

Emergency Response:

Stanislaus County Emergency Medical Services



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February 1999

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**A Report Prepared for the
Stanislaus County Board
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Executive Summary

Coordination of Emergency Medical Services (EMS) in California is an inherently complex task. Typically at least four distinct organizations are involved:

- the dispatch center;
- the fire department;
- the EMS transport (ambulance) provider;
- the hospital.

In many cases, each organization is completely independent from the others. Among the four entities, there is often some mixture of public and private sector service providers. And, with the possible exception of ambulance, for each participant in the system, *EMS is not the primary mission of the organization.*

The EMS system in Stanislaus County is typical of systems statewide. The county has five primary dispatch centers called Public Safety Answer Points, or PSAPs. The county has seven emergency transport providers, including two air ambulance services and five ground ambulance agencies. Some of the ground services are public entities, while others are privately owned. Like most California counties, Stanislaus is thus served by multiple dispatch centers, multiple fire agencies, and a mixture of public and private ambulance providers and hospitals.

The Stanislaus County Board of Supervisors has designated Mountain-Valley Emergency Medical Services Agency to manage EMS in the county. Mountain-Valley is a five-county joint powers authority (JPA) and Stanislaus has one seat on its board.

Any discussion of medical services in the United States in the late Twentieth Century must include the issue of managed care. The open-ended fee-for-service model of the past eventually stimulated premium payers to demand cost controls. Insurers responded with a managed care model under which nearly every medical expenditure must now be justified. Closures of marginally profitable hospitals and mergers among many others have resulted. Controls have also placed restrictions on some medical procedures and have lowered compensation for the procedures which do take place.

Reduced compensation may have particularly serious consequences for EMS. Ambulance providers, for example, have always known that a percentage of their clients would be unable to pay for their services, and have in response set fee schedules to

recover their losses. But the inevitable pressure to cut overhead and trim expenses may make such cost-shifting techniques increasingly problematic in the future.

Specific findings in Stanislaus County

The research team conducted face-to-face interviews with nearly 40 members of the EMS and governance communities in Stanislaus County. In addition, the team interviewed 12 EMS administrators from other local emergency medical services agencies (LEMSAs) around the state. The team's comparative research allowed it to determine how other counties are dealing with commonly held problems, and whether Stanislaus may learn lessons from the experience of others. The following is a list of the major subjects examined and a short description of the issues surrounding each.

The Emergency Medical Care Committee (EMCC) in Stanislaus County has been troubled for some time. Members of the Committee are often competitors, and have found it difficult to reach consensus. There are strained lines of communication between the EMCC and the Board of Supervisors. Since state law no longer mandates having an EMCC, now may be an ideal opportunity to reexamine the mission and goals of the Committee.

Participation in the Mountain-Valley Joint Powers Authority is the best of the current options available to the people of Stanislaus County. The arrangement is cost-effective and has not been politically detrimental to the interests of the County.

Overall EMS costs in the County appear to be reasonable when compared with the experience of other counties in the state. However, data do indicate that collectively public payers account for more than half of EMS gross revenues. Since the national average is less than 25%, this indicates that EMS in Stanislaus is a significant fiscal issue for county government.

While the EMS system cannot be eliminated, programs to prevent emergency medical problems offer the best hope for cost savings. Given the population mix in the County, one preventive program might be an emphasis on bilingual projects.

There is a high degree of satisfaction with EMS among the people of Stanislaus County. Interviews, surveys, and focus groups all confirm the public's very positive attitude toward the County's prehospital system. At the same time, healthcare

professionals throughout the County stress the need to improve system quality and performance at all levels.

Many of the issues facing Stanislaus also face the EMS industry as a whole. The question of public- versus private-sector ambulance service is an example. Fire officials argue that their people are typically the first to arrive at an incident and that they provide critical patient care in the initial stages of a medical emergency. Further, fire personnel often assist private ambulance crews by aiding in patient extrication, loading, and in care en route to the hospital. Currently, however, fire departments do not receive compensation for their crucial services if they do not physically transport the patient to the emergency ward.

For their part, private ambulance companies contend that transport by firefighters tends to dilute medical skills by infringing on the involvement of medics. Moreover, the private providers point out that not all fire agencies are in a position to enter the Advanced Life Support (ALS) transit field, and that those who are tend to be in the densely-populated, more profitable communities. If the private sector is to serve the less populated areas, it must also have access to the more lucrative urban populations in order to stay profitable.

Another related question is whether a single private ALS company should be granted exclusive rights to the entire County. Such a program might be appealing since it could offer a uniformity of service countywide. However, granting a monopoly to any private sector organization is problematic since monopolies have little incentive to price competitively or be responsive to consumers.

EMS dispatch is an area where the benefits of consolidation are fairly clear. Due to the development of its new dispatch center, the County has a window of opportunity to bring fire and ambulance dispatch under one roof.

The closure of many local hospitals is not necessarily a bad situation for County residents, provided that they continue to have access to high-quality emergency transport and non-emergency health services.

Given the complex inter-organizational relationships involved in the EMS system of a large county, it is unrealistic to expect all the elements to work without friction. However, it is crucial that the disparate entities work in harmony for the benefit of

Stanislaus residents. In its dual roles as facilitator and regulator, Mountain-Valley EMSA is well positioned to coordinate this work.

Policy options and areas for further research

The creation of a new dispatch center is only one example of the potential for cost savings and cooperation in Stanislaus County EMS. Plans exist for the creation of a combined police-fire-health center in Modesto. Such a facility could enhance citizen service while giving cities and fire agencies an active role in EMS system design. Similarly, public-private partnerships among ambulance providers and hospitals could enhance the coordination of efforts between government and business in the County.

A re-examination of the roles and mission of the EMCC offers a similar opportunity to bring stakeholders into the decision-making process in a meaningful way. The current arrangement has been unsatisfactory for both participants and the County. The potential redesign of this body merits further exploration.

Neither creation of a single countywide ambulance service, nor expansion of fire agencies into ALS transport, is justifiable at this time. However, there will probably be significant changes in ambulance compensation over the coming 24 months. Indeed, there may be significant changes in the overall matrix of prehospital service. First responders may be compensated for their efforts. And ambulance companies may in time be paid for their services even when they do not transport patients. All of these developments merit close monitoring and an openness to change as circumstances warrant.

The residents of Stanislaus County would be well served if EMS personnel were able to apply their skills in non-emergency situations. While the County cannot unilaterally solve this scope-of-practice issue, it can actively support efforts to do so in the state legislature.

Safety and prevention programs offer the County a cost-effective method for reducing EMS expenditures. Stanislaus already has several programs in place which could be broadened or enhanced. Given the diversity of the County's population, it is important that most of these programs, to be effective, contain a multi-lingual component. In addition, efforts to broaden existing programs for indigent care have the

potential to reduce EMS costs by addressing medical conditions while they are still at manageable levels and do not require an EMS response.

Since the issues facing EMS in this County are not unique to Stanislaus, the County can benefit by participating through the Mountain-Valley EMSA in statewide efforts at problem resolution. While Stanislaus need not wait for solutions to come from Sacramento before taking action, it can benefit by monitoring the efforts of other counties and learning from their experiences.

Although public satisfaction with the EMS system is demonstrably high, it is also true that many, even within the EMS community, are not aware of the responsibilities and efforts of the various system participants. Public education and media programs, designed to highlight both the statistical and human elements of EMS, could pay dividends in terms of both heightened awareness of the benefits of EMS and political support for enhancements of the system.

A high quality, prehospital emergency system needs to be the goal of any EMS program. Delivering such a system will require close monitoring of each of the system's participants and coordination of all their activities. Stanislaus County has a strong foundation upon which to build the EMS system its people will need in the decades to come.

1. An Overview of Emergency Medical Services

Management of Emergency Medical Services (EMS) is an inherently complex task. Typically at least four distinct organizations are involved:

- The dispatch center;
- The fire department;
- The EMS transport provider;
- The hospital.

In many cases, each organization is completely independent from the other. Among the four components, there is typically some mixture of public and private sector organizations. And, with the possible exception of ambulance, for each component of the system, *EMS is not the primary mission of the organization.*

Management of EMS thus requires a sophisticated coordination of disparate groups with different priorities so that they will work together as needed during the course of any particular incident.

In much of California, the process is made all the more challenging by the fact that Local Emergency Medical Services Agencies (LEMSAs) are established on a multi-county basis via an agreement creating a Joint Powers Authority (JPA), an intergovernmental contract, or establishment of a non-profit entity to serve the needs of several counties. These arrangements virtually guarantee that already delicate inter-organizational relationships are overlaid with the political self-interests that are common to any multi-governmental system.

In addition, since the state delegated management responsibility to the counties, many, indeed sometimes all, of the parties actually involved in providing EMS have no direct voice in the management of the system. The result has been a serious degree of frustration for many system participants. This past year, for example, a bill was introduced in the state assembly that would have given cities and special districts more direct control over EMS transport within their boundaries. Though the bill did not pass, its very existence demonstrated a growing desire by system providers for greater participation in the EMS process. Similarly, a yearlong effort by the California State

Emergency Medical Services Authority to set the course for the future of EMS has embraced "shared governance" as one of its objectives.

To illustrate the challenge of EMS management, consider the course of a hypothetical two-car accident at 9:00 p.m. on a Wednesday night in the City of Modesto. A citizen observes the crash and calls 911 from a nearby pay phone. The call would be received by the Stanislaus County dispatch center, currently located in the basement of the county administration building at H and 10th Streets.

County dispatch is responsible for handling the communications needs of five law enforcement agencies and fifteen fire agencies. It currently functions as a department of Stanislaus County government. In this hypothetical case, it would send both Modesto Police and Modesto Fire to the scene. Dispatchers would also notify the secondary Public Safety Answering Point, PSAP for American Medical Response (AMR), a private ambulance company, because AMR is responsible for EMS transport in the city of Modesto.

In many cases, Modesto Fire would arrive on scene first, since fire staffing remains constant throughout the day. AMR staffing varies in response to call volume demands. As the highest medical authority on scene, fire would assume responsibility for patient care until an AMR paramedic arrived. Fire duties would include such activities as patient stabilization, extrication, and preparation for transport.

When AMR arrived on scene, assuming that transportation was clearly needed, the paramedic would verify patient condition, provide appropriate treatment, assure that the patient was fully prepared for transport, and then load the patient into the ambulance for a ride to the hospital. However, fire personnel might stay involved in the process, helping to load the patient in the ambulance and, depending on en route treatment needs, might ride in the ambulance to the hospital to assist the paramedic with patient care.

Upon arrival at the hospital, patient care responsibilities would be transferred to hospital personnel while fire and ambulance staff would prepare to return to their duties in the field.

In the above illustration each of the agencies involved is entirely independent from the other. County dispatch is a department of Stanislaus County Government.

Modesto Fire is a department of the City of Modesto. AMR is a national company owned by Laidlaw of Canada. Neither of the Modesto hospitals is a public sector entity.

In each case, Emergency Medical Services is not the primary function of the organization. County dispatch is responsible for handling incidents for twenty different law enforcement and fire agencies. While emergency services are an increasingly important part of its business, AMR still generates much of its revenue from non-emergency, inter-facility transport operations. And the Emergency Department is only a minor part of the profit picture at any hospital.

Coordinating all of these components to serve the people of Stanislaus County is the Mountain-Valley Emergency Medical Services Agency. This Local Emergency Medical Services Agency (LEMSA) has been designated by the Stanislaus County Board of Supervisors to oversee EMS efforts in the county.

Yet, even Mountain-Valley has multiple tasks and allegiances. The agency is not a county department but rather a Joint Powers Authority (JPA) created by an agreement among Stanislaus, Alpine, Amador, Calaveras, and Mariposa counties. Although Stanislaus is the host county for Mountain-Valley and although the population of Stanislaus County is nearly five times that of its partner counties combined, Stanislaus has but one vote on the JPA's five-member governing board.

Given the amazing complexity of the system, the complete independence of the components, and the fact that none of the organizations involved has the emergency medical needs of the residents of Stanislaus County as its sole responsibility, it is impressive that the system works at all. What is truly remarkable, is that the system works at the high level of quality that it has achieved.

The purpose of this report is to investigate the system as it now exists, identify the major issues in the current system, compare system performance with the experiences of other organizations delivering emergency services to the people of California, and make comments and recommendations on potential improvements and enhancements.

In the course of compiling this report, the research team has spent the past year conducting face-to-face interviews with more than fifty individuals. In addition to Mountain-Valley and its five county members, representatives have visited twelve other LEMSAs around the state of California, representing 30 of the state's 58 counties.

Members of the group have attended three of the five meetings of the State Emergency Medical Services Commission that have taken place over the course of this study. A representative also attended a two-day conference held by the EMS Commission on the future of EMS in California.

2. History of EMS in California

Although historians like to trace the history of Emergency Medical Service back to historic battlefields, the history of civilian EMS in the United States is relatively short.

A case can be made that American EMS dates back to at least the Civil War and the medical evacuation disaster by the Union Army at Bull Run (Boyd, 2). Shelby Foote writes that procedures were so primitive that at least some wounded soldiers begged to be allowed to die by the roadside rather than ride in the rigid wagons that served as "ambulances" at Gettysburg (Foote, 271).

Happily, advances in military emergency medicine occurred in each successive war.

Advances in field resuscitation, efficiency of transportation and energetic treatment of military casualties have proved to be major factors in the decrease in the death rates of battle casualties reaching facilities: from 8% in World War I to 4.5% in World War II to 2.5% in Korea to less than 2% in Viet Nam (Boyd ,2).

The nation's highways have been a major source of EMS incidents in the United States. While there was some discussion of improving traffic safety in the mid-1950s, and Senator John Kennedy mentioned the problem in the 1960 Presidential campaign, it was not until 1966 when the issue of emergency medical service arrived on the national agenda.

In his 1966 State of the Union address, President Lyndon Johnson proposed a Traffic Safety Act, noting that safety had not been a top priority for either the national government nor private industry. "Yet, we know that expensive freeways, powerful engines, and smooth exteriors will not stop the massacre on our roads" (Boyd, 5). In September of that year, the president signed the Highway Safety Act of 1966 and the National Traffic and Motor Vehicle Safety Act of 1966.

That same month, a landmark report was released by the National Academy of Sciences and the National Research Council. The Report, Accidental Death and Disability: The Neglected Disease of Modern Society, identified accidental injury as "...the nation's most important environmental health problem. It is the leading cause of death in the first half of life's span" (5). "Expert consultants returning from both Korea

and Vietnam have publicly asserted that, if seriously wounded, their chances of survival would be better in the zone of combat than on an average city street" (12).

While the report identified prevention as the ultimate solution to the problem and proposed a National Council on Accident Prevention, it went on to make a series of specific recommendations that, for more than three decades, have provided a blueprint for improving response to medical emergencies.

Noting that more than half of the country's ambulance services were provided by morticians, the authors asserted that,

Adequate ambulance services are as much a municipal responsibility as firefighting and police services. If the community does not provide ambulance services directly, the quality of these services should be controlled by licensing procedures and by adequate surveillance of volunteer and commercial ambulance companies.(National Academy of Sciences, 13)

The report addressed the need for improved training of emergency personnel and enhanced communications. It proposed standards for evaluating hospital emergency departments. The study also recognized the importance of maintaining emergency data and called for the establishment of trauma registries. The authors noted the special emergency circumstances surrounding disasters and the importance of "integration of public resources" (National Academy of Sciences, 28).

The 1970s television series "Emergency" is credited by several authors for stimulating interest in EMS in local communities throughout the country. Its 132 episodes ran on NBC from 1972 through 1977. The model portrayed in the show - that of a trained ambulance crew dedicated to emergency medical response - was assumed by many viewers to be the standard in their own communities. Since reality did not imitate art in most areas, policy makers began working to meet citizen expectations by upgrading local EMS systems.

The growing interest in EMS in the early '70s resulted in the creation of a program by the Robert Wood Johnson Foundation. In an effort to encourage the development of regional emergency systems, the Foundation sponsored grants, awarded on a competitive basis by an evaluation committee.

The committee recommended forty-four regions for grant support of up to \$400,000 each. Grants were announced in May 1974 and involved thirty-two states and Puerto Rico. The Foundation concluded that emergency medical care could be strengthened through regionally based communications systems that integrated an area's emergency care resources into a comprehensive network of services (Boyd, 16). (See also Archibald et al., 3)

The program, which ended in 1977, established the basis for many regional EMS systems which have continued to this day.

At that same time, the national government was also working to support EMS regions. The Emergency Medical Services Systems Act of 1973 established 15 system components for regional EMS programs:

1. Provision of manpower.
2. Training of personnel.
3. Communications.
4. Transportation.
5. Facilities.
6. Critical care units.
7. Use of public safety agencies.
8. Consumer participation.
9. Accessibility of care.
10. Transfer of patients.
11. Standard medical record keeping.
12. Consumer information and education.
13. Independent review and evaluation.
14. Disaster linkage.
15. Mutual aid agreements (Boyd, 18).

Significantly, the act also "forbids any withholding of needed emergency medical services to any victims by a participating health care facility because of inability to pay for these services in any EMS funded region" (Boyd, 19).

In 1975, the State of California published a Plan for Emergency Medical Services. The plan identified a broad range of problems plaguing the existing system, including fragmentation of responsibility, maldistribution of resources, lack of a method for identifying the capabilities of EMS health facilities, inadequate financing, lack of public education about EMS, the use of EMS for routine, non-urgent health care services, and the lack of uniform statewide data. Given this wide range of problems, the plan identified

the following goal: "Development of a statewide system capable of assuring throughout California, ready access to high quality emergency medical services" (Lackner, 14).

Eight objectives were established to help the state meet this goal.

1. Develop criteria for the establishment of EMS areas for functional purposes.
 2. Clarify State responsibility and authority for planning and overall regulation of EMS.
 3. Minimize major deficiencies and unnecessary duplication in the provision of EMS.
 4. Establish criteria for classification and approval of EMS facilities.
 5. Define EMS manpower roles and responsibilities.
 6. Provide for review, comment, and approval relative to federal, state, and local funding for EMS.
 7. Establish public information programs that promote appropriate use of EMS.
 8. Collect, analyze, and disseminate EMS data that is uniform statewide.
- (Lackner, 14).

As will be seen throughout the present report, the EMS community shares many of these same objectives 23 years later. This similarity is not because there has been a lack of sincere effort to address these problems. Rather, one can attribute much of the difficulty to the complexity and problematic nature of the system itself.

Chapter 4 of Division 2.5 of the Health and Safety Code allows each county to create an EMS program and establishes the criteria under which the program will function. An essential requirement of any county EMS effort is the selection of an agency to coordinate EMS within the county. "Each county developing such a program shall designate a local EMS agency" (California 1997a 1797.200). There are currently 32 Local Emergency Services Agencies (LEMSAs). Since LEMSAs can serve more than one county, that number is subject to some fluctuation as, some counties leave, and others enter into, multi-county arrangements.

According to the Emergency Medical Services Administrators Association of California (EMSAAC), LEMSAs were created in the early 1980s in response to problems created in the 1970s during the implementation of paramedic and emergency care programs. The problems were "serious with jurisdictional conflicts and financial interest

conflicting with patient care. In addition, there was a lack of coordination between participants in the EMS System" (EMSAAC, 4). The role of LEMSAs, or the perception of that role, has changed over time but, according to EMSAAC, its essential function remains. "The primary role of the LEMSA is the integration of system services, the provision of medical direction and appropriate medical standards, and system planning" (EMSAAC 4).

There is another element of the H&S Act that has been controversial for nearly 30 years. Section 1797.201 allows, upon request, any city or fire district that was providing EMS service prior to June 1, 1980, to enter into a contract with the county to continue those services. Section 1797.224 further allows a LEMSA to create an exclusive operating area (EOA) and grant it, without competitive bid, to providers who have been operating in the EMS area since January 1, 1981. The fact that these provisions have been interpreted to extend to purchasers of ambulance companies has created an ongoing "grandfathering" cycle in many areas. That is, as the marketplace has forced buyouts and consolidations in the ambulance industry, successor companies have enjoyed non-competitive EOAs in some very lucrative markets.

This situation has been troublesome for some LEMSAs who have felt their "hands tied" in designing systems to meet changing needs in their service areas. It has also been problematic for cities and fire agencies that are interested in initiating Advanced Life Support (ALS) transport but are located in a non-competitive EOA. This issue reached the state legislature in 1998, when Assembly Member Deborah Ortiz introduced Assembly Bill No. 2586 (AB 2586). This measure would have eliminated the non-competitive protections of Section 1797.224 and would have allowed cities and fire districts to establish EOAs in their jurisdictions. Though it failed on the assembly floor, AB 2586 is a good example of the complicated and sometimes conflicting relationships between public and private EMS organizations.

Managed Health Care

A relatively recent development has dramatically changed the way healthcare is delivered in the United States. The transformation from a fee-for-service insurance system to a managed care model has made cost containment a priority in nearly every facet of the medical industry.

As recently as the late 1940s, medical services in the United States accounted for just four percent of GNP. In 1945, President Harry Truman proposed a national healthcare system, saying "We can afford to spend more on health" (Anders, 19). Though Truman's plan was labeled socialized medicine and did not succeed, health insurance had become a popular benefit by the end of the 1940s and labor unions increasingly pressed to get coverage for their members in labor negotiations. As this trend developed, corporate America became the primary source of funding for the health care industry. Still, health-care providers, particularly physicians, viewed insurance merely as a way to receive payment. In the 1950's, the head of the American Hospital Association told a meeting of Blue Cross that insurance should be "an agency for the prepayment of hospital care as it is determined by the hospitals and doctors" (Anders 23).

Over time, this open check book system encouraged unnecessary medical procedures and escalating costs. By the late 1980s corporations and other premium payers started demanding cost controls and containment from their insurance providers and the insurance industry responded aggressively. Many medical decisions now require justification and are subject to insurance company review.

The impact on the emergency medical system varies by area. Prehospital service providers in large urban areas report a significant impact. Hospital corporations are signing contracts with ambulance services to provide for their members on a "capitated" basis. That is, for a flat annual fee, ambulance companies agree to provide service to all of the managed care organization (MCO) members. In some cases, the flat fee is rigid. In others, the parties "settle up" at the end of the year. Though many EMS administrators who operate outside of the Bay Area, Los Angeles Basin, and San Diego report minimal impact from managed care at this time, most believe "the future is just over the hills."

The emergency medical services system in the United States has evolved largely along parallel lines with other public safety models such as law enforcement and fire suppression. Due to the inherent uncertainty of emergency situations, these systems tend to maintain excess capacity in most of their operations so that they can be effective and fully functional when called upon in a crisis situation. This model does not fit well with the cost-efficient demands of managed care. The process of identifying a middle ground

between these two organizational cultures is currently underway in both the marketplace and in legislatures throughout the country.

For example, some MCOs are encouraging their members to call an 800 number rather than 911 when they believe they are facing an emergency. Others are withholding payment for "emergency services" which did not receive pre-authorization. At the same time, legislation is being introduced at both the state and national level which would ban alternatives to 911 and would mandate payments for emergency services provided by "reasonable" decision makers, whether or not they were later shown to have been medically necessary.

The competing values of cost effective medical care and universal access to emergency services have resulted in a public debate which will ensue for many years to come.

3. The Current System in Stanislaus County

Emergency medical services (EMS) traditionally include four major elements. These are dispatch, first response, ALS transport, and the hospital emergency department. In Stanislaus County, a myriad of governmental and private agencies provide these services.

Dispatch

The 911 system connects the reporting party to a dispatch center called a Public Safety Answering Point, or PSAP. Since 911 can be used for a variety of emergency services, including police, fire, medical, and hazardous materials, a system of PSAPs has evolved in an effort to send the appropriate agencies to a particular incident. Thus, a network of primary and secondary PSAPs exists throughout Stanislaus County.

A primary PSAP is the reporting party's first point of contact. Sometimes an incident can be completely managed by the agency or agencies tied to the primary PSAP. Other incidents may require the involvement of secondary PSAPs.

Stanislaus County is currently served by seven PSAPs. The city of Ceres, Turlock, and Oakdale each has its own primary PSAP. The Stanislaus County Emergency Dispatch Center is currently located in the basement of the County Administration Building and handles all 911 reports in the county other than those from cellular phones. At this time, all cellular 911 calls go through the CHP office in Merced County.

There are two secondary PSAPs in the county each serving the various medical transport agencies. American Medical Response (AMR), which serves most of the county along the Highway 99 corridor, has its own PSAP. Medcom, which was originally created to dispatch the helicopters for Memorial Hospital, now also serves under contract as the PSAP for Hughson Ambulance, Oak Valley Ambulance, Patterson Ambulance, and West Side Ambulance.

The county is currently in the process of moving the Stanislaus County PSAP into new quarters at a facility on Oakdale Road. A number of agencies are actively considering contracting for dispatch services from this new facility.

The wireless phone situation is not unique to Stanislaus County. Because of a variety of special technical problems with wireless communications, a central organization has been designated to sort out all 911 wireless in each state. For California, that responsibility has been delegated to the California Highway Patrol (CHP). All involved freely admit that this creates problems. "During peak traffic periods, [CHP] is often overwhelmed with call traffic" (Stamison, 1).

However, advances in technology coupled with new regulations may alienate the problem in the near future. In 1996 the Federal Communications Commission (FCC) mandated that wireless carriers install Automatic Number Identification (ANI) in their systems within 18 months. FCC rules call for carriers to be able to "identify the latitude and longitude of a mobile unit making a 911 call, within a radius of no more than 125 meters in 67 percent of all cases" by June of 2001 (FCC, 4) .

As reliance upon emergency dispatch systems has grown, the process has become more sophisticated. While a small number of entry points may be desirable for technical and budgetary reasons, it is now generally believed that police dispatch activities should be kept largely separate, while fire and ambulance dispatch can be closely coordinated. "EMS 2000" accurately outlines the optimum system:

when possible, a single 911 PSAP for the county which provides all dispatch for fire, law enforcement and ambulances. Fire and ambulance dispatch should be conducted from a common dispatch terminal (s), law enforcement should be dispatched from a separate terminal(s) (MVEMSA 1995, 9).

This is not to suggest that police, fire, and ambulance cannot be handled by the same PSAP facility. It does mean, however, that some dispatchers should be dedicated to police work while others can coordinate fire and ambulance efforts. This is essentially the model under which County Dispatch currently operates.

Fire

Stanislaus County is served by a combination of 19 different fire agencies. Some have paid personnel; others are served by volunteers. Some are city departments. Others are independent fire districts.

The agencies include Burbank-Paradise, Ceres City Fire, Ceres Fire Protection District, Denair, Hughson, Mountain View, Keyes, Modesto, Oakdale City, Oakdale Rural, Westport, Salida, Stanislaus Consolidated, Turlock City, Turlock Rural, West Stanislaus, Woodland Avenue, Valley Home, Patterson, and Newman.

No fire agency in the county currently provides ALS response. No fire agency has been authorized to carry paramedic personnel on its engines. Under current county protocols, firefighters having paramedic skills are not permitted to use those skills while acting as firefighters.

Most fire personnel in Stanislaus County are trained at First-Responder skill levels. These skills include patient stabilization, airway management, traditional cardio-pulmonary resuscitation (CPR), wound treatment, splinting, and preparation for transport. Many fire organizations now also carry Automated External Defibrillators (AEDs) on first-responding EMS vehicles. The use of AEDs and traditional CPR has been shown statistically to be the two most effective life-saving procedures that can be administered by pre-hospital personnel.

