



## Background

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

- **Stroke is the fourth-leading cause of death** in Georgia (**3,948 stroke deaths in 2014**)<sup>1</sup>
- **Georgia's age-standardized stroke death rate in 2014 was 16.7% higher** than the national average<sup>1</sup>
- **In 2014, Georgia had the 10<sup>th</sup> highest stroke death rate** compared to other U.S. states<sup>1</sup>
- **In 2014, more than one-fifth (21%) of Georgia stroke deaths were premature**, i.e. among persons under the age of 65 years.<sup>1</sup>
- **In 2014, the stroke death rate for blacks in Georgia was 37% higher than** the rate for whites.<sup>1</sup>
- Stroke is a **leading cause of disability**.<sup>2</sup> Treatment of eligible stroke patients with the drug Alteplase can reduce disability by 30%, but the drug needs to be administered in the first three hours after symptom onset.<sup>3</sup>
- **In 2014, Georgians had 23,727 stroke hospitalizations**
  - The median charge per hospitalization was **\$29,500**
  - The total stroke-related hospitalization charges **were over \$1.1 billion in Georgia**
- **Georgia is in the "Stroke Belt,"** an area in the southeastern U.S. with stroke death rates that are approximately 20% 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% 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 2014, 16% of Georgia stroke deaths occurred at home.** This suggests that some stroke sufferers and witnesses are **not recognizing stroke events or calling emergency services** quickly enough.

- **Adult Georgians have high prevalence rates for stroke-related risk factors.** The 2015 Behavioral Risk Factor Surveillance System (BRFSS) data showed that:<sup>6</sup>
  - **36%** of adult Georgians had hypertension
  - **36%** had high cholesterol
  - **11%** were diabetic
  - **30%** were obese
  - **28%** were physically inactive
  - **18%** of Georgia adults smoked

### **Coverdell-Murphy Act Required Reporting**

Georgia's Coverdell-Murphy Act (CMA), or Senate Bill 549, enacted in 2008, requires the reporting of specific types of stroke data to the Georgia Department of Public Health (DPH) as part of the Georgia Coverdell Acute Stroke Registry (GCASR).<sup>7</sup> The required elements are in Table 1 in bold, exactly as specified in the law. With exceptions noted for data coming from Georgia Emergency Medical Services (EMS), all data in this report come from GCASR. GCASR currently has 65 participating acute care hospitals, of which 44 are comprehensive or primary stroke centers, and seven are remote stroke treatment centers. Georgia EMS provides data on the number of subjects evaluated and transported to acute care facilities with a presumptive diagnosis of acute stroke. This report covers the years 2013 through 2015. Some data elements specified in the law are not available through GCASR or EMS (see Table 1) and thus are not reported.

### **Summary of Data Findings**

According to available data, Georgians received a consistently high quality of stroke care during 2013 to 2015. The median time from hospital arrival to administration of the clot-busting drug Alteplase to ischemic stroke patients was **shortened from 62 minutes in 2013 to 54 minutes in 2015**. Numbers for many other quality indicators, such as stroke education and discharge on appropriate medication, also improved in Georgia from 2013 to 2015.

In Georgia, from 2013 to 2015:

- The number of patients delivered to hospitals by EMS with a presumptive stroke diagnosis, based on provider impression, **increased by 41%** from 2013 to 2015.
- The number of Georgians receiving acute interventional therapy for stroke, defined as Alteplase administration, **increased by 60%** from 2013 to 2015.

- The median door-to-needle time for Alteplase administration **improved by 12%, decreasing from 61.5 minutes to 54 minutes**. Door-to-needle time refers to the minutes elapsed from when the patient arrives at the hospital to the administration of Alteplase.
- The median length of hospital stay for stroke patients **increased from 3 to 4 days** but the inter-quartile range **remained the same (2 – 7 days)** from 2013 to 2015.
- The percentage of eligible stroke patients who received venous thromboembolic prophylaxis **remained consistently high at  $\geq 95\%$**  from 2013 to 2015.
- The percentage of eligible stroke patients discharged on antiplatelet or antithrombotic medications **remained consistently high at  $\geq 98\%$**  from 2013 to 2015.
- The percentage of eligible atrial fibrillation patients who received anticoagulation therapy **remained consistently high at  $\geq 95\%$**  from 2013 to 2015.
- The percentage of eligible patients who had antithrombotic medication administered within 48 hours of hospitalization **remained consistently high at 97%** from 2013 to 2015.
- The number of lipid profiles ordered **increased by 19%** from 2013 to 2015.
- The percentage of eligible patients receiving dysphagia screening **remained at 87% and 86%** from 2013 to 2015, respectively.
- The percentage of patients who received all five components of the recommended stroke education **progressively increased from 93% to 97%** from 2013 to 2015.
- The percentage of eligible patients receiving help for smoking cessation or with whom smoking cessation was discussed **remained consistently high at 98%** from 2013 to 2015.
- The percentage of eligible patients who were assessed for rehabilitation and for whom a plan for rehabilitation was considered remained **consistently high at  $\geq 98\%$**  from 2013 to 2015.
- The number of hospital-admitted stroke patients who were transported by EMS **increased by 23%** from 2013 to 2015.
- The percentage of eligible stroke patients treated with intravenous Alteplase **increased from 89% to 91%** from 2013 to 2015.
- The percentage of eligible stroke patients who were discharged on cholesterol-reducing medication **increased from 93% to 95%** from 2013 to 2015.

