Why we did this review

This review of the Georgia Trauma Care Network Commission (the Commission) was conducted at the request of the House Appropriations Committee. We were asked to measure the degree of success the Commission has attained in reaching their original goals, which include:

1. Increasing the number of Level I, II, and III trauma centers;
2. Improving service delivery and response times;
3. Mitigating uncompensated care through the distribution of formula funds; and
4. Addressing the need for and benefit from providing ambulance purchases.

About the Commission

The Georgia Trauma Care Network Commission was established in 2007 following recommendations from a 2006 Joint Comprehensive State Trauma Services Committee. The Commission’s main duties are to distribute funds to trauma centers and EMS providers to compensate for costs of readiness and uncompensated care related to trauma. The Commission is also responsible for establishing a trauma center network to ensure injured patients are cared for at best available facility.

The Commission currently receives approximately $15 million each year from fines related to Georgia’s super speeder law. Approximately 88% of its funding is distributed to trauma centers, physicians, and EMS providers.

Georgia Trauma Care Network Commission

Requested information on trauma system

What we found

Georgia’s trauma system has made observable progress since the Georgia Trauma Care Network Commission (the Commission) was formed in 2007. Most notably, the number of designated trauma centers has increased, and a slightly higher percentage of trauma patients are being admitted to these facilities. However, further work is needed to ensure continued improvement.

In 2006, designated trauma centers were at risk of dropping out of the system, primarily due to financial constraints related to costs for uncompensated care and additional resources required to maintain designation. The Commission’s initial funding to trauma centers and emergency medical service (EMS) providers stabilized the system and re-engaged stakeholders to move forward on recommendations from national experts. Since 2007, no trauma centers have dropped out of the system.

The number of designated trauma centers has increased from 15 in 2007 to 21 in 2012. Two Level II trauma centers were added, which increases the number of hospitals able to provide definitive care to even the most seriously injured patients. The addition of one Level III and three Level IV trauma centers ensures these rural hospitals are trained to quickly identify and transfer patients needing a higher level of care.

In addition, the percent of trauma patients admitted to trauma centers has increased from 49% in calendar year 2007 to 52% in calendar year 2011. In some regions, the improvement was related to the designation of trauma centers, while in others it appears EMS providers have begun transporting their patients to designated trauma centers rather than community hospitals.
Though the number of trauma centers has increased, there has been little change in the percent of Georgians within 25 miles of definitive care at a Level I or II trauma center. There are still areas of the state—particularly in South Georgia—where residents are more than 50 miles away from a trauma center. There is currently no strategic plan for the desired number and type of trauma centers and where they should be located, though the Commission intends to have criteria in place by June 2013.

Work to further develop the trauma system is likely hampered by the lack of a defined lead agency in Georgia statute. Currently, two entities—the Commission and the state Office of EMS and Trauma (OEMST) within the Department of Public Health—have responsibilities related to the trauma system; however, as noted by national experts, there is no clear delineation of authority and powers. For example, though the Commission is responsible for studying trauma care services and OEMST houses useful data on trauma center and EMS activities, we noted that the entities have not collaborated to develop a performance improvement plan for the state’s trauma system. The Commission plans to have a performance measurement program in place by June 2014.

Without performance measures and historic data, the Commission has been unable to quantitatively demonstrate the impact of its initiatives. For example, the Commission’s ambulance replacement grant program was designed to help rural EMS providers replace old, high-mileage vehicles and thus increase the likelihood that they would travel further to transport trauma patients to a designated trauma center. However, the Commission has not confirmed that recipients have changed their transport decisions now that they have a more reliable vehicle. Our analysis of hospital discharge data shows that it is unlikely the grants have increased the likelihood that recipients will transport to a trauma center.

Since fiscal year 2009, the Commission has distributed $96.7 million to trauma centers, EMS providers, and physicians, primarily for readiness and uncompensated care. Commission funding has mitigated approximately 24% and 65% of estimated uncompensated care costs incurred by trauma centers and participating EMS providers, respectively.

**What we recommend**

To assure continued enhancement of the state trauma system, the General Assembly should consider revising state law to clearly define a lead agency, which would have the authority and responsibility to ensure compliance with rules and regulations and evaluate performance. In the absence of such a change, the Commission and OEMST should collaborate to define each entity’s roles and responsibilities, strategically determine the desired number and locations of designated trauma centers, and develop a performance improvement plan that utilizes currently available datasets.

The Commission should also ensure that its funding programs to trauma centers and EMS providers continue to strengthen the system by investing in areas that will have the greatest impact on trauma patient care.

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1 The Commission’s statutory duties are generally related to distributing funds, investing in a trauma transportation system, and establishing a trauma center network to direct patients to the best care. OEMST is statutory responsible for regulating EMS providers and designating trauma centers.
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While data to measure improvement in service delivery and response times is limited, an increase in the number of trauma centers and in the percent of trauma patients going to trauma centers indicates improvement. 11

The Commission's actions to improve trauma care are closely aligned with criteria set by the American College of Surgeons and other states; however, further improvements are needed. 17

While the number of designated trauma centers has increased since 2007, there are still areas of the state in which injured patients must be transported long distances to receive definitive care at a Level I or II trauma center. 21

The Commission has mitigated approximately 24% of uncompensated care costs incurred by trauma centers and 65% incurred by participating EMS providers. 26

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Purpose of the Special Examination

This review of the Georgia Trauma Care Network Commission (the Commission) was conducted at the request of the House Appropriations Committee. Specifically, we were asked to measure the degree of success the Commission has attained in reaching their original goals, which include:

1. Increasing the number of Level I, II, and III trauma centers;
2. Improving service delivery and response times;
3. Mitigating uncompensated care through the distribution of formula funds; and
4. Addressing the need for and benefit from providing ambulance purchases.

A description of the objectives, scope, and methodology used in this review is included in Appendix A. A draft of the report was provided to the Commission and the Department of Public Health for their review, and pertinent responses were incorporated into the report.

Background

Georgia Trauma Care Network Commission

The Georgia Trauma Care Network Commission (the Commission) was established in 2007 following recommendations from a 2006 Joint Comprehensive State Trauma Services Study Committee. The Committee found that Georgia did not have a statewide, inclusive trauma system. As a result, Georgia's trauma-related death rate was 20% above the national average, costing approximately 700 lives per year. The Committee also found that readiness and uncompensated care costs were the major obstacles trauma centers, physicians, and emergency medical service (EMS) providers faced in meeting the state's trauma needs.

According to O.C.G.A. §31-11-102, the Commission's main duties include:

- **Distributing funds for costs related to trauma care readiness.** Readiness costs are for additional resources required to maintain a hospital's status as a designated trauma center. The added resources may include 24-hour staffing, ground and air transportation, physician and nurse training, and trauma specific equipment.

- **Distributing funds for costs related to uncompensated care services.** Uncompensated care costs are incurred when trauma centers, physicians, or EMS personnel serve a patient who has no medical insurance, is not eligible for medical assistance coverage, has no third party coverage, and has not paid despite documented attempts to collect payment.

- **Investing in a trauma transportation system,** particularly in areas in which current options to transport trauma patients are limited.

- **Establishing, maintaining, and administering a trauma center network** to coordinate the best use of existing trauma facilities and to direct patients to the best available facility for treatment.
The Commission’s duties also include funding partial start-up costs for hospitals entering the trauma system and assisting in data collection to evaluate the provision of trauma care services.

The Commission is composed of nine members appointed by the Governor, the Lieutenant Governor, and the Speaker of the House. The Governor's appointees must include an emergency trauma care physician, a representative of a designated trauma center, and a representative of a state 9-1-1 licensed EMS provider. The Commission also employs five full-time staff members.

The Commission is attached to the Department of Public Health (DPH) for administrative purposes only. DPH also houses the Office of Emergency Medical Services and Trauma (OEMST), which designates trauma centers and licenses EMS providers and personnel. OEMST created the EMS regions that have served as the regional and local infrastructure of the EMS system and are the basis for the Commission's stakeholder groups, trauma plan development and trauma system assessments (see Exhibit 1 for a map of the regions). Each EMS region has a director who inspects ambulances, investigates complaints, and reports to OEMST.

Definition of Trauma
A trauma patient is an injured person who requires timely diagnosis and treatment to diminish or eliminate the risk of death or permanent disability. Traumatic injuries include multiple fractures, paralysis, punctured lungs, stab wounds, and brain injuries. Trauma is the leading cause of death among children and adults below the age of 45. It is the fourth leading cause of death for all ages. In Georgia, an estimated 30,000 patients with traumatic injuries are admitted to hospitals each year. The most common causes of traumatic injuries are motor vehicle crashes and falls.

Components of a Trauma System
Studies have shown that the preventable death rate among trauma patients can decrease by 10-30% if they are served within an established trauma system. The Health Resources and Services Administration defines a trauma system as a pre-planned, comprehensive, and coordinated statewide and local injury response network that includes all facilities with the capability to care for the injured. In particular, a trauma system helps ensure a trauma patient receives care within the “golden hour,” or the first 60 minutes after the occurrence of major injury.

According to national experts, the main components of a well-designed trauma system include: injury prevention, access to care through contact devices (such as 9-1-1 dispatch); pre-hospital care (provided by EMS); acute care (provided by designated trauma centers); and rehabilitative care. This report focuses on the two components on which the Commission has directed its funding: pre-hospital and acute care, described on page 4.

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2 In fiscal years 2009 and 2010, the Commission was administratively attached to the Departments of Human Resources and Community Health, respectively. The Commission did not employ administrative staff and largely relied upon staff from the agencies in the performance of its duties.
Exhibit 1
Georgia has 21 Designated Trauma Centers in 8 of 10 EMS regions

Level I Trauma Centers:
1 Atlanta Medical Center
2 Grady Memorial Hospital
3 Children’s Healthcare of Atlanta at Egleston**
4 Medical Center of Central Georgia*
5 Georgia Health Sciences Medical Center*
6 Memorial Health University Medical Center*

Level II Trauma Centers:
7 Hamilton Medical Center
8 Floyd Medical Center
9 Gwinnett Medical Center
10 North Fulton Regional Hospital
11 Wellstar Kennestone
12 Children’s Healthcare of Atlanta at Scottish Rite**

Level II (Cont.):
13 Athens Regional Medical Center
14 Medical Center - Columbus
15 John D. Archbold Memorial Hospital

Level III Trauma Centers:
16 Clearview Regional Medical Center
17 Taylor Regional Hospital

Level IV Trauma Centers:
18 Wills Memorial Hospital
19 Morgan Memorial Hospital
20 Lower Oconee Memorial Hospital
21 Emanuel Medical Center

Burn Centers:
22 Grady Burn Center
23 Joseph M. Still Burn Center

*Adult trauma center with pediatric commitment
** Pediatric Center

Source: Georgia Trauma Network Commission
Pre-Hospital Care (Emergency Medical Services)

Emergency Medical Services (EMS) describes the continuum of activities that begin with rapid response to an initial call for help and conclude when the patient is admitted to the hospital. EMS services are typically provided by local government agencies, fire departments, hospitals, or private for-profit or non-profit entities. EMS providers may be licensed for ambulance, air transport, first responder, or neonatal transport services. Currently, 240 EMS providers are licensed for ambulance transport in Georgia, operating 1,900 vehicles and employing approximately 19,000 medics. There are also five air ambulance services with 13 helicopters. EMS providers receive an estimated one million calls for service per year, though OEMST staff estimated approximately 3% (30,000) of the calls are trauma related. The majority of trauma care patients are transported to definitive care by EMS personnel.

