by Jack Stout

Our Elected Officials

No Wonder They're Confused

How are elected officials to know which EMS system is going to save their city money? Just look at these conflicting opinions that create confusion.

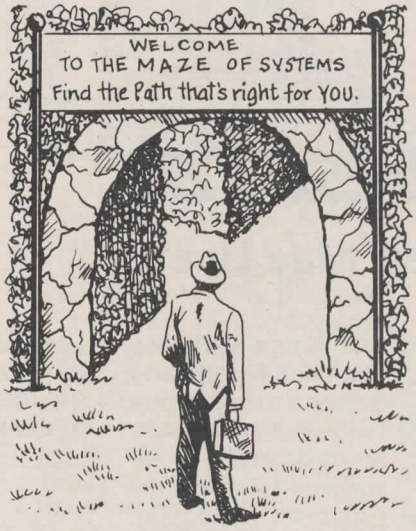
In 1983, the fire department in Fresno, which had been running advanced life support (ALS) engine companies, took paramedics off of fire apparatus and put them on separate rescue rigs—to save money, according to Bud Armstrong, fire chief.

Also in 1983, Chief Bob Simpson of Anaheim said their department, which had been running separate ALS rescue rigs, was pulling paramedics off rescue units and putting them on fire apparatus—to save money.

More recently, the city of Fort Worth installed a *single tiered*, all-ALS, full-service system to improve service and—save money. Meanwhile, the *Houston Post* (Aug. 11, 1986) reported a $93 million shortfall in the city budget and a plan by Houston Fire to help out by pulling its paramedics off of ALS ambulances and reassigning them to $350,000 worth of new rescue trucks "too small to carry patients." The city's transport crews would be downgraded to basic life support (BLS) capability. Everyone is excited about Houston's new *multi-tiered* system because it will improve service and—save money.

In Tulsa, Kansas City, Fort Wayne, Little Rock, Syracuse and many other cities, paramedic crews transport emergency and nonemergency patients, to provide better service and—save money. But according to the *Tampa Tribune* (Aug. 30, 1986), Hillsborough County may soon drop its $2.8 million non-emergency service—"as a cost-saving measure."

Let us now consolidate our facts: Paramedic engine companies are more efficient than separate rescue rigs. Separate rescue rigs are more efficient than paramedic engine companies. Single-tiered systems are more efficient than multi-tiered systems. Multi-tiered systems are more efficient than single-tiered systems. Full-service systems are more efficient than emergency-only systems. And finally, emergency-only systems are more efficient than full-service systems. Armed with this knowledge, we may proceed with confidence. . . in any convenient direction.



Elected officials are routinely barraged with information of this caliber furnished by staff, labor representatives, and consultants. The problem is that every one of these "facts" is both true and false, depending upon context.

ALS Engine Companies vs. Separate Rescue Rigs

The role of a fire department in a prehospital care system can range from BLS-trained firefighters delivering first-responder services from fire apparatus to paramedic crews responding in transport-capable rescue vehicles. Somewhere between lie cross-trained paramedic/firefighters delivering ALS first-responder service from fire apparatus, and paramedic crews responding from rescue trucks without transport capability.

The efficiency (and appropriateness) of each of these models depends entirely upon four factors: marginal cost, utilization, impact upon fire suppression capability, and the quality of local transport services. All four factors differ widely from community to community, and two of them, utilization and impact upon fire suppression capability, differ significantly from neighborhood to neighborhood within a community. Thus, what is right for one city or neighborhood may be foolish or worse in another setting.

What the Patient Needs. As my mentor Dr. Robert Filbeck used to say, it may be helpful to remember our purpose. The best available information tells us that our most time-critical patients, victims of cardiac arrest, need BLS first response within 4 minutes *maximum* and ALS within 8 minutes *maximum*. (***Note:*** these are *maximum*—not "average"—response times.)

Other kinds of patients have different clinical and response time needs, but it is generally safe to say that a system meeting the clinical and response time needs of victims of cardiac arrest provides an excellent foundation for meeting the pre-

---

Jack Stout has been at the forefront of innovations in the design and implementation of EMS systems for the past dozen years. If you have a question, a problem, or a solution related to the public/private interface in prehospital care, address your letter to "Interface" jems, *P.O. Box 1026, Solana Beach, CA 92075.*

hospital needs of other EMS patients.

