



# Stroke in Georgia 2022

**Report on Stroke in Georgia 2022, as Required by the  
Coverdell-Murphy Act, Georgia SB549, Amended by Georgia HB853  
Compiled by the Georgia Coverdell Acute Stroke Registry  
Georgia Department of Public Health  
December 2022**

## Background

### *Why should we care about stroke in Georgia?*

- **Georgia's age-standardized stroke death rate in 2020 was 10.8 percent higher** than the national average<sup>1</sup>
- **In 2020, Georgia had the 12<sup>th</sup>-highest stroke death rate** in the U.S.<sup>1</sup>
- **Stroke is the fourth-leading cause of death** in Georgia (**4,821 stroke deaths in 2020**)<sup>1</sup>
- **In 2020, about 19 percent of Georgia stroke deaths were premature**, i.e. among persons under the age of 65 years.<sup>1</sup>
- **In 2020, the age-adjusted stroke death rate for Blacks in Georgia was 52.2 per 100,000 population, which was 30 percent higher than** the rates for Whites.<sup>1</sup>
- Stroke is a **leading cause of disability**.<sup>2</sup> Treatment of eligible stroke patients with the drug recombinant tissue plasminogen activator (rtPA) can reduce disability by 30 percent, but the drug needs to be administered in the first three hours after symptom onset.<sup>3</sup>
- **In 2021, Georgians had more than 22,600 stroke hospitalizations**
  - The median charge per hospitalization was around **\$50,533**
  - The total stroke-related hospitalization charges **were over \$2.0 billion in Georgia**
- **Georgia is in the "Stroke Belt,"** an area in the southeastern U.S. with stroke death rates that are approximately **30 percent higher than** the rest of the U.S. The coastal plains of Georgia are in the "buckle" of the Stroke Belt, an area with stroke death rates about **40 percent higher** than the rest of the nation.<sup>4</sup>
  - The higher death rates seen in the Stroke Belt can be collectively explained, in large part, by demographic and socioeconomic factors and the prevalence of stroke risk factors and chronic diseases like diabetes and hypertension.<sup>5</sup>
- **In 2021, 67 percent** of adult Georgians knew all three signs of stroke – facial droop, arm weakness, and slurred speech – and the importance of calling 911 immediately.
- **Georgia stroke patients have higher prevalence rates for stroke-related risk factors versus adult Georgians.** The 2021 Georgia Behavioral Risk Factor Surveillance System (GA-BRFSS) and 2021 GCASR data showed:<sup>6</sup>

Risk Factor	Acute Stroke Patients (%) <sup>a</sup>	Adult Georgians (%) <sup>b</sup>
Hypertension	77.7	36.6
Dyslipidemia	45.3	36.6
Diabetes Mellitus	35.4	12.3
Coronary Artery Disease/Prior Myocardial Infarction	19.4	6.6
Atrial Fibrillation/Flutter	13.5	--
Smoking	29.9	15.0

a: GCASR 2021      b: 2021 BRFSS data

### Coverdell-Murphy Act Required Reporting

To assure that patients are receiving the appropriate level of care and treatment at each level of stroke center, Georgia’s Coverdell-Murphy Act (GA-CMA), Senate Bill 549, enacted in 2008 and amended in 2016 (House Bill 853), requires the reporting of stroke care related data to the Georgia Department of Public Health (DPH) as part of the Georgia Coverdell Acute Stroke Registry (GCASR).<sup>7,8</sup> The required data elements are used to generate performance measures that help to monitor the quality of stroke care among the designated stroke centers. GCASR currently has 84 participating acute care hospitals, of which 8 are designated as comprehensive, 40 as primary, 3 as thrombectomy-capable, and 24 as remote treatment stroke centers (Map 1). In 2021, the designated hospitals received **94** percent of Georgians admitted with acute stroke across the state.

