

Pre-Hospital Area Overview/Statement of Problem

Emergency Medical Services (EMS) in North Carolina has benefited from strong collaborative partnerships among NC government agencies, leading stroke advocacy groups, and the NC Office of EMS which oversees the administrative and medical operation of EMS in the state. While there is much work yet to be done, a strong beginning has laid a remarkable foundation from which to work.

EMS is, by nature, a collaborative enterprise at every level of service provision. Field personnel must work with law enforcement, fire departments, and medical personnel both within and outside of the hospital to deliver excellent patient care. Local EMS administrators must work with numerous other service providers including local politicians, vendors, medical leaders from both hospital and community practices, regulatory agencies, and the public to ensure the efficient management of the agency. The NC OEMS must actively engage state politicians, the governor, federal regulatory partners, thought leaders, national leadership groups for both fire and 9-1-1 services, health advocacy groups, and the general public in order to effectively manage and lead EMS services in North Carolina. Because EMS is skilled and practiced in the active engagement of a diverse set of external partners, working collaboratively to improve stroke care in North Carolina has proceeded without many interagency or interpersonal barriers or hurdles.

NC OEMS has taken a proactive leadership stance to improve stroke care. Utilizing a statewide EMS electronic medical record (capturing 1.6 million EMS patient reports per year), the EMS Performance Improvement Center (EMSPIC), through the NC OEMS and with funding from the state HDSP program, has developed a performance improvement tool kit for use by each of the one hundred EMS systems in the state. The Acute Stroke Care Toolkit provides focused agency-specific feedback on the care of stroke patients within an EMS system allowing systems to benchmark their performance against other EMS systems of similar population, similar geographic size, and the state as a whole. Included within the toolkit are suggestions for performance improvement, enabling agencies to measure their performance, initiate performance improvement activities, and assess their progress by generating a follow-up toolkit.

Additionally, the NC OEMS has developed triage destination plans for time-critical illnesses such as stroke, myocardial infarction, and trauma and mandated their use in January 2010 (Appendix E, Stroke EMS Triage and Destination Plan). These triage destination plans provide a common definition of patients who require the highest level of medical service and provide a planning mechanism and standardized approach to transport destination decisions. In the past, EMS personnel made these transport destination decisions based on patient preference or their own experience with a medical facility. If “Somewhere General”, an example of an anonymous hospital, had been nice to them, swiftly receiving their patient and providing them with feedback,

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then perhaps they might have decided to take their stroke patient to that hospital without adequate information about the level of stroke care delivery available. It is very difficult for a field provider to know which facilities are actually delivering the best stroke care based on experiential or anecdotal information. The triage destination plan requires EMS systems to sit down with hospital facilities' staff to ascertain their capabilities for stroke care and their willingness to accept and effectively care for acute stroke patients. Based on this more comprehensive knowledge, EMS systems are then required to make decisions about where their personnel will be directed to transport acute stroke patients for care. These triage destination plans are then filed with the NC OEMS and revised annually. Now, EMS field personnel know where to take acute stroke patients to receive timely acute stroke care. Not only have triage destination plans allowed field personnel to have informed knowledge of where to transport their patients, the plans have facilitated communication and understanding between EMS systems and the hospitals to which they transport patients.

Finally, the NC OEMS has established a standardized set of treatment protocols and required its use for every EMS system in the state. While conceptually simple, the enactment of statewide standardized treatment protocols is a huge step forward in ensuring that every acute stroke patient in the state receives state-of-the-art care.

Such overarching mandates and standardization may appear to reduce the ability of each EMS system to work within its own unique local climate. This is not the case. Each of these mandates requires EMS systems to rise to a common standard of care but allows them to customize the standard to fit local circumstances and variances. Thus, each EMS system has a "home grown", locally developed plan of care that fits the needs of its citizens without compromising the standard of excellence required by the NC OEMS.

EMS is a willing, engaged, and eager partner at the table of those seeking excellence in stroke care delivery. In the past three to five years, EMS has benefited from a heightened awareness of timely and effective delivery of pre-hospital care to acute stroke patients and has secured a seat at the decision-making table.

While tremendous progress has been made, gaps remain. In discussing these gaps, it is useful to consider them in the chronological order in which they occur during the course of EMS response to an acute stroke patient. First, overarching gaps in the system of care will be considered, followed by gaps in 9-1-1 service, first responders, EMS personnel, EMS transport capabilities, and finally gaps in the transitions of care between EMS and emergency departments.

