

TRAUMA REGIONALIZATION

EMS REGION VI

JULY 2011

EXECUTIVE SUMMARY

Traumatic injuries represent a serious health concern for Georgia. The all injury death rate in Georgia is eight percent higher than that of the national average. Motor vehicle crashes (MVC), which account for the majority of injuries in the state, are the leading killer of children, teens and young adults (ages 5 to 34) among the top ten causes of death for all ages. The CDC has estimated the total crash-related death cost in Georgia in one year to be \$1.55 billion dollars, \$17 million of that total in medical costs alone. Studies have shown that many of these deaths are preventable and that the implementation of a trauma system in other states has reduced deaths and improved outcomes from traumatic injury. While trauma patients account for a small percent of the total emergency system response, trauma accounts for a large percent of total years of potential life lost. An inclusive trauma system incorporates all emergency response resources into a system to match the needs of the trauma patient with the appropriate emergency and trauma care resources.

As a result, Georgia is working towards a state-wide trauma system. In order to meet this goal, the Georgia Trauma System will be comprised of integrated regional systems and plans. Each region will represent a trauma service area which will accommodate overlapping and traditional patient catchment areas and incorporate state-wide EMS Regional infrastructure. The Region VI plan will organize existing resources to provide a comprehensive trauma care system to care for patients from the moment of injury through rehabilitation. This plan will address both urban and rural concerns. Rural trauma care is complicated by issues associated with geographic isolation including but not limited to, time from injury to discovery, extrication issues, distance to immediate healthcare as well as local health care resource availability. The development, implementation, and operation of a trauma system is a complex process which requires concerted efforts from all health care providers. Coordination of system activities, data-driven planning, a well defined infrastructure and stable funding are critical to the success and cost effectiveness of the system.

The pages that follow describe the essential components of the Region VI Trauma Plan and Regional Trauma Advisory Committee.

MISSION, VISION AND GOALS

Mission: The mission of the Region VI Trauma plan and committee is to reduce the burden of trauma through injury prevention efforts focused on injury data and statistics specific to Region VI. To ensure the right patient gets to the right hospital with the resources necessary to provide appropriate definitive care in the shortest amount of time and when injured, that victims of trauma receive care across the continuum from pre-hospital through rehabilitation that is of the highest quality to ensure the best possible outcome.

Vision: The Region VI plan and committee will provide leadership regarding the care of trauma patients within the region and across regional and state boundaries where appropriate.

Goals:

- Reduce the number of preventable deaths
- Improve outcomes from traumatic injury
- Reduce medical costs through appropriate use of resources.

Objectives:

- Provide oversight and guidance for system evaluation, education and training programs, and public education and prevention strategies.
- Monitor availability of resources, assure compliance with system standards, and work in conjunction with the State Office of EMS & Trauma (OEMS&T) to develop a process for review of trauma care.
- Evaluate trauma patient outcomes at a system level.
- Ensure that resources within Region VI and those appropriate resources surrounding Region VI are fully incorporated into the Trauma Plan to enable access to care when needed.
- Analyze the impact and results of the system and make recommendations for change as appropriate to assure quality outcomes.

ADMINISTRATIVE COMPONENTS

REGIONAL TRAUMA ADVISORY COMMITTEE

The Region VI Trauma Advisory Committee (RTAC) is established to act as a local resource for input to and support of the Georgia State-wide Trauma Plan. It is the aim of the committee to assist in the reduction of human suffering and cost associated with morbidity and mortality that result from trauma. The RTAC will be instrumental in analyzing local trauma care trends and in promoting regional injury prevention activities and quality improvement actions in an effort to reduce the incidence of trauma and when injury occurs deliver appropriate and timely trauma care across the continuum. The duties of the RTAC are as follows:

1. To promote cooperation and to support communication among trauma care providers, organizations and hospitals;
2. To provide a forum to discuss and resolve issues between trauma care providers;
3. To promote education, public awareness and prevention activities regarding regional trauma;
4. To identify and analyze trends and patient care outcomes based on trauma registry and TCC data;
5. To implement and oversee quality improvement activities within the system to achieve the highest level of trauma care that meets ACS standards: and,
6. To facilitate and encourage hospitals within the region to seek designation at the appropriate resource level.

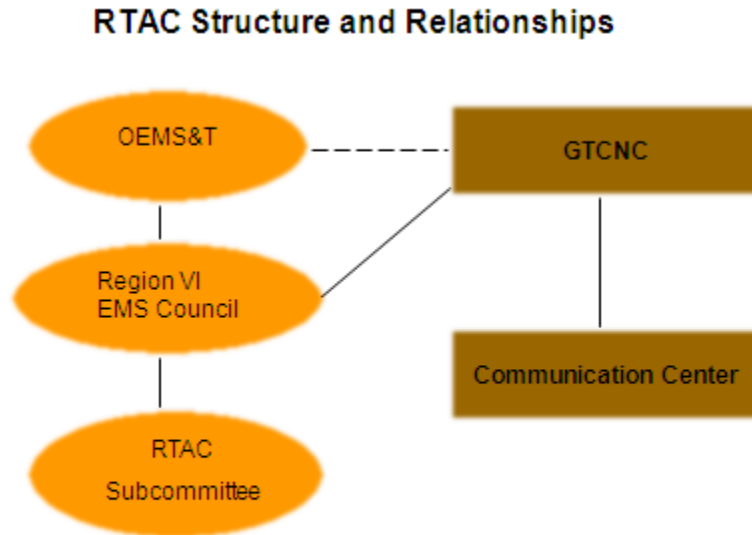
AUTHORITY, STRUCTURE AND FUNDING

The RTAC is a committee of the Region VI EMS Council who is responsible to the Office of EMS and Trauma (OEMS&T) under the Department of Public Health. There is collaboration between the Regional Trauma Advisory Committee (RTAC), Region VI EMS Council, OEMS & T and the Georgia Trauma Care Network Commission (GTCNC). The GTCNC established the Regional Trauma Care Network Planning Framework in September of 2009. This framework is used as a guide to develop and implement regional trauma plans. The GTCNC reviews and approves regional trauma system plans