### Summary of Data Findings

Based on 2008-2019 hospital discharge data from 19 designated Remote Treatment Stroke Centers, acute ischemic stroke patients **treated after the hospitals were designated had 48 percent lower odds of in-hospital death** compared to patients **admitted when the hospitals were not participating** in the Georgia Coverdell Acute Stroke Registry, which aims to improve the quality of stroke care.

From 2019 to 2021, Georgians received high quality stroke care consistently.

- **Nine out of ten** eligible ischemic stroke patients received the clot-busting drug rtPA intravenously.
- About **50 percent** of the patients received rtPA in the first 45 minutes of hospital arrival.

Numbers for other quality indicators, such as venous thromboembolism prophylaxis, antithrombotic medication, stroke education and discharge on appropriate medication, remained **consistently high (above 90 percent)** from 2019 to 2021.

However, **less than 60 percent** of stroke patients were transported to hospitals by EMS and the proportion of patients who arrived at hospital in the first two hours of symptom onset remained persistently **below 40 percent**, indicating the need to raise public awareness to identify stroke in the community, call 911, and transport patients to designated centers rapidly.

## Discussion

The Centers for Disease Control and Prevention (CDC) funds the Georgia Coverdell Acute Stroke Registry (GCASR) to improve stroke systems of care in Georgia. Participating EMS agencies and hospitals are working to strengthen the existing relationships and developing new approaches to deliver the best stroke care possible at all levels of the patient care continuum. Currently, 43 EMS agencies and 84 acute care facilities in Georgia, of which 24 hospitals were designated as Remote Treatment Stroke Centers, participate in the GCASR, and they already have a major impact on the lives of Georgians by reducing mortality and limiting disability from stroke.<sup>9,10</sup>

Shortening the time between symptom onset and hospital arrival is crucial for better patient outcomes. Currently, 66 percent of patients arrived at hospitals two hours or later after symptom onset and 41 percent transport themselves to a hospital; therefore, it is critical that all stakeholders exert a concerted effort to increase public awareness about the signs of acute stroke and the importance of calling 911 for a swift transfer of patients to one of the designated and appropriate level stroke centers.

Moreover, we must continue to improve stroke prevention and treatment across the state by reducing the prevalence of stroke risk factors in Georgia. Adults 55 years and older have a higher risk for stroke.<sup>11</sup> Based on the National Center for Health Statistics projection, 16 percent of Georgia residents are expected to be 65 years and older by the 2030.<sup>12</sup> Thus, the number of Georgians affected by stroke is expected to rise over the next few years.

Stroke is a major cause of disability, and adequate post-hospital care contributes significantly to reducing late complications of the acute incident. It is imperative, therefore, to monitor the quality of post-hospital stroke care. To this end, the GCASR collaborates with EMS agencies to strengthen community paramedicine program.

**Table 1. Performance Measures for Designated Stroke Centers, GCASR, 2019-2021**

Performance Measure	2019	2020	2021
<b>Reach</b>			
% of state acute stroke admissions in designated GCASR hospitals	90	93	94
<b>Public Awareness</b>			
% of patients presenting to ED with acute stroke or TIA that arrive by EMS	55	59	59
% of patients with acute stroke or TIA who arrive at ED in less than 2 hours from time last known to be well (LKW)	36	34	34
<b>Quality of In-hospital Stroke Care</b>			
<b>Early phase</b>			
% of stroke patients who have brain imaging performed within 25 minutes of hospital arrival	72	77	72
% of ischemic stroke patients whose disease severity was assessed and documented using NIH stroke scale score	91	93	94
% of acute stroke patients who had dysphagia screening	88	87	87
% of acute stroke patients who received venous thromboembolism prophylaxis the day of or the day after admission	93	94	92
% of acute ischemic stroke patients who arrived at the hospital within 2 hours from time LKW and received IV rtPA within 3 hours of time LKW	93	94	92
% of eligible of acute ischemic stroke patients who received IV rtPA within 60 minutes of hospital arrival	86	89	89
% of ischemic stroke patients who received antithrombotic medication by the end of hospital day two	98	97	97
<b>Later and at discharge</b>			
% of ischemic stroke patients with medical history of smoking who received smoking cessation advice or counseling	98	99	99
% of ischemic stroke patients who were prescribed antithrombotic at discharge	99	99	99
% of ischemic stroke patients with atrial fibrillation who received anticoagulation therapy	98	97	98
% of eligible ischemic stroke patients who were discharged on statin medication	99	99	99
% of stroke patients who were assessed for rehabilitation services	99	99	99
<b>Patient Education</b>			
% of patients and/or caregiver that received educational materials during the hospital stay addressing all stroke education areas <sup>1</sup>	95	97	96
<b>Aggregate</b>			
% of patients with defect-free <sup>2</sup> in-hospital care	79	78	75
<b>Total number of patients</b>	23,846	22,625	24,012

