motor Vehicle Safety Standards (FMVSS) and other Federal and state regulations applicable or specified for the year of manufacture. The chassis, components, and optional items shall be as represented in the chassis manufacturer's current technical data. The ambulance body, equipment, and accessories shall be as represented in their respective manufacturer's current technical data. Data shall be limited to specifications and technical materials identical to that furnished to the authorized company representatives and shall be furnished to the engineering/technical offices of the procuring activity and the supplier's (contractor's) offices prior to acceptance of the ambulance. The supplier shall provide total standardization and interchangeability between similar vehicles, equipment, items, and accessories specified for all ambulance units under each contract.

EMS placement planners should make selections for new and replacement vehicles from the following three basic vehicle types:

Type I - Class 1 or 2, Configuration A or B, shall be a chassis furnished with a 2-door enclosed cab. The chassis-cab shall be suitable for subsequent mounting of a transferable, modular, ambulance body conforming to the requirements.

Type I - AD - Class 1 or 2, Configuration A, B, or other user specified configurations such as for critical patient or neonatal transport, shall be a conventional truck, cab-chassis with modular body, and increased GVWR, storage, and payload. Additionally, other on-board systems or equipment may be specified for rescue or fire suppression or a combination of applications. The chassis shall be suitable for mounting of a transferable, modular, ambulance body conforming to the requirements.

Type II - Class 1 or 2, Configuration A or B, shall be OEM chassis manufacturer's commercial, long wheelbase, integral van. This vehicle shall be suitable for subsequent ambulance conversion/modification in compliance with the requirements.

Type III – Class 1 or 2, Configuration A or B, shall be a "cutaway" van with a transferable, modular, ambulance body or unitized cab-body mounted on a chassis. The chassis with unitized cab-body or front section cab-chassis shall be suitable for the subsequent fabrication, conversion, or modification into an ambulance incorporating the requirements and the equipment specified.

Type III - AD - Class 1 or 2, Configuration A, B, or other user specified configurations such as for critical patient or neonatal transport, shall be a cutaway cab-chassis with modular body, and increased GVWR, storage, and payload. Additionally, other on-board systems or equipment may be specified for rescue or fire suppression or a combination of applications. The chassis shall be suitable for mounting of a transferable modular ambulance body conforming to the requirements.

Transportation by means other than ground ambulance will be required under certain conditions and in some types of terrain. Helicopters may prove effective rescue units in large cities and congested traffic areas. The most efficient use of helicopters is for the transfer of critical patients from remote rural areas into urban specialty care centers. EMS systems that can finance a helicopter's initial cost and maintenance expenses may

operate such a service, but this is not usually the case. Many hospitals have added helicopter transport to their services. Many EMS systems across the country are assisted in such transfers by military helicopter ambulances. Eligibility for this service is dependent upon the systems proximity to a military base with a MAST (Military Assistance to Safety and Traffic) program. If there is a military base in close proximity to your EMS system and the possibility of establishing a MAST unit has not been explored, it would be wise to do so. Climatic and geographic conditions may dictate still other emergency rescue vehicles such as a fixed wing aircraft, boats, snowmobiles, snow-cats, specialty four-wheel drive vehicles, and boats of various types.

Ambulances should be strategically based within the service area. A maximum response time of seven to ten minutes in the city should be achieved on 95% of their calls. Remote rural areas should strive for a maximum response time of 20 minutes. Rural response time varies based on road conditions (secondary unpaved roads), environment (open range), weather patterns, topography, etc. Response time is considered to be the total elapsed time from the time the call is received in dispatch until the ambulance arrives on scene.

All ambulances are required to carry specific patient care equipment as recommended by the American College of Surgeon's Committee on Trauma and the National Academy of Sciences National Research Council. Additional equipment may be directed by terrain, environment, or other special hazards. The required minimum equipment is specified in **Appendix A**.

➢ Communications

Communications are another key to an efficient EMS system, tying all the components of the system together into a single responsive unit. The communications system should provide:

- Toll-free, 24-hour telephone access to a centralized communications center through the common 911 system. Ideally, the 911 system should be enhanced (E-911) to provide the dispatcher with the actual physical address or location of the caller, even when the call is placed from a cellular telephone.
- Alerting of ambulance crews and rescue squads through the use of voice or alphanumeric pagers or portable radios.
- Rapid voice and data communication among all elements of the system: First Responders, ambulance personnel, fire and rescue squads, law enforcement agencies, and hospitals.

Once alerted, the certified EMD must make quick and proper decisions regarding equipment and manpower requirements to adequately respond and deal with the emergency, whether it involves a single patient or scores of victims. Dispatch and response pre-plans should be utilized so that all dispatchers know how to utilize support services such as utility companies and heavy equipment. They should have access to information on hazardous substances. In the event of widespread disaster, central dispatch coordinates all personnel, vehicles and equipment, and facilities until the stricken area is secured. It may be desirable to utilize a mobile command post to coordinate support functions in the stricken area while central dispatch continues day-to-day operations elsewhere.

Two-way radio voice communication equipment makes it possible for the EMT to talk to competent medical authorities in the hospital and apprise the emergency department of estimated time of arrival and patient condition. All ambulances, regardless of level of care provided, should be equipped with radios with remote radio control in the patient compartment. Inter-hospital communications, such as the Medical Emergency Response Center, provide capabilities for monitoring the availability of hospital beds and facilities within the area and alerting specialty and tertiary care centers of the pending transfer of critical patients.

EMS planners should be aware that an alternate power source must be available to the communications center. This insures uninterrupted service in the event of a power outage. Similarly, it is important that EMS planners not rely solely on one method of communication. Recent disasters have shown that cellular telephone systems quickly become overburdened and fail during a disaster of even minor proportions. Common radio frequencies may become saturated and require switching to an alternate frequency.

- Hospital Facilities

All hospitals should be classified according to their abilities to handle specific types of emergencies in terms of their facilities, equipment, and staffing. Classification systems will vary with each state. Such classification should be a joint effort of EMS planners and administrators and local physician groups.

Existing patient flow patterns in the community should be studied to determine the most logical designation of critical care, particularly trauma centers. In areas where there is excessive duplication of emergency services (e.g., urban areas), several hospitals may discontinue emergency department services. Or, if all hospitals provide emergency services, even the smallest, most remote hospital must be capable of performing lifesaving stabilization and preparing the patient for transfer to a larger or specialized hospital for definitive care.

For a hospital to be available for emergency care, there must be at least one licensed individual in the hospital at all times. The licensed individual can be an RN, EMT, physician assistant, nurse practitioner, paramedic, physician, etc. Alternatives must be established for the care of non-urgent patients in outpatient clinics or by other means and protocols must be established for triage. The ultimate goal of the EMS system, quite simply, is to get the right patient to the right facility in the right amount of time.
At least one hospital in the EMS system must provide 24-hour coverage by a physician. This hospital should be designated as a trauma center at a level three or above. Other hospitals should have a physician identified as “on call” around the clock. All emergency departments must have the potential for temporary expansion of services and facilities to accommodate all victims of a mass casualty disaster.

It is the responsibility of hospitals within the EMS system to cooperate in the training of personnel, coordinate physician services, house or have access to a poison control center, produce emergency department records for evaluation of service, and provide Basic Life Support care. Hospitals may further contribute by housing the EMS system’s ambulances or communication system or support services. The community and hospital may also choose to have the hospital provide the ambulance service. A

committee composed of staff physicians should be responsible for regularly reviewing emergency department services and operations. Committee recommendations should lead to upgrading and improvement of such services.

For example, in Oklahoma the Emergency Services Classification System was mandated by the legislature in 1999. The legislation directed the Oklahoma State Department of Health to…"develop a classification system for all hospitals that treat emergency patients. The classification system shall… identify stabilizing and definitive emergency services provided by each hospital." The law also requires a data-gathering system to evaluate the effectiveness of the effort. In Oklahoma, all hospitals are classified in 9 categories. The Oklahoma classification system was patterned according to national guidelines. It was developed by the Oklahoma State Department of Health with extensive public input from organizations such as the Oklahoma Hospital Association, the State Medical and Osteopathic Associations, the OU Medical School Faculty, and the State EMS and Trauma Advisory Boards.

The system was not intended to force upgrades, but allows direct comparisons based entirely on clinical criteria. It is intended to classify current capabilities only.

The hope is that destination decisions will be simplified for EMS providers. Their Medical Directors can write more precise destination protocols, and (hopefully) improve triage accuracy to ensure only the most severe patients go "upstream". For example, incorporation of the Oklahoma State Triage Transport and Transfer Guidelines and the Oklahoma Hospital Classification System would encourage appropriate distribution of patients, protect tertiary facilities against overload, and discourage inappropriate 'bypass' of regional facilities

There are nine categories within the Oklahoma classification system:

1. Trauma and emergency operative services
2. Cardiology
3. Dental care
4. Neurology
5. General Medicine
6. Obstetrics/Gynecology
7. Ophthalmology
8. Emergency Pediatrics
9. Psychiatry

There are multiple graduated levels within each category, graduated from the lowest levels of care to the highest, as in the American College of Surgeons (ACS) model for trauma center verification. Level I facilities have the highest clinical capabilities and Levels III and IV have the lowest.

Capabilities are determined by the available medical staff, services, and physical plant. In Oklahoma, the initial classifications were self-reported by the facilities in July 2000 and verified by health department facility surveyors in unannounced surveys performed from September 2000 to March 2001. The classifications are being published in the annual Oklahoma Medical Facilities report and will be listed on the State of Oklahoma Health Department website. The web site address is http://www.health.state.ok.us/.

Trauma capabilities require special verification. At Level III the state survey teams are physician-led, while Levels I and II must be verified by the ACS. Provisional classification at the two highest levels is

possible through July 2001; it must be confirmed by the ACS within 18 months or revert to the highest level that can be confirmed by an in-state survey team.

There are either three or four levels per classification category. The general requirements for the levels are very consistent across the categories. They follow what the drafters hope are natural break-points within hospital evolution. They are expected to change over time as the system evolves.

The minimum levels (Level III or IV) are equivalent to the minimum hospital licensure requirements:

- licensed staff on-site,
- a physician on call and immediately available,
- certain minimum resuscitation equipment on-site, and
- transfer protocols in place.

At the next higher level (Level III or II), the requirements are as follows:

- a physician is on duty in the facility 24 hours per day,
- specialty consultation services are immediately available, and
- surgery is available, if applicable.

At the next higher level (Level II or I), the requirements are:

- a specialist within that category of care is immediately available as are support services (staff and equipment), and
- there is a dedicated service within the medical staff for that specialty (OB/GYN, pediatrics, neurology, ophthalmology, etc.).

These are usually a regional resource hospital facility.

The highest-level facility will be a tertiary referral center and is usually a teaching center. A research component may be required.

Specific questions or concerns should be addressed to your EMS Division or State Health Department. In Oklahoma, questions regarding the hospital classification system can be addressed to the Oklahoma State Department of Health, EMS Division, at (405) 271-4027.

➢ Continuous Quality Improvement

Traditionally reserved for hospitals and metropolitan agencies, Continuous Quality Improvement (CQI) has not often been utilized in rural or BLS systems. CQI should be adopted and embraced by all levels of EMS and in all demographic areas. How do EMS decision-makers know that what the EMTs are doing makes a difference unless they take a critical look?

Some questions to be asked include:

- What are we doing?
- How often are we doing it?
- How well are we doing it?
- How do we know we are doing it well?
- What are we doing it with?
- Under what conditions are we doing it?
- To whom are we doing it?
- Why are we doing it?
- What are our desired consequences for doing it?
- How well are we documenting what we are doing?
- How much did it cost for us to get ready to do it?
- How much will it cost for us to continue doing it?
- What is the benefit if we do it this way, or another?
- Who is doing it?

- Should we be doing it at all?

Continuous Quality Improvement involves planning, implementing the plan, monitoring, analyzing, improving the plan, working the improved plan, monitoring the improved performance, etc. In this way, EMS systems are continuously seeking to provide their constituents the most up-to-date services they can and as efficiently and cost-effectively as they can.

A Continuous Quality Improvement program may be handled in a team concept. CQI team members should include at a minimum the following people:

- physician medical director
- training coordinator
- a senior EMT

If the EMS system plans for quality, monitors quality, and improves quality, then the EMS system will continuously deliver quality care to their patients.

As the BLS System Matures

The EMS system involves much more than the provision of pre-hospital and in-hospital emergency care. Once these important aspects of EMS are in place and operational, other capabilities and responsibilities will expand as the system grows. Needs will be recognized and emerge as:

- Mutual Aid Agreements,
- Coordinated Medical Record Keeping,
- Disaster Linkages, and
- Public Information and Education.

Mutual Aid Agreements between ambulance providers in neighboring towns or adjacent EMS systems should be signed to insure that emergency situations will be adequately and consistently covered by ambulance service. When all vehicles within a community are responding to emergencies or away on transfers, neighboring ambulance services should be notified and be prepared to handle emergency calls on a temporary basis. Such agreements should be reviewed and reinstated periodically. If the mutual aid system is activated frequently or on a regular basis, EMS managers will need to consider enhancing their capabilities by scheduling non-emergency transfers or adding vehicles and crews.

Coordinated Medical Record Keeping permits the EMS system to "track" the patient and thereby determine whether or not he/she has received the most appropriate response and care at every level within the system. Such accurate record keeping will allow EMS researchers to evaluate just what the EMS system does that actually "makes a difference" for patients. It simplifies billing procedures for providers and makes records available for continuous review and evaluation of the EMS system, especially when this data is computerized.

Disaster Linkages increase the ability of the EMS system to bring all resources to bear on mass casualty situations. Such disasters require all elements in the system to react to injured patients and insure their movement to appropriate facilities in the briefest possible time. The primary goal of EMS in disaster situations is to do the greatest amount of good for the greatest number of people. The EMS system should regularly test its capabilities by holding disaster drills.

Public Information and Education can be nearly as important as education of emergency medical personnel. It is incumbent upon the EMS community to educate the public on the following:

- What situations constitute an "Emergency"
- Benefits of using "911" addressing systems
- What information is necessary for emergency medical dispatchers to properly dispatch the most appropriate equipment and personnel to the correct location
- Early CPR and first aid measures.

In addition, a properly trained Public Information Officer can enhance the public image of the EMS system. The public news media can be the EMS system's best friend or worst enemy. Every effort should be made to present the EMS system in its best light, to highlight its successes, and to mitigate the impact of occasional errors.

CHAPTER III.

Advanced Life Support: Moving Toward the Ultimate in Emergency Care

Citizens soon realize that a good, quality Basic Life Support system does save lives. This becomes obvious through newspaper stories, television, and populace word of mouth. As this realization occurs, progressing to an Advanced Life Support (ALS) system provides even more life saving opportunities.

Components of an ALS System

In an ALS system, the delivery of emergency care is refined and some components upgraded. Those requiring extensive improvement are:

- Manpower and Training
- Transportation
- Communications
- Facilities - Critical Care Designation
- Medical Control
- Continuous Quality Improvement

Other system functions should have already been put into operation during the Basic Life Support phase of EMS system development and implementation. These will be continued and should be closely coordinated. Some will be intensified, particularly EMT training and provision for more lifesaving equipment.

- Manpower and Training

Manpower and training change dramatically when the system moves forward to ALS. EMTs licensed at advanced levels (EMT-Intermediates and Paramedics) must be available for ALS to function. Rural areas may find it more difficult than their urban counterparts to establish viable ALS due to run volumes resulting in lower revenues (economies of scale).

More and more, ALS is becoming the standard expectation of the public consumer. Manpower, availability of initial and continuing education, and preservation of clinical skills present much greater problems in rural areas than in cities. It is usually cost-prohibitive to staff two advanced level EMTs on each crew in rural areas. Therefore, several options may be considered, and each depends heavily upon a medical priority call screening process by emergency medical dispatchers.

Each shift may have one or more vehicles staffed with advanced level EMTs. That ambulance is sent out only when certain medical criteria are met in the call screening process. This alternative would generally be used in communities with a moderate to large population base.

A “quick response” or tiered system may be used. In this situation, a BLS ambulance crew that has arrived on the scene or the emergency medical dispatcher recognizes the need for immediate Advanced Life Support and requests it. Response is made in vehicles other than an ambulance, usually a sport utility emergency vehicle. This may also be more cost-efficient because of the smaller number of “true emergencies” that may require ALS response. Once the patient is stabilized, the advanced EMT accompanies the patient to the hospital in the ambulance. In such a system, advanced level EMTs often function as field supervisors.

In areas of lesser population or insufficient licensed manpower, communities may opt for a crew consisting of one Nationally Registered First Responder or one EMT-Basic and one advanced level EMT. This combination will allow for certain ALS procedures to be performed, if not all of them.

Finally, all ambulances can be staffed as a fully advanced life support service utilizing only advanced level EMTs. This type of system may be found only where availability of licensed personnel and financing are not great hurdles.

Education in advanced skills should be accomplished following the curricula established by the United States Department of Transportation. Advanced Cardiac Life Support, Advanced Medical Life Support, Prehospital Trauma Life Support, Pediatric Advanced Life Support, and other adjunct courses should also be considered in the provision of initial and continuing education.

An additional level of certification is available to EMT-Paramedics. The Critical Care Transport Paramedic course is an additional certification level that provides for even more advanced assessment, monitoring, and therapeutic intervention techniques. It is particularly helpful in rural areas that may have long transport times to tertiary care centers in distant cities. A strong relationship with the physician medical director is of vital importance in making the critical care transport program work.

EMS educators should consult with their State EMS office in selecting or developing curricula.

- Transportation

Transportation, a prime component of an EMS system, becomes even more critical in an ALS system. Ground transportation will remain basically the same, although some systems may be staffed by teams of specialists. A neonatal transport vehicle is an example of such specialized care.

Helicopter emergency care service is developing rapidly. Some hospitals, individually or collectively, have underwritten the costs of providing helicopter services. Other helicopter services are funded by a membership subscription arrangement. Helicopters may assure rapid patient movement to the hospital best equipped and staffed to handle specific critical cases. Helicopters and other aircraft may be hindered, however, by such variables as landing location and adverse weather. Caution for EMS planners should be advised here. Helicopter transportation is simply an adjunct to the ground EMS system and should function in conjunction with it.

As the system changes from BLS to ALS, serious study and thought should be given to planning a more sophisticated and rapid response for both emergency and routine transfers of patients. Some commercial providers offer a fixed wing air evacuation system. Such a system would allow routine transfers to move long distances on a scheduled basis, allowing ambulances to remain in their home base or immediate response area. A quick response for acute emergencies would also be made available under such a system. It is anticipated that an air evacuation system such as this might involve several states or at least a regional system within a state and may require financial assistance such as joint federal funding or other grants. This type of is only practical for specific geographic areas, i.e. remote areas of Montana only accessible by air, western Kansas, frontier areas of Nevada, and Arizona.

- Communications

Communications take on new urgency when the system provides Advanced Life Support. While the additional education make the

paramedic more competent to provide more detailed assessment and invasive treatment protocols, the emergency department physician has an even greater responsibility to be kept informed of the patient's condition and the treatment being rendered.

Data communication equipment allows the paramedic to transmit 12-lead electro-cardiograms to enhance the diagnoses and treatment of acute cardiac problems while on scene or during transportation to the hospital.

Considering various medical protocols and geographical locations, consultation with a medical communications expert is recommended to design a system to meet the precise specifications of a particular area. Some consideration should be given toward regionalization of communication systems, including call receiving, pre-arrival instructions, and emergency medical dispatch.

- Facilities – Critical Care Designation

Facilities should have been categorized in the BLS phase. Hospitals in the ALS system must provide critical care units in the nine critical care categories or make arrangements for rapid transport to a facility outside the system that can offer such care. These target groups are:

1. Trauma and emergency operative services
2. Cardiology
3. Dental care
4. Neurology
5. General Medicine
6. Obstetrics/Gynecology
7. Ophthalmology
8. Emergency Pediatrics
9. Psychiatry

- Medical Control

Medical Control is a requirement in all EMS systems and is especially critical in ALS systems. All EMTs, especially those possessing advanced skills, in essence become an extension of the emergency department physician. For this reason, as well as others, physicians should assist as much as possible in educating the advanced level personnel.

Medical control does not necessarily mean voice contact and on-line direction of all pre-hospital care by the responsible physician. It also includes assisting in formation of patient care protocols and issuing standing orders. The protocols and orders should be periodically reviewed to insure they are kept current with the rapidly changing medical environment and approved by other physicians involved in the EMS system and the hospitals. Sending and receiving physicians and hospitals should be kept aware of the protocols to ensure smooth transfer and transition of the patient into and out of their care.

Standing Orders are used in some instances when radio communication with a physician is not possible. These should be used with prudence and physicians should be thoroughly familiar with the education and skills of advanced EMTs authorized to execute standing orders.

Typically, the EMS system is inverted, in that most ALS services are available in the urban areas, while most rural areas are served by BLS services. Because travel time and distances are greater in rural areas, rural BLS systems should consider the economic feasibility of advancing in the level of care provided.