Fire personnel are often called upon to assist ambulance staff with such activities as moving patients and loading them into ambulances. In serious cases, it is not unusual for firefighters to ride in the ambulance to assist in providing patient care en route to the hospital. Round trips of twenty miles are common, and round trips of even sixty miles are possible from the outlying areas. As a result, the impact on the response capabilities of rural agencies, which rely heavily on volunteer fire fighters, is substantial.

EMS Transport

Five ground ambulance agencies and two air ambulance units provide transportation from the scenes of EMS incidents.

The county is divided into nine operating areas for ground transport. Six of these are Exclusive Operating Areas and three are Non-Exclusive Operating Areas. The two air ambulance providers serve the county on alternating 24-hour schedules.

The majority of the county's population is served by American Medical Response (AMR), whose service areas are concentrated along the Highway 99 corridor. Hughson

Ambulance serves the city of Hughson and adjacent areas. Both AMR and Hughson are private ambulance companies.

Special district ambulance agencies serve the balance of the county. Oak Valley Ambulance, part of the Oak Valley Hospital District, responds in the northeast regions of the county. Although Del Puerto Hospital recently closed, the Del Puerto Hospital District continues to run Patterson Ambulance and serve the majority of the west county's population. Newman and the southern tip of Stanislaus County receive ambulance service from the West Side Community Hospital District.

The county's air ambulance service is provided by the two hospitals located in Modesto. Air Med is run by Doctors Medical Center (DMC) and Medi-Flight is a service of Memorial Medical Center. In Stanislaus County the two services share primary response duties on an alternating 24-hour schedule. However, both organizations function in other counties as well and are, therefore, available to provide backup service in the event that multiple units are needed on a given day.

Hospitals

As recently as 1983, the California State Emergency Medical Services Authority listed 10 hospitals in Stanislaus County (EMSA 1983, 275). In 1997 there were still six hospitals in the county. As of this writing there are four.

The two largest facilities, Doctors Medical Center and Memorial Medical Center, sit within a few blocks of each other in the City of Modesto. Turlock is served by Emanuel Hospital. The Oak Valley Hospital District runs the Oak Valley District Hospital in Oakdale. Only Oak Valley is publicly owned. The County closed its only hospital, Stanislaus Medical Center, in November 1997. Del Puerto, in Patterson, closed its doors on May 1, 1998.

Mountain-Valley Emergency Medical Services Agency

Each of California's 58 counties is empowered to designate a Local Emergency Medical Services Agency (LEMSA) to coordinate EMS services within the county. In 1981 Stanislaus County entered into a Joint Powers Agreement to create a Joint Powers Authority which is currently known as the Mountain-Valley Emergency Medical Services

Agency. The county's current partners in the JPA include the counties of Alpine, Amador, Calaveras, and Mariposa.

The Agency has a staff of ten including Executive Director Steve Andriese, Deputy Director Doug Buchanan, and a variety of specialists and liaison personnel.

Its current budget of \$937,890 comprises three elements: member contributions, state matching funds, and state grant money. The County's current contribution is set at \$.41 / per capita or \$171,995 for Fiscal Year 1998/99.

Special state funding for regional LEMSAs results from the Health and Safety Code, Division 2.5, section 1797.108. The state Emergency Medical Services Authority,

may provide special funding to multi-county EMS agencies which serve rural areas with extensive tourism to reduce the burden on the rural EMS agency of providing the increased emergency medical services due to that tourism (California 1997a, §1797.108).

This statute has evolved to mean that a multi-county agency of three or more counties qualifies for funding. In the California State budget for FY 99, an additional \$800,000 was set aside to augment this fund. Mountain-Valley's share of this augmentation is \$117,000 (MVEMSA 1998c, 1).

Mountain-Valley is a strong competitor for annual grants from the state EMSA. This year the Agency received \$120,000 to develop standards and guidelines for statewide EMS system evaluation (Wilson, 2).

Cities and Special Districts

Sub-county governments have relatively little authority in this area. City and special district fire agencies have discretion regarding the types of incident to which they will respond and the equipment they will use. However, use of ALS medical skills and the ability to provide medical transport require authorization from Mountain-Valley EMS. Most firefighters in the county have first responder medical training. Use of AEDs, use of EMT-1 or EMT-P skills by firefighters, and Basic Life Support (BLS) or Advanced Life Support (ALS) transport are all subject to approval by the LEMSA.

Recently there was a significant legal challenge to the authority of local EMS agencies. In 1997, the California Supreme Court largely upheld the power of LEMSAs to control medical standards in cities. In County of San Bernardino v. City of San Bernardino, the Court determined that,

...the local EMS agency in San Bernardino (the County) had the authority to subject the City to the medical protocols at issue in the case; the City may not expand beyond the types of emergency medical services it provided as of June 1, 1980; and the City may not exclude the County provider from furnishing ambulance transport services (EMSA 1997b, 1).

Largely in response to the San Bernardino decision, Assembly Bill 2586 (Ortiz) was introduced in the California state legislature in 1998. Although the bill did not pass in the Assembly, it did generate a great deal of support among cities and fire districts. Among other things, the bill would have allowed

...a city or fire district to create one or more exclusive operating areas within its jurisdiction..." and eliminate "...the exemption from the competitive bidding process for EMS that applies when the county continues to allow existing providers to offer services in the manner and scope in which they have been provided since 1981 (Blackwood, 1).

Issues concerning local control of EMS obviously generate a great deal of political controversy.

State

The State of California has ultimate authority over emergency medical services. The Emergency Medical Services Commission provides oversight to the State Emergency Medical Services Authority (EMSA). The Commission is a 16-member board whose composition is defined by Health and Safety Code, Division 2.5 §1799.2. The panel includes physicians, a nurse, a medic, private providers, fire protection personnel and peace officers. The EMSA is currently reviewing the Commission's membership in order to achieve a goal of shared governance in state EMS by creating a better balance of stakeholder representatives (EMSA Dec. 1998, 65).

The Authority itself was created in 1980 by the Health and Safety Code, Division 2.5 §1797.1, in an effort to "...establish a state lead agency and centralized resource to deal with emergency and disaster medical services" (EMSA 1998, 1).

The Authority is charged with several important program responsibilities including:

- EMS personnel and systems development;
- disaster medical services;
- data collection;
- injury prevention;
- EMS for children (EMSA 1998, 1).

4) Public Perceptions of the EMS system

Introduction

One goal of this project was to survey residents' attitudes toward, and opinions about, emergency medical services. The research team utilized several techniques to collect information about such public perceptions. This section of the study reports the results collected through a citizen survey, a user survey, and focus groups. The researchers conducted all surveys and focus groups in both English and Spanish.

Research Methodology

Three separate and distinct research methodologies were utilized in this part of the project. The first phase of the project was a series of face-to-face interviews with knowledgeable persons in the community. Those interviewed included people from political offices, members of fire and police departments, hospital administrators, staff members of Mountain-Valley EMS, personnel from ambulance companies, representatives from the business community, and other interested parties. These initial interviews were to sensitize research members to the problems and concerns of those directly and indirectly impacted by the study. In addition, these discussions provided the relevant background that would form the later randomized surveys that were asked of Stanislaus County residents.

The first portion of the perceptions element of the study was a randomized phone survey of all Stanislaus County residents. The survey consisted of a series of thirty-three questions that measured residents' level of satisfaction with emergency medical services. (Citizen survey is in Appendix A). The researchers utilized a complete list of all county telephone numbers. From this list a systematic sample was taken. A systematic sample is an approved method of selecting a population sample from a larger population universe, in this case all telephones numbers in Stanislaus County.

This research methodology is widely used nationally, since more than ninety-eight percent of Americans now have telephones. The researchers contacted those persons included in the sample for a five- to ten-minute survey. Those contacted and completing the survey numbered 400. Results of this sample can be generalized to the entire Stanislaus County population of 410,870.

The second element of the perception portion of the study was a mail-out user survey. This survey was designed for those residents in Stanislaus County who have used the EMS 911 system in the past four months. The researchers focused on this time period since the records of such persons would be easily accessible and the experience would presumably be fresh in their minds. Records provided by Mountain/Valley EMS yielded a random sample of 911 callers. Of these persons, the research team selected a total sample of 300. (A copy of the user survey is in Appendix B).

The third element of the perceptions portion of the study was a series of focus groups with providers and residents.

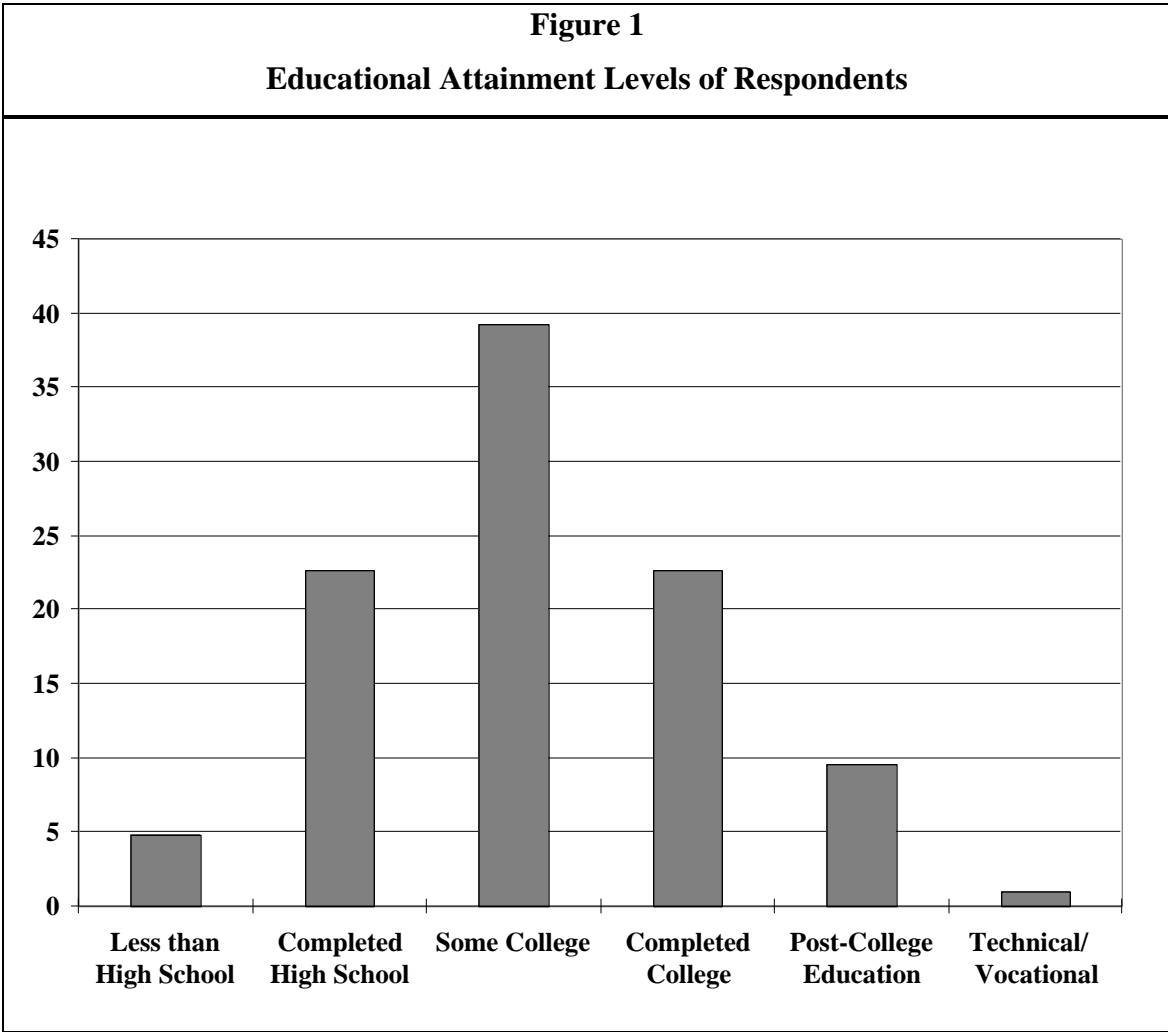
Resident Survey

Profile of Respondents

The research team contacted 400 Stanislaus County residents during August 1998. The statistically typical respondent was a female, between the ages of 35 and 54, earning between \$20,000 and \$60,000 annually. This average respondent also had some college education and owned her home.

A detailed breakdown of respondents shows the following: 61% were female; 54% were homeowners, and 41% renters, while the remainder did not respond to the question. Fifty-six percent of respondents were between the ages of 35 and 54, while three-quarters of the sample fell between the ages of 25 and 54.

As Figure 1 indicates, the respondent group was rather highly educated, somewhat more so than the general population. Income levels, however, were more typical of the resident population: 15% stated they earned between \$10,000 and \$19,999 annually, 15% between \$20,000 and \$29,999, 18% between \$30,000 and \$39,999; 15% between \$40,000 and \$49,999 and 14% between \$50,000 and \$59,999. Fourteen percent indicated they made more than \$59,999, 1.3% claimed to earn less than \$10,000, and the remainder did not answer.



Use and Satisfaction

Of the 400 respondents, a surprisingly high 169 or 42% stated that they had used the 911 system in the past. Researchers also asked whether any other member of the family had ever needed to use an ambulance in the county. Two hundred five respondents, i.e., 52% of the sample, reported having relatives who had used an ambulance service in the past.

The survey respondents indicated a very high level of satisfaction with emergency services as demonstrated by Table 1. The 911 system, fire department response, and ambulance response all received particularly high levels of public satisfaction. While the overwhelming majority of respondents indicated satisfaction with ambulance service, in

response to a separate question 65% indicated they felt it could be improved. Almost three-quarters of the sample indicated satisfaction with service to rural areas and to general emergency responses. Although police response received a somewhat lower positive score, still almost 2/3 expressed satisfaction.

Table 1
Percent of General Public Indicating Satisfaction With Service

Type Of Service	% Indicating Satisfaction	Percent No Response
911	90.8	6.3
Fire Department	86.5	12.0
Local Ambulance Service	82.8	14.0
Service to Rural Areas	73.5	13.0
Emergency Responses	72.8	14.8
Police Response	65.5	11.8
Hospital Care	49.3	27.8
County Health Clinics	46.5	27.8
Hospital Wait Times	16.0	9.8

As Table 1 indicates, the researchers also posed two questions about hospital care. One question asked whether hospital care was good, and the other whether respondents thought hospital wait times were too long. Both of these--and particularly the wait time item--indicate rather low levels of satisfaction.

While many emergencies arise as the result of an unpreventable accident, some emergencies occur because the person has had inadequate access to health care. Health officials generally believe that increasing the public's access to health care would reduce the incidence of emergency situations.

An innovative approach to increased accessibility to medical care would be to use fire stations for minor medical procedures, such as immunizations. To test the public's reaction to such a policy, respondents were asked whether they would support the use of fire stations for minor medical procedures. Fully 353 or 89% of the sample supported the

idea. Using existing infrastructure for community-based public health programs appears to be an idea to which the public responds warmly.

User Survey

While a random sample of the public provided some insight into perceptions of the EMS system, there was also a desire to know more about those who have actually used the system. Three hundred people who had used the EMS system were mailed a one-page, 21-item survey. Of those receiving the survey, 41 responded. The following discussion is, then, based on a very limited sample size. Nevertheless, the results are quite interesting.

Profile of Respondents

The typical respondent was a poor, elderly, white, female with little education. Of all respondents, 73% were women; 59% of the sample was over 54 years of age while almost 2/3 of the sample reported an annual income of less than \$20,000. Forty-seven percent of the respondents had less than a high school education while 18% reported having no more than a high school diploma. Another 24% indicated they had some college education. Three-quarters of the respondents indicated non-Hispanic white as their ethnicity, 13% as Hispanic, 3% as Asian American, 5% as Native American, and the remainder as either other or no response.

Use and Satisfaction

One-quarter of the respondents did not indicate the nature of the emergency. Of the other 3/4, 81% indicated a medical emergency including, in order, heart attack, respiratory failure, “medical,” injuries from falling, and allergies. Other reasons included car accidents, domestic disputes, and suicide attempts.

Respondents to this survey were asked the same questions regarding their level of satisfaction with the system. Results are displayed in Table 2.

As with the general public, users indicated a very high level of satisfaction with 911, the fire department, and ambulance service. The user group had a higher level of satisfaction with hospital care than the general public. By contrast, the user group was more critical of police response and of service to rural areas.

Table 2
Percent of Users Indicating Satisfaction With Service

Type Of Service	% Indicating Satisfaction	Percent No Response
911	90.2	4.9
Fire Department	90.2	4.9
Local Ambulance Service	90.2	4.9
Hospital Care	73.2	7.3
Emergency Responses	68.3	9.8
Hospital Wait Times	61.0	9.8
County Health Clinics	48.8	22.0
Police Response	46.3	17.1
Service to Rural Areas	31.7	46.3

As with the general public, the users were asked whether they would support the idea of providing limited medical care at fire stations. The overwhelming majority--87%--said they would support such a program.

Community Focus Groups

The final component of this research into community perceptions of the Stanislaus County EMS system was a series of focus groups. These group interviews included the Modesto Fire Department, Modesto Police Department, Mountain-Valley staff, Hispanic Chamber of Commerce, Modesto Chamber of Commerce, Martin Luther King Memorial Center, and the Robertson Road Community group.

The purpose of meeting with this wide variety of groups was to create another measure of the level of citizen satisfaction with the current Stanislaus County Emergency Medical System. The complete focus group questionnaire is listed in Appendix C.

All groups indicated a high degree of satisfaction with the EMS system. Members of the Robertson Road group -- an organization of low-income residents in west Modesto -- singled out the Fire Department for praise. Many residents of the area told stories of

how professionally and respectfully they were treated by firefighters. In contrast, their stories of police treatment varied widely.

The question concerning county health facilities and wait times at hospital emergency rooms brought 30 minutes of horror stories from Robertson Road residents. It appeared that each and every resident had negative experiences. They were quite open in describing four-, five-, and six-hour waits at local area hospitals. They were genuinely angry, and felt that the delays were due primarily to either their lack of health insurance or discrimination against them.

While all groups expressed satisfaction with and confidence in the EMS system, some did have suggestions for improvement. The Robertson Road group was particularly adamant that emergency personnel should have the ability to communicate in more than one language. EMS professionals were concerned about the current multiple PSAP system. Some also expressed concern about the use of different radio frequencies by fire and ambulance agencies which could hamper coordination of emergency response efforts.

Finally, many groups' comments contained a considerable amount of misinformation with respect to other groups. That is, respondents were often not really aware of the responsibilities assigned to other agencies. These individuals frequently had misconceptions about how budgets worked, how much money was available, how that money was used, and who had the power to allocate funds.

5. Issues in Stanislaus County

This section examines EMS issues specific to Stanislaus County.

5a. EMS Costs

This section examines the costs of the EMS system from the perspective of the residents of Stanislaus County. These are determined by examining the following major elements of the EMS system:

- Mountain-Valley EMS Agency
- Dispatch
- Fire Service
- EMS Transport
- Hospitals
- Prevention

Mountain-Valley EMS Agency

The Mountain-Valley Emergency Medical Services Agency (MVEMSA) is a Joint Powers Authority serving the counties of Stanislaus, Alpine, Amador, Calaveras and Mariposa. “The mission of the Mountain-Valley EMS Agency is to ensure the appropriate provision of quality prehospital care services to the public in a cost effective manner as an integrated part of the overall health care system”(MVEMSA 1998b). The agency estimates there are approximately 30,000 EMS responses per year in the area for which it coordinates EMS. It sees its most important activities as facilitating smooth interaction of the key providers of EMS and decision making by the Board of Directors representing the interests of the counties. The LEMSAs activities also include contracting on behalf of the counties to have EMS services provided, monitoring the quality of services, providing financial incentives for contract adherence in the form of fines, ensuring compliance with state laws and regulations, and dissemination of policies and protocols to promote quality service.

For all these services the residents of Stanislaus county pay a relatively low cost of approximately \$.41 per capita per year, which ranks the County twenty-first in per capita costs among the 31 California counties considered (Table 24). These relatively

low costs to Stanislaus residents are possible in part because of the other sources of revenue to MVEMSA. Of its \$937,890 budget for fiscal year 1997/1998 only \$171,995, or 18%, came directly from Stanislaus County. Table 3 lists the sources of MVEMSA's revenues for fiscal year 1997/1998.

Table 3: MVEMSA Revenues Fiscal Year 1997/1998				
	Source	Amount		
Local:	Stanislaus County	171,995		
	Alpine County	5,200		
	Calaveras County	14,965		
	Mariposa County	6,560		
	Amador County	19,454		
	Certification/Testing	34,500		
	Delta College ADA	24,000		
	Outside County Contracts	0		
	Ambulance Fees	40,000		
	Air Ambulance Fees	7,250		
	Ambulance Fines (Roll-over)	10,000		
	Ambulance Fines (FY96/97)	18,000		
	Local Funds Interest	12,000		
	Misc.	3,000		
	Paramedic Class Tuition	68,000		
	Total Local			434,924
		State Grant	258,300	258,300
Special Projects	DATA	75,240		
	EMT REG	56,000		
	OAC	30,000		
	QI 96/97	5,766		
	QI 97/98	77,660		
Total Special Projects			244,666	
Total MVEMSA		937,890	937,890	
Source: Mountain-Valley EMS Agency FY 97/98 Budget, Revised 7/30/97				

The other county partners in the JPA contributed \$46,179, or approximately 5%, of costs. Although this total may seem small, on a per capita basis it means all of the county partners except Calaveras pay a higher per capita cost than the residents of Stanislaus. One can also argue that, given traffic patterns across the region, it is not unusual for Stanislaus residents to need EMS in one of the neighboring counties. Being part of a JPA enables MVEMSA to receive state matching funds, substantially reducing

the direct burden on Stanislaus residents. Of course, California residents overall may pay more through state taxes for EMS because of the state's provision of matching funds.

MVEMSA also receives local revenues through fees for services such as classes, certification, testing, ambulance fees and fines. Collectively these revenues account for \$216,750 or almost half of the local revenues. These revenues also represent costs to other elements of the EMS system which are potentially passed on to Stanislaus residents, but since these costs have already been built into the operation of those elements they are not included here to avoid double counting.

Of the \$216,750, \$75,200 was for ambulance fees and fines. MVEMSA is in a difficult position with regard to these funds. If the agency did not charge the fees and fines, one could argue MVEMSA would be over-subsidizing private transport companies and not providing sufficient incentive for contract adherence and quality in transport times. When they do charge the fees and fines, there is naturally some resistance by the payers. Since the payer's interests are substantially concentrated, and the community's interests more diffuse, the payers are more likely to lobby actively for leniency.

There is also the complaint that MVEMSA is, to some extent, dependent financially on the payers they regulate and thus a conflict of interest is created. In extreme cases, such ties and the close relationship between the regulator and those regulated can effectively cause the regulator to be "captured" and represent the interests of the regulated rather than of the overall society (Stigler). Although there is always a danger of conflict of interest, not imposing the fees and fines would appear to be a greater sign of capture than imposing the fees and fines. For the long-term success of the EMS system, financial incentives such as those provided by the system of fines are important. It is worth noting that the most carefully recorded data discussed in the EMS Data and Communications section of this report appears to be the data on response times for which there is some financial incentive.

Special project grants cover nearly \$245,000 of MVEMSA costs. This fact has stimulated complaints that the agency devotes much of its resources to seeking and carrying out research grants funded by the state. From the perspective of the people who live in Stanislaus County, this is not as problematic as it might first seem. There are

some economies of scale in running an EMS agency and having staff available to fill a variety of roles.

For example, the county liaison positions are budgeted at from 20% for Alpine to 60% for Stanislaus. There are also coordinator positions such as for communications (20%), response and transport (70%), medical quality (80%) and disaster (20%). While for budgetary reasons it may be desirable to hire a fifth of a person's time, as a practical matter this can create problems since most people prefer full-time work. By creatively matching duties and skills and by increasing revenues through grants, MVEMSA has been able to build a staff of eight full time professionals. The costs of the research projects are borne by the state as a whole and all the residents benefit. In particular, since many of these projects focus on the Mountain-Valley region, the residents of this area are likely to benefit from the research. In the 1997/1998 fiscal year the largest of these projects were focused on data and quality improvement (over \$75,000 each). Since the information system and data collection portions of this report indicate these are areas where better information is needed, the projects seem particularly appropriate to the interests of the people of Stanislaus County.

Dispatch

The 911 emergency system is designed to handle and direct resources in the case of an emergency. Currently all cellular phone calls go through California Highway Patrol (CHP). Non-cellular 911 calls in Stanislaus County go through the Stanislaus County Emergency Dispatch, the Oakdale PSAP, the Turlock PSAP or the Ceres PSAP. Since these PSAPs also direct their resources to deal with non-medical emergencies (crime, fire, and other dangerous situations), the costs of this system are not strictly costs of EMS.

Currently Stanislaus County Emergency Dispatch provides dispatch for law enforcement and fire personnel for most cities and rural areas in the county through seven Public Safety Access Points (PSAPs). Emergency Dispatch reports response times, call counts, operations, as well as logs for research and court cases. Jeanie Hardin, Director of Stanislaus County EMS Dispatch, indicated that for July 1, 1997 through June 30, 1998 the Center received 121,265 calls through 911 and 210,683 calls through non-emergency

lines for a total of 331,948 calls. Dispatchers do a 3-4 question triage for medical calls to determine whether to send the fire service so the MVEMSA estimate of EMS responses would not include a few emergency medical calls for which no dispatch occurred. However combining dispatch information with MVEMSA's estimate of 30,000 EMS responses per year suggests approximately 8.8% of the calls are for medical emergencies.

Separating the costs due to EMS dispatch is impractical and could be misleading, since there are large fixed costs to dispatch set-up and operation, whether or not actual calls come into the system. It is also important to avoid double counting. County and city departments pay fees to be dispatched. Therefore Fire's dispatch costs are already included in the Fire Department budget. Under the current system, once the dispatcher establishes that an emergency is of a medical nature and in which county zone the emergency is located, frequently the call is switched over to a secondary PSAP, most often that run by AMR. Thus the majority of the costs of medical dispatch are probably borne by AMR and included in their aggregate cost statistics and should not be double-counted.

The move of the Stanislaus County PSAP to new quarters on Oakdale Road is intended to accommodate growth in the size of operations, improve communications, and potentially facilitate centralization of dispatch, not save direct operating costs. MVEMSA, AMR, and representatives of the two air ambulance service providers, who also represent the major providers of hospital emergency services, have all indicated they believe this move will improve efficiency. Coordination of resources and readiness of emergency personnel were also recently improved via the adoption of alphanumeric pagers. Further improvements are anticipated as communications technology improves. For example, geographic location systems may be used to better pinpoint the location of cellular telephone calls.

Fire Service

The fire service often arrives first at the scene of a medical emergency because of its dispersal throughout the county and its continuous staffing. Fire agencies provide first-responder level care and are, therefore, probably substantially responsible for the high level of satisfaction indicated by Stanislaus county residents. The most anxious

moments for people in an emergency tend to be those spent waiting for experts to arrive and initiate treatment. The speed of initial treatment can be critical to survival and the ultimate outcome of all the subsequent phases of treatment.

In Stanislaus county there are 19 different fire agencies, the largest of which is Modesto City Fire. Its estimated 1997-1998 operating budget was approximately \$15,233,232 (Hannink). Of this amount, over 86% was for employee services, the bulk of which are required to maintain the current level of fire service preparedness. Modesto City Fire's estimated marginal cost of providing first-responder medical services in addition to its fire duties, given that to maintain the current level of fire service preparedness the employees must be paid whether they go out or not, is a relatively low \$170,000, or approximately \$20.92 per EMS run made.

