National Emergency Training Center
16825 S. Seton Avenue
Emmitsburg, MD 21727-8998

FEMA

R0151

Dear National Fire Academy Student:

By now you should have received your acceptance email notification from the National Emergency Training Center (NETC) Admissions Office for this course. If you have not, you are not enrolled in this course.

Congratulations on your acceptance into the U.S. Fire Administration's/National Fire Academy's (USFA's/ NFA's) *Advanced Leadership Issues in Emergency Medical Services* (ALIEMS) course. This course offers you the chance to explore many of the latest issues facing the current leaders of pre-hospital emergency care. You will be provided with the research and theory on Emergency Medical Services (EMS) leadership, with ample opportunity to practice and observe effective EMS leadership and management skills.

This course utilizes a performance-based model that promises a challenging and demanding approach to learning. In order to enhance your learning experience, some preparation is necessary. Prior to the first day of class, please read the four enclosed articles on leadership. Familiarity with the contents of these articles will enable you to more effectively participate in the first day's discussion on EMS leadership.

Please bring a copy of your organization's mission statement. You will be given a copy of the National Highway Traffic Safety Administration's "A Leadership Guide to Quality Improvement for Emergency Medical Services Systems" during class. You can download this guide from the Internet (http://www.nhtsa.dot.gov/people/injury/ems/leaderguide/) if you would like to review it before class. Feel free to bring any written materials, i.e., procedures, protocols, etc., to share with other students. We ask that these items be in an electronic format on a CD, and in Microsoft Word format. There will not be an opportunity to photocopy these items due to the limitations on NFA's reproduction resources.

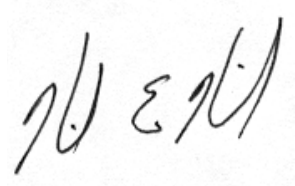
End-of-class graduation ceremonies are an important part of the course, and you are expected to attend. Please do not make any travel arrangements to leave campus until after you and your classmates graduate.

The course materials for this course are now available in a Bring Your Own Device (BYOD) format which will function on any electronic device. If you own an electronic device (laptop computer, tablet, etc.) and are familiar with its document reader functions, we are asking you to download the Student Manual (SM) **before you travel to Emmitsburg** and bring the preloaded device with you. Please see the page following this letter for complete instructions on successfully downloading your course materials. Please note: If you plan to bring/use an iPad, you may experience issues saving/storing/printing course assignments since there is no USB/thumb drive capacity for these devices.

For your information, the NFA classroom environment is PC based. As increasing numbers of students and instructors are bringing laptop computers or other electronic devices to campus you alone are responsible for the security and maintenance of your equipment. The Academy cannot provide you with computer software, hardware, or technical support to include disks, printers, scanners, etc. Classrooms are outfitted with surge protectors at each table for your convenience. Thumb drives or external hard drives used to bring course materials to class cannot be connected to FEMA property without being scanned for viruses. Due to time limitations for scanning, these devices cannot be larger than 8 GB. Anything over this amount will not be scanned and cannot be used. A Student Computer Lab is located in Building D and is available for all students to use. It is open daily with technical support provided in the evenings. This lab uses Windows 7 and Office 2013 as the software standard.

Should you need additional information related to course content or requirements, please feel free to contact Mr. Michael Stern, Emergency Medical Services Curriculum Training Specialist, at (301) 447-1253 or email at michael.stern@fema.dhs.gov.

Sincerely,



Dr. Kirby Kiefer, Acting Superintendent
National Fire Academy
U.S. Fire Administration

Enclosures

National Fire Academy Bring Your Own Device (BYOD)
Course Materials/Download Instructions

The **first step** is to download ADOBE Reader to your device. This will enable you to read and manipulate the course materials. ADOBE Reader can be used to comment and highlight text in Portable Document Format (PDF) documents. It is an excellent tool for note-taking purposes.

For Laptops and Computers

ADOBE Reader can be downloaded from www.adobe.com/downloads/. It is a free download. Please note that depending on your settings, you may have to temporarily disable your antivirus software.

For Tablets and Other Similar Hand-Held Devices

ADOBE Reader can be downloaded onto devices such as iPads, android tablets, and other hand-held devices. ADOBE Reader for these types of devices can be found in the device's Application Store using the search function and typing in "ADOBE Reader." Follow the instructions given. **It is a free application.** Note: In order to have the editing capabilities/toolbar, the document needs to be "opened with ADOBE Reader." There should be a function on your device to do this.

After you have successfully downloaded the ADOBE Reader, please use the following Web link to download your R0151, *Advanced Leadership Issues in Emergency Medical Services* (ALIEMS) Student Manual (SM). (You may copy/paste this link into your Web browser.)

http://nfa.usfa.dhs.gov/ax/sm/sm_r0151.pdf

Note: Please make sure you download the ADOBE Reader first. To open the SM, you will need to open the ADOBE Reader and then open the SM through the ADOBE Reader in order for the note-taking tools to work properly.

If you need assistance, please contact nfaonlinetier2@fema.dhs.gov.

MODULE 1: LEADERSHIP

Objectives:

Given a written evaluation, In-Basket, or group activity, the students will be able to:

1. Identify the 10 modern leadership functions and provide examples of behavioral changes that leaders must make to carry out those functions.
2. Identify and describe the behaviors characteristic of effective leaders.
3. Develop an organization vision statement and a personal mission statement.
4. Describe the strategies useful to gain commitment from employees to the leader's vision.
5. Apply teamwork principles to develop a consensus vision statement for the class.
6. Compare and contrast the consensus vision statement of the class with the Emergency Medical Services (EMS) Agenda for the Future.
7. Explain the value of having an organizational vision and mission statement.
8. Apply teamwork principles to develop consensus agreement.
9. Create a plan to deal with a specific issue or specified change, using a model and a tool presented in the class.

LEADERSHIP FUNCTIONS

Specific functions that are becoming more common in the roles of modern organizational leaders include

- **Visioning**: Developing a statement that commits the organization and its services and products to total customer satisfaction and the highest possible standards of quality, productivity, and continuous improvement.

- **Leading through commitment**: Moving away from directing and controlling to building work environments that encourage people to try to do their very best always.

- **Satisfying the customer**: Maintaining continuous contact with internal and external customers and responding to their needs to build total satisfaction.

- **Coaching**: Controlling less and helping more. Working personally with individuals and teams in resolving performance-related problems, teaching new knowledge or skills, supporting performance, and adjusting performance.

- **Developing human resources**: Demonstrating the commitment, the knowledge, and the skills to develop the potential and careers of coworkers.

- **Leading teams**: Helping teams form, organize, and develop their full potential. Facilitating team meetings and helping teams create their own identities.

- **Managing work processes**: Understanding the end-to-end operations of work processes for which one is responsible. Demonstrating the knowledge and skills required to measure and improve these processes.

- **Managing change**: Anticipating and understanding the sources and processes of change; helping one's organization use change as an opportunity to improve performance.

- **Managing projects**: Demonstrating the competencies required to plan and manage special projects to meet specific administrative, production, and improvement needs of the organization.

- **Measuring performance**: Understanding the key elements in developing a performance measurement plan, identifying the opportunities for measuring organizational performance, and applying this understanding to one's organization.

THE IMPORTANCE OF LEADING WITH VISION

Leaders who lead without a vision of what their organizations are to become doom their organizations to function according to mere tradition. Without a vision of the organization's future, leaders are reduced to keeping things the way they always have been; they are guided by the saying, "If it ain't broke, don't fix it." As a result, these organizations, and the personnel who work for them, cannot prosper and grow.

True leaders do things differently. They live by the saying, "If it ain't broke, you're not looking in the right place." Realizing that there is always room for improvement, they believe that no one has ever done anything so well that it cannot be done better. For true leaders, a vision is not a dream; it is a reality that does not yet exist. The vision is tangible to these leaders; their confidence in, and dedication to, the vision is so strong they can devote long hours over many years to bring it into being. In this way, a vision acts as an internal force, compelling a leader to action. It gives a leader purpose, and the power of the vision and the leader's devotion to it work to inspire others.

VISION--A DEFINITION

What is vision? Vision is difficult to define because it functions at many levels. A simplistic definition of vision is the overarching direction for the future of an organization or program. Leaders with vision are able to take the present as it is and formulate a future that grows out of it and improves upon it. A vision is a target toward which a leader aims his/her resources and energy. The constant presence of the vision keeps a leader on track despite obstacles such as practical difficulties, fear of failure, negative attitudes of superiors, peers, or employees, or problems in the industry. Most important, when shared by employees, a vision can keep an entire organization moving forward in the face of adverse circumstances. Moving toward the same goal, employees work together rather than as disconnected individuals who just happen to work for the same company.

When employees understand a leader's vision, they understand what the organization is trying to accomplish and what it stands for. The vision serves as a unifying force, giving direction to each employee's actions because his/her individual efforts can be checked against it. Each employee can see what the future holds as a rational extension of the present.

In essence, the role of the leader is to give employees a sense of purpose and direction--a meaningful reason behind the work they do. Through their visions of the future, true leaders can lift employees out of the monotony of the daily work world and put them into a new world full of opportunity and challenge. This is why leaders are so critical to the success of an organization. They have the ability to see through all the confusion in the workplace and focus on what matters. A vision helps leaders and employees keep the frustrations of the workplace in perspective, enabling them to live with uncertainty in the short term because they can visualize success in the long term.

COMMUNICATING THE VISION

Leaders must communicate their vision to others for it to become a shared vision. To accomplish this, leaders must first act in a manner consistent with the vision in everything they do. They must set a personal example; they must not send mixed signals by saying one thing and doing another.

Next, leaders must stress the importance of the vision so that people will take an interest in it. If employees believe the vision is important and worthwhile, many of them will want to be involved with it, even if they do not understand the details. Delivering a single, clear, and credible message is important in helping people to understand and buy into organizational goals and objectives. To communicate clearly and reinforce the vision, it is necessary to send frequent and simple messages that focus on the core values and beliefs that support the vision.

Symbols and rituals are effective ways to simplify rich and complex messages. Through symbolization, large amounts of complex information such as formal and informal organizational rules and values, situational information, emotional content, and other apparently unrelated data can be integrated succinctly and represented. For example, executives do not have to express their gratitude toward a retiring partner explicitly if they organize a reception, invite his or her friends, and offer a gift. The whole package symbolizes their recognition of the partner's contribution. Through the use of symbols and rituals, leaders can express their vision for the organization in a manner which is easily understood and remembered.

GAINING COMMITMENT

After a vision has been explained simply and directly, people must decide whether they want to be a part of it. If they don't, they cannot be forced to support the vision over a long period of time without considerable cost to the organization. The day has nearly passed when autocratic leaders can succeed over the long term; the cost of using this approach is too high in terms of the inferior output resulting from poor quality effort, lost employee loyalty and support, and money. Moreover, forcing people to do things they do not want to do requires a great deal of energy over the long term--more energy than most people can afford to expend.

Most people are not motivated by being pushed. They are motivated by the desire to satisfy their own basic human needs: achievement, belonging, recognition, self-esteem, control over their lives, and the sense of having lived up to their ideals. Leaders must connect with these human needs and let people become excited about a vision. To be successful, leaders must respond to the ideas that rise out of the organization. Leaders must involve people in deciding how to achieve the vision, allow them to improve it, and recognize and reward them for their contributions.

Although a vision may be the work of one person, the more people who feel that they personally helped shape the vision, the more people who will be loyal to the vision. Having helped preside over its birth, employee midwives become proud parents who champion the vision. The leader's vision becomes their vision. Simply put, involvement creates ownership.

Even when the original vision is created solely by the leader, a shared vision can still result. But the leader must allow others to influence the implementation of the vision. When others can influence key decisions, they benefit from the resulting feelings of achievement and accomplishment. They feel responsible for the vision's realization. Personal feelings of success then become intertwined with the vision's success, and once this happens, a shared destiny exists. Loyalty to the vision, loyalty to the organization, and loyalty to oneself become fused. Leaders may come and go, but the commitment to the vision remains. Loyalty to the organization grows, because it is the vehicle by which the vision is attained and personal feelings of accomplishment are achieved. As the Chinese sage, Lao-Tse, wrote 25 centuries ago, "A leader is best, when people barely know he exists. When his work is done, his aim fulfilled, people say, 'We did this ourselves.'"

Following is the vision statement from the EMS Agenda for the Future. Review it in context of what you have just read.

EMS AGENDA FOR THE FUTURE

Making It A Reality

A vision for EMS in the next millennium:

Emergency medical services (EMS) of the future will be community-based health management that is fully integrated with the overall health care system. It 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. It 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.

U.S. Department of Transportation, National Highway Traffic Safety Administration, DOT HS 808 441 August 1996 NTS-41

Organizational Mission

The mission of an organization identifies the purpose of the organization. It should include the specific tasks that allow the organization to accomplish the vision. One of the most important and, often one of the most difficult aspects of the strategic planning process, is the development of a mission statement that briefly and clearly states the reasons for an organization's existence. The mission statement should include the organization's purpose(s)/function(s), its primary customer base, and the primary methods it will use to fulfill the purpose. The mission statement provides the context for formulating the strategies by which the organization will operate. It determines how resources will be allocated by the organization and what the general pattern of growth and direction will be for the future. The primary purpose for having a mission statement is to bring clarity of focus to members of the organization. It should provide members with an understanding of how what they do is tied into the organization's purpose.

FORMULATING THE MISSION STATEMENT

The mission statement must complement the organizational values. The mission statement should address four basic elements (see Figure 1):

- What services does the organization offer?
- Who are the recipients of the services?
- How does the organization deliver the services?
- Why does the organization exist?

