

# State Primary Stroke Center Policies in the United States: Rural Health Issues

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## Abstract

**Objective:** To explore the relationship between state primary stroke center (PSC) designation policy implementation and access to optimal stroke care for residents of rural areas. **Materials and Methods:** Primary data were collected during the period September 2008–August 2009. Following content analysis of state PSC policies, four case study states were selected for fieldwork, in part for state rural healthcare access challenges. Variables included the barriers and facilitators to PSC designation policy implementation. More than 100 semistructured stakeholder interviews were conducted by teams of researchers. Large-group meetings were also observed. Interview summaries were reviewed by stakeholders for accuracy and completeness. **Results:** The consistent finding in all study states was that PSC designation and state policy implementation in rural areas are unlikely for a variety of reasons, including lack of financial resources for telemedicine, difficulty maintaining neurology coverage, and emergency departments unable to administer thrombolytics. Findings indicate recognition by states about the need for stroke-care public policy specific to telemedicine in rural areas. **Conclusions:** Although state PSC designation policies raise awareness of rural issues, designation policy alone cannot overcome the obstacle of rural access to optimal stroke care. States must be technology-ready, and providers need to embrace e-health and telemedicine to ensure coordination of care for stroke victims in rural areas. More important is that state policy makers should provide rules and regulations to encourage PSC hospitals to use telemedicine and “proxy credentialing” to support their affiliated rural facilities.

**Key words:** telemedicine, policy, technology

## Introduction

Rural healthcare access for stroke care is an ongoing issue.<sup>1</sup> Twenty percent or more of the U.S. population lives in remote and/or rural areas. Compared with their urban area resident counterparts, residents of rural areas have poorer health, more chronic conditions like heart disease, and less access to healthcare services.<sup>2</sup> Several federal and state initiatives address this

issue, including designation of areas and states at risk for poor rural healthcare access. For example, the U.S. Department of Health and Human Services (DHHS) Health Resources and Services Administration Shortage Designation Branch has designated, as of September 30, 2009, thousands of Health Professional Shortage Areas and Medically Underserved Areas and Populations, mostly in rural areas and encompassing millions of U.S. residents.<sup>3</sup>

Identifying “at-risk” rural areas by measuring primary care physician shortages and designating medically underserved populations is useful in the assessment of access to basic healthcare services. However, based on the literature<sup>4</sup> and our own qualitative research for this project, these measures of access to primary care fail to capture the critical shortage of specialists, which is especially problematic for optimal acute stroke treatment.

Our fieldwork in four case study states, including Florida, Massachusetts, New Mexico, and New York, with mature primary stroke center (PSC) policies suggests that stroke care for rural residents requires systematic management. Stroke care in rural hospitals often does not adhere to accepted guidelines for diagnosis and treatment, including the use of tissue plasminogen activator (tPA).<sup>5</sup> It is less about numbers of hospitals and primary care physicians in rural areas and the availability of specialists and more about coordinated stroke care.<sup>6,7</sup>

Current American Heart Association (AHA) Stroke Council guidelines for acute ischemic stroke patients recommend that tPA be administered to eligible patients within 3–4.5 h of symptom onset.<sup>8</sup> This guideline necessarily encourages rapid diagnosis, emergency response, and care of stroke patients. Stroke is not easily diagnosed with one simple test, which is why most states have adopted scales of test results, such as the Cincinnati Stroke Scale among others, to assist emergency personnel and primary care providers with diagnosis.<sup>9</sup>

Stroke patients living in rural areas likely lacking timely access to neurological specialists to make a confirmed stroke diagnosis may require sophisticated technology for optimal clinical care. The literature shows that primary care physicians and even rural hospital emergency room physicians are often ill-equipped and sometimes hesitant to treat more acute and difficult-to-diagnose conditions, including time-sensitive illnesses such as ischemic stroke.<sup>10</sup> Thus a stroke patient's acute condition requires patient access to specialists and subspecialists for proper treatment—often absent from the rural health services landscape. Although stroke patients in rural areas often receive suboptimal care, strategies are evolving for better stroke care for residents of rural areas, including improved emergency transport and wider dispersion of access to clinical trials of new treatment modalities.<sup>11</sup> We also note recent changes to federal policy for telemedicine “proxy” credentialing that should promote better state policy for rural residents.<sup>12</sup>