**Table 1. Coverdell-Murphy Act Required Data Elements available via GCASR or Georgia EMS, Georgia, 2013-2015**

<b>Indicator (Statewide)</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>
<b>1. The number of patients evaluated</b> Defined as the total number of incidents which were reported by dispatch or transported by EMS as stroke or transient ischemic attack <i>Data source: Georgia EMS data</i>	12,249	15,507	17,228
<b>2. The number of patients receiving acute interventional therapy</b> Defined as number of stroke patients receiving Alteplase administration	1,053	1,296	1,683
<b>3. The amount of time from patient presentation to delivery of acute interventional therapy</b> Median door-to-needle time in minutes (Interquartile Range)	61.5 (47, 86)	58 (43, 83)	54 (39, 75)
<b>4. Patient length of hospital stay</b> Median length of stay in days (Interquartile Range)	3 (2, 7)	3 (2, 7)	4 (2, 7)
<b>5. Patient functional outcome</b> <i>Not collected; see Table 2 for alternative data</i>	--	--	
<b>6. Patient morbidity</b> <i>Not collected; see Note on page 6</i>	--	--	
<b>7. Deep vein thrombosis prophylaxis given</b> Percent among eligible <sup>o</sup> patients	10,319 95%	10,835 95%	12,780 96%
<b>8. Number of patients discharged on anti-platelet or anti-thrombotic medication</b> Percent among eligible patients	8,570 99%	9,035 98%	10,826 99%
<b>9. Number of patients with atrial fibrillation receiving anticoagulation therapy</b> Percent among eligible patients	1,014 96%	1,100 95%	1,272 96%
<b>10. Patients on which the administration of tissue plasminogen activator was considered</b> <i>Not collected; see Note below</i>	--	--	
<b>11. Antithrombotic medication administered within 48 hours of hospitalization</b> Percent among eligible patients	7,308 97%	7,590 97%	8,970 97%

Indicator (Statewide)	2013	2014	2015
<b>12. Number of lipid profiles ordered during hospitalization</b>	12,509	13,120	14,844
<b>13. Number of screens for dysphagia performed</b> Percent among eligible patients	9,314 87%	9,835 86%	11,316 86%
<b>14. Stroke education provided*</b> Number of patients who received all five components of stroke education by GCASR Percent among eligible patients	5,967 93%	6,262 94%	7,484 97%
<b>15. Number of smoking cessation programs provided or discussed</b> Percent among eligible patients	1,626 98%	1,699 96%	1,971 98%
<b>16. The number of patients assessed for rehabilitation and whether a plan for rehabilitation was considered</b> Percent among eligible patients	10,413 98%	10,939 98%	12,798 99%
<b>17. The number of emergency medical services stroke patients who were transported to the hospital facility</b> Defined as number of patients delivered to hospital by EMS with a presumptive stroke diagnosis based on provider impression <i>Data source: Georgia EMS data</i>	6,211	8,492	9,084
<b>18. The number of emergency medical services stroke patients who were admitted to the facility</b>	7,070	7,769	8,689
<b>19. The number and percentage of stroke cases treated with intravenous or intra-arterial tissue plasminogen activator</b> Percent among IV Alteplase eligible patients	590 89%	674 90%	783 91%
<b>20. The number of patients discharged on cholesterol- reducing medication</b> Percent among eligible patients	6,501 93%	6,826 94%	8,155 95%
<b>Total Patients</b>	<b>15,891</b>	<b>16,732</b>	<b>18,947</b>

⊕ Eligibility for specific care varies and is based on criteria set by the Paul Coverdell National Acute Stroke Registry for measuring the performance of hospitals in stroke patient care.

¥ The five stroke education components are: modifiable risk factors, warning signs and symptoms, activating EMS for stroke, prescribed medication, and follow-up after discharge.

Alteplase: is an intravenously or intraarterially administered recombinant tissue plasminogen activator that helps to dissolve blood clots.