- Continuous Quality Improvement (CQI)

Just as we asked a series of questions in the BLS chapter of this Guidebook, we should continue to ask the same questions at the ALS level. These questions are all the more pertinent as we are now dealing with invasive skills and procedures, high-tech biomedical equipment, and medications of various types that interact with and react to each other in various ways.

The same Continuous Quality Improvement planning, monitoring, and improvement process should be conducted at the ALS levels and can be adapted for any process being studied.

The ALS CQI Team should include:

- Physician Medical Director
- Training Coordinator
- Communications Manager
- Data Management Person
- Patient Accounts Person
- Senior EMT or Paramedic

Peer Review is one concept that works in some areas. It allows for EMTs and Paramedics to review one another's reports, learn from the successes and mistakes of others, and helps the physician medical director to key in on potential areas of concern for improvement or outstanding recognition.

A Checklist For Your EMS System

Yes No Are emergencies promptly reported via a toll-free, 24-hour, all purpose telephone number such as 911?

Yes No Are citizens trained in first aid, the obstructed airway technique, CPR and use of the AED?

Yes No Are public safety responders trained and certified as First Responders?

Yes No Are all personnel trained and licensed in accordance with statutory requirements?

Yes No Are there two-way voice communication linkages, other than cellular telephones, between hospital emergency departments and ambulances? Public safety responders, hospitals, and ambulances? All hospitals in the area? Data transmission capabilities?

Yes No Is there a physician present in the hospital emergency department 24 hours a day?

Yes No Are emergency department nurses and physicians specially trained and certified in emergency medicine?

Yes No Are hospitals identified according to their capabilities and are critical patients transported to the hospital that can best provide care for their injuries or sudden illnesses?

Yes No Is your EMS system subject to at least quarterly review and evaluation to measure its successes and to improve on its weak points?

Yes No Are patient care records initiated by ambulance personnel and transferred with the patient through all phases of his/her care?

Yes No Are skill levels of all personnel regularly updated and continuing education classes offered at regular intervals?

Yes No Do mutual aid agreements exist with other emergency medical services in neighboring towns to "cover" while local ambulances are on call or involved in patient transfers?

Yes No Does your community have an Emergency Medical Service council or committee?

Yes No Is medical control from a recognized hospital a function of your EMS system?

Yes No Do your EMS personnel and physician medical director regularly participate in Continuous Quality Improvement (CQI) activities?

Yes No Is adequate extrication and rescue equipment available?

CHAPTER IV.

First Responders: Where Do They Fit In?

First Responders hold the front lines of EMS by being first on the scene and responding to the immediate needs of the patient until the ambulance arrives. They are equally important in BLS and ALS systems. With proper education and basic equipment, First Responders can make great strides in patient stabilization before ambulances arrive at the scene.

The use of First Responders for smaller communities or more remote communities within the EMS response area should be emphasized and encouraged. As First Responder teams within these communities are identified, their response to emergency calls should become closely integrated into the EMS system. Additionally, First Responders should become an integral part of the ambulance service with respect to continuing education and refresher courses. This interface of ambulance service and First Responder crews will establish working rapport between the groups that can only improve patient care on the scene.

First Responders may be notified of an emergency by pager or portable radio. Telephones should not be considered due to the restrictive nature of this type of communications. Portable radios allow for mobility of the First Responders and allow communication with ambulance services while they are working.

First Responders must be educated using the U.S. Department of Transportation's National Standard Curriculum for First Responders. The requirements may vary by state. In Oklahoma, they are required to successfully complete the National Registry of EMTs' practical skills and written examinations. This curriculum consists of crash injury management, cardiopulmonary resuscitators and use of semi-automated advisory defibrillators, vehicle extrication, and hazardous materials awareness. Labor and management groups may consider making First Responder training an integral part of their industrial safety program.

Who are First Responders?

First Responders are law enforcement officers, firefighters, emergency management volunteers, search and rescue personnel, and public utility service personnel. These people have positioned themselves to come to the aid of their friends and neighbors in emergency situations. Sounds like everyone in the community should be a First Responder, right? It may not be a bad idea providing all personnel are properly trained for emergency situations.

CHAPTER V.

Organization of EMS:
A State and Systems Overview

Systems Organization

Emergency medical systems are organized based on level of care, type of operation, and type of ownership. The organization of EMS systems may vary in different states. Each state has legislation that governs the EMS systems in that state. However, the most common organizational definitions are given below.

Level of Care

Typically, the level of care closely resembles the levels of EMT training, as follows:

- Basic
- Intermediate
- Paramedic (ground)
- Paramedic (air)
- Specialty care

The basic level of care provides basic life support care; a minimum combination of interacting elements and personnel to provide the most basic level of life support. The intermediate level of care requires a more highly trained EMT and provides an additional level of care, above the basic level including intravenous administration and advanced airway support.

Paramedic services require a higher level of training and provide an advanced level of care including cardiac monitor/defibrillator. Paramedic services can be either ground services (ambulance vehicles) or air services (helicopter or fixed-wing aircraft). The highest level of EMS care is a licensed specialty care service, which indicates an ALS level service with personnel and equipment for specific and special needs such as neonatal.

Type of Operation

EMS systems have many different types of operation. Some of the more common types are, as follows:

- Governmental (NOT Fire or Police)
- Volunteer Fire Department
- Paid Fire Department
- Law Enforcement
- Volunteer (NOT Fire or Police)
- Hospital Based
- Private (NOT Subsidized)
- Private (Subsidized)
- Authority/Trustee/Board
- Other

The most common type of operation is for an EMS system to be a part of a government entity, but not as a part of the fire or police department. A second method of organization is under the operation of a fire department, either a volunteer or a paid service. Another way to organize an EMS system is to operate as part of a law enforcement agency. An EMS system can organize as a volunteer operation that is not under the auspices of either a fire or police service. EMS systems can be private ventures and can be either subsidized or not subsidized by the local citizens.

Some states have legislation that allows EMS systems to organize as a trust authority with a governing trustee board. This type of operation may allow for specific funding mechanisms under the trust legislation. There may be other types of operations allowed under individual state laws.

Type of Ownership

EMS systems have many types of ownership, including:

- City
- County
- Hospital

- Authority, Trust, or Board
- EMS District
- Private
- Volunteer
- Other

In rural areas the majority of EMS systems are owned by cities (or towns or municipalities or parishes). Some systems are owned by the county government and hospitals own many systems. If systems are organized as a trust, then the authority or trust or trustee board is the owners of the system.

Special legislation in some states allows for the creation of an EMS district. EMS districts must be voted in by the citizens and provide a mechanism for funding of the district. The EMS district is governed by an EMS board. The district becomes the owner of the system. Private entrepreneurs own their own systems and volunteer organizers become the owners of the volunteer systems. Other types of ownership may be utilized in different states.

To illustrate the organization of EMS systems, the level of care, the type of operation, and the type of ownership for the EMS systems in Oklahoma will be presented. Data were obtained from the Oklahoma State Department of Health, EMS Division. **Table 1** illustrates the level of care of all EMS systems in Oklahoma for 2002. The basic level of care was the most common type of EMS system in Oklahoma. Of the 206 EMS systems in Oklahoma, 107 systems or 51.9% operated at a basic level of care.

Table 1

EMS Systems by Level of Care, Oklahoma EMS Providers, 2002

Level of Care	Number of Services	Percent of Total
Basic	107	51.9%
Intermediate	45	21.8%
Paramedic (Ground)	36	17.5%
Paramedic (Air)	9	4.4%
Specialty	9	4.4%
Total	206	100.0%

Figure 1 further illustrates the 2002 Oklahoma EMS systems with a map showing the locations and the level of care provided.

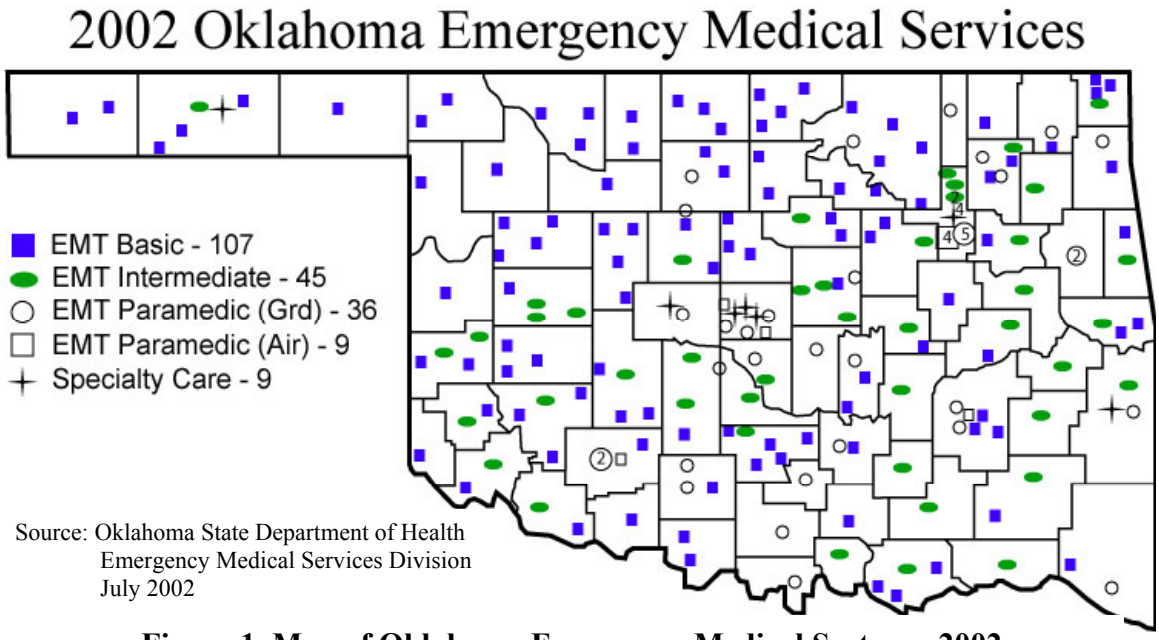

Figure 1. Map of Oklahoma Emergency Medical Systems, 2002

Oklahoma EMS services by type of operation in 2002 are illustrated in **Table 2.** The type of operation with the largest number of EMS services was governmental (not fire or police) with 65 services or 31.6% of the total. The type of operation with the next largest number of EMS services was hospital based with 31 services (15.1%).

Table 2

EMS Systems by Type of Operation, Oklahoma EMS Providers, 2002

Type of Operation	No. of Services	Percent of Total
Governmental (not Fire or Police)	65	31.6%
Volunteer Fire Department	12	5.8%
Paid Fire Department	21	10.2%
Law Enforcement	1	0.5%
Hospital Based	31	15.1%
Private (not Subsidized)	26	12.6%
Private (Subsidized)	12	5.8%
Volunteer (not Fire or Police)	28	13.6%
Authority/Trustee/Board	6	2.9%
Other	4	1.9%
Total	206	100.0%

Table 3 shows the EMS systems by type of ownership for Oklahoma in 2002. The type of ownership with the largest number of EMS services was city ownership (i.e., town, municipality, parish) with 73 EMS systems, representing 35.4% of the total EMS systems. There were another 40 Oklahoma EMS systems (19.4%) owned by 522 EMS Districts. Another 36 services (17.5%) were owned by private agencies or organizations.

Table 3

EMS Systems by Type of Ownership, Oklahoma EMS Providers, 2002

Type of Ownership	No. of Services	Percent of Total
City	73	35.4%
County	1	0.5%
Hospital	20	9.7%
Authority, Trust, or Board	10	4.9%
522 EMS District	40	19.4%
Private	36	17.5%
Volunteer	12	5.8%
Other	14	6.8%
Total	206	100.0%

Oklahoma Selected Studies – Organizational Data

The Oklahoma Cooperative Extension Service Rural Development Division at Oklahoma State University provides detailed call analyses studies and budget studies for EMS services, upon request for EMS services in Oklahoma. Over the last few years (1998 – 2002), detailed EMS data were available from 40 different EMS systems. The aggregated summary data from these selected studies are provided in this chapter of the Guidebook to assist EMS providers in analyzing and comparing EMS systems.

The level of care, type of operation, and type of ownership for these 40 selected studies will be shown in the next three tables. These will give a comparison with the state data given above.

Table 4 represents the level of care provided by the 40 selected EMS services. There were 24 systems or 60% of the total providing basic level of care.

Table 4

EMS Systems by Level of Care,
Selected Oklahoma EMS Systems, 2002

Level of Care	No. of Services	Percent of Total
Basic	24	60%
Intermediate	8	20%
Paramedic	8	20%
Total	40	100%

Table 5 further illustrates the 40 selected Oklahoma studies with the type of operation responsible for the provision of the EMS system. Of the ten types of services, "governmental (not fire or police)" had the largest number of systems with 11 services or 27.5% of the total services. The "volunteer (not fire or police)" had the second largest number of services with 9 services or 22.5%.

Table 5

EMS Systems by Type of Operation,
Selected Oklahoma EMS Systems, 2002

Type of Operation	No. of Services	Percent of Total
Governmental (not Fire or Police)	11	27.5%
Volunteer Fire Dept.	3	7.5%
Paid Fire Dept.	6	15.0%
Law Enforcement	0	0.0%
Hospital Based	3	7.5%
Private (not Subsidized)	4	10.0%
Private (Subsidized)	1	2.5%
Volunteer (not Fire or Police)	9	22.5%
Authority/Trustee/Board	2	5.0%
Other	1	2.5%
Total	40	100.0%

Table 6 represents the agency or organization responsible for the EMS system. The largest agency or organization operating the selected services was the "city" category with 23 services of 57.5%.

Table 6

EMS Systems by Type of Ownership,
Selected Oklahoma EMS Systems, 2002

Type of Ownership	No. of Services	Percent of Total
City	23	57.5%
County	0	0.0%
Hospital	1	2.5%
Authority or Board	3	7.5%
522 EMS District	2	5.0%
Funeral Home	1	2.5%
Private	4	10.0%
Volunteers	5	12.5%
Other	1	2.5%
Total	40	100.0%

Oklahoma Selected Studies – Call Data

To assist EMS system decision makers, detailed data on the EMS calls can be useful. This data is not always available, particularly in the rural areas. However, if the time and resources are available to provide such a call analysis, rural decision makers can benefit greatly from the information.

Most of the 40 selected Oklahoma EMS systems provided call reports that were analyzed and summarized in a series of tables. The next five tables show aggregated data for the selected Oklahoma EMS systems. Data from these selected studies could be further utilized to develop the budgets in the next chapters of this Guidebook.

Table 7 represents the 40 selected Oklahoma EMS systems that were utilized as a data source for this Guidebook. Data was obtained from the service providers' records. A total of 32,523 EMS calls were

serviced by the 40 EMS systems. Thirty-four services served an area with city populations less than 10,000 and represented 13,968 calls or 43.0% of the total calls. There were two systems that represented countywide EMS systems. A countywide system may include one or more stations strategically placed through out the area to best serve the residents.

Table 7
EMS Systems and Calls by Type of Entity, Selected Oklahoma EMS Systems, 2002

Type of Entity	No. of Services	No. of Calls	Percent of Calls
County	2	8,631	26.5%
Cities over 10,000	3	7,702	23.7%
Cities under 10,000	34	13,968	43.0%
Tribal	1	2,222	6.8%
Total	40	32,523	100.0%

Table 8 illustrates the estimated population base or medical service area population for the selected EMS systems. The thirty-four systems within the category of cities under10,000 were estimated to serve a total population of 82,058 and the average population per EMS system was 2,414. The average population served per EMS system was 6,284. The average population served per EMS system for the types of entity, except the county, was 3.547.

Table 8
Total and Average Population of EMS Service Area by Type of Entity, Selected Oklahoma EMS Systems, 2002

Type Of Entity	No. of Services	Population of Service Area	Average Population Served
County	2	107,901	53,951
Cities over 10,000	3	49,181	16,394
Cities under 10,000	34	82,058	2,414
Other/Tribal	1	12,219	12,219
Total	40	251,359	6,284

Table 9 illustrates the age of patients and the estimated EMS utilization for each age group. The 80 and older age category had the most calls with 7,950 patients or 28.9%. The utilization rate for this group indicates approximately 843 people out of 1,000 are using the emergency medical services. The second most EMS calls was for the age category of 70-79 with 4,780 calls (17.4%) with an estimated 312 people per 1,000 using the EMS system. The age range of 60-69 had a total of 3,032 patients (11.1%) and approximately 144 people estimated for utilization. There were 15,762 patients (57.4%) who were 60 years of age and older, with a utilization of 344 people per 1,000. It is interesting to note, at this point, that 57.4% of the ambulance calls studied were for the elderly 60 years and older and that 6.3% of the total population were persons 60 years and older. As the general population continues to mature, this call volume will certainly increase in all locales, thus placing increased demands on EMS systems of all types.

Table 9
EMS Calls by Age of Patient and by % of Population, Selected Oklahoma EMS Providers, 2002

Age	No. of Calls	Percent of Calls	Service Area Population	Percent of Total Population
19 and under	2,840	10.4%	75,648	3.8%
20 - 29	2,159	7.9%	32,399	6.7%
30 - 39	2,212	8.1%	35,644	6.2%
40 - 49	2,205	8.1%	34,762	6.3%
50 - 59	2,213	8.1%	27,114	8.2%
60 - 69	3,032	11.1%	21,046	14.4%
70 - 79	4,780	17.4%	15,318	31.2%
80 and over	7,950	28.9%	9,428	84.3%
Total*	27,391	100.0%	251,359	10.9%

* Data not available for 3,272 EMS calls and 956 were Community Service calls.

Table 10 shows the number of EMS calls by day of week for the selected EMS providers.

Of the 31,703 reported EMS calls, there were 5,085 (16.0%) that were received on Friday with another 4,831 calls (15.3%) received on Monday.

Table 10
EMS Calls by Day of Week,
Selected Oklahoma EMS Providers, 2002

Day of Week	No. of Calls	Percent of Calls
Sunday	3,805	11.9%
Monday	4,831	15.3%
Tuesday	4,599	14.6%
Wednesday	4,465	14.1%
Thursday	4,564	14.5%
Friday	5,085	16.0%
Saturday	4,354	13.6%
Total*	31,703	100.0%

* There were 807 Community Service calls that did not log the day of week and 13 calls that data was missing or not available.

Table 11 shows the number of EMS calls by time of day for the selected EMS providers. Of the 29,345 EMS calls, there were 15,351 calls (52.3%) received between 8 am and 4 pm. There were 21,019 calls (71.6%) for the time period from 8 am to 8 pm.

Table 11
EMS Calls by Time of Day,
Selected EMS Systems, 2002

Time of Day	No. of Calls	Percent of Calls
Midnight to 7:59 AM	4,446	15.2%
8:00 AM to 3:59 AM	15,351	52.3%
4:00 PM to 7:59 PM	5,668	19.3%
8:00 PM to 11:59 PM	3,880	13.2%
Total Calls*	29,345	100.0%

* Data was missing for 1,318 EMS calls and 956 EMS calls were logged as Community Service.

Table 12 shows the type of call. The call type of "other medical calls" was the most frequent with 16,279 calls (52.0%). A total of 4,791 calls (15.3%) were hospital transfer calls and 4,558 calls (14.6%) were logged as nursing home transfer calls.

Table 12
EMS Calls by Type,
Selected Oklahoma EMS Systems, 2002

Call Type	No. of Calls	Percent of Calls
Vehicle Accident	3,807	12.2%
Hospital Transfer Calls	4,791	15.3%
Other Medical Calls	16,279	52.0%
Nursing Home Transfers Calls	4,558	14.6%
Community Service	1,866	6.0%
Total*	31,301	100.0%

Data was Missing for 1,222 EMS calls

Summary

The aggregated data for the 40 selected Oklahoma studies shown is only a partial sample of the type of call data that can be presented to an EMS system. Additional data can be analyzed to show calls that may indicate a need for paramedic level of care and to show total miles and billable miles. The origination location (pick-up) of the patient as well as the destination location (drop-off point) of the patient can be summarized. If the EMS run reports are completed properly, response times, median times, and total call times can be illustrated.

By investigating the data available, decision makers may determine the type of EMS system most desirable in their area. The system planners may use the data to decide the staffing that will be required to provide EMS to the public. Also, the analyzed data can aid in the prediction of the future and feasibility of the EMS system.

CHAPTER VI.

Estimating Costs of an Emergency Medical Services System

Knowledge of emergency medical service costs, as well as revenues, is necessary in determining a method of providing service within the community's financial capabilities. To provide up-to-date cost data for the Guidebook, ambulance dealers, communications equipment distributors, and medical equipment suppliers were consulted in 2002. At the same time, the authors will utilize information and data from their analyses of costs for EMS systems across Oklahoma.

The level of emergency medical service an EMS provides can range from First Responder to Advanced Life Support-Specialty Care. The most common level of service in Oklahoma is Basic Life Support (BLS). A complete system may have First Responder capabilities in remote, low-volume emergency call areas and ALS in high-volume emergency call areas. No matter what level of service is provided, the estimated costs of providing that level of care is needed for accurate planning.

This chapter includes cost estimates for a First Responder system, a Basic Life Support system, and an Advanced Life Support system. Also, decision makers desiring to move from a BLS to an ALS system can estimate the additional costs and revenues.