State policy for stroke center designation consistent with rural emergency care for stroke is needed. Without access to hospitals staffed with neurologists equipped to diagnose acute ischemic stroke and administer tPA, health outcomes of rural stroke patients often suffer. Helicopter and airplane transport can ease this problem somewhat, but air travel is often too expensive for poorer rural areas and can present cost problems for insurance providers and patients. Priorities for state policy concerning technology include integrating data collection and health information exchange with continuing assistance, oversight, and intervention by state emergency medical services agencies.<sup>13</sup>

Among other organizations and agencies, the AHA/American Stroke Association (ASA) advocates an expansion of current uses of health information technology (HIT) in general and telemedicine specifically to improve treatment of stroke.<sup>14</sup> In addition to telemedicine's most frequent use in diagnosis and immediate treatment of acute ischemic stroke, the AHA/ASA recommends expanding the usage of this technology to provide general neurological assessment and primary prevention of stroke, notification and response of emergency medical services personnel, hospital-based subacute stroke treatment and secondary prevention, and rehabilitation and therapy. Current data indicate that only 55% of Americans have access to PSCs within 60 min of their home.<sup>15</sup> These data, coupled with current AHA/ASA guidelines regarding time limits for allowable tPA administration (even expanded in recent months), serve to highlight the critical opportunity for the expansion of telemedicine in the care of acute ischemic stroke incidence for Americans living in rural areas.

In the United States, many rural-urban stroke systems of care that use telemedicine conform to the hub-and-spoke network model. This model incorporates a major hospital staffed with stroke specialists as the urban "hub" and then a series of rural and possibly underserved hospitals as the "spokes." Neurological specialists at hubs then provide consults and treat patients at spoke hospitals via various telemedicine technologies. Telestroke networks confer benefits to stroke patients, including immediate round-the-clock access to specialists, timely treatment decisions, and improved outcomes. Providers and medical centers also benefit through improved alignment with best practices and standards of care, improved efficiency, increased training and education for staff at the remote locations, and enhanced patient satisfaction.<sup>11,16</sup>

Since the advent of tPA, acute stroke patients in rural areas have benefited from an increase in the utilization and acceptance of telemedicine.<sup>17</sup> Unlike some acute medical episodes, time to treatment of stroke with tPA is critical to a patient's outcome. Most hospitals have computerized tomography scan equipment, the equipment needed for preliminary diagnosis of stroke, on site. Because few rural hospitals have neurology services, telemedicine, or telestroke, has emerged as a logical and useful approach to rural access issues for stroke patients. Recent research has shown that telemedicine alone is not enough to improve stroke care because other aspects of state stroke systems of care such as organized stroke units in hospitals also matter.<sup>7</sup> Telemedicine use and effectiveness depend on internal needs of a healthcare system and its providers and the collaboration between the many internal and external providers needed to coordinate optimal care for stroke victims.<sup>16</sup>

When an acute stroke patient arrives at an emergency room on a timely basis, there is sometimes a reluctance to administer tPA without a complete patient history and medical records. Our fieldwork in four case study states also supports this observation. This concern has been eased by improvements in the area of telemedicine related to electronic medical record keeping. When patient records are stored electronically, receiving and consulting physicians gain easier and timely access to vital information and may remotely exchange information with other treating physicians.

Federal and state initiatives for HIT are relatively recent but are evolving quickly. In 2004, the Bush administration outlined a 10-year timeline for widespread adoption of HIT. Multitudes of agencies and organizations promote the use and acceptance of HIT, making it difficult to measure rates of success. Despite the absence of widespread adoption of technology and HIT standards, state efforts and federal financial support of HIT efforts at the state level are robust and ongoing. For example, in 2009 the American Recovery and Reinvestment Act of 2009 (ARRA) earmarked \$20 billion for HIT research by states, with a focus on electronic record keeping and telemedicine. With respect to electronic record keeping, the DHHS notified State Medicaid Directors that ARRA funds were being used to establish a program that provides payment to medical providers who "adopt and become meaningful users of electronic health records (EHR)."<sup>18</sup> In addition to ARRA funds for EHR, in August 2009 the White House announced the creation of two grant programs intended to promote the creation and extension of EHR systems nationwide. With initial funding of approximately \$598 million, the HITECH Priority Grants Program is targeted at providing funding for training medical professionals and support staff involved in the administration of primary care services to help them implement, use, and maintain EHR systems. According to the DHHS, "[t]he HITECH Act clearly prioritizes access to health information technology for historically underserved and other special-needs populations, and use of that technology to achieve reduction in health disparities."<sup>19</sup> The HITECH Priority Grants Program also includes \$564 million to fund the efforts of states and state designed entities at developing and advancing mechanisms to facilitate health information exchange across the healthcare system through the use of certified EHR.<sup>19</sup>