As shown on Exhibit 1, the state is divided into 10 EMS regions. The state is further divided into 170 9-1-1 zones (typically one per county, though some metro counties have two or three); each 9-1-1 zone is assigned to a specific EMS provider. An EMS provider may serve more than one 9-1-1 zone.

According to national experts at the American College of Surgeons (ACS), the successful management of a patient first requires that EMS correctly identify the severity of injuries to triage the patient to the appropriate facility. Destination protocols should be clearly defined and understood by all pre-hospital personnel. In March 2011, the Commission adopted criteria developed by the federal Centers for Disease Control and Prevention as the triage criteria for entrance into the Georgia trauma system (see Appendix B). This decision scheme considers the patient’s vital signs and level of consciousness, the type of injuries, the cause of injury, and special considerations such as age or pregnancy. Patients best served by the highest level trauma centers (I and II) include those who are unconscious, have low blood pressure and/or low breathing, or sustained injuries such as penetrating injuries, pelvic fractures, or skull fractures.

Acute Care (Designated Trauma Centers)

Studies have shown that a trauma patient’s preventable death rate is lower when treated at a designated trauma center, a hospital distinguished by the immediate availability of specialized personnel, equipment, and services to treat the most severe and critical injuries. Trauma centers are different from general hospital emergency departments because they provide, on a 24-hour per day, 7-day per week basis, teams of specialists able to handle the most severe injuries within the golden hour. In Georgia, trauma centers are designated as Level I, II, III, or IV based on the extent to which they meet criteria set forth by ACS, described below and on Exhibit 2 (see page 6).

- **Level I trauma centers** offer the greatest level of comprehensive trauma care from prevention through rehabilitation. They are also responsible for trauma education, research, and system planning. Level I trauma centers are typically attached to a medical school.

- **Level II trauma centers** provide the same level of clinical care as Level I trauma centers but do not focus on research, education, or system planning.
• **Level III trauma centers** provide trauma assessment, resuscitation, emergency surgery, and stabilization but will usually transfer patients requiring more extensive care.

• **Level IV trauma centers** provide advanced life support in rural areas where no higher-level facility is available. Patients are then transported to a Level I or II trauma center.

OEMST also uses ACS criteria to designate the following specialty trauma centers:

• **Pediatric trauma centers** specialize in treating injured children. They must have the same resources as the level counterpart in adult trauma centers in addition to pediatric requirements.

• **Burn centers** are recognized as destinations for the transport of trauma burn patients in Georgia.

There are 21 designated trauma centers (two are pediatric trauma centers) and two burn centers in Georgia. As shown on Exhibit 1 on page 3, eight of the 10 EMS regions have at least one designated trauma center within their borders (the exceptions are Regions 2 and 4).

**Non-Designated Hospitals**

According to ACS, in an inclusive trauma system, non-designated hospitals’ emergency departments may be appropriate destinations for patients with minor injuries such as isolated fractures or minor concussions to ensure Level I and II trauma centers remain available to care for the more seriously injured patients. Trauma patients may also be transported to non-designated hospitals based on the transporting EMS medic’s discretion and patient preference.

In addition to the 21 designated trauma centers, there are 120 non-designated hospitals with emergency rooms in 110 counties in Georgia. Thirty-one of these hospitals are designated by the Office of Rural Health as Critical Access Hospitals, rural hospitals with less than 25 beds that have 24/7 emergency care services. Twenty-six non-designated hospitals have more than 200 beds.

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**Process for Becoming a Designated Trauma Center**

In Georgia, trauma center designation is voluntary. Hospitals seeking to become designated trauma centers first notify their Regional EMS Council and OEMST of their intent. They must appoint a trauma medical director and a trauma coordinator and implement a trauma registry program (see page 7) for at least six months. After OEMST has reviewed data from the registry, the hospital completes a pre-review questionnaire to document how it meets the ACS criteria for the designation it is pursuing.

OEMST reviews the questionnaire and required documentation and then sends a site review team to visit the facility. The site review team then submits a recommendation regarding designation to OEMST and then to the DPH Medical Director. The length of time to become designated varies by hospital, depending on the level of commitment of administrative and medical staff and the time it takes to develop and document the processes and infrastructure required by ACS.

Trauma centers are inspected every three years to maintain their designation. They must also submit quarterly reports and data to the trauma registry. Trauma centers may request to upgrade their designation level (from II to I, for example); this process is similar to the initial designation.
Exhibit 2
OEMST Utilizes ACS Criteria to Designate Trauma Centers in Georgia

<table>
<thead>
<tr>
<th>Level IV</th>
<th>Level III</th>
<th>Level II</th>
<th>Level I</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Institutional Organization</strong></td>
<td>Employ a trauma program, trauma team, and a trauma coordinator</td>
<td>Employ a trauma service, a trauma program medical director, and a trauma multidisciplinary committee</td>
<td></td>
</tr>
<tr>
<td><strong>Hospital Departments/Divisions/Sections (available 24 hours per day)</strong></td>
<td>General Surgery, Orthopedic Surgery, Emergency Medicine, Anesthesia</td>
<td>Neurologic Surgery</td>
<td></td>
</tr>
<tr>
<td><strong>Clinical Capabilities</strong></td>
<td>General Surgery, Anesthesia, Emergency Medicine immediately available 24 hours per day, Radiology and Orthopedic and Plastic Surgery promptly available 24 hours per day</td>
<td>Hand, Neurologic, OB/GYN, Ophthalmic, Oral, Maxillofacial, and Thoracic Surgery promptly available 24 hours per day</td>
<td>Cardiac and Microvascular/Replant Surgery promptly available 24 hours per day</td>
</tr>
<tr>
<td><strong>Clinical Qualifications</strong></td>
<td>General/trauma surgeon and emergency medicine staff with ATLS course completion</td>
<td>Board certified general/trauma surgeon; emergency medicine staff and orthopedic surgeon who attend trauma committee meetings</td>
<td>Board certified emergency medicine staff, neurosurgeon, and orthopedic surgeon who meet continuing education requirements</td>
</tr>
<tr>
<td><strong>Facilities/Resources/Capabilities</strong></td>
<td>Emergency department with basic resuscitation equipment and communication with EMS vehicles; operating room with personnel available 24 hours per day and X-ray capability; recovery room with resuscitation equipment; clinical laboratory services available 24 hours per day; transfer agreements to rehabilitative services</td>
<td>Additional resuscitation and X-ray equipment and personnel requirements in emergency department, operating room, and recovery room; staffed and equipped intensive care unit, radiological and respiratory therapy services available 24 hours per day; physical therapy and social services</td>
<td>Equipment related to head injuries in emergency department, operating suite, recovery room, and intensive care unit; additional radiological and rehabilitative services</td>
</tr>
<tr>
<td><strong>Performance Improvement</strong></td>
<td>Participation in multidisciplinary trauma conference, review pre-hospital trauma care</td>
<td>Review times/reasons for trauma related bypass and transfers, performance improvement personnel dedicated to care of injured patients</td>
<td></td>
</tr>
<tr>
<td><strong>Continuing Education/Outreach</strong></td>
<td>Provide programs for staff &amp; community physicians, nurses, allied health personnel, and pre-hospital personnel</td>
<td>General Surgery Residency Program; provide/participate in ATLS courses</td>
<td></td>
</tr>
<tr>
<td><strong>Prevention</strong></td>
<td>Designated prevention coordinator; outreach activities; information resources for the public; collaboration with existing national and state programs</td>
<td>Injury control studies; collaboration with other institutions; monitoring the progress/effect of prevention programs</td>
<td></td>
</tr>
<tr>
<td><strong>Research</strong></td>
<td>Trauma registry improvement activities</td>
<td>Research committee; educational presentations; scientific publications</td>
<td></td>
</tr>
</tbody>
</table>

Note: The requirements listed here are inclusive.
Source: OEMST Hospital Resources Checklist, adapted from ACS Resources for Optimal Care of the Injured Patient
**Trauma Center Activity Data**

Designated trauma centers are required to collect and submit trauma patient data to the Georgia Trauma Registry. Non-designated hospitals may also voluntarily contribute to the trauma registry. As shown on Exhibit 3 below, designated trauma centers have served approximately 64,000 trauma patients in the past five calendar years. Level I and II trauma centers have cared for nearly all of the trauma patients reported to the registry.

**Exhibit 3**

**Increasing Number of Trauma Patients Served in Designated Trauma Centers Since 2007**

<table>
<thead>
<tr>
<th>Trauma Center Level(1)</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level I</td>
<td>5,966</td>
<td>6,621</td>
<td>6,283</td>
<td>6,264</td>
<td>9,206</td>
<td>34,340</td>
</tr>
<tr>
<td>Level II</td>
<td>5,570</td>
<td>5,843</td>
<td>6,231</td>
<td>6,192</td>
<td>4,778</td>
<td>28,614</td>
</tr>
<tr>
<td>Level III</td>
<td>0</td>
<td>0</td>
<td>136</td>
<td>163</td>
<td>228</td>
<td>675</td>
</tr>
<tr>
<td>Level IV</td>
<td>104</td>
<td>86</td>
<td>18</td>
<td>109</td>
<td>49</td>
<td>218</td>
</tr>
<tr>
<td><strong>Trauma Center Total</strong></td>
<td>11,640</td>
<td>12,550</td>
<td>12,668</td>
<td>12,728</td>
<td>14,261</td>
<td>63,847</td>
</tr>
</tbody>
</table>

(1) A trauma center’s level is based on its designation at the end of the calendar year. For example, since Athens Regional was designated as a Level II in December 2009, its 2009 registry patients are admissions to a Level II trauma center.

Source: Georgia Trauma Registry

**Financial Information**

In fiscal year 2008, the Commission received an initial appropriation of nearly $60 million to be distributed to trauma centers and EMS providers in fiscal year 2009. Commission funding is now tied to revenue collected from “super speeders.” Since 2008, funding for the Commission has decreased by 77% to $15.5 million in fiscal year 2013.

As discussed above, one of the Commission’s primary responsibilities is to distribute funds to trauma centers, physicians, and EMS providers. In fiscal year 2009, nearly all of the Commission's initial appropriation was distributed to these entities (see Exhibit 4 on the next page). Over time, the percent available for distribution has decreased to approximately 88% of total funds in fiscal year 2013, mainly due to new trauma system initiatives such as the Trauma Communications Center (TCC) and regionalization.

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3 The Georgia Trauma Registry includes patient demographics, injury information, pre-hospital information, hospital procedures and diagnoses, outcomes, financial information, and quality assurance data.

4 Criteria for inclusion in the trauma registry is as follows: any patient admitted for an injury who was admitted for at least 48 hours or was transferred to or from another facility, died or was dead on arrival, was admitted to the ICU, or had unscheduled readmissions associated with the trauma within 72 hours of discharge from the first visit. Excluded from this group are patients admitted for late effects of injury, blisters, contusions, abrasions, insect bites, or foreign bodies, as well as patients over 65 years of age with isolated hip fractures resulting from a same-level fall.