Both capital costs and operating costs will be illustrated. Capital costs consist of total capital equipment outlay costs and annual capital costs. Capital and operating costs are based on the average known costs at the time of publication. Annual capital costs are further defined as annual replacement costs of the capital equipment items based on a straight-line depreciation system or an annual amortization amount based on years of the loan and interest rate. The annual capital replacement costs are important since they act as a sinking fund to replace worn capital items and are needed to purchase additional capital items in the future. Annual operating costs are the day-to-day expenses of operating the EMS system (salaries, benefits, fuel, oil, maintenance, supplies, insurance, etc.).

To determine costs in the future, an adjustment factor can be used. There are two different adjustment factors, construction cost index and consumer price index. The adjustment factors can be applied to the current costs in this guidebook to project the costs for future years. The adjustment factors are:

Adjustment Factor 1

$$\frac{\text{Current Construction Cost Index}}{\text{2003 Construction Cost Index}}$$

Adjustment Factor 2

$$\frac{\text{Current Consumer Price Index}}{\text{2003 Consumer Price Index}}$$

Adjustment Factor 1 should be utilized for construction costs only, such as the building itself. The Adjustment Factor 2 should be utilized for all other costs.

First Responder Systems

Wherever people live and work, even if the population is small, one or more of them will eventually need emergency medical care. Many communities, however, experience such a small number of emergency calls that they cannot economically support a complete ambulance service and communication system. A First Responder system can fill this need. First Responders are usually volunteers within a community who are trained to respond to an

emergency and stabilize the patient until an ambulance and EMTs arrive. Thus many decision makers in these communities have created First Responder systems.

In an era of increasing costs and decreasing revenues, decision makers might consider the option of a tiered Advanced Life Support First Response program. A paramedic may respond to the scene of an emergency in a quick response vehicle and provide immediate ALS care while an ambulance equipped for BLS responds for transportation.

First Responders need three equipment items:

- Medical supply kit (containing oxygen),
- Semi-automated advisory defibrillator, and
- Communications equipment.

Not all First Responders need to carry the defibrillator, but all should have access to one.

A list of items needed in the medical supply kit is included **Table 13**. The cost of the basic kit is about $500. Semi-automated advisory defibrillators cost about $1,800. At this writing, several governmental programs and foundations are providing at least partial funding for defibrillators, especially to smaller, rural communities.

First Responders need communication equipment so that they may be notified of calls where they are needed. The least desirable system is one that requires the First Responder to remain near a telephone or in the range of a cellular telephone signal. However, if cellular telephones are utilized, the calling plans vary in cost according to

Table 13
Recommended Items in
First Responder Kit

Quantity	Item
1	Kit box (hard/soft)
1	Blood Pressure Unit
1	Stethoscope
1 set	Oral airways
1 pr.	Bandage shears
1	Splinter forceps
1	Penlight
1	Adult Bag- (Valve-Mask Resuscitator)
1	Child Bag- (Valve-Mask Resuscitator)
2	Adjustable Cervical Collar
2	Malleable splint (per local option)
4	Trauma pads (8”x10”)
4	Trauma pads (5”x9”)
20	Gauze pads (4”x4”)
3	Kling roller gauze (4”)
2	Elastic bandages (3”)
2	Adhesive tape (1”)
6	Triangular bandages
2	Petroleum gauze
10	Band-aids (1”x3”)
2	Band-aids (2¼”x3½”)
2	Water-jelburn dressing (4”x16”)
1	Eye wash
1	Ear syringe
2	Cold packs
1	Bottle Bio hand cleaner
2	Rescue blanket
1	“D” oxygen cylinder
1	Brass oxygen regulator/flowmeter
2	Non-rebreather oxygen masks
2	Nasal cannulas
2	Oxygen tubing
4 pr.	Latex gloves (L)
4 pr.	Latex gloves (XL)
1	Flashlight, with extra batteries

regional availability and frequency of use. More desirable is a system that involves the First Responder carrying a pager while on call so that the dispatcher can notify them of the location and type of emergency. Alpha-numeric pagers cost around $400 each and voice pagers cost around $300 each. Cellular telephones cost approximately $100 - $250 each. Monthly costs for phones, cell phones, and pagers are $35 - $150, $25 - $150, and $7 - $12, respectively.

A portable radio with a built-in pager for each First Responder is another, more desirable way to notify them of an emergency. A portable radio allows the First Responder to communicate directly with the responding ambulance. This type of portable radio (5 watts) costs about $700 and would be adequate for most First Responder systems. Maintenance contract costs for the portable radios with built-in pagers can range from $10 to $25 per quarter per radio.

If distance and terrain are a problem, decision makers might consider the installation of a repeater and tower system. Costs for repeater and tower systems start at about $10,000, depending upon signal strength, height and construction of the tower, land acquisition and necessary federal permits.

Another cost associated with a First Responder system is training. In Oklahoma, training for First Responders is available at many Oklahoma Career-Tech schools and some fire departments and costs between $160 and $225 per person. Training materials cost an additional $50. The National Registry First Responder examination fee is $20. The initial certification is effective for two years. During that two year period, the First Responder is required to maintain CPR certification, successfully complete a 12-hour refresher course for First Responders, plus complete an additional twelve hours of continuing education. Costs per First Responder can range from no cost up to $50. Unless the First Responder goes to a conference, most continuing education is free of charge through the local ambulance service. National Registry renewal of First Responder certification is currently $10 biennially.

The current initial license fee for a First Responder Agency is $25 with a renewal fee of $10 every two years.

Other costs associated with a First Responder system include the medical supplies of $20 per call and the defibrillator use adds another $25 per call. Monthly fees for the pagers and/or cellular telephones also need to be included. Pagers monthly costs range from $7 to $12 per month. Cellular telephones can range from $25 per month up to $150 per month, depending on the plan needed for the medical service area.

Summary -
Costs for a First Responder System

Capital Item	**Cost**
First Responder Kit	$500
Semi-auto Adv. Defibrillator	$1,800
Cellular Phone	$100 - $250
Pager	$300 - $400
Portable Radio	$700
Repeater & Tower System	$10,000 and up
Operating Item	**Cost**
Telephone	$35 - $150/mo.
Cellular Phone	$25 - $150/mo.
Pager	$7 - $12/mo.
Portable Radio Maintenance	$10 - $25/quarter
F.R. Initial Training Course	$160 - $225/person
F.R. Initial Training Books	$50/person
National Registry of F.R. Exam	$20/person/2 yrs
F.R. Continuous Education Class	$50/person
National Registry Renewal Cert.	$10/person/2 yrs
Initial License for F.R. Agency	$25
Renewal Lic. for F.R. Agency	$10/2 yrs
Medical Supplies for All Calls	$20/call
Defibrillator Use per Call	$25/call

Expensing the EMS System

The next chapter will illustrate the costs and revenues to develop an EMS system for both a Basic Life Support (BLS) system and an Advanced Life Support (ALS) system. The costs will include the initial capital costs, the annual cost to replace or amortize the capital items, and the annual recurring operating costs.

Capital Costs

Vehicles

There are three types of ambulance vehicles, Type I, Type II, and Type III (**Figure 2***)*. Vehicles must comply with the Federal Specifications for the Star-of-Life Ambulance KKK-A-1822E (June 1, 2002). Estimated new cost for the standard Type I vehicle is $95,000, a Type II is estimated at $65,000 for the standard unit, and the standard Type III is estimated at $95,000. With the addition of optional available equipment, the vehicle price will increase. Note that the price per vehicle does not include the cost to equip the vehicle for patient care. An estimated additional expense of $15,000 is necessary to furnish the vehicle for basic life support. To provide intermediate life support, the total cost to equip the vehicle is approximately $18,000. To provide advance life support, an estimated total cost of $47,000 is required to equip the vehicles. Consult with your local or area communications sales for the best possible option for the vehicles.

Additional equipment for EMS vehicles includes oxygen sets, first responder kits, and defibrillator units. Oxygen sets range from $1,000 to $2,500. First responder kits are typically $500 per kit while defibrillators cost approximately $1,800.

Summary – Vehicle and Equipment Costs

Item	Cost
Vehicle - Type I	$95,000
Vehicle - Type II	$65,000
Vehicle - Type III	$95,000
BLS Equipment	$15,000
ILS Equipment	$18,000
ALS Equipment	$47,000
Oxygen Sets	$1,000 - $2,500
First Responder Kits	$500
Semi-Automated Advisory Defibrillator	$1,800

Communications System

The type of communications system your service needs will depend on several factors. An EMS system may be able to use an already existing base communications through the local or area law enforcement agencies. Utilizing these agencies may provide a substantial cost savings. If an existing system is not available, the EMS service must construct, maintain, and operate its own base system.

The general equipment needed to build a base communications system include, a tower, antenna, base radio component, and a backup generator. The estimated cost of establishing a base communications system is $50,000. The base communications must have the capabilities of reaching the coverage area of the EMS service area. This coverage may have a radius in excess of 40 miles.

If distance and terrain are a problem, decision makers might consider the installation of a repeater and tower system. Costs for repeater and tower systems start at about $10,000, depending upon signal strength, height and construction of the

Type I Ambulance

Type II Ambulance

Type III Ambulance

Figure 2. Types of Ambulances as Described in KKK-A-1822 Specifications

tower, and necessary federal permits. Consult your local or area communications sales for the radio system best suited for the EMS system.

The EMS system needs communication equipment so that each employee may be notified of calls where they are needed. The least desirable system is one that requires the EMS personnel to remain near a telephone or in the range of a cellular telephone signal. Cell phones and calling plans vary in cost according to regional availability and frequency of use. More desirable is a system that involves the EMS personnel carrying a pager while on call so that the dispatcher can notify them of the location and type of emergency. Alpha-numeric pagers cost around $400 each and voice pagers cost around $300 each. Cellular telephones cost approximately $100 - $250 each.

A portable radio with a built-in pager for each EMS employee is a more desirable way to notify them of an emergency. A portable radio allows the EMS personnel to communicate directly with the responding ambulance. This type of portable radio (5 watts) costs about $700 and would be adequate for most EMS systems.

Each vehicle must be equipped with a communications system that enables the personnel to be in constant contact either with the base communications, the hospital and medical staff, or law enforcement agencies. The most common type of communications is a business band or VHF two-way radio installed in the vehicle. The minimum cost for the radio is estimated at $1,000 and can cost up to $2,500. An additional radio is necessary for the patient compartment. The base cost for the additional radio is $1,000 and can also cost up to $2,500. The function of the added radio is to maintain communications between the EMT and the hospital medical staff to inform medical personnel of patient vitals and to receive instruction from competent medical personnel on medical procedures.

Some consideration should be given toward regionalization of communication systems, including call receiving, pre-arrival instructions, and ambulance dispatch. Consult with your local or area communications sales for the best possible option.

Summary - Communication System Costs	
Base Comm. System	$50,000
Repeater Tower Sys.	$10,000 and up
Pagers	$300 - $400 each
Cellular Telephones	$100 - $250 each
Portable Radios	$700 each
Vehicle Radios	$1,000 - $2,500 each
Vehicle Patient Compartment Radio	$1,000 - $2,500

Building

A building is needed to house ambulances, auxiliary equipment, and the EMT's. The building may also need to accommodate the administration of the system, which may include the billing office. The building may be of new construction or the purchase of an existing structure providing adequate space and adaptable to meet the current and future needs of the EMS system.

The building in this guidebook has bay areas for two ambulances, office space, meeting room, and living and sleeping quarters for EMTs (**Figure 3**). Construction cost for a 2,880 sq. ft. steel building is estimated at $45 - $65 per square foot. This building is used for illustration purpose only; actual size can be modified based on the needs of the

system and actual costs vary considerably depending on the specific area in the country. The building is designed for around the clock housing for EMT shifts. The cost of the building includes heating and cooling equipment needed to maintain a comfortable environment for all personnel in the living and working areas. This is an estimated average cost on a per square foot basis for a contracted building. Building costs can vary with the type of materials and the cost of labor. Construction costs can be lowered if volunteer labor is utilized for the construction of part or all of the building. If the building is built locally with donated labor, a two-bay building can be obtained for a cost of $55,000 - $105,000.

A building can be purchased and renovated to accommodate the EMS system. Costs can vary considerably depending on the location. Costs for the basic purchased building can range from $35,000 to $90,000. Renovating the building can also vary considerably depending on the location and local construction costs. It can range from $10,000 to $25,000.

See **Appendix B** for amortization factors to help determine annual building expense. If local estimates are available, they should replace the average cost estimated in this guidebook. Consult with your local or area contractor for a more accurate estimation of cost.

Building Furnishings

Building furnishings include a desktop computer and printer, telephones, filing cabinets, desks, chairs, couches, tables, lamps, TV/VCR, beds, etc. In some cases, items may be donated to the EMS system by community members or purchased at a reduced cost. On a minimum level, these items may be purchased for about $5,000. If all items were to be purchased new, they could easily meet or exceed $10,000.

Summary – Building and Building Furnishing Costs

Building Items	Estimated Cost
Constructing a Building	
Contract for entire building	
2-Bay Building	
2,880 sq. ft. steel bldg	$45 – $65 per sq. ft. $129,600 - $187,200 total
With Labor Donated	
2-Bay Building	$55,000 - $105,000 materials outlay only
Purchase Building	
Building Cost	$35,000 - $90,000
Renovation Cost	$10,000 - $25,000
Building Furnishings	$5,000 - $10,000

Annual Capital Costs

Annual capital costs are either the annual amortization cost of a loan or the replacement cost based on straight-line depreciation. For example, the building cost could be annualized based on a specified loan interest rate and length of loan. Other capital items could also be amortized; however, the life of the other items is a much shorter term than the building; therefore, a separate loan with a term more in line with the life expectancy would be more appropriate. If capital items are already owned, then the sinking fund provides a method to replace these items upon their expiration. The EMS system would set aside an amount of funding each year to have enough to replace the item when it is no longer useful. In other words, each capital equipment item has a useful life expectancy (i.e., 5 years, 7 years, 10 years) and when the item is no longer useful, the sinking fund would provide the capital to replace the items.

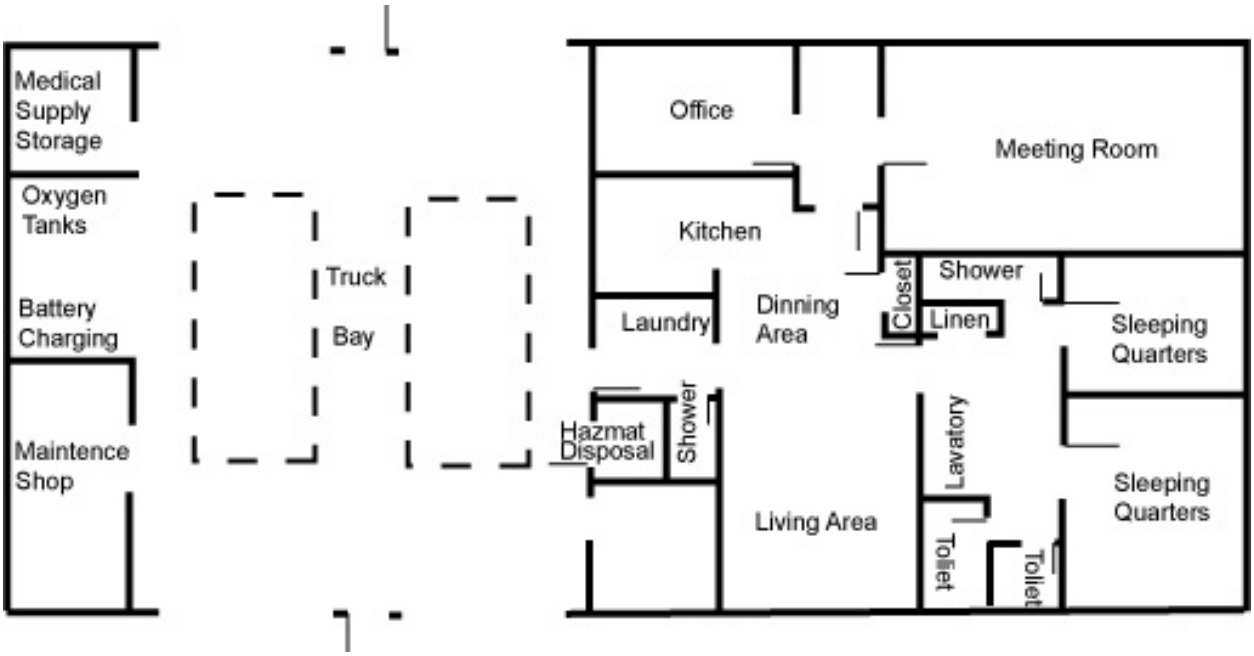

Figure 3. **An example of a floor plan for an EMS building**.

If a capital equipment item was funded through loans, replacement may involve initiating another loan upon the expiration of the item. Ambulance vehicles are depreciated based on 75,000 miles or 7 years, whichever comes first. This is the current standard for vehicle replacement in Oklahoma and may vary from state to state. The additional equipment is depreciated at the same rate as the vehicle. If a vehicle needs to be replaced every 3 years, then the expected life of the equipment is also calculated at 3 years due to the higher level of usage volume. The additional medical equipment has an expected life of 3-5 years, depending on the level of usage and the technological changes.

The life expectancy of the communications equipment is typically 5 years. However, the base station and repeater tower systems may be up to 10 years. The building furnishings typically need to be replaced in 5 years, also.

Summary – Annual Capital

Item	Annual Basis
Vehicles	
Loan Replacement	Amortize
Straight-line Depreciation	7 yrs or 75,000 miles
Additional Amb Equip.	3 - 5 years
Base Station System	Up to 10 years
Repeater Tower	Up to 10 years
Other Comm. Equip.	5 years
Building	Amortize loan (max of 25 - 30 yrs) or Replacement based on life expectancy
Building Furnishings	5 years

Operating Expenses

Licenses

The minimum initial license fee for a new ambulance service in Oklahoma is $300 in 2002. Thereafter, the minimum renewal license fee is $50 every two years. The current initial license fee for a First Responder Agency is $25 with a renewal fee of $10 every two years. License fees for EMT's differ by the level of training:

Table 14 – License Fees

Item	Initial Fee	Every Two Years
EMS System	$300	$50

Level of Training	Initial Fee	Every Two Years
First Responder	$ 20	$10
Basic	$ 75	$10
Intermediate	$150	$15
Paramedic	$150	$20

Vehicle Operating Expenses

Vehicle operating expenses include fuel, oil, filter, and lubrication, tires, insurance, and license. A system may project estimated annual miles by analyzing call data from a prior year.

Estimated mileage can be derived from call origination and call destination data. To estimate fuel consumption, use the EPA's estimated miles per gallon (mpg) and divide that number into the estimated total annual miles driven. Most Type I and Type III ambulances are estimated for fuel consumption of 8 mpg. The Type II vehicle is estimated at 9 mpg. An EMS system may contract fuel with a fuel supplier as a way to maintain a stable pricing structure. EMS systems that are not for profit or governmental based or supported may be

eligible to purchase fuel without paying some state and federal taxes. Consult your state EMS Division or local government representatives to see eligibility requirements. If not eligible for this reduced fuel price, use the current fuel cost (unleaded or diesel). As of this writing, the fuel price per gallon utilized ranged from $1.50 to $2.25.

Recommendations by the manufacturer suggest the vehicle should be serviced for oil, filter, and lubrication every 2,000 to 3,000 miles. The present cost of servicing a vehicle is estimated at $38 per service. An EMS system may be able to save some expense by purchasing service maintenance agreement for their vehicles, thus eliminating the labor expense for the vehicle service. Also, the EMS system may be able to contract the service agreement at a lesser cost.

The expense of replacement of tires can be a substantial expense to an EMS system. Ambulance vehicles must replace tires when a certain amount of tread is remaining. Studies have shown that the average tire wear is estimated at 27,000 miles. Tire cost can vary from $125 to $250 depending on number of plies, load range, and road hazard. Contact your local tire sales for the type of tire that best serves your needs.

The ambulance vehicles require other maintenance and repairs. These total approximately $1,200 - $1,800 per year depending on the condition and age of the vehicle.

Ambulance systems should carry liability and collision insurance on all vehicles. The insurance premium for one ambulance is estimated to be $2,100 annually. Some insurance companies will offer discounts for multi-vehicle fleets and it would be wise to check on these. The EMS system may find insurance at a less expensive rate through the state or the state EMS Division. Consult your state EMS Division about possible lower cost insurance availability.

Current Oklahoma vehicle license fees for city or county owned ambulances are $4 to $10 per year, while private EMS ambulance license fees are $98 per year.