Abbreviation: **ED** – Emergency Department; **EMS** – Emergency Medical Service; **GCASR** – Georgia Coverdell Acute Stroke Registry; **LKW** – Last Known Well; **NIH** – National Institute of Health; **TIA** – Transient Ischemic Attack; **rtPA** – Recombinant tissue plasminogen activator

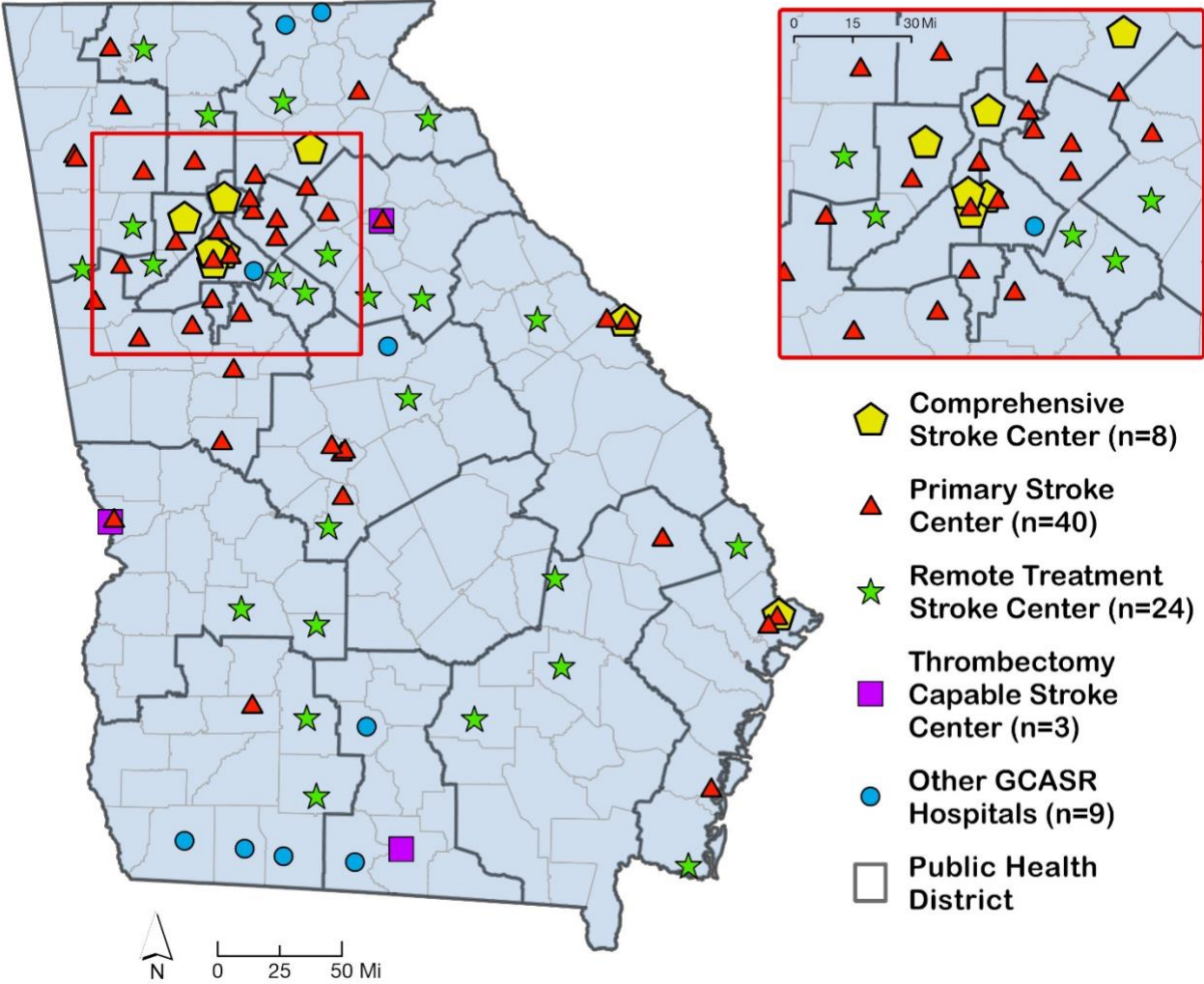
<sup>1</sup>Stroke education areas include activation of EMS, follow-up after discharge, medication adherence, risk factors, and sign and symptoms of stroke.