in conjunction with the OEMS&T. The GTCNC also manages and distributes financial resources for the trauma system.

The Georgia OEMS&T, under the department of Public Health, will be the authoritative structure for the regional plan, with the Region VI EMS Council as the regional authority. Figure 1 demonstrates the RTAC structure and reporting relationships.

Figure 1



RTAC MEMBERSHIP

All RTAC members are appointed by the Region VI EMS Council Chair. There will be a minimum of 15 members appointed. The RTAC functions under the rules and regulations of the Region VI EMS Council and their bylaws. This includes setting a quorum for meetings and removal of committee members for attendance or other issues identified in the bylaws. The members of the RTAC will be central to the success of the regional plan and state-wide trauma system development. The membership shall be active and will require contribution and interaction of all the members.

The membership of the RTAC will be made up of stakeholders who are representative of the demographics of the region and the various components of the trauma system. The initial RTAC will consist of members with staggered terms of appointment.

RTAC Executive Committee (Term - 2 years with option to renew)

The RTAC chair will preside at all RTAC meetings and will be responsible to sign any/all agreements and/or documents necessary on behalf of the RTAC. The chair will set the meeting agenda and facilitate meeting discussion. He/she must be a full voting member of the Region VI EMS Council.

The Vice- chair shall perform the duties of the chair when the chair is absent from a meeting. The Vice-chair is not required to be a member of the Region VI EMS Council.

The secretary will call the role and determine if a quorum is present. They will maintain all minutes of the meetings and distribute to the general membership. They will review and maintain copies of all organizational correspondence and assist in the dissemination of information to the general membership.

The Permanent Member at Large will be a representative of the Level I Trauma Center in the region.

RTAC General Membership (Term - 2 years with option for renewal)

Hospital Members (minimum of 3) – members from this group should be from senior hospital management. At least one member will be from a rural hospital who is a designated or non-designated participating hospital.

EMS Members (minimum of 3) – at least one member will be from an urban 911 EMS service area, at least one member will be from a rural 911 EMS service area and at least one member must provide direct patient care.

Physician Members (minimum of 3) – one member will be a rural physician who is actively providing trauma care at a designated or non-designated participating hospital. One member must be a trauma surgeon from the highest level designated center in the region.

Nurse Members (minimum of 2) – nurses serving on the RTAC will preferably have knowledge of both pre-hospital care as well as hospital care and ideally will have experience in trauma related educational activities or injury prevention activities.

EMSC Representative (1) – There will be a member from EMSC appointed to RTAC to oversee and make recommendations on pediatric trauma care.

At Large Members– the following areas will be considered for At Large membership, others may be included as needed; Law Enforcement, Emergency Management , Injury Prevention, Business and Industry, Public Health to include epidemiologist, Emergency Preparedness, Fire Service, Government Officials and previous trauma patients and/or family members.

OPERATIONAL AND CLINICAL COMPONENTS

TRAUMA REGISTRY AND TCC DATA

Rational decision-making regarding trauma care must be made based upon the understanding of the causes, treatment and outcomes of injury. Trauma registry information and TCC data includes the actual information surrounding the event as well as the hospital course and outcome. This information can be utilized by the individual hospital, as well as at the state level for epidemiology and injury control studies. The trauma registry and the TCC provide the mechanism to collect data and to evaluate trauma care systems, patient care quality improvement, resource utilization, medical research and education on the hospital, regional and state level.

PREHOSPITAL CARE

In 2009 the State of Georgia contracted with the American College of Surgeons, Committee on Trauma to provide a comprehensive study of trauma care in Georgia. The group recognized that "EMS is often the critical link between the injury-producing event and definitive care at a trauma center"..."the pre-hospital care component of the larger emergency healthcare system. It is a complex system that not only transports patients, but also includes public access, communications, personnel, triage, data collection, and quality improvement activities."

In a study done in Georgia several years ago this "critical link" was identified when the study showed that 89% of all critical trauma patients were delivered into the system by EMS. Figure 2.