Since many of the other fire services in Stanislaus County use substantial volunteer labor, their explicit cost estimates would be likely to under-value the true costs of their services. When a person donates his or her labor, the explicit costs of the work may be zero, but the true costs to society are not zero because there is always an opportunity cost to the person's time. Accurate valuation of the costs of volunteer services is difficult. A reasonable proxy frequently used is the cost of provision of the services by paid workers. Assuming the other fire services in Stanislaus County have similar social costs to Modesto City Fire, this suggests a cost to Stanislaus citizens of approximately \$627,600 for first response from fire agencies.

EMS Transport

There are a total of 7 EMS transport services in Stanislaus, but the majority of EMS transports in Stanislaus County are privately provided by American Medical Response (AMR). Other providers include Hughson Paramedic Ambulance Company (HPAC), Oak Valley Ambulance, Patterson Ambulance, West Side Ambulance, and the two air ambulance services Air Med and Medi-Flight. (Occasionally transports are supplied by out-of-area providers.) Table 4 indicates for Stanislaus County the number and percentage of EMS transports by provider from the scene for July 1, 1996 through June 30, 1997 (Cavanaugh). These data clearly indicate AMR has a near monopoly on EMS transport provision.

Table 4: Number & Percent of EMS Transports, by Provider in Stanislaus County, 7/1/96 –6/30/97		
Ambulance Provider	Number of Transports	Percent of Total
AMR	21,633	90%
Oak Valley Ambulance	1,213	5%
HPAC	901	4%
Patterson Ambulance	192	1%
Medi-Flight	108	0%
Air Med	56	0%
Other	9	0%
Total	24,112	100%

AMR

AMR is a large national company initially formed in 1992 through the merger of several ambulance companies. It has grown substantially by acquiring over 100 other transport providers and in 1997 became a subsidiary of Laidlaw (AMR). AMR is the largest national provider of ambulance services. It has over 5,000 vehicles in 39 states and in 1997 had sales of over \$957 million, which represented more than a 33% growth in yearly sales. AMR is open to experimentation, with new methods of coordinating emergency and urgent care through centralized call centers with triage. The company has implemented strategies for reducing costs and maintaining or improving the quality of care, through such programs as “AMR Pathways” in Colorado, Oregon, and Connecticut (AMR).

Despite its relative competitive success, AMR is reluctant to share detailed budget data in case the county were to go to a competitive bidding process at some point in the future. This reluctance, while understandable, limits the level of discussion possible regarding transport costs.

Several members of AMR’s staff did however share their views, knowledge of operations, and some of the company's financial data on a broad level through interviews and numerous telephone discussions. Much of this information came from an interview with Fred Hawkins, who has since changed positions within the larger AMR Corporation, and two interviews with James Ridenour, the local Vice President of Operations. Both of these individuals spoke from substantial experience in local ambulance service,

experience gained both prior to the local service's acquisition by AMR in 1993, and since.

Within the county, AMR has two primary ambulance stations in Modesto, two in Turlock and one in Ceres. The company employs about 167 field operations people in Modesto, Ceres, and Turlock and 40 dispatch employees. The corporation also has located its billing services for Northern California, Hawaii, and soon Washington State in Modesto. Thus AMR employs about 180 people in billing and plans to hire 40 more by March 1, 1999. Altogether AMR employs about 387 people in Stanislaus County; the number will soon grow to 427. Not all of this labor is a cost of EMS in Stanislaus County; however, the figures do help provide a picture of the scope of AMR's local operations.

AMR currently operates 25 ambulances and three support vehicles in Stanislaus County, although between midnight and 6 a.m. there may be only seven ambulances in service. Most units carry two staff; critical care transport units also include nurses. Some units are exclusively for Basic Life Support (BLS) transport.

Locally AMR has expressed interest in forming a public-private partnership to improve the efficiency of dispatch in sending the appropriate level of service in response to calls. AMR administrators believe the company could be helpful in providing additional services around the clock. These could include: medical advice lines; helping direct minor emergency patients to alternative care facilities other than hospitals; staffing ambulances with nurses to be able to conduct on-site treat-and-release procedures; and, when appropriate, transporting to sites other than hospital emergency rooms in order to reduce the costs of care.

AMR believes that in the future payer pressure will lead to further capitation of potential patients and reduction in revenue per transport. To survive financially, ambulance service providers will need to accurately match the level of service needed and provided. Under managed care the company expects the number of medical emergency 911 calls to fall. Management points out that in this area years ago call volume, which is highly correlated with revenue, grew at about 5% per year, but this past year there was no growth. None is anticipated this year, either, in spite of continued population growth.

In discussing the financial aspects of their Stanislaus operations, AMR personnel indicated that for fiscal year 1997/1998 the organization performed approximately 28,416 transports. Since approximately 74% of their calls are emergency calls, and assuming in this context that calls and actual transports are similarly distributed, the company presumably transported about 21,027 EMS patients.

Over this same period AMR had total revenue of approximately \$7.8 million, approximately \$1.6 million of which came through capitation contracts with clients such as Tenet, Doctors Medical Center (DMC) and Memorial Hospitals Association (MHA). AMR also indicated total expenses of approximately \$7.5 million. This suggests a low margin between costs and revenues of only about 4%.

The level of local capital investment is not known. However, since James Ridenour used to be part owner of 911 Emergency Services (operated locally as Mobile Life Support) prior to its acquisition by AMR, he is in a unique position to be able to give a rough estimate of the value of the capital within the county. The prior company, 911 Emergency Services, was in 11 counties so the value of capital in Stanislaus County is substantially less than for that company. Roughly speaking Ridenour estimates the local capital is worth at least \$3 million. This suggests an annual return to capital of about 10%. This seems low, considering the fact that AMR is self-insured and thus subject to more risk than most companies, but it is only a rough estimate.

While MVEMSA reports the list prices for services by ambulance providers in the county (see Table 5), AMR has indicated that, for a variety of reasons, actual revenues received are less than these charges would suggest. Its list price for interfacility transport is only \$270 plus \$14.06 per mile and subject to substantial contractual adjustment. While AMR's average bill is approximately \$585, only approximately 45% of that is actually collected. Some rates are fixed by government provided health insurance plans. For example, Medi-Cal pays on average only about 17.7% of its patients' bills. It used to pay \$71.59 plus mileage, although the rate was recently raised to \$105. Medicare pays only for approved medically necessary transport and averages about \$350 per call. In many cases there may be contractual discounts or capitation agreements.

Ambulance Provider *	Date	County Zone	BLS Base	ALS Base	Emergency ALS	Emergency BLS	Night	Oxygen	Miles
AMR	10/96	1,3,8	322.28	597.65	0	131.25	0	63	13.65
Hughson	12/96	C	240	640	0	0	65	60	14
Patterson	10/96	5,B	326	594	0	50	0	50	12
WestSide	10/96	A	304	572	0	50	62	50	12
Oak Valley	1/93	4,6	298	475	60	60	50	38.9	12
Average			298.06	575.73	12.00	58.25	35.40	52.38	12.73
Std. Deviation			34.55	61.45	26.83	47.07	32.80	9.54	1.01

* In addition to their base rates some providers add itemized charges. These charges can significantly increase the total bill especially in Advanced Life Support (ALS) transports.

Note: Based on regional charges. Averages and Standard deviations may be lower because they are based only on providers in Stanislaus County.

Source: MVEMSA fee schedule

This raises an important conceptual ambiguity. Is the true cost to society of a service the amount billed or the amount paid? This question is particularly important with respect to EMS because the gaps are substantial. For example, in fiscal year 1997/1998 AMR billed \$18,832,034 in Stanislaus County, but only collected \$6,208,391 plus about \$1.6 million in capitation contracts.

It is tempting to say that the costs of those who do not pay are simply shifted to those who do pay. However, this view neglects an important dynamic problem. For example, it is frequently argued that patients with insurance subsidize healthcare for the poor. But increasingly insurance companies pressure providers to reduce the rates they pay. If a patient does not or cannot pay her/his bill the transport may appear to be "free," but it is not free to society at large. The costs of those services are either shifted to other payers or to the providers in the form of reduced profits.

To the extent they are shifted to providers, these costs will not be reflected in the amount paid, but may become evident in other ways. For example, reduced profit margins will tend to cause some firms to leave the industry, and thus concentration is likely to increase. In the extreme, the trend could lead to an absence of willing private providers. In fact, as indicated in the comparative section of this report, in some areas transport is publicly provided or subsidized with government revenue. Because the ability to receive emergency transport when needed is key to the well being of local

residents, when a key private provider fails or its parent company closes local operations, there are important spillover costs to the rest of the community.

One approach to this conceptual ambiguity would be to view the true cost of the service as the amount it would take to keep the firm in business. This concept is similar to the concept of fair-return price setting used in regulating governmentally granted local monopolies. However, without much more detailed financial data on AMR's costs of operations, this type of estimation is impractical. For the purposes of this study, we have assumed that the amount it would take to keep the firm in business is the amount it currently receives. In other words, we assumed that the costs of those who do not pay are simply shifted to those who do pay, although in doing so we may actually underestimate the true costs.

Based on the code types of the calls received, approximately 74% of AMR's workload are probably EMS transports. Based on the list prices EMS transports probably generate about 2.2 times as much billing revenue as interfacility transports per transport. This calculation suggests that about \$16,018,008 of AMR's billing is for EMS transports, or about 85%. If revenues received are similarly distributed then about \$6.5 million is paid to AMR for EMS transports in Stanislaus County. The total works out to about \$309.13 per transport.

HPAC Concerns and Exclusive Operating Areas

AMR's reluctance to share detailed information is not unique. Its only other private sector competitor in Stanislaus County is Hughson Paramedic Ambulance Company (HPAC). HPAC too indicated substantial reluctance to share detailed financial information regarding its operations, lest the data be used against the company in some way. Ultimately HPAC decided not to share budgetary information; however, we did manage to elicit some of the company's concerns.

From the MVEMSA data (Table 4), HPAC performed about 900 EMS transports in Stanislaus County in the 1996/1997 fiscal year. HPAC is extremely concerned that creation of exclusive operating areas (EOAs) has substantially hurt its business and estimates the practice cost the company approximately \$500,000 in business last year. HPAC also believes that the capitation contracts awarded to AMR interfere with its

ability to compete. HPAC considers these arrangements to be in restraint of trade and a serious antitrust issue.

Since AMR provides approximately 90% of EMS transports in the Stanislaus County area it has de facto monopoly power and HPAC's competitive concerns may be justified. Competition generally benefits consumers and therefore competition would tend to be good for the residents of Stanislaus County.

Fundamentally part of the dispute is over whether EMS transports are sufficiently profitable for a provider to be willing to undertake EMS transports without also having an exclusive operating area. In general, interfacility transports used to be considered more profitable than emergency transports. In recent times, the profit margins on these transports have declined as payers increase pressure to keep costs low. AMR believes it is important to have both the EMS and interfacility transports in order to be able to spread out the costs of the infrastructure to providing ambulance service. Another potential argument is that transport services exhibit local economies of scale sufficient to be considered a natural monopoly and thus it is in society's interests for one firm to be granted an exclusive contract. A recent court decision, Schaefer's Ambulance Service v. County of San Bernardino, supports the power of EMS agencies to grant these local monopolies.

Based on only its listed charges, AMR appears more competitively priced for the advanced life support (ALS) transport most commonly associated with EMS, while HPAC is more competitively priced for the basic life support (BLS) transport more commonly associated with interfacility transport. (See Table 5). (This statement would be true even if the list price of \$270 mentioned in interviews with AMR representatives were used.) If there were a natural monopoly then average costs should be falling for all the relevant levels of demand. If this were true, in theory there should be no need for an outside authority to establish an exclusive operating area. The largest firm's substantial cost advantage would make it possible for the firm to undercut its competition on price. These prices seem inconsistent with the view that such economies of scale extend to BLS transport.

To the extent the capitation contracts AMR has negotiated with clients such as DMC and MHA reflect successful competition through contractual discounts and service

agreements, they are evidence of natural monopoly power. If removal of exclusive operating area agreements would alter which organization obtained these contracts, then there is probably no natural monopoly. A natural monopoly would be expected to spread the use of its capital in its marginal activities. Given the very limited data available, it is difficult to draw conclusions in this area, but the fact that some of AMR's ambulances are used exclusively for BLS is inconsistent with traditional natural-monopoly use of capital.

AMR argues that exclusive operating agreements are in the community's best interests because an exclusive provider cannot "cherry pick," i.e., only undertake the runs that will clearly be profitable. EMS provision frequently implies "dry runs" (trips to the site of an emergency from which transports are not made and for which no payment is received) and transports for which collections are limited (Medi-Cal and Medicare) or difficult (uninsured poor). To insure profitability, therefore, the company taking on these responsibilities arguably should also receive an exclusive operating area.

MVEMSA, contracting on behalf of the people of the region, is faced with the fact that AMR is the only local private company of sufficient size to undertake the majority of EMS transport services needed. At this time, unless local governments are prepared to undertake public provision through the fire agencies, it is important that AMR succeed. Public provision is not currently an appealing option, since it would entail loss of substantial experience and expertise. Although experience would increase with time, since transports would be substantially spread over a wider staff, the average level of transporter experience might never reach its current level.

Thus a difficult problem exists. In theory no EOAs should be needed. The idea that AMR needs exclusive operating areas to be reasonably profitable seems unjustified without more detailed financial data from AMR. The costs of these contract concessions made by MVEMSA tend to fall on competitors in the form of lost profits, and possibly on the people in general in the form of higher prices for interfacility transport. However, without detailed financial data from competitors such as HPAC it is difficult to estimate the magnitude, if any, of these costs. HPAC has indicated it believes it has lost about \$500,000 in revenue, but revenues and profits usually differ substantially. If HPAC revenue losses are the same as the revenue gains of AMR from this business, there has been no net loss to the residents in general of Stanislaus County.

HPAC believes AMR is trying to eliminate it. Given AMR's successful growth in the national market through acquisitions, this concern may be justified, but the likely method would be through acquisition. Although HPAC is a much smaller company than AMR, in theory even a small competitive fringe can help improve the efficiency and competitive performance of a near monopoly. Therefore continued competition from HPAC in local ambulance service would likely benefit the people of Stanislaus. However, there is insufficient information to permit a more detailed analysis of this aspect of EMS transport provision.

EMS Transport for Non-EMS Purposes

Another concern in terms of transport costs is the possibility of EMS transport abuse. It is believed that some people use ambulance transport unnecessarily because they lack other convenient means of transportation and can pass the costs to third party payers such as insurers. Anecdotally, it has also been suggested that others may abuse ambulance transport because they believe they will be seen and treated more quickly if they arrive in Emergency Departments (EDs) by ambulance. Another possibility is that people may abuse ambulance transport and emergency department services because they are not aware of alternative resources available. Partly because of this concern, private insurers increasingly are creating contact numbers and approval procedures for emergency treatment. Insurers are also advertising the availability of urgent care services as a substitute for emergency department services. Public insurers such as Medi-Cal are creating additional paperwork requirements for reimbursement for non-emergency transport.

These policies reduce transport costs, but may also create certain other problems. There is concern that requiring individuals to call private insurance contact numbers in true emergencies could delay needed initial treatment. Similarly, increased use of urgent care services is likely to reduce costs, but also creates ancillary problems if critical initial treatment is delayed. Additional paperwork requirements can be problematic for transport providers since the direct costs of the paperwork tend to fall on physicians who already feel overburdened by this type of work and have very little incentive to take on

more. When physicians refuse, their refusal places additional financial pressures on transport providers.

To the extent that patients brought in by ambulance are seen more quickly than others, there is a substantial incentive for patients to use EMS transport. Hospital officials report that incoming patients are triaged, so the means of arrival should not influence how quickly patients are seen. However, others have disputed this view. To the extent that the perception persists, it creates inefficient incentives to overuse ambulance transport.

Confusion about where to go after the closure of Stanislaus Medical Center (SMC) could also lead to an increase in EMS transport use. Data from MHA for 6 months before and after Dec. 1997 indicates a 13.2% increase in the number of emergency service visits arriving by ambulance, but only a slight increase in the percent of emergency service visits arriving by ambulance from 13.6% to 13.8%. This phenomenon suggests that while closure of SMC has increased emergency service transports to MHA, this increase is mostly due to the overall increase in EMS visits at MHA and is probably not the result of EMS transport abuse.

Under the current EMS system there are also substantial financial incentives potentially biasing services in favor of transport. Fire service personnel tend to believe that ambulance providers have a strong bias in favor of transport. Ambulance services are not paid if no transport occurs. If ALS transport received some compensation for treat-and-release, that could reduce the potential for the bias. Over time, if capitation increases, this too could reduce this bias. In either case, however, concern for the well-being of the patient, combined with the risk of lawsuits if needed transports are not undertaken, are likely to insure that needed transports will occur.

HPAC believes that only a small percentage (perhaps 5%) of their 911 patients could safely take a cab, and thinks this differs from the percentage in Modesto (perhaps 30-40%) because of less dependency on public resources and a greater tendency in the Hughson area to go directly to the hospital. Unfortunately, there are few objective data available on the use of EMS transport for non-emergency situations. However, the vast majority of emergency service visits do not arrive by ambulance. Office of Statewide Health Planning and Development (OSHPD) data suggest that, of approximately 177,811

emergency service visits in Stanislaus County between July 31, 1996 and June 6, 1997, only 24,112 were via ambulance transport.

Information Flows

Another transport issue relates to information flows. It has been argued that paramedics would benefit from feedback regarding the accuracy of their diagnoses. It has also been argued that hospitals would benefit from prompt provision of patient care reports (PCRs) from ambulance providers. Currently it is not unusual for staff delivering a patient to give a quick verbal summary of the patient’s situation and turn the PCR in later, sometimes as much as a month later. Currently there are no financial incentives attached to providing either type of information and very little has been accomplished in improving these information flows. Ideally a more automated system, perhaps similar to the bubble sheet forms used by AMR, could improve the timely provision of these data. Improvements in telecommunications should make more efficient information flows feasible, but it may be necessary to create financial incentives before these improvements will be implemented.

Helicopter Transports

The two air ambulance services are Air Med, run by DMC, and Medi-Flight, run by MHA. These services assume primary EMS transport responsibility on an alternating 24-hour basis. Some information on the firms was gathered through interviews at DMC and MHA and some from MVEMSA. Table 6 indicates the Stanislaus County air ambulance providers’ list rates. The additional services supplied in transit by air ambulance can be intensive and usually add substantially to the total bill. However, contractual arrangements, ability to pay, and limits by public payers such as MediCal and Medicare also substantially influence actual collections.

Table 6: Air Ambulance Provider Rates*			
Provider	Base Rate	Night	Mileage
Medi-Flight	\$2,615	\$320	\$93 loaded
Air Med	\$2,450	\$250	\$80 loaded

* Incremental charges for procedures and equipment will increase the total bill.

Air Med started operations in 1994. Representatives estimated that it has about 60 transports a month in the summer, but only about 30 per month in the winter. Many of these transports are outside of Stanislaus County. Some of these transports are part of a 15-year contract with Yosemite. Air Med's base rate is about 6% lower than Medi-Flight's base rate, but company officials do not believe they actually make money directly on air transport, since these accounts are frequently in deficit. The deficit may be made up in other areas such as surgery, hospital stay, and rehabilitation.

Air Med officials estimate they performed 82 scene call transports in Stanislaus County in 1997. These officials assert that estimating the amount of money they received for these transports is difficult, since revenue depends substantially on the payer mix, contractual arrangements, and capitation. Air Med's transport bills average \$3,000 to \$4,000 per patient. The company estimates that it collects about 40%. These data suggest that Stanislaus County residents paid about \$114,800 for EMS air ambulance transport in Stanislaus on Air Med. (Since many Stanislaus County residents also visit Yosemite, they may also pay for some of the air ambulance transport that Air Med provides there).

Medi-Flight is run by California Aeromedical Rescue and Evacuation (C.A.R.E.), which is owned by MHA (Medi-Flight web). The firm uses a nurse-paramedic configuration governed by EMS protocols. Medi-Flight has two helicopters and estimates that it now performs about 600 transports per year and that Air Med probably performs 300-400 in their total service areas. Representatives believe the break-even point for air transports is about 1,000 transports per year. Unfortunately Medi-Flight was not willing to provide financial data to help support this claim.

Another cost-related concern expressed at both DMC and MHA involves the Mobile Intensive Care Nurse (MICN) system. DMC staff claim that the current system ties up a nurse unnecessarily and is inefficient. Representatives assert that permission should not be required simply to work off a protocol, and that instead MICN communication should be reserved for occasions when problems arise.

Frank Erdman, Program Director for Medi-Flight, stated that his agency performed 120 transports of patients from emergency scenes in Stanislaus County in 1997. These transports involved an average of 17 loaded miles. Based on a 10% random sample of scene flights for 1997, the average bill for in-flight therapeutic services was

\$656.42. These figures suggest that the average patient bill for emergency scene transport in Stanislaus County by Medi-Flight was approximately \$4,852.42. However, there is a collection rate of about one half. Stanislaus County residents thus paid about \$291,145 for air ambulance transport to Medi-Flight.

Total EMS Transport Costs

Using the \$309.13 estimated cost per ground EMS transport from the discussion above, one can estimate the cost of all ground transports by multiplying by the number of ground transports (23,948) indicated on Table 4. The resulting product is \$7,403,045. Adding the estimates for the air ambulance services, we reach a rough ballpark estimate of \$7,808,990 in costs to Stanislaus County residents for EMS transports.

Hospitals

Four hospitals in Stanislaus county currently provide emergency department services: Doctors Medical Center (DMC), Memorial Hospitals Association (MHA), Emanuel Medical Center (EMC), and Oak Valley Hospital (OVH). The largest providers are DMC and MHA. Both are private sector corporations; MHA is a non-profit organization. EMC is a church-owned hospital. OVH is district-controlled. The only county-controlled hospital was Stanislaus Medical Center (SMC), which closed November 30, 1997. Another defunct hospital is Del Puerto Hospital (DPH), which was district-controlled.

Representatives at both DMC and MHA granted interviews, were friendly, and shared many of their concerns regarding the current EMS system. But these individuals, too, indicated substantial reluctance to share detailed financial information regarding their operations, lest the data be used against them in some way. Thus most of the budgetary information available is in Summary Individual Disclosure Reports we obtained through the Office of Statewide Health Planning and Development (OSHPD). Much of these data are lumped together in categories different from those which we would have preferred, but we were able to use the data for ballpark estimation of hospital costs associated with EMS.

The OSHPD data available were for periods prior to the closure of SMC and DPH. Since the closures, most of those hospitals' patients presumably have shifted to the remaining hospitals in Stanislaus County. Prior to its closure, SMC's emergency department was one of the busiest in the county, handling approximately 23% of emergency service visits. Data from MHA for 6 months before and after Dec. 1997 indicates an 11.3% increase in emergency department (ED) visits. The data also indicate that during this period there was actually a slight decline in the percentage of Medi-Cal ED visits (19.3% to 18.7%) and a slight rise in self-paid ED visits (10.1 to 10.9%).

Our interviewees estimated that DMC receives approximately 152 ED visits per day. Since the OSHPD data suggest it used to receive about 106.7 per day, the possible increase in ED visits has been as much as 42%. DMC indicated that, while throughput times for ED patients were high, they have been reduced over 30% from November 1997 when SMC first closed. The hospital also started Express Care service in January 1998 to better serve people who actually needed urgent care rather than emergency care.

Using OSHPD data, we can arrive at estimates regarding hospital emergency services in Stanislaus County for the 1996/1997 fiscal year. (While the reports for the six hospitals examined are for one-year periods, the inclusive dates do not completely coincide. EMC's data are for 2/1/96 through 1/31/97; OVH, DPH, and SMC's data are for 7/1/96 through 6/30/97; DMC's data are for 6/1/96 through 5/31/97; MHA's data are for 1/1/97 through 12/31/97.)

Table 7 indicates data on numbers of emergency service visits at each of the hospitals. These figures suggest there are approximately 177,811 emergency service visits per year in Stanislaus County. This figure seems particularly high for a county with a population of approximately 421,900 people, i.e., an average per capita use rate of 42%. By contrast, for 1997 the OSHPD Utilization/License Service Database indicates there were 8,841,709 million EMS visits in California (OSHPD). Given an estimated California population of 32,670,000 (California State Department of Finance), the apparent use rate for California was only 27%. The data in Table 7 also indicate MHA and DMC have substantially more inpatient emergency service visits than the other hospitals and together supplied 82% of the county's inpatient emergency service visits.

Hospital		Number of ED Visits	Percent Admitted	Percent of county
MHA	Inpatient	18,401	39.1%	47.6%
	Outpatient	28,700		20.62%
	Total	47,101		26%
DMC	Inpatient	13,245	34.0%	34.3%
	Outpatient	25,683		18.46%
	Total	38,928		22%
SMC	Inpatient	2,935	7.5%	7.6%
	Outpatient	36,371		26.14%
	Total	39,306		22%
OVH	Inpatient	1,066	9.0%	3%
	Outpatient	10,718		8%
	Total	11,784		7%
EMC	Inpatient	2,959	8.2%	8%
	Outpatient	33,255		24%
	Total	36,214		20%
DPH	Inpatient	47	1.0%	0%
	Outpatient	4,431		3%
	Total	4,478		3%
Stanislaus County Total	Inpatient	38,653	21.7%	
	Outpatient	139,158		
	Total	177,811		

Source: OSHPD

Table 8 reports data on gross patient revenues and estimated gross revenues from emergency services. These data suggest emergency services provided at local hospitals have direct pecuniary costs of \$49,345,453. Ancillary services include surgery and recovery services, anesthesiology, durable medical equipment, laboratories, blood banks, radiology, etc. It is not possible to determine from the data how much of these revenues are due to emergency service visits.

To estimate, we have assumed that the percentage of gross ancillary service revenues due to emergency services is similar to the percentage of gross total patient revenue due to emergency services. On this assumption, we estimate that ancillary services due to emergency services provided at local hospitals may cost \$34,109,467. Added together, the two estimates suggest total hospital gross revenues due to emergency services of \$83,454,920.

Hospital	Emergency Services	Total Ancillary services	Total Patient Revenue (TPR)	% of TPR from Emergency Services	Estimated Ancillary Services due to Emergency Services	Estimated Revenues due to Emergency Services
MHA	17,725,534	367,193,379	493,180,885	3.59%	13,197,386	30,922,920
DMC	13,196,472	601,142,935	779,949,814	1.69%	10,171,124	23,367,596
SMC	10,966,487	47,313,055	82,065,474	13.36%	6,322,488	17,288,975
OVH	3,270,823	24,803,524	47,351,695	6.91%	1,713,306	4,984,129
EMC	3,495,454	79,283,989	110,993,227	3.15%	2,496,851	5,992,305
DPH	690,683	1,604,468	5,319,815	12.98%	208,312	898,995
Stanislaus County Total	49,345,453	1,121,341,350	1,518,860,910	3.25%	34,109,467	83,454,920

Increasingly health insurers encourage patients needing immediate care to visit an urgent care clinic. Those without insurance may be more inclined to use 911 and an emergency department for urgent care or other medical care. We asked officials at DMC and MHA, the two current major providers of emergency department (ED) medical services in this area, whether they had any data on ED abuse. We also asked if ED abuse came substantially from particular groups, such as patients who are uninsured, medically indigent, or under Medi-Cal or Medicare. DMC and MHA indeed believe there is a fair amount of abuse, but did not provide data on abuse. The OSHPD Utilization/License Service Database indicates there has been a decline in the County in the percent of non-urgent EMS visits, from 47.5% in 1995 to 34.5% 1997 (OSHPD 1998a). However, since these data only indicate five hospitals providing EMS in Stanislaus for 1995-1997 so their reliability is uncertain.