In addition to stimulus funds available to states, in March 2010 the U.S. Department of Agriculture announced the continuation of grants available pursuant to the Distance Learning and Telemedicine (DLT) Program to improve access to medical care for rural Americans. The DLT Program will administer 100% grants ranging from \$50,000 to \$500,000 to eligible organizations working to extend and improve the delivery of medical benefits into rural areas through the use of telemedicine.<sup>20</sup>

Successful HIT in rural areas is dependent on communications access. In 2007, the Federal Communications Commission broadened its Rural Healthcare initiative to provide up to \$417 million in funding to eligible communities to improve the quality of care of rural patients through its Rural Healthcare Pilot Program (RHCPP). The RHCPP is aimed at increasing patient access to care via telemedicine and supporting the transfer of electronic medical records by

funding the development of broadband networks in these communities. The RHCPP explicitly promotes the expansion of telehealth and expands funding to include broadband networks *between* urban and rural areas—an area not previously eligible for funding.<sup>21</sup>

Successes in the field of stroke-based telemedicine and the new sources of funding for the expenses associated with the necessary technology demonstrate that this technology is well situated and should become a more important part of, but not the sole answer to, state policy for stroke center designation.

## Materials and Methods

In 2008, the U.S. Centers for Disease Control and Prevention contracted with the National Association of Chronic Disease Directors for a 2-year program evaluation of the implementation of state policies aimed at the development of PSCs. The purpose of the project was to increase knowledge about state policy concerning PSCs, given that performance measures and criteria for stroke care have been well established and with strong consensus. Our early 2009 review of publicly available information on government Web sites and in scholarly publications regarding state policies, including legislation, regulations, and other formal enactments, revealed that 18 states had either enacted policy to encourage the development of PSCs or were actively considering doing so during the then-current year. Of these states, five had at least 3 years of PSC policy implementation experience, including Florida, Massachusetts, New Jersey, New Mexico, and New York. We selected four of these states for detailed fieldwork and analysis to better understand the policy processes, successes, and challenges experienced with policy implementation expected to improve health outcomes for stroke victims. We omitted New Jersey from our fieldwork, not for lack of interesting policy implementation issues but because of our focus on geographic variability of states and access to healthcare for rural areas.

Continuous days of fieldwork were spent in New Mexico in March 2009, in New York in May 2009, and in Massachusetts in June 2009. Two trips within 2 weeks in July 2009 were required to complete interviews in Florida, primarily because of the decentralized nature of the healthcare delivery system and geographic dispersion of the stakeholder group. The fieldwork methodology was the same for each state and included (1) selection of members of the research team for the visit, (2) preparation for the site visit, including scheduling appointments and meetings, (3) researcher preparation, including requesting and reviewing documents and data, (4) completion of the site visit, (5) documentation of preliminary findings and field notes, (6) follow-up to gather additional data, and (7) production of the case study report. Two members of the research team—the project director and senior research associate—participated in all interviews in New Mexico, New York, Massachusetts, and the first trip to Florida. During the second trip to Florida, the senior research associate was accompanied by other research team members. More than 100 semi-structured field interviews were conducted, and a wide variety of public documents and reports were reviewed both before and after the site visits. Large-group meetings were also convened with stakeholders in each of the states, in some cases via conference call

because of the geographical spread of the state or the difficulty of assembling such a diverse group for this purpose. In each of the interviews (and to the extent possible in large-group meetings and conference calls) stakeholders were asked to identify barriers and facilitators to implementation of PSC policy.

Study participants were selected through a variety of methods. We used a snowball sampling technique: Multiple stakeholders from the state health agency and the AHA/ASA in each state would recommend individuals as pertinent to the project. The resulting study participants were queried using a common interview guide and data-gathering format that also permitted customization to particular state contexts. The research team agreed to interview all persons identified as being able to offer important input, including representatives of healthcare delivery, government, advocacy groups, telemedicine firms, and pharmaceutical companies. We scheduled 113 interviews, and with 109 completed, we experienced a 96% response rate. All state stakeholders interviewed were informed of the interview protocol in advance.