EMS – The Critical Link

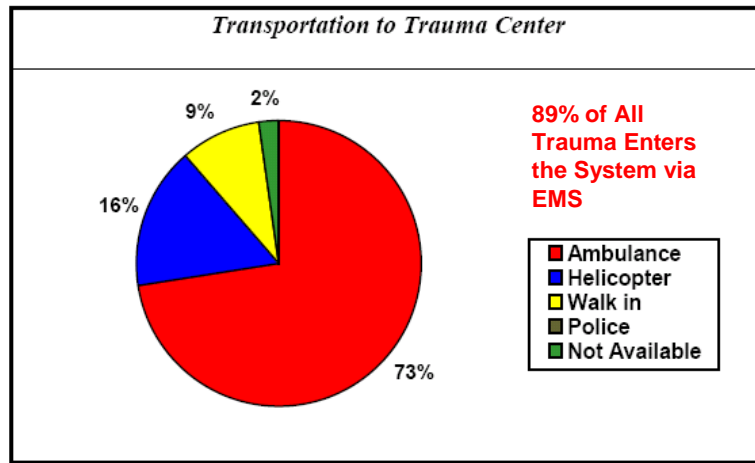


Figure 2

However, EMS is not definitive care. No trauma patient is “saved” in the back of an ambulance. These patients are saved by a fully functioning system that includes a well-equipped, well trained, EMS component working hand-in-hand with physicians and nurses who are trained and dedicated to this task. To achieve the best outcome for these patients the patient must be transported to the appropriate hospital in an expeditious manner.

This section of the plan addresses the pre-hospital component of a comprehensive regional trauma plan. To insure the best possible outcome for all trauma patients several things must occur. These include:

1. Identification of Resources and planning for the best use of these, often scarce, resources within Region VI and those appropriate resources outside the region
2. Patient triage and selection of the “most appropriate” facility. Use of the Trauma System entry Criteria (TSEC) criteria and the CDC Field Triage Decision Scheme
3. Standardized protocol for of care developed using the American College of Surgeons, Committee on Trauma guidelines
4. Development of evidence based decision making tools for determining the method of transport
5. Standardized training for all 911 EMS professionals using PHTLS and/or ITLS to include
 - Pediatric training
 - Geriatric training
 - Obstetrical training

IDENTIFICATION OF RESOURCES

East Central Georgia's Region VI is comprised of 13 Counties. Appendix A of this document provides a view of Region VI and its relationship in the State of Georgia. EMS resources within this region consist of ten different 911 EMS agencies. These include:

GROUND AMBULANCES (GEORGIA)

1. Gold Cross EMS – which provides 911 coverage in the geographical areas of Richmond, Columbia and Jefferson Counties
2. Augusta Fire Department also operates two ambulances within Richmond County as a co-provider of 911 services
3. Burke County EMS – which provides 911 coverage in the geographical area of Burke County
4. Emanuel County EMS – which provides 911 coverage in the geographical area of Emanuel County
5. Jenkins County EMS – which provides 911 coverage in the geographical area of Jenkins County
6. Lincoln County EMS – Which provides 911 coverage in the geographical area of Lincoln County
7. McDuffie County EMS – which provides 911 coverage in the geographical area of McDuffie County and Glascock County
8. Screven County EMS – which provides 911 coverage in the geographical area of Screven County
9. Warren County EMS – which provides 911 coverage in the geographical area of Warren County
10. Wilkes County EMS – which provides 911 coverage in the geographical area of Wilkes County and Taliaferro County.

AIR AMBULANCE (GEORGIA)

1. AirMed EMS operates two helicopters based in Richmond County
2. MCG LifeNet operates one helicopter based in Richmond County
3. Omni Flight operates one helicopter immediately south of Region VI in Vidalia, GA and one aircraft east of Region VI in Springfield GA.
4. AirEvac operates one helicopter immediately south of Region VI in Vidalia GA and one aircraft immediately east of the Region in Statesboro, GA

NON-911 AMBULANCES (GEORGIA)

1. Capital City Ambulance Service
2. SouthStar Ambulance Service

Patients enter the trauma system from South Carolina as a bordering state to Region VI. As such it is important to include resources from the neighboring county who transport patients to the trauma center.

GROUND AMBULANCES (SOUTH CAROLINA)

1. Aiken County EMS – provides primary 911 coverage for Aiken County, SC
2. Palmetto Ambulance – Provides back-up 911 coverage for Aiken County through mutual aid agreement
3. South Star Ambulance – Provides back-up 911 coverage for Aiken County through mutual aid agreement
4. Capitol City Ambulance – Provides back-up 911 coverage for Aiken County through mutual aid agreement
5. Aiken Rescue Squad – Provides back-up 911 coverage for Aiken County through mutual aid agreement

AIR AMBULANCES (SOUTH CAROLINA)

1. MCG Lifenet details above
2. Airmed details above
3. Omni Flight – operates a helicopter from Medical University of South Carolina in Charleston, SC

NON-911 AMBULANCES (SOUTH CAROLINA)

1. Capitol City Ambulance
2. Palmetto Ambulance
3. South Star Ambulance
4. Regional Ambulance

5. Aiken Rescue Squad
6. Belevedere Rescue Squad
7. Jackson First Alert

A more complete listing of the resources operated by these services in Region VI is available in Appendix B

PATIENT TRIAGE AND SELECTION OF THE "MOST APPROPRIATE" FACILITY

The Center for Disease Control (CDC), working with the American College of Surgeons, Committee On Trauma (ACSCOT), has developed the Field Triage Decision Scheme: The National Trauma Triage Protocol for use in identifying the most severely injured patients. The Georgia Office of EMS and Trauma has adopted this as part of the State's Pre-Hospital treatment Protocol. The GTCNC has developed the "Trauma System Entry Criteria (TSEC)" using this nationally accepted protocol. This TSEC will be used to assist in determining the appropriate patient destination. It is essential that the State approved protocol be used as the standard by which all decisions are made. To use a variety of methods would invite confusion and not allow appropriate study of patient outcomes.

