

# Overview of Emergency Medical Services in North Carolina

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The emergency department is an integral part of our nation's health care safety net. Emergency medical services (EMS) are the integral thread in the safety net.<sup>1</sup> The position EMS care has in health care is significant and the services it provides are unique. There are more than 18 000 EMS systems in the United States<sup>2</sup> and approximately 800 separate service units operate in North Carolina. Coordinated at the county level, giving North Carolina 100 local "systems," North Carolina EMS systems incorporate local rescue squads and hospital, public health, and public safety personnel.<sup>3</sup> In many rural areas of the US, there may be a single volunteer rescue squad that serves as the only form of health care for miles.<sup>4</sup> Spread across almost every community in the US, there are nearly one million paramedics, emergency medical technicians (EMTs), and emergency first responders.<sup>5</sup> An estimated 33 000 EMTs and paramedics are currently certified in North Carolina and most are volunteers.<sup>6</sup>

In most communities, EMS care is available to anyone, for any reason, at any time. On average, individuals use EMS care twice in their lifetimes.<sup>4</sup> The likelihood of using EMS care increases as an individual ages.<sup>7,8</sup> In some communities, demographic and socioeconomic factors associated with EMS utilization include lower income (poverty), minority race, female gender, and Medicaid or health maintenance organization insurance coverage.<sup>9-15</sup>

It is unclear exactly how frequently EMS care is accessed on a national scale. A recent Institute of Medicine of the National Academies report estimated 16 million EMS transports to emergency departments (EDs) in 2002.<sup>16</sup> Other publications cite much higher frequencies with as many as 28 million EMS encounters.<sup>17</sup> Thousands of other EMS encounters involve interfacility transports or transports to clinics, physicians' offices, or other institutions. North Carolina citizens use EMS over 1 million times each year.<sup>18</sup>

Emergency medical service systems are well known for their ability to handle cardiac emergencies and traffic-related trauma, but much of the medical care EMS provides is nonemergent

in nature.<sup>14,19-22</sup> Research shows that an overwhelming number of visits to the ED are nonemergent<sup>23</sup> and, in fact, are unnecessary,<sup>19,24,25</sup> and use life-saving and expensive health care services needed by others.

## A Call to Action

There are things in life and in health care that move along at yesterday's pace for seemingly no good reason. Many aspects of today's system of EMS care vary little from what was seen in the 1970s. In the 1950s and 1960s in North Carolina and across the nation, ambulance services provided little more than "scoop and run" transport.<sup>26</sup> Untrained personnel in hearse-type vehicles sped to an emergency scene, "scooped" up the patient with no regard to injury, illness, or care and raced—sometimes with both the driver and an attendant (if present) riding in the cab—to an ill-equipped and poorly staffed emergency room. Such was the case in almost every community across this nation.

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Before the 1960s, ambulance transportation was often provided by volunteer rescue squads or through local funeral homes. It was the norm and something that was accepted. Funeral home ambulances were solely for convenient, horizontal transportation. As of 1959, local governments were also authorized to help finance rescue squad operations.<sup>31</sup> At that time, North Carolina's volunteer emergency squads were structured and

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funded in a haphazard way. These volunteer squads were mostly dependent on local donations to fund their activities. Rescue squads were sometimes formed through local fire departments, police departments, or civil defense units. Regardless of affiliation, the availability and quality of rescue and ambulance services across North Carolina was generally questionable. North Carolina wasn't alone; emergency services across the country were much the same.

Physicians and other health care providers insisted we could do better. In 1965, the National Academy of Sciences (NAS) published a report entitled *Accidental Death and Disability: the Neglected Diseases of Modern Society*.<sup>27</sup> The report forced public officials to take concrete steps to establish standards for ambulance design and construction, EMS equipment and supplies, and training programs and protocols for personnel. The NAS, drawing on lessons learned in the military in Korea and Vietnam, reported 52 million accidental injuries in the US, with 107 000 deaths. Of those who survived their injuries, more than 10 million were temporarily disabled and another 400 000 permanently disabled, all at a cost of \$18 billion. The report described accidents as the “neglected epidemic of modern society” and “the nation’s most important environmental health problem.”

The report stimulated the passage of the National Highway Safety Act of 1966, which called on the US Department of Transportation (DOT) to develop minimum standards of care for accident victims. It also gave the federal DOT the right to withhold 10% of its highway design, construction, and operation funds to states that did not comply. This risk equated to millions of dollars annually for each state and, as intended, quickly drew the attention of state governments.

