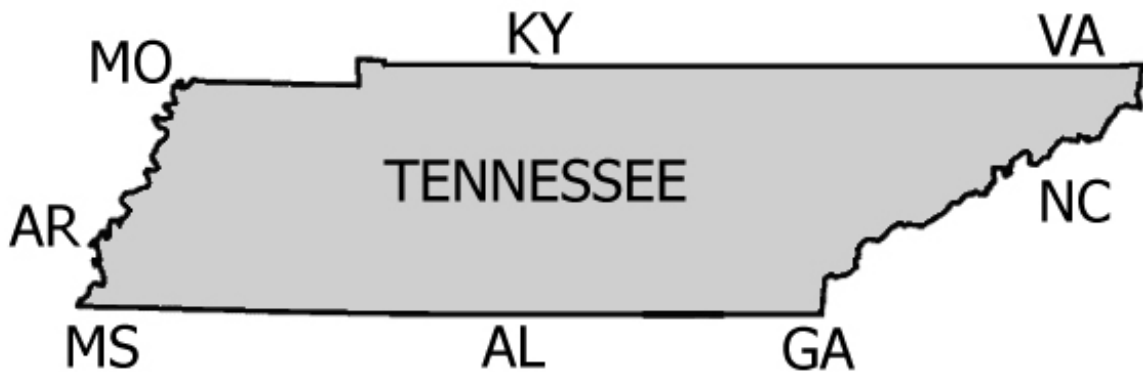


Tennessee Trauma Care System Plan

Tennessee Department of Health
July, 2004



**A System That Serves Tennessee
and Supports Eight Neighboring States**

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MISSION STATEMENT

To establish and promote a continuum of care that provides timely and appropriate delivery of emergency medical treatment for people with acute traumatic injury, supported by the appropriate resources, to diminish or eliminate the risk of death or permanent disability and to use all of the state's trauma system resources to implement effective injury prevention programs.

PREFACE

Trauma has become an epidemic in the United States, claiming the lives of over 140,000 people annually. It can be said to be the last major plague of the young, killing more Americans between the ages of one and thirty-four than all other diseases combined. It remains the leading cause of disability of all people under the age of 65.

Medicine has made extraordinary advances during the last forty years, while the battle to abate the trauma epidemic has seen only limited success. Three major factors account for this.

First, the specialties of emergency medicine and trauma care are relatively new. The concept of early field intervention and immediate transport to an acute care center with highly skilled health care professionals prepared to provide early, definitive care was only recently developed, a by-product of our twentieth century wars, culminating in the Vietnam conflict. However, it is not possible to save or rehabilitate all trauma victims, due to the nature of their injuries or the time required for the victims to reach a trauma center.

Second, injury prevention, a powerful weapon in the fight against trauma, suffers from a lack of drama and immediacy. Too often, the blaring sirens and flashing lights of the emergent, acute care component of trauma overshadow the seemingly mundane arena of prevention. Too often fatalistic attitudes that “accidents” are “inevitable” justify inaction and create a cycle that feeds upon itself. Yet, from improvements in automotive safety to changes in personal behavior, prevention has the potential of being the most effective and least costly means for reducing the occurrence of trauma.

Lastly, the development of a trauma care system - a system which assures that the required resources are available and the necessary infrastructure is in place to deliver the “right” patient to the “right” facility in the “right” amount of time – entails broad consensus and cooperation among divergent groups around complex logistical, political, financial, legal, and medical issues.

Given the nature of the epidemic, a comprehensive trauma care system, which includes a strong injury prevention component, holds the most promise for curbing this brutal epidemic. Thirty to forty percent of all trauma deaths occur within hours of the injury, usually from shock and/or internal bleeding. Virtually all of these deaths are considered inappropriate and preventable, and should not occur if an organized trauma system were in place. Moreover, many trauma deaths, and particularly those that occur within minutes of injury and for which effective medical treatments are not available, could be avoided through an effective injury prevention infrastructure and programs.

HISTORY

Tennessee implemented a statewide trauma care system in 1988 with the designation of eleven hospital Trauma Centers. The Board for Licensing Health Care Facilities (BLHCF) created a Trauma Center Task Force to study the need for trauma centers in the state. The Task Force completed its work in 1985 with a recommendation that specific rules for Trauma Centers be promulgated based on the American College of Surgeons Committee on Trauma (ACS-COT) trauma center guidelines (Hospital Resources Document – Appendix 1). The BLHCF approved

these trauma center rules and required a specific inspection process managed by the state EMS Director. Each hospital seeking trauma center designation was required to submit a written application followed by an on-site inspection by a team as specified in the rules. The inspection team was comprised of an out-of-state trauma surgeon as the team leader, an in-state trauma surgeon, a critical care nurse, a hospital administrator and the state EMS Director, who assumed the functions of team administrator. The rules set standards for Level I and Level II trauma centers. The first inspections were conducted in 1987 and involved 14 hospitals in 6 cities. The 4 Level I applicants, all teaching hospitals, met designation requirements but none of the Level II applicants passed the initial inspections.

The trauma center designation process was highly debated after the initial inspection reports were presented in 1987 at the BLHCF meeting. Level II applicants made appeals, and it became apparent that trauma centers by themselves did not comprise a trauma care system. The BLHCF then decided not to designate any trauma centers until several actions were taken:

1. Approve trauma patient destination requirements by the state EMS board.
2. Develop standards for Level III and Pediatric Trauma Centers.
3. Implement a state trauma registry.
4. Resolve concerns about trauma center advertising.