5 “Super speeders” are convicted of driving 85 miles per hour or more on any road or highway and 75 miles per hour or more on any two-lane road or highway. In addition to local fines and penalties imposed, super speeders must pay a $200 fee, which is deposited into the general fund to be used to fund a trauma care system in Georgia.
### Exhibit 4
Approximately 90% of Commission Funding Distributed to Stakeholders (Fiscal Years 2009-2012)

<table>
<thead>
<tr>
<th>Trauma Center/Physician Allocation</th>
<th>FY09</th>
<th>FY10</th>
<th>FY11</th>
<th>FY12</th>
<th>Total (FY09-FY12)</th>
<th>FY13 (Budgeted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Readiness Payments</td>
<td>$23,851,385 40%</td>
<td>$6,696,610 38%</td>
<td>$1,583,469 15%</td>
<td>$4,355,542 27%</td>
<td><strong>$36,487,006 36%</strong></td>
<td>$3,634,632 24%</td>
</tr>
<tr>
<td>Uncompensated Care Payments</td>
<td>23,851,385 40%</td>
<td>6,043,406 35%</td>
<td>2,262,103 22%</td>
<td>5,444,433 34%</td>
<td><strong>37,601,327 37%</strong></td>
<td><strong>5,192,331 34%</strong></td>
</tr>
<tr>
<td>Capital Grants (Level I &amp; II Trauma Centers)</td>
<td>4,148,602 7%</td>
<td>0 0%</td>
<td>0 0%</td>
<td>0 0%</td>
<td><strong>4,148,602 4%</strong></td>
<td>0 0%</td>
</tr>
<tr>
<td>Level IV Trauma Center Stipend(1)</td>
<td>200,000 0%</td>
<td>54,000 0%</td>
<td>0 0%</td>
<td>0 0%</td>
<td><strong>254,000 0%</strong></td>
<td>0 0%</td>
</tr>
<tr>
<td>Performance Based Payments</td>
<td>0 0%</td>
<td>760,380 4%</td>
<td>678,629 7%</td>
<td>1,077,692 7%</td>
<td><strong>2,516,701 2%</strong></td>
<td>1,557,699 10%</td>
</tr>
<tr>
<td>New Trauma Start-up Grants</td>
<td>0 0%</td>
<td>0 0%</td>
<td>1,000,000 10%</td>
<td>0 0%</td>
<td><strong>1,000,000 1%</strong></td>
<td>0 0%</td>
</tr>
<tr>
<td>Trauma Registry</td>
<td>0 0%</td>
<td>0 0%</td>
<td>0 0%</td>
<td>583,301 4%</td>
<td><strong>583,301 1%</strong></td>
<td><strong>565,804 4%</strong></td>
</tr>
</tbody>
</table>

**Total Trauma Center/Physician Allocation**

| $52,051,372 88% | $13,554,396 78% | $5,524,201 53% | $11,460,968 72% | **$82,590,937 80%** | **$10,950,466 71%** |

### EMS Allocation

<table>
<thead>
<tr>
<th>EMS Allocation</th>
<th>FY09</th>
<th>FY10</th>
<th>FY11</th>
<th>FY12</th>
<th>Total (FY09-FY12)</th>
<th>FY13 (Budgeted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicle Replacement Grant</td>
<td>$4,000,000 7%</td>
<td>$1,392,242 8%</td>
<td>$1,385,258 13%</td>
<td>$1,228,318 8%</td>
<td><strong>$8,005,818 8%</strong></td>
<td><strong>$721,740 5%</strong></td>
</tr>
<tr>
<td>Uncompensated Care Payments</td>
<td>1,479,945 3%</td>
<td>1,000,000 6%</td>
<td>284,988 3%</td>
<td>748,028 5%</td>
<td><strong>3,512,967 3%</strong></td>
<td><strong>733,125 5%</strong></td>
</tr>
<tr>
<td>GPS &amp; Automatic Vehicle Locator System</td>
<td>996,452 2%</td>
<td>0 0%</td>
<td>72,842 1%</td>
<td>0 0%</td>
<td><strong>1,069,294 1%</strong></td>
<td><strong>360,250 2%</strong></td>
</tr>
<tr>
<td>Training</td>
<td>0 0%</td>
<td>338,445 2%</td>
<td>453,763 4%</td>
<td>333,264 2%</td>
<td><strong>1,125,472 1%</strong></td>
<td><strong>281,060 2%</strong></td>
</tr>
<tr>
<td>Trauma Related Equipment</td>
<td>0 0%</td>
<td>338,445 2%</td>
<td>338,444 3%</td>
<td>409,096 3%</td>
<td><strong>1,085,985 1%</strong></td>
<td><strong>496,489 3%</strong></td>
</tr>
<tr>
<td>Administrative</td>
<td>0 0%</td>
<td>0 0%</td>
<td>4,127 0%</td>
<td>1,464 0%</td>
<td><strong>5,591 0%</strong></td>
<td><strong>3,500 0%</strong></td>
</tr>
</tbody>
</table>

**Total EMS Allocation**

| $6,476,397 11% | $3,069,132 18% | $2,539,422 24% | $2,720,170 17% | **$14,805,121 14%** | **$2,596,164 17%** |

### Total Distribution to Trauma Centers, Physicians, & EMS

<table>
<thead>
<tr>
<th>FY09</th>
<th>FY10</th>
<th>FY11</th>
<th>FY12</th>
<th>Total (FY09-FY12)</th>
<th>FY13 (Budgeted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$58,527,769 99%</td>
<td>$16,623,528 95%</td>
<td>$8,063,623 78%</td>
<td>$14,181,138 89%</td>
<td><strong>$97,396,058 95%</strong></td>
<td><strong>$13,546,630 88%</strong></td>
</tr>
</tbody>
</table>

### Other Trauma Care Initiatives & Administrative Expenses

| Admin/ Operations | $375,000 1% | $192,173 1% | $286,871 3% | $384,974 2% | **$1,239,018 1%** | **$440,175 3%** |
| OEMST Allocation | 6(2) 0% | 189,400(2) 1% | 264,321 3% | 489,715 3% | **943,436 1%** | **463,773 3%** |
| Trauma Communications Center | 0 0% | 0 0% | 1,113,847 11% | 495,447 3% | **1,609,294 2%** | **574,469 4%** |
| New Projects/System Support | 0 0% | 459,833 3% | 655,355 6% | 377,525 2% | **1,492,713 1%** | **434,050 3%** |

**Total Funding for Other Trauma Care Initiatives & Administrative Expenses**

| $375,000 1% | $841,406 5% | $2,320,394 22% | $1,747,661 11% | **$5,284,461 5%** | **$1,912,467 12%** |

### Total Commission Expenditures

<table>
<thead>
<tr>
<th>FY09</th>
<th>FY10</th>
<th>FY11</th>
<th>FY12</th>
<th>Total (FY09-FY12)</th>
<th>FY13 (Budgeted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$58,002,769</td>
<td>$17,464,934</td>
<td>$10,384,017</td>
<td>$15,928,799</td>
<td><strong>$102,680,519</strong></td>
<td><strong>$15,459,097</strong></td>
</tr>
</tbody>
</table>

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(1) For the first two years of the Commission's funding, Level IV trauma centers received a stipend, while higher level trauma centers received funding based on readiness and uncompensated care formulas. Beginning in fiscal year 2011, Level IV trauma centers received readiness and uncompensated care funding.

(2) According to O.C.G.A. §31-11-102, OEMST receives 3% of the Commission's funding each year. According to Commission staff, in fiscal year 2009 OEMST received a portion of the $375,000 allocated for administration and operations. In fiscal year 2010, DCH allocated $655,500 of the Commission's funding to OEMST. OEMST utilized $189,400 for three staff positions and returned the remaining $466,100 to the general fund. Beginning in fiscal year 2011, the Commission transferred the funds as part of a memorandum of understanding with OEMST.

Source: PeopleSoft Financials; Commission budget documents
Designated trauma centers have received approximately 85% ($83 million) of the $97 million available for distribution from fiscal year 2009 to fiscal year 2012, primarily to mitigate costs associated with readiness and uncompensated care, which are funded by formulas described below. Trauma centers are required to give 25% of their readiness and uncompensated care funding to physicians who provided trauma care.

- **Readiness Funding:** Readiness costs are incurred for additional resources required to maintain a trauma center’s designation. Trauma centers have received $36.5 million in readiness payments, which are awarded based on the trauma center’s designation level. Readiness costs were initially determined through a survey of the Level I and II trauma centers, the results of which were then adjusted according to national trauma center norms. In fiscal year 2012, Level II trauma centers received 60% of Level I trauma center awards, and Level III and IV received 10% and 5%, respectively. The Commission will begin awarding burn centers 50% of Level I readiness costs in fiscal year 2013.

- **Uncompensated Care Funding:** The Commission has awarded trauma centers approximately $37.6 million to cover uncompensated care costs over the past four years. The Commission calculates uncompensated care costs by injury severity score using cost norms developed by the National Foundation for Trauma Care. These cost norms are applied to the number of trauma patients served based on audited survey results from the designated trauma centers. Each trauma center receives a percent of the Commission’s fund that corresponds to its percent of all trauma centers’ claims.

The Commission also devoted $4.1 million for capital equipment grants to Level I and II trauma centers in fiscal year 2009 and $1 million in start-up grants to new trauma centers in fiscal year 2011. Finally, approximately $2.5 million has been provided to trauma centers for meeting certain performance standards since fiscal year 2010.

EMS agencies have received 14% ($14.1 million) of funds available for distribution since fiscal year 2009. Approximately 37% ($8 million) of the EMS allocation has been awarded as competitive grants for rural EMS providers seeking to replace an older, high mileage ambulance. Approximately 25% ($3.5 million) has covered uncompensated care costs, which are awarded as a grant to any EMS provider who submits a claim. The Commission has also funded trauma-related equipment purchases ($748,000) and various EMS trainings ($790,000). Finally, the Commission has collaborated with the Georgia Tech Research Institute and the Georgia Emergency Management Agency to develop and implement the Automatic Vehicle Location System, which has placed GPS devices in 685 vehicles across the state ($1.1 million).

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6 An Injury Severity Score (ISS) provides an overall score for patients with multiple injuries. ISS range from 0 to 75 based on severity. To calculate uncompensated care cost norms, the National Foundation for Trauma Care grouped patients by ISS of 0-8, 9-15, 16-24, and over 24.

7 Trauma centers report the number of patients served three years prior to the grant year. For example, uncompensated care distributions for fiscal year 2013 are based on claims from services rendered in calendar year 2010.
Approximately 5% of the Commission’s total funding from fiscal year 2009 to 2012 has been spent on other trauma care initiatives. In fiscal year 2011, the Commission began funding the TCC, a call center that coordinates EMS transports and hospital transfers based on the patient’s injury and trauma centers’ availability. The Commission has also distributed grants to EMS regions to develop stakeholder groups. Finally, in accordance with O.C.G.A. §31-11-102, the Commission allocates 3% of its total annual funding to OEMST for the administration of an adequate system for monitoring state-wide trauma care, recruitment of trauma care service providers into the network as needed, and for research as needed to continue to operate and improve the system.
Requested Information

Service Delivery

While data to measure improvement in service delivery and response times is limited, an increase in the number of trauma centers and in the percent of trauma patients going to trauma centers indicates improvement.

A comprehensive assessment of trauma system improvement since the Commission’s creation is hindered by the unavailability of historical performance data maintained by the Commission or OEMST. Despite this limitation, we were able to note performance in two areas that indicate improvement in the state’s trauma system. Since 2007, the number of designated trauma centers has increased, as well as the percentage of trauma victims admitted to designated trauma centers.

In addition to these measures of improvement, the Commission is taking action to address recommendations to improve the trauma system made by the American College of Surgeons. These activities are discussed in the finding on page 15.

Performance Measurement

The Commission has not created performance measures or used data to evaluate whether service delivery along the continuum of trauma care has improved over the past five years. According to ACS, system-wide evaluation should include access to care, availability of services, quality of services rendered, and financial impact.

The Commission has tied a portion of its trauma centers’ readiness funding to performance since 2010; however, these measures have been limited to participation in Commission initiatives and meeting data submission deadlines. Commission members and staff recognize the importance of measuring patient and system outcomes, and, according to the Commission’s strategic plan, a program will be in place by June 2014. Already, Level I and II trauma centers have begun participating in ACS’s national Total Quality Improvement Program (TQIP), which benchmarks them against other participating trauma centers on outcome areas such as mortality and morbidity. The Commission intends to tie a portion of these trauma centers’ funding to TQIP data, specifically reviewing care outcomes, standard of care adherence, and overall performance.