Between the DOT and the National Highway Traffic Safety Administration (NHTSA), model EMS systems were developed. The appropriations for each agency included more than \$48 million for national training standards for emergency medical training. This structure provided for multiple levels of training to include emergency medical technician-basic (EMT-Basic), EMT-Intermediates, and EMT-Paramedics.<sup>28</sup>

On November 16, 1973, Congress approved the Emergency Medical Services Systems Act of 1973 (PL 93-154)<sup>29,30</sup> which funded and authorized the US Department of Health, Education and Welfare to help develop EMS programs throughout the country. Funding allocated \$30 million for the fiscal year ending June 30, 1974, \$60 million through June 30, 1975, and \$70 million through June 30, 1976. The act identified 15 “key elements” of an EMS system including manpower, training, communications, transportation, facilities, critical care units, mutual aid, consumer participation, accessibility to care, transfer of patients, standard record keeping, consumer information and education, review and evaluation, disaster linkage, and use of public safety agencies. Because PL 93-154 called for the development of a comprehensive system with a minimum of 15 complex components, an EMS system built around the federal model actually became many different innovations rolled into one umbrella known as EMS.

## North Carolina as a Leader in EMS Innovation

North Carolina was one of the first states in the nation to address EMS development through state government involvement and on a statewide basis. National and state-level legislation led the way in the formation of modern EMS programs across the country. But while many states approved EMS development on an element-by-element basis, North Carolina approached EMS from a comprehensive system development perspective. Considerable federal and state resources were applied to system development and talent was drawn from both in-state and out-of-state to support the overall program and its implementation.

North Carolina adopted the federal 15-element model and actively pursued implementation of EMS across the state. The central theme and intent of the EMS Systems Act was to develop systems of emergency medical care that would significantly decrease death and disability rates. However, implementation is often far more complicated than planning. In North Carolina’s case, some volunteer emergency squads were just as ready to block federal intervention then as other types of North Carolina volunteers were ready to block Union troops in the American Civil War. Federal ambulance and training standards, even though they were to be administered through state government, were viewed by many local rescue volunteers as an intrusion on their rights, values, and way of life. This set the stage for another battle. This time it was state regulators, armed with federal standards and an innovative concept called emergency medical services, squaring off with community volunteers from across the state.

Due to many factors, by August 1966, 56 counties in North Carolina were threatened with the loss of ambulance service. Some municipalities stepped up to the plate to offer services that were lost, and some commercial providers began operation, but those services were normally of poor quality and limited financial means. Some commercial providers were allocated subsidies from local governments, but even with that, most still failed. By 1967, the lack of a sound approach to ambulance service was more visible than ever before. Many public and private interest groups, along with a growing list of medical professionals, began to focus on the statewide ambulance issue. Funeral directors began to withdraw from the delivery of the service, in part driven by the cost of labor due to newly introduced federal labor standards. The North Carolina General Assembly responded by passing the Ambulance Act of 1967. The act placed the legal responsibility for ambulance availability on county governments as an extension of public health.

In North Carolina, the Ambulance Act of 1967 represented the first major step for ambulance legislation in the state. More states across the country were taking advantage of federal dollars for technical assistance and funding in support of ambulance improvements and model projects. With money from the US Department of Transportation, the Jacksonville, Florida, fire department began efforts to reduce traffic related deaths by implementing a citywide EMS system.<sup>32</sup> Overnight, the city government became involved in ambulance service. All of the community funeral homes and commercial ambulance services

quit providing the service during a strike. In 1968, a similar situation occurred in North Carolina's Guilford County. The county had to step in and assume immediate responsibility for ambulance service when the only local, private service went on strike. Incidents like these were not isolated and occurred in numerous locations across the nation and throughout North Carolina.

State government, with limited funding, began to oversee North Carolina's ambulance and rescue services. For the first time in the state's history, minimum training standards, very minimum by today's rules, were established. Ambulance "attendants" were required to complete a 24-hour course in standard first aid through the American Red Cross or other training source. The North Carolina Board of Health also established equipment standards for all ambulances, based on recommendations from the American College of Surgeons' Committee on Trauma. Even with the minimal requirements, some rescue squads still refused to participate because they were wary of government intervention and they resisted change.

