North Carolina Stroke Prevention and Treatment Facilities Survey
rtPA Therapy for Acute Stroke

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Background and Purpose—North Carolina is situated in the “stroke belt” region of the United States, an area of the country with a particularly high incidence of cerebrovascular disease. The North Carolina Stroke Prevention and Treatment Facilities Survey was carried out to determine the availabilities of a variety of stroke prevention and treatment services throughout the state. The purpose of the present study was to determine how widely recombinant tissue-type plasminogen activator (rtPA) has been adopted for the treatment of patients with acute ischemic stroke and to determine the characteristics of the medical facilities in the state offering this therapy.

Methods—A single-page survey was mailed to the medical center directors of each inpatient medical facility in North Carolina. Data collected included questions related to the availability of selected basic and advanced diagnostic tests and procedures, stroke prevention and treatment programs and services (community stroke awareness program, acute stroke identification program, acute stroke team, stroke rtPA protocol, stroke care map, neurologist), and facilities (Stroke Acute Care Unit or equivalent).

Results—Responses were obtained from all 125 inpatient medical facilities in North Carolina. rtPA stroke protocols were adopted in 54 facilities located in 46 of the state’s 100 counties. Seventy-four percent of the state’s population resides in counties with hospitals providing rtPA treatment. Compared with facilities not offering rtPA, those with rtPA protocols more commonly sponsored stroke community awareness programs (41% versus 17%, \( P = 0.003 \)) and more frequently had an organized stroke team (31% versus 8%, \( P = 0.001 \)), used stroke care maps (56% versus 17%, \( P < 0.001 \)), had rapid stroke identification programs (33% versus 6%, \( P < 0.001 \)), or had a Stroke Acute Care Unit or its equivalent (33% versus 7%, \( P < 0.001 \)). Neurologists were available in 78% of the facilities offering rtPA compared with 38% in facilities without rtPA protocols (\( P < 0.001 \)).

Conclusions—These data show that this new therapy for ischemic stroke is potentially available to a high proportion of the state’s citizens based on their county of residence. However, other services that may improve outcomes and reduce stroke-related costs (eg, stroke teams, stroke units, care maps) are not being widely used, even in centers providing treatment with rtPA. The simple methodology used in this study is potentially applicable in other states and permits targeting of selected centers for development of stroke treatment capabilities. (Stroke. 1998;29:2069-2072.)

Key Words: cerebrovascular disorders ■ data collection ■ emergency medical services ■ plasminogen activator, tissue type ■ thrombolytic therapy

The prevention and treatment of stroke is undergoing a revolution. Much of this excitement has been prompted by the advent of recombinant tissue-type plasminogen activator (rtPA) therapy for selected patients with acute ischemic stroke.1 Although there has been some controversy surrounding the use of rtPA,2-5 emerging data6-9 suggest that judicious use of this drug in a variety of community settings results in outcomes similar to those found in the clinical trial that led to the approval of rtPA by the Food and Drug Administration. In addition to rtPA, other hyperacute therapies are currently under development. A variety of healthcare organizations are stressing the need for public education concerning stroke symptoms and for the development of medical systems capable of rapidly identifying, triaging, and treating patients with acute stroke.

North Carolina lies in the country’s “stroke belt,” and cerebrovascular disease is a major public health problem in the state.10 The purpose of the present study was to determine how widely rtPA has been adopted for the treatment of patients with acute ischemic stroke by North Carolina hospitals and the characteristics of the medical facilities offering this therapy.
Subjects and Methods
A list of all inpatient medical facilities in North Carolina (n = 125) was obtained from the Division of Facilities. In January 1998, a 1-page survey (Table 1) was mailed to the medical directors of each facility, with a cover letter explaining its purpose signed by the study principal investigator and the deputy director of the state Department of Health and Human Services. Nonresponders were sent a second mailing, again asking them to complete the survey. The survey was then sent by fax to those not responding to the second mailing, with telephone follow-up as necessary.

Several categories of data were collected relating to the availability of basic and advanced stroke prevention and treatment facilities and programs. These included a variety of diagnostic studies useful in the management of patients with cerebrovascular disease and a series of programs and services (community stroke awareness programs; the performance of carotid endarterectomy; the availability of an emergency department, an acute stroke team, hospital stroke care map, an acute stroke identification program, stroke rtPA protocol, Stroke Acute Care Unit or its equivalent; and whether the hospital had a neurologist).

χ² statistics were used to compare the characteristics of facilities offering or not offering rtPA treatment. Population data were obtained from the last available census, which permitted calculation of the proportion of the state's population residing in counties with hospitals providing treatment with rtPA and other stroke-related services.

Results
Responses were obtained from every inpatient facility in North Carolina, providing comprehensive statewide data. These 125 facilities were located in 84 of the state's 100 counties.

Treatment with rtPA was offered in 54 hospitals in 46 counties (Figure). Seventy-four percent of the state's population resides in counties with these facilities. Table 2 compares the characteristics of medical facilities providing rtPA treatment with those not offering this therapy. Hospitals with stroke rtPA protocols had more inpatient beds (mean,
programs (less than 20% of hospitals not offering rtPA treatment had these types of programs). Based on these data, the need for local public education, particularly within stroke belt communities, needs further emphasis.

Once a patient reaches the hospital, acute stroke care is expedited by a mechanism for rapid patient identification and treatment.17,18 However, only one third of the hospitals with rtPA protocols also had rapid patient identification programs. In addition, the treatment of patients with acute stroke by an organized team19,20 and the use of stroke care maps21,22 have been associated with shorter hospital stays, fewer complications, and improved functional outcome. Although only high-volume centers can support a dedicated stroke unit,19,21–27 the provision of organized stroke care can be accomplished in many settings. Stroke care maps were used in just over one half of the hospitals with rtPA protocols, and stroke teams were organized in one third. Significantly fewer hospitals without rtPA protocols had these programs. Given their apparent benefit, more widespread adoption of organized care systems should be advocated.

These data show that rtPA, a new therapy for ischemic stroke, is potentially available to a high proportion of the North Carolina’s citizens based on their county of residence. However, other services that may improve outcomes and reduce stroke-related costs (eg, stroke teams, stroke units, care maps) are not being widely used, even in centers providing treatment with rtPA. The simple methodology employed in this study is applicable in other states and permits targeting of selected centers for development of stroke treatment capabilities.

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