<sup>2</sup>Defect-free care is defined as the delivery of care meeting all quality indicators for which a patient is eligible.

## References

1. Centers for Disease Control and Prevention, National Center for Health Statistics. Underlying Cause of Death 1999-2020 on CDC WONDER Online Database, released in 2021. Data are from the Multiple Cause of Death Files, 1999-2020, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Accessed at <http://wonder.cdc.gov/ucd-icd10.html> on Jan 4, 2023.
2. Centers for Disease Control and Prevention (CDC). Prevalence and most common causes of disability among adults: United States, 2005. *MMWR Morb Mortal Wkly Rep.* 2009;58:421–426. Available at <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5816a2.htm>
3. The National Institute of Neurological Disorders and Stroke rt-PA Stroke Study Group. Tissue plasminogen activator for acute ischemic stroke. *N Engl J Med.* 1995; 333:1581-1588. Available at: <http://www.nejm.org/doi/full/10.1056/NEJM199512143332401#t=article> doi: 10.1056/NEJM199512143332401
4. Virani SS, Alonso A, Aparicio HJ, Benjamin EJ, Bittencourt MS, Callaway CW, et al; on behalf of the American Heart Association Council on Epidemiology and Prevention Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics—2021 update: a report from the American Heart Association. *Circulation.* 2021; 143(8):e254-e743. doi: 10.1161/CIR.0000000000000950.
5. Liao Y, Greenlund KJ, Croft JB, et al. Factors Explaining Excess Stroke Prevalence in the US Stroke Belt. *Stroke.* 2009;40:3336-3341. Available at: <http://stroke.ahajournals.org/content/40/10/3336.full> (<https://doi.org/10.1161/STROKEAHA.109.561688>)
6. Georgia Behavioral Risk Factor Surveillance System Data 2021. Chronic Disease, Healthy Behaviors, and Injury Epidemiology, Georgia Department of Public Health. For more information: <http://dph.georgia.gov/georgia-behavioral-risk-factor-surveillance-system-brfss>
7. Georgia Coverdell-Murphy Act. SB 549, Section 31-11-116. 14 May 2008, Official Code of Georgia Annotated, 2008. Available at: <http://www.legis.ga.gov/Legislation/20072008/85749.pdf>
8. Amendment to Georgia Coverdell-Murphy Act. House Bill 853, 26 April 2016. Accessed on Dec 15, 2017 at: <http://www.legis.ga.gov/Legislation/en-US/display/20152016/HB/853>
9. Ido MS, Bayakly R, Frankel M, Lyn R, Okosun IS. Administrative data linkage to evaluate a quality improvement program in acute stroke care, Georgia, 2006-2009. *Prev Chronic Dis.* 2015;12:E05. doi: 10.5888/pcd12.140238.
10. Ido MS, Okosun IS, Bayakly R, Clarkson L, Lugtu J, Floyd S, et al. Door to intravenous tissue plasminogen activator time and hospital length of stay in acute ischemic stroke patients, Georgia, 2007-2013. *J Stroke Cerebrovasc Dis.* 2016;25(4):866-71. doi: 10.1016/j.jstrokecerebrovasdis.2015.12.025.
11. Ralph L. Sacco R, Emelia J. Benjamin EJ, Joseph P. Broderick JP, Mark Dyken M, J. Donald Easton JD, William M. Feinberg WM, et. Al. Risk Factors. *Stroke.* 1997;28:1507-1517. Available at <http://stroke.ahajournals.org/content/28/7/1507.full> (<https://doi.org/10.1161/01.STR.28.7.1507>)
12. Population Projections, United States, 2004–2030, by state, age and sex, on CDC WONDER Online Database, September 2005. Accessed at <http://wonder.cdc.gov/population-projections.html> on Jan 4, 2022.