In addition to these response time requirements, the at-scene and en route prehospital care of the most seriously ill or injured patients sometimes demand a coordinated effort by two or more trained personnel. An EMS system should be designed to meet this occasional need for additional manpower.

Why the Fire Department? Due to the increasing success of fire prevention efforts (building codes, code enforcement, etc.), fire departments everywhere have been declining in levels of manpower productivity, especially among personnel assigned to fire suppression duties. Given the proliferation of firefighting equipment and personnel throughout most communities, and the declining frequency of demand for fire suppression service, an expanded role in the EMS system seemed an efficient solution to a growing public need, *and* a partial solution to the problem of declining productivity in the fire service.

While a few urban systems do successfully employ police departments in a first-responder role, most attempts have been less successful than fire department-based, first-responder services. The reason: while frequency of demand for fire suppression service is on the decline, frequency of demand for police services is on the rise. In most cities, surplus production capacity and declining productivity are *not* police department problems.

BLS First Response. The marginal cost of providing BLS first-responder service from fire apparatus averages about $25 per call. "Marginal cost" means the expenses incurred in providing a service which would *not* be incurred if that service were terminated. Since the fire department's costs of facilities, equipment, and personnel must be funded anyway, the marginal costs of providing BLS first-responder services, using existing equipment and personnel, are limited to: training costs, amortized (spread over expected useful life) costs of medical equipment, medical supplies, additional fuel, accelerated preventive maintenance, and slightly accelerated equipment depreciation schedules.

Citizens and elected officials sometimes question the financial wisdom of sending a several-hundred-thousand dollar piece of firefighting equipment to the scene of a medical emergency. They are forgetting that, whether responding to calls or sitting in the station, equipment and its crew cost the taxpayers almost the same amount of money. Equipment costs per call go *down*—not up—when call volumes are increased. (Firetrucks are replaced because of obsolescence, not because of high mileage on the odometer.)

Where reliable paramedic transport service with eight minutes *maximum* response times already exists, a fire department-based BLS first-responder service can be local government's most cost-effective public service. The increased call volumes dramatically improve manpower productivity, while priority dispatching and reliable paramedic transport service safely limit the sending of first-response units to the calls where they are needed. Furthermore, the medical and legal risks of call screening and patient handoffs to lesser-trained crews do not exist in this type of system.

ALS First Response on Fire Apparatus. In communities or neighborhoods where ALS transport service is not reliably available within eight minutes or less, it makes sense to upgrade the BLS first-response system, or part of it, to ALS capability. Perhaps the best example of this selective upgrading of first-response units to ALS status is Chief Howard MacMillan's first-responder program in Forth Worth, Texas. Fort Worth already enjoys a reliable, private ALS transport system which works in close cooperation with the fire department's BLS first-responder program. However, in certain parts of the community it is more cost-effective to use ALS first responders to stop the eight-minute clock.

Working together, the fire department and the private transport company have "tuned" the first-responder program to deliver BLS throughout the community, and ALS first-responder services specifically where they are needed (and where they are most cost-effective). Again, good priority dispatching limits the use of first responders to the calls where they are needed, without the dangers of call screening and patient handoffs from ALS first responders to BLS transport crews.

The marginal cost of delivering ALS first-responder services from fire apparatus depends upon staffing patterns. Where no additional personnel are involved, the costs include the marginal costs of BLS first-responder service, plus "premium pay" for one or two firefighter/paramedics per unit per shift (usually about 15 percent additional compensation), and some added costs of training, equipment and supplies. Properly set up and deployed, ALS first responders on fire apparatus both improve manpower productivity within the fire service and fill difficult gaps in the ALS transport system in the most efficient possible way.