The North Carolina Board of Health was designated to inspect ambulances, but again, the quality of this oversight process was poor. Staff was assigned to monitor a system that truly didn't exist. F. O'Neil Jones, a freshman senator from the 24th district (Anson County), learned of the problems from Dr. Bill McKennon, a friend and physician, who said that something needed to be done. Armed with McKennon's advice and help from David Warren at UNC-Chapel Hill's Institute of Government, Jones created a research commission to examine statewide issues in emergency care and transportation. The results of the commission were outlined in the 1972 report *Emergency Medical Services in North Carolina: Transportation, Communication and Personnel*. The report stated:

North Carolina has approximately 400 organizations with 927 vehicles and 6,300 persons providing ambulance and/or rescue services. About one half of these providers is volunteer agencies and one-fourth is funeral home operators. Though volunteer and funeral home units represent almost 75 percent of the providers, they respond to only 43 percent of the calls. Governmental and commercial responders, who constitute less than 20 percent of the providers, respond to 52 percent of the calls. Other providers, such as hospitals, respond to the remaining calls.... It is estimated that only 202 service units meet the minimum requirements. (RTI, 1972:3)<sup>33</sup> ... The presumption is that people are dying needlessly at the hands of ambulance attendants who are so medically under skilled that they do not know how to deal effectively with many common medical emergencies.

Jones' work and the report of the commission resulted in the North Carolina EMS Act of 1973 and the creation of the North Carolina Office of Emergency Medical Services (NC OEMS) in the North Carolina Department of Human Resources. Subsequently, North Carolina was one of the first states in the country to begin a statewide effort to establish an EMS system in every community.

This lead agency, under the secretary of the North Carolina Department of Human Resources, established broad powers and responsibilities to create, maintain, and oversee prehospital EMS operations and hospital-based trauma and helicopter ambulance services in the state. David Warren was appointed as acting chief of NC OEMS with instructions to get the office organized and do a national search for the best person to become permanent chief. That led to the hiring of a man who many emergency service professionals across the globe now describe as an emergency medical services pioneer—James (Jim) O. Page.

Jim Page, an attorney and a Los Angeles County fire battalion chief, was a leader of one of the first agencies in the nation to train paramedics and provide advanced prehospital care. Page, at the time, was also technical advisor to the NBC hit show "Emergency!" This program and Page's leadership brought him to North Carolina to lead the new agency after he came to the state for a speaking engagement and was enticed to apply for the newly created chief's position. He assumed the role as chief of North Carolina OEMS on December 19, 1973.

Page and the talented OEMS team he developed found it straightforward to upgrade vehicles and equipment through federal funding and new national standards in ambulance design and construction. Funds were also available to assist with the initial development of local and statewide EMS communications systems and air ambulance services. Likewise, the designation of hospital trauma centers was also a duty assigned to NC OEMS.

Implementing training standards and working with the hundreds of emergency service providers across the state proved to be another challenge—one that would eventually cost Page his job. The task of training and certifying basic EMTs was monumental. Urban areas rapidly accepted and adopted the new training standards while eastern and western parts of the state resisted implementation. Specifically, major pockets of opposition quickly built within the volunteer squads in and around Wayne County in the east and Gaston County in the west. The resistance was "organized, highly vocal, media intensive and politically active."<sup>34</sup>

Rescue squads and funeral homes saw the training as an extra burden that was too much to ask of their members or employees. Page's support for training and education set him up as a political lightning rod. A number of state senators were complaining to the secretary of the Department of Human Resources that their local rescue squads were angry and putting significant political pressure on them about Page and NC OEMS.

Another looming problem and one that hints at reasons why some squads resisted initial training was illiteracy. For the first time, ambulance personnel would be required to attend formal training, read an EMT textbook, and pass written and practical exams. At the time, illiteracy was a problem plaguing squads from the mountains to the coast. Political pressure mounted to extend the basic EMT certification deadline, which Page was willing to do, and allow for oral examination for EMT candidates, which he was not. Giving in to "voter

pressure,” Page was asked to resign by the secretary, but he refused to do so. Page was then terminated. He was at the helm less than two years.

Page was replaced with Colonel Charles A. Speed, former commander of the North Carolina Highway Patrol. Speed was a highly principled man who also refused to compromise on the training standards. Although the road remained rocky for some time, the statewide training program moved forward; by 1977 all 100 counties had adopted basic EMT training, and by 1984 the number of certified EMTs had climbed to more than 50 000.

Following Colonel Speed’s retirement, strong leadership continued to be a characteristic of NC OEMS. Under each chief, including the current chief, Drexel Pratt, the implementation of all 15 key elements and many more add-on components and policy advances of the state’s EMS system have continued to take place.