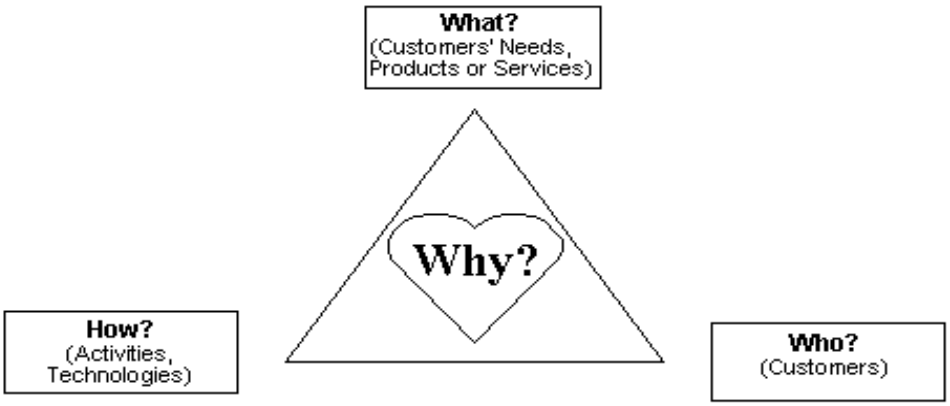


Figure 1
Four Basic Elements of the Organizational Mission

What

"What" involves defining the needs that the organization is attempting to fill. An organization must expand the definition past just services it provides and focus on the customers' needs.

Successful organizations try to identify services that meet the needs of the public and include these considerations. Achieving consensus on how broadly or narrowly to answer the "what" question can be a major issue in formulating the mission statement.

Who

"Who" identifies the customers the organization is attempting to serve. No organization, regardless of size, is large enough to meet the needs of all possible customers.

An EMS organization can identify its customers in many ways: by geography, age, ethnicity, etc. An organization can identify its customers by single or multiple factors, for example, geographic density of calls and collection rate by payer mix. Clarity about its customers enables the organization to be more sensitive to their needs and to focus its resources.

How

"How" defines the organization's methods for achieving its goals. For example, what level of service (Basic Life Support (BLS), Advanced Life Support (ALS), first response, transport) will be used in meeting the needs of its customers. This may involve a distribution strategy, such as providing injury prevention programs.

Why

"Why" an organization provides the services that it does frequently is important to define for both profit-oriented and not-for-profit organizations. Many organizations feel the need to include some simple statement regarding "why" as part of their mission statements. It appears in the center of the diagram in Figure 1 on SM p. 1-7.

DRIVING FORCES

Identifying and prioritizing the forces that drive the organization are important in developing the mission statement. Based on experience, an organization approaches strategic questions with these forces in mind. These forces help to determine and integrate the strategic choices of the managers. These forces may include

- services offered;
- customers served;

- technology used;
- method of delivering services; and
- financial stability.

This list of forces is not intended to be complete. The forces for each organization should be determined by a strategic planning team. Once they are determined, they should be prioritized in order of their perceived importance. Most major strategic decisions that organizations make involve the allocation of resources according to a set of priorities. If there are inadequate resources, the ranking of the forces that have been identified can determine how resources will be allocated or which direction the organization will pursue.

ORGANIZATIONAL ATTRIBUTES

Developing the mission statement also should include identifying those attributes the organization has that set it apart from its competitors. What services do they alone offer? Distinct attributes may involve specialty services, alternative transport, or injury prevention programs.

Once the basic elements are addressed and the organization's driving forces and distinctive attributes are identified, they can be integrated into the organization's mission statement. The mission statement should be brief and identify the organization's basic service clearly. A well-written mission statement helps the organization develop its course of action and provides a guide for making routine day-to-day decisions. Once the mission statement is written, it is critical that all members of the organization know and understand it.

MISSION FORMULATION IN ORGANIZATIONAL SEGMENTS

Once an overall mission statement has been developed for an organization, mission statements that are more specific and concrete should be developed for various divisions of the EMS organization such as training or the Public Information, Education, and Relations (PIER) office. Division mission statements should be more focused and more limited than that of the total organization, but they must be derived from the organizational mission statement.

DEALING WITH ISSUES AND CHANGE

It has been said that Christopher Columbus defined bureaucracy while discovering America, i.e., he didn't know where he was going, he wasn't sure how he was going to get there, and he didn't recognize it once he arrived. Unfortunately, the same often can be said for fire service organizations--especially when they are called upon to face the ever-changing issues and the demand for change common to all modern organizations.

Functions of leaders include dealing with issues and managing changes. Dealing with issues and managing changes both involve a systematic process that has four stages: analysis, planning, implementation, and evaluation.

Analysis involves analyzing the existing situation and assessing the changes that need to be made. In this stage, an overall needs assessment is performed.

Planning involves using the information gathered during analysis to formulate a plan designed to address the issue or bring about the desired change. The goal of planning is to translate the requirements identified in the analysis stage into detailed, strategically sound plans. The planning phase generally involves developing a vision of the solution or end result, and defining goals, objectives, methods, and strategies to achieve the desired results.

Implementation involves executing the strategies identified in the planning stage. It is in this stage that unanticipated difficulties are most likely to occur.

Evaluation involves continuously and systematically monitoring the implemented plan to ensure that it is working as anticipated. Whether an approach is working can be determined by evaluating the effects of the implementation against the goals and objectives set out in the plan. Evaluation may take a variety of forms depending on the implementation approach. It is important that the evaluation tools selected allow for early detection of problems. If problems with the plan are detected or if the plan is not working as anticipated, the approach must be adjusted or the plan must be revised.

Several tools are available to facilitate the entire process necessary in dealing with an issue or managing change. These tools include the Project Planning Process and the Change Management Model. In addition, there are tools to facilitate various parts of the process, such as the "SWOT analysis" (strengths, weaknesses, opportunities, threats) and strategic planning. These tools are explained in detail in various National Fire Academy (NFA) courses, and are provided in an overview form below.

The Project Planning Process

The Project Planning Process is designed to manage the development and implementation of specific processes/issues within the organization. An example would be determining a plan to update EMS providers on new protocols. This process is used in NFA's current *Management of EMS* (MEMS) course.

The Change Management Model

The Change Management Model is designed to facilitate a smooth and effective modification or addition of new processes or operations. The Change Management Model uses separate teams for analysis and implementation, and could be used to manage

the relocation of EMS units within a system or increase the number of ALS units in a department effectively. The Change Management Model is used in NFA's current *Strategic Management of Change* course.

Strengths, Weaknesses, Opportunities, Threats Analysis

The strengths, weaknesses, opportunities, and threats (SWOT) Analysis is one tool that can be used to address some of the aspects necessary for a thorough analysis. It is used to identify the strengths, weaknesses, opportunities, and threats to an organization with respect to a current issue. SWOT Analysis is used in the NFA's *Executive Leadership* course.

Strategic Planning

The Strategic Planning Process incorporates the SWOT tool for analysis and provides guidance for the planning stage. The Strategic Planning Process could be used to determine a vehicle replacement schedule over a 20-year period. Strategic Planning is used in the NFA's *Executive Planning* course.

Appendix C of this manual contains graphic and/or abbreviated descriptions of each of the tools discussed in this section. You should refer to any or all of these tools to assist you in completing exercises during this course.

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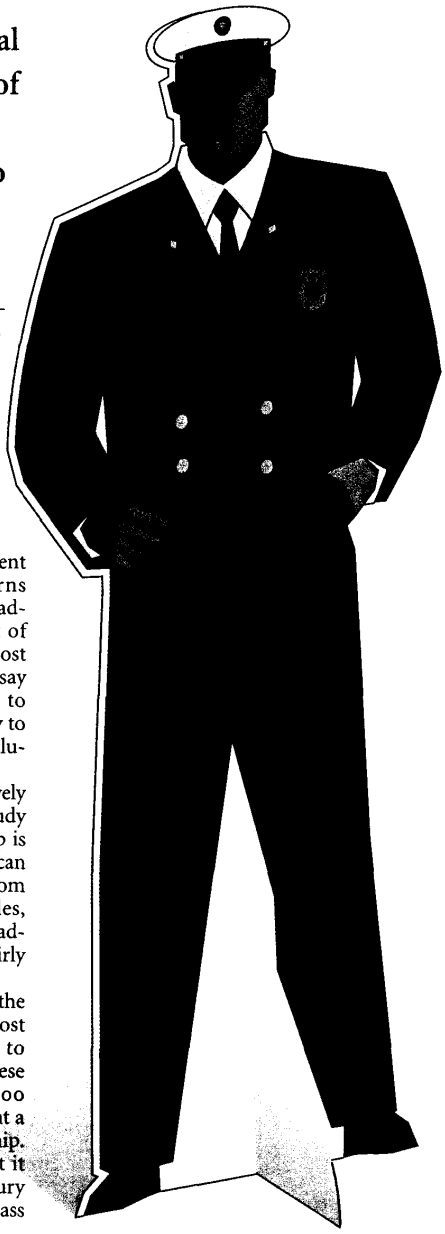
Leadership: Fact or fiction?

The future of the fire service hinges on effective, entrepreneurial leadership. How many of these seven keys to successful leadership do you hold?

By Kevin Brame, Chief Training Officer
Orange County (Calif.) Fire Authority



Leadership: Is it real or just a figment of the imagination? Is leadership merely marketing hype, or is there substance to the increasing popularity of leadership writings and teachings? Is leadership really just management wearing a different guise, or is it something altogether different from traditional management concepts? Leadership: What is it, really?

These and other questions represent the many ideas and concerns addressed in the growing field of leadership study. The interesting part of these questions is that if you ask most people if leadership is real, they'll say yes. However, when you ask them to define leadership, their answers vary to the point of being vague and inconclusive.

The study of leadership is a relatively new discipline. Compared to the study of medicine, for example, leadership is but a babe in the woods. While one can certainly derive leadership lessons from the classic works of Plato, Sophocles, and Machiavelli efforts to quantify leadership in modern society are still fairly new.

In his 1991 book "Leadership for the Twenty-First Century," Joseph C. Rost notes Bass' and Stodgill's efforts to develop a leadership handbook. These scholars compiled more than 4,700 leadership studies, yet did not present a single unified definition of leadership. In his own studies, Rost noted that it wasn't until the turn of the 19th century that any effort was made in world-class dictionaries to define the term leadership. Up to that point, leadership remained a vague notion behind the more definable terms of lead, leader and leading.

Proof of leadership

Over the years and through observations and readings, I've concluded that leadership is in fact real, even though definitions can be drastically different. "In the eye of the beholder" is probably a more appropriate approach to trying to define what leadership is or is not. Still, there are some common threads that can help tie together thinking about leadership.

First, from a purely academic view, most of the empirical studies of leadership conclude that it involves so many variables that it's nearly impossible to capture a single unified meaning.

In his writings, James MacGregor Burns noted that although leadership is one of the most observed and studied fields, it remains one of the least understood. He also argued that for all we know about leaders, we know far too little about leadership: We've failed to grasp the essence of leadership in modern society.

So the first common thread is that leadership definitions by their very nature will be vague to one person or industry and precise to another. This concept then allows for the exploration of leadership from unique personal or organizational perspectives.

The second common thread is

founded on the first. If you accept the notion that leadership means different things to different people or organizations, then you recognize that leadership won't be defined in the empirical terms of a scientific approach, but rather in the abstract concept of an art. While efforts to define leadership in concise quantifiable terms are appropriate, the vast array of popular literature that tries to link leadership to personal thought and development is also valuable and substantive.

In his thoughtful writing "Leadership is an Art," Max DePree tries to define leadership in personal terms that are easily understood from an internal perspective and that point to the abstractness of art. He writes, "Leadership is an art, something to be learned over time, not simply by reading books. Leadership is more tribal than scientific, more a weaving of relationships than an amassing of information, and in that sense I do not know how to pin it down in every detail."

In comparing leadership to art, one can find things appealing in the most graphic of paintings or in the subtlest of watercolors. But in both cases, the appealing part is often found only through quiet reflection and introspection. As observers of art we know what we like. Although they're not always quantifiable, our likes and dislikes are still real.

7 keys to effective leadership

By now you're probably wondering how this applies the fire service. The answer lies in examining where our industry is headed and who's in the lead. The fire service, like any organization in our society, is looking for leadership. Burns puts this thought into a larger context by saying, "One of the universal cravings of our time is a hunger for compelling and creative leadership."

Arguably the best method for examining the leadership desires of our industry is to look at leadership from a personal perspective. In a 1982 address to the Western Academy of Management, Thomas E. Cronin presented a framework for such a process. His seven key ingredients for effective leadership may serve as useful tools to help you develop your personal concepts of where the fire service is headed and who's in the lead.

1) Leaders know who they are and where they're going. In an industry designed around a paramilitary structure, it's often difficult for people to differentiate position power from true leadership. Although wearing five bugles in and of itself doesn't constitute leadership, many think it does. This is the point when the old saying "Actions speak louder than words" is appropriate. Simply put, leadership is action, not position, rank, title, age, experience or any other limiting device.

To be decisive and action-oriented means that the leader must have a clear understanding of self and a sense of direction. An understanding of self is often the most difficult to achieve and maintain. To gain a comprehensive self-understanding, one must often look to others for observation and feedback.

In the National Fire Academy's Executive Fire Officer Program, a 360° evaluation process is used to provide critical feedback to students. The process incorporates self-ratings, as well as ratings from peers, subordinates and supervisors.

When the results are returned to the student, it's interesting to note changes in their facial expressions and demeanor. In many cases, the feedback is the first opportunity students have had to get real information about how others see them.

It's easy in rank-conscious organizations for position to overshadow true leadership. Chief officers must constantly remind themselves that rank has no place in the promulgation of leadership. If rank becomes a consequence of good leadership, then so be it. But all in all, development of leadership must start from within the person and not the badge.

If you have a solid understanding of self, then determining a sense of direction is easier. Take a moment and consider how many individuals you know who've been promoted through the ranks only to get to the top and have no clue of where to go from there. For many, their only direction is toward the retirement office. At the same time, our industry awaits compelling and creative leadership.