Table 1 shows the distribution of completed interviews by the self-described primary role or title of the participant. For the sake of simplicity we categorize stakeholders by their primary role but note that many of the interviewees held multiple roles. For example,

**Table 1. Summary of Completed Interviews by Stakeholder Type**

STAKEHOLDER TYPE	NUMBER OF INTERVIEWS				
	FL	MA	NM	NY	TOTAL
Academics			2		2
AHA/ASA	2	3	2	1	8
Emergency department physicians/nurses	5	1	4		10
Emergency medical services	11	3	5	1	20
Hospital representatives/advocates				1	1
Insurance/payors/advocates			1	1	2
Neurologists and other medical specialists	9	2	4		15
Telemedicine	4	1	1	4	10
Special populations			1		1
State Department of Health	1	3	3	4	11
State regulatory agency	1	3		1	5
Stroke coordinators in hospitals	9	3	3	1	16
Stroke survivors		1	3		4
Other	1		2	1	4
Total	43	20	31	15	109

AHA/ASA, American Heart Association/American Stroke Association.

a self-described neurologist in Florida is also an academic, an advocate of telemedicine, and active in the AHA/ASA. This count does not include several hundred attendees at a full-day Stroke Conference sponsored by the New York Department of Health that we attended, 30 plus members of the Florida State Stroke Advisory Board sponsored by the AHA/ASA who participated in a 90-min conference call with us, or 30 plus members of the Massachusetts Primary Stroke Service Steering Committee to the Division of Healthcare Quality who met with us. Individuals who participated in these latter three events could not be identified by name and are not included in the counts below. Their input was, however, included in our results and discussion.

On completion of the fieldwork researchers prepared individual field notes and reviewed recommended documents, articles, and Web-based information identified during interviews. All project team members reviewed the field notes and identified areas of interest and concern for follow-up or clarification. The research team and the Centers for Disease Control and Prevention met in person or by phone monthly to discuss emerging themes. The findings concerning “rural healthcare issues” emerged during these meetings.

## Results

Definitive technological advances and consensus on resource requirements for stroke care have affected state policy initiatives, especially as this subject relates to residents of rural areas where PSCs are least likely to exist. At the onset of the project it was clear that some states have been more successful than others in legislating and implementing PSC policy, including developing guidelines for linking the several domains needed to prevent strokes and render optimal stroke care.

The consistent finding in all study states is that where there are rural hospitals they are unlikely to have PSC or primary stroke service designation. The rural facilities tend (1) to lack financial resources for equipment and staffing of acute stroke care services, (2) to have difficulty maintaining neurology coverage throughout the day and on weekends, and (3) to have emergency departments that are somewhat less willing to administer tPA. Yet our findings also indicate the recognition by state agencies about their role in developing options for stroke care for rural residents and their support of rural hospitals to effectively treat stroke patients by having the resources needed to be “stroke ready.” One of our key findings in the case study states is that they work diligently to form policy around the most recent science and best practice models especially to address rural resident access to optimal care.

## Discussion

Continued advances are certain in the field of HIT and telemedicine, especially for stroke care. Yet technology cannot solve all issues associated with acute stroke diagnosis and care in rural regions. Diverse populations and transport issues even within rural areas will remain challenges for the foreseeable future. Nevertheless, technology offers a particularly appealing choice as a state and federal policy priority. With substantial funding developments in

relaxed hospital telemedicine privileges (e.g., “proxy credentialing”<sup>12</sup>), support from the federal and state governments, and continued development of privately owned telemedicine companies, the HIT industry should continue its ascent and increase in popularity and utilization. Rural stroke care is well poised to take advantage of advances in the field of HIT. The field has demonstrated success thus far with respect to patient outcomes in telemedicine situations and enjoys solid policy support from the Centers for Medicare & Medicaid Services, DHHS, and the AHA/ASA. Given the acute stroke narrow treatment window, rural stroke patients will reap outsized benefits from improved and expanded HIT. Telemedicine has achieved success with treatment of acute stroke patients, but supporters and champions must continue promoting refinement of state policies, including better designation of stroke-ready facilities and more funding for telestroke.

Research has shown that funding is a primary obstacle to the success of telemedicine, including capital expenditures associated with initial implementation and training as well as ongoing costs related to keeping the technology updated. Our fieldwork demonstrates that states with several years of PSC designation experience recognize that healthcare providers need resources for rapid emergency response. Beyond the provision of resources to promote the use of such technology, policy makers would do well to encourage private insurers to adapt to the changing acute stroke care landscape and where possible assist with the burden of red tape associated with complex but improving credentialing processes given recent changes in Centers for Medicare & Medicaid Services policies concerning telemedicine.<sup>12</sup> State policy makers should provide rules and regulations to encourage hospitals to use telemedicine and “proxy credentialing” to support their affiliated rural facilities.

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No competing financial interests exist.

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