The CDC Field triage Decision Scheme: The National Trauma Triage Protocol is listed in Appendix C

THE TRAUMA COMMUNICATION CENTER

To assist the EMS provider in identifying the appropriate trauma patients for transport to a designated trauma center the Georgia Trauma Commission established the Trauma Communication Center (TCC). This center is staffed with professionals who will have the ability to instantaneously identify the "status" and "capability" of each participating hospital in the system. These staff members will provide guidance to the EMS professional and notification to the Trauma Center that the patient is enroute. This center will also be able to direct the EMS provider to a non-designated participating hospital that can provide the definitive care based on resource availability if the patient's condition and injuries makes this destination appropriate.

The TCC will be located in Forsyth, Georgia and will be operational in September. It is recognized that some EMS services within Region VI could have difficulty connecting to the communication center. Appendix B, which lists EMS resources, identifies the number of ambulances that do not have cell phone capability. Some services may be able to use their 911 dispatch as a "bridge" to the TCC others may not have this capability. The RTAC will need to address this limitation and develop a clear

communications plan to ensure connectivity from the field to the TCC. It is also important to note that the EMS professional caring for the patient and Medical Control will have the final decision as to patient destination.

STANDARDIZED PROTOCOL

The 2009 ACS study stated: "The EMS system medical director must have statutory authority to develop protocols, oversee practice, and establish a means of ongoing quality assessment to ensure the optimal provision of pre-hospital care. ... the EMS system medical director must work closely with the trauma system medical director to ensure that protocols and goals are mutually aligned. The EMS system medical director must also have ongoing interaction with EMS agency medical directors at local levels, as well as the state EMS for Children program, to ensure that there is understanding of and compliance with trauma triage and destination protocols" The development of these protocols is essential for the optimal performance of the system. Without this standardization it will be difficult, perhaps impossible, to adequately study outcomes and make improvements to the system. It may be necessary to modify these protocols based on time and distance from the trauma center. These protocols should be reviewed annually based on patient outcomes and current science.

DEVELOPMENT OF EVIDENCE BASED DECISION MAKING TOOLS FOR DETERMINING THE METHOD OF TRANSPORT

Region VI is a large area. The distance from the southern end of our region and the Level One Trauma Center is over 100 miles. The ACS study points out: "Periodic assessment of dispatch and transport times will also provide insight into whether resources are consistent with needs. Each region should have objective criteria dictating the level of response (advanced life support [ALS], basic life support [BLS]), the mode of transport, and the disposition of the patient based on the location of the incident and the severity of injury. A mechanism for case-based review of trauma patients that involves pre-hospital and hospital providers allows bidirectional information sharing and continuing education, ensuring that expectations are met at both ends"

Data on each trauma admission that looks at the amount of time from the initial injury to the arrival of the patient at definitive care will be reviewed. Patient "hand offs" from EMS to definitive care will be evaluated to insure that the trauma patient is moved through the system in a rapid and efficient manner. In addition, times spent in community hospitals before transport and transport times comparing both ground and helicopter transportation will be evaluated. It is essential that open and professional conversations occur between all levels of providers. If we are to improve the "system" we must think of it as a system of care and be willing to address limitations of both the system and individual components of the system.

Resources availability will be evaluated when developing decision tools. The EMS provider is faced today with an increasing constraint on destination decisions. Trauma, Stroke, STEMI, and pediatric patient populations are quickly moving toward a

regionalization approach to care. This will increase the transport time for most if not all providers in Region VI. The ACS study: "Ensure that 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" The study also addresses the "home rule" or local government control status of Georgia as it relates to EMS back up coverage. This political concept will not be an easy issue to address. EMS Directors and Governmental leaders must be willing to increase resources where possible and share resources when needed.

STANDARDIZED TRAINING FOR ALL 911 EMS PROFESSIONALS

According to the ACS, "It is critical that trauma system leaders work to ensure that pre-hospital care providers at all levels attain and maintain competence in trauma care. However, trauma care knowledge and skills need to be continuously updated, refined, and expanded through targeted trauma care training such as Pre-hospital Trauma Life Support®, Basic Trauma Life Support®, and age-specific courses. Mechanisms for the periodic assessment of competence, educational needs, and education availability within the system should be incorporated into the trauma system plan.

The Region VI RTAC will review the current education standards of EMS and if needed address any gaps in order to develop a robust training needed will program to insure that all of our EMS providers are competent in providing trauma care.

STEPS TO ACCOMPLISH EMS GOALS

EMS leaders must be willing to change some long held policies. They must be willing to immediately transport trauma patients to the appropriate centers. In some cases this may be to a local hospital where needed lifesaving procedures, not available to the EMS provider, need to be performed. To do this we will need to develop more human resources or be willing to "float" services across imaginary lines (county boundaries). These changes will not be easy and will take much planning and discussion. The EMS subcommittee of the Trauma Commission has discussed utilizing funds to provide EMT-B courses in rural areas to help "back fill" the 911 zones when immediate transport is required. The Trauma Commission has provided money to train Medical First Responders to insure a quicker response to rural areas distance from an EMS station. The Region VI Council should support this initiative.

Pre-hospital providers must embrace the trauma interfacility transfer as a "true emergency" situation and not just a "hospital transfer". In some cases the local 911 provider does not make "hospital transfers" which means that the hospital must call a non-911 service to make the transfer. This often means this provider must travel long distances to make this happen. For pre-hospital, long distance = long times.

