

Medical Oversight for Emergency Medical Services: Defining Success

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The provision of emergency medical services (EMS) is a practice of medicine. Although it has been present in various forms since the days of Napoleon, the currently utilized EMS system in the United States began in 1966 with the publication of the EMS “White Paper” from the Institute of Medicine of the National Academies (IOM) and the passage of the Highway Safety Act.^{1,2} Over the past 4 decades, the public and members of the medical community have come to rely upon the prompt, professional response of the EMS system, summoning ambulances over one million times per year in North Carolina alone.³ Indeed, the EMS practice of medicine is one of the largest in every community because all citizens are potential patients. On an annual basis, between 7% and 9% of the population become actual patients and summon EMS via 9-1-1.

Unfortunately, these have not been 4 decades of clinical progress in EMS. There are shining examples of clinical success, but we often fail to dedicate sufficient resources to the prehospital medical effort. As the recent IOM report confirms, the federal government has not provided sufficient funding in the areas of research or disaster preparedness, with EMS receiving less than 5% of the preparedness funding since the attacks of September 11, 2001.⁴ The medical community remains uncertain of exactly how to incorporate EMS physicians, for while the number of EMS fellowships continues to grow, the American Board of Medical Specialties has yet to incorporate the subspecialty of EMS into the formal board structure. Finally, the IOM report calls for a new federal agency to oversee EMS, indicating that EMS neither belongs exclusively in the National Highway and Traffic and Safety Administration (the current federal oversight agency for EMS) nor exclusively in the

areas of public health or homeland security.⁴ From the local to the federal level, EMS is truly at the crossroads, and leadership from physicians and the broader medical community is now urgently needed to guide us through this transition.

What is an EMS Physician?

The EMS physician divides clinical activities into two spheres: the traditional, direct care activities in the emergency department and the less traditional, indirect patient care that is delegated to EMS providers in the community. In the latter role, the EMS physician is responsible for all medical components of the prehospital encounter, including dispatch algorithms for the 9-1-1 center, development and revision of patient care protocols, education for all providers, and remediation of providers when necessary. Gone are the days when the EMS physician could create protocols once every few years and meet with paramedics only when they violated these protocols. The practice of EMS medicine is truly a partnership between receiving hospitals, public health, emergency medical dispatchers, basic life support first responders, and, in most communities, advanced life support providers. This partnership requires intensive and frequent interaction with the EMS physician in order for it to function in the patient's best interest. For maximum patient benefit,

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these interactions should occur both in the formal settings of the classroom, boardroom, and conference room as well as in the informal settings of the 9-1-1 center and the houses and highways where EMS providers operate. The appropriate balance of administrative activity and in-the-street observation directly influences patient outcomes, particularly in the area of cardiac arrest.⁵

Rather than simply performing the “sign and go” tasks related to infrequent protocol revision and remediation, the modern EMS physician will be actively involved in the initial and continuing education of all participants in the medical practice. This includes reviewing protocols for the dispatch center, ensuring first responders have access to the latest medical information, and interacting with advanced life support providers on a regular basis.

The need for physician leadership is most urgent as we begin to address this simple question: Are we providing quality clinical care for our EMS patients? The overall clinical care provided by EMS involves two components: the treatments provided by EMS providers and the decisions reached about patient disposition. In regards to the former, a surprising majority of the treatments and interventions provided by EMS are supported only by anecdotal evidence and deference to historical precedent. Medical antishock trousers (MAST) and high dose epinephrine for cardiac arrest are familiar examples of established treatments that did not survive the test of scientific scrutiny. More recently, the “established treatments” of endotracheal intubation (with or without rapid sequence induction) and ventilations during cardiopulmonary resuscitation (CPR) have been called into question. Finally, with the advent of automated external defibrillators (AEDs) and thus defibrillation by basic life support first responders, the relative importance of paramedic response time is being reexamined in a scientific manner.

Decisions regarding patient disposition also directly impact the quality of care rendered by EMS, not only in the urban environments but in the suburban and rural settings as well. In the urban setting, there is compelling evidence suggesting patients with ST-segment elevation myocardial infarction be diverted to a hospital capable of percutaneous coronary intervention (PCI).^{17,18} In the rural setting, investigators with the Reperfusion of Acute Myocardial Infarction in Carolina Emergency Departments (RACE) initiative and others are working to ensure prompt treatment for this patient population either by primary lytic therapy or early activation of the air ambulance for transfer to PCI.¹⁹

Finally, the EMS physician has the responsibility for caring for patients who suffer cardiac arrest in the out-of-hospital setting, both from sudden cardiac death and from a variety of other medical and traumatic etiologies. Mandating hospital transport for all of these patients not only consumes limited emergency department resources for futile cases, it may also impede resuscitation for those cases which are not futile. We now know that interruptions in cardiac compressions as brief as 20 seconds may decrease the probability of successful resuscitation in a meaningful way, and the movement of a patient from the location of the arrest to the ambulance will inevitably create

many such pauses. In the optimal setting, the EMS system is responsible for the resuscitation of cardiac arrest, and the emergency departments and hospitals are responsible for postresuscitation care. Obviously, the EMS physician must be actively involved in all components of the EMS system for such a system to function appropriately.

