

Telestroke Area Overview/Statement of Problem

The burden of stroke in North Carolina is one of the highest in the nation. From 2003-2007, there were 27,927 stroke hospitalizations in the state (Huston, 2010). The number and high costs of stroke have made it incumbent to improve the number of patients receiving appropriate treatment. Unfortunately, there are barriers for treatment of acute stroke, namely time and access.

The only FDA approved medical treatment for ischemic stroke, Tissue Plasminogen Activator (tPA), has an accepted time window of three hours (National Institute of Neurological Disorders [NINDS], 1995) which has recently been expanded to four and one-half hours. A new science advisory in 2009 from the American Heart Association/American Stroke Association (AHA/ASA) recommends use of tPA between three and four and one-half hours to treat acute ischemic stroke. The advisory updated the previous guidelines of three hours mainly on the basis of findings from the European Cooperative Acute Stroke Study 3 (ECASS 3) which showed a benefit from thrombolytic therapy in patients treated between three and four and one-half hours after symptom onset. Therefore, it is not only vital that patients or witnesses identify the symptoms of stroke promptly, but they must quickly arrive at a facility capable of providing the appropriate treatment. To truly understand this barrier, one must consider the issue of access to care as it relates to geographical constraints across North Carolina. Recent research has revealed that only 83 counties out of the state's 100 have a hospital that provides general acute care (Goldstein, 2010). Looking more specifically at access to stroke specialists in North Carolina, only 54% of the population has access to an acute care hospital with a neurologist on staff 24/7 (Goldstein, 2010). Access to specialists is an important factor in obtaining the best treatment for stroke patients. Also, research has shown that even patients who have not been administered thrombolytics have better outcomes if a neurologist is involved in their treatment (Schwamm, 2009a). Thus, increasing the number of patients who receive early treatment by neurologists is a key to realizing the best patient outcomes.

As new reforms in health care are enacted, there is increased interest in improving the quality of care provided to patients. Additionally, improvements in technology have made telemedicine a viable option for increasing access for patients. Therefore, it is not surprising that telestroke would be a recommended model for improving stroke care in North Carolina, given the aforementioned difficulties experienced in the treatment of acute stroke patients.

Telemedicine is “the use of telecommunications technologies to provide medical information and services” (Perednia, 1995). The more specific term regarding such technologies for treating acute stroke is “**telestroke**”. **Telestroke**, for the purposes of this report, is defined as: “the process by which electronic, visual, and audio communications (including the telephone) are

NC Stroke System of Care Plan December 2010

used to provide diagnostic and consultation support to practitioners at distant sites, assist in or directly deliver medical care to patients at distant sites, and enhance the skills and knowledge of distant medical care providers” (Deshpande, 2008).

Several large scientific reviews supporting the use of telestroke services to enhance the quality of acute stroke care have been published, and their main findings are summarized in the following text. The American Stroke Association published *A Review of the Evidence for the Use of Telemedicine Within Stroke Systems of Care* in 2009 (Schwamm, 2009a). This comprehensive review details the high level of evidence that supports the use of telemedicine in the setting of acute stroke. In this review, the team of investigators provided recommendations based upon the quality of the scientific studies. The highest level recommendations (Class 1) are listed below, the other recommendations and details of this review can be found in the original article located in Appendix L. Importantly, their specific evidence-based recommendations refer to high quality video teleconferencing (HQ-VTC) as the preferred modality of patient interaction for performing the NIHSS assessment or providing medical opinions regarding the use of tPA as part of telestroke services.

A. Class 1 Recommendations Summary

1. Regarding the quality of performing an appropriate assessment of a stroke patient by telemedicine technologies:

Class 1, Level A Recommendation: The NIHSS-telestroke examination, when administered by a stroke specialist using High-Quality Videoconferencing (HQ-VTC)¹⁵ is recommended when a NIHSS-bedside assessment by a stroke specialist is not immediately available for patients in the acute stroke setting. This assessment is comparable to a NIHSS-bedside assessment.

2. Regarding the use of telemedicine to consult on the administration of tPA:

Class 1, Level B Recommendation: It is recommended that a stroke specialist using the HQ-VTC provide a medical option in favor of or against the use of intravenous tPA in patients with suspected acute ischemic stroke when on site stroke expertise is not immediately available.

3. Regarding the use of teleradiology systems to make CT Scan images available for review by consultants involved in caring for the acute stroke patient:

Class 1, Level A Recommendation: 1) Teleradiology systems approved by the FDA (or equivalent organization) are recommended for timely review of brain CT scans in patients with suspected acute stroke; and 2) Review of brain CT scans by stroke

¹⁵ HQ-VTC is characterized by the use of dedicated, high-quality, interactive, bidirectional audiovisual systems, coupled with the use of teleradiology for remote review of brain images.

NC Stroke System of Care Plan December 2010

specialists or radiologists using teleradiology systems approved by the FDA (or equivalent) is useful for identifying exclusions for thrombolytic therapy in acute stroke patients.