OEMST collects two datasets that could be used in assessing the trauma system: (1) Georgia EMS Information Systems (GEMSIS), which documents information from EMS medics’ patient care reports and includes information such as time of notification, time to scene, and time of arrival to the hospital; and (2) the state trauma registry, which includes data such as injury type, length of stay, and final disposition of trauma patients served by trauma centers.

According to OEMST staff, GEMSIS data was not sufficient for the audit team to create a baseline of performance prior to the Commission’s formation, though calendar year 2012 data will be complete enough to analyze response times. In addition, the datasets are limited in their usefulness in assessing the system as a whole. For example, it is not possible to link GEMSIS with trauma registry data to track a patient through the entire continuum of care. Finally, since trauma patients
may be treated at non-designated hospitals, trauma registry patients are only a subset of the entire patient population. While information on all trauma patients is available through the Georgia Hospital Association (GHA), information such as injury severity or time to find an available specialist is not captured.

OEMST has denied the Commission’s requests for access to the trauma registry and GEMSIS, citing a need to maintain individual hospitals’ and EMS providers’ confidentiality and a lack of data analysis expertise within the Commission. As a result, the Commission has begun to create its own dataset in an attempt to link patients across the continuum of care. When an EMS provider calls the Commission’s Trauma Communications Center (TCC) the operator collects information such as a description of the patient’s injuries, whether the patient’s injuries warrant transport to a trauma center, and the patient’s status upon arrival at the hospital. However, based on the number of EMS calls to the TCC over the past nine months (approximately two per day), this dataset is not likely to be complete enough to use for performance measurement.

Despite these limitations, the datasets provide useful information in assessing certain aspects of the trauma system’s performance. As shown in Exhibit 5 below, the datasets contain a number of potential metrics that could be used to assess the system. OEMST staff indicated they would run reports showing these data elements on a statewide and regional level.

**Exhibit 5**
*Data Currently Available to Measure Trauma System Performance*

<table>
<thead>
<tr>
<th>Measure</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-Hospital Care</strong></td>
<td></td>
</tr>
<tr>
<td>Time between notification and arrival to patient</td>
<td>GEMSIS</td>
</tr>
<tr>
<td>Time between scene and hospital</td>
<td>GEMSIS</td>
</tr>
<tr>
<td>Percent of trauma patients transferred from another facility to a higher level of care</td>
<td>Trauma Registry, GHA Hospital Discharge Data</td>
</tr>
<tr>
<td>Number and percent of trauma patients treated at designated trauma centers</td>
<td>Trauma Registry, GHA Hospital Discharge Data</td>
</tr>
<tr>
<td>Percent of EMS providers submitting patient reports to the state</td>
<td>GEMSIS</td>
</tr>
<tr>
<td><strong>Acute Care</strong></td>
<td></td>
</tr>
<tr>
<td>Patient disposition by injury severity</td>
<td>Trauma Registry</td>
</tr>
<tr>
<td>Length of stay by injury severity</td>
<td>Trauma Registry</td>
</tr>
<tr>
<td>Time in emergency department</td>
<td>Trauma Registry</td>
</tr>
<tr>
<td>Start time of essential hospital procedures</td>
<td>Trauma Registry</td>
</tr>
<tr>
<td>Time on diversion by specialty</td>
<td>TCC Hospital Resource Availability Display</td>
</tr>
</tbody>
</table>

Sources: ACS, Georgia Trauma Registry data dictionary, stakeholder interviews

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8 The TCC was established to coordinate EMS transports and hospital transfers based on the trauma centers’ availability. All trauma centers—and participating non-designated hospitals—update a Resource Availability Display, which shows TCC operators their availability in specialties trauma patients typically need (orthopedics, neurology, etc.). When EMS calls the TCC, the operator will recommend a hospital based on the specialties available.
Number of Trauma Centers

The Commission has cited the increase in the number of trauma centers as evidence of an improved trauma system. The number of trauma centers has increased from 15 at the end of fiscal year 2007 to 21 at the end of fiscal year 2012, with two Level II trauma centers, one Level III, and three Level IV trauma centers entering the system.

According to trauma stakeholders we interviewed, the increased number of trauma centers improves service delivery because it means more hospitals are being held to a standard level of care for trauma patients. While non-designated hospitals may have the clinical capabilities to handle a trauma patient’s injuries, emergency room staff at trauma centers are required to have specific processes in place to quickly triage a trauma patient to definitive care (either by transferring to a higher level trauma center or admitting them to the hospital). Finally, designated trauma centers are required to have a performance improvement program in place to identify and correct any issues in providing optimal patient care.

ACS states that large, resource-rich trauma centers are central to an ideal trauma system because they can provide immediate medical care for significant numbers of injured patients at any time. The designation of Athens Regional and Wellstar Kennestone as Level II trauma centers means that two additional hospitals are held accountable to providing definitive care to trauma patients in their catchment area.

In addition, the designation of the Level III and IV trauma centers helps ensure that trauma patients in rural areas can be identified, stabilized, and transferred quickly. Emergency room staffs in these hospitals have been trained to recognize when a patient needs a higher level of care than they can provide. As a result, rural trauma patients’ time to definitive care is reduced. Level III and IV trauma centers can also treat trauma patients with minor injuries, ensuring higher level trauma centers are free to care for the most severely injured.

A more detailed discussion on the number of trauma centers can be found on page 21.

Georgia Hospital Discharge Data Analysis

Another metric of improved service delivery is whether a larger percentage of trauma patients is being cared for at designated trauma centers. We found that in the past five calendar years the percent of Georgia trauma patients treated at trauma centers has increased by three percentage points (from 49% in 2007 to 52% in 2011), though improvements in some regions were more significant. In addition, patients with multiple traumatic injuries are more likely to be admitted to a trauma center than those with single injuries.

We obtained from the Georgia Hospital Association (GHA) 2007-2011 hospital discharge data, which shows every patient who was admitted to a Georgia hospital. To identify our trauma patient population, we utilized criteria set by ACS, as well as methodology utilized by OEMST for a similar study. Based on information such as injury type, cause of injury, and length of stay, we identified trauma patients whose

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9 Our review does not include patients who were treated at the emergency department and were either released or died without being admitted to the hospital. According to the Commission consultant and OEMST’s epidemiologist, the patients who were released would not fit criteria for severely injured patients, and those who died would have minimal effects on the results.
injuries were serious enough to warrant treatment at a designated trauma center.\textsuperscript{10} We reviewed this methodology with Commission members, a consultant frequently utilized by the Commission, and the epidemiologists at OEMST, who found it to be a valid method of identifying the most serious trauma patients.

It should be noted that the Commission has hired a consultant to utilize 2011 GHA data to conduct a similar study. The consultant will use an algorithm to assign each patient an injury severity score to more precisely define the trauma patient population that should be served by trauma centers. The Commission expects a report at the end of fiscal year 2013.

\textbf{Exhibit 6}
\textbf{Statewide Percent of Georgia Trauma Patients Admitted to Trauma Centers Has Increased Three Percentage Points Since 2007}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{chart}
\caption{Statewide Percent of Georgia Trauma Patients Admitted to Trauma Centers Has Increased Three Percentage Points Since 2007}
\end{figure}

Note: This analysis does not account for trauma transports to Erlanger (Level I in Chattanooga, TN) and Shands Jacksonville (Level I in Jacksonville, FL), which are utilized by EMS providers in Regions 1 and 9, respectively. Including the transports to these hospitals would result in a higher percentage of trauma patients from these regions going to trauma centers.

Source: GHA Hospital Admissions Data

\textsuperscript{10} A more detailed description of our methodology can be found in Appendix A.
As shown on Exhibit 6 on the previous page, the percent of Georgia trauma patients admitted to trauma centers has increased from 49% in calendar year 2007 to 52% in calendar year 2011. The percent of trauma patients going to trauma centers has increased in seven of the 10 EMS regions. It appears that improvement in some regions is related to the designation of trauma centers, while in others EMS behavior is likely to have changed. These reasons were present in the two regions with the greatest improvement, as noted below:

- **Region 8**: Even though no new trauma centers have been designated in Region 8, the percent of trauma patients admitted to trauma centers has increased from 19% in 2007 to 45% in 2011. It appears that EMS providers have begun taking trauma patients to Archbold Memorial (the Level II trauma center in Region 8) rather than the non-designated hospitals. Commission staff also speculated that increased availability of air transport in Region 8 may have affected medics’ transport decisions.

- **Region 10**: The largest improvement in the percent of Region 10 trauma patients going to trauma centers occurred between 2009 (34%) and 2010 (67%). Athens Regional became a designated trauma center in December 2009. It appears that EMS providers were already taking patients to Athens Regional, and its designation increased the percentage.

Further improvements will likely occur in 2012 because Wellstar Kennestone (Region 3) became a Level II trauma center in November 2011. Wellstar Kennestone is one of the largest hospitals in the state, and it was already serving trauma patients from Cobb County and the surrounding area before its designation.

**Exhibit 7**

*Patient Admissions to a Trauma Center Based on Number of Injuries Have Not Changed Significantly Since 2007*

Note: This analysis does not consider severity of the injuries, only the number.

Source: GHA Hospital Admissions Data
According to ACS, patients with minor injuries may be treated at non-designated hospitals, while those with more severe injuries should be transported to a trauma center. As shown on Exhibit 7, our review found that EMS transports are likely consistent with this criteria.\textsuperscript{11} Approximately 44\% of trauma patients with an isolated injury have been admitted to a trauma center over the past five years, compared to 68\% of trauma patients with three or more injuries.\textsuperscript{12} It does not appear that statewide EMS behavior has changed significantly since 2007; the most severely injured patients have always been more likely to be treated at trauma centers. In addition, the percent of patients with multiple injuries treated at trauma centers increased two percentage points (68\% in 2007 to 70\% in 2011). However, if more Level II facilities became designated, further improvements would likely be observed.

RECOMMENDATIONS

1. The Commission and OEMST should collaborate to develop a performance improvement program that utilizes data to evaluate service delivery in the state’s trauma system. The performance measures should consider statewide and regional performance.

2. The Commission should utilize currently available data sets to obtain quantitative information showing the changes in system outcomes. Since OEMST is most familiar with its trauma registry and GEMSIS data, the Commission should request reports from OEMST showing statewide and historic trends related to trauma system performance.

Commission Response: “We are in agreement with the findings and recommendations.” Regarding performance measurement, the Commission noted that “Georgia is one of only two states (Michigan) with statewide TQIP participation. Beginning in FY 2014, the Commission, working in collaboration with the trauma centers and the Georgia Chapter of the American College of Surgeons Committee on Trauma, will look to utilize performance information, determined by TQIP data, to advance our performance-based payment program. Georgia’s incorporation of TQIP statewide and linkage of readiness payments to a performance-based payment program is viewed nationally as best practice.”

OEMST Response: Regarding data quality, OEMST stated that its “staff recognizes the importance of the EMS data set and has been working tirelessly on improving the quality of the GEMSIS system,” especially since a 2007 rule change required all EMS providers to report data. “Currently Staff is assessing the use of the GEMSIS data to provide data analysis and link GEMSIS data with trauma data.”