So do you know who you are and where you're headed? Besides a paycheck, what's your drive for coming to the fire station each day? Do you have a need for leadership that's being left unanswered? Are you willing to step out and provide that leadership? Before you say yes or no, stop and take a look inside. Organizational leadership must begin with personal leadership.

2) A leader selects important problems and mobilizes followers to overcome them. In traditional management training programs, significant effort is placed in defining and implementing various models of problem-solving. These are valuable efforts necessary for the conduct of efficient and effective best business practices.

However, what's often overlooked is how the problems are first identified. Then, once a plan is established, how do you effectively make the issue a passion to everyone? That's the point when leadership steps in and management becomes a tool of effective leadership.

The difficulty fire service leaders face in establishing priorities is that our industry breeds reactionaries. For the most part, our culture allows resources to lie in wait for a crisis to happen, although fire prevention and education is one area where we've been proactive. Overall, the fire service has been successful in reducing the number of fires and related deaths and injuries. The problem for fire service leadership is how to sustain those efforts. I don't know a fire department in this country that doesn't have growing pockets of apathy toward prevention efforts.

Apathy among followers is a terminal illness of effective leadership, and we as an industry have a problem. Take a moment and consider your department's efforts and success in Fire Prevention Week activities. Granted, success in this case is subjective, but one need only look two weeks later in October to see how our promotion compares to the enthusiasm and energy surrounding law enforcement's Drug Awareness Week.

Did you ever stop to think about the fact that we've significantly lost momentum in what used to be our shining month? I look around at all the grade schools in my community and

note that during Fire Prevention Week, we're generally lucky to get a one-liner in the PTA newsletter.

When faced with such a loss of enthusiasm, how does a leader sustain success and stay motivated, while helping others to do the same? Cronin suggests that the leader select important problems. Reading between the lines, leaders must stop worrying about the things they can't control and start working on those they can effectively influence. It means choosing battle lines on a map not because they're on the map, but rather because they're the right lines to choose.

A classic example of choosing the right problem for the right reason is found in the ongoing issue of EMS. Recently I presented this leadership topic at the IAFC Fire-Rescue Med conference. As expected, the public-versus-private banter was all around.

In quizzing a few of the attendees, I asked, "Why are you pursuing the public transport model?" Inevitably, the responses included the idea of generating revenue. Sadly in some cases, it was the first comment made.

The leadership issue derived from these responses: Are we doing it for the right reasons? Is battling for transportation rights our highest priority? How does this fit into where we're going as an industry? How do we sustain our enthusiasm for this effort over the long run?

Again, to be successful in leading this cause, we must have self-honesty. As leadership philosophers and students have said, managers do things the right way, but leaders do the right things.

3) Leaders have to provide the risk-taking and entrepreneurial imagination. Once the priority problems have been identified, the solutions usually aren't easy to come by. Effective solutions to complex problems, such as community fire protection, often require trial and error. Effective solutions also require imagination and the ability to think out of the box, and that often means taking risks.

Risk-taking is an important part of being an effective leader. Imaginative thinking requires the leader to step out of the office and perceive things that could be rather than things that are. This isn't easy for many, particularly in an military-structured industry with a lot of rank consciousness.

To be an entrepreneurial leader requires thinking that benchmarking is for someone else to do, because you're the benchmark. To be the benchmark and be willing to take risks means that you comprehend the seriousness of Cronin's first key ingredient. Leaders must have confidence in themselves and their organizations, which begins with knowing that they're doing the right things.

The imaginer and risk-taker is often the subject of ridicule and the infamous firehouse commentary. But the effective leader recognizes this and will use it to his advantage.

I recently heard some typical firehouse rhetoric about a chief in a metropolitan area who recognized two significant problems. The first was that some fire station conditions were deteriorating, and the second was that there was no money available to address the issue.

This chief stepped outside the box and established a coin collection program, placing "Friends of the Fire Department" collection jars at various retail stores in the community. For many volunteer agencies this may not sound risky, but in a metropolitan career department the idea was classified by many as absurd.

While the final results of the coin collection program won't be known for some time, the mere fact that the chief was willing to try something different says that the leadership in him won over the conservatism and status-quo proponents. To sustain an imaginative approach to issues faced, leaders such as this chief must be willing not only to be proponents of "why not," but must also nurture the same philosophy among their followers.

Failure to use imagination and out-of-the-box thinking can often lead to tragedy. A classic point of this lesson comes from the history documented in "From the Earth to the Moon," a recent HBO miniseries about the U.S. effort to put a man on the moon.

Leadership reading list

"C.Y.A. — Change Your Attitude," Tom Bay, 1997, Bay & Macpherson, Newport Beach, Calif.

"Address to the Western Academy of Management," Thomas E. Cronin, published in "To Lead or Not To Lead," 1995, Phi Theta Kappa, Jackson, Miss.

"Leadership is an Art," Max DePree, 1989, Dell Publishing, New York.

"Leadership for the Twenty-First Century," Joseph C. Rost, 1991, Praeger Publishers, Westport, Conn.

Following the tragic fire on the launch pad that killed three astronauts, a Senate hearing was conducted to look at the cause. When asked specifically what caused the tragedy, a respondent simply attributed it to "a lack of imagination."

Further questioning provided the detail that even with all the planners, scientists, technicians and astronauts, no one considered that there would be a fire on earth, so contingency plans only related to fires in space.

Whether true or not, the point of the matter is that imagination and entrepreneurial spirit can lead to seeing things outside the box. A leader's role is to be the one opening the doors to the outside and asking everyone to join him or her in the fresh air.

4) Leaders need a sense of humor and a sense of proportion. Laughter *is* the best medicine. Leadership is a serious business, but not one that requires the leader to be without laughter.

Often in the fire service, we're accused of being cold or callous because of what some perceive as gallows humor. The reality is that we often look for the humorous points in life so we can survive the serious times. It also indicates that leaders are human and with that goes the possibility of snafus. I for one don't want to be led by someone who can't take a step back and laugh at him or herself.

Effective leaders use the human side of leadership to gain support and respect for their role by not trying to hide behind a mask of seriousness. Contrary to some beliefs, no one goes through life without at least one or two screw-ups. The effective leader capitalizes on those events by learning from them and demonstrating that even those in the lead can have a bad day. Humor provides the leader the opportunity to express humanity, vitality and resilience.

Humor provides another opportunity that's truly critical to effective leadership: a sense of proportion. Through a sense of self, the true leader has an understanding of his or her worth to the industry, the community and family.

All too often, people in supposed leadership positions fail to remember where they came from. Many also forget that someone was in the seat before them and someone will be in their chair when they leave. The chief who fails to recognize these limits may at some point have the opportunity to find a position in the unemployment line.

A classic analogy to make my point was brought to my attention by Tom Bay, a speaker and co-author of the book "C.Y.A. — Change Your Attitude." He describes the image of a hand being placed inside a bucket of water. The analogy is that your hand represents you, and the water represents your organization. As you're inserted in your organization, the water is displaced around you so that your hand can be accommodated and then the organization fills in all around you.

In an industry designed around a paramilitary structure, it's often difficult for people to differentiate position power from leadership.

Now imagine removing your hand. What happens? The water quickly fills the void where your hand used to be, and after a short time the ripples disappear and the surface is smooth.

In this scenario, true leaders with a sense of proportion recognize that once they're removed from the picture, life goes on. Yes, folks, none of us is irreplaceable. The failure of many chief officers is to think that they're indispensable. The same is true for organizations whose leaders fail to keep their organizations in proper perspective. The fact that fire departments around the country are consolidating more and more frequently, that EMS is now traded on the stock market and that private fire protection services are becoming more prevalent should be cause for our industry to step back and reflect.

5) Leaders have to be skilled negotiators and mediators, but leaders must also be able to stir things up and encourage healthy and desired conflict. To some, Cronin's point here may seem contradictory, but it's really a leadership survival skill. Earlier I noted that effective leadership requires imagination. Imagination is often not found until someone is forced or challenged to think creatively.

Conflict, when managed correctly, often provides the leader with that opportunity. I've never met a fire service member who didn't like a good rescue or fireground challenge. After all, we're a can-do industry. The task of today's fire service leadership is to go beyond fireground scenarios and take that eagerness to the boardroom.

This past year, there has been controversy at the National Fire Academy, resulting in the program chairs taking a rather dramatic step in producing a position paper that was critical in some regards to where the academy is and where it's headed. Regardless of your opinion of the chairs' position, it's important to see the issue as an opportunity for leadership to come through controversy.

Controversy is often viewed as detrimental, yet effective leaders recognize conflict as opportunity. If a leader doesn't have someone challenging his or her position, then a status quo environment will persist. In such a situation, the potential for failure may exceed the leader's ability to overcome groupthink, and a catastrophic failure may occur.

The Challenger space shuttle disaster is a classic example of controversy gone astray with the inability of those in hierarchical positions to effectively accept controversy as being for the good of the order. The results were tragic.

The ability to be an effective negotiator, mediator and conflict manager takes a significant effort on the part of the leader, and it often means taking controversial stands. It's during conflict that the phrase "It's lonely at the top" comes to mind. But again, leadership requires weighing all the facts, seeking out opposite opinions and views, and doing the right thing.

Here's a simple example. I recently submitted "Leadership: Fact or Fiction?" as the title for a conference presentation. The response I received from a conference planner was that some might find it insulting or offensive. I questioned this thinking from the perspective that if it's insulting or offensive, that's all the more reason to put it in the conference, because to challenge another's thinking can result in beneficial growth for all.

6) The leader has to have brains and breadth. A significant challenge in our industry is to continue to evolve beyond the "fire is hot and water is wet" approach to education. Without sounding condescending, tomorrow's true fire service leaders must become educated beyond the traditional bounds.

Younger members of our industry often ask me about degree programs. Instead of offering validation, I challenge them to clarify why they want this particular degree and what good it will do in their future. The response is usually a blank stare, because they're not thinking past tomorrow.

While I encourage anyone to com-

plete a degree program, I'll do my best to lean people away from limiting degrees that don't incorporate a broad spectrum of interdisciplinary studies.

Recently, in reviewing several fire service career development programs, I noted that they centered on the traditional fire-and-water components. One program designed to lead to a chief officer certification never accounted for group dynamics, public speaking, written communication skills or critical thinking.

A while ago, I made a proposal to conduct career development programs at a regional fire training association. Their response was that no one will attend because it doesn't focus on big fire, big water. I wondered if this is how the dinosaurs ended up the way they did.

Challenging the status quo requires leadership with views beyond traditional lines. The goal of an effective leader should be to look beyond the obvious. Remember to look laterally for assistance in maintaining a course of growth and to glance backward to help measure progress.

Consider the ancient Polynesians as they set out for distant islands. Equipped with minimal provisions and only outrigger canoes, they pushed off from one shore toward lands unknown.

In a tradition-bound organization this would never have happened. In an organization where only lip service is given to leadership, the outrigger would have been on a short tether. But in an organization that promulgates leaders with a broad spectrum of education and experience and equips them with provisions for the long haul, the just rewards are new lands to explore and enjoy.

7) Effective leaders must have integrity. This ingredient is last because without it all the others don't matter. Leadership integrity represents the leader's ability and desire to consider the perspective of those being led. In other words, people will follow those who see them as human beings rather than simply a means to accomplishing the goal.

Like character, Cronin writes, integrity is more easily maintained than recovered. Once a follower questions a leader's integrity, the ability to be successful becomes questionable. There are a number of chief officers throughout our industry who fail to recognize that a gold badge doesn't come with integrity and leadership. Those characteristics are won and lost based on your actions.

DePree solidifies Cronin's thought on leadership integrity: "The first responsibility of leadership is to define reality. The last is to say thank you. In between the two, the leader must become a servant and a debtor. Leadership is much more an art, a belief, a condition of the heart rather than a set of things to do. The visible signs of leadership are expressed ultimately, in its practice."

The effective fire service leader will consider Cronin's key ingredients as an acceptable and realistic point from which to start overcoming individual and industry challenges. In terms of our future industry, the status quo is no longer acceptable. Our effort as today's leaders should be to develop our legacies through development and service to those we'll leave behind. Remember that leadership is measured by your actions, not your position. FC

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SPECIAL CONTRIBUTION

EMS AGENDA FOR THE FUTURE: WHERE WE ARE . . . WHERE WE WANT TO BE

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ABSTRACT

During the past 30 years, emergency medical services (EMS) in the United States have experienced explosive growth. The American health care system is now transforming, providing an opportune time to examine what we have learned over the past three decades in order to create a vision for the future of EMS. Over the course of several months, a multidisciplinary steering committee collaborated with hundreds of EMS-interested individuals, organizations, and agencies to develop the EMS Agenda for the Future. Fourteen EMS attributes were identified as requiring continued development in order to realize the vision established within the Agenda. They are integration of health services, EMS research, legislation and regulation, system finance, human resources, medical direction, education systems, public education, prevention, public access, communication systems, clinical care, information systems, and evaluation. Discussion of these attributes provides important guidance for achieving a vision for the future of EMS that emphasizes its critical role in American health care. **Key words:** emergency medical services; EMS Agenda for the Future; community health.

PREHOSPITAL EMERGENCY CARE
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The 1966 paper, "*Accidental Death and Disability: The Neglected Disease of Modern Society,*" provided 29 recommendations to improve the American emergency health care system.[1] Eleven related directly to out-of-hospital emergency medical services (EMS). Subsequent federal initiatives, in the forms of the Highway Safety Act of 1966 and the Emergency Medical Services Systems Act of 1973, and other public and private support spawned rapidly evolving EMS systems across the country. EMS expanded in the belief that better response would improve patient outcomes. Yet, initial EMS growth began with a lack of knowledge of the most efficient processes for delivering optimal resources to the spectrum of situations addressed by today's EMS systems.