Table 15 – Annual Vehicle Operating Expenses

Operating Expenses	Estimate
Vehicle - Type I or III	8 mpg
Vehicle - Type II	9 mpg
Fuel Cost per Gallon	$1.50 - $2.25
Need for Oil Change	2,000 - 3,000 miles
Oil, Filter, and Lubrication	$38/service
Average Tire Wear	27,000 miles/tire
Cost per Tire	$125 - $250/tire
Vehicle Maintenance and Repairs	$1,200 - $1,800/yr
Vehicle Insurance	$2,100/vehicle/yr
Vehicle License Fee	(based on OK rates)
City/County Own	$4 - $10/yr
Private Owned	$98/yr

Communications Equipment Maintenance Expenses

Operating expenses for communications equipment are assumed to equal the costs of service contracts for the separate components. A service contract for an ambulance mobile radio unit costs about $15 to $40 per month (UHF or VHF equipment). The base station service contract costs approximately $40 to $80 per month. Consult locally for options available.

Summary –
Annual Communication System Costs

Maintenance Contracts	Costs
Vehicle Radios	$15 - $40/month
Base Station	$40 - $80/month

Medical Expenses

The typical cost of medical supplies for the basic life support base run is estimated at $5 per every call. For emergency calls, an additional cost of $20 per call must be included. The cost of medical supplies for the intermediate life support base run is estimated at $8 per every call and an estimated $22 additional for emergency calls. The expense for an advanced life support system is $12 for every call and an estimated $25 additional for emergency calls. This cost can vary depending on the severity of the patient's condition and the type of care needed.

Summary - Medical Expenses

Item	**Cost**
Basic Life Support*	
For All Calls	$5/call
For Emergency Calls Only	Additional $20/call
Intermediate Life Support*	
For All Calls	$8/call
For Emergency Calls Only	Additional $22/call
Advanced Life Support*	
For All Calls	$12/call
For Emergency Calls Only	Additional $25/call

* Costs based on average and can vary depending on severity of patient condition and type of care needed.

Labor

Traditionally, emergency medical technicians, regardless of licensed level, have been under-compensated professionals. Many paid EMTs are forced to work more than one EMS job, or to work at other types of employment, to earn enough money to raise a family above the poverty level. Many rural EMS systems are completely dependent on volunteer labor who often work other full-time jobs. Reflecting the multi-faceted functions of the EMS system of the future and increased educational requirements coming from the federal level, compensation for these professionals must be improved.

Decision makers in rural areas with limited budgets need to understand the downfalls in choosing the most economical solution for staffing the emergency medical service. Since payroll is a major budget item, labor requirements under several arrangements are discussed. These alternatives are fully staffed service, volunteer service, and partly-paid partly-volunteer service.

EMTs are classified and paid according to their level of training – First Responder, Basic, Intermediate, and Paramedic. An estimation of $8.00 average hourly rate for first responder, $10.00 average hourly rate for basic level training, intermediate level of training would be paid $11.00 average hourly rate, and paramedic level of training at $12.00 average hourly rate. An additional $1 to $3 per hour can be added for EMTs in a supervisory position. Depending on the size of the EMS system, the position of supervisor or EMS administrator may be a full-time position. A full-time administrator may need to have an intermediate or paramedic level training. Administrative salaries vary based on level of training and

volume of calls; the salary can range from $30,000 to $75,000.

Dispatch could be provided through the local law enforcement agency. Non-EMT staff, such as radio dispatch and clerical, is estimated at $7.00 per hour. EMT Radio Dispatch/EMD would increase the hourly rate to $8.00. Depending on the size of the system, it may be necessary for two separate individuals to occupy these positions. A smaller system may be able to utilize one person for both duties. The most common overtime policy for all systems was time and one half over 40 hours per week. An estimation of an additional 5% to 10% of annual salary can be used to calculate annual overtime pay. The expense of fringe benefits such as insurance(s) and retirement can be estimated by using 20% - 30% of base salary. The percentage will vary depending on what benefits are provided by an EMS System.

Table 16 - Labor

Level	Average Rate
Non-EMT Radio Dispatch/Clerk	$7.00
EMT Radio Dispatch/EMD	$8.00
First Responder	$8.00
Basic	$10.00
Intermediate	$11.00
Paramedic	$12.00
Supervisor	$1 - $3 additional/hour
Administrator	$30,000 - $75,000/year
Overtime Pay	5 - 10% of base labor
Benefits	20 - 30% of base labor

Fully Staffed

Operating a fully-staffed service, 24-hours per day, 365 days, requires 8,760 hours of labor annually per crew member. **Table 17** represents the annual salary expense to staff one crew member 24 hrs/day, 365 days/year (a total of 8,760 hours per year).

Annual base salary for a complete staff of First Responders would be $70,080 ($8.00 x 8,760 = $70,080). With benefits of 30%, the total increases to $91,104 for one first responder crew member 24 hours/day, 7 days/week.. Annual base salary for one EMT-Basic crew member would be $87,600 ($10.00 x 8,760 = $87,600). With benefits of 30%, the total cost for one EMT-Basic crew member for the year is $113,880 for 24 hours/day, 7 days/week.. To staff a 2-member crew with one First Responder and one EMT-Basic, you would add the above 2 examples together ($91,104 + $113,880 = $212,984).

Table 17 also illustrates this concept for EMT-Intermediate and Paramedic level crew members.

Table 18 represents the annual salary expense to staff one crew member 40 hours/week, 52 weeks/year (a total of 2,080 hours per year). To staff a day-time 40 hour per week position, this table will assist the EMS system planner. For an EMT-Basic to work 8 am to 4 pm, 40 hours/week, the cost would be $27,040, based on $10 per hour and benefits of 30%.

To staff a 2-person crew member 24/7, a total of 8.4 full-time equivalent persons would be needed based on the 40 hour per week system. Based on a 40 hour work week, an example to staff the system from Monday thru Friday is to have crew #1 work the midnight to 8:00 am shift, crew #2 would cover the hours of 8:00 am to 4pm, and the hours of 4:00 pm to midnight would be the responsibility of crew #3. To staff the weekend shift, 2 crews working 12-hour shifts would be one option or 3 crews working 8-hour shift. With a staffing such

Table 17

Annual Personnel Expense for One Crew Member by Level of Training, 24/7 (8,760 hours)

Level	Avg. Hour Rate	Salary	Benefits (30%)	Total
First Responder	$8.00	$70,080	$21,024	$91,104
Basic	$10.00	$87,600	$26,280	$113,880
Intermediate	$11.00	$96,360	$28,908	$125,268
Paramedic	$12.00	$105,120	$31,536	$136,656

Table 18

Annual Salary Expense for One Individual by Level of Training, 40 hours/week (2,080 hours)

Level	Avg. Hour Rate	Salary	Benefits (30%)	Total
First Responder	$8.00	$16,640	$4,992	$21,632
Basic	$10.00	$20,800	$6,240	$27,040
Intermediate	$11.00	$22,880	$6,864	$29,744
Paramedic	$12.00	$24,960	$7,488	$32,448

as this, minimal overtime hours would be accumulated. Any system with only one crew staffed would need to have Mutual Aid agreements with other EMS systems to serve as back-up to cover calls when the crew is already occupied with a call. Mutual aid agreements are common among most EMS systems and are an effective way of providing EMS to the area when only one crew is available or when a crew is on a call outside of the EMS service area.

By adequately staffing the EMS system, overtime hours could be kept to a minimum level. Paying overtime wages can be very costly and detrimental to an EMS system. Consideration should be given to keeping overtime pay to a minimum to control costs of the EMS system.

Volunteer Service

This labor agreement is referred to as volunteer, but in fact, volunteers are often reimbursed for their expenses and/or paid a nominal fee. There are a large number of volunteer EMS systems in Oklahoma. They differ some in their methods of utilizing volunteers and reimbursing volunteers for their expenses. In volunteer systems, ambulance calls are answered and dispatched by the all-emergency dispatcher located either at the fire station, local law enforcement, or area law enforcement. A volunteer EMS system will not have any added benefits other than the payments of taxes required by law. Contact your state Department of Labor or employment or equivalent agency or the U.S. Department of Labor to determine the legalities concerning volunteer labor in your region or area.

There are two basic methods of reimbursing a volunteer:

- Fee per call (a nominal fee for actually responding to a call)
- On-call fee (a nominal fee for just being on call)

The following table illustrates the different volunteer pay methodologies.

Table 19
Volunteer Systems – Nominal Fee Methodologies

	Sample Pay Methods	Sample Pay Rates
Method One - Fee per Call		
	Flat rate	$10 - $50 per call
	Mileage fee	$0.35 per mile
	Largest amount	$0.35 per mile or $35, whichever is greater, or some combination of flat rate per call and mileage fee per mile
Method Two - Combination of Both Fee per Call and On-Call Fees		
Fee per Call	Flat rate	$10 - $50 per call
	Mileage fee	$0.35 per mile
	Largest amount	$0.35 per mile or $35, whichever is greater
PLUS		
On-Call Fee	Flat amount per shift	$10/shift, $25/shift, $50/shift
	or Nominal fee per hour	$1/hour
	Nominal fee per 24-hour weekend	$50 per weekend

Recruitment of Volunteers

Being realistic with potential recruits is especially important when they are volunteers, who usually have fewer and weaker ties to an organization than regular employees. When volunteers, especially EMS volunteers, decide the job is more than they bargained for, they can and will quit. Volunteers must not be given the impression that the job is all glamour and happy endings. They need to be aware of the difficult problems they will face so that when a crisis occurs they are not completely surprised. If the EMS organization fails to provide volunteers with sufficient notice as to the difficult situations EMTs may face, the unanticipated emotional trauma of an emergency run with an unsatisfactory result may lead to the volunteer's subsequent failure to show up for calls or even to resignation.

By the same token, potential volunteers should be encouraged to be honest about what they have and can do and what their own personal limitations are. Volunteers may develop an ability to deal with difficult situations, but if they are faced with tough problems they are not ready for, they are likely to quit. Volunteers may not know how they will react to the misfortune of others and should be encouraged to think this through and make a realistic assessment of what they can handle.

There are many ways to encourage a person to volunteer. Shared experiences, films, and roleplaying exercises are techniques that can be used to develop a fair assessment by both the recruiter and a potential volunteer as to whether or not that individual should volunteer for EMS work. Recruitment does not mean dwelling on the negative parts of the job, but it does mean providing an accurate picture of what is likely to happen. The bottom line is that volunteers themselves must have enough information about what they will do in the EMS organization to make a decision that is right for them.

Written job descriptions and signed commitment statements are useful tools for ensuring that both the volunteer and the EMS organization have shared expectations as to the volunteer's role in organizational activities.

For additional information on recruitment, visit the Federal Emergency Management Agency website at http://www.usfa.fema.gov and review the "Emergency Medical Services (EMS) Recruitment and Retention Manual."

Retention

Keeping volunteers in EMS organizations has become more difficult. An EMS organization's efforts to retain its volunteers are as important to the success of an EMS organization as its recruitment program. The best recruitment program is of little value if the organization cannot retain its members. EMS managers must identify and respond to the social, organizational, and job-related conditions that contribute to early or increased turnover if they are to maintain an adequate level of qualified volunteer staff for the organization.

There are many reasons why individuals discontinue volunteer service. Today's lifestyles and work patterns mean that many have less extra time for volunteer work in general. Two-career and single-parent families feel sharp time constraints. The changes in volunteers' lives may make it difficult for them to continue to serve for the same length of time in the same capacities as in the past.

The demands within EMS organizations also can have a negative effect on retention. The requirements for becoming and remaining an EMS professional, volunteer and career, are more stringent. Meeting additional training and certification requirements is time-consuming and even costly. Internal conflicts, potential health and safety risks, work-related stress, and lack of confidence in the use and performance of specialized equipment may contribute to early volunteer resignations.

EMS managers need to identify alternative options and develop a strategy for retaining their most valuable resource--the existing staff of trained, competent volunteers. The factors within the control of the manager that contribute to turnover need to be recognized and eliminated if possible. The EMS manager needs to adjust to those factors that cannot be controlled. For example, opportunities for reduced levels of participation could be provided for volunteers whose personal life or job require them to reduce their time commitment to the organization. Volunteers suffering from boredom or stress in their present positions could be reassigned to new or less stressful jobs at least on a temporary basis.

For additional information on retention, visit the Federal Emergency Management Agency website at http://www.usfa.fema.gov and review the "Emergency Medical Services (EMS) Recruitment and Retention Manual."

Partly Paid/Partly Volunteer Service

In areas where a fully paid system is not feasible and more service is demanded than can be provided by volunteers, the EMS system may be staffed with some full-time EMTs and some volunteers. The full-time personnel work during the busier hours of the day and the volunteers work the slack hours. The volunteers can be paid only a nominal fee per actual EMS call or the volunteers could be paid both a nominal fee per actual EMS call and a nominal fee to be on call (the on-call fee is paid whether there are any actual calls received or not).

The paid staff would be paid as a regular paid staff member. The volunteer personnel would be paid as a volunteer system, with either a fee per call or a combination of fee per call and on-call pay.

It is up to the decision makers as what type of volunteer pay methodology to incorporate into the EMS system.

Building

Annual building operating costs are also estimated; these will vary by locality and building type. Estimated costs for building insurance, utilities, etc, are presented in **Table 20**. Insurance cost is based on a brick structure. Premium costs can be less expensive providing the building meets the insurance company's code. Insurance costs range from $12 to $17 per $1,000 building value. The estimated cost for electricity for heating and cooling ranges from $125 to $350 per month. Heating and cooling represents the additional cost of fuel to heat the building using natural gas, LP gas, fuel oil, and/or electricity.

Building maintenance can range from $40 to $75 per month, depending on climate and building location for lawn service, snow removal and maintenance of the building. Water, sewer, and domestic trash disposal is usually available in most small communities and ranges from $40 to $100 per month. In smaller EMS systems, most EMTs provide the general daily housekeeping and uniform laundry within the building, but a larger EMS system may consider the option of janitorial services for the building or a laundry service for uniforms. Janitorial services ranger from $40 to $100 per month and laundry services range from $75 to $300 per month. These building costs can vary greatly depending on ownership, climate, and location of the EMS service.

Table 20
Building Operating Expense[1]

Insurance	$12 - $17 / $1,000 bldg value
Electricity, Gas, or Other Fuel Oil	$125 - $350/month
Maintenance	$40 - $75/month
Water, Sewer, Trash	$40 - $100/month
Janitorial Services	$40 - $100/month
Laundry Services	$75 - $300/month

[1] If local cost data are available, they should be used in estimating operating costs, replacing the data in this table.

Biological Waste Disposal

Proper disposal of biological waste is a major environmental and health concern. Smaller EMS systems have arrangements with the local hospitals for biological waste disposal. Larger EMS systems may need to make their own arrangements for biological waste disposal. The cost for disposal is estimated at $2.00 - $3.50 per EMS call.

Telephone

A telephone at the EMS building is a necessity. Typically, only one line is necessary; however, larger EMS systems choose to have more than one phone line. EMS systems that have full-time administrative staff will need additional phone services. These costs are assuming that dispatch is provided at a different location, other than the EMS system, and that dispatch utilizes other communication modes for call notification. The telephone cost will vary from $35 per month up to $200 per month per location. With the other communications systems utilized in EMS, personnel should be able to keep telephone costs to a minimal amount.

Office Supplies

Office supplies will be needed in any EMS system. The smaller EMS providers may actually need more office supplies than larger EMS providers that outsource their billings or accounts receivables. Office supplies can vary from a monthly cost of $20 up to $150.

Billing Services

Billing for EMS services is an important component of an EMS service. Billing arrangements can vary from the EMT Supervisor performing this task to a separate specialty EMS billing service performing this service. In a municipal system, the city clerk may do the billing. The internal billing system will not always incur an additional cost. If the EMS system chooses to outsource their billings, the current rate is 10% of total collections. The cost of billing services can vary from a minimum of $50 for billing supplies to 10% of total fees collected. Again, check to compare what is available in your local area.

General Liability Insurance

General liability is required for all EMS services. Cost can vary based on ownership of the system, volume of calls, and the level of service. For instance, a municipally owned system can include their EMS service under the municipality's insurance. A commercially owned system would be more costly and would be specific to EMS only and purchased from a private insurance carrier. Cost of insurance varies from $200 to $1,000 or more per month.

Training Expenses

Additional training and continuing education is required of the emergency medical staff technicians. Costs will vary based on the level of service and the level of training previously attained by each individual technician, i.e. First Responder, EMT-Basic, EMT-Intermediate, or Paramedic. Training costs also vary by how much the EMS service pays for the technicians. Different states may have different levels of requirement. For a budget basis, training costs can range from $50 to $450 per technician per year.

Miscellaneous Expenses

A miscellaneous expense category is not designated for any particular expense, but rather is available in case of variance in the budget amounts and in case of any unexpected expenditures. The miscellaneous expense amount can vary from $1,500 to $5,000 per year up to 5% or 10% of total operating costs. The miscellaneous expense also varies by the size of the EMS system. It is the decision makers who decide the amount of this budget item.

Summary - Operating Expenses

Biological Waste Disposal	$2.00 - $3.50/call
Telephone	$35 - $200/month
Office Supplies	$20 - $150/month
Billing Services	$50 min (for ofc. Supplies) up to 10% of revenues collected
General Liability Insurance	$200 - $1,000/month
Training	$50 - $450/ technician/year
Miscellaneous (for Unexpected Variances)	$1,500/yr up to 5 - 10% of total costs

Summary

One of the purposes of this guidebook is to provide a method to estimate costs of, and income from, an EMS system. To determine the feasibility of an EMS system, planners must analyze the call data unique to the area to be served. It is assumed that the demand for the EMS system is equivalent to the previous year's EMS run reports. They must determine the number of patients transported and transferred since these calls are usually billable calls. Also, decision makers must realize that there are many EMS calls which do not generate revenues; yet still provide a service to the community. Calls such as cancelled, refused treatment, treated but no transport, false calls, community service calls, and standby calls all have some type of expense. The total number of emergency and non-emergency calls should be considered. The day of week and time of day can aid the system planners on how they may want to staff the system.

Collecting the data on call origination locations can play an important part in finding an ideal location for the EMS building. This also may help to determine the average response time and miles to the scene for each call. The type of traumatic incident and medical chief complaints should also be studied so the EMS system may properly equip the ambulance and train personnel appropriately for the situations they may encounter. The destination locations of calls is necessary to help determine the average miles from the scene to the destination and also estimating arrival time to the destination and the time for the ambulance vehicle to return to service. By estimating the mileage, EMS systems are able to estimate revenues available for loaded miles, as well as determine cost for fuel, maintenance, tires, and upkeep of vehicles based on the use and depreciation of the vehicles. Finally, the EMS system should look at the population demographics of the patients. Comparing this data with census population data, the EMS system can estimate the age and gender of most patients.

An effective way of obtaining this information would be to gather a full year of data from the EMS systems currently serving the area. If data information on EMS calls cannot be acquired, check with the state EMS Division to aid in obtaining information vital to the success of the EMS system.

When developing a budget for an EMS system, local cost data should be utilized when and if available. The information included in this cost section is only intended as a general guideline. The methodology is designed to assist decision-makers in developing an EMS system to fit their needs.

CHAPTER VII.

Funding Options

Decision makers for an EMS system have several ways to raise revenues. Some of these ways, like community fund-raisers, are commendable but not reliable. More reliable sources are user fees, mileage fees, sales tax collections, public utility assessments, subscription/membership fees, county and city subsidies, third party reimbursement, and special taxation districts. The different funding options are summarized in **Table 21**. In addition, collection percentages for EMS charges have declined due to decreased Medicare and Medicaid reimbursements. Collection percentages average between 30 percent and 70 percent.

Table 21
Summary of Funding Options

Method	Amount
User Fees	
Non-Emergency Fee per Call	$250-$700
Emergency Call Fee per Call	$350-$800
Mileage Fees (per loaded miles)	$3-$10
Sales Tax	¼¢ to 2¢
Public Utility Assessments	$2.50-$10
Subscription/Membership Fees	$50-$150
County and City Subsidies	Vary
Third Party Reimbursements	Vary
Special Taxation Districts	1-3 mills

User fees and mileage fees are generally charged for EMS services with the service having the option to charge different amounts for emergency calls and non-emergency calls. Non-emergency call fees average between $250 and $700 while emergency call fees average between $350 and $800. Mileage fees range from $3 per loaded or transport mile to $10 per loaded mile. A loaded or transport mile represents miles driven where a patient is being transported in the ambulance vehicle. For the smaller rural EMS systems, these fees generally do not cover costs and have not kept up with EMS costs and inflation. Thus, they are often supplemented with other forms of revenues. Other funding sources may need to be used to supplement funding for the EMS system.

User fees and mileage fees are typically collected from Medicare, Medicaid, private insurances, military insurances, and private pay from individuals representing deductibles, co-pays, and full-payment from the uninsured.

Sales tax collections are another way to fund an EMS. An election of the citizens of the medical service area is normally required to authorize a sales tax. Percentages for sales tax collections designated for EMS systems average between ¼¢ and 2¢. Funding generated from a 1¢ sales tax specifically designated for the EMS system is usually sufficient to support most community EMS systems.

Public utility assessments are another method that community residents might pay for the EMS service. This method is through an EMS system that is owned by the municipality that also owns its utilities. Residents may already pay the municipality for water, sewer, sanitation, and/or electrical services. The municipality itself can typically authorize a public utility assessment without a vote of the residents. The assessment is added to their normal utility bill and is paid monthly based on the municipality's current system of collection. The public utility assessment fees average between $2.50 and $10 per month.

