In 2000, members of the Brain Attack Coalition published
recommendations for the establishment of primary stroke
centers (PSCs), and in 2005 they published recommendations
for the establishment of comprehensive stroke centers
(CSCs). To improve patient care and outcomes for stroke, the
recommendations suggested that stroke centers should include
acute stroke teams, written care protocols, emergency medical
services integrated with the stroke center, rapid testing
procedures, and continuous improvement processes. Since then,
several certification programs have been developed to identify
hospitals that have established a stroke center that meets
specific criteria for the treatment of stroke.

The Joint Commission, DNV GL, and Healthcare Facilities
Accreditation Program offer certification programs for PSCs
and CSCs. PSC certification was designed to meet the Brain
Attack Coalition’s recommendations for improved stroke care
through access to dedicated, specialized personnel and proce-
dures. CSCs must meet all of the requirements for certification
as a PSC, plus additional requirements meant to help manage
complex stroke cases. These include the requirements to meet
specified volumes of patients and procedures, be capable of
providing advanced imaging on-site at all times, provide after
hospital care coordination for patients, have dedicated neurological
intensive care unit beds for complex stroke cases, participate
in stroke research, and collect standard performance measures.

Several studies have analyzed the effectiveness of stroke
centers in the care and management of patients with stroke.
In New York state, patients with ischemic stroke admitted to a
designated stroke center experienced a lower 30-day all-cause
mortality rate and greater use of thrombolytic therapy. Also,
among Medicare beneficiaries aged ≥65 years, hemorrhagic
stroke patients treated at Joint Commission certified PSCs had
lower 30-day mortality rates. PSCs and CSCs have shown
improvements in stroke performance measures, the collection
of which is required to maintain certification.3

The maps displayed here show the locations of Primary and
Comprehensive Stroke Centers certified by The Joint
Commission, DNV GL, and Healthcare Facilities Accreditation
Program as of May 2015 overlaid on stroke hospitaliza-
tion rates and discharge status by county among Medicare
beneficiaries aged ≥65 in the United States (2010–2012). Rates are age standardized and spatially
smoothed to enhance the stability of rates in counties with small
populations. Counties with the highest stroke hospitalization
rates (13.5–24.1 per 1000 total beneficiaries) were located pri-
marily in the Southeast for both total beneficiaries and black ben-
eficiaries (Figure 1). CSCs (n=113) are located in 32 states and
the District of Columbia. Most are located in urban areas, and
more than two thirds are located east of the Mississippi River.
Concentrations of certified PSCs (n=1197) are located along
the East and West coasts, Texas and near Chicago and Atlanta
(Figure 2). The percentage of stroke hospitalizations in which
Medicare beneficiaries died before discharge from the hospital
was highest in counties in the Northeast and West. Many coun-
tries with high stroke hospitalization rates or high percentages
of Medicare beneficiaries who died before discharge from the
hospital do not have a stroke center located nearby.

These maps were created using the Interactive Atlas of
Heart Disease and Stroke—a web-based tool created by the
Division for Heart Disease and Stroke Prevention within the
Centers for Disease Control and Prevention and are the first
ever to show stroke centers certified by all 3 organizations.
The Atlas enables users to easily create and share county-level
maps that display heart disease and stroke data by sex, race/
ethnicity, and age group. Users can also create maps depicting
an array of county-level social and economic data, including
poverty, education, and urban/rural status. In addition, users
can overlay locations of a variety of healthcare facilities and
congressional boundaries on maps they create, view two maps
at a time to compare indicators, and generate a report for a
county or group of counties. The Interactive Atlas of Heart
Disease and Stroke is a valuable tool for public health profes-
sionals, healthcare providers, researchers, community leaders,
and others interested in monitoring trends, generating hypoth-
eses, setting research priorities, and planning patient services.
http://www.cdc.gov/dhdsp/maps/atlas

Disclosures

None.

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Key Words: geographic mapping ■ health services accessibility ■ stroke

Figure 1. Comprehensive Stroke Centers 2015, with stroke hospitalization rates among Medicare beneficiaries and stroke hospitalization rates among black Medicare beneficiaries only, 2010 to 2012.

Figure 2. Primary Stroke Centers 2015, with stroke hospitalization rates among Medicare beneficiaries and percentage of stroke hospitalizations in which Medicare beneficiaries died before discharge from the hospital, 2010 to 2012.
Mapping Primary and Comprehensive Stroke Centers by Certification Organization
Linda J. Schieb, Michele L. Casper and Mary G. George

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