Because the health care system is undergoing transformation, this is an opportune time to examine what has been learned during the past three decades in order to create a vision for the future of EMS. In June 1995, the National Highway Traffic Safety Administration (NHTSA), in partnership with the Health Resources and Services Administration (HRSA), Maternal and Child Health Bureau (MCHB), realized the need for agencies, organizations, and individuals involved in EMS to evaluate their roles and chart a course for the future. They commissioned the de-

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TABLE 1. Summary of Recommendations: How to Get "Where We Want to Be"

Integration of Health Services
- Expand the role of EMS in public health
- Involve EMS in community health monitoring activities
- 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

EMS Research
- Allocate federal and state funds for a major EMS systems research thrust
- Develop information systems that provide linkage 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
- Develop involvement and/or support of 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

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

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 development

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

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 EMS as a physician and nurse subspecialty certification
- Appoint state EMS medical directors

Education Systems
- Ensure adequacy of EMS education programs
- Update education core content objectives frequently enough so that they reflect patient EMS health care needs
- Incorporate research, 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

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 initiatives

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

continued

TABLE 1 (*continued*).

Public Access
- Implement 9-1-1 nationwide
- Provide emergency telephone service for those who cannot otherwise afford routine telephone services
- Ensure that all calls to a 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 patients' needs

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

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 transport as a criterion for compensating EMS systems
- Establish proactive relationships between EMS and other health care providers

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

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

velopment of the EMS Agenda for the Future to help meet that need.

The purpose of creating the EMS Agenda for the Future was to determine the most important directions for future EMS development, incorporating input from a broad group of EMS stakeholders. This would provide guiding principles for the continued evolution of EMS, focusing on out-of-hospital aspects of the system.

PROCESS

The process used to develop the EMS Agenda for the Future was a modification of the National Institutes of Health (NIH) Technology Assessment and Practice Guidelines Forum.[2] A multidisciplinary steering committee prepared initial drafts of the document. The committee distributed its second draft to 500 EMS-interested organizations and individuals for peer review. Of these, 178 (28%) furnished comments. The steering committee analyzed these comments and revised the document accordingly.

The EMS Agenda for the Future Blue Ribbon Conference convened in McLean, Virginia, on December 1–3, 1995. One hundred thirty-three individuals participated. Each participant attended several of 32 breakout sessions to comment on critical aspects of the future of EMS and critique the steering committee's updated draft. Later, the steering committee sent its subsequent revision to conference participants for their final comments. The steering committee met again in March 1996, at which time final comments were reviewed and appropriately incorporated. The following discussion summarizes the conclusions and recommendations of the EMS Agenda for the Future.

EMS: VISION FOR THE FUTURE

The health system of today, with its emphasis on advanced technology and costly acute interventions to achieve societal health, is transforming to focus on the early identification and modification of risk factors before illness or injury strikes. EMS will mirror and, in some cases, may lead this transition.

The EMS of the future will be community-based health management that is fully integrated with the overall health care system. It will have the ability to identify and mod-

ify illness and injury risks, provide acute illness and injury care and follow-up, and contribute to treatment of chronic conditions and community health monitoring. EMS will be integrated with other health care providers and public health and public safety agencies. It 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.

The vision for the future emphasizes a continued critical role for EMS in caring for the health of Americans. Fourteen EMS attributes, described below, require ongoing attention and development if such a vision is to be realized. Specific recommendations with regard to each attribute are summarized in Table 1.

Integration of Health Services

Where we are: Contemporary EMS systems were created to meet the immediate needs of the acutely ill and injured. EMS, in general, meets these objectives in relative isolation from other health care and community resources. EMS systems are disconnected from other community resources and do not routinely ensure appropriate follow-up by other health care providers or agencies. They are unable to integrate their care with sources for patients' continuing health care. Thus, potential positive effects of EMS, in terms of improved health for individual patients and the community, remain unrealized.

Researchers have published reports regarding public health surveillance and referral to social service agencies by EMS personnel.[3–5] Others have described a model for incorporating EMS and health monitoring referral systems.[6] Some EMS systems are determining the benefits of collaboration and routine communication with patients' primary health care providers.

Where we want to be: EMS is an integral component of the health care system, and it shares attributes with the other elements that collectively represent the continuum of health care (Fig. 1). EMS provides care that is integrated with other health care providers and community health resources, ensuring that EMS treatment is part of a complete health care program. Liaisons with other community resources enable EMS to be proactive in affecting people's long-term health, relaying information regarding potentially unhealthy situations to agencies with a vested interest in maintaining the health of their clients. With medical direction, EMS facilitates access for its patients to appropriate sources for continued medical care, supporting efforts to implement cost-effective community health care while ensuring that the special needs of specific patients are addressed.

EMS Research

Where we are: EMS has evolved rapidly over the past 30 years despite slow progress in developing EMS-related research. The "chain of survival" concept provides the best evidence of meaningful systems research.[7,8] Most published EMS research focuses on a single intervention or health problem and rarely addresses the inherent complexities of EMS systems.[9] In many cases our poor understanding of systems research has led to the development of wrong assumptions with regard to EMS care.[9,10]

Currently there are major impediments to the development of high-quality EMS research. They include: inadequate funding, lack of integrated information systems that provide for meaningful linkage with patient outcomes, paucity of academic research institutions with long-term commitments to EMS systems research, overly restrictive informed consent interpretations, and lack of education and appreciation by EMS personnel regarding the importance of EMS research.

Where we want to be: A national EMS research agenda provides guidance so that a sufficient volume of quality research is undertaken to determine the effectiveness of EMS system design and specific interventions. EMS evolves with a scientific basis. Adequate investigations of EMS interventions and system designs occur before they are advocated as standards. As much as possible, EMS research employs systems analysis models, using multidisciplinary approaches to answer complex questions. Federal agencies responsible for funding health care research are committed to EMS-related studies. Additionally, integrated information systems facilitate data collection to determine EMS effectiveness. EMS personnel of all levels appreciate the role of research in terms of creating a scientific basis for EMS care.

Legislation and Regulation

Where we are: All states have legislation that provides a statutory basis for EMS activities and programs. However, during 35 state evaluations by NHTSA technical assessment teams, only 40% of states reported having comprehensive enabling legislation for development of a statewide EMS system.[11] Only 20% of states had an identified lead agency that provided central coordination of EMS system activities.[11] In some cases, local governments have passed ordinances to delineate EMS standards for their communities. Authorities responsible for implementing regulations are, in general, extensively involved in personnel licensing, training program certification, EMS vehicle licensing, and record keeping.

Where we want to be: A federal lead EMS agency is sufficiently funded to provide coordination among federal programs and agencies affecting EMS, serve as an information clearinghouse, and facilitate nationwide EMS development. All states have a single EMS lead agency responsible for developing and overseeing a statewide EMS system. It

ensures that EMS of acceptable quality is available to the entire population and provides technical assistance to local EMS systems. Furthermore, state legislation provides a template that allows local medical directors to determine the specific parameters of practice for their EMS systems, helping them meet the health care needs of their communities.

System Finance

Where we are: Providing the nation with EMS is a multibillion-dollar effort each year. In Hawaii, where the entire EMS system is state-funded, the cost is approximately $27 per capita per year.[12] Extrapolating that cost to the entire U.S. population yields an estimate of $6.75 billion per year for EMS. This does not include the costs of human efforts, including those by volunteers.

Emergency medical services systems are funded by a combination of public and/or private funds. Those EMS systems relying on third-party payers for significant revenue must, in general, provide patient transportation in order to be reimbursed for their services. The primary determinants of EMS cost relate to system preparedness. On the other hand, the primary determinant of payment for services is patient transport. Thus, the driving forces of cost and payment are not aligned.

Some health care insurers or providers may stipulate to their subscriber patients that authorization must precede utilization of EMS. Refusal to pay EMS for services provided may be based on lack of preauthorization or retrospective determination that the patient condition did not represent an emergency.

Where we want to be: As a component of the health care delivery system, EMS is consistently funded by mechanisms that fund other aspects of the system. These mechanisms recognize the value of treatment that is provided without transport. Payment for EMS is preparedness-based, accounting for the cost of maintaining a state of suitable readiness. It considers such factors as service area size and complexity, utilization, and predetermined quality standards. Finances are linked to value, as determined by community consumers, and cost and payment drivers are aligned. The maintenance of EMS system preparedness and continued development of its infrastructure are also facilitated by local, state, and federal governments.

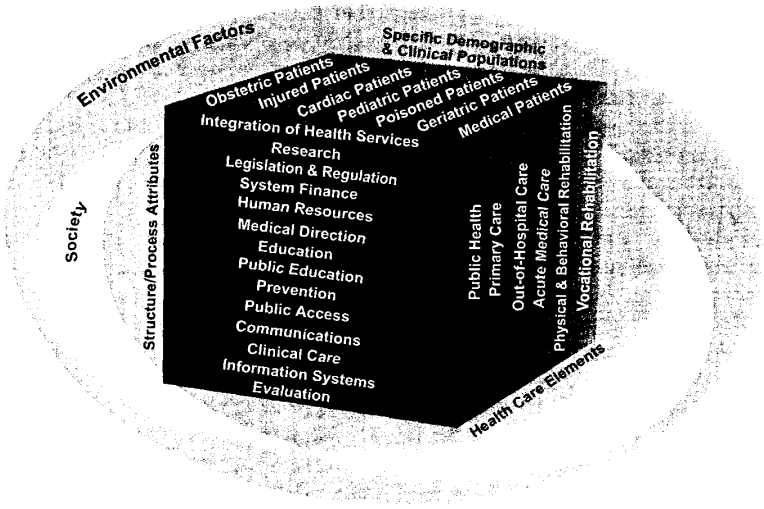

FIGURE 1. EMS: part of the health care system, sharing attributes with the other health care system elements.

Human Resources

Where we are: Across the country, more than 40 different levels of emergency medical technician (EMT) certification exist. However, the National EMS Education and Practice Blueprint has established standard knowledge and practice expectations for four levels of EMS providers: First Responder, EMT-Basic, EMT-Intermediate, and EMT-Paramedic.[13] Many other health care workers also collaborate to affect the patient care provided by EMS. They include physicians, nurses, nurse practitioners, physician assistants, respiratory therapists, and others. Volunteers serve more than 25% of the nation's population, but the number of EMS volunteer organizations is decreasing.[14,15]

Perennial issues for EMS workers include unique occupational risks, limited mobility, and inadequate compensation. Emergency personnel are at least twice as likely as the general population to suffer from post-traumatic stress disorders.[16,17] Exposure to blood-borne pathogens may be another significant risk. Between 6 and 19 per 1,000 advanced life support (ALS) EMS responses involve a contaminated needlestick to EMS personnel.[18,19] The average hepatitis B virus seroprevalence among EMS workers has been reported to be 14%, 3 to 5 times higher than that of the general population.[20] EMS workers frequently confront dangerous situations, and assault, lifting, falling, and motor vehicle crashes contribute to injuries.[21–24]

Where we want to be: People attracted to EMS service reflect the cultural diversity of our communities. The value of supporting the well-being of the workforce is widely recognized, and there is improved understanding of the occupational issues unique to EMS workers. All EMS workers receive available immunizations against worrisome communicable diseases, appropriate protective equipment, and pertinent education.

Reciprocity agreements between

states eliminate unnecessary barriers to mobility for credentialed EMS professionals. Career ladders exist to facilitate transitions for EMS workers to parallel fields. EMS personnel are recognized as members of the health care delivery team. Optimal preparation helps ensure that they deliver quality care that meets an acceptable community standard.

Medical Direction

Where we are: Administrative and medical direction management components, working in concert, are theoretically required to ensure quality state-of-the-art EMS. In most states, medical direction of EMS systems that provide advanced care is mandated by law. The form of such direction varies dramatically from close supervision to infrequent consultation. A growing number of basic-level EMS systems are also being required to establish a formal relationship with a medical director, and the Emergency Medical Technician: Basic (EMT-B), National Standard Curriculum emphasizes the role of medical direction during EMT-B education and practice.[11,25]

Emergency medical services medical directors come from several specialties. However, most on-line medical direction, contemporaneous medical supervision of EMS personnel caring for patients in the field, is provided by emergency physicians.[11] A model curriculum for EMS education within emergency medicine residency programs has been published.[26] Although on-line medical direction may be important for selected patients, its systematic application for all EMS patients remains controversial.[27–33] Medical direction activities in addition to contemporaneous oversight of in-field personnel are also critical for ensuring optimal EMS. The medical director's role is to provide medical leadership for EMS, involving the participation of medical direction staffs, oversight agencies and boards, community physicians, administrative staffs, and others. Ultimately, this collaborative effort is responsible for ensuring the appropriateness and quality of EMS care.

Where we want to be: All EMS providers and activities have the benefit of effective medical direction. Each state has a qualified EMS medical director responsible for overseeing the state's EMS system. EMS medical directors, in consultation with other health professionals, are responsible for determining EMS systems' practice parameters to ensure that the needs of individual patients and communities are being met.

Medical direction is provided by qualified physicians and staffs with special competency in EMS. The resources available to medical directors are commensurate with responsibilities and the size and complexity of the population served. EMS medical directors are in a position to positively influence systems and the care they deliver through their knowledge of the complexity of EMS, optimal care for the spectrum of EMS patients, issues related to population-based care, occupational health concerns of EMS personnel, and principles of clinical research.

Education Systems

Where we are: Curricula developed on behalf of the U.S. Department of Transportation (DOT) provide the bases for education of First Responders, EMT-Basics, EMT-Intermediates, and EMT-Paramedics. Settings for EMS education include hospitals, community colleges, universities, technical centers, private institutions, and fire departments.[34] Increasing numbers of colleges offer bachelor's degrees in EMS.[35] Most reports of EMS education issues discuss the requirements to develop specific skill proficiency.[36-44] However, meaningful analyses linking the suitability of EMS education to the spectrum of services provided have not been published.