The EMS system, led by the EMS physician, has the opportunity to improve the outcomes for individual patients as well as to enhance the health of the community as a whole. From system design to treatment protocols to hospital destination directives, modern EMS systems require active involvement of EMS physicians to ensure clinical excellence in prehospital emergency care.

The Challenges Ahead

The EMS physicians of 2007 face many challenges. First, we must provide leadership in the area of workforce stability and career development for our prehospital providers. No matter how involved in our medical practice we become, it is for naught in the absence of a qualified and willing workforce. As the demand for all allied health workers exceeds supply, paramedics become attractive candidates to educational institutions training nurses and respiratory therapists as well as to hospitals and medical clinics seeking highly qualified technicians to operate in the cardiac catheterization lab, emergency department, or other settings. In nearly all of these situations, scheduled work in a climate-controlled environment is offered for a higher salary than EMS currently offers. Paramedics may most accurately be viewed as members of the allied health community and, as such, reimbursement must be reexamined. EMS physicians must be allies for our prehospital providers and seek to improve reimbursement for the important work they do.

The EMS physician must actively participate in defining quality in EMS. In just one example of unintended consequences, it may appear logical to support improved response times for EMS. It will surprise some to know, however, that there is no evidence in the medical literature indicating an association between advanced life support response times and survival.¹⁴⁻¹⁶ Moreover, there is a clear association between response time of a BLS defibrillator and survival from cardiac arrest, but this is often not measured or reported.²¹ Finally, it appears that the annual experience of a paramedic may be at least as important as the response time. In each community, cardiac arrests occur with a predictable annual incidence of about 1 per 10 000 population. As one adds more paramedics to a system with a stable population, the individual paramedic encounters fewer patients in cardiac arrest each year. Preliminary studies indicate improved survivability from cardiac arrest in areas with fewer paramedics, raising the hypothesis that rapid response of a basic provider with an AED followed by a delayed response of a well-experienced paramedic may be superior to rapid response of a relatively less experienced paramedic.^{22,23} This is not surprising, as the same has been demonstrated for invasive cardiologists and other medical specialists: there is a minimum number of high acuity encounters required on a regular basis in

order to maintain clinical excellence.²⁴⁻²⁶ This, combined with the known short supply of paramedics mentioned above, may eventually place the EMS physician in the seemingly unusual position of calling for fewer paramedics while ensuring the paramedics that are in the field receive the best training, equipment, and reimbursement possible.

This is not to say the historical duties of the EMS physician may be neglected. Protocol revision and assurance of protocol compliance remain the cornerstones of excellent EMS practice. For today's EMS physician, however, these revisions must occur frequently because evidence regarding treatment and transport decisions is emerging more rapidly than at any time in the 4-decade history of EMS. Just in the past 12 months, evidence from North Carolina researchers indicates noninvasive positive pressure ventilation (NIPPV) may become the standard of care for prehospital treatment of pulmonary edema and potentially other forms of respiratory distress.²⁷ National and international manuscripts have challenged our current methods of CPR and defibrillation with indications that continuous compressions can markedly increase the proportion of patients with neurologically intact survival from cardiac arrest.^{9,20,28} The timely revision of EMS protocols is now required to ensure optimal patient outcomes.

Assurance of protocol compliance may be adequately performed with chart review but is only optimally performed after observation in the field. Response with EMS personnel to assess both the quality of the care provided as well as the quality of the medical protocols is necessary for excellence in medical oversight.

Finally, the EMS physician is called upon to perform duties not directly related to routine, individual patient encounters. The events of September 11, 2001 and Hurricane Katrina reminded us that disaster preparedness is not an optional activity. Fortunately, in North Carolina we have several resources including Med-1 at Carolinas Medical Center in Charlotte, the Special Operations Response Team in Winston-Salem, and the State Medical Assistance Teams to assist local resources in any such

response. Issues surrounding public health response to infectious disease as well as injury prevention and public safety are also issues for the EMS physician.

Where Do We Go From Here?

Although the challenges are great, the dedication of resources to address them is perhaps the most significant it has been in our 4-decade history. The clarity of the recent IOM report, the multi-center NIH supported Resuscitation Outcomes Consortium (ROC), and the outstanding initiatives emerging from the EMS Performance Center in North Carolina are just a few examples of this dedication. Funding remains a challenge, but as our treatments become more evidence-based, a more cogent argument for dollars becomes available to us. In Hubble's paper for example, we learn that the need for an intubation in the emergency department is avoided for every 6 pulmonary edema patients treated with prehospital NIPPV. The health care dollars saved by the avoidance of a single intensive care unit admission could pay for many NIPPV units in the prehospital setting. As our evidence becomes more robust, the appropriateness of increased funding will hopefully become self-evident.

In conclusion, despite all of the challenges we face, the career of the EMS physician is satisfying and rewarding. When I began my fellowship in EMS, someone with years of experience in the field stated that the duties were 80% political and 20% clinical. They actually were wrong—they are 90% political and 10% clinical on the best days. Yet, despite all of this, the opportunity to care for those cannot otherwise care for themselves is afforded every day. We impact those who have been down on their luck for years as well as those from all walks of life who experience an unexpected illness or injury—and we can help them each in unique ways. At the end of the day, via this dedicated practice, I am able to recall why I entered the medical field in the first place: to help my fellow man. **NCMJ**

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