A. General Gaps

For the most part, the role of EMS in stroke care delivery has been confined to a small box. The emphasis for EMS has been on patients who fall within the narrow treatment window (currently four and one-half hours) for acute strokes. EMS can do so much more in terms of primary

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prevention, community stroke awareness, and community after-care of stroke patients who have recently been discharged from the hospital or rehabilitation center. Integrating EMS into the entire continuum of care for stroke patients may create manpower resources for community partners that are often scarce.

In the world of time-critical illnesses, a major emphasis has recently been placed on regionalization of care – centralizing resources and taking the right patient to the facility best equipped to expeditiously manage the incident. EMS needs to be built into plans for regionalization of stroke. In small, resource-poor communities, it is difficult to rationalize sending one of the only two ambulances in the county an hour away to a primary stroke center. The ambulance will be out of service and “lost” to the community for at least two hours and probably more. Additional resource capability needs to be built into EMS system designs and into regionalization plans.

EMS systems in North Carolina are predominantly funded locally through tax revenue and through fee for service charges. The purse strings are held by local politicians who may not understand or appreciate EMS services and resource constraints. It is critical to educate local elected officials and to integrate these important decision makers into EMS planning efforts both locally and regionally.

B. 9-1-1 Gaps

9-1-1 centers are critical to the infrastructure of EMS services. These essential partners are frequently left completely out of both EMS planning and regionalization efforts. While the care of a stroke patient begins with the 9-1-1 call, in North Carolina, 9-1-1 centers are often not part of the EMS system. They are managed by law enforcement agencies with little medical oversight or direction. Approximately one-third of North Carolina 9-1-1 centers are fully staffed by personnel certified in Emergency Medical Dispatch. The rest are staffed by personnel with little or no formal emergency medical dispatch training. Callers with a medical emergency expect to talk with a trained 9-1-1 professional, and this is often not the case in North Carolina. Additionally, many 9-1-1 centers do not operate from standardized and validated emergency medical dispatch protocols.

C. First Responders Gaps

First responders are personnel trained at a basic level who are dispatched with and arrive prior to the ambulance. Commonly members of local professional or volunteer fire departments, these personnel are critical to the provision of timely and life-saving treatment, such as defibrillation and CPR. Despite their essential position in the overall system of care, they are often not included in medical planning at the local or state level.

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Because first responders operate at a basic level of service, they have a small number of continuing education requirements. Ensuring that first responders are trained to the standard of care for a large number of disease processes requires prioritization of continuing education topics. The continuing education curriculum is established at the local level and may be inconsistent and unfocused. In addition, many small first responder agencies do not consistently participate in quality assurance activities nor are they included in many performance feedback loops. Finally, the approved skill set for first responders does not include important stroke assessment elements such as glucose assessment and stroke screening.

D. Transport Personnel Gaps

In North Carolina, ambulances must be staffed by a minimum of two Emergency Medical Technicians. The state recognizes five levels of pre-hospital certification: Emergency Medical Dispatch (EMD) (for 9-1-1 telecommunicators), Medical Responder (for first responders), Emergency Medical Technician-Basic (EMT), EMT-Intermediate, and EMT-Paramedic. Each of the last four certification levels is ordinal in nature, meaning that each succeeding one implies a higher level of knowledge, skill, and responsibility. The majority of North Carolina's citizens are served at the highest level of skill, EMT-Paramedic; but a few counties (at last count seven) are only able to provide service at the EMT-Intermediate or EMT-Basic level. In several other counties, paramedic services are only available for portions of the duty hours (for example, EMT-Paramedics are only available during the daytime hours and not at night).

Large portions of rural North Carolina are served by volunteer rescue squads and ambulance companies. Many counties have a mix of paid and volunteer staff. For some counties, there is a lack of consistency between the medical services (and care) provided by career versus volunteer personnel. Not only is the level of service and training inconsistent but there is no standardization in the ratio of service resources to population need. Some states (e.g., Wisconsin) have mandated service standards to ensure a consistent level of service statewide and to provide local governments with guidelines for EMS service provision. North Carolina has many counties with insufficient EMS services to meet the population needs. Whether this is due to insufficient local financial resources or poor understanding of the needs for EMS services at the local government level is not clear.

While the NC OEMS has developed quality performance tools for acute stroke care, local EMS systems seem to have little understanding of their powers and of how to use them. Few EMS systems consistently generate toolkits. The EMSPIC has deployed a quality assurance expert to each and every system to assist them in generating a toolkit and reviewing with them the elements of quality assurance and how to develop a performance improvement loop. Nevertheless, EMS has historically not understood quality assurance nor do EMS systems have experience in developing performance improvement initiatives. Most are simply trying to survive and keep ambulances on the road. Planning for improvement and measuring performance are

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relatively new concepts for EMS. This is not unique to North Carolina and is an EMS culture problem that will take time and patience to change.