In county or multi-county EMS systems, subscriptions equal to the public utility assessment fees in the municipalities are offered for sale to rural residents. In a municipality that has a public utility assessment, when service is supplied to residents in the service area that are not paying that fee, then the EMS user fees charged to the non-participants

approximates the actual costs per run or is charged at a higher fee level than the EMS user fees charged to those residents that are paying the public utility assessment. Thus, persons not within the geographical boundaries of the system will pay their fair share of the cost of EMS.

Subscription/membership fees are another source of funding for EMS systems. Cities and rural areas in a county can pay a membership fee to the EMS system. Subscription fees are voluntary payments from individuals and/or businesses. A subscriber may be allowed a discounted user fee if and when the subscriber should utilize the EMS service. Subscription/ membership fees range from $50 to $150 per year. These fees are collected on a voluntary basis.

County and city subsidies are funds allocated to EMS systems by local governments. Local governments may allocate funds to the EMS systems to supplement the service in order to assure that the residents of the area will have adequate EMS services available. EMS is beginning to be perceived as a necessary infrastructure emergency response service, like police and fire.

Third party reimbursements are collections of payments made by governmental agencies and private insurance companies. These amounts can account for as much as 80 percent of the fees charged to patients. It is extremely important to understand how to successfully access these vital funding sources. The rules and regulations to bill vary by source of third part collections. Many EMS systems are outsourcing their billings in order to better access these funds. The cost of a billing service is approximately 10% of total collections. If an appropriate and successful billing service is available, the increased collections will typically pay the additional cost for the service.

Special taxation districts are another method for funding EMS. An EMS district has to be created by a vote of the people within the area the district is to be established. The district may encompass one or more counties, incorporated cities, a township, school districts, or parts of a school district that lie within the borders of a county. The district may assess up to three mills of ad valorem taxes to support the operation of the EMS system for both operating and capital costs (3 mills each). An EMS Board of Trustees will need to be established to administer and expend such tax funds for the EMS.

The procedures involved in creating an EMS District and the powers and responsibilities of its Board of Trustees include having a special election called by the County Commissioners. Both capital and operational millage levy must be approved by a majority of the voters with each being able to levy up to three mills of net property valuation. The operational millage levy continues until voters change it; the capital millage levy is in effect until bonds are completely repaid. A board of trustees is appointed by the County Commissioners. The Board assumes the responsibility to make necessary rules, procedures, and contracts, to hire appropriate personnel, to issue bonds upon approval by a majority of the voters at a special election (bonds are paid out of the capital millage levy), for the economic expenditure of funds, and to assess additional fees for services. The Board can sue and be sued.

Medicaid Ambulance Coverage

Medicaid is a joint program of the federal and state governments. Each state

establishes its own Medicaid regulations. Therefore, the reimbursement level for ambulance service from Medicaid varies greatly from state to state. There is no standard methodology to determine reimbursement rates.

Medicare

Medicare began using a national fee schedule effective January 1, 2000, as per the Balanced Budget Act of 1997. In February 2002, the Centers for Medicare and Medicaid (CMS) published the Final Rule implementing the fee schedule beginning April 1, 2002. The new Medicare fee schedule has a 5-year phase-in period. In 2003, the fee schedule is in its third year of the five-year phase-in period. Base rates and mileage rates are included in the new schedule. Base rates are adjusted for geographic cost variations and mileage rates are designated as rural or urban based on the zip code of the trip origination. The rates will vary based on the level of service provided and based upon appropriate documentation of services provided, making documentation important for EMS providers to be reimbursed properly, equitably, and at the maximum allowable level.

All ambulance trips billed to Medicare beneficiaries must be billed on assigned basis. The beneficiary will only be responsible for the deductibles and co-pays. The EMS provider will no longer be able to bill the patient or his/her secondary payer for the difference between Medicare allowed charge and the total EMS charges.

These new Medicare regulations complicate the billing procedures and the documentation process. The EMS providers must take a proactive role in properly billing Medicare calls and providing adequate documentation to ensure maximum reimbursement levels.

The EMS providers will need to either research Medicare guidelines on a regular basis to keep billing procedures current at all times or to contract (or outsource) their billing to a professional billing service.

An EMS provider should thoroughly document to promote good patient care, to reduce liability, and to ensure proper conscientious management.

For complete information on the new Medicare Fee Schedule, visit the CMS website at http://cms.hhs.gov/ or the Medical Emergency, Rescue and Global Information Network at http://www.merginet.com.

How to Determine Fees

EMS providers can become confused as to what fees can be charged to various individuals and insurance companies. The different payment polices of the third party payers are causing this confusion.

Medicare's main requirement is that you do not routinely charge other payers less than you charge the Medicare program for the same services. An EMS provider can set up a comprehensive list of the different levels of service it provide with pricing for each level of service that is billed to all patients/insurers.

EMS providers should establish their own fee schedules based on the needs of their communities. They should follow the following principles:

- The levels of service must be consistently defined based on patient need, not what is covered and not

covered by Medicare or other insurers.

- The levels of service should have a standard price that is charged consistently to all patients, regardless of who pays the bills.
- All coinsurance and deductibles should be collected unless the patient demonstrates financial hardship.

Medicare is strict about how the EMS providers bill for the range of services that it pays for. How the EMS providers bill for services that Medicare does not cover is up to the EMS provider.

To obtain additional information on the Medicare regulations for fee determination, visit the CMS website at http://cms.hhs.gov/ or the Medical Emergency, Rescue and Global Information Network at http://www.merginet.com.

Summary

In summary, there are many mechanisms to fund EMS systems. The funding mechanisms discussed in this chapter are not all inclusive and each state may have different funding mechanisms available to them. This guidebook intends to represent EMS based on the current rules, regulations, and laws at the time of this writing. The information in this guidebook could be affected by new legislation involving EMS enacted after the date of this publication. Contact your state EMS Division to determine the funding mechanisms available to you.

CHAPTER VIII.

Example EMS System Case Studies

Estimated Costs of Funding Delivery Systems

Two case studies will be presented to illustrate the funding of EMS systems. The first case study will show a First Responder system. The second case study is based on a volunteer basic life support (BLS) EMS service provided 24 hours per day, 365 days per year. The case studies are not recommendations but rather an informational analysis of a method for funding the First Responder system and the BLS EMS system.

Capital and operating costs are based on the average known replacement or operating costs. Annual capital costs are defined as the annual depreciation of the capital equipment (ambulance, radios, equipment, buildings, etc.). These annual capital costs are important since they act as a sinking fund to replace worn capital items and are needed to purchase additional capital items in the future. Annual operating costs are the day-to-day expenses of operating the EMS system (salaries, benefits, fuel, oil, maintenance, supplies, insurance, etc.).

Case Study – First Responder Service

To illustrate the cost of a First Responder system, a case study is illustrated on **Form 1**. The case study shows the cost for four First Responders with four portable radios with built-in pagers ($700 x 4 = $2,800), four first responder kits ($500 x 4 = $2,000), and two semi-automated advisory defibrillators ($1,800 x 2 = $3,600). Due to the terrain of the area, the system added a repeater and tower system at a cost of $10,000. The total capital costs for the First Responder System are estimated to be $18,400.

The First Responder system will need to either borrow money to cover the capital costs or establish a replacement fund to replace equipment as it expires. The repeater and tower system is set up on a loan over 10 years at a 7% interest rate. The amortization factor is 0.14238 (**Appendix B**) to derive an annual loan payment of $1,424 over the ten-year period. The remainder of the equipment items are estimated to have a life expectancy of approximately 5 years. Each item will include the annual replacement cost based on a 5-year straight-line depreciation method. The expected life of items can vary based on the level of usage and on technological changes in equipment. The total annual capital costs for the First Responder Case Study are $3,104.

Two of the First Responders need to be trained ($210 x 2 = $420) and pass the National Registry ($20 x 2 = $40). The other two First Responders will attend a refresher/continuing education class this year ($25 x 2 = $50) and have their National Registry fees renewed ($10 x 2 = $20). The First Responder system services 45 calls per year ($20 x 45 = $900) with 25% of the calls needing defibrillator use ($25 x 11 = $275). There is a maintenance contract on the four portable radios with built-in pagers that costs $10 per quarter per radio, for a total cost of $160 annually. The total annual operating costs are $1,865 for the First Responder Case Study. The total annual capital and operating costs are estimated to be $4,969, which is an average cost of $110.42 per call for the 45 calls.

Form 1. Estimating the Annual Cost of a First Responder System

for **1st Responder Case Study**

(1) Item	(2) Unit Cost		(3) No. of Units		(4) Adjustment Factor		(5) Total Capital Costs		(6) Years to Replace	or	(7) Amortization Factor		(8) Annual Costs	
Capital Costs														
First Responder Kits	$500	x	4	x	1	=	$2,000	÷	5	or x		=	$400	A.
Semi-Automated Advisory Defibrillator	$1,800	x	2	x	1	=	$3,600	÷	5	or x		=	$720	B.
Communications (Choose One)														
Portable Radios with Built-In Pagers	$700	x	4	x	1	=	$2,800	÷	5	or x		=	$560	C.
Portable Radios		x		x		=		÷		or x		=		D.
Pagers (Alpha-Numeric or Voice)		x		x		=		÷		or x		=		E.
Cellular Telephones		x		x		=		÷		or x		=		F.
Repeater and Tower Systems (as needed)	$10,000	x	1	x	1	=	$10,000	÷		or x	0.142377	=	$1,424	G.
CAPITAL COSTS SUMMARY							$18,400						$3,104	H.
													Sum A. - G.	
Operating Costs														
Initial Training														
First Responder Courses/Books/Supplies	$210	x	2	x	1							=	$420	I.
National Registry First Responder Exams	$20	x	2	x	1							=	$40	J.
Continuing Education														
Biennial Refresher Course	$25	x	2	x	1							=	$50	K.
National Registry Renewal Fees	$10	x	2	x	1							=	$20	L.
Medical Supplies Per Call	$20	x	45	x	1							=	$900	M.
Defibrillator Use Per Call	$25	x	11	x	1							=	$275	N.
Monthly Pager/Cellular Telephone Fees		x		x								=	$0	O.
Equipment Maintenance Contracts	$40	x	4	x	1							=	$160	P.
TOTAL OPERATING COSTS													$1,865	Q.
													Sum I. - P.	
TOTAL ANNUAL CAPITAL AND OPERATING COSTS													$4,969	R.
													H. + Q.	

Case Study –
Basic Life Support Volunteer Service

The BLS Case Study is based on estimated costs for a basic life support (BLS) EMS system that would provide one working EMS administrator and one volunteer crew 24 hours a day. The capital equipment items needed for this alternative are included in the first column of **Form 2**.

The EMS system has two Type III ambulance vehicles with an estimated replacement cost of $95,000 each, for a total of $190,000. The vehicles are equipped with basic life support equipment, at a cost of $15,000 per ambulance, for a total of $30,000. The BLS equipment necessary to equip an ambulance is listed in **Appendix A**. The EMS service may desire to contract through a Mutual Aid Agreement with a neighboring EMS service for backup support in the event the EMS crew is not available.

A vehicle radio for communications will be needed for each ambulance at an estimated cost of $1,000 per radio, for a total of $2,000 to stock both vehicles. Communications between the dispatcher and the EMS staff are of utmost importance; portable radios/phones/pagers will be needed to facilitate these communications. It is estimated that 8 portable radios/phones/ pagers will be needed. At a cost of $600 each, the total cost is estimated at $4,800.

Oxygen sets will be stocked at a cost of $1,000 each; a total of $4,000 will be spent to stock two oxygen sets per ambulance vehicle. The cost of a new building is included in this study. It is estimated that it would cost $45,000 for a 2-bay building. This is based on local data from the community. Total capital costs for the BLS Case Study are estimated to be $275,800.

A sinking fund or capital equipment replacement fund is necessary to provide for the long-term needs of an EMS system. Items can be depreciated based on straight line depreciation methodology or money can be borrowed and the amortization can be illustrated. For this alternative, the annual capital costs (or annual replacement costs or depreciation costs) are shown in column 9 of **Form 2**.

Ambulance vehicles are depreciated based on 75,000 miles or seven years, whichever comes first. Annual depreciation cost for the ambulance vehicle is based on annual total miles of 9,400 as reported by the BLS Case Study EMS. Over a seven-year period, the total miles driven will be approximately 65,800 (9,400 miles x 7 years = 65,800 miles). Since this number is less than the 75,000, the vehicle will be depreciated over 7 years, based on the maximum of number of years. This results in an estimated annual replacement cost of $27,143 for both Type III ambulance vehicles. The BLS equipment is also depreciated over a seven-year period, resulting in an annual replacement cost of $4,286 for the two ambulances.

The vehicle radios, portable radios/ phones/pagers, and oxygen sets, are all depreciated over five years, resulting in annual replacement costs of $400, $960, and $800, respectively. To keep the building facilities updated according to local and state codes, a building replacement/ improvement fund needs to be established for the future. Amortizing the building over 30 years at an interest rate of 7% results in an annual capital cost of $3,626. The estimated total annual capital costs for the BLS Case Study are $37,215.

Annual operating costs are the day-to-day expenses of operating the EMS system (salaries, benefits, fuel, oil, maintenance, supplies, insurance, etc.). The annual operating costs for this alternative are shown in column 8 of **Forms 3a, 3b, 3c, and 3d**.

Vehicle expenses include fuel being purchased at an estimated cost of $1.70/gallon. Based on 8 mpg for the Type III vehicles and total mileage for the year estimated to be 9,400 miles, the total gallons estimated to be needed is 1,175 (9,400/8 = 1,175). The annual cost for gas is estimated at $1,998 ($1.70 x 1,175 = $1,998). Fuel may be obtained at a lower cost from local government officials if local arrangements can be made. The vehicle tires are estimated at a cost of $125 per tire for 6 tires. The annual mileage is divided by the estimated life of a tire which is 27,000 miles to derive an a annual cost of $261 for tires. Oil, filter and lubrication is based on a cost of $38 per change and changing the oil every 2,000 miles. The total cost is $179. The vehicle licenses are based on a cost of $10 per vehicle for a total of $20. Other vehicle maintenance and repairs is estimated at $1,200 per year. The vehicle insurance is estimated to cost $2,100 per vehicle for a total of $4,200. Check with your state to see if lower rates are available through a state subsidized insurance program or risk management or insurance commission. The total vehicle operating costs are estimated to be $9,058 (**Form 3a**).

The insurance expense for the building is $750, based on a cost of $16.67 per $1,000 of building value of $45,000. Utilities are budgeted at $185 per month, for a yearly total of $2,220. Telephone is an additional monthly expense of $150, for a yearly total of $1,800. Building maintenance and upkeep is estimated to cost $40 per month, for a yearly total of $480. The medical supply expenses are based on a cost of $5 per call for all 238 calls ($5 x 238 = $1,190) and a cost of $25 per call for each of the 38 emergency calls ($25 x 38 = $950). Biological waste disposal is estimated to cost $3 per call for a total of $828 annually. The portable radios/phones/pagers are important for effective communications and are estimated to cost $175 per month per year to maintain, for an annual total expense of $2,100. General liability insurance for BLS System is estimated at $200 per month for a total of $2,400. This is based on a municipal government system so the cost is quite low. The cost for this insurance can vary widely based on the type of ownership and the area of the U.S.

The labor costs for this alternative are detailed in **Form 3c**. The EMS Director has a wage rate of $400 per month and works 40 hours per week. Total annual salary for the administrator is $4,800. Administrator duties are to oversee the day-to-day operations of the BLS Case Study EMS.

There will be one volunteer crew staffing the BLS Case Study EMS. The staff will consist of one EMT Basic and one EMT First Responder 24 hours a day. These volunteers are being paid $1 per hour while on duty and an established fee per transport call of $10. There were 167 transports resulting in an estimated total volunteer fee per transport expense of $3,340. The total expense of base salaries, volunteer pay per hour, and volunteer transport pay is estimated to be $23,532 for the Case Study. Benefits are only the government required social security rate, calculated at 8% of total base salaries and overtime. Therefore, benefits are estimated to cost $1,883 annually. All of the labor costs are broken down in detail in **Form 3c**. The total labor

costs are estimated to be $23,532 and with the required social security amount of $1,883, the total labor costs are $25,415.

Office supplies are estimated at $100 per month, for an annual expense of $1,200. Training expenses are estimated at $150 per person for 8 persons, for an annual training expense of $1,200. Licensing expenses are estimated to be $130 per year. These include the license for a BLS EMS system and the EMT's licenses. A miscellaneous expense of $2,000 is also included in the budget.

To summarize the costs, **Form 4** shows the total capital costs of $275,800, the annual capital costs of $37,215, and the annual operating costs of $51,721. The BLS Case Study EMS total annual capital and operating costs are estimated to be $88,936, representing a cost of $322 per all EMS calls and a cost of $533 per transported calls.

Alternative Revenue Sources – BLS Case Study

Decision makers for the BLS Case Study EMS service have several ways to raise revenues. Some of these ways, like community fund-raisers, are commendable but not reliable. More reliable sources are user fees, sales taxes, subscription/membership fees, third party reimbursement, fee collected on local utility bill, and special taxation districts. User fees are generally charged for EMS services; however, these fees generally do not cover costs and have not kept up with EMS costs and inflation in the smaller rural EMS sytems. Thus, they are often supplemented with other forms of revenues. For this study, mileage and user fees, millage levies from formation of a special taxation district, and sales tax are presented in **Forms 5a, 5b, 5c, and 5d**.

Form 5a shows the revenues possible for user fees with alternative collection rates. Base rates for ambulance user fees, starting at $250 and ranging up to $600 are shown. These are shown based on transported emergency calls of 38 and transported non-emergency calls of 238, so that an EMS service could charge different rates for these two types of calls. Alternative collection rates are shown: 90%, 80%, 70%, 60%, 50%, and 40%.

Mileage charges (**Form 5b**) are shown for $3.50 per mile up to $6 per mile for one-way (loaded) miles. For the BLS Case Study, estimated one-way miles are approximately 35.6% of the total miles, for a total of 3,342 miles (9,400 x 35.6% = 3,342 miles one-way). Calculations are shown on how much revenue could be generated if 30, 40, 50, 60 70, 80, or 90 percent of the total mileage fees are collected.

Form 5c illustrates the estimated revenues that would be generated from millage levies through the creation of a special taxation district for the Case Study school district. The total net property valuation for the Case Study school district for FY 2002 was $14,820,097. Three mills would generate $44,460, two mills $29,640, and one mill $14,820.

Form 5d illustrates the revenue from a sales tax collection. The table shows the revenues resulting from a ¼ ¢ up to a 2 ¢ sales tax based on FY 2001 sales tax collections obtained from

the Case Study's State Tax Commission. The sales subject to sales tax totaled $5,517,428 for the Case Study's municipal government. A 1¢ sales tax would result in an estimated $55,174 in revenues. These estimates are based on historical data and are only intended to estimate future revenues.

To illustrate how to utilize the revenue tables, **Form 6** presents 2 funding options for BLS Case Study. The BLS Case Study would need an estimated $88,936 for total annual capital and operating expenses. One method to fund this alternative is shown in **Funding Option #1;** to charge a flat mileage fee of $5 with an assumed collection rate of 40% to generate $6,684 in revenues, to charge a non-emergency call fee of $400 at 40% collections to generate $38,080, to charge an emergency call fee of $500 at 40% collections to generate $7,600, and to collect the 1¢ sales tax, estimated to total $55,174. The total estimated revenues are $107,538, which leaves a surplus of $18,602 for the BLS System using **Funding Option #1** (**Form 6**).

Another method to fund this alternative would be to increase the collection rates while maintaining the same mileage fees and user transport fees. **Form 6, Funding Option #2** shows the increased revenues for these fees; $8,355 would be generated from mileage fees of $5 with an increased collection rate to 50%, $47,600 would be generated from a non-emergency fee of $400 with a 50% collection rate, and $9,500 would be generated from an emergency call fee of $500 with a 50% collection rate. These three fees plus a 1¢ sales tax would total $120,629, which covers the total annual capital and operating costs of $88,936, leaving a surplus of $31,693 using **Funding Option #2** (**Form 6**).

Conclusion

The analysis of the BLS Case Study EMS service is based on average costs received from many different sources; from the Oklahoma EMS studies completed over the last few years, from equipment suppliers, from the EMS training facilities in Oklahoma, from the experiences of the EMS Division field staff in Oklahoma, etc. This guidebook is designed to assist an EMS service to develop their own Case Study by using the blank forms in **Appendix C**. If additional assistance is needed, refer to resources included in **Appendix E**.