Table 9 indicates numbers of emergency service visits by payer type. Medi-Cal patient visits represent about 35% of emergency service visits in Stanislaus. This percentage is approximately 30% higher than the 27% percent they represent of the overall population. Collectively public payers, Medicare, Medi-Cal, and the county's ICHP, account for approximately 55.5% of emergency service visits. Although IHCP patients account for only about 4.3% of emergency service visits, this figure is substantially above their approximate 2.9% representation in the overall population, i.e.,

they have about 48% more emergency service visits than expected for this number of people. However, we cannot be sure that these figures result from an undue bias toward more emergency service use. There is a strong correlation between poor health and poverty. It may be that poverty has negative effects on health, or because poor health has negative effects on income, or both. The people in the IHCP may simply have poorer health in general, and their poor health may result in a disproportionately high use of emergency services.

Table 9: Numbers of Emergency Service Visits by Payer Type							
		Payer					
Hospital	Type of Care	Medicare	Medi-Cal	IHCP	Third Party	Other	Total
MHA	Inpatient	5,915	1,928		9,282	1,276	18,401
	Outpatient	3,735	6,561		16,573	1,831	28,700
	Total	9,650	8,489		25,855	3,107	47,101
	% of County	33.5%	13.6%	0.0%	41.5%	18.5%	26.5%
DMC	Inpatient	3,602	2,727	62	6,662	192	13,245
	Outpatient	3,304	9,659	222	9,397	3,101	25,683
	Total	6,906	12,386	284	16,059	3,293	38,928
	% of County	24.0%	19.9%	3.7%	25.8%	19.6%	21.9%
SMC	Inpatient	755	1,401	439	139	201	2,935
	Outpatient	2,768	21,166	6,793	2,044	3,600	36,371
	Total	3,523	22,567	7,232	2,183	3,801	39,306
	% of County	12.2%	36.2%	95.3%	3.5%	22.7%	22.1%
OVH	Inpatient	692	139	24	165	46	1,066
	Outpatient	1,872	2,598	51	4,388	1,809	10,718
	Total	2,564	2,737	75	4,553	1,855	11,784
	% of County	8.9%	4.4%	1.0%	7.3%	11.1%	6.6%
EMC	Inpatient	1,369	557		916	117	2,959
	Outpatient	4,276	14,573		10,598	3,808	33,255
	Total	5,645	15,130		11,514	3,925	36,214
	% of County	19.6%	24.3%	0.0%	18.5%	23.4%	20.4%
DPH	Inpatient	15	11		7	14	47
	Outpatient	529	946	1	2,180	775	4,431
	Total	544	957	1	2,187	789	4,478
	% of County	1.9%	1.5%	0.0%	3.5%	4.7%	2.5%
Stanislaus County Total	Inpatient	12,348	6,763	525	17,171	1,846	38,653
	Outpatient	16,484	55,503	7,067	45,180	14,924	139,158
	Total	28,832	62,266	7,592	62,351	16,770	177,811
	% of Total Visits in County	16.2%	35.0%	4.3%	35.1%	9.4%	100.0%

Table 10 reports emergency service gross revenues by payer type. The data indicate that public payers, Medicare, Medi-Cal, and ICHP, collectively account for approximately 54.4% of emergency service gross revenues. This figure is much higher than the national estimate that about 24% of overall medical costs result from Medicaid/Medicare funding, and suggests that emergency services in Stanislaus County are indeed a substantial fiscal problem for government. Applying our estimate to the gross revenue

figures, we conclude that individuals covered by public payers generate about \$45,399,476 in Stanislaus County for hospital gross revenues due to emergency services.

Table 10: Emergency Service Gross Revenues by Payer Type							
		Payer					
Hospital		Medicare	Medi-Cal	IHCP	Third Party	Other	Total
MHA	Inpatient	2,811,486	1,190,888		4,728,653	658,653	9,389,680
	Outpatient	1,077,506	1,904,167		4,815,189	538,992	8,335,854
	Total	3,888,992	3,095,055		9,543,842	1,197,645	17,725,534
	% of County	25.8%	19.7%	0.0%	52.4%	28.0%	35.9%
DMC	Inpatient	1,220,940	924,576	20,972	2,258,316	65,220	4,490,024
	Outpatient	1,120,146	3,274,336	75,158	3,185,590	1,051,218	3,539,993
	Total	2,341,086	4,198,912	96,130	5,443,906	1,116,438	13,196,472
	% of County	25.8%	26.8%	4.6%	29.9%	26.1%	26.7%
SMC	Inpatient	597,473	1,108,920	347,281	109,843	159,968	2,323,485
	Outpatient	657,925	5,029,760	1,614,187	485,650	855,480	8,643,002
	Total	1,255,398	6,138,680	1,961,468	595,493	1,015,448	10,966,487
	% of County	13.8%	39.2%	94.2%	3.3%	23.7%	22.2%
OVH	Inpatient	331,713	66,924	11,698	79,406	22,053	511,794
	Outpatient	481,849	668,767	13,135	1,129,590	465,688	2,759,029
	Total	813,562	735,691	24,833	1,208,996	487,741	3,270,823
	% of County	9.0%	4.7%	1.2%	6.6%	11.4%	6.6%
EMC	Inpatient	329,244	133,801		220,052	28,014	711,111
	Outpatient	357,996	1,220,235		887,320	318,792	2,784,343
	Total	687,240	1,354,036	0	1,107,372	346,806	3,495,454
	% of County	7.6%	8.6%	0.0%	6.1%	8.1%	3,495,454
DPH	Inpatient	2,911	2,034		1,363	2,657	8,965
	Outpatient	86,415	148,554	196	328,488	118,065	681,718
	Total	89,326	150,588	196	329,851	120,722	690,683
	% of County	1.0%	1.0%	0.0%	1.8%	2.8%	1.4%
Stanislaus County Total	Inpatient	5,293,767	3,427,143	379,951	7,397,633	936,565	17,435,059
	Outpatient	3,781,837	12,245,819	1,702,676	10,831,827	3,348,235	26,743,939
	Total	9,075,604	15,672,962	2,082,627	18,229,460	4,284,800	49,345,453
% of Total County ED Revenues		18.4%	31.8%	4.2%	36.9%	8.7%	100.0%

Will the consolidation in emergency services in Stanislaus County increase efficiency and quality due to internal economies? Or will it instead tend to raise costs and reduce quality? While research in health economics on this issue is still inadequate, some recent work (Hamilton and Ho) does offer some insights. Comparing the quality of patient care in hospitals before and after mergers and acquisitions occurring in California

between 1992 and 1995, Hamilton and Ho found that increasing consolidation had not raised inpatient mortality. Consolidation had, however, reduced length of stay and increased some readmission rates.

Most of the costs of emergency services fall on the population either directly or indirectly, through insurance premiums, taxes, and potentially the availability of resources. The conceptual problem of whether the cost to society of a service is the amount billed or the amount paid again arises, and again the gaps between the figures are substantial.

Although many of the costs of non-pay and low-pay patients are shifted to those who do pay, when shifted to providers these costs will not be reflected in the amount paid. But reduced profit margins could tend to force some firms out of business, and thus increase concentration in the sector. In fact, in the local hospital market we have seen many hospital closures. Because the ability to receive emergency services when needed is key to the well-being of the people of Stanislaus, these closures may have important spillover costs to the rest of the community. This impact is discussed in more detail in our section on hospital issues facing Stanislaus.

Table 11 indicates the level of net patient revenue compared to gross patient revenue for each of the six hospitals and the county as a whole. The data suggest that hospitals receive only about 30% of the value of their gross revenues. Estimated net revenues due to emergency services for Stanislaus County is \$24,680,147.

Table 11: Net Patient Revenue, Gross Patient Revenue and Estimated Net Revenues From Emergency Services					
Hospital	Net Patient Revenue (NPR)	Total Patient Revenue (TPR)	NPR % of TPR	Estimated Gross Revenues due to Emergency Services	Estimated Net Revenues due to Emergency Services
MHA	144,604,611	493,180,885	29.32%	30,922,920	9,066,850
DMC	169,500,807	779,949,814	21.73%	23,367,596	5,078,309
SMC	55,156,317	82,065,474	67.21%	17,288,975	11,619,944
OVH	23,375,271	47,351,695	49.37%	4,984,129	2,460,426
EMC	53,061,314	110,993,227	47.81%	5,992,305	2,864,675
DPH	3,474,844	5,319,815	65.32%	898,995	587,213
Stanislaus County Total	449,173,164	1,518,860,910	29.57%	83,454,920	24,680,147

The decline in the number of hospitals in Stanislaus is also a potentially serious concern in terms of the adequacy of EMS resources. In extreme situations hospital EDs go on what is called “code 2 diversion,” meaning they become so overloaded they turn away code 2 calls. They avoid code 3 diversion unless there are no surgical suites left or there is an internal disaster such as a fire. If both DMC and MHA go on diversion, effectively neither is on diversion, but essentially patients are likely to have to wait longer and may potentially be at greater risk.

It is in the interests of the people of Stanislaus County that adequate emergency services are available and thus it is in the interests of the people of Stanislaus that the remaining hospitals succeed. Table 12 indicates OSHPD data on profitability ratios for the hospitals. The two hospitals that recently closed, SMC and DPH, both had much older capital. In fact SMC’s estimated return on assets may look high because its capital ledgers went all the way back to 1929 and so some of its assets had been substantially depreciated.

Hospital	Net Return on Operating Assets	Net Return on Operating Equity	Operating Margin	Turnover on Operating Assets	Average Age of Plant (Years)
MHA	5.78	8.72	3.29	1.27	7.04
DMC	24.88	31.91	20.04	1.11	7.12
SMC	65.67	167.92	20.57	3.1	14.73
OVH	11.01	11.66	6.82	1.44	6.52
EMC	7.6	13.43	3.81	1.11	7.89
DPH	-24.58	8.95	-11.35	2.38	18.41

Prevention

The EMS system has been created to reduce the very real and substantial costs of medical emergencies. The EMS system saves lives and reduces suffering. Although difficult to value in dollars, the benefits are clearly valuable (Phelps 537). Prevention of medical emergencies has even greater potential benefits. Prevention is generally believed to be much more cost effective than curative care. Curative care frequently cannot fully restore a person's level of well-being. Preventing emergency medical situations may substantially reduce both the direct pecuniary costs of the other elements of the EMS system and the substantial costs in terms of loss of life and limb, suffering, time, and lost productivity for the residents of Stanislaus County

Table 13 gives some mortality statistics for Stanislaus County, California overall, percentage differences between the state and the county, and percentage differences between the county and National Health Objectives for the Year 2000. These data indicate Stanislaus has a relatively high death rate, which even after adjustment for age demographics exceeds the state rate by over 10%. The rates of death from some types of preventable emergencies seem particularly high when compared to the state rates. For example, age adjusted motor vehicle accidents and unintentional injuries exceed the state age adjusted rates by more than 50%. Age adjusted drug related deaths exceed the state rate by 33.8 % and the National Health Objective rate by 256.7%.

Table 13: Average Mortality Statistics for 1994-1996							
Cause of Death	Stanislaus County			Statewide	National Objective for Year 2000	% Difference in Stanislaus Age Adjusted Death Rate	
	Deaths	Crude Death Rate	Age Adjusted Death Rate	Age Adjusted Death Rate		vs. Statewide	vs. Objective
All Causes	3,144.0	759.8	502.7	454.2	N/E	10.7%	N/E
Motor Vehicle Accidents	83.3	20.1	20.2	13.2	14.2	53.0%	42.3%
Unintentional Injuries	184.0	44.5	41.4	26.6	29.3	55.6%	41.3%
Firearm Injuries	54.0	13.0	13.3	15.0	11.6	-11.3%	14.7%
Homicide	33.7	8.1	8.7	11.8	7.2	-26.3%	20.8%
Suicide	48.3	11.7	11.3	10.7	10.5	5.6%	7.6%
All Cancers	689.7	166.7	123.5	115.9	130.0	6.6%	-5.0%
Lung Cancer	203.7	49.2	37.7	31.8	42.0	18.6%	-10.2%
Female Breast Cancer	55.3	26.4	20.3	19.7	20.6	3.0%	-1.5%
Coronary Heart Disease	790.0	190.9	108.5	100.6	100.0	7.9%	8.5%
Cerebrovascular Disease	218.3	52.8	27.1	26.3	20.0	3.0%	35.5%
Drug Related Deaths	44.3	10.7	10.7	8.0	3.0	33.8%	256.7%
N/E: National Objective for the Year 2000 has not been established.							
Note: Crude death rates and age-adjusted death rates are per 100,000 population.							

Source: California Department of Health Services

Preventable deaths are only part of the picture. Preventable injuries, disease, and serious medical conditions can also lead to the need for emergency medical care. According to CHP in 1997 there were 61 people killed and 4,443 people injured in motor vehicle accidents in Stanislaus County (CHP 91). This represents almost 73 times as many injuries as fatalities. According to Jeanne Hardin, Director of Stanislaus County EMS Dispatch, many of the medical calls received are related to difficulty breathing.

These calls and the high age adjusted lung cancer death rate suggest air quality and respiratory conditions also relate to potential prevention of emergency medical situations.

Table 14 indicates the number of AMR dispatch calls that were triggered by various types of incidents in 1998 (Ridenour). Over 48% of these calls are classed as “medical” and might be reduced through preventive care. The remaining incident types also suggest areas where prevention could be helpful. It is also worth mentioning that, according to AMR, overall call volume was down by about 4,500 calls for a three-month period in 1998, almost solely due to a reduced incidence of the flu. This datum indicates the importance of flu vaccinations.

Table 14: Number of AMR Dispatch Calls by Type of Incident in Stanislaus County, 1998

Incident Type	Number of Calls
Motor Vehicle Crash	2,904
Motorcycle	49
Pedestrian	177
Rec. Vehicle	7
Assault	777
Strangulation	7
Stabbing	88
Shooting	74
Other Trauma	602
Other Penetrating Trauma	62
Fall	1,823
Aircraft	2
Bicycle	141
Bite/Sting	46
Diving	1
Fire	56
Near Drown	18
Medical	16,277
Other	10,679

Source: James Ridenour, AMR

MVEMSA does undertake some activities to try to prevent emergencies through public education. Unfortunately in the 1997/1998 fiscal year MVEMSA was only able to fund about 46 hours of a person’s time as a Health Educator and about 115 staff hours for public information and education, or approximately \$3,500. MVEMSA does seek grants from organizations such as the Department of Transportation (DOT) to try to do more. In

fiscal year 1992/1993 the agency developed a program called Student Activities for Emergencies (S.A.F.E.) with a DOT grant (Smith). It is a program for interactive, hands-on teaching and demonstration of practical safety and first-aid ideas that has since been used throughout the state. Students visit 15 to 18 stations each for 12 to 15 minutes learning about things such as controlling breathing, fire prevention, how to operate a fire extinguisher, earthquake safety, bike safety, swimming safety, road safety, search and rescue, etc.

Substantial community resources are also committed, such as school time, space, and staff, and resources from community organizations such as Search and Rescue, CHP, Police or Sheriff's Department, Fire Department, utility companies, Medical Personnel, Dispatch service, Disaster Preparedness, American Red Cross, military, auto mechanics, and roadside service. Since the program's inception, about 10,000 to 12,000 local students have participated.

There are many different forms emergency prevention can take and the potential benefits are substantial. According to the National Highway Traffic and Safety Administration (NHTSA) "Every year, one in four Americans will have a potentially preventable injury serious enough to require medical care. These injuries account for almost 10 percent of all physician office visits and 38 percent of all hospital emergency department visits (NHTSA 1998a)." To increase prevention the NHTSA sponsors policies and programs to:

- increase the use of safety belts, airbags and other life and limb saving restraints;
- conduct research into biomechanics & trauma;
- promote child passenger safety through education and law enforcement;
- address new driver issues;
- improve the safety and mobility of older drivers;
- improve the safety of pedestrians, bicyclists, and motorcycle riders;
- research and evaluate safety and accident prevention.

Early medical care for conditions can prevent them from becoming emergencies. Thus improved access to basic health care and greater use of managed care can reduce the costs of EMS. Early care is a large part of the thinking behind the move toward HMOs and other systems designed to reduce costs by maintaining good health rather than

simply treating poor health. Similarly environment and hazard management may reduce the costs of EMS.

Many prevention activities are focused on reducing traffic accident. Traffic accidents are the leading cause of death for young people between the ages of 6 and 27. In 1995 there were approximately 41,800 traffic deaths and about 3.4 million traffic injuries nationally. Unfortunately in California's Central Valley the fatality rate from motor vehicle accidents is about three times higher than in other parts of California (NHTSA 1998b).

Increasing the use of safety belts, airbags and other restraints could substantially reduce the severity of the effects of traffic accidents. NHTSA has estimated increasing the use of safety belts from 68% to 85% could save Medicare and Medicaid about \$275 million a year. The agency notes that, for those who are admitted as inpatients, the average hospital charges for an unbelted driver are about \$5,000 higher than for a belted driver.

Seat belt laws effectively reduce the costs of EMS because they increase seat belt utilization, which reduces the severity of injuries when accidents occur. Prior to the passage of seatbelt use laws in 1983, national usage was only about 14%. Since then it has risen to about 68% nationally. In 1996 California had the highest seat belt use rate, 87%, of all the states. NHTSA attributes this high rate of seat belt use to the 13-percentage-point boost in use obtained when California upgraded its seat belt use law from secondary enforcement to primary enforcement. Under secondary enforcement a citation for non-use was only written when a driver had already been stopped for another violation. With primary enforcement, citations can be given whenever an unbelted driver or passenger is observed.

Unfortunately, the NHTSA profile of non-users may fit many drivers in Stanislaus County. "Non-users come from all segments of society but are frequently male, less than 30 years of age, unmarried, and have little or no post-secondary education. They often drive pickup trucks or sport utility vehicles and live in rural areas" (NHTSA 1998a). Encouraging police enforcement of the California seat belt use law may therefore help reduce EMS costs.

For children under five, child safety seats when used properly can reduce

fatalities 71 percent and the need for hospitalization 69 percent. Such use could result in substantial EMS system savings. However, many parents need assistance in obtaining seats and learning how to use them properly. The problem is likely to be more acute in Stanislaus County, in that approximately 52% of births are paid for by Medi-Cal (Diringer et al., 104). To address the local need, Anne Stokman of SMC in 1991 developed the “Keep Baby Safe” (KBS) project. This award-winning program is a nice example of community cooperation, and has probably reduced EMS costs to Stanislaus County residents. The project involves cooperation between hospitals, public health officials, CHP, Modesto Police Department (MPD), Hamaways Baby News (local provider of child safety seats), community organizations, preschools, daycare centers, and social services.

The KBS project includes: networking of services, classes, traffic school, community activities, and buckle-up check points. KBS classes cover the correct usage of different child safety seats, selection of the appropriate child safety seat, the dangers of not using a child safety seat, and seat belt laws. Each of the local hospitals offers classes, as do HSA clinics and the maternity outreach mobile. The classes are offered in English, Spanish, Cambodian, Hmong, and Laotian. As of September 1998, 10,392 people had attended and the program had distributed 5,873 child safety seats. By participating in about 200 community events, KBS has reached approximately 28,000 people. Presentations at preschools and day care centers have reached 1,118 children.

The KBS traffic school is for child safety seat violators and, if approved by the court, costs the violator only \$50 instead of a \$280 fine. These classes are offered in English, Spanish and Cambodian. As of September 1998, 3,619 people had attended.

The buckle-up check points are collaborations with MPD, CHP, and KBS instructors. Through the 67 check points conducted as of September 1998, 9,499 people have been educated. The buckle-up check point data for children under four in 1992 indicated 27% with no car seat. By 1998 this had fallen to only 8%. The percent using car seats correctly grew from 22% to 27%. While this is a strong improvement, it unfortunately implies that 8% still need safety seats, and about 65% are using seats incorrectly. One may hope that these numbers will fall. The program has been funded by DMC Foundation start up funding, Office of Traffic Safety grant funds, SB1073, traffic

school revenue, donations by organizations such as Hamaways Baby News, CHP, and MPD, car seat coupon sales, and the HSA.

New drivers (NHTSA 1998c) account for a disproportionate share of motor vehicle accidents. For example, although 15 to 20 year olds are only about 7% of drivers nationwide, they are involved in about 14% of all traffic fatalities. To combat the problem California has adopted a strong graduated licensing program. The program stemmed from an earlier graduated licensing program in the state, which, according to the California Department of Motor Vehicles, helped reduce accidents for 15 to 17 year olds by 5.3%.

Stanislaus County developed a program called “The Young and the Reckless” (NHTSA 1998d) after undergoing a 22% increase in injury crashes and a 5% increase in fatal crashes from 1988 to 1992. This program included creation of drivers’ education enhancement sessions, several television programs for cable and classroom use, a talk show, a program to divert first time teen speeders to a 3 to 4 hour class on speeding, risk taking, and impaired driving called AUTOSHOP, and presentations at schools and community events. The project cost approximately \$231,630 and received funding from a state grant. State funding ended in 1997, and only the AUTOSHOP portion, funded by participant fees, still exists.

Impaired driving can cause serious accidents. “Nationwide in 1997, alcohol was involved in 38.6 percent of the traffic fatalities (8.3 percent low alcohol and 30.3 percent high alcohol), translating to 16,189 alcohol-related fatalities (NHTSA 1998e). The Center for Human Services of Stanislaus County organizes campaigns such as *Take A Stand Against Impaired Driving* and provides coordination for organizations such as Friday Night Live, Club Live, and Friday Night Live Kids which promote non-violent, non-impaired youth activities. To the extent that these activities reduce impaired driving emergencies and other drug and alcohol related emergencies, they will tend to reduce EMS costs.

Many migrant farm workers come to the Central Valley each year and many of these migrant drivers do not speak English, do not understand traffic laws, and do not have a license (NHTSA 1998b). To deal with these safety problems, the La Loteria del

Manejo Seguro (Motor Vehicle Driver Safety) program was created to reach out to the Hispanic population. It promotes a bilingual driver safety training manual and training system. Development and initial implementation costs were about \$280,745, but the program focused on Yolo, Fresno, Tulare and San Joaquin. Stanislaus residents presumably could also benefit from implementation of a similar program.

Fire prevention and safety programs can substantially reduce fires and related medical emergencies. The Fire Prevention Bureau of the Modesto Fire Service conducts numerous public education and safety promotion activities. These include: safety inspections, investigating the causes of fire, helping conduct fire drills at local institutions such as convalescent homes and at large employers, participating in Safety Days through programs like S.A.F.E., working with the YMCA to promote safety and offer classes such as CPR, visiting schools, and public information dissemination through signs designed by High School art students. The Fire Prevention Bureau of the Modesto Fire Service has a budget of approximately \$570,000.

The Stanislaus County Health Services Agency (HSA), through its attempts to promote general health, has probably reduced the costs of EMS substantially. HSA recently obtained managed care program access for Medi-Cal eligibles through OMNI Health Care and Blue Cross of California Medi-Cal. Research findings have suggested, for instance, that a shift to the use of managed care for Medicaid patients led to a 30-40% drop in the use of emergency rooms by the poor (Hurley et al.).

The HSA's ambulatory services, by increasing access to primary care providers through its clinics and maternity outreach mobile visits, try to prevent emergency medical conditions from developing. Also, HSA's urgent care center is likely to care for some patients who otherwise would have gone to an emergency room. However, patients insured by Medi-Cal often have problems in obtaining access to specialty and subspecialty services. Some may thus still need to seek emergency service treatment.

HSA's Public Health Service Division, by promoting general health, is also likely to reduce EMS costs. For example, the reduction in the incidence of the flu in 1998 may in part be due to increased flu vaccinations.

HSA's Health Education Services Division through Community, Patient, and Staff Education also help promote general public health and reduce emergency medical situations.

The Indigent Health Care Program (IHCP) provides necessary medical services to indigent Stanislaus County residents not covered by other insurance. In 1997/1998 the IHCP in Stanislaus County spent approximately \$10,313,341. A substantial portion of its funds (about \$2,088,000 in 1997/1998) come from intergovernmental funds such as the state tobacco tax funds, through the California Healthcare for Indigents Program (CHIP). The program reimburses medical providers for care delivered to indigent persons classed as Medically Indigent Adult (MIA), Indigent (IDG), Indigent transient (IDX), and Child Health and Disability (CHD). A goal of the HSA is to move this program from a fee-for-service program toward a managed care system. Given the benefits of managed care for reducing use of emergency rooms (Hurley et al.), logically a similar shift to managed care for the IHCP could reduce county indigent use of emergency services.

However, some problems are anticipated. While reductions in smoking are socially desirable, an implication is that over time tobacco tax revenues would decline. Similarly, cutbacks in disability insurance and welfare will probably increase MIA enrollment. And those eligible for the Child Health and Disability Program (CHDP) are also expected to increase in number. In fact, the IHCP anticipates approximately \$911,000 in unmet needs. To the extent these needs remain unmet, they will probably increase the use of emergency services in Stanislaus County.

Environmental hazards and disasters can lead to the need for EMS. The county Department of Environmental Resources (DER) tries to protect the environment, consumers, and public health. DER tries to prevent hazardous materials problems through inspections, a household hazardous waste disposal program, and mitigation and assessment services. The agency deals with about 200 to 300 hazardous materials incidents a year. Such incidents include the floods, the tire fire, the train derailment along route 99, drug labs, fuel, gas and solvent spills. Representatives indicate that, for some incidents, every ambulance within 100 miles was kept on alert. In some disaster situations the DER has acted as an unofficial Emergency Operations Center (EOC). If the responsible party associated with a hazardous waste incident can be found, the agency

tries to recover costs from that party. The agency also charges for inspection services and receives some state funds.

DER's proposed budget for fiscal year 1998/1999 estimates \$1,632,174 in expenditures. The Department anticipates \$80,000 in state funds. Most of its revenues are expected to come through fees for services to local businesses and county resources. This extremely valuable service thus costs the residents of Stanislaus approximately \$1,552,174.

Many other injuries may also be preventable. Merced County EMS undertook a study of injury incidents in 1995 and found the most frequent cause of nonfatal injuries needing hospitalization was falls. Many of the fall victims were elderly. Since then the County has developed a program for training fall prevention (Craven). Given the 1,823 calls in Stanislaus County, which AMR indicates were fall-related, this type of program could be beneficial in Stanislaus County as well.

Recent statewide EMS meetings have also suggested the benefits of prevention. Unfortunately, while these benefits are in theory very large, they are also very difficult to measure. Essentially looking at their value involves attempting to estimate the value of things that did not occur. A full review of these services is clearly beyond the scope of this project. However, without these services the well-being of the people of Stanislaus County would clearly be lower and the costs of the EMS system would clearly be higher. It is likely that greater investment in prevention would be one of the most cost-effective ways to reduce the costs of the EMS system and also promote the overall well-being of the residents of Stanislaus County.

Whether these prevention activities should strictly be attributed to EMS costs or simply be considered part of the costs of improving general health and well-being is ambiguous. It is also extremely difficult to apportion the costs of most of these programs between general health promotion and prevention. In fact, much of law enforcement is also intended to promote safety and could also be considered EMS prevention. Similarly prisons which retain violent criminals and courts that encourage their retention could be considered part of EMS prevention. For practical reasons a full study of the costs of prevention are beyond the scope of this report.

The effort here has been to indicate some of the programs that are likely to be valuable. We have noted the cost information associated with different programs. We have also suggested that greater prevention efforts would likely be beneficial to the people of Stanislaus County.