EMS must be trained, understand and follow the CDC trauma triage guidelines as well as be adequately trained in PHTLS or ITLS. The pediatric components must also be utilized to insure that this very important aspect of our responsibility is met. Goals should be set to insure that within three years all of the providers in Region VI have taken and successfully completed one of these courses. Money needs to be provided by the trauma commission to provide these classes. To reach this goal 7 classes would need to be provided annually. Instructors should avail themselves of the training materials available from the CDC. The EMS instructors in Region VI will work with the Trauma Center to develop training materials for these courses. Review of the State Trauma Protocols will be done annually in conjunction with the OEMS&T. If changes are made, providers will have training regarding the changes. EMS leadership will have to develop tools to evaluate and insure compliance with these changes. The GAEMS has obtained a two year grant from the State Office of Rural Health to work on protocol development and compliance. As this project begins we should take advantage of this opportunity.

We have much to do, but we have great resources to work with. Highly trained and motivated people working together will improve the trauma care for the citizens of this Region.

HOSPITAL CARE

HOSPITAL COMPONENT

The regionalization plan is being developed as an inclusive system which allows all hospitals to have a role in providing trauma care. The goal is to assure that all trauma patients receive optimal care, given available resources and the needs and locations of the patient are matched with the resources of the system.

Figure 3 shows the continuum of hospital participation in the Georgia Trauma System:

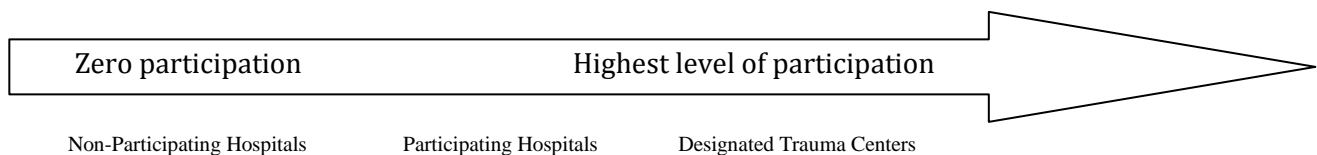


Figure 3

Hospitals will participate in the Georgia Trauma System on a voluntary basis, either as state-designated Trauma Centers or as non-designated participating hospitals. Georgia Trauma Centers are designated by the State Office of EMS and Trauma (OEMS&T) using standards based on the American College of Surgeons Trauma Center Verification Standards. (Appendix D)

The Region VI EMS Council, with recommendations from the RTAC will determine the optimal number and location of Level I, II, III and IV trauma centers based on

geography and population density to allow optimal care of trauma patients and to manage patients locally as much as possible. These recommendations will be forwarded to the OEMS&T for final approval.

Level III and IV Centers are generally located in areas that do not have adequate Level I or II resources. Level III and IV Centers must have good working relationships with the nearest Level I or II Trauma Center, for Region VI that is the Level I Center located in Augusta.

There should be Pediatric and Burn Resources identified. Depending on geography, pediatric and burn centers in adjacent states may be the most appropriate resource. Region VI has both a Pediatric and Burn specialty center located in Augusta. The Georgia Health Sciences Children's Medical Center and the Joseph M. Still Burn Center.

Trauma Centers participating in the Georgia Trauma System may determine at any time whether their status is "system-open" (have adequate resources currently available and are able to receive Trauma System patients based on system operations protocols) "system-caution" (lack some primary resource availability but are able to receive Trauma System patients based on System operations protocols) or "system-closed" (have to receive patients per System routine protocols). All Trauma Centers are able to broadcast their status as system-open, system-caution, or system-closed at will. A Trauma Center status record is a system performance point reviewed by the RTAC. Non-designated participating hospitals will accept patients according to service-line availability and will self-determine open, caution and closed status independently.

Each participating hospital will have a point of contact designated 24/7 who is responsible for status determinations. The RTAC will review status records of participating hospitals as a performance improvement point. Each participating hospital must actively participate in Plan development and the regional performance improvement plan.

Trauma Center Participation

Trauma centers are de-facto participants in the Georgia Trauma System and thus the regional plan. The OEMS & T has defined in policy the process for Trauma Center Designation, re-designation and regulation. As a condition of designation, Trauma Centers will participate in regional trauma system planning and performance improvement. Appendices E and F contain all relevant information on the designation of Trauma Centers in the Georgia Trauma System. Appendix E provides detailed information on Trauma Program administration and Trauma and specialty Center designation, re-designation and status level changes. Appendix F is a Hospital Resources Checklist for Georgia Trauma Center Designation.

Non-designated Participating Hospital

Non-designated participating hospitals are acute care community hospitals with emergency departments that have varying capabilities to receive and treat low acuity

trauma patients. These hospitals will not receive Trauma System patients in transfer and their level of participation will be determined on a hospital by hospital basis in collaboration with the RTAC. The Trauma Communication Center (TCC) will not recommend transport of Trauma System patients to non-designated participating hospitals. These hospitals participate in the Georgia Trauma System by signing a letter of commitment indicating conditions of participation.

The advantage of Trauma System participation to non-designated hospitals is access through the Resource Availability Display (RAD) to all other participating hospitals service line availability and assistance in transfer of trauma patients to the appropriate level and located trauma center. Non-designated participating hospitals will also participate in regional trauma development activities, have access to known data and be publically identified as a participant in the state trauma system.