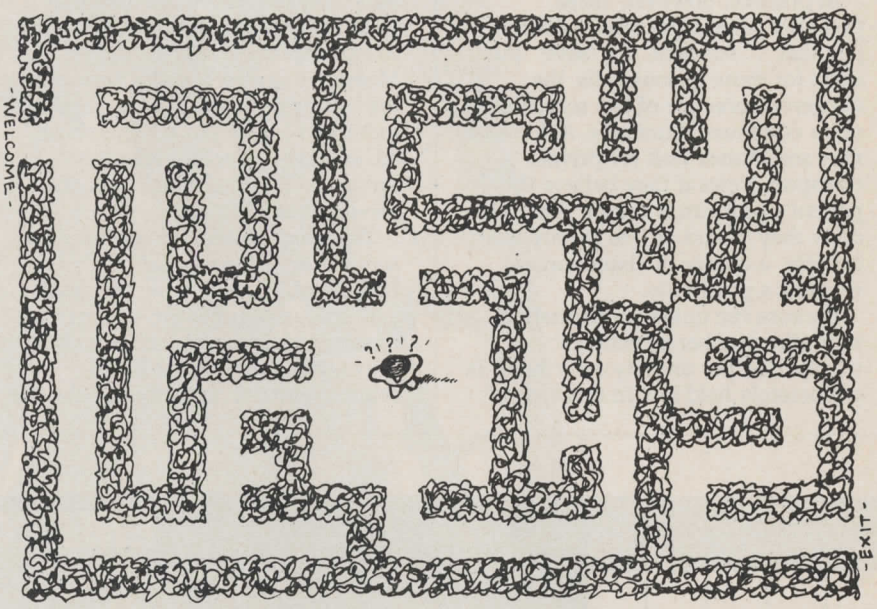
Notice that both BLS and ALS first-responder services, when delivered from fire apparatus, improve productivity levels within the fire service. Yet, in the context of a reliable ALS transport service, neither program need detract significantly from the fire department's primary role in fire suppression. In contrast, where a reliable ALS transport service has not yet been established, BLS first responders can save few, if any, lives, and ALS first responders and their patients face the added medical and legal risks of delayed transport and the occasional risks of handing off patients to BLS crews.

Furthermore, without a reliable ALS transport service, first-responder crews may be routinely unavailable for long periods of time while waiting for a transport unit or accompanying the patient to the hospital in a BLS ambulance, or both. Improved productivity is no bargain when it comes with increased exposure to abandonment claims and a substantial reduction in fire suppression readiness.

ALS First Response from Non-Transporting Rescue Rigs. Compared with an ALS-capable engine, separate ALS rescue rigs have two significant disadvantages: First, their use does nothing to improve the productivity of firefighters not assigned to the rescue units; second, the marginal cost of operating an ALS rescue rig is at least double and often triple the marginal cost of operating an ALS engine. If that is true, the reader may ask, how is it possible that some fire chiefs think they'll save money by switching to separate rescue rigs while others believe the opposite?

The answer lies in knowing what they were switching *from*. For example, before the change in Anaheim, Chief Simpson was running five-person engine companies, two of those persons being firefighter/paramedics assigned to an ALS rescue unit. By cutting back to four-person engine companies and eliminating the rescue unit, he was able to save the cost of an entire position, allow his paramedic to accompany the patient in a BLS transport ambulance when necessary, and still have sufficient manpower on the engine to fight a fire.

At the Fresno Fire Department, Chief Armstrong, on the other hand, was starting with four-person paramedic engine companies being phased down by attrition to three-person crews. At the three-person level, with a firefighter/paramedic accompanying the patient, the usefulness of the engine company in fire suppression would have been severely impaired. Thus, Chief Armstrong pulled his remaining paramedics off the engines (cutting them to three-person crews), and set up separate ALS rescue rigs with his paramedic personnel. (Keep in mind that, at the time these changes were being made, neither community enjoyed reliable ALS transport service.)



There is another situation that may justify consideration of converting an ALS engine to a BLS engine and a separate ALS rescue unit. That is, when a given ALS engine is so frequently dispatched on first-responder calls that its availability for fire calls is substantially impaired (say, more than 8 or 10 medical calls per 24-hour shift), it is probably wise to consider alternatives, including contracting with a private ALS firm for additional first-responder coverage in that area during peak demand periods.

Again, non-transporting ALS first-responder rescue units are no substitute for a reliable ALS transport service. And in areas where, with good priority dispatching and reliable ALS transport service, EMS first-responder call volumes are reasonably low, ALS engines can safely lower marginal costs *and* improve manpower productivity.

INTERFACE

Transport-Capable ALS Rescue Units. Transport-capable ALS first-responder units have three potential advantages over non-transport capable ALS units. First, the transport delay can be eliminated (a great benefit to many victims of trauma). Second, the medical and legal risks of handing off a patient to a BLS transport crew can be eliminated. Third, costs can be partially recovered by fee-for-service billings for transport services.