In regard to providing data to the Commission, OEMST stated, “Data published through OEMST is vetted through the state process and must be validated. The Commission does not have a process for validation and publication approval through DPH. No request by the Commission for reports from the trauma registry has been denied.” It stated that it attempted to educate the Commission on data

\textsuperscript{11} GHA data does not show who transported the patient to the hospital (ground ambulance, helicopter, or civilian transport). However, the majority of trauma patients are transported to the hospital by ground ambulance.

\textsuperscript{12} It should be noted that this analysis does not consider the severity of the injuries, only the number. ACS recommends that a patient with an isolated head injury, for example, should be treated at a trauma center, whereas care at a non-designated hospital may be sufficient for someone with two closed fractures.
Georgia Trauma Care Network Commission

availability but that the Commission “chose to request the entire database instead of focusing on
benchmarking.” It added that “Certain information available to OEMST has not been shared with
the Commission because of its proprietary nature. Members of the Commission are also competing
entities within the health care system. For this reason, OEMST does not share information that
could give Commission members an unfair advantage over their competitors.”

The Commission’s actions to improve trauma care are closely aligned with
criteria set by the American College of Surgeons and other states; however,
further improvements are needed.

In 2009, the Commission and OEMST requested a consultation by the American
College of Surgeons (ACS), widely viewed as the authority on what is required for an
optimal trauma system. The Commission has partially addressed many of the ACS
recommendations within its authority; however, significant work remains to fully
address the recommendations. Much of this work is included in the Commission’s
2012-2015 strategic plan.

The ACS report noted that Georgia’s trauma system had limited central state
authority to set standards; little uniformity in trauma triage and destination
protocols; limited resources to support infrastructure; and limited analysis of trauma
registry data for performance. The report included dozens of recommendations to
improve Georgia’s trauma system, but 20 were labeled as the most critical for the Georgia
trauma system’s short and long-term success. We condensed these 20 recommendations
into five areas: structure, financing, system development, operations, and
performance measurement. ACS’s recommendations – and the Commission’s actions –
are described below. Information on the current status of all 20 recommendations
can be found in Appendix C.

We also interviewed several states about their trauma operations, including states
contiguous to Georgia and best practice states identified by trauma stakeholders.13
Information about these states is included in the discussion below.

Structure

Georgia statute does not define a single lead agency for the trauma system.
According to ACS, there must be a statutorily assigned lead agency that has the legal
authority to enhance and improve trauma care. The agency should create rules and
regulations, define policies for stakeholders to work together, and evaluate
performance. In our interviews of the contiguous and best practice states, we found
that eight of the nine states had a defined structure in which the state office was the
lead agency and was advised by a committee of trauma experts. Louisiana assigned
an appointed commission as its lead agency.

Staff at the Commission and OEMST agree that the Commission’s statutory
responsibilities are related to funding and system development and OEMST’s
responsibilities are related to EMS regulation and trauma center designation.

13 The audit team interviewed Alabama, Arkansas, Florida, Louisiana, Mississippi, North Carolina,
South Carolina, Tennessee, and Texas.
However, ACS noted that without a lead agency defined in statute, there was no clear delineation of authority and powers between the Commission and OEMST. As such, it is unclear which entity is responsible for or authorized to ensure all trauma stakeholders are working together to effectively implement the system. For example:

- ACS interpreted that O.C.G.A. §31-11-102(8) provided the Commission with the authority to promulgate rules and regulations for the statewide trauma transportation network only. The Commission does not have the same authority for other aspects of the trauma system. (It does have limited ability to influence the system through grants.)

- While statute gives OEMST the authority to regulate EMS providers, it does not include responsibility for ensuring adherence to trauma system policies and procedures that may be adopted or endorsed by the Commission.

- The Commission is statutorily responsible for studying the provision of trauma care services in Georgia to develop best practices and propose changes to improve the system. However, data to evaluate the trauma system is housed at OEMST.

- The Commission is responsible for system development, but OEMST has the authority to recruit and designate trauma centers irrespective of selection factors that may be preferred by the Commission.

Unclear responsibilities have likely contributed to a relationship between OEMST and the Commission that is not always effectively collaborative. During the course of the review, we noted that the Commission and OEMST could not agree on which entity should analyze the datasets necessary for performance benchmarking (GEMSIS and the trauma registry) and that no meaningful effort to resolve this impasse was apparent. Commission staff also appeared unaware of the details of OEMST’s trauma system-related activities, such as the status of potential trauma center designation and even the occurrence of the follow-up to the ACS report.

The Commission and OEMST have acknowledged the importance of a working relationship. A memorandum of understanding between the two entities includes deliverables expected from OEMST in accordance with the funding received from the Commission. In addition, the two entities intend to collaborate on various initiatives moving forward.

**Financing**

In its recommendations, ACS noted the importance of identifying a sustainable and protected source of revenue to fund the administrative, personnel, and infrastructure costs of the system and its lead agency. ACS noted that all components of a trauma system (injury prevention, pre-hospital care, acute care, and rehabilitation) need sufficient funding to assure maximum service delivery.

Effective January 1, 2010, Commission funding became tied to fines related to Georgia’s super speeder law, which brings in approximately $15 million per year14.

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14 In fiscal year 2012, super speeder fines amounted to $16.5 million; approximately 73% ($11.9 million) had been collected as of June 30, 2012.
Also in 2010, a referendum expected to generate $80 million for the trauma system through vehicle registration fees did not pass. The Commission plans create a Georgia Trauma Foundation to raise money for the system by June 2013 and launch a campaign for permanent, additional funding in the future.

In addition, the budget for OEMST has decreased each year. OEMST staff reported losing approximately half of their regional officers; only one person now oversees each EMS region.

Trauma system funding in other states we interviewed varies. For example, in states such as Alabama, Louisiana, and North Carolina, state appropriations fund administrative costs only. In other states such as Florida and Mississippi, funding was available through fines and fees. Florida receives approximately $32 million per year from fines related to traffic violations. Mississippi receives approximately $24 million per year through an increase in fines related to moving violations, license plate renewal fees, and motorcycle, boat, and ATV point-of-sale fees. This revenue enables these states to distribute funds to trauma system stakeholders.

**System Development**

As recommended by ACS, the Commission has begun to re-engage a broad range of trauma stakeholders across the state. This broad constituency works to inform and educate others about the trauma system, implement trauma prevention programs, and assist in trauma system evaluation and research to ensure the right patient is sent to the right hospital at the right time. According to ACS criteria, involved stakeholders should include trauma center medical directors, nurse coordinators, EMS personnel, injury prevention advocates, and others.

Stakeholders are primarily involved in the trauma system through the Regional Trauma Advisory Councils (RTACs) in each EMS region. Three RTACs have been created and include stakeholders representing trauma centers and hospitals, EMS providers, physicians, nurses, and the public. Five regions will receive $50,000 RTAC startup grants in fiscal year 2013. The Commission intends to have RTACs in all regions by June 2014.

In addition, the Commission has three subcommittees that consist of trauma center medical directors, trauma coordinators and registrars, and EMS providers representing each EMS region.

**Operations**

The Commission has not yet developed a statewide trauma plan to facilitate the continuum of trauma care in Georgia, as recommended by ACS. The Commission has developed a framework for RTACs to use in developing regional trauma plans, which will then be compiled into a state trauma plan.

The framework follows ACS recommendations for identifying the role of stakeholders (EMS, trauma centers, and participating non-designated hospitals) and presents a general overview of system operations. EMS providers, for example, should have knowledge of the Georgia Trauma System Entry Criteria (see Appendix.

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1. Most RTACs will be committees of the region’s EMS Council. As such, the RTACs will report to both the Commission and OEMST.
B) and the protocol for using the Commission’s TCC. Trauma centers and participating hospitals should regularly update their availability of trauma-related specialties on the Commission’s Resource Availability Display, utilized by TCC operators making recommendations to medics transporting trauma patients.

The Commission cites the TCC as a major initiative in improving trauma system operations. However, to date it appears to be of limited usefulness to EMS providers. The TCC received 524 calls from January to September 30\(^6\), approximately two calls per day. Approximately 10% of the calls resulted in an accepted recommendation; EMS did not request a recommendation in 87% of the calls. The TCC can also be used by hospitals looking to transfer a patient to a trauma center. During the period reviewed, it received 18 hospital calls and had two with a recommendation given and accepted. The majority of EMS providers and trauma center representatives we interviewed did not intend to utilize the TCC on a daily basis because EMS medics and hospital staff were already aware of where they needed to take patients. The Commission intends to reevaluate the TCC based on the results of the pilot.

**Performance Improvement**

As discussed in the previous finding, the Commission has not developed a performance improvement plan for the state trauma system. According to ACS, evaluation of system-wide effectiveness would include outcomes of population-based injury prevention programs, access to care, availability of services, quality of services provided in pre-hospital and acute care phases, and financial impact or cost. Neither the Commission nor OEMST has utilized available data to measure whether operations and outcomes have improved over the past five years.

The performance improvement programs in other states we interviewed varied. Three states do not have a formal performance program, while other states regularly monitor data points related to pre-hospital and acute care. For example, Florida monitors the percent of trauma patients served within the golden hour, the state's mortality rate, the rate of readmissions to the intensive care unit, and the number of hours that more than one trauma center was on diversion. Louisiana also measures the percent of patients who were transported to the appropriate facility within an hour, as well as the number and percent of hospitals and EMS providers that participate in the system.

According to the Commission’s strategic plan, the Commission plans to establish system performance metrics by June 2014. Additionally, Level I and II trauma centers are participating in ACS’s Total Quality Improvement Program (TQIP), which helps measure quality of care against other participating trauma centers. The Commission intends to connect performance funding to the trauma centers’ performance in TQIP.

**RECOMMENDATION**

1. The General Assembly should consider revising state law to clearly define a lead agency for trauma care in Georgia. The lead agency should have the authority and responsibility to ensure compliance with rules and regulations and evaluate performance in a confidential manner.

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\(^6\) The TCC was a pilot program in Regions 5 and 6 from January to July and then went statewide in July. During the pilot program the TCC received approximately 67 calls per month (2.2 calls per day). After July, the average number of calls per month has increased to 71, or 2.4 calls per day.
2. In the absence of a state law change, the Commission and OEMST should continue with plans to clarify each entity's roles and responsibilities, specifically noting any areas of uncertainty (e.g., overlap or gaps in responsibility). The entities should then negotiate their roles in those particular areas.

3. The Commission and OEMST should continue to utilize ACS recommendations and best practice states to guide trauma system activities.

**Commission Response:** “We are in agreement with the findings and recommendations.” In addition, the Commission provided statements on two areas covered by the finding.

Concerning financing, the Commission stated that it “supports restoration of adequate OEMST funding to provide basic EMS regulatory services in Georgia.”

In regard to operations, the Commission stated that “During the time period addressed in the report, only two regions out of ten were participating in the [TCC] pilot project. Those two regions were chosen for the pilot project, in part, for the limited number of trauma centers contained within the two regions. In the majority of instances within the two chosen regions, medics should know the most appropriate destination for their trauma patient. This parameter provided the best environment to test the functionality of the TCC and its systems. For this purpose, the Commission believes the use of the TCC within the pilot regions has been successful. Going forward, the TCC will work to incorporate the use of available technologies in order to provide a more virtual access to the TCC to healthcare providers for effective trauma system patient disposition.” The Commission also noted that “The draft report emphasized the number of destination recommendations made but did not acknowledge any of the other times the TCC has been of service to EMS providers. These services include: patching calls to the receiving facilities, relaying hospital service line availability, and identification of closest non-designated [hospitals] for non-trauma system patients.”

**OEMST Response:** “OEMST is identified as the agency for designation of trauma centers in rules and regulations. This rule has been in place since the late 1970s. Regulatory activities preceded the establishment of the Commission.”