The most likely problem for policy makers in this area is that the costs of prevention tend to be on budget, i.e., require government or grant revenues. The greatest value of the savings they create -- lives and limbs saved, disease prevented, suffering reduced, as well as reduced transport and hospital costs -- tend to be off budget. However, since 55.5% of emergency visits in Stanislaus County are made by people insured by MediCal, Medicare, and the IHCP, prevention could impact these budgets significantly.

Cost Summary

The annual cost estimates generated in this research are approximations. Most of the private providers were extremely reluctant to share detailed cost information, and we have made many assumptions regarding factors such as collection rates and the percentages of services due to emergencies. Notwithstanding the foregoing disclaimers, we have arrived at estimates of costs.

- Stanislaus county residents pay approximately \$172,000 for Mountain-Valley EMS Agency services.
- Most of the costs of dispatch service are actually for other services and most medical dispatch costs are included in the cost estimates of AMR.
- First response by fire service probably costs approximately \$628,000.
- EMS transports may cost Stanislaus County residents approximately \$7,808,990.
- Estimated net revenues due to emergency hospital services for Stanislaus County are \$24,680,147.
- Total costs, other than those directed at prevention, are thus approximately \$33,289,100.

This study does not attempt to assess costs associated with prevention. Most EMS prevention activities can be considered multipurpose. For example, these activities

may promote general health, reduce accident costs, or promote law and order, as well as prevent medical emergencies. Shifting greater resources toward prevention would therefore likely reduce the monetary costs of EMS. But the greatest “savings” from prevention are non-pecuniary. Such “savings” would be in terms of, e.g., human lives and limbs saved, disease prevented, and suffering reduced.

5b. EMS Data and Communications

There are two types of operational data considered in this section:

- Data descriptive of the various parameters of the emergency medical system
- Data reflective of the quality of the emergency medical system.

As has been noted elsewhere in this report, data collection problems have plagued Emergency Medical Services for more than three decades. Yet the need for timely, reliable information is crucial to system design, quality assurance, and resource allocation. According to the National Highway Traffic Safe Administration's Emergency Medical Services Agenda For The Future:

Systems for data collection and information management have developed slowly within Emergency Medical Systems (EMS). Several recent initiatives have focused on the development of improved techniques for collecting EMS-related data. The Trauma Care Systems Planning and Development Act of 1990 emphasized the need for collection of data for the evaluation of emergency care for serious injuries. 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. During the 1993 Uniform Pre-hospital Emergency Medical Services Data Conference, potential data elements were discussed and determined to be essential or desirable. (NHTSA 1996, 55)

There are few statewide or national requirements for data collection and evaluation. The California EMS Authority (EMSA) indicates that a "standardized statewide data collection is a long-term proposal. Prehospital data collection using the standardized core data set will be promoted via the EMS Systems Guidelines as a required activity. The EMSA will continue to support local data efforts by providing technical assistance and by making data collection effort a special funding priority." (EMSA 1993, 2)

In the local Mountain-Valley Emergency Medical Services Agency (MVEMSA) region the data, including descriptive data, are primarily gathered by the agency itself, and maintained in a data base. The MVEMSA has been looking at the data picture, and in 1995 produced a document, EMS Design 2000 The Local EMS System Model, which identifies the characteristics of the data system, quality improvement, and retraining.

Determining What to Collect

The California EMSA says that a local EMS agency data system should collect data necessary to meet the following requirements:

- Provide information to the local agency regarding:
 - EMS system quality
 - Provider contract compliance
 - Acute care facility contract compliance
- Have the capability of providing information to the State EMS Authority as outlined in State EMS Authority Reporting Needs.

Such a system ideally includes prehospital data for all patients who are attended to by emergency medical personnel, including:

- Patients who are contacted in the prehospital setting but not treated either because treatment is unnecessary or treatment is refused;
- Patients who are contacted in the prehospital setting and treated but not transported;
- Patients who are contacted in the prehospital setting and are treated and transported;
- Patients who are contacted at an acute care facility for the purpose of being transferred to another acute care facility. (EMSA 1993, 5)

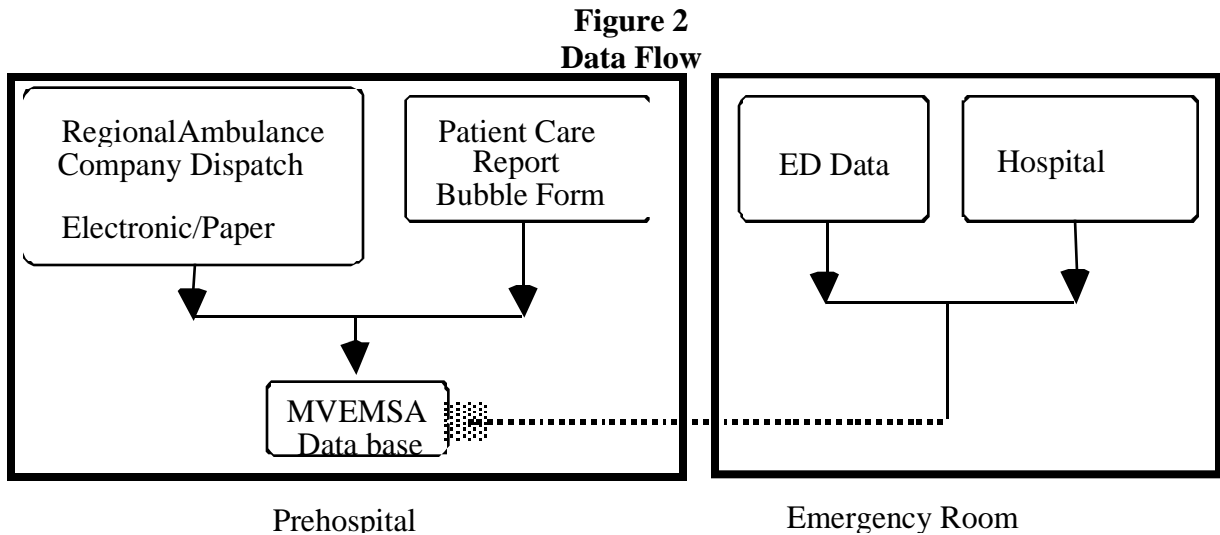
EMS patient data are collected in various segments as the patient passes through the system. In general, there are five parts. Prehospital Data includes the Dispatch Data, First Responder Data, and Ambulance Provider Data. Hospital Data include Base Hospital Data and Receiving Hospital Data.

Generally, collection of these data is at the sites which generate them, rather than at a central site. However, the information must be sent to a single location (presently MVEMSA) in order to generate reports that combine data collected at different sites. Independent collection works only if the data from each segment can be related to the other segments on a per-patient basis. Technological and patient confidentiality issues currently make matching the prehospital data with hospital data virtually impossible.

In order to accomplish data matching and individual patient tracking, one must link prehospital and hospital data. One typically achieves linking through data base keys. In order to link data from different data tables within a data system, and to link those tables with data tables from other data systems, one must be able to compare common elements. (EMSA 1993, 13)

Descriptive Data

Descriptive data flow into the EMS system and the MVEMSA collects them. Figure 2 represents the data flow diagram. Data enters from emergency dispatchers (i.e., ambulance dispatchers) and from scanned Patient Care Reports (PCR) filled out by the paramedics. When the data gets to MVEMSA, the two types of data are merged and entered into the data base. Qualitative reports can be generated from this data base. Several examples follow.



It would be useful if the patient data generated at the emergency room or in the hospital could be merged at MVEMSA to completely track a patient through the system. Tracking is at present cumbersome at best. As far as outside agencies are concerned, it is impossible to actually analyze patient activity and progress through the emergency medical system.

The next several tables show tabulated figures from 911-type emergency calls which resulted in Code 1, Code 2, or Code 3 responses and/or transports to medical facilities. (Code 1 is scheduled transports, Code 2 is emergency, and Code 3 is emergency with lights and sirens.) Table 15 shows ambulance responses according to response code.

Table 15
Ambulance Responses (All Codes) By Counties

	1995	1996	1997
Alpine			
Code 1	1	0	1
Code 2	25	10	5
Code 3	54	36	12
<u>Unknown</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	80	46	18
Amador			
Code 1	1	3	8
Code 2	467	394	379
Code 3	1320	1172	1251
<u>Unknown</u>	<u>12</u>	<u>0</u>	<u>0</u>
Total	1800	1569	1638
Calaveras			
Code 1	21	26	79
Code 2	363	394	387
Code 3	1738	1675	1749
<u>Unknown</u>	<u>24</u>	<u>0</u>	<u>0</u>
Total	2146	2085	2215
Mariposa			
Code 1	10	33	50
Code 2	204	171	192
Code 3	687	647	854
<u>Unknown</u>	<u>13</u>	<u>0</u>	<u>0</u>
Total	914	851	1096
Stanislaus			
Code 1	1388	65	260
Code 2	6015	5688	8450
Code 3	22877	21269	21048
<u>Unknown</u>	<u>102</u>	<u>668</u>	<u>810</u>
Total	30382	27690	30568
Tuolumne			
Code 1	0	3	1
Code 2	201	242	121
Code 3	2156	2283	1207
<u>Unknown</u>	<u>3</u>	<u>108</u>	<u>165</u>
Total	2360	2636	1494

Source: 1995 data AMLSJEMSA Annual Report 1996, p.9-14
1996 and 1997 data, Rick Jones MVEMSA 1998

Note: The 1997 Stanislaus County data are doubled half-year figures because of a computer problem when AMR changed systems.

Table 16 shows the comparison between scene calls for ambulances in Stanislaus County and transports to medical facilities. These data are from the MVEMSA data base.

Table 16
Stanislaus County by type of call

	1996 Responses	1996 Transports	1997 Responses	1997 Transports
Code 1	65	43	260	94
Code 2	5688	4543	8450	7130
Code 3	21269	15538	21048	16206
Unknown	668	506	810	614
Total	27690	20630	30568	24044

Source: MVEMSA

Table 17, 18, and 19 show annual transports to Doctor's Medical Center, Memorial Medical Center, and Stanislaus Medical Center.

Table 17
Primary Reason For Emergency Transport to Doctor's Medical Center 1995-97

	1995	1996	1997
Cardiac	330	345	456
Environmental	5	5	6
Medical	154	60	68
Neurologic	664	705	692
Obstetric	103	113	118
Other Medical	2224	2653	1714
Poisoning	97	87	37
Psychiatric	58	72	86
Respiratory	567	536	506
Trauma	1013	806	680
Unknown	212	237	226
Total	5427	5619	4589

Source: MVEMSA

Table 18
Primary Reason For Emergency Transport to Memorial Medical Center 1995-97

	1995	1996	1997
Cardiac	279	263	434
Environmental	7	8	5
Medical	158	51	66
Neurologic	575	631	720
Obstetric	16	25	25
Other Medical	2121	1641	1647
Poisoning	79	87	41
Psychiatric	103	66	80
Respiratory	545	474	560
Trauma	862	556	681
Unknown	211	173	206
Total	4956	3975	4465

Source: MVEMSA

Table 19
Primary Reason For Emergency Transport to Stanislaus Medical Center 1995-97

	1995	1996	1997
Cardiac	104	98	124
Environmental	3	8	4
Medical	52	24	25
Neurologic	371	399	297
Obstetric	6	8	11
Other Medical	1402	1126	935
Poisoning	205	115	43
Psychiatric	153	103	91
Respiratory	267	293	192
Trauma	418	187	221
Unknown	126	126	183
Total	2981	2361	1943

Source: MVEMSA

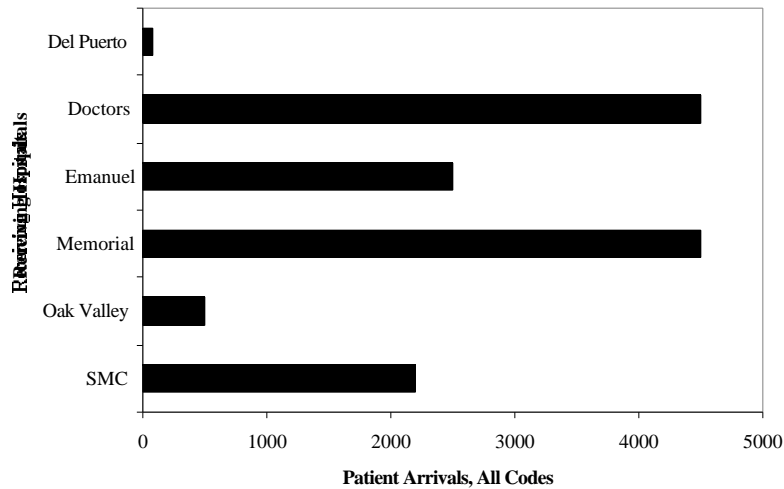
Table 20 summarizes the emergency transports to the three Modesto emergency facilities from 1995 through Sept. 30, 1998. Note that the 1998 column is just for three-fourths of the year and that since Stanislaus Medical Center had closed, no emergency patients went there.

**Table 20
Transports by Hospital**

	1995	1996	1997	1998
Transports to Doctors Medical Center	5427	5619	6644	8559
Transports to Memorial Medical Center	4956	3975	4465	5315
Transports to Stanislaus Medical Center	2981	2361	1943	0
Transports to Emanuel Medical Center	-----	-----	-----	2798

Next, Figure 3 shows the various emergency facilities in Stanislaus County and the Code 3 emergency arrivals at each facility in 1997.

**Figure 3
Stanislaus County Patients 1997**



Source: MVEMSA

Note in Figure 3 that there may be some inconsistencies in numbers of transports because of multiple injury transports, transports from outside of Stanislaus County into the county, and air ambulance transports.

One of the important parameters of the emergency response system is the time of response between the placing of a 911 call and the dispatching of an ambulance. MVEMSA is able to collect data on ambulance response to compare the regional ambulance companies to pre-determined standards. In Stanislaus County, there are four demographic zones, with four different response time standards. Table 21 summarized the standards.

**Table 21
Responses by Zone**

Demographic Type	Population Density	Maximum Response Time
Metro/Urban	Greater than 100/mi ²	Less than 8 minutes
Suburban	51-100/mi ²	Less than 12 minutes
Rural	7-50/mi ²	Less than 20 minutes
Wilderness	Less than 7/mi ²	ASAP

Table 22 shows a summary of response times for Code 3 responses in each of the four demographic areas of the county.

**Table 22
Code 3 Responses by Area**

1996				
Response Times (minutes)	Metro-Urban	Suburban	Rural	Wilderness
0 to 5	6021	7	47	0
5 to 10	5105	29	188	8
10 to 15	260	41	65	3
15 to 20	26	19	11	2
Over 20	8	6	7	1
Total	11420	102	318	14
Average response time (minutes)	5	12	8	11
1997 (half year)				
Response Times (minutes)	Metro-Urban	Suburban	Rural	Wilderness
0 to 5	4949	45	19	0
5 to 10	3202	0	29	1
10 to 15	149	0	33	2
15 to 20	25	163	10	0
Over 20	24		6	2
Total	8349	208	97	5
Average response time (minutes)	5	12	11	18

Data Reflective of Quality

Analysis of data from a system produces information about the system and the analysis allows one to draw inferences and conclusions about the system.

The Mountain-Valley Emergency Medical Services Agency (MVEMSA) collects and analyzes data for the Continuous Quality Improvement (CQI) program. The Mountain-Valley EMS Agency Continuous Quality Improvement Program Document describes the CQI program (MVEMSA 1997).

MVEMSA collects data both manually and electronically from agencies with which MVESMA has contracts. These agencies include dispatch agencies, fire and first responders, ambulance companies and hospitals. Non-contract agencies (e.g., fire departments) may choose not to provide data. Data are also collected from some individuals. Data from AMR ambulances are entered using a "bubble" form which is scanned and then transmitted to MVEMSA; AMR dispatch data are entered manually, as are data from the other ambulance companies. Of necessity, these data only reflect the prehospital phase of emergency services.

The Mountain-Valley EMS Agency collects these data for analysis of quality indicators (QI). A quality indicator is a measurement of the degree and/or frequency of conformance to an established standard (MVEMSA 1997, 4). The QI are grouped according to ALS or base hospital indicators. Following are the indicators as defined by MVEMSA:

ALS-Providers Indicators:

Clinical Skills:

- Percent success rate for advanced airways
- Percent success rate for med administration
- Percent success rate for vascular access
- Percent success rate for cardiac skills;

Treatment Guideline Compliance:

- Percent compliance cardiac
- Percent compliance respiratory
- Percent compliance trauma
- Percent compliance pediatric

Non-Transport Disposition

- Percent refusal rate
- Percent refusal AMA rate (MVEMSA 1997, 9)

Base Hospital Indicators:

ED/Hospital Survival

- Percent survival cardiac arrest-witnessed
- Percent survival cardiac arrest-unwitnessed
- Percent survival critical trauma adult
- Percent survival pediatric poisoning
- Percent admission/survival pediatric respiratory distress (MVEMSA 1997, 9)

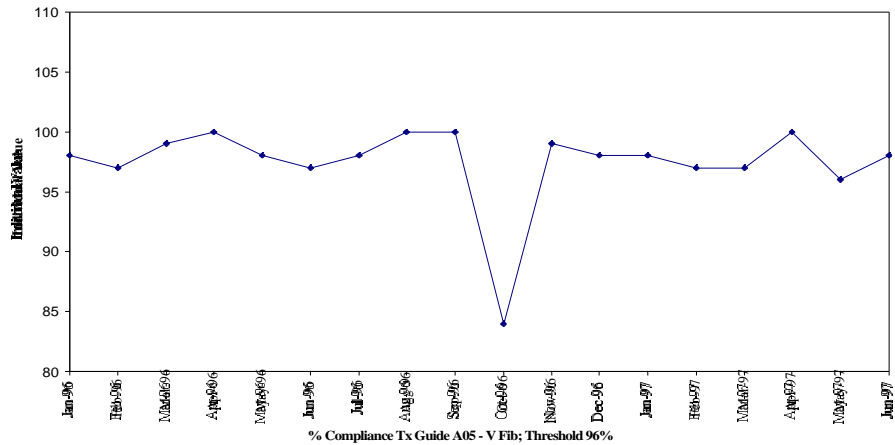
Each indicator is examined with respect to a benchmark threshold which defines the upper and lower points of conformance within an acceptable standard.

The determination of benchmark thresholds is done by consensus of the subcommittee of the QLC using the following process:

1. Benchmark Studies- Studies on the subject to be measured are extracted from published journals, and used to determine beginning threshold points.
2. Local Data Reports- Local data reports published by the Mountain-Valley EMS Agency are referenced to compare local history to benchmark studies. Threshold points are revised, as needed, to incorporate local history.
3. Statistical Analysis - The threshold points are analyzed using the mean value of the data, and the standard deviation is calculated so a standardized control limit calculation is within three (3) standard deviations of the mean. This determines the normal curve where 99% of the data should fall. The upper and lower threshold points are revised to these specifications.
4. Expert Panel - The threshold points are submitted for review by a subcommittee for consensus of members of the medical profession and a consensus is reached.
5. Community Consensus - Benchmark indicators are then given to members of quality oversight groups for review, comment and consensus. (MVEMSA 1997, 14)

Figure 4, taken from The Mountain-Valley EMS Agency Continuous Quality Improvement Program Document, and is reproduced here to demonstrate what the quality indicators look like in graphic form.

Figure 4
MVEMSA System Indicator



Source: MVEMSA 1997, 16d

The Mountain-Valley LEMSA concludes that,

The assessment of CQI information by statistical control charts and benchmark quality indicators requires the cooperation and active participation of the EMS community in order to be effective. The MVEMSA recognizes that there exists within the MVEMS region, a diversity of prehospital health care providers and system participants, each with their own unique needs and attributes. Therefore, implementation of this program should be done in a manner and scope that is applicable to the resources of each provider. In order to facilitate implementation of these indicators the MVEMSA will provide training sessions and on-site assistance to participants. (MVEMSA 1997, 15)

Quality indicators can be particularly useful for identifying training needs, and for providing a framework for uniform data collection and analysis. Any citizen concern concerning the quality and efficacy of emergency care in the Mountain-Valley region can be directed to the Continuous Quality Improvement Committee for a discussion of the appropriate quality measures.

As the state and the nation move toward quality measurement standards, absolute, rather than relative, standards may begin to evolve. At such time, the local data can be compared with the absolute standards to evaluate the local quality in a more global fashion.

Data System Evaluation

According to Mountain-Valley's EMS Design 2000, there are several components to the data system for which the governing board of the agency responsible for EMS system planning and coordination should be responsible.

- There should be a wide area computer network linking first response agencies, ambulance services, dispatch centers, hospitals, and the local EMS agency for recording and integrating all call information with patient outcome information. (MVEMSA 1995, 13)

There is no wide area computer network available in the MVEMSA area at present. Data flows "by hand" and by electronic means. Further, there is no way to generally link prehospital data with hospital data. This linkage could now only occur through the common use of the patient's name. In the future there should be an identification number which could track patients confidentially through the system.

This theme has been echoed on the state level by the Quality Improvement Vision Subcommittee. "There is a great need for a coordinated and integrated system for conducting effective EMS system evaluation. Currently, there is no ability to track the clinical course of a patient in the EMS system or link data throughout the continuum of care (dispatch, field, hospital, discharge, and post-discharge)" (EMSA 1998f, 32). At the same time the Information Systems Subcommittee cautions, "All prehospital emergency medical data systems must operate under an overriding policy of protecting personal information and maintaining confidentiality" (EMSA 1998f, 40).

- Patient care information should be generated electronically, and common information (e.g. patient name, address, billing/insurance information, etc.) shared at the time of input to reduce duplication. (MVEMSA 1995, 13)

Again, at present this is not possible because not all prehospital data is electronic in nature; additionally, hospital data can not be identified with prehospital data without a data base link that does not exist.

- Appropriate patient history information should be available electronically to prehospital responders at the scene of the call. (MVEMSA 1995, 13)

This is not technologically available at present; see the future data scenario in the following section for a conceptualization.

- At the end of each shift EMS field personnel should have an electronically generated report of their patient's E.D. diagnosis and any appropriate feedback on the case from E.D. staff. (MVEMSA 1995, 13)

Present practice does not allow this, and in fact, at the end of an EMS shift prehospital data may not yet have been submitted to the EMS agency.

Similarly, the EMS system envisioned for Quality Improvement is not yet a reality.

- A data driven QI system, based upon CQI/TQM principles should be in place at each participating agency. (MVEMSA 1995, 13)

This is available only through agencies which contract with MVEMSA. Data from fire calls may not be included at present but could be in the future.

- All participating agencies should be involved in a system-wide utilization review which analyzes the quality of medical care provided, while striving to reduce the cost of poor quality. (MVEMSA 1995, 14)

One cannot at present fully assess the quality of medical care due to the inability of the system to track patients once they enter the hospital.

Retraining

- Continuing education should focus on educational needs identified in the QI process, new trends, and reviewing infrequently used procedures. (MVEMSA 1995, 14)

Because of the extensive records developed by the MVEMSA, quality of prehospital care, and can establish training based on the quality indicators. This part of the data environment is working well.

The following are recommendations for meeting State reporting needs related to process measures of EMS systems. These are recommendations related to items specifically listed by the State.

Accuracy of LEMSA reports to the State is dependent on many factors, including:

- **Completeness of Data Collection**
The State process measure items involve data from all ALS and BLS type calls. In the case of larger LEMSAs, collection of data for all BLS calls into a computerized data system has been identified as a problem area. Despite its

difficulty, the EMS Authority believes that collection and analysis of BLS data is an important endeavor and should be pursued. (EMSA 1993, 41)

This is generally not available locally at this time.

- **Coding Standards**
For statewide aggregation of data, involved elements and code sets would ideally be identical for all LEMSAs, so that subsets in reports to the State would be divided along identical boundaries for all LEMSAs. Of course, this could be accomplished without identical code sets, but LEMSAs would have to code elements in such a way that subsets in reports to the State would remain standard and accurate. (EMSA 1993, 41)

There is utilization of coding standards locally.

- **Database Integrity**
The amount of validation that data entered into a data system is subjected to will vary among LEMSAs . (EMSA 1993, 41)

Validation is handled by MVEMSA.

- **Report Integrity**
The integrity of reports generated by LEMSAs will vary according to methods used to develop information about non-computerized data accuracy of computerized data element and coding definition accuracy of algorithms/logic used for reports. (EMSA 1993, 41)

Information Systems Scenario

The following scenario from the EMS Agenda for the Future helps summarize the discussion of information systems. It points out the raw material for information is data, and that information systems collect and arrange data to serve certain purposes.

The future: Erin, a nineteen-year-old woman, calls EMS because she is experiencing abdominal pain. When EMS personnel evaluate her, she complains of some left lower abdominal tenderness. However, she states that her pain has somewhat subsided, and for that and other reasons she refuses to be transported. The personnel update her medical "smart card" , and their computer also advises Erin's primary care network of the call and their findings and request that she receive follow-up. During the primary care follow-up telephone call, four hours later, Erin is not well. She explains that her pain has mostly gone, but that she is too lightheaded to stand. Again, EMS is called, although different personnel respond. Enroute, they are updated via their personal digital assistants. Erin is no longer able to converse, and her blood pressure is low. Because of the previous call, which was recorded in the EMS information system and on Erin's "smart card", personnel suspect a ruptured ectopic pregnancy. She is resuscitated and transported to the nearest hospital with gynecological services. There, she is met by a physician already familiar with her care to this point. Following emergency surgery, Erin does well. She credits EMS and the follow-up call from her primary care health network for saving her life.
(NHTSA 1996, 55)

The use of smart card technology and similar could undoubtedly be beneficial to the health of Stanislaus County residents. Its usefulness deserves monitoring and further research.

Data and Information Systems Discussion

Aside from listings such as the Trauma Registry, there is no national or state central database that relates to the current practice of EMS; however, there is a regional database which is maintained by MVEMSA. For this data base, the information required to completely describe an EMS event exists in several locations and forms. These include MVEMSA, emergency departments, hospital medical records, other public safety agencies, and other offices. In most cases, meaningful linkages between various sites are nonexistent. The MVEMSA data base would be more useful if there were consistent

reporting standards (i.e., regulating/funding agencies requiring periodic reports based on the data base) and consistent reporting. The melding of data (Figure 2) into the MVEMSA data base is a case in point. The dispatch and PCR forms could be uniformly required information.

The purposes of collecting EMS data are (1) to evaluate the emergency medical care to improve access and treatment and to reduce mortality, and (2) to determine some of the characteristics and trends as changes occur in populations, emergency facilities, and other agencies. The lack of organized information systems to produce reliable data is a significant barrier to coordinating EMS system evaluation.

An additional area of concern is in the lack of a meaningful integration of pre-arrival information for a patient with emergency room or hospital data. The purpose of this matchup is to help the emergency personnel better understand the consequences of their treatment of the patient.

Add to this the lack of pre-incident patient-related data for the emergency care provided during an emergency incident. The emergency personnel are unlikely to have patient data available to them during their care of the patient.

If there is interest in Stanislaus County, or in the state, about research related to the emergency system, then the present data collection system is probably inadequate for any substantive, statistically valid studies. However, the present system is adequate for answering certain large-scale types of questions.

How to Get There

EMS agencies must adopt uniform data elements and definitions, and incorporate these into information systems. There is an effort under way in California to standardize data collection through uniform data system standards. These uniform standards are fully discussed in Emergency Medical Services Data System Standards. The MVEMSA is using the state data standards at present, but the system would operate more efficiently if all data collection and submission were done electronically. A step in this direction would be for the agencies to submit data on uniform data sheets (e.g., the bubble forms used by AMR) for prehospital data. As EMS data systems emerge and are standardized, emphasis should move to assuring the integrity of the data.