In practice, however, these potential advantages often remain just that . . . *potential*. To "save" the units for more serious calls, the dangerous practice of call screening is often continued. Similarly, ALS crews may sometimes wait for private transport crews if they believe the patient's problem is minor. And if the crew they "hand off" to is only BLS-capable, a charge of abandonment remains a possibility.

Because the unit-hour utilization ratio (the number of patients transported per on-duty crew hour) is deliberately held low in this type of system (to preserve ALS resources), the cost per patient transport is high—higher than in other types of systems. This higher cost per transport, combined with fee structures artificially reduced by local tax subsidies, makes it unlikely that a high percentage of operating costs can be recovered in fee-for-service revenues. (This, in part, explains Houston's planned switch to non-transporting ALS first-responder rescue units.)

Dennis Murphy's (*jems*' "Public Forum" columnist) Eugene/Springfield system proves it is not impossible to realize the potential advantages of fire department-based ALS transport service. However, Murphy's experience also shows that the business practices and operating methods required to achieve these advantages are, to put it mildly, foreign to the traditions of the fire service industry.

Transport-capable, first-responder services are a poor substitute for a reliable ALS transport service and can, by carving into the system's fee-for-service revenues and depressing prevailing rates (for Medicare reimbursement), actually prevent the establishment of a reliable ALS transport service.

On the other hand, where local government is unwilling or unable to cope with the complexities of establishing a reliable transport service, public or private, transport-capable ALS first responders may be the only alternative.

Single-Tiered vs. Multi-Tiered Systems

Even Dennis Murphy will agree that, in the hands of a qualified and properly motivated private provider, a single-tiered, all-ALS system will consistently outperform, financially and medically, multi-tiered systems. Whether that same consistency can be achieved in a socialized setting remains to be seen.

Because demand for emergency service fluctuates considerably by time-of-day and day-of-week, as well as geographically, the *potential* exists (especially in urban areas) to combine aggressive deployment and redeployment strategies with peak-load staffing patterns to achieve superb response-time reliability at substantially lower cost. The problem is that these advanced deployment

and redeployment methods (now called "system status management") go far beyond the most aggressive fire department "move-up" protocols and could cause severe labor problems if applied in a traditional fire department or "third service" setting.

Measured in terms of transports per unit hour, the most efficient urban providers are often three or four times more productive than those of more traditionally managed EMS organizations. But achieving such efficiency, without jeopardizing response-time reliability, requires the persistent use of some very inconvenient operational methods— many of which may be downright counterproductive in a fire department or other government setting.

The bottom line on single-tiered systems: all-ALS, single-tiered systems consistently outperform, both medically and financially, multi-tiered systems, but only in organizations having the expertise, motivation, and freedom to use the most aggressive system status management techniques and peak load staffing patterns.

Full-Service vs. Emergency Only

Hillsborough County, FL may be wise to sell off its non-emergency business, but not for the reasons they suppose. Because of the extreme peak period demand fluctuations of emergency service, any ALS system with sufficient peak load coverage to achieve 90 percent response time reliability must, by definition, maintain a large surplus ALS production capacity. Thus, a *potential* exists to deliver non-emergency services, using surplus ALS production capacity, at extremely low marginal costs per transport. (In addition, collection rates for non-emergency service are usually better than those for emergency ambulance service.)

The problem is that in order to safely realize this potential efficiency, the ALS system must first be structured to take full advantage of the potential benefits of an all-ALS, single-tiered system, as discussed earlier, and then develop the *additional* expertise to safely perform non-emergency work using surplus ALS capacity. Today's all-ALS, full-service systems serving substantial urban populations are, without exception, run by private firms— the best in the business. With little and sometimes no government subsidy, they deliver clinical excellence and superb response-time performance with levels of productivity once thought impossible.

There is little, if any, advantage to the provision of non-emergency services by an EMS provider unless those services are delivered at low marginal cost by ALS crews using advanced strategies of system status management and peak load staffing. And where non-emergency services are delivered by ALS crews *without* the expert use of advanced deployment/redeployment techniques and aggressive peak load staffing patterns, the results will be more than inefficient, they will be deadly, too.

The bottom line on full-service systems: Unless you've mastered advanced system status management, peak load staffing, and have already established a superbly efficient all-ALS, single-tiered system, don't try it, especially in a large urban system. □