Where we want to be: EMS education employs sound principles and facilitates lifelong learning for EMS professionals. It provides the tools necessary for EMS providers to serve identified health care needs of the population. Thus, educational objectives are congruent with the services provided. Education programs are based on nationally standardized core contents for providers of various levels. Core content standardization facilitates recognition by credentialing agencies, while providing program infrastructure and opportunity for local customization. Higher-level EMS education programs are affiliated with academic institutions. Colleges and universities recognize EMS education as achievement worthy of academic credit. Interdisciplinary and bridging programs provide avenues for EMS professionals to enhance their credentials or transition to other health care roles.

Public Education

Where we are: EMS has not yet developed its full potential to educate the lay public. Most of what the public knows about EMS is derived from television programs intended for entertainment and not for education. Isolated examples of EMS public education initiatives exist. In some areas Emergency Medical Services for Children (EMS-C) funds have facilitated development of programs related to childhood illness and injury.[45] The Make the Right Call campaign and other efforts have focused on timely access and appropriate utilization of EMS.[46,47] Additionally, some EMS systems participate in disseminating cardiopulmonary resuscitation (CPR) and bystander care education. However, planned and evaluated EMS public education initiatives remain sporadic. In general, EMS is not optimally engaged in providing education that improves community health through prevention, early identification, and treatment.

Where we want to be: Public education is acknowledged as an essential ongoing activity of EMS. EMS contributes to improving community health by disseminating valuable information regarding prevention of illnesses and injuries,

appropriate access and utilization of EMS and other health care services, and bystander care. EMS public education programs address the needs of all members of the community, including school-age children, senior citizens, and those with special needs. The public's knowledge of EMS-related issues, including funding, level of care provided, and system expectations and standards, is enhanced. Furthermore, purchasers of health care services are well informed about EMS issues, including evaluating and ensuring optimal EMS.

Prevention

Where we are: The health care system is evolving from an emphasis on providing highly technologic, curative care to improving health through prevention and wellness. In this era, injury prevention has taken on a new dimension for both improving the nation's health and truly controlling health care costs.[48] Addition of injury prevention modules to the National EMS Education and Practice Blueprint has been strongly advocated.[49]

Emergency medical services are not commonly linked to the public's prevention consciousness. However, the potential role of EMS in prevention has been recognized.[49,50] In some regions EMS personnel currently are taught principles of injury prevention.[51] EMS-initiated prevention programs have been successful in reducing drowning in Pinellas County, Florida, and in Tucson, Arizona, and in reducing falls from height in New York.[45,52,53] The Safe Communities and Safe America concepts involve systematic approaches to address all injuries, and emphasize the need for integration of public and private partners and efforts, including acute care.[54,55]

Where we want to be: EMS providers receive education regarding prevention principles. EMS systems and providers are actively engaged in injury and illness prevention programs. These are based on local needs, addressing identified injury and illness problems. EMS systems also maintain prevention-oriented atmospheres that emphasize safety and well-being for their own workers. They enhance their ability to document the circumstances contributing to illness and injuries. Such information is shared with other community resources to help attenuate injury and illness risk factors.

Public Access

Where we are: For nearly 30 years, 9-1-1 has been the designated national emergency telephone number. Currently, approximately 25% of the U.S. geography is covered by 9-1-1, making it available to 78% of the population.[56,57] Seventy-nine percent of the largest U.S. cities use 9-1-1E, which automatically provides emergency call-takers with callers' telephone numbers and locations.[58] When 9-1-1 is the emergency telephone number, 85% of the public knows it, compared with 36–47% when the emergency telephone number is seven digits.[59] Cellular telephones provide one alternative for accessing emergency help. However, in many areas cellular telephone users cannot be assured of reaching the appropriate public safety answering point (PSAP) for their locations. The most important piece of information provided during an emergency call is the location of the person(s) requiring help. Yet, adequate address systems are lacking in many areas.

Financial barriers also affect access to appropriate emergency care via 9-1-1. These include inability to pay for telephone services, requirements of health care networks for their patients to obtain authorization prior to using 9-1-1, requirements to access emergency care through an alternative telephone number, and others.

Many EMS systems prioritize calls to appropriately delay response to less acute situations. This theoretically enhances the system response to critical emergencies. However, EMS is generally unsophisticated in terms of its ability to ensure that the eventual response is commensurate with the services that are actually needed.

Where we want to be: Implementation of 9-1-1 is nationwide. From any telephone in the United States, a caller can dial 9-1-1 or push an emergency icon in order to contact the appropriate PSAP. In cases where routine telephone services are not provided because of an inability to pay for them, limited service that enables 9-1-1 access is made available. Every call for emergency services is automatically accompanied by location-identifying information, including an address or other geographic data. Cellular telephones and other personal communication systems provide a reliable means of accessing EMS via 9-1-1. Position-identifying technology ensures that all emergency calls are routed to the appropriate PSAP.

No financial, legal, social, or age-related barriers to accessing appropriate care via 9–1-1 exist for those who perceive an emergency. Systems for accessing EMS and other emergency services also employ communications technology that reduces barriers imposed by geography, caller age, specific disabilities, and language spoken. EMS access results in allocation of system resources that best fulfill the need. Calls are triaged so that the EMS response, given the available options, is the most appropriate (Fig. 2).

Communication Systems

Where we are: Effective communication networks provide access to the EMS system, dispatch of EMS and other public safety agencies, coordination among EMS and other public safety agencies, access to medical direction, communications to and between emergency health care facilities, communication be-

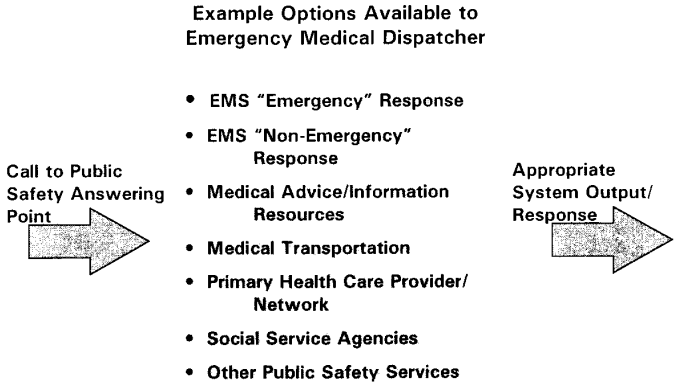

FIGURE 2. Public access to an appropriate EMS response.

tween EMS and other health care providers, and outlets for disseminating information to the public. Emergency medical dispatchers (EMDs) have been advocated as essential personnel at all EMS dispatching centers, and a national standard curriculum is available.[60–64] EMDs are able to efficiently query callers and provide dispatch life support via pre-arrival instructions.[65,66] Such instructions are thought to be a cost-effective mechanism for improving survival from out-of-hospital cardiac arrest.[67]

From a communications perspective, EMS personnel are, for the most part, isolated from the rest of the health care delivery system. They rarely have access to medical history information that might improve decision making. Limitations of communication systems may even hinder the ability to obtain on-line medical direction. The spectrum of communications equipment currently in use is broad and includes antiquated radios, cellular telephones, and mobile data terminals. Only 14 states have a comprehensive EMS communications plan in place.[11]

Where we want to be: Each call for emergency medical care is received by personnel with the requisite combination of education, experience, and resources necessary to enable them to determine the most effective course of action. All callers to EMS receive appropriate medically-directed dispatch life support. EMS communication networks incorporate other health care providers and community services. These networks allow EMS workers to receive and share data with others who have important information about their patients and clients. Additionally, EMS communication systems ensure reliable availability of on-line medical direction and enable transmission of relevant real-time patient data. Networks are geographically integrated and based on functional need to enable reliable communications among EMS, fire, law enforcement, and other public safety agencies. Issues related to disaster preparedness are addressed, and each state maintains an up-to-date communications plan.

Clinical Care

Where we are: The clinical care delivered by EMS has evolved significantly over the past 30 years. To some extent it has capitalized on the availability of new pharmacologic agents and technology, developed the means to deliver lifesaving care faster, and begun to systematically address the particular needs of specific groups of patients. However, EMS systems vary dramatically with regard to the sophistication of care they provide. There is no standard baseline of care that is provided by all systems, and the scopes of EMS care differ among states and often between localities. The interventions EMTs can perform, the equipment available to them, and the medications they carry vary greatly.[68,69] In some areas, EMS clinical care variations may be the result of adapting to meet the health care needs of communities. A project at Red River, New Mexico, is an example of such adaptation in a rural community.[70] However, the effectiveness of EMS care has been established for few clinical problems.

Regardless of its sophistication, EMS care is usually intended to get patients to a hospital. Transportation of patients to nonemergency facilities or between facilities may be accomplished by EMS providers or ambulance services operating outside the EMS system.

Where we want to be: EMS provides a defined baseline of care and services in all communities. Expansion of services occurs in response to identified community health care needs. Out-of-hospital EMS care is optimal for patients' circumstances, so that it positively influences outcomes. The effects of EMS are properly and continually evaluated. Technologic and pharmaceutical advances are evaluated in terms of their appropriateness and effectiveness prior to their widespread deployment in EMS systems.

Patient transport activities are integrated with the overall health care system. EMS is capable of facilitating access to hospital emergency departments and other health care resources designated by medical direction. Staffing patterns for interfacility or secondary transports match the potential care required for specific types of patients. The responsibility and authority for medical direction during these transports are clear.

Information Systems

Where we are: Several initiatives have focused on the need for development of improved techniques for

collecting EMS-related data. The Trauma Care Systems and Planning Act of 1990 emphasized the need for collection of data for the evaluation of emergency care for serious injuries.[71] The 1993 Institute of Medicine Report, "Emergency Medical Services for Children," recommended that states collect and analyze uniform EMS data needed for planning, evaluation, and research of EMS for children.[72] During the 1993 Uniform Pre-Hospital Emergency Medical Services Data Conference, conferees discussed potential data elements and determined them to be essential or desirable.[73,74]

The data required to completely describe an EMS event exist in disparate locations. These include EMS agencies, hospital records, public safety agencies, and vital statistics offices. In most cases, meaningful linkages between such sites are nonexistent. The lack of organized information systems that provide valid, reliable, and accurate data is a significant barrier to conducting EMS system evaluation, including outcomes analysis.[10,75] Lack of information systems that are integrated with EMS and other health care providers and community resources limits the ability to share useful data. Research efforts are also hindered. For example, integrated information systems may serve as multisource databases, which have been advocated as useful tools for conducting EMS cardiac arrest research.[76]

Where we want to be: EMS shares integrated information systems with other health care providers, public safety agencies, and community resources. They provide mechanisms for EMS to transmit and receive useful information. The data necessary to describe entire EMS events are available within information systems that link multiple-source databases. These information systems incorporate uniform data elements, facilitating continuous EMS evaluation, even across multiple EMS systems, and supporting EMS-related research.

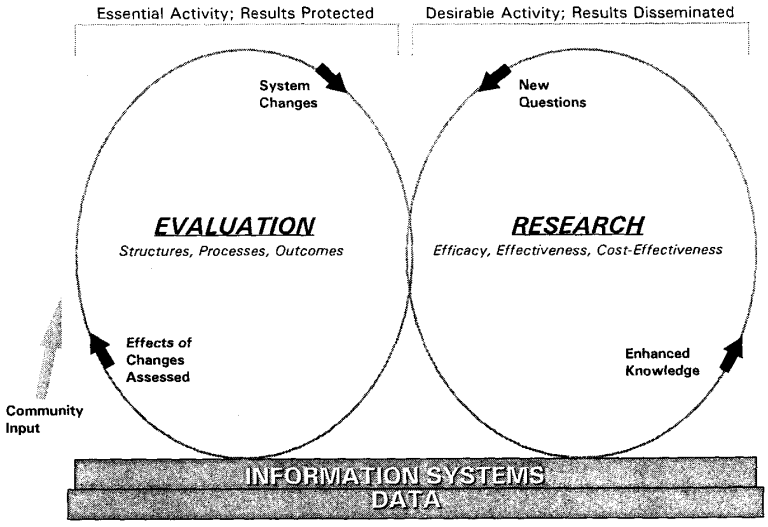

FIGURE 3. EMS evaluation and research: supported by information systems.

Evaluation

Where we are: Evaluation is the process of assessing the quality and effects of EMS, so that strategies for continuous improvement can be designed and implemented. EMS systems are evaluated using structural (input), process, and outcome measures. Because long-term patient outcomes may be insensitive to variation in EMS care, intermediate outcomes that have a closer temporal relationship to EMS care often are utilized.[77] Cardiac arrest and trauma are widely used as "tracer" conditions to determine the overall effects of EMS systems.[78–80] For other conditions, there is a paucity of literature evaluating the effects of EMS. Estimates of EMS costs for saving the life of a cardiac arrest victim are similar to those for other lifesaving treatments.[81,82] However, such estimates are locality-specific and do not necessarily apply to all EMS systems. Models for determining EMS effectiveness and cost–effectiveness are lacking.

System evaluation and EMS research both rely on information systems as sources of data (Fig. 3). Research is a desirable but optional activity for every EMS system. Evaluation, on the other hand, is essential, and seeks to determine the effects of applying new knowledge through structural and process changes.

Where we want to be: Continuous comprehensive evaluation of EMS assesses all aspects of the system. Evaluation is integral to quality improvement processes that measure, maintain, and improve the effectiveness and efficiency of EMS. Evaluation involves many clinical conditions. Although mortality remains an important outcome to evaluate, others are tracked as well. These include disease, disability, discomfort, dissatisfaction, and destitution.[83] Public satisfaction and consumer input are a focus of EMS evaluation efforts. The cost–effectiveness of EMS is also evaluated. This includes the cost–effectiveness of system preparedness and relates to various injury and illness conditions.

IMPLICATIONS FOR THE FUTURE

The EMS Agenda for the Future project sought and received input from a large group of individuals and organizations with interests in EMS. Despite the group's heterogeneity,

common themes pervaded the process. Although the project was not specifically intended to develop consensus, it was promising that a great degree of agreement existed on fundamental issues. This facilitated identification of areas appropriate for future EMS development.