A monumental issue is linking all the significant data including pre-incident patient data, incident data, and post-incident data. This is an extremely difficult situation and cannot be accomplished without a great deal of study, financial commitment, and relevant decisions. "EMS should collaborate with other health care providers and community resources to develop integrated information systems. Such efforts should provide each participant with patient-related data that potentially affects the continuum of care, facilitates access for patients to appropriate care and attention, enhances clinical care decision making, and facilitates follow-up care" (NHTSA 1996, 56)

Daniel W. Spaite, M.D., commented

Finding desperately needed answers to many important questions in EMS is hopeless without the development of new ways to collect, link, and analyze valid, meaningful information. This is the very foundation of the future of EMS! (NHTSA 1996, 55)

Communication Systems

In any organization, communication systems not only link the organization internally but also provide links to the external community. Communication systems historically include telephones, radios, TV, and mail, but more recently computers, video conferencing, electronic mail, and the Internet. In emergency systems, radio and 911-telephone systems are critical components of communication with the outside community . This 911 link is the most visible connection with the public.

Thus, EMS communications provide

- access to the EMS system by the public through the dispatching of public safety agencies;
- coordination among emergency agencies;
- coordination among health care providers;
- information for the public.

In the 911 system, data (i.e., incoming calls) flows in to various answering points called public safety answering points (PSAP).

A key element related to providing greater efficiency in the EMS system is to utilize emergency medical dispatchers (EMD) within the local PSAP, as incoming calls may be handled by personnel with various emergency medical skills. "EMDs are able to query callers and determine the appropriate resources to be dispatched. Furthermore, EMDs are

able to provide dispatch life support via pre-arrival instructions for appropriate patients." (NHTSA 1996, 46)

Stanislaus County is in the process of developing a new PSAP facility in Modesto and the opportunity exists to better integrate the various county PSAPs into a single PSAP.

Radio communication is important because when emergency vehicles are in the field they can only maintain contact with other agencies through radios (or cellular telephones, which, after all, are radios). They need to be in contact with other emergency vehicles as well as base hospitals.

In the future, global positioning systems (GPS) may well help identify the location of emergency vehicles. It is also possible that satellite communications will be used for other communication activities (e.g., transmission of medical data).

EMS personnel are information-isolated as they typically do not have access to any great amount of medical information for a specific patient in a given emergency.

EMS communications systems should allow for the transmission of real time medical advice between the ambulance and a medical facility. That would allow both better medical care for the patient en route and the receiving facility would be better prepared to deal with the incoming patient. Additionally, the communication system should allow for the transmission of real time data between the emergency vehicle and the EMS agency from a standpoint of general statistical data and quality control.

There are several goals for EMS systems with regard to sharing communications technology with other segments of the general community.

- Promulgate and update standards for EMS dispatching.
- Develop cooperative ventures between communications centers and health providers to integrate communications processes and enable rapid patient-related information exchange.
- Determine the benefits of real-time patient data transfer.
- Appropriate federal, state, and regional funds to further develop and update geographically integrated and functionally-based EMS communications networks.
- Facilitate exploration of potential uses of advancing communications technology by EMS.

- Collaboration with private interests to effect shared purchasing of communication technology. (NHTSA 1996, 47)

As with the data system, a futuristic scenario involving communications details is illustrative of possibilities and trends.

The future: A neighbor finds John, a 65-year-old rural farmer, unconscious in his house and summons EMS. At the communications center John's health provider information is available automatically. The patient's health database is accessed and his current problem list, medications, and allergies are downloaded to the responding personnel's personal digital assistants. EMS personnel find John in severe shock and in critical condition. They learn from his health database that he suffers from severe adrenal insufficiency, and suspect that an intercedent illness or inability to take his medication has led to John's current condition. By computer this information is relayed to the medical command center 50 miles away, and the decision is made to administer a stress dose of hydrocortisone in addition to other resuscitative treatment. The patient's primary care provider is also identified from the database, is updated directly from the EMS unit, and is able to provide additional helpful information to emergency department staff prior to John's arrival there. John is much improved by then, and he recovers fully. (NHTSA 1996, 47)

Bob Bailey noted:

"As EMS becomes better integrated with other health services, the needs for efficient information transfer among system partners will increase. Communication systems provide the links that make information transfer possible, and they should exploit technology that enhances their efficiency." (NHTSA 1996, 47)

5c. Other Significant EMS issues in Stanislaus County

Transport: Public versus Private

The role of fire agencies in EMS has evolved since the mid-1960s along with the EMS system itself. With the evolution have come questions concerning emergency transport. "Police and fire protection districts, county and district hospitals, and coroner may own and operate emergency ambulance services. (Lackner, p.9) The issue of EMS transport by public agencies has long been an area of interest for both firefighters' unions and fire chiefs.

The argument

When fire agencies do not transport patients, there is often concern about duplication of effort and cost. If the private ambulance provider is responding, and there is no fire or other public safety threat, why should a fire crew respond as well?

There are several legitimate arguments for including fire agencies in pure emergency medical response incidents. First, fire personnel are typically distributed within a five-to-seven minute radius of residents in urban areas. It is not cost effective, in most cases, for private transport providers to deploy their resources as intensively. Thus, although they may not transport, fire personnel can often be on scene faster than ambulance personnel can. They can stabilize a patient, provide initial treatment (including Automatic External Defibrillation) and can begin to prepare patients for transit.

An ambulance crew almost always consists of two people. Fire personnel can supply additional labor when special situations are encountered. When dealing with unusually heavy patients, or people who must be moved up or down staircases for example, additional personnel can be quite helpful. Moreover, since one of the ambulance crew members must drive the vehicle, fire personnel can assist in the ambulance itself. If a patient has suffered a heart attack, the paramedic can administer medication or assist breathing, while the firefighter administers compressions.

Although one can argue that the use of firefighter labor by the private ambulance provider constitutes a form of public subsidy, one could also argue that the community as a whole benefits from the use of available public labor. Otherwise, significant additional labor costs, which would be incurred if private sector providers had to staff at the levels,

required if fire personnel were not available. (Note: On those occasions when firefighters are involved in other incidents and cannot respond for emergency medical calls, there are often significant time delays while the ambulance personnel wait for additional company assistance.)

Fire agencies and other proponents of exclusive public sector EMS argue that faster response times and the need for fire personnel assistance in many cases, prove that the fire service should be the exclusive provider of EMS transport. It is true that there are many fire agencies throughout California that provide excellent ALS transport in their communities. At the same time, there are legitimate public policy concerns which argue against universal public ALS transport.

Foremost among these is the fact that many fire agencies have neither the financial resources nor the personnel to undertake and maintain effective ALS transport. Typically, these fire agencies operate in the smaller towns and rural areas where there is not an adequate tax base to initiate public ambulance service and not a large enough patient base to sustain it. The areas where fire-based ALS transport is likely to be most successful are in the larger urban population centers.

However, for a private ambulance provider to be successful, it needs a large, insured population base as well. Private sector ambulance service cannot be expected to simply fill in the gaps where public sector service cannot succeed. The dilemma, therefore, is that the population centers where public sector ALS transport is most likely to be viable, are the very areas where private sector companies can find enough profit to offset the cost of serving small towns and rural populations. Carving out a geographic response area that is both attractive and profitable for private providers is a major challenge for many LEMSAs.

There is an additional concern about fire-based ALS transport, expressed by a number of EMS administrators throughout California. The very fact that firehouses are so well-distributed throughout the population, means that the average fire-based paramedic is likely to see fewer calls per shift than his or her private sector counterpart. There is a sincere concern that over time a dilution of skills will take place among the fire-based personnel so that, ultimately, they may arrive on scene faster but be less well-equipped to deal with the emergency when they arrive.

A final policy issue also raised in this debate has been termed the "ethics of privatization" (Denhardt 119). The argument is that there are some public services that are so important to citizen well-being that it is crucial that they are controlled by elected representatives, who are responsive to the community they serve, rather than stockholders who, most likely, do not live in the community and whose legitimate priorities are return on investment rather than responsiveness to residents.

No fire department currently offers EMS transport in Stanislaus County. Most of the issues, though discussed in abstract above, were in fact, raised in interviews with Stanislaus County EMS stakeholders.

One county supervisor remarked that his personal concern was that dual fire and ambulance response is a waste of resources. But, he acknowledged, having the fire engines respond to their emergencies seems to be popular with residents and he has not received complaints about the practice.

It has been calculated that, if Modesto City FD abandoned EMS altogether it would save about \$170,000 of a \$15 million budget (Hawkins). If 65 percent of their 12,500 runs per year are EMS related (Hinshaw), there is only a cost of about \$20.92 per run.

While the overall satisfaction with the performance and professionalism of AMR personnel appears to be high among public officials, numerous fire and city officials expressed a degree of frustration with the lack of detailed information AMR is willing to share. From AMR's perspective, as a private sector provider, operational details are proprietary information. As long as the company meets its contractual responsibilities, the specifics of its staffing and deployment plans are not for public consumption.

Public safety officials, however, expressed concern over the fact that they are never certain what resources are available to them and where they are. During an evening ride along with an AMR crew during the summer of 1998, the research team learned that during evening hours, depending upon call volume, there are seven or fewer ambulance crews available to serve the AMR response area.

The authors observed a Status 1 condition during their ride along. The condition meant that, because the other ambulance crews had not yet completed work on their incidents, only one vehicle was available to respond to any call from Turlock to Salida.

The condition observed lasted only 15 minutes and no emergency calls came in during that time.

Furthermore, AMR has a strong record of contract compliance, quality assurance and information gathering. One hospital spokesperson credited AMR's data system with providing vastly improved information over that of its predecessor. And the manager of another ambulance service in the county said that AMR *is* the County's quality assurance system. Nonetheless, the problem of information-sharing between private and public elements of the EMS system underscores the complexity of coordinating this multi-organizational system.

Interviews and focus groups with Modesto Fire personnel revealed an interesting phenomenon which is common to many fire organizations at this time.

A generational split exists within the organization. Older firefighters were attracted to the profession because of a desire to fight fire. The additional emergency medical responsibilities, which have come about during the course of their careers, are considered secondary to their original mission. Younger firefighters, however, those who grew up watching shows such as "Emergency" and "Rescue 911" were drawn to the fire service by a desire to get involved deeply involved with EMS as well as fire suppression.

Since these younger firefighters are gradually taking roles of leadership in the organization, and since EMS now accounts for more than two-thirds of all fire agency responses, there is a growing desire in many fire organizations to assume all pre-hospital EMS responsibilities in their communities. As has been noted, however, it is difficult to argue that those fire agencies that have not been providing ALS transport over the past ten years, should enter the field at this time.

AMR and Modesto fire have engaged in active discussions about the possibility of sharing resources in at least one downtown station to save money and get the fire department more directly involved in EMS services.

Single v. Multiple Providers

EMS 2000 suggests that "A single exclusive operating area (EOA) for each county should be considered for both ALS and BLS emergency transport services." (12) Not surprisingly, this assertion has been somewhat controversial in Stanislaus County which is currently served by five ambulance providers.

The pure economic theory issues surrounding this question were explored in depth in the section on EMS costs. There are some global issues which should also be noted.

This is a particularly volatile time in the ambulance business.

The Medical Industry has shifted from fee-for-service to managed care, forcing all providers to become more efficient and cost-effective. At the same time, as EMS has evolved over the past three decades, standards have become stricter and operations have become more complex. These trends have made it difficult for smaller ambulance services to survive successfully. Large providers such as American Medical Response (AMR) and Rural Metro, now dominate the private ambulance industry.

This national trend is mirrored in the experience of Stanislaus County. At least four of the six ambulance providers that existed in the county fifteen years ago (EMSA 1983, 276) are no longer in business. Most have been purchased by AMR which now serves roughly 80 % of Stanislaus County's residents.

1999 is expected to add new pressures to the ambulance transport community. In addition to its many other provisions, The 1997 Balanced Budget Act will bring with it a number of changes to the way EMS is compensated. As of January 1, 2000 all Medicare Payments will be made under a national fee schedule. The Health Care Financing Administration (HCFA) which makes the payments, will spend 1999 establishing the fee schedule through a "negotiated rulemaking" process with ambulance service providers. Once in place, "(t)he fee will apply to all ambulance services whether provided by an independent supplier, a hospital, or under arrangement with a hospital...Payment increases in subsequent years would be tied to the CPI-U" (United States, Subtitle F Chapter 3 §4531).

Ambulance organizations are quite concerned about the potential impact of the new fee schedule. Not only will it be difficult to create a national system which addresses the wide variations among provider costs, but also the schedule will undoubtedly serve as a standard for other health care payers. Thus, the outcome of the negotiated rule making process could have a profound impact on the financial structure of ALS transport and EMS services.

Helicopter Issues

Air ambulance service has become an integral part of the EMS system and it has been a controversial issue in Stanislaus County in recent years.

In 1966, the National Academy of Sciences and National Research Council stated, "Helicopters have proved so successful as ambulances in combat theatres that they should be adopted for selected us in this country." (NAS/NRC 15) While determining the "break even" point for air transport has proven elusive, maintenance of an air ambulance service is costly and several hundred transports a year seem necessary in order to make it profitable on a stand-alone basis.

The question of EMS air transport in Stanislaus County is often referred to as "Helicopter Wars". At present, both Doctors Medical Center (Air Med) and Memorial (Medi-Flight of Northern California) provide EMS air transport service to the County on an alternating 24-hour basis. Analyzing the various arguments for and against designating an exclusive helicopter service in the County, Rick Jones noted,

True to the prediction made by Medi-Flight, air ambulance rates have increased significantly since Doctors AirMed Team became integrated into out dispatch system in April of 1993 due to competition over scarce resources...This is an increase that may have been unnecessary if there was only one provider. (Jones undated, 2)

On the other hand, the operation of more than one air provider, gives Stanislaus County residents built-in back up when the system requires multiple responses. This consideration, coupled with a variety of concerns surrounding the logistics and cost of creating an Exclusive Operating Area (EOA) for air ambulance service, led Jones to conclude, "...the potential for instability appears to be even greater with the development of an exclusive operating area in our unique circumstances" (Jones undated, 3).

Interestingly, interviews with officials from both hospitals revealed very different philosophies about the service. One competitor believes that there are not enough transports to continue to make helicopter service viable for either organization. The other, agrees that air transport is not profitable per se, but pays for itself by bringing in the types of cases which do generate significant revenue for the facility.

The Dispatch System

Stanislaus County is currently served by seven Public Service Answering Points (PSAP) plus an eighth location, the CHP office in Merced County which presently answers 911 calls placed by cellular phones.

There are several questions that have been raised concerning the current combination of PSAPs. There are also two recent developments, which may have a significant impact upon the future of emergency communications in the County.

While fire and ambulance agencies can often share dispatch responsibilities successfully, it is often difficult to integrate police dispatch functions with these other two services. Fire and ambulance tend to be deployed from fixed, known locations. Police officers are often in motion while carrying out their patrol duties. Fire and ambulance units are typically composed of multi-person crews. Police units are often in single-person configurations. This requires them to maintain more constant communications with their dispatchers. Finally, police often find themselves in dangerous, life-threatening situations. Fire and ambulance crews are seldom, if ever deployed until police have secured an incident scene.

The County PSAP has tried to address these different needs by dividing responsibility for a call once the type of incident has been screened by the initial call-taker. Due to their smaller size, this is more difficult for the city PSAPs in Turlock, Ceres, and Oakdale to accomplish. While the call volume in these individual locations usually permits smooth and efficient incident management, when conflicts occur, police dispatch typically takes priority.

An unusual, but dramatic illustration of this problem occurred recently in Ceres. In November of 1997, a major train derailment took place on the tracks that parallel Highway 99 through most of the county. Because the incident took place in Ceres, the

city's PSAP was contacted. Since the incident took place at 1:12 a.m., there was a single dispatcher on duty at the time. (Roberts and Mooney, 1) The Ceres dispatcher immediately sent police to the scene.

Then, due to the nature of the incident, he contacted the secondary PSAP at AMR to get medical aid moving toward the scene. At that point, he turned his attention back to handling the various police units that were responding. It was not until six or seven minutes later that the County PSAP in Modesto, which dispatches Ceres Fire and was monitoring this major incident, called to ask if the clearly overwhelmed dispatcher would like to have them send fire units. (Weber)

In this particular case, no hazardous materials or injuries were involved. But the incident does indicate some of the potential complications of having multiple PSAPs dealing with major incidents. The problems created by involving yet another PSAP when cellular callers initiate an EMS response, may be resolved in the near future.

Cellular phone companies have been mandated to be able to provide location information for cell phone calls by the year 2001. At present, all cell phone 911 calls in California are handled by the nearest CHP dispatch office. This has created a 7 million call per year burden, and lack of location identification in the wireless phone system has substantially slowed the ability of EMS personnel to respond. Not only is there no automatic location capability in the current system, but the reporting party is often incapable of helping officials locate the incident since the caller may be passing through the area and not certain of his or her own exact whereabouts. The fact that the CHP office trying to decipher the emergency information is located in Merced County makes the situation all the more problematic for Stanislaus. Successful testing of a triangulation system in New Jersey in 1997 led to the mandate of location identification for cellular calls nationwide by 2001.

Finally, the county is actively pursuing an opportunity to relocate its primary PSAP in the former AT&T building on Oakdale Road. This facility will provide significantly greater space for dispatch operations and is already configured to handle large-scale communications operations.

The county is developing additional partners to maximize the potential of the new location. The City of Modesto will be one of the participants. Oakdale Fire is quite

interested and the Ceres Police Department is also considering the possibility. It is quite possible that all fire agencies in the county except Turlock City Fire will be dispatched from this new location.

There is also a distinct possibility that most EMS transport dispatch will also be housed at the Oakdale Road site. AMR is actively considering moving its dispatch and call-nurse program into the new location and the other ground ambulance providers are also looking into the possibility. There has been some concern expressed that housing private sector providers in the new dispatch center will create greater temptation for counter-competitive activities. In particular, it has been suggested that AMR's presence may create a situation where their personnel will tend to hold less critical calls, knowing that their competitors are available to do the work.

While agreements among the parties are yet to be finalized, the arrangement envisioned at this writing would address the above concerns so that the benefits of cooperative EMS dispatch can be realized for the citizens of Stanislaus County.

Rural Health Issues and Distribution of Resources

According to the EMSA report to the legislature in 1983, "Stanislaus County has ten acute general hospitals and six of the ten have a 24-hour Emergency Service...No residents live more than thirty minutes from an emergency medical base and/or any hospital emergency unit" (EMSA 1983, 273).

Sixteen years later, there are only four hospitals including Emanuel in Turlock, Oak Valley in Oakdale, and Doctors and Memorial hospitals in Modesto. This trend toward hospital closure is part of a national pattern, driven by a variety of economic incentives.

The county's loss of 60 % of its hospitals in less than 16 years has had a substantial impact on the county's rural populations. In particular, the closure of Del Puerto Hospital in April of 1998 (Birch), and Westside Hospital prior to that, means that the people of the west and southern parts of the County have experienced a significant change in access to medical services.

A 1990 report on EMS in Los Angeles County by RAND noted that "...countywide capacity was adequate for the observed demand for EMS services.

However differences in the rates of use were found...This indicates that the county may be facing a distributional issue, not one of total capacity." (Farley et al., 9) As Stanislaus County finds itself with hospital beds and facilities confined to its high population areas, it may face a comparable distributional challenge. Indeed, the National Advisory Committee on Rural Health has noted, "...rural communities experience unique problems in health care delivery, distinct from urban areas due to distance, travel time, low population density, poverty, and disproportionate numbers of elderly persons" (Beaulieu and Barry, 264)

The loss of acute beds in rural areas creates additional pressure for quality ALS transport by both air and ground providers. A study by the Office of Technology Assessment in the late 1980s said, "Evidence suggests that a 'scoop and run' approach is advisable in urban areas, but enhancing the trauma skills of rural EMTs to provide more care during the prehospital phase...might improve trauma outcomes in rural areas". (U.S. Congress, 4).

Baur and Weis agree. "Emergency medical services (EMS) care is the other key to the future of rural health...a modern EMS system can actually be better than a typical emergency room in a rural hospital. The combination of a fully equipped modern ambulance and a currently trained crew can now stabilize most critically ill or injured patients at the scene...In many smaller towns, money spent toward emergency medical care is better spent on upgraded EMS capabilities...". (Beaulieu and Barry 47).

The debate over public versus private provision of ALS transport services mirrors this resource distribution paradox. Although a 1993 management audit of the Modesto Fire Department found, based upon cost benefit analysis, no justification for entering into ALS services (Mathis, 55). A city with the population and tax base of Modesto could make the policy decision that provision of such services by the Fire Department would create an additional benefit for its residents. However, by gutting AMR's current response area and taking away the core population base, the city would undermine the economic viability of the entire area for the private transport company.

More importantly, debates about which agency should provide transport within an 10 minute radius of a hospital emergency department are rather meaningless. The quality of ALS transport services are much more critical in the rural areas where transport times

can be 20 minutes or more. However, in those areas, population density and call volume may be neither economically attractive to private providers nor professionally attractive to career prehospital personnel. The benefits of quality EMS in rural communities suggest that efforts must be made to overcome these impediments.

EMCC

The concept of an Emergency Medical Care Committees (EMCC) dates back to the late 1960s. In his proposal for an Emergency Medical Services Program for the State of California, Thomas Larke outlined the composition and functions of such a group. It would include representatives from ambulance organizations, hospitals, fire and law enforcement, the area medical community, and the patients themselves. It would investigate EMS complaints, evaluate disaster preparedness, determine the proper number and availability of emergency vehicles, and determine proper response times. (Larke i)

While the Health and Safety code no longer mandate EMCCs, they are still active in many counties, including Stanislaus. In a regional EMS system, the purpose of EMCC has special importance. It reports to individual boards of supervisors on the status of EMS in their particular county. In theory it should provide, on an ongoing basis, much of the same information provided by this report.

However, there has been a great deal of dissatisfaction with the Stanislaus County EMCC, both from its members, and from interested outside observers.

The 15-member committee is designed to include representatives the CHP and local law enforcement, fire, the medical community, and public and private ambulance providers. It should also include a representative from each of the five supervisorial districts and an at-large member. At the time of this writing, there are no public members from the five districts nor is there an at-large member.

The current chair has had difficulty over the past year getting a quorum from among the remaining nine members. At one meeting, only two people, including the chair, attended. On paper, the EMCC is the ideal forum for monitoring and improving

EMS performance in the county. However, it is troubled with organizational problems common to both advisory boards and shared governance organizations.

As an advisory board, it has been criticized by the board of supervisors for failing to bring any substantive information or reports to the county. For their part, committee members complain that they get little direction or guidance from the supervisors and are largely ignored by the county.

As a vehicle for shared governance, the structure is intended to bring representatives of all stakeholders to the table. Unlike smaller counties, however, where stakeholders share a fairly common vision of the EMS system, Stanislaus is large enough that broad representation means bringing strong competitors into a common forum, and natural camps of interest, largely revolving around alliances to one of the two Modesto Hospitals, tend to form. Clearly, the representatives from the medical community will have their allegiances. In addition, the "public" members who volunteer for the supervisory and at large positions, do so because of a strong interest in Stanislaus county EMS, often created by their personal employment. Truly objective, disinterested individuals are unlikely to volunteer to serve on an advisory board.

In short, the EMCC and Board of Supervisors both believe they are poorly served and supported by the other. And most of the members of the EMCC itself, come to the organization with a mixture of self-interest and concern for the EMS system as a whole.

The problems of the Stanislaus County EMCC are symptomatic of the problems with the overall EMS system. Natural self-interest has developed into a series of "turf wars." Until genuine concern for patient well being becomes the mission of all parties, the EMCC will continue to be frustrated and ineffectual. And the County will have lost its best opportunity to monitor and improve the EMS system for the people of Stanislaus.

One of the Vision items currently under consideration by the state EMSA is a proposal to change the local governance of EMS agencies. However, as a member of a regional EMS agency, Stanislaus county will continue to have a need for a body to continually monitor performance of the EMS system within county boundaries. If the supervisors cannot make the EMCC functional again, they may wish to solicit more detailed performance reports from the LEMSA to help them monitor system

performance. Such a program, however, would be a poor replacement for the expertise and independent analysis that an EMCC should provide.

The relaxation of state requirements in this area, offers Stanislaus County the ideal opportunity to re-examine the mission and goals of the Emergency Medical Care Committee.

6. EMS in California - A Comparative Look

An important feature of this study has been the comparisons among counties. In addition to the meetings with Mountain-Valley personnel the research team met face-to-face with 12 other California EMS administrators who represent a total of 29 counties and a population of 8.9 million people.

This comparative work served several useful purposes. It enabled the team to identify issues that were unique to Stanislaus county and those which were common to the field of EMS. In addition, the focus permitted researchers to examine approaches pursued by other LEMSAs and to evaluate their relative efficacy. We do not assume that all problems are solvable. Nor do we believe that that an approach which has been successful in San Mateo County, for example, would be necessarily be workable in Stanislaus. What comparison does accomplish, however, is to enable policy makers to evaluate alternative strategies and learn from the experiences of others, good or bad.

We restricted our research to California LEMSAs, because all of them work under the same rules and regulations as Stanislaus. EMS service in the United States is organized on a state-by-state basis, and a program or approach that worked elsewhere in the nation would be of little value to Stanislaus if it were not permitted here. In California, there are 58 counties working under similar restrictions. We examine the experiences of more than half of these counties in this section.

California EMS Authority

All LEMSAs in California work under the umbrella jurisdiction of the California Emergency Services Authority (EMSA). For more than a year, Richard Watson has served as the Interim Director of that Agency.

The State EMSA was created in 1980 in response to the efforts of several EMS constituent groups around the state to create a central agency to coordinate EMS activities. SB 125 (CH 1260; 1980), the Emergency Medical Services System and Prehospital Emergency Care Personnel Act, created the Emergency Medical Services Authority and added Division 2.5 to the Health and Safety Code of California. The EMSA is one of 13 departments that comprise the state's Health and Welfare Agency.

The mission of the EMS Authority is to reduce morbidity and mortality in California by developing a statewide system of coordinated and integrated emergency medical care and preventive services. (EMSA 1998a)

The EMSA develops and implements regulations that set training standards and scope of practice for California's emergency medical personnel. These personnel include EMT-I, II, and paramedic, Mobile Intensive Care Nurses (MICNs), and firefighters. EMSA operates the State Paramedic Licensure program, which tests and licenses the state's paramedic candidates.

The EMSA is the lead agency for coordinating medical response to disasters. In 1990 it received a grant from the National Highway Traffic Safety Administration (NHTSA) to establish an Office of Research and Information Services (ORIS). Among other tasks, ORIS has worked to encourage LEMSAs data capacity and capability and to develop an aggregate statewide prehospital database. EMSA also works to foster injury prevention programs and emergency medical services for children.

California's LEMSAs System

Without exception, all of the EMS administrators interviewed for this study were very open and cooperative. Interviewees also willingly shared most of the materials we requested. Most interviews lasted about 90 minutes.

While each LEMSAs has its unique properties, researchers asked a series of questions of all administrators. We wished to ensure that we explored issues of importance to Stanislaus County with representatives of the other organizations.

LEMSAs Background

Dr. Richard Narad writes:

The failures of the marketplace to optimize emergency medical services, and the resistance of autonomous organizations to voluntary coordination to manage their functional interdependence, justify government involvement in system optimization efforts and demonstrate the need for an external coordinating mechanism. (Narad 1990a, 188)

In California, that need became apparent in the late 1970s. In spite of a growing awareness of the importance of prehospital care in saving lives,

...it became evident in some areas that excessive competition between some ambulance transportation providers had resulted in unacceptable variance in the quality of prehospital care. The public and elected officials lacked the expertise to recognize the quality of services being provided. Hospital specialty services were not always recognized by the prehospital providers, or were not utilized because of the parochial policies that kept services within political jurisdictions. (EMSAAC, 7)

Given these conditions, the 1980 California Emergency Medical Services system and the Prehospital Emergency Medical Care Personnel Act *permitted* counties to develop an emergency medical services program. If a county chooses to create an EMS program, it must designate a local EMS agency.