**Number of Trauma Centers**

While the number of designated trauma centers has increased since 2007, there are still areas of the state in which injured patients must be transported long distances to receive definitive care at a Level I or II trauma center.

Since the Commission’s creation in 2007, the number of trauma centers has increased from 15 to 21. Two of the six hospitals became Level II trauma centers, thus increasing the number of trauma centers able to provide definitive care to even the most serious trauma patients. However, the geographic distribution of Level I and II trauma centers has improved only slightly. As a result, there are still areas of the

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17 It should be noted that while Commission members and staff may work to recruit prospective hospitals to become trauma centers, the final decision about designation is made at DPH.
state—particularly in South Georgia—where residents are more than 50 miles away from definitive care at a Georgia trauma center.

Neither the Commission nor OEMST has developed a strategic plan for the desired number and type of trauma centers or where they should be located, though staff from both entities indicated a general idea of which areas of the state lacked definitive care through a Level I or II trauma center. According to the Commission’s strategic plan, criteria for the number of trauma centers will be developed by June 2013, and all Georgians will be within one hour of a Level I, II, or III trauma center by June 2015. The Commission will utilize GHA hospital discharge data to identify the non-designated hospitals that are serving large numbers of severely injured patients and work to recruit those hospitals into the system.

**Number of Trauma Centers**

Prior to the Commission’s formation, designated trauma centers were at risk of dropping out of the system, mainly due to the financial constraints. The Commission’s initial $52 million distribution helped stabilize the trauma centers, and no trauma center has lost its designation since 2007. Beginning in fiscal year 2010, OEMST began adding more trauma centers to the system.

As shown in Exhibit 8 below, the number of trauma centers has increased from 15 at the end of fiscal year 2007 to 21 at the end of fiscal year 2012. In fiscal year 2010, Athens Regional became a Level II trauma center, and Clearview Regional upgraded from a Level IV to a Level III. In fiscal year 2011, Taylor Regional became a Level III trauma center, and Atlanta Medical Center upgraded from a Level II to a Level I. Finally, in fiscal year 2012, Wellstar Kennestone became a Level II trauma center, Emanuel Medical and Wills Memorial became Level IV trauma centers, and Children’s Healthcare of Atlanta-Egleston upgraded from a Level II to a Level I.

**Exhibit 8**

**Six Trauma Centers Have Been Added Since Fiscal Year 2007**

<table>
<thead>
<tr>
<th>Trauma Center</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>Change Since 2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level I</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>+2</td>
</tr>
<tr>
<td>Level II</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>10</td>
<td>9</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Level III</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>+2</td>
</tr>
<tr>
<td>Level IV</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>+2</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>16</td>
<td>18</td>
<td>21</td>
<td>+6</td>
</tr>
</tbody>
</table>

Source: OEMST

As noted on page 5, the process of becoming a trauma center is extensive, particularly for those seeking Level I or II designation. Oftentimes, hospitals must obtain commitments from administrative and medical staff, hire additional staff such as trauma coordinators and registrars, and train emergency department personnel on how to triage and care for a trauma patient. For all facilities, the process takes at least six months to fulfill OEMST’s requirement of submitting data to the trauma registry. Staff at one recently designated trauma center estimated the process took approximately two years.
Commission staff indicated that two large hospitals intend to become Level II trauma centers in the coming year, though at the time of this report OEMST has not received any applications. In addition, a number of smaller hospitals have expressed interest in becoming Level III trauma centers.

**Geographic Distribution of Trauma Centers**

In order to assess the geographic distribution of trauma centers, we determined the number of Georgians living within 25 miles and 50 miles of the state’s Level I and II trauma centers, since they offer the highest level of care to even the most severe trauma patients. Though this methodology does not take into account travel time, which would vary in urban and rural areas, or identify areas that may have higher levels of trauma due to their proximity to heavily traveled roads, it is one useful metric to identify gaps in the system.

**Exhibit 9**

Approximately 66% of Georgians Reside within 25 Miles of Georgia’s Level I and II Trauma Centers

![Exhibit 9](image)

This chart shows residents within 25 miles of a designated trauma center in Georgia. An additional 6% of Region 1 residents are within 25 miles of Erlanger Hospital, a Level I trauma center in Chattanooga, TN, which increases Region 1’s percent to 92%. No other out-of-state trauma centers are within 25 miles of Georgia residents.

Source: MapPoint analysis, United States Census
As shown in Exhibit 9, 66% of Georgians reside within 25 miles and 90% reside within 50 miles of a Level I or II trauma center (see map in Exhibit 10 on the page 23). The percent of residents covered by a 25-mile radius from a Level I or II trauma center ranges from 15% in Region 8 to 90% in Regions 3 and 10. Of particular note:

- **Region 3**: The eight counties in Region 3 (metro Atlanta) account for nearly 40% of the state’s population. Approximately 90% of residents are within 25 miles of a Level I or II trauma center and 100% are within 50 miles. In addition, EMS providers from Region 3 indicated the distribution of trauma centers enables most patients to be transported to definitive care within the golden hour.

- **Regions 8 and 9**: Only 26% of Georgians in these regions live within 25 miles of a Level I or II trauma center, and about half are within 50 miles. In addition, there are no Level III or IV trauma centers in these regions to offer stabilization and transfer services. Region 9 EMS providers we interviewed stated they often transport trauma patients to the Level I trauma center in Jacksonville, FL (Shands Jacksonville). Approximately 7% of Region 9’s residents are within 50 miles of this trauma center, which increases the percent of Region 9 residents within 50 miles from 54% to 61%.

Though two Level II trauma centers have been added to the system since 2007, the percent of Georgians statewide within 25 miles of a Level I or II trauma center has increased only slightly from 63% in 2007 to 66% in 2012. This is mainly due to the geographic location of the trauma centers added.

With the addition of Athens Regional, the percent of Region 10 residents within 25 miles increased from 34% in 2007 to 90% in 2012. While Wellstar Kennestone's designation did not increase the percentage of Georgians within 25 miles of a trauma center, the travel time to a trauma center for residents in the north metro Atlanta area decreased by at least 30 minutes.\(^{18}\)

It should be noted that large, non-designated hospitals may have the clinical capabilities to provide adequate care to patients in areas that are far from a trauma center. For example, Exhibit 10 includes six hospitals that are similar in size to some Level II trauma centers\(^ {19}\) and, in at least some cases, serve a significant number of trauma patients due to their distance from designated trauma centers (as previously noted, two large hospitals intend to obtain Level II designation).

The option of having a Level I or II trauma center does not exist in all areas of the state. As shown in Exhibit 10, in large parts of Regions 5 and 9, there is no large non-designated hospital within a reasonable distance, but these areas do include other hospitals that provide emergency care 24 hours a day. While these smaller hospitals are unlikely to obtain a Level I or II designation, some may be able to provide the services required of a Level III or IV trauma center. ACS notes that Level III and IV trauma centers are crucial in rural areas.

\(^ {18}\) In normal traffic conditions, it takes approximately 30 minutes to drive the 21 miles from Wellstar Kennestone in Marietta to Grady Memorial Hospital (Level I) in Atlanta and 30 minutes to drive the 18 miles from Wellstar Kennestone to North Fulton Regional Hospital (Level II) in Roswell.

\(^ {19}\) This is based on the number of beds. Trauma center designation, however, is based on the availability of specialties such as orthopedics, neurology, etc.
In addition, as previously noted, EMS providers from Regions 1 and 9 indicated that they often transport trauma patients to Erlanger Medical Center (Level I trauma center in Chattanooga, TN) and Shands Jacksonville (Level I trauma center in Jacksonville, FL), respectively. Finally, EMS providers in counties far from a designated trauma center indicated they utilize air transportation when the patient’s condition warrants faster transport times.

Exhibit 10
A Large Portion of South Georgia is More Than 50 miles From a Level I or II Trauma Center
RECOMMENDATION

1. The Commission and OEMST should determine the number and level of designated trauma centers needed in Georgia based on geographic location, population density, and hospitals’ capabilities.

2. If additional trauma centers are designated and additional funding is unavailable, the Commission should ensure that its funding programs continue to strengthen the system by investing in trauma centers that are having the greatest impact on the system.

Commission Response: “We are in agreement with the findings and recommendations.”

Uncompensated Care

The Commission has mitigated approximately 24% of uncompensated care costs incurred by trauma centers and 65% incurred by participating EMS providers.

The Commission has distributed approximately $43.4 million to designated trauma centers to mitigate approximately 24% of their $183 million in uncompensated care costs for serving trauma patients over the past five years. EMS providers have received approximately $3.4 million from the Commission, which has covered approximately 65% of the $5.3 million in claims reported.

Trauma Centers

The Commission funds trauma centers’ uncompensated care costs based on patient volume and patient treatment cost norms developed by the National Foundation for Trauma Care. Trauma centers report the number of eligible trauma patients served three calendar years prior to the reporting year, categorized by severity. The Commission then calculates uncompensated care costs using the cost norms (e.g., the cost of treating a patient with an injury severity score of 4, for example, costs $5,267 at a community hospital compared to nearly $20,000 for a patient with an injury severity score of 24). Trauma centers’ total uncompensated care costs are added together for a total statewide cost. Trauma centers are given a percent of the funding available equal to their percent of the statewide total claims. Trauma centers must give 25% of their uncompensated care funding to individual physicians who provide trauma services to patients at the trauma center.

Since fiscal year 2009, designated trauma centers reported providing uncompensated care services to 13,300 trauma patients, totaling approximately $183.2 million. On average, trauma centers reported about $36.6 million in uncompensated care each year, though over the past two fiscal years the average has been approximately $28 million. Commission staff stated this decrease likely resulted from a more refined

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Uncompensated Care: Care to a trauma patient who has no medical insurance, is not eligible for medical assistance coverage, has no third party coverage, and has not paid after documented attempts by the service provider to collect payment. (OCGA §31-11-100)

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20 For example, uncompensated care distributions for fiscal year 2013 are based on claims from services rendered in calendar year 2010. These numbers are audited by a consultant for the Commission.

21 Eligible physicians include emergency physicians, trauma surgeons, burn surgeons, neurosurgeons, radiologists, orthopedists/hand surgeons, plastics/maxillofacial surgeons and anesthesiologists who are identified in the trauma center’s trauma registry and burn repository.
definition of applicable patients, as well as the Commission’s audits of trauma centers’ reported numbers.

Most (84%) of the uncompensated care costs are incurred by the Level I trauma centers. In particular, Grady Memorial Hospital’s (Level I in Atlanta) uncompensated care claims constituted 41% of the total claims of the past five fiscal years; the next highest, Memorial Health (Level I in Savannah), comprised 14%.

As shown on Exhibit II below, the Commission’s uncompensated care funding was nearly $24 million in fiscal year 2009; it has dropped to $5.2 million in fiscal year 2013. As a result, the percent of trauma centers’ uncompensated care costs mitigated by Commission funding decreased from 61% in fiscal year 2009 to 18% in fiscal year 2013. Trauma center staff we interviewed indicated that while the funding is helpful, it is not enough to make a significant impact in their operations.

**Exhibit 11**

Commission Funding has Mitigated Approximately 20% of Trauma Centers’ Uncompensated Care Costs in Last Two Fiscal Years

EMS

While all designated trauma centers receive some level of uncompensated care funding (if they have applicable patients), EMS providers receive reimbursement through a grant application process. Eligible trauma patients must have been transported to a designated trauma center in Georgia (as confirmed by inclusion on
the trauma center’s trauma registry). Cost is calculated using a $400 base pay plus a mileage reimbursement rate of $6.85 per mile for urban counties and $10.28 for rural counties. Providers are then paid a percent of total available funds equal to their share of the total calculated costs.