Our collective EMS experiences over the last 30 years provide a foundation on which to create the future. As we look forward, it is clear that EMS must be integrated with other services intended to maintain and improve community health and ensure its safety. The special needs of members of our diverse society must be recognized and addressed. We must also focus on aspects of EMS that improve its science, strengthen its infrastructure, and broaden its involvement in enhancing the health of our communities. Additionally, the value of EMS as the public's emergency medical safety net cannot be neglected. Most importantly, the ability to achieve the vision for the future of EMS will depend on the development of new partnerships within the health care system and commitments to improve the emergency health care system.

The EMS Agenda for the Future represents an effort to look toward the future from a specific point in time. American society and the health care system are dynamic. Thus, frequent evaluation of where we are and where we want to be is essential to ensure that EMS fulfills its critical role in optimally caring for the health of Americans.

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MANAGING INFORMATION FOR THE FIRE DEPARTMENT

BY MICHAEL MORIARTY

• The secretary was going crazy! It had happened again. One of the training officers got tired of working with a file over the Localtalk network and copied it to his machine. He continued to work on it there. Now, there were two files, which didn't match—one on the server and one on the officer's machine. This happened all the time, and the secretary was stuck with manually updating the files.

• The dispatcher was stymied. A battalion chief who "knows computers" was put in charge of designing and implementing the department computer system. The BC knew dBASE™, so he had used a dBASE™ database for incident reports. The problem was that dBASE™ locked out everyone else whenever someone was editing a file. With 50 runs per day, the dispatcher could seldom get into the incidents database to see if there had been previous runs to the address to which he had just sent the ambulance.

• Suddenly the new IBM clones were brought in to the dispatching unit. None of the dispatchers was given any training. Worse was the fact that all of the information the dispatchers needed to function was in the old Macintoshes. The DOS/Windows™ enthusiast the department had put in charge of designing the computer system had made no plans to move the information to the new machines. In a panic, the dispatchers called a computer-literate firefighter at a far-flung station and asked him to translate the files so they could operate.

Does any of this sound familiar? Unfortunately, scenes like these are commonplace around fire departments today. Lack of proper planning has put powerful technology on the desktop and then cruelly denied users the ability to use it in the most effective manner. Do you want to learn the basics of how to plan and implement an information system? Read on.

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OVERVIEW

The modern microcomputer has become cheap enough to be present in a great many fire departments. Along with the promise presented by this technology comes the problem of planning to use it properly. Unfortunately, there is a worldwide shortage of planning expertise; and the fire service, already fighting cutbacks, has been among the least likely to have the resources available to take maximum advantage of this new technology. The result is that this powerful new weapon on many a desk is being radically underutilized. Lack of planning has blunted the beneficial effects of computers on actual operations.

To realize the benefits of computer technology, data (a conglomeration of facts) must be processed into *information* (a useful form of data). Information, of course, means different things to different people in different situations with different needs. The common tendency is to put the cart before the horse and commit to a given favorite com-

puter platform without assessing the holistic informational needs of the organization. Contrary to common tendencies, the central focus should be on the *information*, not a given computer platform (IBM vs. Mac vs. UNIX®, etc.).

The function of a comprehensive *information system* is to deliver the proper information to the proper people in usable form at the proper time.

The classic article "Cash Drain, No Gain" (*Computerworld*, Nov. 25, 1991) reveals that 50 percent of the durable tools purchased by American companies are computer technology-related. At the same time, productivity gains are falling. A strong case is made for the position that the decline in American productivity gains is related to the companies' refusal to retool the workplace to take full advantage of computer technology. Businesses install hardware and then keep working in the same old way; they fail to use the technology to accomplish what it can. They use high-technology equipment as an exotic typewriter. To use computer information system technology most effectively, your department has to be willing to examine itself and reengineer work processes.

But be aware that "reengineering" can be a wolf in sheep's clothing. Too many times, the term is used to justify actions originating from an agenda other than sound information management. According to *Computerworld* (June 13, 1994), various studies indicate that between 50 and 85 percent of the businesses that have reengineered are unsatisfied with the results. It points out that "downsizing" may be the motivation for "reengineering" and that the two are not necessarily the same thing. The tendency is to invest in technology as a replacement for personnel but then to pull the resources before the technology is implemented. In an era of budget cuts, watch out for predatory attempts to cut back on personnel or other resources without a methodical bedrock plan for implementing the changes.

Before initiating the purchase process for any information technology, it is wise to have the systems analyst, or whoever is going to be in charge, in place first. If you are going to use people from within your fire department, do not choose those responsible for the information system on the basis of rank. Rank has absolutely nothing to do with competence in system analysis and design. Choosing on the basis of rank is a sure way to shoot your system in the foot right from the start.

Too often, decisions of major importance are made before the people who are going to run the system are on board. This means they are not there to affect the crafting of the system. Outside consultants may or may not approach the project with competence and the appropriate ethics. Sometimes hardware sales drive the consultant. In such a situation, you will end up with a slipshod end product of considerably less use than one that has been well constructed. It is always wise to have those who have to live with the product construct it; they have a vested interest in creating a truly viable end result.

As an example, I encountered a project wherein the police and fire departments of a jurisdiction were directed by their city council to cooperate in constructing an information system. A consultant had been hired to see them through the process. The consultant analyzed the needs of the two departments and then sent out a request for proposal (RFP). The project was so far along that the systems analyst was hired two weeks before the formal evaluation of five vendor proposals. The proposals were to be evaluated by a committee of 14 people, all using standardized evaluation forms. Points were to be awarded and totaled; the winner would be awarded the $3 million contract. This selection process is an attempt to be objective and is aimed at eliminating litigation from the unsuccessful vendors.

This all sounds fine until one gets into the details. Doom hung heavily on the horizon as members of the evaluation committee began asking the consultant questions such as, "But where am I going to put this on my desk?" Although the fire stations had to deal with 72 reports, the RFP requested that only two be put on the computer system, the Ambulance Report Form (ARF) and the Incident Report Form. No provision was made for ambulance personnel to input the ARFs at the hospital, which meant the paramedics would have to fill out a dry form and then enter the computerized version at the station and that lawyers involved in a lawsuit might be provided with two versions of the ARF over which to argue. In addition, work for the paramedics would be doubled, and the fire department would be exposed to a liability risk.

Although the RFP had listed CAMEO™ compatibility as one of the fire department's needs, it was entirely missing from the evaluation sheet. Nowhere in the RFP or proposals was adequate training mentioned. One vendor listed three days of training support in its proposal. The fire department was supposed to pay $400,000 for this system.

As it turned out, the consultant had spo-

ken with one person in the fire department and had never visited a station. When confronted, the consultant blamed the fire department for not telling him what it needed. Apparently, it had never occurred to him that, if this fire department knew how to design an information system, it wouldn't have hired him. Finding out what the fire department needed was his job. This was basically a hardware sale. Luckily, the fire department had not committed to the project and was able to bail out. Further involvement could have led to a financial loss, protracted litigation, or both. Be forewarned: Get your people in place before going too far, and be sure to provide them with enough resources so they are not fighting "brushfires" instead of building your system.

INFORMATION SYSTEM COMPONENTS

There are two major parts to an information system. The first deals with the structured information a department needs to have technology "chew" on in a very predictable and repetitive fashion. Payroll, incident reports, personnel actions, etc. fit into this category. This kind of information typically is digested by the traditional management information system (MIS). The second part of the effort to build an information system has to do with what happens, what is available, and what can be done on the desktop.

PART 1

Classic Information System Design

It is useless to begin planning an information system without first having a *strategic plan* for the development of the organization. After all, if the system is designed to deliver the proper information to the proper people in the proper form at the proper time, we have to know who they are, where they are, and what they need. This would be impossible without first knowing what the structure of the organization will be and where each unit within it is headed. Growth needs to be planned for, not encountered. To be utilized at maximum effectiveness, an *information system* must be created by a management that is aware of where the organization is going.

Organizational Information Requirements Analysis

The Organizational Information Requirements Analysis (OIRA) is the first step in the design of an information system. Each organizational unit of the department should have its information needs assessed. This assessment can include a look at the paperwork, survey forms, interviews, and actual observation of operations. An increasing level of understanding of the needs of a given organization or unit can be gained as more of these tools are used to look at a given situation. Use as many as you can. You can't know your organization too well.

Design

"The hardest single part of building a software system is deciding precisely what to build. No other part of the conceptual work is as difficult as establishing the detailed technical requirements, including all the interfaces to people, to machines and to other software systems. No other part of the work so cripples the resulting system if done wrong. No other part is more difficult to rectify later," stressed F. Brooks in *IEEE Computer* (April 1987).

From the OIRA, the design flows. This is the point at which specifications are worked out and different options compared. The comparison should include performance; maintenance; and costs, both long range and immediate. This is the time when hardware and software platforms are considered and software is evaluated.

At this point, financial considerations force many departments into buying canned software. Many of these packages are excellent tools for performing specific functions. The problem is that they are a very partial solution to a comprehensive problem. The software companies that produce the packages cannot anticipate the particular needs of all possible customers. If you buy the product and then modify it to suit your needs, it is only reasonable that the company that sold the product to you will refuse to guarantee it. After all, it can't tell what you might do to it.

Another choice is to pay the company to do the programming. This is costly and can result in anything from an excellent product to a horror show. Know with whom you are dealing and what their capabilities are. Check with customers to find out if they like the support they get. Make sure the contract is clear as to what each party's responsibilities are, and make sure you have all that you require clearly spelled out in the contract.

The absolute worst-case scenario is to have your people looking at an incident report on the screen of a computer and then checking information on that screen against information in another computer file or on a piece of paper to see if they match. The idea is to automate this stuff, eliminating disparate data files so that everyone is using the same information and avoiding "busy work."

To design an integrated information system, it first is necessary for the analyst to "normalize" the data with which you work. This process involves methodically examining each piece of data your organization uses. It is a step-by-step process for replacing convoluted associations between data with associations in a two-dimensional tabular form.

- Each entry in a table represents one data item; there are no repeating groups.
- Entries are column-homogeneous—that is, in any column, all items are of the same kind.
- Each column is assigned a distinct name.
- All rows are distinct; duplicate rows are not allowed.
- Both rows and columns can be viewed in any sequence at any time without affecting the information content or the semantics of any function using the table.

The basic thrust here is that any data item should originate only in one place; all the other dependent files should get that piece of data from this one source. By forcing your department to structure data this way, loose items, data replications, and disparate data files can be eliminated. It may be that many forms use the same piece of data but it is called by different names; standardization of naming conventions, therefore, is part of this phase.

After each data piece is identified, it is thoroughly described in a "data dictionary." This tool provides a reference you can use to learn what, where, who, and why about any data you may later need to understand. After all of the data is "normalized," dependent relationships in the data can be considered in the actual programming.

New technologies are constantly evolving. For example, relational technology, described above, is being challenged by "object oriented programming" (OOP). Rather than relying on code, "objects" are created and can be used and reused as needed. OOP provides the advantage of quick development times, but it can be a real chore to maintain databases created with some of these tools. Do not be too eager to be on the "bleeding edge" of technology. Look for tools that work and for which you can find satisfied references.

In many instances, major cost factors are not considered during the early stages of system design. Among such costs are the following:

- *The physical environment.* Thoroughly examining the physical environment (offices and stations) that will house the new technology is a wise preemptive move: it will give you a better handle on a realistic

budget. Appropriate desks, wrist rests, chairs, and glare screens are factors that, if ignored, can result in repetitive injury claims by workers.

• *Training and support costs.* This area represents the single largest budget item in an information system. Do not be fooled by comparing the costs of the hardware/software only. You perpetually will need to train and support your personnel. Have a good look at ease-of-use issues for your end users. Getting a 10-percent break on the hardware and then paying twice as much for training and support later is not a good deal. Carefully assess the training and support costs that are likely to pile up later. Write these costs into the budget.

• *Compatibility.* Lack of hardware standards may cause problems with compatibility later. Getting the needed disk storage space and RAM on machines may not be adequately considered if software requirements are not thoroughly understood and related to hardware purchases. When negotiating dealer maintenance agreements, be as hard-nosed as possible and push for all you can get. You'll need the help later. What appears to be a deal on price from a smaller manufacturer actually may cost you more when you fail to get the support you would have gotten from a "more expensive" vendor. Software costs could be 70 percent upgrade- and installation-related. This is worth remembering as you estimate software costs for your system. Try to think methodically about your entire work environment.

Software Creation, Software Tools, Coding

The first thing to remember here is that your department needs to be ready for the long haul. The last thing you need is to be dependent on one person and have that person be unavailable. One old-timer in information systems calls this "the motorcycle syndrome." He told me that whenever he takes over a project, he asks all the young hotshot programmers if they ride motorcycles. If they do, he assigns other workers to find out what they are doing on the project (as a backup). He told me that he had seen projects fail when a young programmer, responsible for an important module, was injured in a motorcycle crash. The concept is applicable to more than software and motorcycles.

Another common pitfall is the programmer who is building job security by not documenting what makes up the system. This strategy, which is more common than desirable—and also intolerable—means you must be dependent on this programmer. *Insist* that every line of code and every piece of data be defined and documented. Everything about your system needs to be recorded. Analysts unfamiliar with the system should be able to read the documentation and understand what they are dealing with. This is the industry "standard of care," and those who will not live up to it—especially if they are acting in their own best interest—are a danger to the organization. If employees refuse to document their activities adequately, fire them and be ready to start over. Be ruthless on this issue; your organization's welfare depends on it.

A CUSTOMIZED SYSTEM

If you decide to create a customized system, be aware that this is a complex process. One of the major business problems a manager faces is how long a given task will take. Among the methods of estimating software development time are the standard formula developed by IBM; Historical Records, which depends on having records of similar projects; the "seat of the pants" method; and the "ask the programmers and multiply by 2" method. None of these methods historically has proved to be very exact.