Form 2. EMS System - Estimating Capital Costs for BLS Case Study

(1)	(2)	(3)	(4)	(5)	(6)	(7)		(8)	(9)
Capital Expenditures	Unit Cost $	No. of Units	Adjustment Factor	Total Capital Costs	*Life Miles/Yrs to Replace	Annual Miles	OR	Amortization Factor	Annual Capital Costs
Vehicle and Vehicle Equipment									
A Vehicle Type I		x	x	=	x (	x	) or	x	=
B Vehicle Type II		x	x	=	x (	x	) or	x	=
C Vehicle Type III	$95,000	x 2	x 1	= $190,000	÷ (7	÷ 1	) or	x	= $27,143
D Command Vehicle		x	x	=	÷ (	÷	) or	x	=
E First Responder Vehicle		x	x	=	÷ (	÷	) or	x	=
F BLS Equipment	$15,000	x 2	x 1	= $30,000	÷ (7	÷ 1	) or	x	= $4,286
G ALS Equipment		x	x	=	÷ (	÷	) or	x	=
H Subtotal - Vehicle and Vehicle Equipment				$220,000					$31,429
				Sum A5 - G5					Sum A9 - G9
Capital Expenditures	Unit Cost $	No. of Units	Adjustment Factor	Total Capital Costs	Years to Replace			Amortization Factor	Annual Capital Costs
Communications Equipment									
I Base Communications		x	x	=	÷		or	x	=
J Rpeater and Tower Systems		x	x	=	÷		or	x	=
K Vehicle Communications	$1,000	x 2	x 1	= $2,000	÷ 5		or	x	= $400
L Pagers/radios/phones	$600	x 8	x 1	= $4,800	÷ 5		or	x	= $960
Additional Equipment									
M Oxygen Set	$1,000	x 4	x 1	= $4,000	÷ 5		or	x	= $800
N First Responder Kit		x	x	=	÷		or	x	=
O Defibrillator Unit		x	x	=	÷		or	x	=
Building and Furnishings									
P Building	$45,000	x 1	x 1	= $45,000	÷		or	x 0.08059	= $3,627
Q Furnishings		x	x	=	÷		or	x	=
R Subtotal - Communications, Additional Equipment, & Building/Furnishings				$55,800					$5,787
				Sum I5 - Q5					Sum I9 - Q9
S TOTAL OF CAPITAL COSTS				$275,800					$37,215
				H5 + R5 TOTAL					H9 + R9 ANNUAL

* Maximum life for vehicle is 75,000 miles or 7 years, whichever comes first.

Form 3a. EMS System - Estimating Annual Operating Costs for Vehicles for __BLS Case Study_____

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Item						Subtotal	Annual Operating Costs
	Vehicle(s)							
	Gasoline							
A	Cost per Gallon of Gas	**$1.70**	x **1**	= **$1.70**				
		Cost/Gallon	Adj. Factor	Adj. $/gal				
B	Type I or Type III vehicle	**9,400**	÷ **8**	x **$1.70**			= **$1,998**	
		Yr. Mileage	Ave. mpg	A4				
C	Type II vehicle		÷	x			=	
		Yr. Mileage	Ave. mpg	A4				
	Tires (radials)							
D	Cost per Tire	**$125**	x **1**	= **$125**				
		Cost/Tire	Adj. Factor	Adj. $/Tire				
E	Type I or Type III Vehicle	**9,400**	÷ 27,000	x **$125**	x 6		= **$261**	
		Yr. Mileage	Mileage/Tire	D4	No. of tires			
F	Type II Vehicle		÷ 27,000	x	x 4		=	
		Yr. Mileage	Mileage/Tire	D4	No. of tires			
G	Oil, filter and lubrication	**$38**	x **1**	= **$38**	x **9,400**	÷ **2,000**	= **$179**	
		Cost/Change	Adj. Factor	Adj. $/Change	Yr. Mileage	Miles/Change		
H	Vehicle Licenses	**$10**	x **2**				= **$20**	
		Cost/Vehicle	No. Vehicles					
I	Vehicle Maintenance and Repairs	**$1,200**	x **1**	x **2**			= **$2,400**	
		Yr. Cost	Adj. Factor	No. Vehicles				
J	Vehicle Radio Contract		x	x			=	
		Yr. Cost	Adj. Factor	No. Vehicles				
K	Vehicle Insurance	**$2,100**	x **1**	x **2**			= **$4,200**	
		Yr. Cost	Adj. Factor	No. Vehicles				
L	Subtotal - Vehicle Operating Costs							**$9,058**
								Sum (B7:K7)

Form 3b. EMS System - Estimating Annual Operating Costs for Building/Medical/Communications/Liability Insurance for __BLS Case Study__

	(1)	(2)		(3)		(4)		(5)		(6)		(7)	(8)
	Item											Subtotal	Annual Operating Costs
	Building												
A	Building Insurance	**$16.667**	x	**1**	=	**16.6667**	x	**$45,000**	÷	$1,000	=	**$750**	
		Cost/$1,000		Adj. Factor		Adj. Cost/$1,000		Bldg. Value					
B	Water, Sewer, Trash, Heat/Cool	**$185**	x	**1**	=	**$185**	x	**12**			=	**$2,220**	
		Cost/Mo.		Adj. Factor		Adj. Cost/Mo.		Months					
C	Telephone	**$150**	x	**1**	=	**$150**	x	12			=	**$1,800**	
		Cost/Mo.		Adj. Factor		Adj. Cost/Mo.		Months					
D	Building Maintenance	**$40**	x	**1**	=	**$40**	x	12			=	**$480**	
		Cost/Sq. Ft.		Adj. Factor		Adj. Cost/Sq. Ft.		Months					
	Medical Supplies												
E	For non-Emergency Calls	**$5**	x	**1**	=	**$5**	x	**238**			=	**$1,190**	
		Cost/Call		Adj. Factor		Adj. Cost/Call		Non-ER Calls					
F	For Emergency Calls	**$25**	x	**1**	=	**$25**	x	**38**			=	**$950**	
		Cost/Call		Adj. Factor		Adj. Cost/Call		ER Calls					
G	**Medical Waste Disposal**	**$3**	x	**1**	=	**$3**	x	**276**			=	**$828**	
		Cost/Call		Adj. Factor		Adj. Cost/Call		Calls					
	Communications Expense												
H	Communications Monthly Costs	**$175**	x	**1**	=	**$175**	x	12			=	**$2,100**	
		Cost/Mo.		Adj. Factor		Adj. Cost/Mo.		Months					
I	Communications Maintenance		x		=		x	12			=	**$0**	
		Cost/Mo.		Adj. Factor		Adj. Cost/Mo.		Months					
J	**General Liability Insurance**	**$200**	x	**1**	=	**$200**	x	12			=	**$2,400**	
		Cost/Mo.		Adj. Factor		Adj. Cost/Mo.		Months					
K	Subtotal - Building/Medical/Communications/Liability Insurance Operating Costs												**$12,718** Sum (A7:J7)

Form 3c. EMS System - Estimating Annual Operating Costs for Personnel/Benefits for __BLS Case Study____

	(1) Item	(2)	(3)	(4)	(5)	(6)	(7) Subtotal	(8) Annual Operating Costs
	Labor							
A	EMS Administrator - Hourly	_____ No.	x _____ Hrs./Day	x _____ Days/Yr.	x _____ Hourly Rate	= _____		
B	EMS Administrator - Annual Salary	1 No.	x $4,800 Yr. Salary			= $4,800		
	Crews - Paid or Volunteer							
C	1st Crew Member_____	1 No.	x 16 Hrs./Day	x 260 Days/Yr.	x $1.00 Hourly Rate	= $4,160		
D	2nd Crew Member_____	1 No.	x 24 Hrs./Day	x 260 Days/Yr.	x $1.00 Hourly Rate	= $6,240		
	Crews - Paid or Volunteer							
E	1st Crew Member_____	1 No.	x 24 Hrs./Day	x 104 Days/Yr.	x $1.00 Hourly Rate	= $2,496		
F	2nd Crew Member_____	1 No.	x 24 Hrs./Day	x 104 Days/Yr.	x $1.00 Hourly Rate	= $2,496		
	Call or Transport Pay							
G	1st Crew Member_____	167 No.	x $10 Rate			= $1,670		
H	2nd Crew Member_____	167 No.	x $10 Rate			= $1,670		
I	Dispatch Clerk	_____ No.	x _____ Hrs./Day	x _____ Days/Yr.	x _____ Hourly Rate	= _____		
J	Total Base Salaries					= $23,532 Sum (A6:I6)		
K	Overtime	_____ J6	x _____ Percent			= _____		
L	Total Base Salaries and Overtime						= $23,532 J6 + K6	
M	Benefits	$23,532 L7	x 8.00% Percent				= $1,883	
N	Subtotal - Personnel/Benefits Operating Costs							$25,415 L7 + M7

Form 3d. EMS System - Estimating Annual Operating Costs for "Other Expenses" for __BLS Case Study___

	(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)
	Item							Subtotal	Annual Operating Costs
A	**Billing Expense**		x				=		
		Cost/Call		Billable Calls					
B	**Office Supplies**	**$100**	x	12			=	**$1,200**	
		Cost/Mo.		Months					
C	**Uniform Allowance**		x				=		
		Cost/Yr.		No.					
	Training Costs								
D	Training Courses/Books/Supplies	**$150**	x	**8**			=	**$1,200**	
		Cost/Person		No.					
E	National Registry Exams		x				=		
		Cost/Person		No.					
F	**Car Allowance**		x				=		
		Cost/Mile		Yr. Mileage					
	Licenses								
G	EMS License Fee	**$50**	x	**1**			=	**$50**	
		Cost/EMS		No.					
	EMT License Fee								
H	First Responder		x				=		
		Cost/Person		No. Persons					
I	EMT - Basic		x				=		
		Cost/Person		No. Persons					
J	EMT - Intermediate	**$10**	x	**8**			=	**$80**	
		Cost/Person		No. Persons					
K	Paramedic		x				=		
		Cost/Person		No. Persons					
L	**Miscellaneous**		x	12			=	**$2,000**	
		Per/Month		Months					
M	Subtotal - "Other Expenses" Operating Costs								**$4,530**
									Sum (A7:L7)

Form 4. EMS System - Summary Costs for ___BLS Case Study____

	(1)	(2)	(3)
A	Total Capital Costs		**$275,800**
			Form 2, S5
B	Total Annual Capital Costs		**$37,215**
			Form 2, S9
	Total Annual Operating Costs		
C	Vehicle Costs	**$9,058**	
		Form 3a, L8	
D	Bldg/Med/Comms/Liab Ins	**$12,718**	
		Form 3b, K8	
E	Personnel/Benefits	**$25,415**	
		Form 3c, N8	
F	"Other Expenses"	**$4,530**	
		Form 3d, M8	
G			**$51,721**
			Sum (C2:F2)
H	Total Annual Capital & Operating Costs		**$88,936**
			B2 + G2

Form 5a. EMS System Revenues - Estimated User Fee Per Call for __BLS Case Study_____

Transported Calls	
Emergency Calls	38
Non-Emergency Call	238
Total Transported Calls	276

EMERGENCY CALLS

			Estimated User Fee Per Call						
			$250	$300	$350	$400	$450	$500	$600
Emergency Calls	38	100%	$9,500	$11,400	$13,300	$15,200	$17,100	$19,000	$22,800
Collections at		90%	$8,550	$10,260	$11,970	$13,680	$15,390	$17,100	$20,520
Collections at		80%	$7,600	$9,120	$10,640	$12,160	$13,680	$15,200	$18,240
Collections at		70%	$6,650	$7,980	$9,310	$10,640	$11,970	$13,300	$15,960
Collections at		60%	$5,700	$6,840	$7,980	$9,120	$10,260	$11,400	$13,680
Collections at		50%	$4,750	$5,700	$6,650	$7,600	$8,550	$9,500	$11,400
Collections at		40%	$3,800	$4,560	$5,320	$6,080	$6,840	$7,600	$9,120

NON-EMERGENCY CALLS

			Estimated User Fee Per Call						
			$250	$300	$350	$400	$450	$500	$600
Non-Emergency Calls	238	100%	$59,500	$71,400	$83,300	$95,200	$107,100	$119,000	$142,800
Collections at		90%	$53,550	$64,260	$74,970	$85,680	$96,390	$107,100	$128,520
Collections at		80%	$47,600	$57,120	$66,640	$76,160	$85,680	$95,200	$114,240
Collections at		70%	$41,650	$49,980	$58,310	$66,640	$74,970	$83,300	$99,960
Collections at		60%	$35,700	$42,840	$49,980	$57,120	$64,260	$71,400	$85,680
Collections at		50%	$29,750	$35,700	$41,650	$47,600	$53,550	$59,500	$71,400
Collections at		40%	$23,800	$28,560	$33,320	$38,080	$42,840	$47,600	$57,120

Form 5b. EMS System Revenues - Estimated Mileage Fees for __BLS Case Study_____

Total Loaded Miles **3,342**

		Mileage Fees					
		$3.50	**$4.00**	**$4.50**	**$5.00**	**$5.50**	**$6.00**
For One-Way Miles	**3,342**						
Gross Revenues	100%	**$11,697**	**$13,368**	**$15,039**	**$16,710**	**$18,381**	**$20,052**
90% Collections	90%	**$10,527**	**$12,031**	**$13,535**	**$15,039**	**$16,543**	**$18,047**
80% Collections	80%	**$9,358**	**$10,694**	**$12,031**	**$13,368**	**$14,705**	**$16,042**
70% Collections	70%	**$8,188**	**$9,358**	**$10,527**	**$11,697**	**$12,867**	**$14,036**
60% Collections	60%	**$7,018**	**$8,021**	**$9,023**	**$10,026**	**$11,029**	**$12,031**
50% Collections	50%	**$5,849**	**$6,684**	**$7,520**	**$8,355**	**$9,191**	**$10,026**
40% Collections	40%	**$4,679**	**$5,347**	**$6,016**	**$6,684**	**$7,352**	**$8,021**

Form 5c. EMS System Revenues - EMS District Mills for _BLS Case Study_____

School District	Total Net Valuation	One Mill	Two Mills	Three Mills
School District-Case Study	**$14,820,097**	**$14,820**	**$29,640**	**$44,460**
School District B				
School District C				
School District D				
School District E				
School District F				
School District G				
School District H				
School District I				
Total	**$14,820,097**	**$14,820**	**$29,640**	**$44,460**

Form 5d. EMS System Revenues - Sales Tax for __BLS Case Study_____

City	Sales Subject to Sales Tax	Sales Tax Rates ¼¢	½¢	¾¢	1¢	1¼¢	1½¢	1¾¢	2¢
Case Study	**$5,517,428**	**$13,794**	**$27,587**	**$41,381**	**$55,174**	**$68,968**	**$82,761**	**$96,555**	**$110,349**
City B									
City C									
City C									
City D									
City E									
Totals	**$5,517,428**	**$13,794**	**$27,587**	**$41,381**	**$55,174**	**$68,968**	**$82,761**	**$96,555**	**$110,349**

Form 6. EMS System - Possible Funding Options for BLS Case Study

Funding Option #1		Funding Option #2	
Costs:		Costs:	
Total Annual Capital & Operating Expenses	**$88,936**	Total Annual Capital & Operating Expenses	**$88,936**
	Form 4, H3		Form 4, H3
Revenues:		Revenues:	
Mileage Fee, $5, 40%	**$6,684**	**Mileage Fee, $5, 50%**	**$8,355**
Non-ER Fee, $400, 40%	**$38,080**	**Non-ER Fee, $400, 50%**	**$47,600**
ER Fee, $500, 40%	**$7,600**	**ER Fee, $500, 50%**	**$9,500**
Sales Tax (1 cent)	**$55,174**	**Sales Tax (1 cent)**	**$55,174**
Total Revenues	**$107,538**	Total Revenues	**$120,629**
Difference	**$18,602**	Difference	**$31,693**

CHAPTER IX.

Effective Administration:
A Key to a Viable EMS Program

Methods and concepts of EMS administration may be varied and will depend on how your system functions. What works in Typicaltown may not work someplace else. For instance, Typicaltown and the county in which it is located have created an EMS District. The district will receive tax monies for operation, and will charge its users for services it renders. The tax revenue ensures availability of service. If collections for service are vigorously pursued, there will be adequate continuous funding to support operation of the EMS system.

Dispensation of the tax funds are the responsibility of a Board of Trustees appointed by the taxing authority upon creation of the district. The Board also has the power to contract, organize, maintain, and otherwise assure life-sustaining emergency care within the EMS District. Members of the Board are professional, business and civic leaders of the area to be served. They are responsible for day-to-day operation of the EMS system but cannot, because of their personal business and professional obligations, supervise daily operations themselves.

The Board's first step, whether they are going to operate the service themselves or contract for service, should be to find a person capable of supervising daily operations of the EMS District. It is desirable for the administrator to be an Emergency Medical Technician, so that he/she could step in to respond on an emergency should additional personnel be needed. However, his/her job should be primarily administrative, not patient care. The EMS Board of Trustees in Typicaltown decided to contract with a local community to supply EMS to the entire region. The Board's administrator is responsible for the following:

- Maintain such financial records as are necessary to substantiate actual cost of service to the EMS District.

- Prepare and submit invoices to users of the ambulance service on a monthly basis, then accomplish actions necessary to assure maximum collection of bills for service including personal contact with debtors and where appropriate, filing actions in small claims court to collect debts, or coordinate this activity with a contracted billing service.

- If a licensed EMT, assist in the care and transport of patients when necessary to compliment the availability of existing personnel.

- Coordinate an effective public information and education program to both general public and specific audiences (e.g., medical and governmental) on the activities, goals, and objectives of the EMS district.

- Maintain records of service utilization and effectiveness to provide necessary data for continuing evaluation of the service thus assuring Continuous Quality Improvement.

- Maintain close working relationships with the EMS contractor to assure that the provisions of the agreement for emergency medical care between the EMS Authority or Board and the EMS provider are met.

- Involve the local medical community, particularly the

Physician Medical Director. Encourage and urge their support and involvement in the areas of training and physician provision of on-line medical control and protocol development.

- Maintain working liaison with neighboring EMS providers, and with other emergency service agencies in the area, in provision of communications services and continuing education as well as mutual aid response agreements.

- Coordinate with regional and state EMS authorities for the provision of training for Emergency Medical Technicians, other ancillary medical personnel, physicians and the general public from existing educational resources at the regional and state levels. Additionally, assure awareness of desired participation in other regional and state EMS programs meeting local needs.

- Perform such other administrative duties as may be required by the authority to assure the provision of quality emergency medical care and transportation services to the citizens of the EMS district.

The additional problems of personnel management would be added if the EMS authority provided a free-standing service instead of contracting for EMS.

The salary established for the EMS administrator should be lucrative enough to attract the type of person needed to manage the system and work harmoniously with employees, volunteers, elected officials, civic groups, and the general public. The position of EMS administrator is extremely important. The administrator's task is very demanding - - the wrong person could adversely affect the public confidence in the EMS system's performance.

CHAPTER X.

Available Resources and Services

This section is designed as an aid for interested citizens and local leaders in establishing or improving emergency medical services in their area. This section defines the services available and functions of EMS groups throughout the state.

The Emergency Medical Services Division has been designated the lead state agency for emergency services. The Division of EMS plans, establishes, or supplements emergency services. The Division of EMS is also the enforcement department to insure that EMS regulations and guidelines are followed in local EMS services.

The Division of EMS acts as a clearinghouse for information on EMS activities at national, state, and local levels and directs inquires for assistance to appropriate sources.

Training for emergency medical technicians is available from various sources. Many community colleges offer an associate degree for EMTs. Career and Technology Education Centers offer EMT training that range from basic to advanced levels. The Oklahoma State University Fire Training School also offers training for EMTs. **Appendix E** contains information for training sources as well as state and national contacts. For other information in emergency medical services, contact county health departments, EMS district board of trustees, county medical societies, agricultural extension agents, ambulance service providers, hospital administrators, city managers, and boards of county commissioners.

References

Doeksen, Gerald A., Leonard G. Anderson, Jr., and Vanessa Lenard. *A Community Development Guide for Emergency Medical Services: A System Approach to Funding and Administration*, 1981.

Federal Communication Commission. 37th Annual Report Fiscal Year, 1979, Washington, D.C., pp. 11 and 12.

Federal Emergency Management Agency, *Emergency Medical Services (EMS) Recruitment and Retention*.

General Services Administration, Federal Supply Service. *Federal Specification for the Star-of-Life Ambulance: KKK-A-1822E*, June 1, 2002.

Goldstone, Marc, Esq., MICP. *Ambulance Service Compliance in the Era of OIG Guidance, Part Two*, August 2003. Medical Emergency, Rescue and Global Information Network. Website: http://www.merginet.com/admin_management/legal/OIGComplianceGuidancePartII.cfm.

Robert Woods Johnson Foundation, *Special Report, Number Two*, Princeton, N.J., 1977, p.13.

Scott, Tom, *Book Review: Ambulance Service Guide to HIPAA Compliance*, August 2003. Medical Emergency, Rescue and Global Information Network. Website: http://www.merginet.com/admin_management/legalBookReviewHIPAA.cfm.

Scott, Tom. *Medicare Ambulance Fee Schedule*, August 2003. Medical Emergency, Rescue and Global Information Network. Website: http://www.merginet.com/admin_management/finance/FeeSchedule.cfm,

Scott, Tom. *What Do We Charge to Whom*, August 2003. Medical Emergency, Rescue and Global Information Network. Website: http://www.merginet.com/admin_management/finance/Charges.cfm.