Class 1 Level B Recommendation: When implemented within a telestroke network, teleradiology systems approved by the FDA (or equivalent) can be effective in supporting rapid imaging interpretation in time for thrombolysis decision making.

Other published work which supports the use of telemedicine systems for acute stroke include the *Guidelines for the Early Management of Adults with Ischemic Stroke* and the *Recommendations for the Establishment of Stroke Systems of Care* which, collectively, call for the use and implementation of telestroke systems to expand access to stroke expertise in resource-limited geographic areas (Schwamm, 2005; Adams, 2007). The scientific evidence supporting these guidelines and ideal care models are well detailed in the American Heart Association's Policy Statement titled "*Recommendations for the Implementation of Telemedicine within Stroke Systems of Care*" (Schwamm, 2009b). This document provides the evidence supporting that: 1) The number of acute stroke patients who received tPA has significantly increased due to the existence of telestroke systems; 2) Performing stroke severity scales via videoconferencing is both reliable and feasible; 3) Remote supervision of tPA administration is reliable and feasible; and 4) Functional outcomes and mortality measures among those treated with the assistance of remote consultations are equivalent to those among patients treated with on-site consultants (Schwamm, 2009b). In addition, telestroke systems have been shown in a randomized controlled trial to enhance the accuracy of decision making regarding tPA administration compared to traditional phone only communications systems (Meyer, 2008).

The supportive evidence and the likely continued improvements in existing technologies have the potential to increase the availability of the stroke care experts needed to guide the safe initiation of thrombolytic therapy as well as other existing and forthcoming therapies for acute stroke patients. Policy makers, members of the health care work force, and patient advocacy groups should support strategies to develop IT infrastructure and reimbursement for these necessary systems of care.

Although more widely deployed in other parts of the country, telestroke services for acute stroke in North Carolina are currently limited to two networks, a hospital unaffiliated with either established network which is utilizing third party telestroke services as part of their acute stroke care, as well as another health system engaging in a single site telestroke pilot project (Appendix M, NC Telestroke Networks). Wake Forest University Baptist Medical Center (WFUBMC) and Forsyth Medical Center (FMC), both in Winston-Salem, NC, created telestroke networks in November 2009. WFUBMC currently has six affiliated network hospitals, and FMC has three. These telestroke networks use different technologies and approaches to provide 24/7 telestroke services. The main difference between their approaches is that WFUBMC utilizes a robotic technology (In Touch, Santa Barbara, CA) to accomplish the HQ-VTC link and uses Vascular Neurologists on the faculty at Wake Forest University Health System (WFUHS) to perform the

NC Stroke System of Care Plan December 2010

consultations. FMC utilizes a cart-based HQ-VTC system (Specialists On Call (SOC), Westlake Village, CA), and consultations are out-sourced to neurologists provided by their vendor (SOC).

Besides the two telestroke networks, Carolina East Hospital in New Bern, NC utilizes equipment and consultative services offered by Specialists on Call to obtain telestroke consultations. There is also a single site pilot project underway between Carolinas Medical Center (CMC) and one of their affiliated hospitals, Cleveland Regional Medical Center, in Shelby, NC. A staff neurologist will be providing the hospital with telestroke consultations using a cart-based HQ-VTC system weekdays from 8:00 AM to 5:00 PM. Many other hospitals and health systems have indicated plans to develop telestroke networks or to access such services, and there are indications that there may be six to eight telestroke networks deployed across North Carolina within one to two years.

There are many options for accessing and implementing telestroke services in North Carolina. As above, the use of HQ-VTC is considered the standard for acute stroke services. Many commercial vendors provide such equipment, including In Touch, Specialists on Call, and Reach, among others. It is also possible to develop "home-grown" systems. There are a variety of choices or options to be considered when creating a telestroke network, or seeking telestroke services, such as whether the consultative service will be provided by local/in-house physicians, outsourced to a third party, or a combination of the two, as well as the credentials of the consultant (Vascular Neurology vs. General Neurology).

Telestroke is a market-driven service in North Carolina which has influenced the current deployment as well as financial considerations related to this service. As a result, the costs to hospitals for telestroke services depend on many factors and range from virtually no cost to a monthly or annual fee paid to a hub hospital or to a third party provider.

Telestroke consultations are currently included with other telemedicine services in regard to reimbursement by Centers for Medicare and Medicaid Services (CMS). Telestroke consultations are reimbursable by CMS if, as for other telemedicine services, it is provided in a rural county as defined by the US Office of Management and Budget. Those counties considered as metropolitan are not eligible for reimbursement of telemedicine, and thus telestroke, services. This dichotomy serves to greatly limit the geographical areas where telestroke is a reimbursable service in North Carolina.

Outside of telestroke for acute stroke care, there are several projects across North Carolina that address other areas of the stroke systems of care. These primarily focus on the rehabilitation and recovery of stroke patients. First, in 2009, the University of North Carolina at Chapel Hill (UNC) partnered with Southeastern Regional Medical Center and Native Angels Home Care and Hospice to form the Stroke Telemedicine Access Recovery (STAR) Project, a three-year research project in Robeson County which is providing treatment for stroke patients in post-stroke rehabilitation. Additionally, the University of North Carolina at Greensboro (UNC-G) has developed a telerehabilitation program for speech-language patients including stroke survivors. Telemedicine is also being used elsewhere to provide outpatient care and consultations, which could also have great value in the prevention and management of stroke.