Counties have several options available when considering designation of an EMS agency.

Each county developing [an emergency medical services program]...shall designate a local EMS agency which shall be the county health department, an agency established and operated by the county, an entity with which the county contracts for the purposes of local emergency medical services administration, or a joint powers agency created for the administration of emergency medical services... (California 1197a, §1797.200)

Dan Smiley, Deputy Director of the California EMSA, says that the state does not have a preferred model for LEMSAs and sees all programs as regions. (Smiley) The LEMSA models employed by the agencies contacted (including Mountain-Valley) are summarized in the table below.

Table 23
LEMSA Models Among Agencies Contacted

Model	Number of Agencies Using Model *	Total Number of Counties Served
Single County	9	9
JPA	3	13
Contract	1	3
Non-Profit	1	11

*Napa is counted as a JPA in this chart

The single-county model

28 counties in California use a LEMSA, which is part of the county government and responsible only for EMS activity within the county's boundaries. Most of these agencies are part of the county's health services departments. In one case, Kern, the LEMSA is a separate department in county government.

In addition to Fred Drew of Kern, we interviewed single-county EMS Administrators from Alameda, Contra Costa, Merced, San Joaquin, San Mateo, Santa Barbara, and Tuolumne. Santa Clara county officials were also very cooperative although their new administrator had not yet taken her post at the time we contacted them.

Multi-county options

Currently there are six multi-county LEMSAs. \$212,000 was earmarked in the Fiscal 1998-99 California State budget to help fund the creation of a seventh, including Napa, Sonoma, and Mendocino counties. (P. Wilson)

Smiley says that successful multi-county arrangements have at least three characteristics: shared common interests; natural patient flow patterns; and a lack of insistence on local control by the individual counties. (Smiley)

The JPA Model

Stanislaus county uses the JPA model. Five counties have entered into a Joint Powers Agreement and formed the Joint Powers Authority, Mountain-Valley EMS, which is responsible for managing EMS activities. In addition to Mountain-Valley personnel, we interviewed Leonard Inch of Sierra-Sacramento EMSA and his staff. Their five-county JPA lies along Interstate 80, both west and east of Sacramento.

Contract

A county may choose to designate the EMS agency of another county to provide services. Both Madera and Kings counties have contracted with Fresno. We interviewed Dan Lynch, administrator of Fresno County EMS, as part of this study. Napa County, which has been using a single-county plan to this point, is in the process of contracting with Sonoma county for EMS services. Researchers interviewed the Napa Administrator, Bonny Martignoni, for this study.

Non-Profit

One of the more unusual LEMSA arrangements is Northern California (Nor-Cal), based in Redding. Nor-Cal is a non-profit organization which serves an 11-county area. Each of its member counties contracts with the agency for most of the EMS duties. (A multi-county LEMSA must perform at least 18 of the 22 emergency service functions in order to qualify for state matching funds.) Most of the Nor-Cal members have reserved Exclusive Operating Area (EOA) determinations for themselves and two counties pay extra for additional services from Nor-Cal. Unlike the traditional joint powers authority, which typically includes at least one member from each participating government on its board of directors, Nor-Cal's board has only nine members. Only two are elected public officials. We interviewed Administrator Dan Spiess for this study.

LEMSA Roles

Smiley speaks of a life cycle of LEMSA responsibility. In his view, during the 1970s the predominant model was training and manpower development. From 1981 through approximately 1993, the emphasis was on the developing a systems approach, providing technical assistance to multiple organizations having functional independence. Smiley believes that since 1993 the role of LEMSAs has moved toward that of a regulator.

By a ten-to-one margin, LEMSA administrators who commented on the most important function of their agency. Named facilitation and coordination over regulation as the most. Even Drew, whose Kern County LEMSA is more deeply involved in training than most, named facilitation as his biggest responsibility. Perhaps this, in part, is due to this county's being served by eight private ambulance companies and eight hospitals.

Those who had been in EMS the longest tended to look back fondly at a "golden age" when Mountain-Valley's predecessor, Alpine, Mother Lode, San Joaquin EMSA conducted a wide variety of training classes for pre-hospital service providers. For these individuals, training should be the highest priority of a local EMS agency. Most LEMSA Administrators see the training function becoming a smaller priority for their agencies as the state, local colleges and universities, and the providers themselves assume responsibility for educating prehospital personnel.

Recently, however, Mountain-Valley has resumed some training activities.

...in conjunction with Columbia College and Doctors Medical Center [Mountain-Valley] began providing paramedic training in FY 1997/98. The EMS Agency had sponsored paramedic training programs from 1985 to 1992, however, in 1993 the course was dropped due to a saturation of paramedics in the system, and the ample supply of private training programs in the area. After a reassessment of local needs, it was determined the Agency should once again provide the training. (MVEMSA 1998c, 1)

Another Stanislaus County group, particularly city and fire officials, see a strong role for LEMSAs in regulation. These officials contend that, since county government has been delegated control over EMS by the state, and since the LEMSA has been designated as the County's agent for EMS, it follows that the LEMSA has an obligation to represent the County's interests. This belief is particularly strong when it comes to such matters as enforcing response times by private sector ambulance providers.

Factors other than quality control concerns may contribute to this view. One is the natural importance placed by fire personnel on response times. The second is that the fines paid by ambulance companies for non-performance go into a fund, which is then allocated, to fire departments and other EMS organizations.

A third model, that of facilitator, seems to be a natural outgrowth of the EMS process itself. As discussed elsewhere in this report, the integration of so many organizations, each having different missions and capabilities, into a seamless unit when it comes to emergency medical response, is a complex and difficult task. The role of the facilitator, smoothing the relationships between these disparate groups, can become a major priority for EMS administrators -- particularly the more contentious the groups tend to be.

Where there is a single hospital, a single transport provider, and/or a single fire agency, the role of facilitator may not be as crucial a responsibility. In Stanislaus County, however, with at least two competitive hospitals, two competitive private ambulance services, a combination of eight public and private PSAPs, and 19 different fire agencies, the facilitator role takes on a higher priority.

Intergovernmental

The complexity of uniting a wide variety of organizations into a coherent unit for the delivery of EMS services is compounded by the surrounding political atmosphere. Even for single-county LEMSAs, integration of state mandates with individual community needs can be daunting.

Several of the LEMSA administrators spoke of the importance of sensitivity to city expectations. If a city wished to explore public ambulance transportation, for example, administrators advised trying to find ways in which accommodation could be reached. Creating greater complexity in the system was not, in itself, sufficient reason to reject the proposal. The greater issue of maintaining profitable EOAs for the existing private providers may well be.

Some of the single-county administrators acknowledged the greater political challenges faced by their multi-county colleagues. Responding to a question about the benefits of forming a hypothetical region with two neighboring counties, one county administrator quickly ticked off a number of areas where one could reduce duplication of effort by sharing tasks across county boundaries. Then, just as quickly, the administrator added, "but they'd have to get their politics straightened out in those two counties first."

Multi-county administrators seemed to be acutely aware of the fragile nature of their political alliances. Even those in the larger areas shared concerns about the impact of the loss of one of their members. All spoke about the importance of keeping in close communication with all of the counties in their service areas. This meant not just having a staff presence, but making sure the administrator was physically present in each county and in touch with policy makers on a regular schedule.

Joint Powers Agreements tend to be fragile in nature. Typically they are not "marriages of equals" and so it is common for the partners to worry about whether they are getting commensurate value for their investment. Moreover, representation on the board typically consists of a representative from each of the member governments. There is a natural tendency for each of these representatives to feel a great deal of responsibility to look out for the interests of his or her area rather than the region as a whole.

A cursory examination of the Mountain-Valley EMS might lead an observer to predict complaints from all parties. The mountain counties would be tempted to perceive the agency placing too much emphasis on the interests of Stanislaus County since the county holds a larger population than all of its partners combined. At the same time, one might expect complaints from Stanislaus County because, despite its substantially larger population, it has only one vote on a five-member board. And, in fact, interviewers did hear such complaints from both sides.

These observations are neither meant as a criticism of Stanislaus County or of the JPA format. Indeed, JPAs have been by far the fastest growing form of government in California since the passage of Proposition 13 in 1978. They provide a sensible means of sharing resources and capturing economies of scale while, at the same time, maintaining a stronger form of control than elected leaders might enjoy under a third-party contract with a private sector agency or the formation of an independent special district.

What our findings do indicate, however, is the critical importance of political skills that any successful JPA administrator must possess. Successful administration of a multi-county LEMSA becomes much more dependent upon the administrator's skills in diplomacy than upon medical competence.

Funding, Budget, Staff

Funding for LEMSAs comes from a variety of sources.

The most common source of funding is money from the County General Fund. Sometime county finding can be offset by revenue-generating activities of the JPA. These activities include training and certification programs and the imposition of fines for non-performance.

State matching funds are available to multi-county LEMSAs of three counties or more, under the provisions of the Health and Safety Code Division 2.5, §1797.103.

The state also provides grant money to fund a variety of research projects. In the current fiscal year, \$1.6 million has been allocated to 23 LEMSAs for projects ranging from trauma to data collection to injury prevention. (P. Wilson)

Alameda County is a source of envy for most other jurisdictions. That LEMSA is supported by a substantial parcel tax. The tax generates \$13 million per year.

On a per capita basis, Stanislaus county's contribution of \$.41 places it 21st among the 31 counties this study examined. (Table 24).

**Table 24
County Contributions to LEMSAs**

County	LEMSA	Model	1997 pop	County cost	Per capita	Rank
Alameda	County	PubHealth	1,381,700	\$ -	\$ -	32
Alpine	MV	JPA	1,190	\$ 5,200	\$ 4.37	1
Amador	MV	JPA	33,200	\$ 19,454	\$ 0.59	12
Butte	NorCal	Non-Profit	197,500	\$ 28,800	\$ 0.15	31
Calaveras	MV	JPA	37,100	\$ 14,965	\$ 0.40	25
Calusa	NorCal	Non-Profit	18,400	\$ 9,900	\$ 0.54	15
Contra Costa	County	PubHealth	887,100	\$ 600,131	\$ 0.68	9
Fresno	FKM	Contract	772,400	\$ 1,250,000	\$ 1.62	4
Glenn	NorCal	Non-Profit	26,800	\$ 15,000	\$ 0.56	13
Kern	County	Department	629,200	\$ 561,000	\$ 0.89	6
Kings	FKM	Contract	116,700	\$ 51,500	\$ 0.44	20
Lassen	NorCal	Non-Profit	34,350	\$ 15,844	\$ 0.46	17
Madera	FKM	Contract	111,900	\$ 51,500	\$ 0.46	18
Mariposa	MV	JPA	15,950	\$ 6,560	\$ 0.41	23
Mendocino	SonMen	JPA	85,400		\$ -	32
Merced	County	PubHealth	200,200	\$ 220,000	\$ 1.10	5
Modoc	NorCal	Non-Profit	10,150	\$ 6,260	\$ 0.62	11
Napa	SonMen	JPA	120,100		\$ -	32
Nevada	Sierra-Sac	JPA	87,700	\$ 34,556	\$ 0.39	27
Placer	Sierra-Sac	JPA	212,400	\$ 69,472	\$ 0.33	29
Plumas	NorCal	Non-Profit	20,350	\$ 10,060	\$ 0.49	16
San Joaquin	County	PubHealth	537,700	\$ 300,000	\$ 0.56	14
San Mateo	County	PubHealth	704,800	\$ 600,000	\$ 0.85	7
Santa Barabar	County	PubHealth	397,200	\$ 700,000	\$ 1.76	3
Santa Clara	County	PubHealth	1,654,800		\$ -	32
Shasta	NorCal	Non-Profit	162,500	\$ 38,000	\$ 0.23	30
Sierra	NorCal	Non-Profit	3,360	\$ 6,200	\$ 1.85	2
Siskiyou	NorCal	Non-Profit	44,150	\$ 28,184	\$ 0.64	10
Sonoma	SonMen	JPA	428,600		\$ -	32
Stanislaus	MV	JPA	421,900	\$ 171,995	\$ 0.41	24
Sutter	Sierra-Sac	JPA	75,400	\$ 31,112	\$ 0.41	21
Tehama	NorCal	Non-Profit	54,500	\$ 21,584	\$ 0.40	26
Trinity	NorCal	Non-Profit	13,300	\$ 9,258	\$ 0.70	8
Tuolumne	County	PubHealth	51,900	\$ 21,361	\$ 0.41	22
Yolo	Sierra-Sac	JPA	153,700	\$ 53,036	\$ 0.35	28
Yuba	Sierra-Sac	JPA	60,800	\$ 27,024	\$ 0.44	19
Totals			9,764,400	\$ 4,977,956	\$ 0.51	

Source: State Demographics and LEMSA budgets

For a variety of reasons, exact financial and staffing figures are difficult to pinpoint. Since LEMSAs structures vary since income to LEMSAs come from several sources, and since LEMSAs can generate income from fees, training, certifications, and fines, determining the cost to taxpayers of a specific agency can be problematic.

Similarly, precise staffing levels can prove elusive. Many single county agencies share

administrators with other county departments. Even a JPA such as Sierra-Sacramento has been able to take advantage of administrative resources in its host county, Placer.

Nonetheless, Table 25 summarizes the figures reported by LEMSA administrators.

**Table 25
Budget and Employment Figures for LEMSAs in this Study**

	S t a n	alco	coco	f/k/k	kern	merced	nap	norcal	s.bar	s.joaq	s.mat	sier-sac
Bud		13	3 mil	1.3	648K	220K	80	900K	700K	300K	600K	675K
\$		mil		mil			K					
FTE		13	9	21	8	2.5	2	10	4	4	4	7

Note: FTE means Full Time Equivalent
Source: Interviews

EMS Plans

Each LEMSA is required to report to the state on its EMS plan based upon the State EMSA's EMS Systems Standards and Guidelines (EMSA 1993a). The purpose of the Standards and Guidelines is fourfold:

1. Guide system development by identifying both minimum standards and desirable goals for local EMS agencies;
2. Provide standards for evaluating local EMS plans and local EMS systems;
3. Educate EMS agency staff, system participants, elected officials, and policy makers about EMS systems in California; and generally
4. Provide justification for maintenance of current service level and proposed program change of improvement (2).

Appendix D of this report contains a chart comparing selected EMS plans, including that of Mountain-Valley.

It is crucial to point out that minimum standards established by the state "...are considered to be both appropriate for and attainable by all local EMS systems in

California...Recommended guidelines are based upon system optimality and have been identified as standards to which each system should strive, but they may not be attainable by all local EMS systems" (2).

The fact that a standard is appropriate and attainable does not mean that all agencies have achieved it. The plan serves as a progress report, a point of comparison, and a goal. It should also be noted that these plans vary in age from 1995 to 1998. The Mountain-Valley Plan reflects the 1997/98 fiscal year.

Using the EMS Plan process as a tool, Mountain-Valley was able to identify a series of objectives including:

- Study the feasibility of ALS first response
- Determine the feasibility of county-wide EOAs for ambulance
- Creating a single EMS dispatch center and integrated dispatch system by county
- Develop better method to triage emergencies and dispatch resources
- Identify optimal roles and responsibilities for EMS participants
- Establish a single system-wide on-line medical control point
- Use non-hospital medical facilities for some EMS patients
- Develop a trauma care system (MVEMSA 1998a, 2)

Comparison with specific Stanislaus issues

In addition to the structural, political, financial, and planning issues common to all LEMSAs, we questioned administrators about specific concerns we had identified in interviews with policy makers and EMS officials in Stanislaus.

Advanced Life Support Transport

Advanced Life Support (ALS) transport, essentially ambulance service in most emergency situations, creates additional distribution of resources questions for public safety administrators. The mixture of insured and uninsured populations in an community makes the creation of response zones quite challenging. The fundamental reality is that private ambulance companies have a legitimate need to make a profit. Yet LEMSA must ensure complete coverage throughout its area. Thus, LEMSAs try to design response zones that offer a mixture of insured, often capitated populations, and uninsured and

indigent communities as well. Designing such an area often means crossing jurisdictional boundaries.

At the same time, the political reality is that the larger cities, with the larger populations, tend to be in the best position to finance a public EMS transport system. Residents are, however, unlikely to support the notion of tax-sponsored city ambulances providing service to individuals living outside the city limits.

Table 26 illustrates the combinations of fire and ambulance services facing various EMS regions.

Table 26
ALS Transport Comparisons

	1,998	Fire	Private	Public	Response	Ambulance	Helicopter
LEMSA	Population	Agencies	Ambulance	Ambulance	Times(c)	Subsidy	#/basis (d)
MVEMSA(a)	421,900	19	2	3			2/alt.
Alameda	1,408,100	12	1	4	10	some	3/geo
Contra Costa	900,700	10	1	2		\$2mil.	2/alt.
Fresno/KM	1,023,900		2	5		\$12,000	3/geo
Kern	639,800	4	8	0	8	\$530,000	2/?
Merced	204,400	4	3	0			4/?
Napa	120,100	5	2	1			
NorCal	593,710	200	34(b)				4/alt
S. Barbara	405,500	7			8		1 (oil co.)
S. Joaquin	545,200		2	3	8		4/geo/alt
S. Mateo	715,400		1	1	8:59		2/geo
Sierra-Sac	601,700		2 ?		8		6/?
a) Stanislaus County Only							
b) Public/Private split not known							
c) Ambulance, Code 3, 90 percent or better							
d) Basis of dispatch: alt.=alternating; geo.=geographic							

Source: Interviews

This table illustrates a remarkable variety in ALS transport. The Northern California LEMSA is quite unusual in terms of the number of fire agencies and ambulance providers that serve its residents. Among the other LEMSAs, Kern is notable for the relatively large number of ambulance providers and small number of fire agencies. At least four of the LEMSAs contacted provide cash subsidies to help offset the cost of non-paying transports although two administrators expect to renegotiate those agreements as contracts come up for renewal.

Availability of air ambulance service varies widely among the LEMSAs as do the dispatch protocols. At the time of the interview in the summer of 1998, Santa Barbara

County had no emergency air ambulance service. The helicopter serving the oil rigs off the coast agreed to provide transport, when available, as a community service. Most other LEMSA areas are served by multiple air ambulance providers. Administrators divided over the question of whether they should dispatch helicopters on a 24-hour alternating basis throughout the region, or choose them on the basis of the service geographically closest to a given incident.

The issue of response times is often a major point of contention between private and fire-based ambulance agencies. As noted, one of the main reasons that fire personnel are used in EMS situations, whether or not they provide transport, is because fire stations, particularly in urban areas, are typically situated within five to seven minutes of most businesses and residences. Fire personnel tend, therefore, to place a great deal of emphasis on in the importance of response times and are critical of private ambulance companies who often cannot arrive at an incident as quickly.

It is not economically feasible, in most cases, for private ambulances to station their personnel in the same proximity as fire stations. The call volume in a given area is typically not great enough to justify the "down time" of personnel and equipment. Many private ambulance service providers rely heavily on statistical tendencies and the use of "flexible postings" to ensure that their people and equipment are positioned close enough to potential calls to meet their contractual obligations, without incurring excessive overhead costs.

This controversy over response time standards has created varying standards throughout California. When does the "clock" start for ambulance response compliance purposes. From the reporting party's point of view, it begins as soon as someone answers a 911 call. But in many cases, allowances are made for the fact that the ambulance company cannot be responsible for a call until its secondary PSAP actually receives notice from the primary PSAP. In some cases further allowances are made for variations in the time it may take a dispatcher to determine that an ambulance is needed and at what level of response.

Similarly, there is controversy concerning when the clock stops. Has the ambulance arrived when the driver can see the incident? When the ambulance turns into

an apartment parking lot and begins looking for an address? Or when the vehicle's wheels have stopped? The answers to all of these "timing" questions vary throughout the state.

A new approach now under test allows ALS transport to be delayed as long as ALS (paramedic) personnel can be on scene quickly. In San Mateo County, AMR is working with a consortium of fire departments. The fire departments will put paramedic personnel on their first-responding vehicles. AMR will help pay for the costs of these paramedics through the savings it realizes in being able to send its ALS ambulances to the scene less quickly. A similar model is envisioned in Request for Proposal (RFP) currently being circulated by Alameda County. Contra Costa County EMS is testing yet another pilot program.

Addressing this issue from a purely medical perspective, the EMS Medical Directors Association of California (EMDAC), released a position paper in September 1998.

Currently best medical evidence suggests that response intervals for presumptively defined life-threatening emergencies, measured from the time of the first ring at the primary PSAP until arrival at the scene with wheels stopped, should be 5 minutes for responders capable of performing CPR and defibrillation, 10 minutes for providers capable of performing ALS, and 12 minutes for a transport-capable vehicle. (EMDAC, 6)

Mountain-Valley has faced all of these transport-related issues in Stanislaus County. The City of Modesto may well be able to support fire transport system at some point. However, the vast majority of the county's insured population lives within the Modesto City Limits. Were the city to take over ambulance service within its boundaries, the more sparsely populated areas would likely not generate an adequate base for private ambulance service and, if the county were to take up the slack, AMR would probably have to operate the service at a loss and, therefore, cease operations.

Dispatch

Closely tied to the issue of arrivals is that of dispatch. Public Safety Answering Points (PSAPs) are those places receiving emergency calls which dispatch emergency personnel. A primary PSAP is the place first receiving a 911 call. Depending upon the

nature of the emergency, the primary PSAP may be able to dispatch the necessary personnel, or it may have to transfer the call to a secondary PSAP.

Minimizing the number of PSAPs in a system arguably encourages efficiency, eliminates redundancy, and shortens the time necessary to get needed resources moving toward an incident.

Again, discussions with various EMS administrators revealed a wide variation in PSAP configurations. As has been mentioned, the growing number of wireless phone calls to 911 has created special technical problems. In California, all wireless 911 incidents are forwarded to the California Highway Patrol (CHP). Although this makes CHP the primary PSAP in these situations, the CHP is not counted as a primary PSAP in the figures provided in Table 27.

Table 27
Number of Primary PSAPs

Stan	AlCo	CoCo	F/K/M	Kern	Merc.	Napa	NoCal	S.Bar.	S.Joaq	Sierra
5	10	9	3	1	6	3	vary	4	1	17

Source: Interviews

Data Collection

Interviews with EMS administrators from throughout the state suggest that there are four different types of data which are desirable to capture. These include Dispatch, First Responder, Patient Care Reports (PCRs), and Patient Outcome. The ability to capture these data, and the relative satisfaction of administrators with their information systems varies greatly. Most LEMSA administrators reported a fair to high degree of satisfaction with their data collection capability. When pressed, however, most admitted that not all facets of their program were satisfactory. Table 28 indicates the best data collection element for each LEMSA.

Table 28

Best Data Elements

Stan	A l c o	CoCo	F/K/M	Kern	Merc	Napa	NoCal	S.Bar	S.Joaq	S. Mat	Sierra
PCR	tr au m a	disp.	disp.	PCR	trauma	PCR	PCR	PCR	PCR	PCR	PCR

Source: Interviews

Those agencies reporting a high degree of satisfaction with trauma typically have a designated Trauma Center, which routinely copies the LEMSA on the information they send to the national trauma registry. Those happiest with PCR information (the reports filled out by ALS transport personnel) tended to have standardized forms which could be scanned or otherwise electronically entered into a database.

Dispatch

Information about the time a call was received from the reporting party (RP), how long it took for various agencies to arrive on scene, how long the agencies remained on scene, how long it took to transport the victim to the medical facility, and how long before units were back in service, are all indicators that various agencies use to track the performance of their systems. The ability to capture dispatch data is a function of several factors: the number of PSAPs, control of the PSAP (public or private), the technical sophistication of specific PSAPs, and the relative interest in the data of participating agencies. This final element is particularly interesting. If fire and ambulance agencies, and the LEMSA itself, do not request, or use, the data, the dispatch center has little incentive to generate it. There appears to be a self-fulfilling prophecy element in this area.

On-Scene

Information concerning measures taken by various care givers at the scene of the incident is important for a variety of reasons. It creates a legal record of the actions taken by personnel on scene. It generates a billing record for those who charge for their services. It provides a point of reference that hospital personnel can use to compare the patient's condition and treatment in the field, with the conditions observed in the emergency department.

For the EMS system, it creates an important point of comparison. How does the analysis of the patient's needs by the EMS personnel compare with the diagnosis and treatment performed at the hospital? This comparison can be a two-way street. A number of administrators pointed out that a good save in the field can be destroyed by the actions of hospital personnel. And a botched job in the field can sometimes be saved by quick action in the emergency department.

Unfortunately, there are a number of circumstances undermining the timely sharing of patient care reports (PCRs) Pressure on ambulance personnel to return to the field as quickly as possible may make the timely completion of a PCR a secondary consideration. Natural reluctance to admit mistakes or errors can result in misleading report information.

AMR has a good reputation in this area. As a large ambulance corporation, it has standardized its PCRs using pen-based computer terminals in the field or Scantron forms. The firm generates cumulative reports daily and uses these internally to monitor and improve the performance of field personnel. AMR also forwards the reports to the various LEMSAs to add to the agencies' cumulative database.

The current tendency to focus on the improvement of systems rather than individuals, has resulted in expressions of some dissatisfaction about the use of PCR information. Those who have been in the EMS business a long time can remember a time when they knew most of the crews in the field and could deal with the individual shortcomings of specific EMTs and Paramedics on a one-to-one basis. They complain about the current trend to treat these issues as system problems rather than personal failures as non-productive. However, the literature suggests that as systems become larger and more complex, and as individual field personnel change jobs with increasing rapidity, the personal, one-to-one approach is no longer effective or realistic.

Outcome Data

The final piece of the information puzzle is typically referred to as outcome data. What ultimately happened to the patient? For a variety of reasons, this can be the most difficult of all information to obtain.

One important issue is the definition of outcome. When does emergency treatment end and general hospital care begin? Another issue is that of hospital contamination. Did emergency department procedures significantly alter the patient's field condition? Privacy issues further complicate the process, making it difficult to follow a patient's progress throughout an incident.

It must also be acknowledged that hospitals already have a large mandated reporting burden to agencies such as California's Office of Statewide Health Planning (OSHPD) and Development. Additional reports, customized to fit the requirements of individual LEMSAs, are typically not forthcoming on a voluntary basis. Recognizing this problem, the state EMSA is making efforts to coordinate its data processing standards and requirements with those of OSHPD.

Future of EMS and LEMSAs

The EMS administrators interviewed were asked about their expectations for the future of EMS and the LEMSA system. The following observations were noteworthy.

- There will be greater partnering between EMS and managed care providers to cover such emerging issues as payment of first responders and cost-effective treat-and-release procedures.
- The protection of existing response areas will sunset.
- There will be expanded scopes of practice for prehospital personnel.
- There will be more regional LEMSAs as finances tighten.
- There will be greater diversification of LEMSA funding.
- Better data collection will result in improved EMS systems.

The Future of EMS in California - The EMSA Vision Process.