**Note:** Some data elements listed in the Coverdell-Murphy Act are not available via GCASR or Georgia EMS (noted in Table 1) and thus are not reported here. Modification or clarification of the missing elements in the CMA may allow for future reporting on these elements. The GCASR collects some alternative data elements for “patient functional outcome” (Table 2). While these data are not exactly what the CMA stipulates, they are indeed indicators of patient outcomes.

**Table 2. Additional Data from the Georgia Coverdell Acute Stroke Registry, 2013-2015**

Data Element	2013	2014	2015
<b>Ambulatory status of patient at discharge, if documented</b>			
Able to ambulate independently with or without device Percent among eligible patients	7,614 59%	8,524 60%	9,403 57%
Able to ambulate with assistance by another person Percent among eligible patients	3,357 26%	3,511 25%	4,783 29%
Unable to ambulate Percent among eligible patients	1,890 15%	2,088 15%	2,324 14%

## Conclusions

The Georgia Coverdell Acute Stroke Registry is funded by the Centers for Disease Control and Prevention to improve stroke systems of care in Georgia. Participating EMS agencies, hospitals, and rehabilitation centers are working to strengthen the existing working relationship and developing new approaches in pursuit of delivering the best stroke care at all levels of the patient care continuum. Currently, GCASR-participating hospitals account for eighty-eight percent of all Georgia stroke admissions. They have already had a major impact on the lives of thousands across the state by reducing mortality and limiting disability from stroke. Analyses of hospital data indicated that ischemic stroke patients treated at GCASR facilities were less likely to die one year post-discharge than patients treated at non-GCASR facilities.<sup>8</sup> Shortening the time between arrival at a hospital and administration of intravenous Alteplase has been seen to shorten the length of hospital stay.

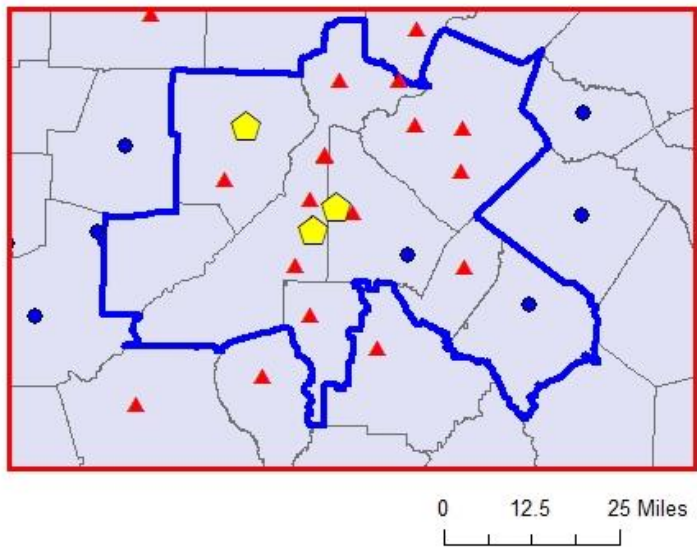
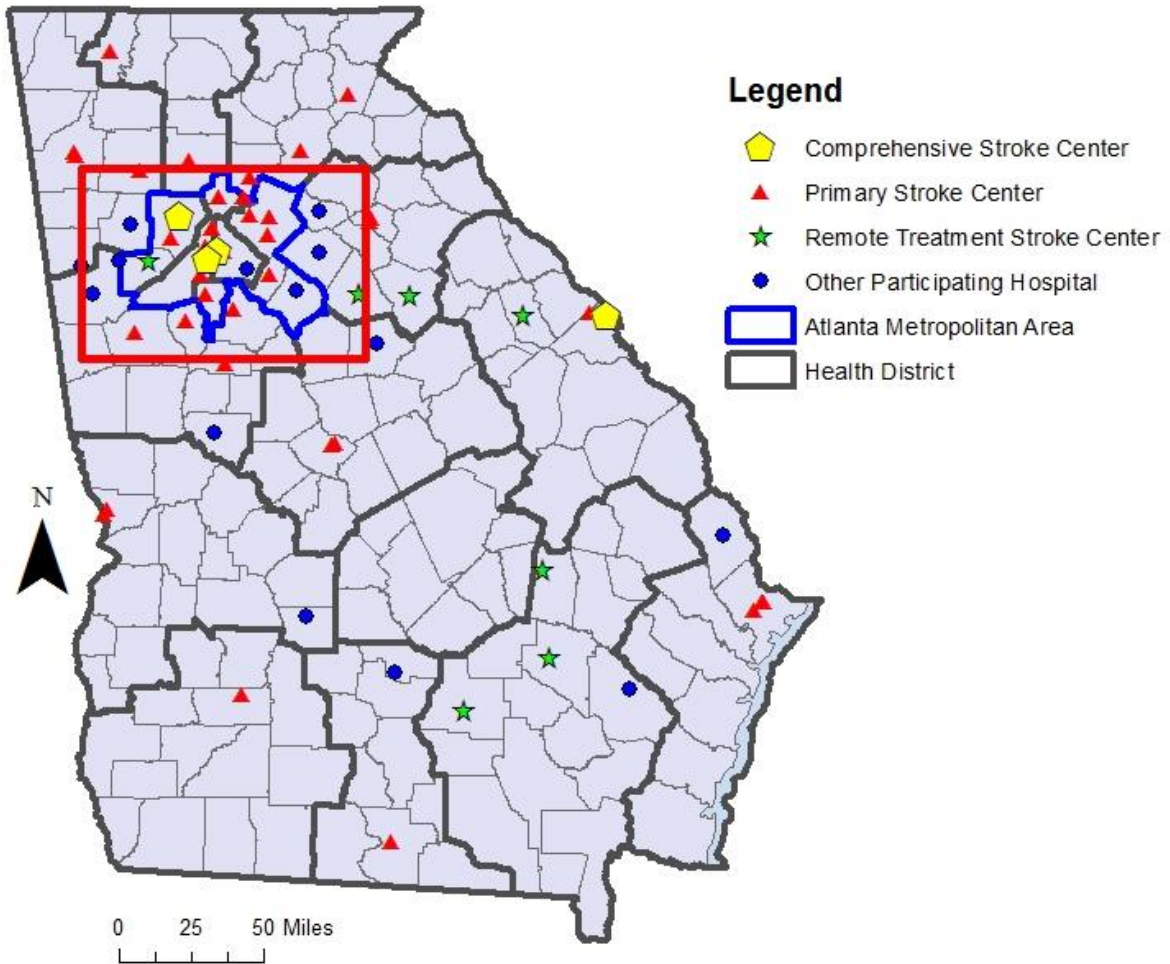
GCASR-participating hospitals are providing quality stroke care as evidenced by the consistently high levels of performance measures. It is imperative to monitor both pre-and post-hospital stroke care. With the current five-year grant from the Centers for Disease Control and Prevention, the GCASR has expanded its reach and is adopting and implementing performance indicators to improve the quality of both pre- and post-hospital care for stroke patients.