Sloggett, Gordon R., Gerald A. Doeksen, Marvin Hays, and Sam Larsen. *A Community Development Guide for Emergency Medical Services: A Systematic Approach to Funding and Administration*, 1988.

Wolfberg, Doug and Steve Wirth. *Write It Down! Management Documentation in Time of Uncertainty*, August 2003. Medical Emergency, Rescue and Global Information Network. Website: http://www.merginet.com/admin_management/finance/Documentation.cfm.

American College of Emergency Physicians
1125 Executive Circle
Irving, TX 75038-2522
800/798-1822 or 972/550-0911
Fax: 972/580-2816
Website: www.acep.org

American College of Surgeons
633 N. Saint Clair St.
Chicago, IL 60611-3211
312/202-5000 Fax: 312/202-5001
Website: www.facs.org

American Medical Association
515 N. State Street
Chicago, IL 60610
312/464-5000
Website: www.ama-assn.org

National Academy of Sciences National Research Council
500 Fifth St., N.W.
Washington, D.C. 20001

National Association of EMS Directors
111 Park Place
Falls Church, VA 22046-4513
703/538-1799 Fax: 703/241-5603
E-mail: info@nasemsd.org
Website: www.nasemsd.org

National Registry of Emergency Medical Technicians
Rocco V. Morando Building
6610 Busch Blvd., P.O. Box 29233
Columbus, OH 43229
614/888-4484 Fax: 614/888-8920
Website: www.nremt.org

National Highway Traffic Safety Administration

Emergency Medical Services Division
National Highway Traffic Safety Administration
400 Seventh St., S.W. NTS-42
Washington, D.C. 20590
202/366-5440

Regional Offices

Region 1 – CT, ME, MA, NH, RI, VT
Volpe National Transportation Systems Center
55 Broadway, Kendall Square, Code 903
Cambridge, MA 02142
617/494-3427 Fax: 617/494-3646
E-mail: region1@nhtsa.dot.gov

Region 2 – NJ, NY, Puerto Rico, Virgin Islands
222 Mamaroneck Ave., Suite 204
White Plains, NY 10605
914/682-6162 Fax: 914/682-6239
E-mail: region2@nhtsa.dot.gov

Region 3 – DE, DC, MD, PA, VA, WV
10 S. Howard St., Suite 6700
Baltimore, MD 21201
410/926-0090 Fax: 410/962-2770
E-mail: region3@nhtsa.dot.gov

Region 4 – KY, TN, NC, MS, AL, GA, SC, FL
Atlanta Federal Center
61 Forsyth St. SW
Atlanta, GA 30300
404/562-3739 Fax: 404/562-3763
E-mail: region4@nhtsa.dot.gov

Region 5 – IL, IN, MI, MN, OH, WI
19900 Governors Dr., Suite 201
Olympia Fields, IL 60461
708/503-8822 Fax: 708/503-8991
E-mail: region5@nhtsa.dot.gov

Region 6 – NM, OK, AR, TX, LA, Ind. Nations
819 Taylor St., Rm. 8A38
Fort Worth, TX 76102
817/978-3653 Fax: 817/978-8339
E-mail: region6@nhtsa.dot.gov

Region 7 – NE, IA, KS, MO
901 Locust St., Rm. 466
Kansas City, MO 64106
816/329-3900 Fax: 816/329-3910
E-mail: region7@nhtsa.dot.gov

Region 8 – CO, MT, ND, SD, UT, WY
555 Zang St., Rm. 430
Lakewood, CO 80228
303/969-6917 Fax: 303/969-6294
E-mail: region8@nhtsa.dot.gov

Region 9 – American Samoa, AZ, CA,
Guam, HI, N. Marianas, NV
201 Mission St., Suite 2230
San Francisco, CA 94105
415/744-3089 Fax: 415/744-2532
E-mail: region9@nhtsa.dot.gov

Region 10 – AK, ID, OR, WA
915 Second Ave.
Seattle, WA 98174
206/220-7640 Fax: 206/220-7651
E-mail: region10@nhtsa.dot.gov

APPENDIX A.

Essential Equipment for Ambulances

Appendix A

American College of Surgeons
Essential Ambulance Equipment

Prices vary according to manufacturer and retail dealer, as well as accessories included. Prices for all hardware are subject to wide variations depending on whether a trauma bag, for example, is a hard or soft case, whether or not it is fully stocked, etc.

Basic Life Support Equipment

1 ea.	A functioning portable suction apparatus with wide-bore tubing (1/4"), rigid and soft suction catheters for adults, children, and infants, which may be electronically, manual or oxygen powered	
	Electric powered	$ 600.00
	Manual powered	$ 100.00
	Rigid catheters (pkg/5)	$ 20.00
	Soft catheters (pkg/5 $7.00 x 3)	$ 21.00
1 ea.	An adult, pediatric and infant bag-valve-mask resuscitators with an adult, child, and infant clear mask	
	Disposable, adult w. reservoir bag (case/6)	$ 100.00
	Disposable, child w. reservoir bag (case/6)	$ 120.00
	Disposable, infant w. res. bag (case/6)	$ 120.00
1 set.	Oropharyngeal airways, set or a minimum of one (1) of each size for adult (size 7, 9, or 9), child (size 3, 4, 5, or 6), and infant (sizes 0, 1, or 2) - nasal pharyngeal airways are optional	
	Lifesaver Kit	$ 30.00
1 set	Portable and wall-mounted oxygen sets, with variable flow regulators and adequate length tubing, and an extra bottle of portable oxygen	
	Wall-mounted flow meter	$ 70.00
	Portable Resuscitator w. case	$ 800.00
	Aluminum "D" cylinders ($95. X 2)	$ 190.00
Supply	Oxygen masks in adult, child, and infant sizes, and cannulas for adults	
	Adult non-rebreather mask (case/50)	$ 80.00
	Ped. non-rebreather mask (case/50)	$ 100.00
	Infant non-rebreather mask (pkg/5)	$ 15.00
	Adult simple mask (case/50)	$ 47.00
	Ped. simple mask (case/50)	$ 67.00
	Adult nasal cannula (case/50)	$ 33.00
1 ea.	Bite Stick (pkg/10)	$ 10.00
1 ea.	Pocket mask w. one-way valve and oxygen inlet	$ 20.00
2 ea.	Sterile Burn Sheets ($20 ea.)	$ 40.00
50 ea.	Sterile 4"x4" dressings (box/100)	$ 22.00
6 ea.	Sterile 6"x8" or 8"x10" dressings (8"x7 ½" tray/20 $7.00)	
	(8"x10" tray/20 $10.00)	$ 10.00

Appendix A

Basic Life Support Equipment (Continued)

10 ea.	Roller bandage, soft (kerlix, kling, or equivalent) and/or elastic (2" or larger) 4" non-sterile kling (bag/12)	$ 12.00
4 ea.	Rolls of tape (1/2" or larger) (1" hypoallergenic, box/12)	$ 17.00
4 ea.	Sterile occlusive dressings, 3"x8" or larger (box/24)	$ 35.00
8 ea.	Triangular bandage ($2.25 ea.)	$ 18.00
1 pr.	Bandage Scissors	$ 5.00
1 ea.	Traction splint for lower extremity, with limb support slings, padded ankle hitch, padded pelvic support, traction strap Adult & Pediatric package, hare type	$ 300.00
1 set	Upper and lower extremity splints for joint above and below fracture (such as pneumatic, wire ladder, wood, cardboard)	$ 60.00
	Air splint set, complete $60 Wire ladder set (pkg/12) $60 Cardboard (pkg/12) $50 Wood (set/6) $37	
2 ea.	Short spine board or vest type including straps and accessories Kendrick-type $140 x 2	$ 280.00
2 ea.	Long spine board including straps and accessories Polyethylene w. speed-clips $190 x 2 Speed-clip straps $16 ea. x 8 Head Immobilizer (foam/vinyl blocks $95) x 2 (cardboard, up to $15)	 $ 380.00 $ 128.00 $ 190.00
1 set	Rigid extrication collars in large, medium, small adult sizes, and pediatric sizes for children ages 2 years and older and infants ($12 ea. w. $30 bag)	$ 100.00
1 ea.	Portable blood pressure set in adult, child, and infant sizes (multi-cuff kit)	$ 135.00
1 ea.	Stethoscope	$ 20.00
1 ea.	Pneumatic anti-shock garment, compartmentalized, control valves, inflation pump	$ 800.00
1 ea.	Obstetrical kit, sterile	$ 15.00

Appendix A

Basic Life Support Equipment (Continued)

Supply	Universal communicable disease precaution equipment, including gloves, mask, gown, goggles, and other universal precautions	
	combo-masks box/25	$ 33.00
	gowns box/15	$ 33.00
	goggles $6 pr. per crew member x 10	$ 60.00
	gloves $10/box x 4 asst. sizes	$ 40.00
1 ea.	Blood glucose measurement equipment per protocol	$ 100.00
1 ea.	sturdy, lightweight, all-level cot for primary patient	
	hare any level cot w. mattress & straps	$1,700.00
	heavy duty cot complete	$3,100.00
1 ea.	crash stable side or center mounting cot fastener	$ 300.00
2 ea.	five pound ABC fire extinguisher ($35 ea.)	$ 70.00
1 ea.	Flashlight (3 cell mag-lite)	$ 25.00
1 ea.	Trauma Bag complete	$ 250.00
Basic Extrication Tools can be purchased at the local hardware		$ 200.00
	Subtotal	$7,921.00
	Optional BLS Equipment	
1 ea.	Pulse Oximetry Device	$1,700.00
1 ea.	Semi-Automated Advisory Defibrillator	$3,500.00
	Total cost to equip one BLS ambulance	$13,121.00

Appendix A

Intermediate Life Support Supplies & Equipment

Intravenous administration equipment			$637.00
Supplies of 12 each solution:	5% dextrose in water $4.50 ea.	= $54.00	
	Lactated Ringer's Sol. $5.00 ea	= $60.00	
	0.9% Normal Saline $4.00 ea.	= $48.00	
Administration sets pkg/12	10 drops/ml set w. inject. site	$45.00	
	60 drops/ml set	$45.00	
quik-cath IV catheters pkg/10	14 g. x 2"	$18.00	
	16 g. x 2"	$18.00	
	18 g. x 1 ¼"	$18.00	
	20 g. x 1 ¼"	$18.00	
	22 g. x 1 ¼"	$18.00	
IV start kit box/50 x 1.90		$95.00	
veni-gard dressings box/100		$65.00	
Alcohol prep pads case/10 boxes		$25.00	
Iodine prep pads case/10 boxes		$110.00	
Intraosseous administration equipment per protocol	case/10 18 g. jamshidi		$170.00
Advanced Airway Equipment			$669.00
Esophageal Obturator Airway, complete 2 x $65		= $130.00	
Laryngoscope handle and blades	standard set complete	$350.00	
	standard blades $35 ea. x 9	= $315.00	
	fiber-optic blades $100 ea. x 9	= $900.00	
	stylettes $4 ea x 2 ea x 3 sizes	= $ 24.00	
Endotracheal tubes assorted sizes	3 kits include 1 ea. adult size $35	= $105.00	
	3 kits include 1 ea. child size $20	= $ 60.00	
OSHA approved Sharps Containers			$30.00
Blood Sampling Equipment			$150.00
Total Intermediate Life Support Supplies			$1,656.00

Paramedic Life Support Equipment & Supplies

Cardiac monitor/defibrillator - according to manufacturer options, prices vary from $5,000 to $12,000
Pre-load drugs per medical protocols - prices vary according to preferences and according to market

An additional budget of $20,000 for paramedic level supplies and equipment is not unreasonable.

APPENDIX B.

Amortization Factors

Appendix B
Amortization Factors

Interest Rate (Percent)	Years for Repayment									
	3	**5**	**7**	**10**	**15**	**20**	**25**	**30**	**35**	**40**
5	0.367215	0.230974	0.172819	0.129505	0.096342	0.080243	0.070953	0.065051	0.061072	0.058278
6	0.374111	0.237394	0.179134	0.135868	0.102963	0.087185	0.078226	0.072649	0.068974	0.066462
7	0.381054	0.243891	0.185553	0.142377	0.109795	0.094393	0.085810	0.080587	0.077234	0.075009
8	0.388034	0.250456	0.192072	0.149030	0.116830	0.101850	0.093679	0.088827	0.085803	0.083860
9	0.395055	0.257092	0.198691	0.155820	0.124059	0.109546	0.101806	0.097336	0.094636	0.092960
10	0.402115	0.263797	0.205405	0.162745	0.131474	0.117460	0.110168	0.106079	0.103690	0.102259
11	0.409213	0.270570	0.212215	0.169801	0.139065	0.125576	0.118740	0.115025	0.112927	0.111719
12	0.416349	0.277410	0.219118	0.176984	0.146824	0.133879	0.127500	0.124144	0.122317	0.121304
13	0.423522	0.284314	0.226111	0.184290	0.154742	0.142354	0.136426	0.133411	0.131829	0.130986
14	0.430731	0.291284	0.233192	0.191714	0.162809	0.150986	0.145498	0.142803	0.141442	0.140745
15	0.437976	0.298315	0.240360	0.199252	0.171017	0.159761	0.154699	0.152300	0.151135	0.150562
16	0.445257	0.305409	0.247613	0.206901	0.179358	0.168667	0.164013	0.161886	0.160892	0.160424
17	0.452573	0.312564	0.254947	0.214657	0.187822	0.177690	0.173423	0.171545	0.170701	0.170319
18	0.459923	0.319778	0.262362	0.222515	0.196403	0.186820	0.182919	0.181264	0.180550	0.180240
19	0.467308	0.327050	0.269855	0.230471	0.205092	0.196045	0.192487	0.191034	0.190432	0.190181
20	0.474725	0.334380	0.277424	0.238523	0.213882	0.205357	0.202119	0.200846	0.200339	0.200136

Calculated using the following formula

$$\text{Amortization Factor} = \frac{i}{1-(1+i)^{-n}}$$

where i = interest rate; n = number of years

APPENDIX C.

Forms for Estimating Costs of EMS Systems

Appendix C

Forms for Estimating Costs of EMS Systems

Appendix C includes the forms needed to build budgets for either a First Responder system or an EMS system at any level of care. These forms are designed to utilize with the costs illustrated in **Chapter VI** and the completed Case Studies in **Chapter VII**.

This guidebook was developed in late 2002 and early 2003. To determine costs in the future, an adjustment factor can be used. There are two different adjustment factors, construction cost index and consumer price index. For future year, the adjustment factors are applied to the current costs in this guidebook to determine costs for the appropriate year in the future. The adjustment factors are:

Adjustment Factor 1

$$\frac{\text{Current Construction Cost Index}}{\text{2003 Construction Cost Index}}$$

Adjustment Factor 2

$$\frac{\text{Current Consumer Price Index}}{\text{2003 Consumer Price Index}}$$

Adjustment Factor 1 should be utilized for construction costs only, such as the building itself. The **Adjustment Factor 2** should be utilized for all other costs.

For additional information, **Appendix E** lists additional resources.

Appendix C

Form 1. First Responder System - Estimating the Annual Cost for _____

(1) Item	(2) Unit Cost	(3) No. of Units	(4) Adjustment Factor	(5) Total Capital Costs	(6) Years to Replace	or	(7) Amortization Factor	(8) Annual Costs	
Capital Costs									
First Responder Kits	_____ x	_____ x	_____ =	_____	÷ _____	or x	_____ =	_____	A.
Semi-Automated Advisory Defibrillator	_____ x	_____ x	_____ =	_____	÷ _____	or x	_____ =	_____	B.
Communications (Choose One)									
Portable Radios with Built-In Pagers	_____ x	_____ x	_____ =	_____	÷ _____	or x	_____ =	_____	C.
Portable Radios	_____ x	_____ x	_____ =	_____	÷ _____	or x	_____ =	_____	D.
Pagers (Alpha-Numeric or Voice)	_____ x	_____ x	_____ =	_____	÷ _____	or x	_____ =	_____	E.
Cellular Telephones	_____ x	_____ x	_____ =	_____	÷ _____	or x	_____ =	_____	F.
Repeater and Tower Systems (as needed)	_____ x	_____ x	_____ =	_____	÷ _____	or x	_____ =	_____	G.
CAPITAL COSTS SUMMARY				_____ Total Capital Costs				_____ Sum A. - G.	H.
Operating Costs									
Initial Training									
First Responder Courses/Books/Supplies	_____ x	_____ x	_____					= _____	I.
National Registry First Responder Exams	_____ x	_____ x	_____					= _____	J.
Continuing Education									
Biennial Refresher Course	_____ x	_____ x	_____					= _____	K.
National Registry Renewal Fees	_____ x	_____ x	_____					= _____	L.
Medical Supplies Per Call	_____ x	_____ x	_____					= _____	M.
Defibrillator Use Per Call	_____ x	_____ x	_____					= _____	N.
Monthly Pager/Cellular Telephone Fees	_____ x	_____ x	_____					= _____	O.
Equipment Maintenance Contracts	_____ x	_____ x	_____					= _____	P.
TOTAL OPERATING COSTS								_____ Sum I. - P.	Q.
TOTAL ANNUAL CAPITAL AND OPERATING COSTS								_____ H. + Q.	R.

Appendix C

Form 2. EMS System - Estimating Capital Costs for _____

(1)	(2)	(3)	(4)	(5)	(6)	(7)		(8)	(9)
Capital Expenditures	Unit Cost $	No. of Units	Adjustment Factor	Total Capital Costs	Life Miles	Annual Miles	OR	Amortization Factor	Annual CapitalCosts
Vehicle and Vehicle Equipment									
A Vehicle Type I	_____ x	x	_____ =		÷ (	_____ ÷	_____) or	x _____ =	
B Vehicle Type II	_____ x	x	_____ =		÷ (	_____ ÷	_____) or	x _____ =	
C Vehicle Type III	_____ x	x	_____ =		÷ (	_____ ÷	_____) or	x _____ =	
D Command Vehicle	_____ x	x	_____ =		÷ (	_____ ÷	_____) or	x _____ =	
E First Responder Vehicle	_____ x	x	_____ =		÷ (	_____ ÷	_____) or	x _____ =	
F BLS Equipment	_____ x	x	_____ =		÷ (	_____ ÷	_____) or	x _____ =	
G ALS Equipment	_____ x	x	_____ =		÷ (	_____ ÷	_____) or	x _____ =	
H Subtotal - Vehicle and Vehicle Equipment									
				Sum A5 - G5					Sum A9 - G9
Capital Expenditures	Unit Cost $	No. of Units	Adjustment Factor	Total Capital Costs	Years to Replace			Amortization Factor	Annual Capital Costs
Communications Equipment									
I Base Communications	_____ x	x	_____ =		÷	_____	or	x _____ =	
J Rpeater and Tower Systems	_____ x	x	_____ =		÷	_____	or	x _____ =	
K Vehicle Communications	_____ x	x	_____ =		÷	_____	or	x _____ =	
L Pagers/radios/phones	_____ x	x	_____ =		÷	_____	or	x _____ =	
Additional Equipment									
M Oxygen Set	_____ x	x	_____ =		÷	_____	or	x _____ =	
N First Responder Kit	_____ x	x	_____ =		÷	_____	or	x _____ =	
O Defibrillator Unit	_____ x	x	_____ =		÷	_____	or	x _____ =	
Building and Furnishings									
P Building	_____ x	x	_____ =		÷	_____	or	x _____ =	
Q Furnishings	_____ x	x	_____ =		÷	_____	or	x _____ =	
R Subtotal - Communications, Additional Equipment, & Building/Furnishings									
				Sum I5 - Q5					Sum I9 - Q9
S TOTAL OF CAPITAL COSTS									
				H5 + R5 TOTAL					H9 + R9 ANNUAL

Appendix C

Form 3a. EMS System - Estimating Annual Operating Costs for Vehicles for __BLS Case Study_____

	(1) Item	(2)	(3)	(4)	(5)	(6)	(7) Subtotal	(8) Annual Operating Costs
	Vehicle(s)							
	Gasoline							
A	Cost per Gallon of Gas	**$1.70** x Cost/Gallon	**1** = Adj. Factor	**$1.70** Adj. $/gal				
B	Type I or Type III vehicle	**9,400** ÷ Yr. Mileage	**8** x Ave. mpg	**$1.70** A4			= **$1,998**	
C	Type II vehicle	÷ Yr. Mileage	x Ave. mpg	 A4			=	
	Tires (radials)							
D	Cost per Tire	**$125** x Cost/Tire	**1** = Adj. Factor	**$125** Adj. $/Tire				
E	Type I or Type III Vehicle	**9,400** ÷ Yr. Mileage	27,000 x Mileage/Tire	**$125** x D4	6 No. of tires		= **$261**	
F	Type II Vehicle	÷ Yr. Mileage	27,000 x Mileage/Tire	x D4	4 No. of tires		=	
G	Oil, filter and lubrication	**$38** x Cost/Change	**1** = Adj. Factor	**$38** x Adj. $/Change	**9,400** ÷ Yr. Mileage	**2,000** = Miles/Change	**$179**	
H	Vehicle Licenses	**$10** x Cost/Vehicle	**2** No. Vehicles				= **$20**	
I	Vehicle Maintenance and Repairs	**$1,200** x Yr. Cost	**1** x Adj. Factor	**2** No. Vehicles			= **$2,400**	
J	Vehicle Radio Contract	x Yr. Cost	x Adj. Factor	 No. Vehicles			=	
K	Vehicle Insurance	**$2,100** x Yr. Cost	**1** x Adj. Factor	**2** No. Vehicles			= **$4,200**	
L	Subtotal - Vehicle Operating Costs							**$9,058** Sum (B7:K7)