## EMS Today

Today no one debates the merits of a 9-1-1 system, skills certification for paramedics, or the need for understood “levels” of care whether those be in the hospital-based trauma program or the neonatal intensive care unit. As September 11, 2001 taught us, the ability to communicate is essential in order to protect lives. When terrible things happen, people turn to their hospitals for help. As the recent tragic events at Virginia Tech also showed us, a level III trauma center handled more than 20 wounded students, many of them in critical condition, with skills and processes that make us all proud.

Are all of our hospitals in North Carolina and all of our first responders ready to handle such a terrible event? What should be the level of care we expect of any hospital in our state that has an emergency department? Many of our state’s original emergency services physicians, nurses, physician assistants, and paramedics have or are approaching retirement. How will we replace their skills and expertise?

These are important questions the state’s hospitals, physicians, policy makers, and their partners in emergency medical services are considering and debating. Once again, it will be surprising if North Carolina does not lead the way in finding solutions.

## Essential Components of EMS: A Status Report

Over time, EMS systems in North Carolina and in the nation have evolved into sophisticated and mobile medical care units with highly trained medical professionals. In this special issue, local, state, and national experts and leaders in EMS provide detailed discussions and commentaries on the essential components of EMS.

Recruitment and retention of EMS personnel at all levels is perhaps the most visible challenge for EMS systems in North Carolina and nationally.<sup>35</sup> The EMS industry is in a struggle at the moment with advancing the profession while sustaining the existing workforce to meet rising public need and demand. Dr.

Daniel Patterson comments on the nature of the manpower challenge for our state and the nation. Although research is limited, many states, local leaders, and colleagues in foreign nations are experimenting with a variety of approaches to ensure every citizen has access to the emergency care they need. We in North Carolina should monitor these trends and adopt emerging and innovative approaches to sustaining the EMS workforce.

In most locales, EMS professionals are first trained at the basic level of certification to deliver essential life saving care. With additional training, professionals are certified as intermediate technicians, paramedics, or critical care professionals. The bulk of the nation’s and North Carolina’s EMS professionals are trained in the community college system. Studies of EMS professionals show that many would prefer a degree over certification only.<sup>36</sup> In several commentaries, national and state leaders in EMS education and training discuss the role of community colleges, universities, and national registration organizations in the training of EMS professionals.

EMS communications include the transmission of information between EMS professionals, members of public safety (ie, police), and others. Cell phones and text messaging are increasingly being used to facilitate EMS communications. Much consideration has been given to gaps in communications due mostly to the communications challenges experienced during September 11, 2001 and during recent natural disasters. Communications experts Carl Van Cott of North Carolina and Kevin McGinnis of the National Association of State EMS Officials outline EMS communications in North Carolina, the challenges we face, and what is on the horizon in terms of new communications technologies and how they can help prevent miscommunication.

Data are the foundation for research that advances knowledge and even a profession. While we know that our nation’s emergency departments receive over 100 million visits annually, we have no true sense of how many EMS responses and transports are made in America. Nor do we know very much about the details of EMS utilization or how best to go about reducing unnecessary use and improving the quality and safety of care for those who need EMS assistance. Sporadic record keeping in EMS is partly to blame. A lack of data has in many respects stalled the advancement of EMS as a service to our citizens. Work performed right here in North Carolina with support from a variety of federal agencies has helped to construct a national EMS information system, NEMSIS. Dr. Greg Mears of the University of North Carolina at Chapel Hill describes NEMSIS and what it can do for the state of North Carolina and EMS nationally.

EMS has evolved such that it works in concert with public safety and health care while standing on the outside looking in. EMS is a very fragmented system where it is difficult to make the vertical and horizontal connections between EMS and many of its partners in public safety or health care. Poor integration impacts patient transportation and transfer (by air or ground) to different facilities such as critical care units. It also impacts how one EMS system communicates and works with other EMS systems. Several commentaries included in this issue touch on

these components from a variety of vantage points.

Emergency medical service was founded under the umbrella of traffic safety. Over time, various federal and state agencies have assumed responsibility for some or all aspects of providing EMS care. Identifying who or what agency is responsible for EMS can be difficult. Bob Bailey, a former chief of the NC OEMS, describes federal EMS legislation and what the legislation is intended to do. Drexdal Pratt, the current chief of the North Carolina Office of EMS, describes North Carolina's EMS legislation.