Beware of "creeping elegance." Whenever you do something, it is inevitable that new ideas for doing it better will occur to you after you have finished. This is natural; but in the setting of software development, it is a dangerous invitation to cost overruns and extended development times. Programmers will run you around endlessly with this if you let them. Be absolutely intransigent on the issue of meeting the specifications. Ask yourself, "Is this feature in the specifications?" If it isn't, tell the programmer to forget it. If the module or feature runs to specifications, forget improving it for now and move on to finishing the project.

The creative effort is in the design specifications. Programmers are needed to render that design faithfully, not to be "creative" during the programming stage. This highlights how very important your initial specifications are. If you mess up on them, the project is torpedoed from the beginning.

With the computer technology changing as quickly as it is and with the large costs involved in creating an information system, it is wise to maximize the options open to your department. It would be horrible to have spent the money to create a fine customized information system and then find that the hardware manufacturer on which you are dependent is going out of business. Even long-time players in the computer industry are not immune to real problems.

PORTABLE SOFTWARE TOOLS

One way of hedging your bets is to use "portable" software tools such as portable operating systems and portable applications.

Portable operating systems

Portable operating systems can run on multiple hardware platforms. The UNIX® operating system immediately comes to mind. Portability is present with UNIX®, but be aware that it is not as simple as it seems at first. Two major UNIX® implementations are in use around the UNIX® world, and then various proprietary flavors of each of them. Getting software from one system to work on another can be a trick; quite often device drivers present a problem. Another example of a portable operating system is Windows NT®, which runs on a large number of hardware platforms.

Operating systems are going to become more and more portable. UNIX® and Macintosh® computers have been able to run DOS® and Windows® for some years now. Many implementations of UNIX® run on Intel® boxes (Sun®, Solaris®, Next Step®, SCO®, etc.).

The next phase of operating system evolution involves a software architecture called the "micro kernal." Micro kernals are tiny software kernals capable of invoking multiple operating system "personalities." An example would be "Chorus," a popular French micro kernal that takes up all of 45K in disk space. Don't be fooled by size. Micro kernal technology is the basis for Windows NT as well as the new operating system Apple® and IBM® are developing together. We shall soon see a wave of micro kernal-based operating systems capable of running software from multiple operating systems.

PORTABLE APPLICATIONS

Portable applications run under multiple operating systems. The advantage here is similar to that achieved with portable operating systems: You can move your expensive system and not have to recreate it. Some examples of portable database software are Oracle™, Double Helix™, dBASE™, and Omnis 7™. There are others, and one may be well-suited for you. Taking a close look at all portable software before committing to any product can protect your investment and give you leverage in your dealings with hardware vendors. If your hardware vendor is not performing the way you want, no problem; you can buy hardware from someone else next time because your system is portable.

IMPLEMENTATION

There are a number of ways to convert to the new system:

- *the direct method*—the new system is put in place and run,
- *the parallel method*—the old and new systems run side by side, and
- *the phased method*—parts of the system are brought online in a predetermined order.

Many fire departments may find themselves using phased conversion because it allows for smaller capital outlay in tight fiscal times. It is also possible to run a pilot program.

IMPORTANT CONSIDERATIONS

The important things to consider are the following:

- You have a plan as to what will happen, what is needed, and why.
- You evaluate the effectiveness of the system you put in place. Ask your organization, "Is this thing doing what it is supposed to?"

Information systems are constantly evolving as needs change and technical opportunities arise. Do not take a view from the top and think everything is okay. Design your evaluation process so that it involves all levels of your organization and gives you a representative picture of what is really going on. Make sure you take advantage of opportunities and eliminate problems in a systematic fashion.

PART 2

Distributed Computing

While the predictable and indisputable needs of the organization can be addressed by a traditional management information system, sitting on the desktop now lies a well of technical and creative possibilities. This technology, combined with the synergy of many creative minds in your organization, can become a major resource for your department. However, you have to consciously decide to make this happen. The name *Traditional Management Information Systems* (MIS) even suggests that only management has meaningful information needs. Why waste the system on management only? Why not give the front line troops the opportunity to maximize the technology present on their desktops? This is a powerful potential weapon for all levels of the organization.

The vast wellspring of ideas present in your personnel can be used to drop your training and support costs by enabling personnel to communicate with and support each other. Advanced users can coach less computer-able personnel, reducing depen-

SOURCES OF SYSTEMS ANALYSIS TRAINING

- *The National Fire Academy.* Offers a relatively new course in information system planning designed to aid fire department managers in planning information systems.
- *UC Berkeley.* Offers a correspondence course called "Systems Analysis and Design" (X422). Connection also is offered through direct dial over telephone lines or the Internet. Contact: Center for Media and Independent Learning, University of California Extension, Fulton Street, Berkeley, CA 94720; (510) 642-4124; Internet: cmil violet.berkeley.edu
- *NOVA University.* Regionally accredited, NOVA Southeastern is the largest private university in Florida and offers master's and doctorate degrees with a specialty in information systems. The course work is done mostly remotely over the satellite systems. Contact: NOVA Southeastern University, Center for Computer Based Learning, College Avenue, Fort Lauderdale, FL.
- *The International School of Information Management.* Offers master's degrees in information resources management. Accredited by the California Department of Education, ISIM delivers master's degree online via the Connect Inc. Network, the same network that carries ICHIEFS. Contact: The International School of Information Management, Box 1999, Santa Barbara, CA 93116-1999, Phone: (805) 685-1500, Fax: 805/685-9685, e-mail: Connect Inc.-ISIMADMIN, 3406188, Compuserve - 73320,1462
- *University of Phoenix Online.* Offers bachelor's and master's degrees in business administration via computer telecommunications. An information management course, "Information Management in Business" (CIS 564), is available. Online classes are delivered by direct dialing, through Compuserve or, shortly, via the Internet. Contact: University of Phoenix Online, California Street, Suite 505, San Francisco, CA 94111, (415) 956-2121, (800) 388-5463; fax: (415) 956-6339. ■

—MICHAEL MORIARTY

dence on a central help desk, thereby dropping costs. Software tools developed by personnel within various stations or divisions—say a spreadsheet on water available at different hose pressures run through differing lengths of hose—can be exchanged and used by others.

To do this, an electronic bulletin board system (BBS) can be used. A variety of BBSs are available. Some are cheap or free; some are not so cheap. It is wise to have the structured part of your system well analyzed before beginning to think about which product to buy. For instance, there are questions regarding whether the bulletin board can be run over a Local Area Network (LAN) and the network protocols under which they will operate. Questions such as these highlight the wisdom of knowing where you are headed with the general system before looking at BBS products.

The BBS might serve also as an electronic mail enabler. It is vital that whatever electronic mail system you choose be able to send computer files, not just a text-based message. This ability will enable users to share software tools they have constructed. After all, it is the people at the front lines who know what they need most. You will be amazed at what they come up with.

Whatever mail system you choose, it is wise to consider the technical specifications closely. For instance, if someone decides to send a cute holiday greeting to all the fire personnel (via a mailing list), does this make a copy for everyone—taking up masses of disk space—or is the replication done for everyone off one record? This can be critical. You can crash the system and quickly run out of disk space with the former setup. Another nice feature is the ability to "unsend" mail. Not very many systems have it.

Some bulletin board systems allow multiple computer types to use them easily. A number of BBS systems allow Windows®, Macintosh®, and text-based terminal emulators to use them. Windows®- and Macintosh®-based systems can use full-fledged graphical user interfaces (GUI)—icons and point and press, for example. A secondary benefit is that it is possible for personnel to log in from their home computers regardless of the platform the department has adopted as its standard. On the other hand, the GUI software also can be used as an added layer of security, to lock out unwanted visitors.

Another factor worth consideration is the ease with which a query may be made of the database used by the department. If queries must be constructed in arcane computer language, you can bet there will be a minimum of queries. This means your people will not be looking at the data from a myriad of different angles, trying to make "information" out of it. Isn't that what you are paying for? Simple query tools are required.

Some software tools allow nearly English language queries that then transparently search multiple databases (without your having to know exactly where to look) and arrive back with the answer. Look into using these tools; they will allow your people to creatively address their problems with a minimum of technical hurdles. The vast majority of your people are far less interested in mastering the intricacies of computers than in getting the information they need to assist them in their work.

Constructing information systems is no easy job. It requires a methodical approach. If you give the question a 15-minute design, you will get about 15 minutes of productive use out of your system. By paying close attention to the structured information needs of your department, as well as making room for the less definable creative possibilities residing in your personnel, you will be on the way to maximizing your investment in technology. If management remains oblivious to the information needs of front-line personnel or, because of some draconian fear, decides to consciously limit the ability to creatively utilize information and communicate with each other, the technology sitting on the desktop will continue to do just that. ■

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Oak County Simulation Training Exercises
Background Materials

Advanced Leadership Issues in Emergency Medical Services

National Fire Academy

OAK COUNTY SIMULATION TRAINING EXERCISES

Background Materials

Oak County is located in the southwestern corner of East State (ES). The county is bordered on the west by West State, on the east by Pine County, ES, on the north by Swift County, ES, and on the south by the State River and New County, ES. Oak County covers about 650 square miles and is home to just under 380,000 people. The population is largely concentrated in the city of Holly Hills (250,000), which is the county seat and the only major population center in Oak County. The remainder of the county is comprised mostly of rural farm areas. Figure 1 is a map of Oak County and its surrounding area.

The majority of Holly Hills' residents are employed in the large metropolitan area of Cedar City located across the State River and 12 miles due south of Holly Hills. Cedar City has a population of 600,000, and is the site of Cedar City Regional Hospital, a large teaching hospital and the closest Level I trauma center to Holly Hills. Cedar City is also the county seat for New County, ES. Cedar City International Airport is the only major airport serving the population of Oak and New Counties. Cedar City is shown on Figure 1.

The Oak County Fire & EMS organization is comprised 265 career members and operates on a budget of approximately $20 million per year. Average salaries for personnel are summarized in Table 1. Steady population growth in the county has supported the timely replacement of fire and EMS capital equipment. However, in the past five years Oak County has been experiencing an economic downturn due to a shrinking state budget and a reallocation of available funds.

The headquarters of Oak County Fire & EMS and the office of the Fire Chief are located in the Oak County Public Safety Complex in Holly Hills. The offices of the county mayor, county commissioners, and county administrators are in the Oak County Municipal Building, which is adjacent to the Public Safety Complex.

The Fire Chief reports directly to the county mayor with input from the County Commission and the County Manager. Internally, the Fire Chief is supported by a Deputy Chief, Administration, and a Deputy Chief, Operations. These organizational lines are shown in Figure 2. In addition to these positions, there are three individuals who are tasked frequently by the Mayor to participate in high-level EMS issues. These individuals are:

- Assistant Director of Planning, Oak County
- Assistant Administrator of Oak County Memorial Hospital
- Director of Emergency Preparedness