As shown on Exhibit 12 below, funding for EMS uncompensated care has decreased from $1.4 million in fiscal year 2009 to $748,000 in fiscal year 2012. The percent of claims funded has varied, ranging from 100% in 2009 to 30% in 2011.

**Exhibit 12**
Commission Funding Since 2009 has Mitigated Approximately 65% of EMS Providers’ Uncompensated Care Costs

The program has largely benefited urban providers, with approximately 60% ($2.1 million) going to 13 EMS providers in Region 3 (metro Atlanta). The second highest region—Region 5—received 14% ($465,000).

While the Commission staff initially estimated that 155 providers transport trauma patients to designated trauma centers and would thus qualify for an uncompensated care grant, approximately 50% (75) providers have participated thus far. Some EMS providers we interviewed indicated that the number of eligible patients was not high enough to warrant taking the steps necessary to demonstrate that attempts were made to collect payment.

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22 The ratio for rural mileage is based on Medicare payment formula.
Ambulance Replacement Grants

The extent to which the Commission’s ambulance replacement grant program benefits trauma patients is unclear.

Over the past four years, the Commission has awarded 76 EMS providers 111 grants to replace old, high mileage ambulances. According to Commission members, the program was expected to increase the likelihood that EMS providers would transport trauma patients to trauma centers. While the Commission has not determined whether the grants have impacted EMS transport decisions, our analyses indicate that the grants have had little effect on EMS transport decisions.

According to O.C.G.A. §31-11-102 (7) and (8), the Commission is responsible for supporting trauma transportation. It is expected to compensate members of EMS providers for readiness and should appropriate money for investment in a system specifically for trauma transportation...to provide transport to trauma victims where current options are limited. As shown on Exhibit 4 on page 8, the Commission has distributed $14.1 million to EMS providers for ambulance grants, uncompensated care reimbursements, training, and equipment grants.

The $8 million in ambulance replacement grants comprises approximately 57% of the EMS funding over the past four years. The program targets rural EMS providers by favoring those that operate in counties located a greater distance from a trauma center that have a low number of hospital beds in their county and low population density (the uncompensated care program was designed to benefit urban EMS providers due to the volume of patients). Each grant amounts to approximately $72,000 per vehicle. As shown in Exhibit 13 below, grant recipients continue to meet the Commission’s initial criteria. In particular, the average age and mileage of vehicles replaced has not diminished significantly over the past four years, indicating the continuing presence of old/high mileage ambulances. See Exhibit 14 on the next page for a map of the counties in which grant recipients operate.

### Exhibit 13

<table>
<thead>
<tr>
<th>Grant Criteria</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicle Age</td>
<td>10.2</td>
<td>10.9</td>
<td>11.3</td>
<td>10.2</td>
<td>10.5</td>
</tr>
<tr>
<td>Vehicle Mileage</td>
<td>197,717</td>
<td>203,424</td>
<td>227,709</td>
<td>191,642</td>
<td>200,685</td>
</tr>
<tr>
<td>Distance from a Trauma Center</td>
<td>65.2</td>
<td>78.9</td>
<td>68.5</td>
<td>83.7</td>
<td>71.8</td>
</tr>
<tr>
<td>Population Density</td>
<td>48.7</td>
<td>51.5</td>
<td>45.0</td>
<td>55.4</td>
<td>50.1</td>
</tr>
<tr>
<td>Number of Acute Care Beds</td>
<td>31.8</td>
<td>37.9</td>
<td>27.0</td>
<td>39.2</td>
<td>34.1</td>
</tr>
</tbody>
</table>

Source: Commission Documents
The Commission believed that EMS medics who had to travel long distances to transport patients to a trauma center were less likely to make the trip if they had an older, high mileage ambulance. However, the Commission has not confirmed that grant recipients have changed their transport decisions because they now have a
more reliable vehicle. Rather, the Commission’s studies and surveys have confirmed that recipients are located in counties far from a trauma center, that older, high mileage vehicles have been replaced, and that the new vehicle has improved the dependability of the EMS fleet and reduced time related to unscheduled repairs.

Based on our analysis of GHA hospital discharge data, it appears that the grants did not increase the likelihood of a transport to a trauma center. We compared the GHA hospital discharge data of trauma patients from counties that received an ambulance replacement grant in fiscal years 2009 and/or 2010 with those from counties that did not receive a grant. As shown in Exhibit 15 below, the percent of trauma patients admitted to trauma centers increased by two to three percentage points from 2008 to 2011, regardless of whether the EMS provider serving the patient’s county of residence received a grant in 2009 and/or 2010.

Exhibit 15:
2009-2010 Ambulance Grants Do Not Appear to Affect Trauma Patient Transports

![Chart showing the average number of trauma patients admitted to designated trauma centers and non-designated hospitals in counties that received and did not receive grant, as well as statewide averages.]

(1) These numbers indicate the county in which the patient resides, which may or may not be the county in which the patient was injured. In addition, GHA data does not indicate who transported the patient to the hospital (911 EMS provider, air ambulance, or civilian transport).

Source: GHA Hospital Admissions Data

23 The GHA data does not specify the location of the patient’s injury or the entity that transported the trauma patient, only the county where the patient resides. The audit team cannot conclude that all patients from a county were injured in that county and were also transported by the EMS provider serving the 911 zone in that county.
Potential Alternatives for Fulfilling O.C.G.A. §31-11-102
(Based on interviews with trauma stakeholders)

- **Air Transport:** While air transport cannot be relied upon 24/7 due to weather limitations, it is a valuable resource in areas far from a trauma center. Helicopters can generally transport patients to definitive care faster than ground ambulances. Though it is considerably more expensive, the Commission could consider ways to invest in air transport as a component of the trauma transportation system, particularly in areas without designated trauma centers.

- **Trauma-Related Training:** A number of EMS providers we interviewed indicated more training should be made available to EMS in rural areas, as well as first responders. In addition, all EMS providers could benefit from education about the CDC trauma triage criteria and transport decision scheme, trauma centers’ and community hospitals’ capabilities, and system participation. The Commission could work with OEMST and Georgia EMS Association to require EMS providers and medics to take a trauma-related course to maintain their licensure.

- **Trauma-Related Equipment:** In a recent Commission-sponsored survey of EMS providers who had received a vehicle grant, the most commonly requested funding was trauma equipment.

- **Consolidation of EMS Providers in Small Counties:** According to EMS stakeholders, small rural counties could improve their operations – and thus improve service delivery to their patients – through consolidation. This spreads out administrative costs and increases the number of vehicles and medics able to respond to a call. Montgomery and Toombs counties, as well as Wilcox and Crisp counties, utilize this structure, and, according to the EMS providers, the arrangement has benefited patients in these counties. The Commission could help subsidize pilot programs for counties that would benefit from a more regionalized EMS program.

At the regional level, it appears the grant may have impacted EMS providers in Region 5. Trauma patients from counties that received a grant in 2009 and/or 2010 were 16% more likely to be admitted to a trauma center, compared to 5% in counties that did not receive a grant. However, the difference in improvement was not as significant elsewhere in the state, and, in some regions, improvement was less pronounced in counties that received grants compared to those that did not.

**Exhibit 15** also shows that it is unlikely that EMS providers in the counties that have received a grant transport a large number of trauma patients. On average, 165 trauma patients admitted from 2008-2011 resided in a county that received a grant, less than half the statewide average of 381. As such, the return on investment in those counties is not likely to be significant.

Our interviews with EMS stakeholders support these findings, with EMS providers citing additional factors related to their transport decisions. EMS providers in small rural counties stated they may not go to a trauma center because there is no backup crew to cover the county for the duration of the transport. Additionally, EMS providers operating in remote counties indicated that when a trauma patient’s injuries are severe enough to warrant care at a trauma center, the EMS provider calls for air transport.

Prior to the Commission’s funding, both public and private EMS providers replaced their vehicles as a standard operating expense. However, EMS providers indicated that due to financial constraints they would not have been able to get a new vehicle without the Commission’s funding. Some EMS providers stated that the grant enabled them to use their own funds to purchase additional equipment.

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24 Region 5 is the only region to have implemented its regional trauma plan, which may have also impacted EMS providers’ transport decisions.
No other state we interviewed has EMS funding streams devoted solely to ambulance replacement grants, or even uncompensated care. Rather, states that fund EMS distribute general block grants that can pay for a variety of items. For example, Mississippi distributes approximately $4 million to EMS in grants based on county size, which can be used for medic salaries, training, commodities such as gas, equipment, capital investments such as ambulances, or an escrow account. In Arkansas, 15% of the total trauma budget goes to EMS providers based on the level of basic or advanced life saving training and population; grants must be used toward trauma system enhancement.

**RECOMMENDATION**

1. The Commission should evaluate the ambulance replacement program’s impact on trauma patients using defined metrics to determine whether it is the best use of EMS distribution funds.

*Commission Response:* “We are in agreement with the findings and recommendations.”
Appendix A: Objectives, Scope, and Methodology

Objectives
This report examines the Georgia Trauma Care Network Commission (the Commission) at the request of the House Appropriations Committee. Specifically, the Committee asked us to measure the degree of success the Commission has attained in reaching their original goals, which include:

1. Increasing the number of Level I, II, and III trauma centers;
2. Improving service delivery and response times;
3. Mitigating uncompensated care through the distribution of formula funds; and
4. Addressing the need for and benefit from providing ambulance purchases.

Scope
This audit generally covered activity related to the Commission that occurred from its inception in 2007 to 2012. Information used in this report was obtained by reviewing relevant laws, rules, and regulations, interviewing Commission members and staff, interviewing staff at the state Office of EMS and Trauma (OEMST), and reviewing Commission and OEMST documents.

We reviewed calendar years 2007-2011 hospital discharge data collected by the Georgia Hospital Association (GHA), which includes information such as patient demographics, injury type and cause, and whether the facility was a designated trauma center. We assessed the controls over data used for this examination and determined that the data used were sufficiently reliable for our analyses.

We interviewed representatives from seven designated trauma centers, one burn center, and two non-designated hospitals. Our sample was based on location, designation level, and duration of designation. We conducted site visits of one trauma center at each designation level, as well as one non-designated hospital. We also interviewed 14 EMS providers based on their location, urban vs. rural, size of operation, and participation in Commission initiatives and grant programs.

Finally, we interviewed representatives of state trauma programs in the contiguous states, as well as best practice states mentioned in discussions with Commission and OEMST staff.

Methodology
To determine the extent to which the number of Level I, II, and III trauma centers has increased, we reviewed documentation from OEMST showing the dates of designation for each of the current trauma centers. We also assessed whether the geographic distribution of trauma centers had increased the percent of Georgia residents living within 25 and 50 miles of a designated trauma center. We utilized the most recent census tract population data from the United States Census.

25 We interviewed representatives from Grady Memorial Hospital, Georgia Health Sciences University, Floyd Medical Center, Wellstar Kennestone, Archbold Memorial, Taylor Regional Hospital, Morgan Memorial, Grady Burn Center, Phoebe Putney Memorial Hospital, and Northeast Georgia Medical Center. We conducted site visits at Grady, Kennestone, Taylor, Morgan, and Northeast Georgia.

26 The audit team interviewed Alabama, Arkansas, Florida, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Texas.
To obtain information on service delivery and response times, we attempted to utilize OEMST's trauma registry and EMS data; however, the data was insufficient to develop a baseline of performance prior to the Commission's formation. We also reviewed critical recommendations made by the American College of Surgeons during a 2009 evaluation of Georgia's trauma system and assessed current status based on document reviews and interviews with Commission and OEMST staff.