NC Stroke System of Care Plan December 2010

Many states have developed telemedicine systems. These include, but are not limited to, Georgia, Maine, Massachusetts, New York, and Virginia. Some of the most recent legislation is from Virginia. Their state legislature passed Va. Code §38.2-3418.16 April 7, 2010. This legislation focused on reimbursement as a means of improving the use of telemedicine (Appendix N, Virginia Acts of Assembly – 2010 Session); however, Virginia evaluated the effects of this mandate prior to its passage and determined that it was supported widely, would not significantly affect premiums, and would serve to remove one of the larger barriers to using telemedicine (Joint Legislative Audit and Review Commission of the Virginia General Assembly [JLARC], 2009) (Appendix O). In addition, Maryland created a task force in order to establish a statewide telemedicine system this year. Thus, many states have either enacted legislation for telemedicine or are in the initial stages of this process.

Each state has employed a variety of means to achieving a statewide telemedicine system. Issues that have to be addressed include the administrative structure, the technological infrastructure, reimbursement, and legal and regulatory barriers. It has been common for legislative and regulatory changes to be necessary. Furthermore, the degree of involvement of the state government has varied from essentially no involvement, to public-private partnerships, to more significant administration and oversight.

Telestroke services offer a viable mechanism to help alleviate gaps in access to 24/7 stroke expertise in hospitals across North Carolina, especially in the context of the evaluation and treatment of acute strokes. Telestroke consultative services alone should not be considered adequate for a hospital to be able to provide acute stroke care. There are many other elements required for a hospital to be capable of providing effective acute stroke treatment such as infrastructure, personnel, protocols, and services. Additionally, hospitals that provide telestroke consultative services for acute stroke should be certified by the Joint Commission as a Primary Stroke Center or another equivalent designation.

B. Recommendations

1. Advocate for more uniform geographic coverage of telemedicine reimbursement from CMS irrespective of the designation as metropolitan or rural site of service.

Utilize expertise on the Stroke Advisory Council (SAC) to identify current and potential partners who can assist with locating resources and leveraging support for national organizations such as the American Telemedicine Association (ATA) in endeavors to change the current reimbursement system of CMS. Refer to Appendix P for copies of six briefs sent by the ATA to the current administration.

2. Execute a public policy initiative to pass a North Carolina telemedicine reimbursement bill that precludes all third-party payers from denying

reimbursement to hospitals and physicians if they provide telemedicine services by remote presence using HQ-VTC technologies.

Identify existing partners such as the American Heart Association/American Stroke Association, the NC Medical Society, and the NC Hospital Association in order to begin drafting policy. Additionally, other partnerships should be explored such as collaboration on regulations or legislation with the NC Department of Insurance.

3. Promote telestroke as a model to improve access to stroke expertise and acute treatment in North Carolina.

Engage various stakeholders such as the NC Hospital Association, the Office of Emergency Medical Services (OEMS), and the North Carolina Healthcare Information and Communications Alliance (NCHICA) to encourage hospitals with limited capacity for acute stroke care to adopt a telestroke mechanism. The system adopted by these facilities should be built on best practices using guidelines from the American Academy of Neurology and the American Stroke Association. Additionally, it should foster quality improvement, thus ensuring hospital awareness of essential stroke quality improvement programs such as the NCSCC or AHA's Get With The Guidelines – Stroke. Finally, in promoting this effort, opportunities for funding and demonstration projects for hospitals should be explored.

4. Promote the practical use of telestroke across the overall continuum of the stroke system of care in North Carolina, from the acute event through rehabilitation.

While there is currently limited use of telestroke services outside of the acute care setting in NC, it is recommended that partnerships be developed to foster increased usage. This includes identifying current capabilities of facilities across the state. Ultimately, it would also require more infrastructure and interoperability of systems; however, there are many partners who could expand these endeavors. These include, but are not limited to, the North Carolina Health Information Exchange (NCHIE) Board and NCHICA. The Department of Health and Human Services can be engaged to assist with educating potential users and may provide avenues for evaluation of the stroke care system. Finally, it is anticipated that the SAC, including all subcommittees, will regularly communicate regarding opportunities to promote telemedicine and to increase the capacity of the Telestroke Work Group.

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NC Stroke System of Care Plan December 2010

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**NC Stroke System of Care Plan
December 2010**

APPENDICES

The American Stroke Association, *A Review of the Evidence for the Use of Telemedicine Within Stroke Systems of Care*

NC Telestroke Networks

Virginia Acts of Assembly – 2010 Session

Joint Legislative Audit and Review Commission of the Virginia General Assembly (JLARC), 2009

Joint Legislative Audit and Review Commission, Copies of Six Briefs Sent By the American Telemedicine Association (ATA) to the Current Administration