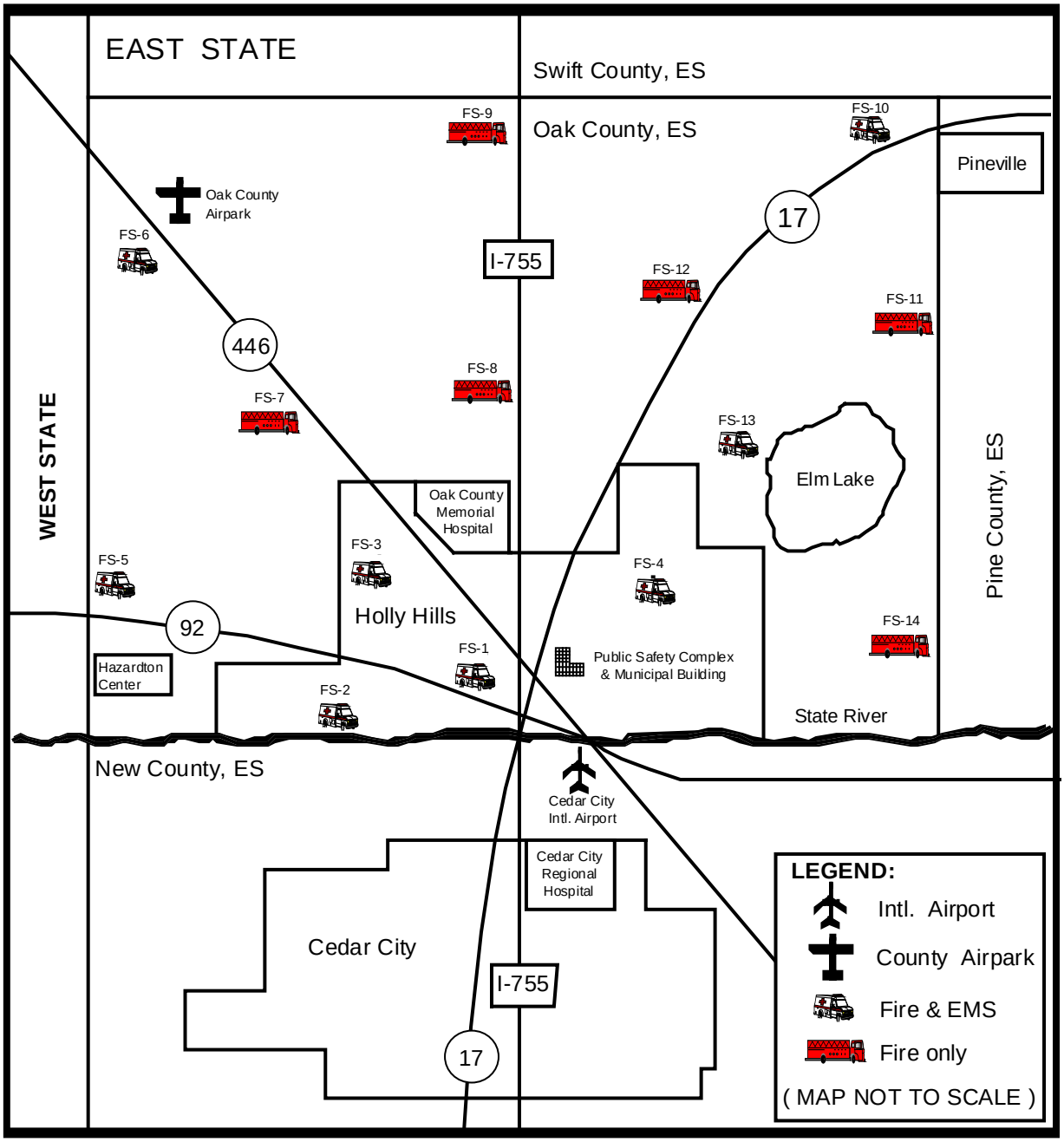

Figure 1. Map of Oak County and Surrounding Area

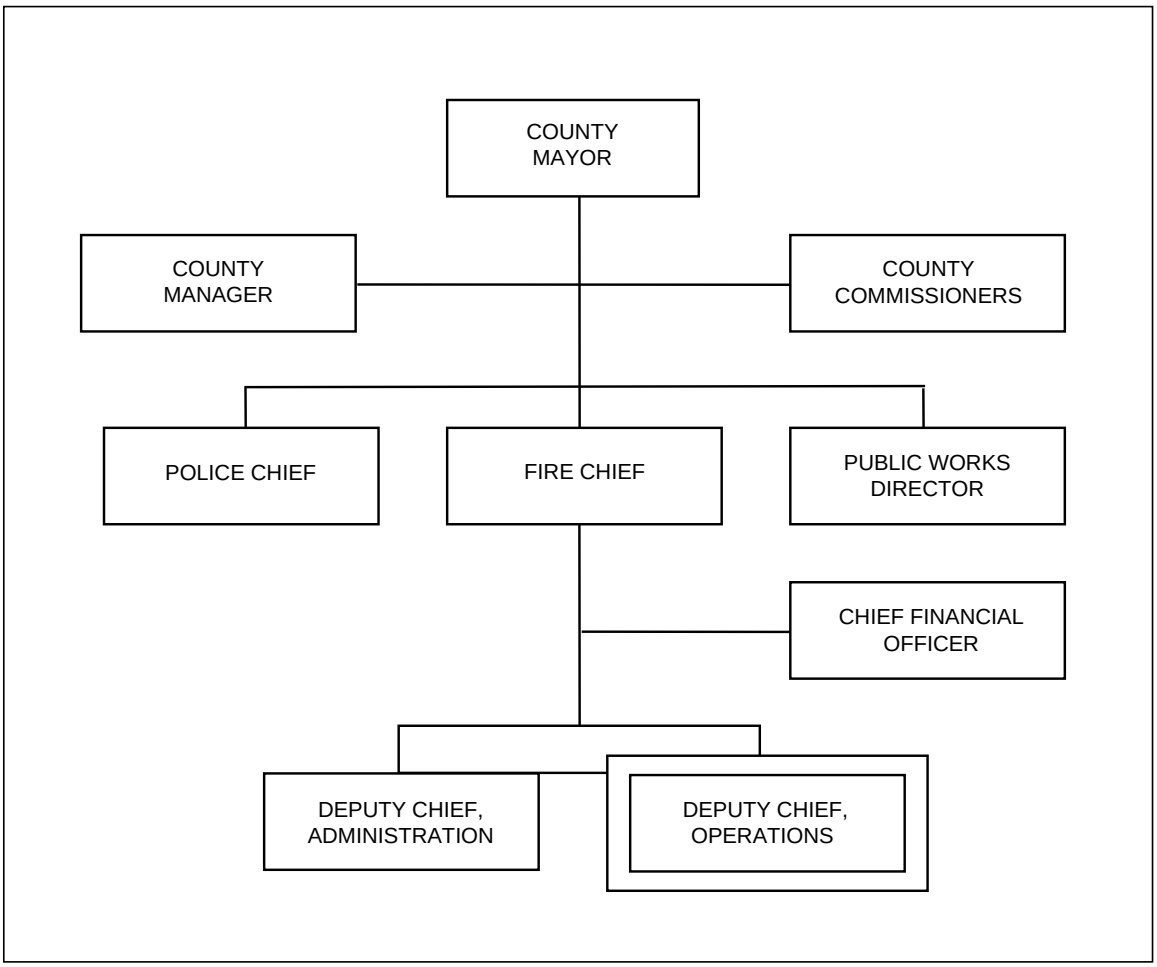

Figure 2. Oak County Organization for Public Safety

The Deputy Chief, Administration, Oak County Fire & EMS, is responsible for the Fire Prevention Office (Fire Marshal), Administrative Services, Communications Center Manager, Training Officer, and Community Relations Office as shown in Figure 3. The office of the Deputy Chief, Administration, is located in the Public Safety Complex.

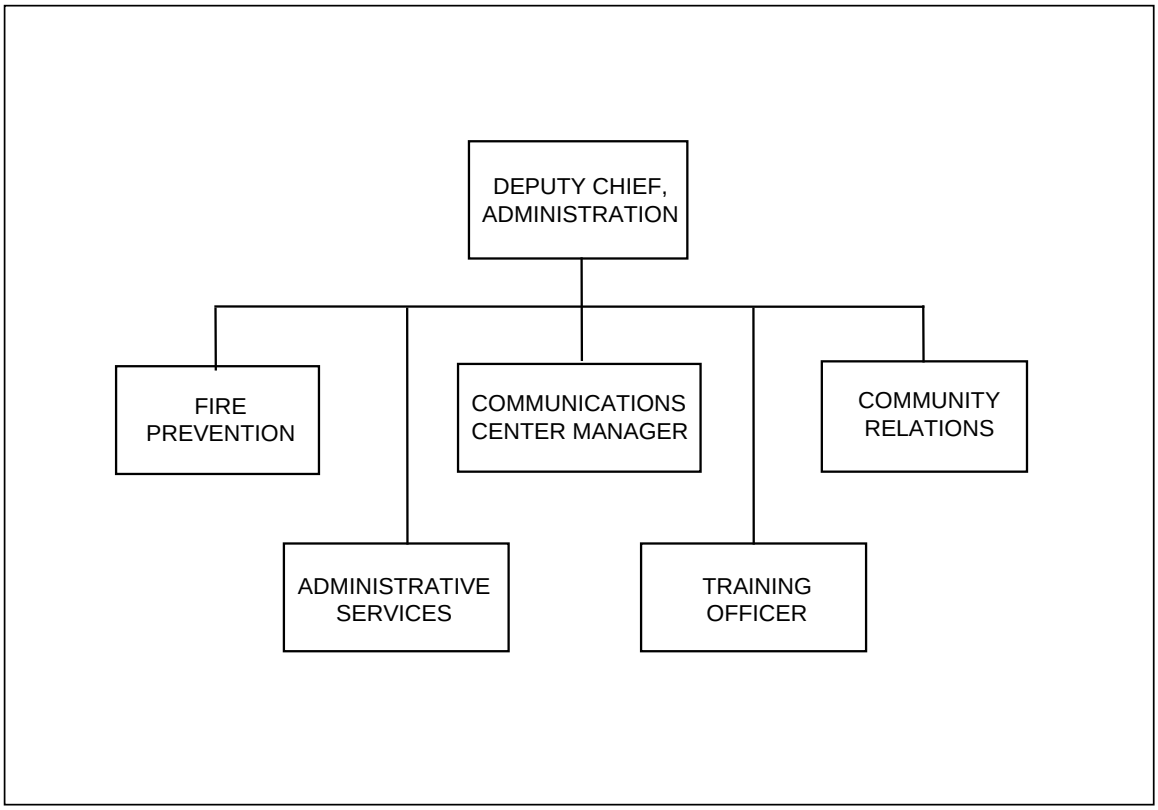

Figure 3. Organization Chart
Oak County Fire & EMS Administration Division

The Deputy Chief, Operations, Oak County Fire & EMS, is supported by three Assistant Chiefs and six Battalion Chiefs and has direct liaison with the Oak County EMS Medical Director, as shown in Figure 4. The office of the Deputy Chief, Operations, is co-located with the offices of the Assistant Chiefs in Fire Station 1. Fire Station 1 is located in the center of Holly Hills.

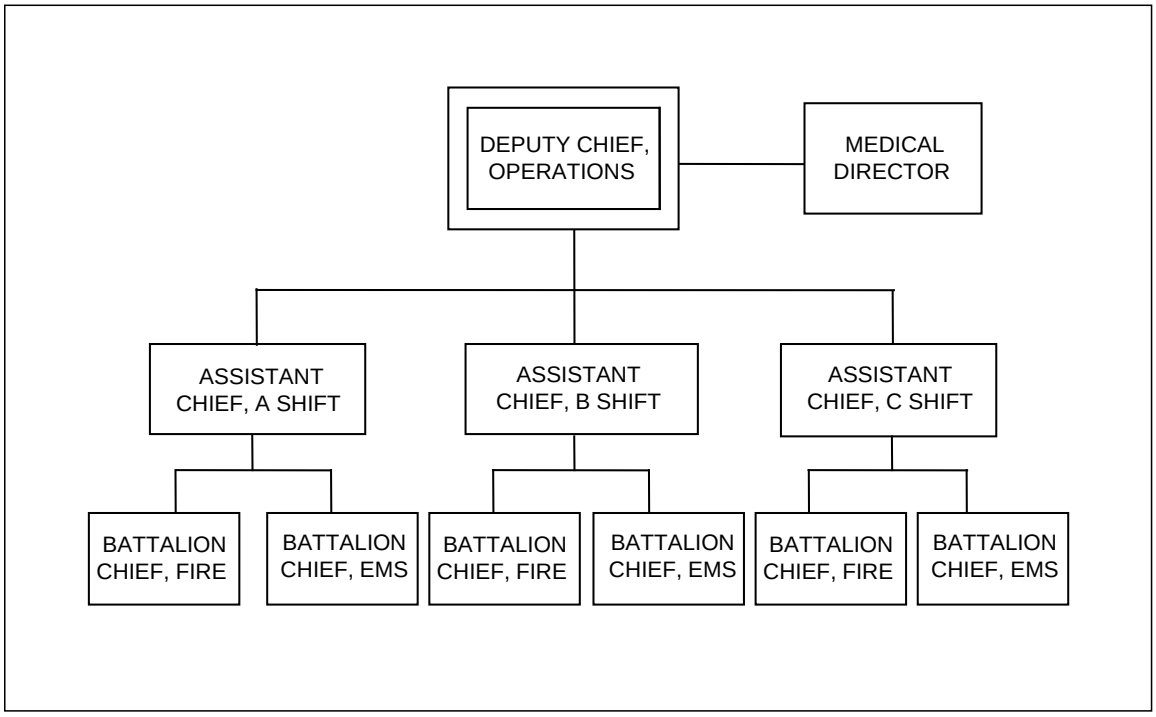

Figure 4. Organization Chart
Oak County Fire & EMS Operations Division

Oak County Fire & EMS provides service to Holly Hills and the remainder of the county through 14 fire stations, all staffed by career members. Oak County Fire & EMS is a cross-trained/dual-response department. Stations within Holly Hills can be characterized as urban in the downtown area and suburban or rural in the outlying areas. The downtown stations are the busiest, having the usual problems associated with high run loads. To enhance the response capability of Oak County Fire & EMS, mutual aid agreements are in effect with Cedar City and Pineville, East State. Pineville is a small community (population 25,000) located in Pine County, northeast of Holly Hills.

Oak County Fire & EMS shares responsibility with the Oak County EMS Medical Director for operation of the county emergency medical service as a division of the fire department. The Medical Director works directly with the Deputy Chief, Operations, to support the Oak County EMS providers. The Oak County EMS Medical Director is a part-time position, currently held by the head of the emergency department at Oak County Memorial Hospital in Holly Hills. Oak County Memorial is a 180-bed, general hospital.

As shown in Figure 4, the Deputy Chief, Operations, is the Oak County Fire & EMS officer responsible for overseeing the Oak County Emergency Medical Services Program. EMS oversight responsibilities include serving as an advisor on EMS issues to each duty shift Assistant Chief, interfacing directly with the County Medical Director, and coordinating county and non-county EMS activities. Specific duties and responsibilities of the Deputy Chief, Operations, position with regard to EMS include the following:

- Prepare Oak County annual EMS budget.
- Represent Oak County on appropriate medical committees as required.
- Serve as liaison for Oak County Fire & EMS with the County Medical Director, state EMS provider organizations, state EMS technical advisory panels, neighboring hospitals, medical institutions, and allied health groups.
- Manage training, recertification, and continuing education for all EMS personnel in the Oak County Fire & EMS organization.

Each Oak County EMS shift operates eight ambulances. Four ambulances are stationed within Holly Hills city limits, one is near the Oak County Airpark, one at Elm Lake, one on SR 17 in the northeast section of the county, and one on SR 92 near the county line. EMS shift staffing includes 16 paramedics/EMTs and an EMS Battalion Chief (Figure 5). Oak County EMS response information (alarms) by unit for the past 12 months are summarized in Table 2. Revenue information for the past 12 months is summarized in Table 3.

OAK COUNTY STATISTICS

Table 1. Average Annual Salaries (including benefits)

FF/EMT	$39,569
Paramedic	$45,724
Supervisor	$51,881
Training Officer	$51,881

Table 2. Alarms and Transports

Total Alarms	35,252
EMS Alarms	28,201
EMS Alarms By Unit	
FS-1	4,230
FS-2	4,089
FS-3	3,948
FS-4	3,807
FS-5	3,187
FS-6	2,933
FS-10	2,425
FS-13	3,582
EMS Transports	22,560
BLS Transports	19,176
ALS Transports	3384

Table 3. Revenue

Billings ($)	
BLS Transport	200.00
ALS Transport	425.00
BLS	3,835,200.00
ALS	1,438,200.00
Total	$5,274,025.00
Collected Revenues ($)	
BLS Transport	147.50
ALS Transport	259.00
BLS	2,828,545.00
ALS	876,484.00
Total	$3,705,435.50