Financing EMS services is a very complex and often contentious issue. Many EMS systems receive some support from federal, state, and local governments. This funding usually represents a very small component of total system revenues or capital. In many instances, EMS systems must bill for services rendered which means transportation. If an EMS system responds to a scene and the patient is not transported, most systems are not reimbursed for the costs incurred. Todd Hatley, a former North Carolina local EMS training officer and EMS quality consultant, describes the EMS financing system, financial challenges, and experiences.

When one compares the amount of published research on topics specific to EMS to the amount published on non-EMS topics or in other disciplines, one word comes to mind: paucity.<sup>37</sup> Some of our nation's most recognized leaders in EMS research are located right here in North Carolina. Two leaders, Dr. Herb Garrison of East Carolina University and Dr. Jane Brice of the University of North Carolina at Chapel Hill, discuss research and evaluation in EMS, focusing their attention on gaps in EMS research and where we need to be in terms of advancing the profession.

A survey of some Eastern North Carolina residents found that many have very little idea what their local EMS system provides in terms of medical care.<sup>38</sup> This lack of understanding also extends to many medical professionals. EMS professionals are designated agents of a physician.<sup>39</sup> In other words, EMTs and paramedics provide medical care under the license of a physician. With supervision and guidance, EMS professionals administer medications and perform many cognitively complex medical procedures outside of the hospital setting. Added to the list of 15 essential components of an EMS system after the 1973 legislation was written, medical oversight is an extremely important element of EMS care and delivery.<sup>40</sup> Local EMS systems, their chiefs, and their personnel must overcome many challenges in order to access and receive the medical oversight they need to perform their duties. Rural areas are known to have limited access to adequate medical oversight.<sup>41</sup> The National Association of EMS Physicians (NAEMSP) and others have published a list of duties all physicians engaging in medical oversight activities must provide a local EMS system.<sup>42,43</sup> Dr. Brent Myers, the medical director for Wake County EMS and WakeMed's Emergency Services Institute, comments on medical oversight in North Carolina and in the nation.

Providing a very in-depth look into one of the most controversial medical procedures performed in the prehospital

setting is Dr. Henry Wang of the University of Pittsburgh. Endotracheal Intubation (ETI) is the insertion of a plastic tube into the mouth and throat of a patient in order to establish or maintain an open airway. For many reasons, performance of this procedure by EMTs has attracted a great deal of scrutiny from the medical community. Dr. Wang comments on the origins of ETI, outlines some of the controversies, and speculates on the future of ETI in EMS.

Threats of terrorism and natural disasters are prominent on the minds of most citizens and policymakers. Regardless of the type of event, EMS must be prepared for mass casualties. Drs. Roy Alson and Jane Brice are intimately involved in EMS preparedness activities and planning. They comment on preparedness in North Carolina.

## Conclusion

At some point in time, virtually every North Carolinian and every American will require the assistance of EMS. One Congressionally supported report published in the late 1980s anticipated that every American could anticipate a minimum of two EMS encounters in his/her lifetime.<sup>4</sup> The importance of our state and nation's EMS system should not be understated. When EMS is needed, we expect them to get there as fast and safely as possible. It is only at that point in our own history that we can truly appreciate the significance of our local EMS system, the training EMTs and paramedics go through, and the challenges they encounter while tending to our emergency needs.

Unfortunately, while we may all voice our appreciation for EMS in our community, the state's system of prehospital care, and that of the nation, is in jeopardy. In the recently released *Rural and Frontier EMS Agenda for the Future*,<sup>44</sup> the authors noted that the infrastructure upon which EMS was built is crumbling. More recently, our nation's emergency care system received an overall grade of C- in the first ever National Report Card on the State of Emergency Medicine.<sup>45</sup> Overcrowding, poor access to emergency care, and liability issues were identified as prominent factors. The nation's leading independent health policy body, the Institute of Medicine of the National Academies, released three scathing reports on the state of emergency departments, EMS, and pediatric emergency care in 2006. The reports focused on the lack of federal leadership in the development of EMS systems as the most critical of factors in the delivery of EMS care today.<sup>16</sup>

Throughout its 50-year history, North Carolina's modern EMS system has played a prominent role in the evolution of EMS health care nationally. While there are many obstacles and many challenges, as the reader will learn in the pages that follow, North Carolina EMS authorities are well positioned to lead efforts in innovation and improvement. With recognition from state policymakers that EMS is a vital component of health care, public safety, and public health, our state's EMS system can continue to improve and serve as the EMS model for the nation. **NCMJ**

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