Inter-facility Transfer Guidelines (Appendix G) will be established and used to assist the practitioner in identifying the types of injured patients who may benefit from early transfer to a specialty care service at another hospital within the system. These are intended to be guidelines and are not hospital specific. The goal is to identify patients who require transfer early so that the necessary arrangements can be made for transfer where optional care can be provided without unnecessary delay. The TCC will assist any non-designated participating hospital with transfer options.

The American College of Surgeons Committee on Trauma has developed criteria for consideration of transfer. Figure 4 outlines the criteria for consideration of transfer (Resources for Optimal Care of the Injured Patient 2006)

A. Critical Injuries to Level I or highest regional trauma center
1. Carotid or vertebral artery injury
2. Torn thoracic aorta or great vessel
3. Cardiac rupture
4. Bilateral pulmonary contusion with PaO ₂ to FIO ₂ ratio of < 200
5. Major abdominal vascular injury
6. Grade IV or V liver injuries requiring >6U RBC transfusion in 6 hours
7. Unstable pelvic fracture requiring >6U RBC transfusion in 6 hours
8. Fracture or Dislocation with loss of distal pulses

B. Life-threatening injuries to Level I or Level II trauma center
1. Penetrating injury or open fracture of the skull
2. GCS score < 14 or lateralizing neurologic signs
3. Spinal fracture or spinal cord deficit
4. >2 unilateral rib fractures or bilateral rib fractures with pulmonary contusion
5. Open long bone fracture
6. Significant torso injury with advanced comorbid disease (such as coronary artery disease, COPD, type 1 diabetes mellitus, or immunosuppression)

Figure 4

Education and Training

All designated trauma centers must meet the professional education and training requirements specified by the American College of Surgeons Committee on Trauma. Level I and II trauma centers can enhance the competence and skill of personnel at Level III and IV centers by providing regular multidisciplinary education and care reviews for personnel at these centers.

COMMUNICATIONS COMPONENT

The communications component is vital to the operation of the Georgia Trauma System as the link between all components of the system. The Communications component will provide:

1. Essential information regarding the status of pre-hospital capabilities and Trauma Center and non-designated participating hospital resource availability on a constant basis;
2. Access to Trauma System information i.e., regional protocols and trauma system entry criteria;
3. A linkage between injury scene and definitive hospital care for the rapid exchange of the injured patient care needs and the required resources; and,
4. Support for system-wide data collection to ensure system compliance for regional performance improvement activities.

Georgia Trauma Communication Center

The Trauma Communication Center (TCC) coordinates Trauma System activities by maintaining and providing information on Trauma Center status and, when appropriate, on pre-hospital capabilities. This information is used to ensure that patients meeting TSEC criteria have access to definitive trauma care at an appropriate level of state-designated Trauma Center. The TCC is continually staffed by personnel with specific and in-depth knowledge of trauma system design, function, and protocols. While use of the TCC is not mandatory, it is a resource that will provide quick access to real time resource availability.

The TCC operates through statewide guidelines and region-specific protocols established by the RTAC, Regional EMS Council, OEMS&T and the GTCNC. The TCC **ONLY** provides information and recommendations about patient destination as per pre-established regional protocols for system function. The TCC serves as an information resource for EMS providers, trauma centers and non-designated participating hospitals. The general functions of the TCC are to:

1. Provide information on system entry criteria based on statewide guidelines as requested by system stakeholders and providers;

2. Assign a unique system I.D. number for each patient meeting TSEC;
3. Collect brief pre-hospital database information;
4. Maintain available resource information and the functional status of all system trauma centers and non-designated participating hospitals at all times and, when appropriate, knowledge of system's pre-hospital capabilities;
5. Provide information regarding secondary **triage** status of the patient based on statewide guidelines and approved regional protocols;
6. Establish dependable communication link between field EMS provider and receiving facility;
7. Record and enter pre-hospital data for the **Trauma System Communication Database**;
8. Arrange inter-facility transfers of TSEC patients between trauma centers and non-designated participating hospitals; and,
9. Coordinate communication for optimal resource utilization using pre-established statewide guidelines and regional protocols for medical surge during mass casualty incidents or public health emergencies in collaboration with the Department of Public Health Division of Preparedness and Response and the Georgia Emergency Management Agency.

The data collection capabilities attributed to the TCC in the list above and the description of the RAD below are based upon an information system currently under development. This information is subject to change based upon selection of the information system and software design.

Resource Availability Display (RAD)

The RAD is the point of communication between hospitals and the TCC. A RAD terminal at each participating hospital provides the TCC with a continuous and real-time functional status display of all participating hospital's capabilities.

Trauma centers and non-designated participating hospitals have distinct display options for resource availability. Trauma centers will use the RAD to display overall status as either "system-open", "system-caution", or "system-closed". These status labels will inform TCC destination recommendation to EMS providers based on regional protocols and EMS provider discretions. Non-designated participating hospitals will make RAD updates based upon the availability of specific service lines at the hospital. All information should be accurate and timely. Such availability updates will enable the TCC to make informed patient transfer recommendations.

Participating hospitals are responsible for updating their respective resource displays. The TCC maintains a consolidated system-wide available resource database. All hospital status changes will be automatically communicated to the central system monitoring

station at the TCC and to all other participating hospitals. All participating hospitals can view all other participating hospitals' resources status updates through the RAD. A record of participating hospitals' resource status over time will be available to each RTAC for regional performance improvement activities.