Appendix C

Form 3b. EMS System - Estimating Annual Operating Costs for Building/Medical/Communications/Liability Insurance for __BLS Case Study__

	(1) Item	(2)		(3)		(4)		(5)		(6)	(7) Subtotal	(8) Annual Operating Costs
	Building											
A	Building Insurance	**$16.667** Cost/$1,000	x	**1** Adj. Factor	=	**16.6667** Adj. Cost/$1,000	x	**$45,000** Bldg. Value	÷	$1,000=	**$750**	
B	Water, Sewer, Trash, Heat/Cool	**$185** Cost/Mo.	x	**1** Adj. Factor	=	**$185** Adj. Cost/Mo.	x	**12** Months		=	**$2,220**	
C	Telephone	**$150** Cost/Mo.	x	**1** Adj. Factor	=	**$150** Adj. Cost/Mo.	x	12 Months		=	**$1,800**	
D	Building Maintenance	**$40** Cost/Sq. Ft.	x	**1** Adj. Factor	=	**$40** Adj. Cost/Sq. Ft.	x	12 Months		=	**$480**	
	Medical Supplies											
E	For non-Emergency Calls	**$5** Cost/Call	x	**1** Adj. Factor	=	**$5** Adj. Cost/Call	x	**238** Non-ER Calls		=	**$1,190**	
F	For Emergency Calls	**$25** Cost/Call	x	**1** Adj. Factor	=	**$25** Adj. Cost/Call	x	**38** ER Calls		=	**$950**	
G	**Medical Waste Disposal**	**$3** Cost/Call	x	**1** Adj. Factor	=	**$3** Adj. Cost/Call	x	**276** Calls		=	**$828**	
	Communications Expense											
H	Communications Monthly Costs	**$175** Cost/Mo.	x	**1** Adj. Factor	=	**$175** Adj. Cost/Mo.	x	12 Months		=	**$2,100**	
I	Communications Maintenance	Cost/Mo.	x	Adj. Factor	=	Adj. Cost/Mo.	x	12 Months		=	**$0**	
J	**General Liability Insurance**	**$200** Cost/Mo.	x	**1** Adj. Factor	=	**$200** Adj. Cost/Mo.	x	12 Months		=	**$2,400**	
K	Subtotal - Building/Medical/Communications/Liability Insurance Operating Costs											**$12,718** Sum (A7:J7)

Appendix C

Form 3c. EMS System - Estimating Annual Operating Costs for Personnel/Benefits for _____

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Item						Subtotal	Annual Operating Costs
	Labor							
A	EMS Administrator - Hourly	____ x	_____ x	_____ x	_____	= _____		
		No.	Hrs./Day	Days/Yr.	Hourly Rate			
B	EMS Administrator - Annual Salary	____ x	_____			= _____		
		No.	Yr. Salary					
	Crews - Paid or Volunteer							
C	1st Crew Member_____	____ x	_____ x	_____ x	_____	= _____		
		No.	Hrs./Day	Days/Yr.	Hourly Rate			
D	2nd Crew Member_____	____ x	_____ x	_____ x	_____	= _____		
		No.	Hrs./Day	Days/Yr.	Hourly Rate			
	Crews - Paid or Volunteer							
E	1st Crew Member_____	____ x	_____ x	_____ x	_____	= _____		
		No.	Hrs./Day	Days/Yr.	Hourly Rate			
F	2nd Crew Member_____	____ x	_____ x	_____ x	_____	= _____		
		No.	Hrs./Day	Days/Yr.	Hourly Rate			
	Call or Transport Pay							
G	1st Crew Member_____	____ x	_____			= _____		
		No.	Rate					
H	2nd Crew Member_____	____ x	_____			= _____		
		No.	Rate					
I	Dispatch Clerk	____ x	_____ x	_____ x	_____	= _____		
		No.	Hrs./Day	Days/Yr.	Hourly Rate			
J	Total Base Salaries					= _____		
						Sum (A6:I6)		
K	Overtime	____ x	_____			= _____		
		J6	Percent					
L	Total Base Salaries and Overtime						= _____	
							J6 + K6	
M	Benefits	____ x	_____				= _____	
		L7	Percent					
N	Subtotal - Personnel/Benefits Operating Costs							_____
								L7 + M7

Appendix C

Form 3d. EMS System - Estimating Annual Operating Costs for "Other Expenses" for _____

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Item						Subtotal	Annual Operating Costs
A **Billing Expense**	_____ x	_____			=	_____	
	Cost/Call	Billable Calls					
B **Office Supplies**	_____ x	12			=	_____	
	Cost/Mo.	Months					
C **Uniform Allowance**	_____ x	_____			=	_____	
	Cost/Yr.	No.					
Training Costs							
D Training Courses/Books/Supplies	_____ x	_____			=	_____	
	Cost/Person	No.					
E National Registry Exams	_____ x	_____			=	_____	
	Cost/Person	No.					
F **Car Allowance**	_____ x	_____			=	_____	
	Cost/Mile	Yr. Mileage					
Licenses							
G EMS License Fee	_____ x	_____			=	_____	
	Cost/EMS	No.					
EMT License Fee							
H First Responder	_____ x	_____			=	_____	
	Cost/Person	No. Persons					
I EMT - Basic	_____ x	_____			=	_____	
	Cost/Person	No. Persons					
J EMT - Intermediate	_____ x	_____			=	_____	
	Cost/Person	No. Persons					
K Paramedic	_____ x	_____			=	_____	
	Cost/Person	No. Persons					
L **Miscellaneous**	_____ x	12			=	_____	
	Per/Month	Months					
M Subtotal - "Other Expenses" Operating Costs							_____
							Sum (A7:L7)

Appendix C

Form 4. EMS System - Summary Costs for _____

	(1)	(2)	(3)
A	Total Capital Costs		
			Form 2, S5
B	Total Annual Capital Costs		
			Form 2, S9
	Total Annual Operating Costs		
C	Vehicle Costs		
		Form 3a, L8	
D	Building/Medical/Communicationss/Liability Insurance		
		Form 3b, K8	
E	Personnel/Benefits		
		Form 3c, N8	
F	"Other Expenses"		
		Form 3d, M8	
G			
			Sum (C2:F2)
H	Total Annual Capital & Operating Costs		
			B2 + G2

Appendix C

Form 5a. EMS System Revenues - Estimated User Fee Per Call for _____

Transported Calls

Emergency Calls _____

Non-Emergency Call _____

Total Transported Calls _____

EMERGENCY CALLS — Estimated User Fee Per Call

Emergency Calls _____	100 %							
Collections at	90 %							
Collections at	80 %							
Collections at	70 %							
Collections at	60 %							
Collections at	50 %							
Collections at	40 %							

NON-EMERGENCY CALLS — Estimated User Fee Per Call

Non-Emergency Calls _____	100 %							
Collections at	90 %							
Collections at	80 %							
Collections at	70 %							
Collections at	60 %							
Collections at	50 %							
Collections at	40 %							

Appendix C

Form 5b. EMS System Revenues - Estimated Mileage Fees for _____

Total Loaded Miles _____

Mileage Fees

For One-Way Miles	_____						
Gross Revenues	100%						
Collections at	90%						
Collections at	80%						
Collections at	70%						
Collections at	60%						
Collections at	50%						
Collections at	40%						

Appendix C

Form 5c. EMS System Revenues - EMS District Mills for _____

School District	Total Net Valuation	One Mill	Two Mills	Three Mills
School District A	_____	_____	_____	_____
School District B	_____	_____	_____	_____
School District C	_____	_____	_____	_____
School District D	_____	_____	_____	_____
School District E	_____	_____	_____	_____
School District F	_____	_____	_____	_____
School District G	_____	_____	_____	_____
School District H	_____	_____	_____	_____
School District I	_____	_____	_____	_____
Total	_____	_____	_____	_____

Appendix C

Form 5d. EMS System Revenues - Sales Tax for _____

City	Sales Subject to Sales Tax	Sales Tax Rates ¼¢	½¢	¾¢	1¢	1¼¢	1½¢	1¾¢	2¢
City A									
City B									
City C									
City C									
City D									
City E									
Totals									

Appendix C

Form 6. EMS System - Possible Funding Options for _____

ALTERNATIVE 1 Funding Option #1		ALTERNATIVE 2 Funding Option #1	
Costs:		Costs:	
Total Annual Capital & Operating Expenses	_____	Total Annual Capital & Operating Expenses	_____
	Form 4, H3		Form 4, H3
Revenues:		Revenues:	
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
Total Revenues		Total Revenues	
Difference	_____	Difference	_____

APPENDIX D.

BLS Case Study Call Tables

Appendix D

An Analysis of EMS Calls for the BLS Case Study EMS System

The Case Study community and surrounding area is serviced by the BLS Case Study EMS. The EMS system is currently a volunteer system. In order to provide more timely and cost effective service to the Case Study EMS service area, an analysis of the Case Study EMS calls is being included in this report.

Through this analysis, the Cooperative Extension Service is not advocating any of the alternatives presented. This report is not in the form of a recommendation. This report is provided for informational purposes only.

An Analysis of the BLS Case Study EMS Calls for 2001

Data was provided by the BLS Case Study EMS that is currently providing EMS services to Case Study and the surrounding area. EMS call data is for the 2001 year and is summarized in the next ten tables.

To summarize the call data, the BLS Case Study EMS system received 276 calls (**Table 1**). The majority of the calls (189 call, 68.5%) were received between the hours of 8 a.m. and 8 p.m. (**Table 2**). The majority of the calls (204 calls) had the initial response mode of emergency (82.9%) and the 167 transported calls from the scene had the majority response mode of non-emergency (77.2%), as shown in **Table 3**. The median elapsed response time per call was 10 minutes, while the median total time per call was 117 minutes (**Table 4**). Of the 276 total calls, there were 242 calls that originated in the category of Cities/Towns and 29 calls from Hospitals (**Table 5**). The majority of EMS calls were for medical illness (130 calls, **Table 6**). Of the 130 medical illness calls (**Table 7**), it was estimated that 63 calls (48.5% of the medical illness calls) may have needed paramedic level service (**Table 8**). The majority of call destinations was

Appendix D

Hospitals (145 calls, 86.8%) from **Table 9**. From the date in **Table 10**, the highest percentage of patients was in the age range of 20 - 29 (19.6%) and the patients age 60 and over accounted for 94 calls or 39.2% of total calls.

Table 1
BLS Case Study EMS
EMS Calls for 2001
Type of EMS Calls

Type of Call	Number of Calls	Percent of Calls
Transports	145	52.6%
Transfers	22	8.0%
Cancelled Calls	8	2.9%
Refused Treatment	34	12.3%
Treated, No Transport Calls	31	11.2%
False Calls	1	0.4%
Treated, Transported by P.O.V.	6	2.2%
No Patient Found	2	0.7%
Mutual Aid	2	0.7%
Standby	0	0.0%
Community Service	18	6.5%
D.O.A.	7	2.5%
Total	**276**	**100.0%**

Appendix D

Table 2
BLS Case Study EMS Calls for 2001
EMS Calls by Day of the Week and Time of Day

Time of Day →	Midnight - 7:59 AM	8:00 AM 3:59 PM	4:00 PM 7:59 PM	8:00 PM 11:59 PM			
Day of Week ↓					No Report	**Total Calls**	Percent of Calls
No Report	0	0	0	0	0	0	0.0%
Sunday	5	15	11	3	2	36	13.1%
Monday	3	18	7	3	1	32	11.6%
Tuesday	5	18	6	7	4	40	14.5%
Wednesday	1	28	9	6	1	45	16.3%
Thursday	6	17	10	10	1	44	15.9%
Friday	3	23	11	5	5	47	17.0%
Saturday	7	13	3	8	1	32	11.6%
Total	**30**	**132**	**57**	**42**	**15**	**276**	**100.0%**
Percent of Calls	10.9%	47.8%	20.7%	15.2%	5.4%	100.0%	

Appendix D

Table 3

BLS Case Study EMS Calls for 2001
Emergency vs. Non-Emergency EMS Calls,
Initial Response Mode and From Scene Response Mode

	Initial Response Mode[a]		From Scene Response Mode[b]	
	Number	Percent	Number	Percent
Emergency	204	82.9%	38	22.8%
Non-Emergency	42	17.1%	129	77.2%
Totals*	**246**	**100.0%**	**167**	**100.0%**

[a] "Initial" Response Mode reflects total calls minus community service calls (18), cancelled calls (8), and walk-ins (4).

Table 4

BLS Case Study EMS Calls for 2001
Response Times

Response Time → / Response Mode ↓	Median Elapsed Time (Minutes)	Reported Calls	Possible Number of Calls	Percent of Reported Calls
Received Enroute	4	240	258	93.0%
To Scene	3	232	251	92.4%
At Scene	16	230	248	92.7%
To Destination	25	167	167	100.0%
At Destination	76	163	167	97.6%
Median Response Time	10	230	248	92.7%
Median Total Time Per Call	117	222	258	86.0%

Appendix D

Table 5
BLS Case Study EMS Calls for 2001
Call Origination Locations

Locations	Number of Calls	No. of Calls by Category	Percent of Calls	Percent by Category
Hospitals				
City A - Case Study Memorial Hospital	24		8.7%	
City B – City B Regional Hospital	2		0.7%	
City C Area Hospitals	3		1.1%	
Subtotal		**29**		**10.5%**
Doctor's Offices				
City A, Case Study County	1		0.4%	
Case Study, Case Study County	3		1.1%	
Subtotal		**4**		**1.5%**
Other Medical Facilities				
Cancer Research Center, City D	1		0.4%	
Subtotal		**1**		**0.4%**
Cities/Towns				
City E, Town County	1		0.4%	
City A, Case Study County	1		0.4%	
City F, City County	9		3.2%	
City G, Case Study County	4		1.4%	
Case Study, Case Study County	227		82.2%	
Subtotal		**242**		**87.6%**
Total	**276**	**276**	**100.0%**	**100.0%**

Appendix D

Table 6
BLS Case Study EMS Calls for 2001
Type of Incident

Type of Call	Number of Calls	Percent of Calls
Assault	7	3.2%
All Terrain Vehicle (ATV)	2	0.9%
Bicycle	3	1.4%
Bite/Sting	0	0.0%
Ejection	0	0.0%
Electrical	0	0.0%
Explosion	0	0.0%
Fire/Burn	8	3.6%
Motorcycle	1	0.5%
Motor Vehicle Collision (MVC)	32	14.1%
Vehicle Rollover	12	5.4%
Pedestrian	1	0.5%
Shooting	1	0.5%
Stabbing	1	0.5%
Near/Drown	0	0.0%
Occupant (Death)	0	0.0%
Significant Fall	14	6.4%
Medical Illness	130	58.9%
Other Trauma	9	4.1%
Total	**221**	**100.0%**

A total of 221 calls were reported out of a possible 225 calls.

Appendix D

Table 7
BLS Case Study EMS Calls for 2001
Medical Illness Summary of EMS Calls

Medical Condition	Number of Calls	Percent of Calls
Abdominal Pain	7	5.4%
Airway Obstruction	0	0.0%
Allergic Reaction	0	0.0%
Behavioral	1	0.8%
Breathing Difficulty	29	22.3%
Cardiac Arrest	1	0.8%
Cardiac Symptoms	4	3.1%
Chest Pain	17	13.1%
Cerebral Vascular Accident (CVA)	3	2.3%
Dehydration	0	0.0%
Dizziness	3	2.3%
Gynecological	0	0.0%
Hypertension	0	0.0%
Hypo/Hyperglycemia	4	3.1%
Hypo/Hyperthermia	3	2.3%
Nausea/Vomiting	3	2.3%
Obstetrical	2	1.5%
Pain	5	3.8%
Paralysis	1	0.8%
Poisoning/Ingestion	2	1.5%
Respiratory Arrest	2	1.5%
Seizure	5	3.8%
Shock	0	0.0%
Unconscious	5	3.8%
Weakness	3	2.3%
Other	30	23.2%
Total	**130**	**100.0%**

Appendix D

Table 8
BLS Case Study EMS Calls for 2001
Summary of Reported Medical Conditions that
May Indicate Need for Paramedic Level Service

Paramedic Level Medical Condition	Number of Paramedic Level Calls	Percent of Paramedic Level Calls
Breathing Difficulty	29	46.1%
Cardiac Arrest	1	1.6%
Cardiac Symptoms	4	6.3%
Chest Pain	17	27.0%
Cerebral Vascular Accident (CVA)	3	4.8%
Hypertension	0	0.0%
Hypo/Hyperglycemia	4	6.3%
Seizure	5	7.9%
Shock	0	0.0%
Total	**63**	**100.0%**

Of the 130 medical illness calls, 63 calls (48.5%) indicated paramedic level service.

Appendix D

Table 9
BLS Case Study EMS
EMS Calls for 2001
Call Destination Locations

Destination of Calls	Number of Calls	No. of Calls by Category	Percent of Calls	Percent by Category
Hospitals				
City A - Case Study Memorial Hospital	86		51.5%	
City B - City B Regional Hospital	47		28.1%	
City D - Southwestern Medical Center	2		1.2%	
City H - City H Regional Hospital	1		0.6%	
City C Area Hospitals	9		5.4%	
Subtotal		**145**		**86.8%**
Retirement/Nursing Home, Assisted Living				
City A - City A Nursing Center	1		0.6%	
City A - Springs Nursing Home	2		1.2%	
City J - Sterling House	1		0.6%	
City I - City I Nursing Home	1		0.6%	
Subtotal		**5**		**3.0%**
Doctor's Office				
City C	1		0.6%	
Subtotal		**1**		**0.6%**
Other Medical				
City D - Cancer Research Center	1		0.6%	
Subtotal		**1**		**0.6%**
Residences				
City A, Case Study County	1		0.6%	
City G, Case Study County	1		0.6%	
Case Study, Case Study County	13		7.8%	
Subtotal		**15**		**9.0%**
Total	**167**	**167**	**100.0%**	**100.0%**

Appendix D

Table 10

Case Study EMS EMS Calls for 2001

EMS Calls by Age and Gender of Patient

	Unavailable		Female		Male		Total	
Age Group	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Unavailable	1	0.4%	0	0.0%	2	0.8%	3	1.2%
19 and Under	0	0.0%	17	7.1%	21	8.7%	38	15.8%
20 - 29	0	0.0%	11	4.6%	36	15.0%	47	19.6%
30 - 39	0	0.0%	13	5.4%	11	4.6%	24	10.0%
40 - 49	0	0.0%	10	4.2%	8	3.3%	18	7.5%
50 - 59	0	0.0%	6	2.5%	10	4.2%	16	6.7%
60 - 64	0	0.0%	4	1.7%	6	2.5%	10	4.2%
65 - 69	0	0.0%	14	5.8%	4	1.7%	18	7.5%
70 - 79	1	0.4%	15	6.3%	12	5.0%	28	11.7%
80 +	0	0.0%	26	10.8%	12	5.0%	38	15.8%
Totals	**2**	**0.8%**	**116**	**48.4%**	**122**	**50.8%**	**240**	**100.0%**

APPENDIX E.

Resources

Appendix E

Resources

For additional information on specific EMS system components or EMS system development in Oklahoma, contact the following:

Oklahoma State Department of Health
Emergency Medical Services Division
1000 NE Tenth
Oklahoma City, Oklahoma 73117-1299
405-271-4027

Oklahoma Cooperative Extension Service
Department of Agricultural Economics
Oklahoma State University
513 Ag Hall
Stillwater, Oklahoma 74078
405-744-6081

Publications

Statutes and Regulations
Oklahoma State Department of Health
Protective Health Services
Emergency Medical Services
1000 N.E. 10th
Oklahoma City, OK 73117-1299
July, 2002

Training

For additional information on training in Oklahoma, contact the following:

Oklahoma Department of Career and Techonology Education
Communications and Marketing Office
1500 West 7th Ave.
Stillwater, OK 74074
405/377-2000 Fax: 405/743-5541
Website: www.okcareertech.org

Oklahoma State University
Fire Protection and Safety Technology
303 Campus Fire Station
Stillwater, OK 74078-4082
405/744-5721 Fax: 405/744-6758
Website: fpst.okstate.edu

Government Agencies

Environmental Protection Agency (EPA)
401 M St. S.W.
Washington, DC 20460
202/260-2090
Web: www.epa.gov

Federal Emergency Management Agency
Emergency Management Institute
16825 S. Seton Ave.
Emmitsburg, MD 21727
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