



## Background

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

- **Stroke is the fourth-leading cause of death** in Georgia (**3,636 stroke deaths in 2012**)<sup>1</sup>
- **Georgia's age standardized stroke death rate is 13.3% higher** than the national average<sup>1</sup>
- **Georgia has the 14<sup>th</sup>-worst stroke death rate** compared to other U.S. states<sup>1</sup>
- Stroke is a **leading cause of disability**.<sup>2</sup> Treatment of eligible stroke patients with the drug tissue plasminogen activator (tPA) can reduce disability by 30%, but the drug needs to be administered in the first three hours after symptom onset.<sup>3</sup>
- Georgians had **23,833 stroke hospitalizations in 2012**
  - The average cost per hospitalization was **\$39,453**.
  - The total stroke-related hospitalization charges **were \$940 million 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>
- Only 44% of Georgia stroke deaths occur in a hospital. This suggests that stroke sufferers and witnesses are **not recognizing stroke events or calling emergency services** quickly enough.
- The 2006 Georgia Stroke and Heart Attack Awareness survey showed that 3.2 million Georgians (46% of Georgia adults) would not be able to recognize and properly respond to a stroke event.<sup>6</sup>
- Nearly **one-fifth (21.6%) of Georgia stroke deaths are premature**, i.e. among persons under the age of 65 years, based on 2012 death data.
- The stroke death rate for blacks in Georgia is **33% higher than** the rate for whites (2012 death records).
- **Adult Georgians have high prevalence rates for stroke related risk factors.** 2013 Behavioral Risk Factors Surveillance System data showed that:<sup>7</sup>
  - **35% of adult Georgians had hypertension;**
  - **38% had high cholesterol;**
  - **11% were diabetic;**
  - **30% were obese;**
  - **27% were physically inactive; and**
  - **19% 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) primarily as part of the Georgia Coverdell Acute stroke Registry (GCASR).<sup>8</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 that currently has 64 participating acute care hospitals. 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 2011 through 2013 in Georgia. Some data elements specified in the law are not available through GCASR or EMS (see Table 1) and thus are not reported here.

## Summary of Data Findings

According to available data, Georgians received a consistently high quality of stroke care during 2011 to 2013. The median time from hospital arrival to administration of the clot-busting drug tPA to ischemic stroke patients was **shortened from 73 minutes in 2011 to 61 minutes in 2013**. Numbers for many other quality indicators, such as stroke education and discharge on appropriate medication, also improved in Georgia from 2011 to 2013.

In Georgia during 2011 to 2013:

- The number of patients delivered to hospitals by EMS with a presumptive stroke diagnosis, based on provider impression, **increased by 27%** from 2011 to 2013.<sup>A</sup>
- The number of Georgians receiving acute interventional therapy for stroke, defined as tPA administration, **increased by 42%** from 2011 to 2013.
- The median door-to-needle time for tPA administration **improved by 16%, decreasing from 73 minutes to 61 minutes**. Door-to-needle time refers to the number of minutes elapsed from when the patient arrives at the hospital to the administration of tPA.
- The median length of hospital stay for stroke patients **decreased by one day** from 2011 to 2013.
- The percentage of eligible Georgia stroke patients who received venous thromboembolic prophylaxis **remained consistently high at 95%** from 2011 to 2013.
- The percentage of eligible Georgia stroke patients discharged on antiplatelet or antithrombotic medications **remained consistently high at 99%** from 2011 to 2013.
- The percentage of eligible atrial fibrillation patients who received anticoagulation therapy **increased slightly from 93% to 96%** from 2011 to 2013.
- The percentage of eligible patients who had antithrombotic medication administered within 48 hours of hospitalization **remained consistently high at 97%** from 2011 to 2013.
- The number of lipid profiles ordered **increased by 28%** from 2011 to 2013.
- The percentage of eligible patients receiving dysphagia screening **increased from 85% to 87%** from 2011 to 2013.
- The percentage of patients who received all five components<sup>\*</sup> of the recommended stroke education **progressively increased from 87% to 92%** from 2011 to 2013.
- The percentage of eligible patients receiving help for smoking cessation or with whom smoking cessation was discussed **remained consistently high at 98% and 97%** from 2011 to 2013.
- The percentage of eligible patients who were assessed for rehabilitation and for whom a plan for rehabilitation was considered remained **consistently high at 97% to 98%** from 2011 to 2013.
- The number of hospital admitted stroke patients who were transported by EMS **increased by 18%** from 2011 to 2013.
- The percentage of eligible stroke patients treated with intravenous tPA **increased from 77% to 89%** from 2011 to 2013.
- The percentage of eligible stroke patients who were discharged on cholesterol-reducing medication **increased from 85% to 91%** from 2011 to 2013.