PERFORMANCE IMPROVEMENT

Trauma system evaluation is achieved through a comprehensive Performance Improvement Plan (PIP). The purpose of the plan is to review system performance as related to patient needs, system resources, medical care and cost. Trends in care and outcomes must be identified and appropriate system adjustments made to improve the quality and timely availability of trauma patient care. Ongoing evaluation of the trauma care system is essential throughout the continuum of patient care.

Performance improvement emphasizes a continuous multidisciplinary effort to measure, evaluate, and improve both the process of care and the outcomes. The trauma care providers, EMS, Hospital, TCC and others will gather detailed data regarding services rendered to the trauma patients. Specific data related to system performance will be submitted to the Region VI RTAC for analysis. The RTAC will provide a quarterly report of the data which then can be utilized to identify opportunities for improvement.

In order to deliver the best possible care for the injured patient, both system and individual hospitals must develop PI plans and there must be close cooperation between these programs.

The performance improvement program of the RTAC will establish and monitor performance improvement benchmarks and indicators based on data-driven, nationally established guidelines for regional trauma system outcomes. This oversight includes the development and evaluation of process improvement measures from all aspects of trauma system care, including injury prevention, pre-hospital, acute, and rehabilitation services. As of June 2011, this process is in its earliest stages and primary efforts are focused on further developing the Regional Trauma System Planning Framework Goals and Aims which are:

1. Develop a matrix of what and how success will be measured
2. Identify current mortality rate for Region VI – determine what is target rate and when
3. Establish how this section impacts education and training
4. Incorporate data from the Trauma Registry for performance improvement
5. Incorporate data from the Trauma Communications Center for performance improvement
6. Perform an annual review of system performance as related to patient needs, system resources, medical care, and cost

Prior to engaging in the development of the above goals, members of the Region VI RTAC used the Trauma System Self-Assessment Supplemental Tool to complete a self-assessment of the current status of the Region VI trauma system based on national benchmarks and indicators published in the Model Trauma System Planning and Evaluation document, compiled by the US Department of Health and Human Services Administration (2006). The results of this assessment were used as the foundation for the matrix of what and how success will be measured in this region, in combination with a review of trauma systems literature, published guidelines from the Resources for the Optimal Care of the Injured Patient compiled by the American College of Surgeons Committee on Trauma (2006), and recommendations by regional trauma care expert-members of this task force.

The American College of Surgeons Committee on Trauma [ACS-COT (2006)] has identified determinants of trauma system performance which augment the concepts identified in the Model Trauma System Planning and Evaluation document (2006). These include important *system* variables such as 1) efficacy of care; 2) safety of care; and 3) cost of care, as well as *patient* variables such as 1) survival; 2) quality; and 3) ease of recovery. Thus, these concept variables were also incorporated into the performance improvement matrix in addition to the benchmarks and indicators identified by Model Trauma System Planning and Evaluation document where appropriate.

A significant portion of the system and patient performance improvement indicators identified by our task force represent beginning efforts by the Region VI Trauma Advisory Council (RTAC) to meet the "next step" indicators for those self-assessment items in the Model Trauma System Planning and Evaluation document that were rated lowest by task force members during the self-assessment exercise. It is the intent of the RTAC Performance Improvement Task Force that progress towards these and all other indicators will be evaluated annually, and that the indicators will be updated as each benchmark is met by the developing and maturing Region VI trauma system.

During the development of this performance improvement matrix, indicators from other national and regional trauma system guidelines were also incorporated into this document. These include but are not limited to the CDC Guidelines for Field Triage of Injured Patients (2009), the Minnesota Trauma System Performance Improvement Plan, the Birmingham (AL) Regional Emergency Medical Services System Regional Trauma System Plan, and the New Mexico Trauma Strategic Action Plan.

As the Region VI trauma system performance improvement process evolves and matures, this task force will further define the following concepts, using the Minnesota Trauma System Performance Improvement Plan as the primary basis for our model:

1. Standing membership and regional representation structure
2. Recurring task force responsibilities and oversight
3. Specific patient population to assessed across all care entities
4. Data collection and information sources
5. Scope of review and key task force activities

6. Documentation and reporting activities

Likewise, the document upon which these goals and concepts are recorded is expected to evolve and mature, and will likely be followed by multiple revised versions.

Aim 1: Develop a matrix of what and how success will be measured

In accordance with the directive set forth by the Regional Trauma System Planning Framework document, data-driven performance improvement efforts will utilize data from at least three data sets, including, but not limited to 1) pre-hospital data; 2) the hospital trauma registry; and the 3) Trauma System Communications Database

TABLE 3. SYSTEM VARIABLES:

