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POLICY BRIEF

Time is Brain: Reducing Delays in Access to Treatment Through Streamlined Pre-Hospital Care

Summary

- Stroke care is time sensitive: when it comes to stroke care, time is brain.
- Delays in recognizing stroke symptoms, dispatching EMS to the stroke patient, and transporting the stroke patient to the most appropriate hospital can all lead to worse outcomes for rural patients.
- Better stroke management protocols and training are needed to ensure rapid recognition of stroke, efficient management of acute stroke symptoms, and timely transport of the patient to the most appropriate hospital.

Issue

Early identification of stroke and rapid treatment are key to reducing stroke morbidity and mortality. Rural strokes can be particularly devasting because of the time and distance required to access definitive care. Delays of care can begin in the prehospital setting, resulting from a lack of access to prehospital stroke assessment tools, lack of real-time routing and bypass data, and variability in accessibility of EMS and training of EMTs.

Background

Stroke care is inherently time sensitive: When it comes to stroke care, time is brain. For every minute that a stroke is occurring, a patient will lose two million neurons and two weeks of disability free life.[1,2] Timely initiation of treatment is essential to reduce morbidity and mortality and to ensure that stroke treatments can be effective. Stroke care is costly (averaging $59,900 per patient per year for acute stroke treatment)[3], but every minute saved between identification of stroke and definitive care yields a $1000 savings on medical costs.[4] In the United States, rural counties have a 30% higher stroke mortality rate than urban counties[5] which can be attributed in part to delays in access to care.

Time-sensitive conditions disproportionately impact rural patients where geographic barriers in access to Emergency Medical Services (EMS) and hospitals increases that interval between the onset of symptoms and medical treatment. Rural stroke patients are less likely to receive thrombolysis or endovascular therapy, both of which are time-limited in their window of efficacy.[5] Further, rural patients experience higher in-hospital mortality for stroke when compared to urban patients.[5]

Delays in access to treatment for rural patients can have multiple causes. Many rural areas lack adequate access to EMS (whether due to distance or staffing shortages) which leads to long 911 response times. Some rural hospitals lack the infrastructure and services required to rapidly

diagnose and treat stroke, requiring rural patients to be transported or transferred to more distant hospitals to access the appropriate care.

Current Status

The 2025 New York State Department of Health Statewide Adult and Pediatric Treatment Protocols outline the state protocols for stoke management by EMS.[6,7] The guidelines address recognition of stroke symptoms, management of acute symptoms, and selection of the optimal destination hospital. Delays in any of these elements are likely to lead to poorer outcomes for rural patients. Many of the state protocols defer to regional guidance; this allows for a locally-sensitive response but also introduces ambiguity and leads to differences in interpretation and implementation within and across regions.

Considerations

Not all hospitals are capable of providing all levels of treatments for stroke. New York State has a three-tiered Stroke Designation System[8] that classifies Primary Stroke Centers, Thrombectomy-ready Stroke Centers, and Comprehensive Stroke Centers. Many rural areas of the state lack any stroke-designated hospitals. State EMS protocols for stroke state that EMS should transport stroke patients preferentially to the nearest stroke designated center even if this means bypassing one or more non-stroke designated hospitals.[6,7] However, the EMS guidelines also defer to local or regional care pathways to account for regional variation in accessibility of services. The lack of clear, specific and organized statewide guidelines for transport to the appropriate stroke center complicates the selection of the most appropriate destination hospital for stroke patients. Ambiguity or disputes about the most appropriate destination hospital can lead to delays in access to treatment, especially in the most remote and underserved areas of the state.

Policy Recommendations

- *Improve rapid identification and assessment of stroke*
    - Public health campaigns can help to improve layperson recognition of stroke symptoms and help them communicate stroke concerns to 911 dispatchers.
    - 911 dispatcher training should include strategies for recognizing layperson descriptions of stroke symptoms.
    - A single, standardized stroke assessment tool should be implemented across the state to reduce variation in how stroke symptoms are collected, assessed, and reported.
- *Improve selection of the most appropriate facility for stroke treatment*
    - Clear algorithms should be provided to select the most appropriate destination hospital, which may include non-stroke designated hospitals when the time-distance exceeds a safe threshold.
    - A live map application should be adopted for use by EMS, Hospitals, and 911 dispatchers to help select an appropriate destination hospital based on capabilities, but also considering traffic and weather factors, and hospital capacity.
    - All stroke-designated hospitals should be required to participate in real-time data sharing for stroke capabilities, wait times, and door-to-care times.

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