**Table 1. Coverdell-Murphy Act Required Data Elements available via GCASR or Georgia EMS, Georgia, 2011-2013**

| <b>Indicator (Statewide)</b>  | <b>2011</b>     | <b>2012</b>    | <b>2013</b>    |
|---|-----------------|----------------|----------------|
| <b>1. The number of patients evaluated</b><br>Defined as the total number of incidents which were reported by dispatch or transported by EMS as stroke or transient ischemic attack<br><i>Data source: Georgia EMS data<sup>A</sup></i> | --*             | --*            | 12,652         |
| <b>2. The number of patients receiving acute interventional therapy</b><br>Defined as number of stroke patients receiving tPA administration  | 745             | 995            | 1,060          |
| <b>3. The amount of time from patient presentation to delivery of acute interventional therapy</b><br>Median door-to-needle time in minutes<br>(Interquartile Range)  | 73<br>(54, 102) | 66<br>(50, 88) | 61<br>(47, 86) |
| <b>4. Patient length of hospital stay</b><br>Median length of stay in days<br>(Interquartile Range)   | 4<br>(2, 6)     | 3<br>(2, 6)    | 3<br>(2, 7)    |
| <b>5. Patient functional outcome</b><br><i>Not collected; see Table 2 for alternative data</i>  | --              | --             | --             |
| <b>6. Patient morbidity</b><br><i>Not collected; see Note below</i>   | --              | --             | --             |
| <b>7. Deep vein thrombosis prophylaxis given</b><br>Percent among eligible <sup>o</sup> patients  | 8,275<br>93%    | 9,648<br>95%   | 10,424<br>95%  |
| <b>8. Number of patients discharged on anti-platelet or anti-thrombotic medication</b><br>Percent among eligible patients   | 6,870<br>98%    | 7,890<br>99%   | 8,664<br>99%   |
| <b>9. Number of patients with atrial fibrillation receiving anticoagulation therapy</b><br>Percent among eligible patients  | 763<br>93%      | 923<br>95%     | 1,022<br>96%   |
| <b>10. Patients on which the administration of tissue plasminogen activator was considered</b><br><i>Not collected; see Note below</i>  | --              | --             | --             |
| <b>11. Antithrombotic medication administered within 48 hours of hospitalization</b><br>Percent among eligible patients   | 6,153<br>97%    | 6,722<br>97%   | 7,386<br>97%   |

| Indicator (Statewide)  | 2011          | 2012          | 2013          |
|--|---------------|---------------|---------------|
| <b>12. Number of lipid profiles ordered during hospitalization</b>   | 9,782         | 11,741        | 12,562        |
| <b>13. Number of screens for dysphagia performed</b><br>Percent among eligible patients  | 7,541<br>85%  | 8,805<br>87%  | 9,390<br>87%  |
| <b>14. Stroke education provided*</b><br>Number of patients who received all five components of stroke education by GCASR<br>Percent among eligible patients   | 4,477<br>87%  | 5,461<br>90%  | 6,036<br>92%  |
| <b>15. Number of smoking cessation programs provided or discussed</b><br>Percent among eligible patients   | 1,302<br>98%  | 1,533<br>98%  | 1,648<br>97%  |
| <b>16. The number of patients assessed for rehabilitation and whether a plan for rehabilitation was considered</b><br>Percent among eligible patients  | 8,293<br>97%  | 9,702<br>98%  | 10,512<br>98% |
| <b>17. The number of emergency medical services stroke patients who were transported to the hospital facility</b><br>Defined as number of patients delivered to hospital by EMS with a presumptive stroke diagnosis based on provider impression<br><i>Data source: Georgia EMS data</i> | 5,469         | 6,191         | 6,929         |
| <b>18. The number of emergency medical services stroke patients who were admitted to the facility</b>  | 5,994         | 6,999         | 7,078         |
| <b>19. The number and percentage of stroke cases treated with intravenous or intra-arterial tissue plasminogen activator</b><br>Percent among IV tPA eligible patients   | 410<br>77%    | 513<br>74%    | 593<br>89%    |
| <b>20. The number of patients discharged on cholesterol- reducing medication</b><br>Percent among eligible patients  | 5,001<br>89%  | 5,853<br>91%  | 6,544<br>93%  |
| <b>Total Patients</b>  | <b>12,512</b> | <b>14,846</b> | <b>15,977</b> |