We reviewed calendar year 2007-2011 GHA hospital discharge data to determine whether a larger percentage of trauma patients are being cared for at designated trauma centers. We utilized criteria set by ACS, as well as methodology utilized by OEMST for a similar study, to identify our trauma patient population. We selected all patients whose primary reason for admission was an injury. We limited our population to patients who were admitted to the hospital for more than 48 hours, patients who were transferred to or from another hospital, and patients who died. We excluded patients whose primary injuries were likely treatable at non-designated hospitals or specialty centers, including sprains and strains, dislocations, burns, closed fractures, and pelvic or femoral fractures that resulted from a same-level fall in patients over 65 years. We reviewed this methodology with Commission members, a consultant utilized by the Commission, and OEMST epidemiologists, who found it to be a valid method of identifying the most serious trauma patients.

To determine the extent to which the Commission has mitigated uncompensated care costs through the use of formula funds, we reviewed Commission documents showing the number of patients reported by trauma centers, the Commission's cost calculations, and the amount of funding distributed. We also reviewed documents showing EMS claims and the amount of Commission funding.

To determine the extent to which the Commission has addressed the need for and benefit from providing ambulance purchases, we reviewed grant recipients’ applications and interviewed trauma stakeholders and other states representatives. We also used GHA data to compare the percent of trauma center admissions of trauma patients from counties who had received a vehicle replacement grant in 2009 and/or 2010, those that had not received a grant, and the statewide average.

This special examination was not conducted in accordance with generally accepted government auditing standards (GAGAS) given the timeframe in which the report was needed. However, it was conducted in accordance with Performance Audit Division policies and procedures for non-GAGAS engagements. These policies and procedures require that we plan and perform the engagement to obtain sufficient, appropriate evidence to provide a reasonable basis for the information reported and that data limitations be identified for the reader.
Appendix B: Georgia Trauma System Entry Criteria

2011 Guidelines for Field Triage of Injured Patients

1. Measure vital signs and level of consciousness
   - Glasgow Coma Scale ≤13
   - Systolic Blood Pressure (mmHg) <60
   - Respiratory Rate ≥20
   - or need for ventilatory support
   - (infant aged ≤1 year)

   NO → Assess anatomy of injury
   YES

2. Assess mechanism of injury and evidence of high-energy impact
   - Falls
     - Adults: ≥20 feet (one story is equal to 10 feet)
     - Children: ≥10 feet or two or three times the height of the child
   - High-risk auto crash
     - Intrusion, including roof: ≥12 inches occupant side
     - ≥18 inches any site
     - Ejection (partial or complete) from automobile
     - Death in same passenger compartment
     - Vehicle telemetry data consistent with a high risk of injury
   - Auto vs. pedestrian/bicyclist thrown, run over, or with significant (>20 mph) impact
   - Motorcycle crash ≥20 mph

   NO → Assess special patient or system considerations
   YES

3. Assess special patient or system considerations
   - Older Adults
     - Risk of injury/death increases after age 55 years
     - SBP ≤110 may represent shock after age 65
     - Low impact mechanisms (e.g. ground level falls) may result in severe injury
   - Children
     - Should be triaged preferentially to pediatric capable trauma centers
   - Anticoagulants and bleeding disorders
     - Patients with head injury are at high risk for rapid deterioration
   - Burns
     - Without other trauma mechanism: triage to burn facility
     - With trauma mechanism: triage to trauma center
   - Pregnancy ≥20 weeks
   - EMS provider judgment

   NO → Transport according to protocol
   YES

Transport to a trauma center, which, depending upon the defined trauma system, need not be the highest level trauma center.

When in doubt, transport to a trauma center.

Find the plan to save lives, at www.cdc.gov/FieldTriage

Source: Georgia Trauma Care Network Commission
## Appendix C: Critical American College of Surgeons Recommendations and Current Status

<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Current Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Structure</strong></td>
<td></td>
</tr>
<tr>
<td>Recommend to the legislature to enact legislation that includes an assigned lead agency and the establishment of rules, regulations, policy, and procedures.</td>
<td><strong>Not Implemented</strong>: Georgia law currently does not assign a lead agency to the trauma system.</td>
</tr>
<tr>
<td>Clearly define in statute, rule, or policy the relationship between OEMST and the Commission, along with reporting and accountability mechanisms.</td>
<td><strong>Partially Implemented</strong>: The Commission and OEMST now have a memorandum of agreement tied to OEMST’s funding from the Commission. However, current statute does not clearly delineate the roles of each entity related to trauma. The Commission has requested an Attorney General opinion to clarify responsibilities.</td>
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<tr>
<td>Ensure that system leadership delineates the vision for Georgia’s trauma system, including the development and deployment of operational policy.</td>
<td><strong>Partially Implemented</strong>: The Commission’s regionalization framework presents a vision for the state trauma system’s operations. The Commission plans to promulgate rules and regulations by June 2013, though enforcement authority is unclear.</td>
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<td>Perform a strategic analysis to assess the optimal lead agency structure and position within Georgia’s state government.</td>
<td><strong>Partially Implemented</strong>: OEMST hired an epidemiologist dedicated to the trauma registry in December 2010. The Commission and OEMST plan to identify additional key positions needed by June 2014.</td>
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<td>Provide OEMST and regional EMS offices with adequate staff to efficiently manage and ensure EMS services and providers are appropriately educated, credentialed, licensed, certified, and monitored to ensure competent patient care.</td>
<td><strong>Not Implemented</strong>: OEMST’s regional staff has been reduced by half since 2009. Currently there is only one person over each EMS region. Though the Commission now gives 3% of its total funding to OEMST, this has supplanted the decreased state appropriations.</td>
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<tr>
<td>Appoint a state EMS medical director who has medical oversight of the EMS system as that individual’s primary focus.</td>
<td><strong>Fully Implemented</strong>: OEMST’s deputy medical director has had primary oversight over the EMS division for the past two years.</td>
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<td><strong>Financing</strong></td>
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<td>Identify a sustainable and protected revenue source for the essential administrative, personnel, and infrastructure costs for the trauma system’s lead agency.</td>
<td><strong>Partially Implemented</strong>: A 2010 referendum to add $10 to annual vehicle registrations for trauma system development did not pass. Commission funding is now tied to super speeder revenue. The Commission intends to implement a campaign for adequate and permanent funding in the future.</td>
</tr>
<tr>
<td>Seek legislative changes to O.G.C.A. §31-11, Article 5 that continue the cost of readiness support to trauma centers and EMS and clarify that the lead agency funding allotments must be payable before other funds are distributed.</td>
<td><strong>Fully Implemented</strong>: O.G.C.A. §31-11 continues readiness support to trauma centers and EMS. Though the law does not prioritize OEMST’s funding over distribution funds, Commission budget documents show this to be the practice.</td>
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<tr>
<td><strong>System Development</strong></td>
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<td>Re-engage a broad range of stakeholders and empower them to provide input on system development.</td>
<td><strong>Fully Implemented</strong>: Commission subcommittees and Regional Trauma Advisory Councils (RTACs) include stakeholder representatives, including physicians, designated trauma centers, non-designated hospitals, local governments, and the public.</td>
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**Appendix C (Continued)**

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<th>Recommendation</th>
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<tr>
<td>Identify roles for all hospitals and stakeholders in an inclusive trauma system within the trauma system plan.</td>
<td><strong>Fully Implemented:</strong> Roles for trauma centers, non-designated hospitals, and EMS providers are defined in the Commission’s regionalization framework, which serves as a model for each region’s trauma plan.</td>
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<tr>
<td>Establish multi-disciplinary regional trauma advisory committees centered around Level I or II trauma centers and their catchment areas.</td>
<td><strong>Partially Implemented:</strong> RTACs are established in three of the 10 EMS regions. The Commission expects all RTACs to be established by June 2014.</td>
</tr>
<tr>
<td>Define roles, responsibilities, and accountabilities for all acute care facilities in an inclusive system related to trauma care.</td>
<td><strong>Partially Implemented:</strong> Roles for trauma centers and participating non-designated hospitals are outlined in the Commission’s regionalization framework. The Commission is currently working to create letters of commitment for participating non-designated hospitals.</td>
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**Operations**

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<tr>
<td>Develop a comprehensive trauma system plan to facilitate integration of all services through a collaborative process involving all stakeholders and community partners.</td>
<td><strong>Partially Implemented:</strong> RTACs will create regional plans that will then form the state trauma plan. Currently, two regional plans have been developed.</td>
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<td>Ensure each region has an established plan for back-up EMS coverage at the local level when the patient’s condition requires primary transport to a distant trauma center or specialty care facility.</td>
<td><strong>Partially Implemented:</strong> Though EMS providers have been required to have mutual aid agreements, OEMST staff indicated these are not regularly reviewed. OEMST and Commission staff indicated this would be addressed in RTAC regional plans.</td>
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<tr>
<td>Establish uniform, clearly defined designation criteria, including critical and non-critical criteria deficiencies for each trauma center level, modeled on current ACS guidelines.</td>
<td><strong>Partially Implemented:</strong> OEMST is currently developing a manual for potential trauma centers that will clearly identify critical and non-critical deficiencies for each trauma center level.</td>
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<td>Establish state criteria for trauma center diversion with regional adoption of notification plans and time frames for diversion. Make diversion a reportable event tied to funding support and designation.</td>
<td><strong>Partially Implemented:</strong> State criteria for diversion do not exist. However, trauma centers and participating hospitals operate a Resource Availability Display, which shows the availability of specialties related to trauma care. The Commission will monitor trauma centers’ RADs and will tie a portion of performance funding to their RAD updates in fiscal year 2014. <strong>Fully Implemented:</strong> The Commission has partnered with the Georgia Emergency Management Agency’s Automatic Vehicle Locator System program, which enables EMS directors to know the location of all their vehicles on a daily basis and in the event of a disaster. The Commission has also helped fund First Responder Training. Finally, DPH’s Office of Emergency Preparedness has partnered with the Georgia Hospital Association to create a system for tracking patients and their possessions during a disaster event, which EMS medics can use on a daily basis.</td>
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Focus disaster training and preparedness initiatives on programs that can be integrated into daily and routine use.
### Appendix C (Continued)

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<td><strong>Performance Measurement</strong></td>
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<tr>
<td>Link allocation of cost of readiness funding to deliverables</td>
<td><strong>Partially Implemented</strong>: A portion of trauma centers’ readiness funding has been tied to performance measures since fiscal year 2010. The measures, however, are limited to outputs rather than outcomes or access to care. The Commission plans to tie future funding to more sophisticated measures.</td>
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<td>designed to support performance improvement in areas of system management,</td>
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<td>access to care, patient safety and outcomes, and the financial stability of</td>
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<td>the system and its components.</td>
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<tr>
<td>Develop and implement a statewide and regional trauma system performance</td>
<td><strong>Not Implemented</strong>: The Commission has not developed a performance improvement plan for the system. The Commission intends to establish performance metrics by June 2014.</td>
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<td>improvement plan.</td>
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<tr>
<td>Use existing trauma registry data to develop simple benchmarking reports.</td>
<td><strong>Not Implemented</strong>: The trauma registry has been used to provide a descriptive picture of trauma in Georgia; however, it does not appear to have been used for benchmarking.</td>
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Source: Commission documents, stakeholder interviews
The Performance Audit Division was established in 1971 to conduct in-depth reviews of state-funded programs. Our reviews determine if programs are meeting goals and objectives; measure program results and effectiveness; identify alternate methods to meet goals; evaluate efficiency of resource allocation; assess compliance with laws and regulations; and provide credible management information to decision-makers. For more information, contact us at (404)657-5220 or visit our website at www.audits.ga.gov.