Delivery of stroke care could benefit from standardization across the state. There is a need for agreement on a common EMS stroke screening tool. Some systems use the Cincinnati Pre-hospital Stroke Scale; some use the Los Angeles Stroke Screen; and some use home grown unvalidated screens. Standardization of assessment tools would allow for more effective EMS-hospital communication. Finally, there are no statewide continuing education standards for stroke in terms of number of recommended hours or content.

E. Transport Gaps

The only realistic hospital destination for stroke patients in rural areas is the local community hospital. Initial transport to a primary stroke center is not feasible for smaller communities as it could take a local unit out of service for six or more hours depending on the distance traveled. Once assessed and stabilized, these patients frequently require transportation to a higher level of care or a primary stroke center. Local EMS systems are not staffed for interfacility transports, leaving specialty care services as the logical option for transportation services.

Getting patients to the most appropriate facility for stroke care is often onerous and confusing. There is a lack of support for secondary transport to tertiary care centers as well as confusion over who is responsible for transport from critical access hospitals to tertiary care facilities. While the NC OEMS has developed and mandated use of triage destination plans, there is no state designation for stroke capable hospitals. The NC OEMS has provided a definition of stroke capable hospitals, but, at present, there is no mechanism for verifying the self-defined capability.

F. Transitions of Care Gaps

Transitions of care is an area of particular concern for patient safety and consistent delivery of care. The intersection between EMS and the emergency department (ED) is particularly difficult. The emergency department is a busy and often chaotic place. EMS should provide EDs with ample lead time through pre-notification to allow appropriate resources to be assembled to provide timely care. EMS may prove to be a valuable resource for EDs in planning for efficient and effective stroke system of care plans. Additionally, EMS is not integrated into the wider range of stroke planning such as public stroke education, primary prevention, and post-stroke discharge services in the community. Finally, the Health Information Portability and Accountability Act, which limits the amount of information that can be shared between health care providers, limits the ability of health care facilities to provide focused and directed feedback to EMS services.

G. Why Do These Gaps Exist? What are the Barriers?

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It is important to begin with an understanding that these gaps in care do not exist from a lack of passion or desire to deliver excellent patient care. The funding of EMS systems is a primary reason for many of the identified gaps in the Pre-Hospital section of this plan. EMS systems are funded from fee-for-service revenue collections and tax dollars. Many fire departments are funded from fire taxes. EMS systems are funded out of the general tax revenue and must compete with other essential services such as schools, libraries, and law enforcement for funding.

Stroke is a subtle disease process in many instances. Many other medical events, such as hypoglycemia, can masquerade as a stroke, making recognition difficult. There is a lack of common tools and language across specialties. Stroke outcomes are not dramatic or concrete. It is hard to demonstrate that EMS made a real difference and/or contributed to a positive outcome. Finally, stroke is not as common as other events such as chest pain or trauma.

H. Recommendations

The following recommendations will move North Carolina's system of stroke care forward. Several of these recommendations are directed at infrastructure needs and funding. While these recommendations are not stroke-specific, they are essential to managing this time-critical illness that causes so much morbidity and mortality in North Carolina.

1. Mandate that 9-1-1 centers:

- a. Be staffed by personnel certified in Emergency Medical Dispatch;
- b. Operate from standardized and validated Emergency Medical Dispatch protocols;
- c. Be integrated into EMS Systems; and
- d. Have medical direction and oversight from a physician certified in Emergency Medicine or Emergency Medical Services.

2. For first responders, provide:

- a. Statewide standardization of the stroke continuing education curriculum;
- b. A place for first responders at the planning table for stroke systems of care;
- c. Additional stroke skill sets including glucose check and administration of stroke screens; and
- d. Quality assurance mechanisms including closure of the feedback loop for stroke.

3. Transport personnel should be:

- a. Certified at the highest level of service possible;
- b. Provided with consistent, standardized stroke continuing education;
- c. Educated in quality assurance and performance improvement activities; and
- d. Utilize a consistent stroke assessment tool and common language that all can understand.

4. The ratio of EMS service resources to population needs should be standardized across the state.

5. Fund EMS at a level consistent with their mission.

6. Build capacity across the state for secondary transport of stroke patients from critical access hospitals to stroke capable facilities.

7. Identify stroke centers and stroke capable hospitals utilizing standard definitions and validated designations.

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- 8. Integrate EMS into planning for stroke systems of care and regionalization planning.**

REFERENCES

None

APPENDICES

Stroke EMS Triage and Destination Plan