SYSTEM ENTITY	ACS-COT CONCEPT : Efficacy	ACS-COT CONCEPT: Safety	ACS-COT CONCEPT: Cost	HRSA QUALITY INDICATOR ACTION
Injury Prevention	Baseline data is currently needed. Agree-determine what is being done now- Percent annual reduction in patients with injury diagnosis codes within Region 6	Number of annual community education programs aimed at injury prevention and safety within Region 6	Determine cost and feasibility of TV ads, newspaper ads, radio spots, bill boards, mailers, teen education in high schools	Indicator# 304.1: An annual report on the status of injury prevention efforts within the Region 6 catchment area will be prepared and distributed to all stakeholders within the region. Content of this report will be determined by available injury statistics data.
Pre-hospital	Data to determine	Educate pre-hospital providers and have	Ensure appropriate	Indicator 302.6: Universal trauma

	if all pre-hospital agencies are utilizing the trauma triage criteria	‘standardization’ of trauma treatment. Mandate this education among pre-hospital providers to ensure best practice.	level of care- often determined by pre-hospital agencies for trauma patients thus perhaps reducing cost and eliminating denials Develop transfer or transport relationship with trauma center EXAMPLE : Insurance carrier denials or percent of accounts paid within 90 days	triage criteria have been developed for use by all pre-hospital care providers within the Region 6 catchment area. OR: (Pick) Indicator 305.2: All-hazards training is a routine part of trauma system training.
Hospital	Standardize trauma assessment for ER staff. This effort should provide cleaner data for TRACS. Decision tree for trauma patients determining	Encourage outlying hospitals to participate in the state trauma system by developing more Level II / III/ IV centers statewide. Increase awareness of and determine facility capabilities with regards to providing care for trauma patients.	Transfer agreements with trauma centers. Participation in data collection which is then reported to state trauma.	Indicator 307.2: The designated trauma centers engage in review of patient care outcome data to evaluate each center’s performance against national norms. This process will be designation-specific – for example, Level II centers will compare their data

	appropriate level of care.			against national norms for other Level II centers.
Rehabilitation	Definitely need baseline data with regards to numbers of trauma patients requiring rehab and injury specific outcomes	Develop plan to engage rehab facilities in trauma system plans/data collection/collaboration efforts	Need more information with regards to percentage of trauma pts requiring rehab services and the average cost	Indicator 308.1: Rehabilitation centers and outpatient rehabilitation services are integrated into the regional trauma system plan.

TABLE 4. PATIENT VARIABLES:

PATIENT ENTITY	ACS-COT CONCEPT: Survival	ACS-COT CONCEPT: Quality	ACS-COT CONCEPT: Ease of Recovery
Injury Prevention	Determine percentage of injuries that were preventable or possibly preventable. Determine sectors of public that might need more education with regards to trauma prevention.	Percent annual reduction in injury severity as measured by ISS within Region 6	
Pre-hospital	Mortality Morbidity	Response time Time to definitive care	

		Patient satisfaction	
Hospital	Mortality Morbidity	Unplanned re-admissions Length of stay Patient satisfaction Complications	Time to inpatient rehabilitation consult Monthly percentage of inpatient rehabilitation consultations for eligible patients
Rehabilitation		Length of stay Patient satisfaction	Functional independence measure Post-injury employment (Parks, 2010)

INJURY PREVENTION AND OUTREACH

One of the major goals of any trauma system is the development of programs to prevent unnecessary injuries and deaths due to trauma. The goal of these programs is to reduce behavioral and environmental risks by mobilizing communities through citizen involvement and expanded partnerships. Education and awareness strategies are often employed to encourage individuals to protect themselves from harm. Effective prevention requires a multifaceted approach including;

1. Review of research and data to accurately describe the burden of traumatic injury;
2. Sharing all injury data from multiple sources so that interventions may be target areas of highest risk;
3. Development and implementation of strategies to decrease individual risk factors and environmental risks ;and,
4. Collaboration and coordination at the community level to increase local ability to address needs.

The injury prevention goals for Region VI are as follows:

1. Identify current injury prevention programs within Region VI

2. Review injury data and define areas that are not currently addressed

Injury prevention resources

The Department of Community Health provides mini grants for county care seat distribution for low income families. Participants from Region VI include the following counties: Wilkes, Lincoln, Taliaferro, McDuffie, Warren, Richmond, Glascock, Jefferson, Burke, Emanuel, Screven and Jenkins.

The Georgia Traffic Injury Prevention Institute (GTIPI) trains and certifies child passenger seat technicians. Provides care fit train the trainer programs and the PRIDE program (Parents Reducing Injury and Driver Error).

SafeKids East Center, led Georgia Health Sciences Children's Medical Center provides a multitude of injury prevention programs aimed at children.

Fire and burn safety programs are provided by the Joseph M. Still Burn Center at Doctor's Hospital in partnership with the Southeastern Firefighters Burn Foundation, The Georgia Firefighters Burn Foundation, and local fire department.

Fort Gordon provides a gun safety program. Local law enforcement participates in both the DARE and GREAT programs and the Georgia State Patrol conducts the click it or ticket program, the impaired driver simulation program and conducts numerous road blocks throughout the year.

The local Family YMCA is the host of several water safety programs.

Gaps in injury prevention efforts

1. Prevention programs seem to be focused around children and burn safety;
2. There are more resources and programs available in the urban areas and less in rural areas;
3. There is no central location or entity coordinating and implementing a plan for injury prevention in the region;
4. There is no coordination of regional injury data from which to trend and identify target area for prevention programs; and,
5. Limited funding.

Regional plan to address gaps:

1. Develop a list of what and where injury prevention resources and programs are for the region;

2. Develop and injury prevention timeline and strategy for implementation in Region VI
3. Develop an ongoing relationship with the East Central Public Health District, EMS and designated and non-designated participating hospitals to advertise and implement programs;
4. Create a resource of EMS community ambassadors by including injury prevention into their CEU licensure requirements; and,
5. Develop a mechanism to aggregate and analyze existing data sources to trend injury morbidity and mortality for the region in order to target injury prevention efforts.