\* Data not available for 2011 and 2012.

⊕ 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.

**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, 2011-2103**

| <b>Data Element</b>  | <b>2011</b>  | <b>2012</b>  | <b>2013</b>  |
|--|--------------|--------------|--------------|
| <b>Ambulatory status of patient at discharge, if documented</b>                          |              |              |              |
| Able to ambulate independently with or without device<br>Percent among eligible patients | 5,824<br>54% | 7,233<br>57% | 7,608<br>59% |
| Able to ambulate with assistance by another person<br>Percent among eligible patients    | 3,194<br>29% | 3,527<br>28% | 3,358<br>26% |
| Unable to ambulate<br>Percent among eligible patients                                    | 1,839<br>17% | 1,970<br>15% | 1,889<br>15% |

## Conclusions

Georgians are disproportionately affected by death and disability from stroke compared to residents in other states. Those who survive, along with their families, endure the lifelong burden of disability, which is often severe. Controlling stroke risk factors and providing timely treatment of acute stroke are effective ways to limit death and disability from stroke.

The 64 hospitals participating in GCASR provide care for more than three-fourth of all Georgia stroke admissions. They emphasize high-quality acute stroke care and have had a major impact on the lives of thousands across the state by limiting the damage and disability from stroke. Analyses of hospital data indicated that ischemic stroke patients treated at GCASR facilities were 1.38 times more likely to receive tPA and significantly less likely to die one year post-discharge than patients treated at non-GCASR facilities.

With an aging Georgia population<sup>9</sup> entering the stroke-prone years (above 55 years)<sup>10</sup>, the number of Georgians affected by stroke is expected to rise over the next decade, which 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 treatments of acute stroke to limit the damage to the brain that stroke causes. Although we’ve made great progress, there’s a great deal more to do to address this major public health problem in Georgia.

## Notes

- A. The patient care report format for Georgia EMS data changed from 2011 to 2013, therefore Georgia EMS data may not be entirely comparable from year to year for this time period.

## References

1. Centers for Disease Control and Prevention, National Center for Health Statistics. Underlying Cause of Death 1999-2010 on CDC WONDER Online Database, released 2012. Data are from the Multiple Cause of Death Files, 1999-2010, 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 Dec 4, 2014.
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. Go AS, Mozaffarian D, Roger VL, et al; on behalf of the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics—2013 update: a report from the American Heart Association. *Circulation.* 2013;127:e6–e245. Available at: <http://circ.ahajournals.org/content/125/1/e2.full.pdf+html>
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. Clarkson, LS. 2006 Georgia Stroke and Heart Attack Awareness Survey. Georgia Department of Human Resources, Division of Public Health, October 2008. Publication Number: DPH08/335. Available at: <http://dph.georgia.gov/sites/dph.georgia.gov/files/2008SHAAwarenessSurveyReport.pdf>
7. Georgia Behavioral Risk Factor Surveillance System Data 2013. 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>
8. 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>
9. 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.gov/Aging\\_Statistics/future\\_growth/future\\_growth.aspx#state see State-Percent\\_65+yr-ageprojections-2005-2030.xls](http://www.aoa.gov/Aging_Statistics/future_growth/future_growth.aspx#state see State-Percent_65+yr-ageprojections-2005-2030.xls)
10. 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>

**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 tPA is administered. Eligible patients must receive tPA 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.

**Tissue Plasminogen Activator (tPA):** 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.