Adults 55 years and older have a higher risk for stroke.<sup>9</sup> Based on the U.S. administration of ageing, 16% of the population are expected to be 65 years and older by the 2030.<sup>10</sup> Thus, the number of Georgians affected by stroke is expected to rise over the next decade. This will increase costs, both financially and in terms of productive years of life lost. We must continue to improve stroke prevention and treatment across the state by reducing the prevalence of stroke risk factors in Georgia, and increasing public awareness of stroke signs and symptoms and knowledge to call 911 immediately for stroke. We must also continue to enhance hospital-based acute treatments and post-hospital rehabilitation services, including home care.

## References

1. Centers for Disease Control and Prevention, National Center for Health Statistics. Underlying Cause of Death 1999-2014 on CDC WONDER Online Database, released 2015. Data are from the Multiple Cause of Death Files, 1999-2014, 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 Nov 29, 2016.
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>
4. Mozaffarian D, Benjamin EJ, Go AS, Arnett DK, Blaha MJ, Cushman M, et al; on behalf of the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics—2016 update: a report from the American Heart Association. *Circulation.* 2016;133(4):e38–e360. doi: 10.1161/CIR.0000000000000350.
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>
6. Georgia Behavioral Risk Factor Surveillance System Data 2015. 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. 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 Jan 15;12:E05. doi: 10.5888/pcd12.140238.
9. 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>
10. US Administration on Aging, Department of Health and Human Services. State Projections of Population Aged 65 and over: July 1, 2005 to 2030. Available at: [http://www.aoa.acl.gov/Aging\\_Statistics/future\\_growth/future\\_growth.aspx](http://www.aoa.acl.gov/Aging_Statistics/future_growth/future_growth.aspx) see State-Percent\_65+yr-ageprojections-2005-2030.xls

**Georgia Coverdell Acute Stroke Registry Participating Hospitals (n=65), November 2016**





**Definitions:**

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

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

**Door-to-Needle Time:** Time elapsed in minutes from when an eligible stroke patient arrives at the hospital to when Alteplase is administered. Eligible patients must receive Alteplase 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.

**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.

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

**Lipid Profile:** Panel of tests to measure cholesterol and triglyceride levels. High cholesterol is a risk factor for stroke.

**Alteplase:** FDA-approved clot-busting drug for stroke. This drug can reduce disability by 30% in stroke sufferers if given to eligible patients within 3 hours of symptom onset.

**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.