One of State EMSA Director Watson's most important innovations has been the establishment of a series of Vision Committees to look at the future of significant aspects of California's EMS system. The committees' areas of responsibility include:

- Establishing stable system financing based on Value of Service
- Developing and implementing a system that could define and measure quality EMS
- Developing a comprehensive statewide integrated information system
- Integrating prevention activity into EMS
- Resolving where responsibility and authority should be placed for most effective and efficient EMS system care
- Clarifying system access
- Improving rural EMS
- Defining future role of EMS personnel

The Committees met in San Francisco on December 2 and 3, 1998 to share their findings. The group's work is to be published by mid-January 1999. The following are some of the major points from visions draft papers in various areas.

Funding

- Evaluate establishment of EMS regions throughout California (EMSA 1998f, 8)
- We should strive to develop EMS regions for best function rather than on number of counties (EMSA 1998f,10)
- Cost shifting for uncompensated and indigent care has led to unstable and inequitable financing for First Response and Medical Transportation (EMSA 1998f, 15)
- EMS-generated revenue for first response and rescue services should be handled through a detailed reimbursement model using a single county-wide distribution point (EMSA 1998f, 17)

Quality Improvement

- Great need for an effective evaluation model (EMSA 1998f, 34)
 - Lack of effective oversight and structure
 - Guidelines are fragmented and arbitrary

EMS Information System

- EMSA currently possesses no requirement or capability for LEMSAs to transmit and store data related to individual patient contacts. (EMSA 1998f, 39)
 - Reports are voluntary, quarterly, and internally inconsistent.
- None of the 50 states have information systems that meet the requirements

Governance

- Task for committee is to outline a structure that allows EMS to be managed so that all stakeholders share in the governance (EMSA 1998f, 53)
- Since 1990, EMS has unsuccessfully tried to create consensus on governance
- Change focus of EMS director to admin, rather than technical skills
- "Each group believes their (sic) perspective is the one that has the PATIENT'S best interest in mind while the jockey for position and the high ground." (EMSA 1998f, 57)
- Create uniform standards for administrative functions of EMS agency.
- EMSA should arrange of provide and evaluation of all LEMSAs every 3 years
- A chief purpose of LEMSA would be to promote coordination of EMS system activities in a region (EMSA 1998f, 67)
- Amend H&S Code to establish LEMSA Commissions balanced to ensure true shared governance

Access

- Maintain public access and the integrity of 911 system (EMSA 1998f, 72)
 - Over-utilization usually refers to using EMS for non-emergent conditions
 - Carve-out is removal of consumers (by HMO) from 911 system through diversion to another number
- EMS should be part of a universal access system (like 911)
- Medical appropriateness must have primacy in system

7. Major Findings and Policy Options

Overall, the news about EMS in Stanislaus County is good. There is a high level of resident satisfaction. Residents are not being over-charged for EMS. The Mountain-Valley Emergency Medical Services Agency Joint Powers Agreement has worked well for the people of Stanislaus County.

This is not to say that there are not problems. The problems that do exist, however, are not unique to Stanislaus County. Many have been faced for decades by the EMS community nationwide. Others are products of the rapid changes taking place in the modern medical industry. Still others are products of the size and diversity of a county like Stanislaus.

We do not offer these comments as an argument for settling for the status quo. Problems should be addressed, and in doing so, it is important to have regional and statewide cooperation on issues. Because the problems faced by Stanislaus County are shared at so many levels, the experiences of others around the state can provide a context for problem solving.

Findings

Finding 1. EMCC

The Emergency Medical Care Committee has the potential for maximizing public involvement in the Stanislaus County EMS system. The EMCC has the potential to bring six members of the consumer community in regular and structured contact with prehospital and hospital service providers. The committee also has the ability to provide the Board of Supervisors with a mechanism to regularly monitor the EMS system in Stanislaus County, while maintaining the benefits of the JPA system.

In point of fact, however, the current EMCC is dysfunctional. Its members feel they receive inadequate direction and respect from the County. The Board of Supervisors believes it is receiving inadequate service from the Committee. And the Committee itself is fractured along institutional lines. As it is currently structured, the Stanislaus County EMCC is a source of frustration to its members and is useless to the County.

Finding 2. Participation in the Mountain-Valley Joint Powers Authority

Participation in the Mountain-Valley Joint Powers Authority is the best of the current options available to the people of Stanislaus County. Although the voting power of the County is disproportionately low relative to its population, there does not appear to be any action of the JPA board which has been taken to the detriment of the residents of Stanislaus County. It is also unlikely that a more favorable distribution of voting power for Stanislaus could be negotiated among the current JPA members. The situation is a common one for JPAs of all types.

Moreover, given the other three current models, the JPA is the most beneficial available to the County at this time. The county could enter into a more favorable *political* situation if it entered into a different multi-county arrangement. However, the contract model of Fresno-Kings-Madera shows that the contractor county pays more per capita for EMS than its contracting neighbors do. The non-profit model of NorCal EMS guarantees no political advantage on the board of directors for any of its county members. Finally, the single county model obviously gives the county more administrative control over the LEMSA but there is no evidence that Stanislaus would receive any financial benefit.

Interviews with San Joaquin and Merced County show no inclination to return to the JPA. There is in these counties no current dissatisfaction with the single-county model. Stanislaus should not expect either county to rejoin the JPA as partners in the near future.

It is too early to determine whether Tuolumne County would ever consider returning to the JPA. In the first year of "independence" County officials expressed a high degree of satisfaction with their status. Some in Stanislaus County criticized Tuolumne for adopting essentially the same procedures that are used by Mountain-Valley. Tuolumne was a participating, and paying member of Mountain-Valley when the protocols and procedures were developed, as a result, the county has every right to continue using them.

Finding 3. EMS costs

Stanislaus County is not paying too much for EMS services. Indeed, of the counties contacted for this study, Stanislaus is paying less than the average to support its local EMS agency. Other indicators such as per capita spending on Total Public Health and general Emergency Services also show that Stanislaus County spends less than most other counties for these services.

At the same time, data indicate that collectively public payers, Medicare, Medi-Cal, and ICHP, account for approximately 54.4% of emergency service gross revenues. Since payment from these sources account for an estimated 24% nationally, emergency services in Stanislaus County constitute a substantial fiscal problem.

Prevention and partnerships offer the best hope for additional cost savings. The use of seat belts, for example, is undeniably effective in reducing EMS costs. Stanislaus County has at least two populations that are particularly at risk. Young male drivers with limited education and children under the age of five are two groups which could benefit from aggressive prevention efforts.

Efforts to target non-English speaking populations may be particularly effective. Hispanics represent one quarter of the County's population and are its fastest growing segment. The usefulness of multi-lingual programs merits further investigation.

Finding 4. Resident perceptions

There is a high degree of public satisfaction with EMS in Stanislaus County. This fact has been confirmed by resident surveys, user surveys, focus groups, and interviews with the County's political leadership. There is also a laudable sincere desire for quality improvement throughout the EMS professional community. The vast majority of the county's residents have a high degree of satisfaction and faith in the emergency medical services system of Stanislaus County.

Finding 5. Other Issues

There are many problems with the current EMS system in Stanislaus County. But those problems are shared by EMS providers throughout California. And many problems, such as a need for better, more timely system data, have been unrealized goals of EMS

planners for more than two decades. However, the foregoing are in fact important reasons for regional and statewide cooperation on these issues.

Transport

The question of who should provide ALS emergency transport is currently hotly debated throughout the United States. Fire agencies argue that they are strategically deployed 24 hours per day and can typically arrive on scene more quickly than private ambulance services. The agencies further argue that, free from the profit motive, they are able to act solely in the best interests of the patients. Finally, they take the position that a service so crucial to the health and safety of the people should be controlled locally by elected public officials and not by stockholders whose interests are in return on investment rather than the good of the community.

Private ambulance providers believe that they can operate more cost effectively and efficiently than public sector competitors. These providers raise legitimate questions regarding the dilution of skills that would ensue if paramedic firefighters were located in every station and individual call volumes declined.

Stanislaus County is currently served by two private ambulance companies and three public sector ambulance providers. Like other LEMSAs throughout the state, Mountain-Valley faces the delicate problem of maintaining profitable response areas for private ambulance services while continuing to subsidize fire personnel's responding to and aiding in EMS incidents.

The fire service contributes significantly to the EMS system. Fire personnel contribute uncompensated labor to patient transport and en route care. They also contribute to patient treatment by having trained first responders on the scene in a timely manner. There may be no effective way at this time for fire agencies to recover the value added by their efforts to the EMS. But policy makers need to see this activity as positive contributions by the public sector to citizen's well-being, similar to fire suppression or police duties.

A single ambulance provider could lead to easier coordination of service, uniformity of quality, and a reduction in fragmentation. However, there are benefits that flow from competition, and the private sector ambulance industry faces an uncertain

future over the next two years. These factors support the maintenance, at present, of multiple ambulance providers in the County.

Competition among air ambulance services is becoming a common phenomenon statewide. Indeed, Mountain-Valley's own analysis suggests that the selection of helicopter transport be made by the marketplace rather than by government regulation. The role of government in "helicopter wars" should therefore be to ensure that a smooth, well-defined system for helicopter use is in place and understood by all involved parties. The option of creating an air ambulance EOA is always available should the need arise.

Dispatch

The creation of a new, centralized dispatch center in the County, offers the potential of enhanced coordination and an enhanced level of service. Some very real hurdles must be overcome. Not all of the public agencies are convinced that they should give up their independence. Not all of the private companies trust their competitors with some share of the control of call allocation. Nonetheless, the uniting at least fire and ambulance PSAPs under one roof will be of significant public benefit. Resolution of differences among the various parties should be a high priority.

Distribution of resources

Given the reality of current health care economics, it is unrealistic to expect an increase of acute care beds in areas of low population density. The four hospitals still open in Stanislaus County are, in fact, all located in the County's population centers. The current situation is not necessarily a bad one for rural and low income residents *provided they have adequate access to high quality emergency transport and non-emergency health services*. The implication is that dollars which once supported rural and public hospitals need to be re-channeled into improved ambulance services, public health clinics, and urgent care facilities. Without a significant redistribution of financial resources, individuals' manageable health care problems will become emergency problems, and emergency problems can only be handled in the expensive context of hospital emergency wards.

Parochialism

To expect all elements of the EMS system in Stanislaus County to work together without friction or disputes is unrealistic. The various organizations involved have different missions and different priorities. In many cases, the organizations are in direct competition with one another.

However, it is crucial to the public that the disparate entities work in harmony to deliver their life-saving services at the most effective and efficient level possible.

The facilitative role of the Mountain-Valley EMSA must thus be given the maximum support possible. While legitimate inter-agency differences must be acknowledged and respected, these differences must not be permitted to undermine the functioning of the system as whole. Mountain-Valley is the optimal organization to mediate any disputes. This also implies that Mountain-Valley must be held accountable for effective facilitation.

Policy Options

Option 1. Partnerships

The creation of the new dispatch center is only one example of the potential for cost savings and inter-organizational cooperation in the Stanislaus County EMS system. Plans are also currently underway to create a combined police-fire-health center in Modesto; resident surveys indicate overwhelming support for projects such as this.

Cooperation among agencies is potentially beneficial in a number of ways. Partnerships among public agencies can give cities and fire agencies the voice they clearly desire in EMS decision making. Since public agencies receive no compensation for their contributions to the EMS system, participation of public health and safety services would give these organizations an active role in determining the levels and quality of programs their residents receive.

Public-private partnerships with ambulance providers and hospitals can similarly contribute to enhanced coordination of efforts. Partnerships can also help private sector participants maintain the necessary profitability. The loss of private sector participants in the EMS system could create a void that would be quite costly for local governments to fill.

Option 2. EMCC

The Health and Safety Code no longer mandates the existence of EMCCs. The board of supervisors therefore, has a window of opportunity to restructure the current committee and give it a meaningful role in the EMS process. At the present time, the Committee membership includes representatives from organizations who are competitors with each other or who have histories of mutual distrust. Even the appointed "public" members have often had allegiances to one or more organizations in the EMS system. In the absence of a state mandate, the board of supervisors is free to create an advisory commission whose first priority is citizen service rather than occupational loyalty.

If the board chooses to create such an advisory body, however, the supervisors should charge it with clear and meaningful responsibility and respond to its reports and recommendations appropriately. Part of that charge should be regular review of LEMSA reports, which should be timely, detailed, and accurate.

Failing the creation of an advisory body, the county needs to demand such reports from Mountain-Valley itself, specifically reflecting the activity of the Stanislaus County EMS system. The board should also charge someone on the county staff with the task of monitoring the system's progress and reporting to the board on a regular basis.

Option 3. Transport

We do not recommend creation, at present, of a single ambulance service countywide or the expansion of fire agencies into ALS transport. But changes in the private ambulance industry should be closely monitored over the coming 24 months.

Likewise, changes in the ALS response model as proposed by EMDAC as currently in San Mateo, Alameda, and Contra Costa should be watched closely. If the experiments of the Bay Area counties prove successful, the County and Mountain-Valley may wish to consider major changes in their fire/ambulance response model. However, given the volatility of the ambulance industry, the relative newness of the EMDAC proposal, and the fact that at least three other counties are now only experimenting with the model, there is no compelling need for Stanislaus County to make major changes in its ALS response system at this time.

Private ambulance providers are currently reimbursed only when they transport a patient from an incident to a hospital. In many instances, there is adequate medical expertise at an incident to treat a patient and release him or her on the spot. The county should create mechanisms for paying providers for treat-and-release services. A system such as this would not only be beneficial to patients, but would also help minimize expenses.

Option 4. Improve Data Collection

The county should establish a coordinated dispatch system, following an incident from the time of initial contact at the primary PSAP to patient discharge. Sound policy decisions cannot be made in an information vacuum.

Option 5. Scope of practice

Many interviews noted that such use of emergency medical personnel would help to fill the vacuum created by the closure of several area hospitals. Using emergency personnel could also alleviate the problems faced by residents who have difficulties getting to non-emergency health facilities. One could use EMS personnel to offer immunizations in fire stations, and use paramedics to visit the elderly or house-bound for screenings and check ups.

The problem is that emergency personnel are not generally authorized to use their skills in non-emergency circumstances. But pilot programs in various counties have demonstrated that such programs can be both safe and cost effective. For example, Orange County recently completed a trial dealing with tuberculosis screenings. And Alameda County has received approval to provide immunizations for school children through fire agencies.

Stanislaus County can become actively involved in making the case to the state legislature that county residents would be well served by expanding the scope of services for emergency medical personnel.

Option 6. Prevention

Prevention efforts are probably the least exciting, but the most cost effective, part of an EMS system. There is very little drama in preventing accidents, and it is difficult to quantify the value of something that did not happen. Moreover, the best prevention program in the world will not eliminate the need for fire trucks and ambulances and emergency departments.

Nonetheless, timely access to non-emergency health care, while medical problems are still manageable, has many benefits. Among these benefits are the savings to insurers, the reduced costs for medical departments, and the overall improved quality of life and productivity for the public. Similarly, tragedies that do not occur- whether falls, drownings, traffic accidents, or other traumas- certainly reduce financial and emotional burdens otherwise visited upon the public and the medical system of the county.

There are several areas in Stanislaus County where preventable emergency incidents are unusually high (See the section on EMS costs). These areas deserve the particular attention of the county officials.

Option 7. Trends

The Emergency Medical Services system in Stanislaus County does not operate in a vacuum. It shares common issues and challenges with the EMS in many of the other 57 counties in California.

The State EMSA has undertaken a year-long program to identify the major upcoming issues facing the EMS community in California. The statewide group has in fact considered many of the concerns facing Stanislaus County, including finance, information systems, prevention, governance, accessing rural service, and the role of EMS personnel. It is important that the County continue to participate and assist in the discussions taking place at the state level. While the County need not wait for problems to be resolved in Sacramento before taking action, the county should also not try to "reinvent the wheel". Stanislaus should take experience and wisdom of elsewhere. Mountain-Valley and staff should be encouraged to continue representing the County's residents in the state EMSA and in similar programs

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Appendix A--Citizen Survey



CALIFORNIA STATE UNIVERSITY, STANISLAUS

Public Policy Center

801 West Monte Vista Avenue • Turlock, CA 95382

TEL: (209) 667-3408

FAX: (209) 664-7067

EMS Citizen Survey

Hello, I'm _____ from California State University Stanislaus in Turlock. The Public Policy Center here is doing a study on the Emergency Medical System in Stanislaus County. We are looking at the level of satisfaction with the emergency medical system such as the fire department and ambulance service. Could we have two to three minutes of your time to answer a few brief questions?

1) Have you ever needed to use 911 in Stanislaus County?

Yes No

If yes, what was the type of emergency? (check all that apply)

Fire

Police

Medical

Other _____

Approximately how long ago was that:

Month _____

Year _____

2) Do you think that Stanislaus County's 911 works well?

Yes No

3) Have you, a family member, or friend ever used an ambulance in Stanislaus County?

Yes No

If yes, do you remember the name of the company?

How would you rate that ambulance service:

Excellent

Good

Poor

- 4) Have you, a family member, or friend ever called for an ambulance without using 911?
 Yes No

If yes, do you remember the name of the company?

How would you rate that ambulance service:
 Excellent Good Poor

- 5) There has been discussion about using existing Fire Department buildings to do minor medical services such as immunizations. Would you support such an idea?
 Yes No

We would like to get your opinion regarding a number of statements. Could you answer either with Agree or Disagree to the next ten statements.

- 6) My Fire Department does a good job Agree Disagree
 7) I am happy with the local ambulance service Agree Disagree
 8) 911 works well in Stanislaus County Agree Disagree
 9) The police respond immediately to calls Agree Disagree
 10) The response time of emergency people is slow Agree Disagree
 11) Hospital care in the county is good Agree Disagree
 12) The ambulance service could be improved Agree Disagree
 13) The County health clinics do a great job Agree Disagree
 14) Wait times at hospitals emergency rooms is acceptable Agree Disagree
 15) Rural parts of the county are served as well as the cities Agree Disagree

- 16) Stanislaus County experienced flooding in January of 1997. Did you at that time have any contact with emergency personnel (police, fire, ambulance)?
 Yes No

If you did have contact, did you notice any difference with that level of service and non-disaster service?
 Much better About the same Much worse

- 17) Are there any changes in the current 911 system that you would like to see come out of our study?
 Yes No

If yes, what _____

Finally a few questions about yourself:

18) Sex: Female Male

19) Which of the following categories does you age fall into?

- 18 to 24 1
- 25 to 34 2
- 35 to 44 3
- 45 to 54 4
- 55 to 64 5
- 65 to 74 6
- 75 or older 7
- Refused 8

20) Do you own or do you rent?

- Own 1
- Rent 2
- Refused 3

21) Which category best describes your total household income before taxes:

- Less than \$10,000 01
- \$10,000 to \$19,999 02
- \$20,000 to \$29,999 03
- \$30,000 to \$39,000 04
- \$40,000 to \$49,000 05
- \$50,000 to \$59,999 06
- \$60,000 to \$69,000 07
- \$70,000 to \$79,999 08
- \$80,000 to \$89,999 09
- \$90,000 to \$99,999 10
- \$100,000 or more 11
- Refused 12

22) Which category best describes you education:

- Grade school or some high school..... 1
- High school diploma 2
- Some college NO BA 3
- College graduate 4
- Graduate school (MA, Ph.D.)..... 5
- Technical/vocational school 6

Refused 7

23) Most people think of themselves as belonging to a particular ethnic or racial group. What ethnic or racial group are you a member of (ask only if necessary)

White 1

Non-Hispanic 2

African Am. 3

Asian/American 4

Hispanic/Latino 5

Native American 6

Mixed race 7

Refused8

Other-specify: _____

24) How long have you lived in Stanislaus County? _____

25) What is your zip code? _____

Appendix B-- User Survey



CALIFORNIA STATE UNIVERSITY, STANISLAUS

Public Policy Center

801 West Monte Vista Avenue • Turlock, CA 95382

TEL: (209) 667-3408

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August 20, 1998

A research team with the Center of Public Policy Studies at California State University, Stanislaus is studying the Stanislaus County Emergency Medical System for the Board of Supervisors. One goal of the study is to ask citizens who have used the 911 system what are their opinions of that system.

You have been scientifically selected to complete the following survey. According to official records, you have used the system in the past several months. Could you spend two to three minutes completing the following survey on your experience, so that we may use your opinion to improve the current service offered citizens.

Your responses will remain confidential. Responses will only be reported in aggregate form (for example 30 percent feel that system is working). NO INDIVIDUAL RESPONSES WILL BE REPORTED.

Once completed, simply place the completed survey in the return envelope and drop in any mail box. We will cover the cost of postage.

Thank you for your participation

1) **Our records show that you have called 91. Is that correct?**
Yes No

2) **What was the type of emergency?**

3) **Who responded to your call? (circle all that apply)**

Fire

Police

Ambulance

Medical

Other_____

4) **Approximately how long ago was that:**

Month_____

Year_____

5) **How would you rate the service that you received for this 911 call by the fire department?**

Excellent

Good

Poor

6) **How would you rate the ambulance service, if used?**

Excellent

Good

Poor

7) **Do you remember the name of the ambulance service?**

8) **Have you, a family member, or friend ever called for an ambulance without using 911?**

Yes

No

If yes, do you remember the name of the company?

How would you rate that ambulance service:

Excellent

Good

Poor

9) There has been discussion about using existing Fire Department buildings to do minor medical services such as immunizations. Would you support such an idea?

Yes No

We would like to get your opinion regarding a number of statements. You can answer with either: Agree or Disagree. Please circle the best category.

- | | | |
|---|-------|----------|
| 10) My Fire Department does a good job | Agree | Disagree |
| 11) I am happy with the local ambulance service | Agree | Disagree |
| 12) 911 works well in Stanislaus County | Agree | Disagree |
| 13) The police respond immediately to calls | Agree | Disagree |
| 14) The response time of emergency people is slow | Agree | Disagree |
| 15) Hospital care in the county is good | Agree | Disagree |
| 16) Ambulance service could be improved | Agree | Disagree |
| 17) County health clinics do a great job | Agree | Disagree |
| 18) Wait times at hospital are not too long | Agree | Disagree |
| 19) Rural parts of county are served well | Agree | Disagree |

20) Are there any changes in the current 911 system that you would like to see come out of our study, based on your experiences?

Yes No

If yes, what _____

Finally a few questions about yourself:

- 21) Sex: Female Male
- 22) Which of the following categories does your age fall into?
18 to 24
25 to 34
35 to 44
45 to 54
55 to 64
65 to 74
75 or older
- 23) Do you own or do you rent your home?
Own
Rent

24) Which category best describes your total household income before taxes:

- Less than \$10,000
- \$10,000 to \$19,999
- \$20,000 to \$29,999
- \$30,000 to \$39,000
- \$40,000 to \$49,000
- \$50,000 to \$59,999
- \$60,000 to \$69,000
- \$70,000 to \$79,999
- \$80,000 to \$89,999
- \$90,000 to \$99,999
- \$100,000 or more

25) Which category best describes you education:

- Grade school or some high school
- High school diploma
- Some college NO BA
- College graduate
- Graduate school (MA, Ph.D.)
- Technical/vocational school

26) Most people think of themselves as belonging to a particular ethnic or racial group. What ethnic or racial group are you a member?

- Non-Hispanic White
- African Am.
- Asian/American
- Hispanic/Latino
- Native American
- Mixed race
- Other-specify: _____

27) How long have you lived in Stanislaus County?

_____ Years

28) What is your zip code? _____

Appendix C-- Focus Group Questions



CALIFORNIA STATE UNIVERSITY, STANISLAUS

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We have brought you all together to solicit your opinions on the current Emergency Medical System (EMS) in Stanislaus County. California State University Stanislaus' Public Policy Center has received a grant from the county to review the current system. Our research began with a series of one-on-one interviews with county leaders. These interviews range from the Board of Supervisors, to AMR, fire departments, to Mountain Valley EMS.

There are many interested parties to the local EMS system. It is impossible for us to individually interview each person, so we have set up these group or focus interviews. These group interviews will allow us to ensure that all opinions are heard, and that your concerns are included in the final report. We will be writing down your thoughts-not your names!

Questions

- 1) Thinking about the current EMS System as a whole:
 - * What do you believe is working
 - * What do you believe is not working
 - * How would you rate current system-why**

- 2) There have been many questions about transportation, how do you view the following:
 - * Is it currently effective
 - * Is it medically sound
 - * Suggested improvements**

- 3) There have been many questions concerning dispatch, how do you view the following:
 - * Is it currently effective
 - * Is it medically sound
 - * Suggested improvements**

- 4) From your positions in the system, what would you view the best possible EMS system for Stanislaus County.**

Appendix D -- EMS Plan Comparisons

Description	M.V.	AlCo	Clara	CoCo	Kern	NCal	S.Joaq	S. Mateo	S.Barb	Sierra
Enhanced Level: Advanced Life Support										
ALS Staffing	2	3	3	3	3	2	2	3	2	3
ALS Equipment	2	2	2	3	2	2	2	2	2	2
Enhanced Level: Ambulance Regulation										
Compliance	1	2	2	3	2	2	2	2	1	2
Enhanced Level: Exclusive Operating Permits										
Transportation Plan	2	2	2	3		2	1	2	2	0
"Grandfathering"	2	2	2	3		2	2	2	2	0
Compliance	2	2	1	3		2	2	2	2	0
Evaluation	2	2	2	3		2	1	2	2	0
Facilities and Critical Care										
Universal Level										
Assessment of Capabilities	2	3	2	2	3	3	3	3	3	3
Triage & Transfer Protocols	1	2	2	3	2	2	2	2	1	2
Transfer Guidelines	1	2	2	3	2	2	1	1	1	2
Specialty Care Facilities	1	2	1	2	2	2	2	2	2	2
Mass Casualty Management	2	3	3	3	3	3	3	3	3	2
Hospital Evacuation	1	2	2	3	2	1	2	1	1	2
Enhanced Level: Advanced Life Support										
Base Hospital Designation	2	2	2	3	2	2	2	2	2	2
Enhanced Level: Trauma Care System										
Trauma System Design		2	2	3	1	2	1	1	2	2
Public Input		2	2	3	2	2	1	2	1	2
Enhanced Level: Pediatric Emergency & Critical Care System										
Pediatric System Design	1	2	2	2	1	2	1	1	2	2
Emergency Departments	2	1	3	2	1	3	1	3	1	3
Public Input	2	2	2	2	1	2	1	2	2	2
Enhanced Level: Other Specialty Care System										
Specialty System Design		2		3	1	2	1	2	2	2
Public Input		2		3	1	2	1	2	2	2
Data Collection and System Evaluation										

Description	M.V.	AlCo	Clara	CoCo	Kern	NCal	S.Joaq	S. Mateo	S.Barb	Sierra
Universal Level										
QA / QI Program	3	2	1	3	2	3	3	2	1	3
Prehospital Records	2	2	2	3	2	2	2	2	2	2
Prehospital Care Audits	3	2	2	2	2	2	3	2	2	3
Medical Dispatch	1	2	2	2	2	2	1	2	1	1
Data Management Systems	3	1	2	3	1	2	2	2	1	3
System Design Evaluation	2	2	2	2	1	2	1	2	1	2
Provider Participation	2	2	2	3	2	2	2	2	2	2
Reporting	2	2	2	3	1	2	2	2	1	2
Enhanced Level: Advanced Life Support										
ALS Audit	3	2	2	2	2	3	2	1	1	3
Enhanced Level: Trauma Care System										
Trauma System Evaluation		2	2	3	1	2	1	1	1	2
Trauma Center Data		3	3	3	1	3	1	1	1	3
Public Information and Education										
Universal Level										
Public Information Materials	2	3	3	3	2	3	2	2	3	3
Injury Control	2	3	3	3	2	3	2	2	3	3
Disaster Preparedness	1	3	2	3	2	3	2	2	1	3
First Aid & CPR Training	1	2	2	3	2	2	2	2	2	2