# Acute Care Hospital Participants Georgia Coverdell Acute Stroke Registry, December 2022





**Definitions:**

**Recombinant tissue plasminogen activator (rtPA):** FDA-approved clot-busting drug for stroke. This drug can reduce disability by 30 percent in stroke sufferers if given to eligible patients within 3 hours of symptom onset.

**Anticoagulation and Antithrombotic Medications:** Medications that reduce blood clotting.

**Atrial fibrillation:** A disorder resulting in an irregular and often rapid heart rate. It predisposes to blood clotting and increases the risk of stroke, coronary heart disease and other heart-related complications.

**Door-to-Needle Time:** Time elapsed from when an eligible stroke patient arrives at the hospital to when rtPA is administered. Eligible patients must receive rtPA within 3 hours of symptom onset.

**Dysphagia Screening:** Screening for difficulty in swallowing. This identifies patients who need targeted treatment to improve their ability to swallow, so they do not aspirate or take fluid into the lungs. Aspiration of fluid can lead to pneumonia.

**Hemorrhagic Stroke:** A stroke caused by a blood vessel rupturing and bleeding in the brain. Hemorrhagic strokes are often fatal.

**Ischemic Stroke:** A stroke caused by a clot or blockage in a blood vessel supplying blood to the brain. The majority of strokes in Georgia are ischemic.

**Statin medications:** High cholesterol is a risk factor for stroke and statins lower blood cholesterol level.

**Stroke ICD-10 Codes:** GCASR uses the following ICD-10 codes to define stroke and TIA – I60, I61, I63, I64, G45, and G46.

**Venous Thrombosis:** When a blood clot forms in a vein, usually in the leg. If the clot breaks off, it can cause serious complications and even death.

**Know the Signs and Symptoms of Heart Attack and Stroke**

**Heart attack and stroke are life-threatening emergencies. Call 911 if you experience these symptoms.**

**Signs of Heart Attack**

- Chest discomfort. Most heart attacks involve discomfort in the center of the chest that lasts more than a few minutes, or that goes away and comes back. It can feel like uncomfortable pressure, squeezing, fullness, or pain.
- Discomfort in other areas of the upper body. Symptoms can include pain or discomfort in one or both arms, the back, neck, jaw, or stomach.
- Shortness of breath. This feeling often accompanies chest discomfort, but it can occur before the chest discomfort.
- Other symptoms may include nausea, lightheadedness, or breaking out in a cold sweat.

**Signs of Stroke**

- Sudden numbness or weakness of the face, arm, or leg, especially on one side of the body.
- Sudden confusion, trouble speaking or understanding.
- Sudden trouble seeing in one or both eyes
- Sudden trouble walking, dizziness, loss of balance or coordination.
- Sudden, severe headache with no known cause.