The Department of Health convened an ad hoc committee to develop solutions to these problems. The resulting consensus on these issues and re-inspection of all Level II applicants led the BLHCF to designate 11 hospitals as trauma centers in August 1988: 4 as Level I, 7 as Level II.

The promulgation of Level III and Pediatric Trauma Center rules led to designation of several such trauma centers by 1990. Several other hospitals applied for either Level I or II designation and several Level II and III hospitals voluntarily relinquished their designations. As of March 2004, there were 12 designated trauma centers: 6 Level I, 2 Level II, and 4 Level III (Appendix 3). Of the approximately 19,000 trauma patients seen annually in Tennessee trauma centers, more than 15,000 received definitive care in the 6 Level I centers.

The ad hoc Trauma Center Task Force continued its work after 1988, focusing on trauma care quality assurance issues. It delivered its final report to the BLHCF in 1990, recommending that a permanent advisory group be established to advise the Board on trauma care policy and regulation. In response, the BLHCF created the Trauma Care Advisory Council (TCAC) in 1990 comprised of 12 members, a majority of whom are trauma surgeons (Appendix 2). Its mission was to:

1. Advise the BLHCF
2. Promote public education on trauma care and trauma system issues.
3. Conduct trauma systems planning.

Specific activities assigned at that time included preparation of an annual state trauma systems report, development of requirements for trauma center reporting, and monitoring the state trauma registry. However, to date, a functioning trauma registry has lacked funds and is not implemented. Work is currently in progress to secure funding and seek legislation to establish and protect a statewide database.

TRAUMA SYSTEM STRUCTURE

Tennessee's demographics and geography have contributed greatly to its trauma system structure and function. The state's population is 5.7 million and divided into 5 urban areas (focused in Memphis, Nashville, Knoxville, Chattanooga, and the Tri-Cities area in northeast Tennessee) and several sub-regions. The urban centers are separated by 100-200 miles, all are affiliated with medical schools that operate Level I trauma centers, and all have associated helicopter ambulance services. Almost all persons in the state are within 100 air miles from a Level I trauma center. This basic physical structure is almost ideal. The geography and the BLHCF and the state EMS Board having broad powers enabled Tennessee to develop a trauma care system without legislation. Only rule making was required to designate trauma centers and provide guidance to EMS personnel for the identification and transport of patients. Level I centers are the key focal points of the system. The geographic/demographic structure of the state and the ability to capitalize on it have created the existing system (Appendix 3).

TRAUMA SYSTEM PROBLEMS AND ISSUES

Trauma Registry. Although the trauma registry officially began operation in 1989, an unresolved legal issue has so far rendered it non-functional. In 1991 a legal opinion from the BLHCF counsel stated that without specific legal protection, the registry would be a publicly accessible database. The TCAC then blocked access to these data as the only means to protect hospitals and physicians from potential liability.

In 1995, the TCAC adopted the American College of Surgeons TRACS registry software for use in all trauma centers. The trauma centers enter all relevant data and transmit files to ACS. The legal problem has been greatly reduced by HIPPA and amendments to state law, but the legal creation of a State Trauma Registry still remains a necessity.

Public Information. A state chapter of the America Trauma Society was formed in 1989. It was active until 1995 and assisted the TCAC in publicizing the trauma care system and obtaining grants to meet objectives such as purchasing the TRACS software. Since 1995 there has been no statewide effort to inform the public and policy makers of trauma system issues.

Pediatric Trauma Care. Pediatric trauma centers were designated in 1990 in Knoxville and Chattanooga. Comprehensive pediatric emergency care legislation was enacted in 1998 that directed the BLHCF to set minimum pediatric emergency care standards for all hospitals. The highest level is the Comprehensive Regional Pediatric Center (CPRC; Appendix 4); there are a total of 4 in Children's Hospitals located in Memphis, Nashville, Knoxville, and Chattanooga.

The original concept was that CRPCs would provide definitive trauma care. However, as part of the process of adopting the comprehensive pediatric rules the BLCHF abolished the pediatric trauma center rules. CRPCs provide much of the care for critical pediatric trauma patients, but are supplemented in some areas by adult Level I trauma Centers.

Injury Prevention. Trauma care providers can be powerful and credible advocates for injury prevention programs. However, although individual trauma centers are required to support injury

prevention programs, there has been no statewide effort to use trauma care resources for injury prevention.

Reimbursement. In 1994 Tennessee implemented a Medicaid managed care program called TennCare. Managed Care Organizations (MCO's) are funded by the state to contract with health care providers. Trauma care is well organized and efficient, but not adequately reimbursed by many MCO's. The survival of the trauma care system depends on an adequate reimbursement structure.

System Structure. While the location and number of Level I trauma centers is almost ideal, other elements of the system structure may be improved. For example, all Level III trauma centers are located only within the 100 mile corridor from Knoxville to Chattanooga and only 2 Level II centers remain, with 2 in Memphis and 1 in Bristol, separated by a distance of more than 500 miles. Also, the existing system is exclusive; only trauma center hospitals are required to report patient data or are considered to be formally part of the system.

Summary. The underlying issue with most of the above problems is lack of accessible trauma patient and system information. The lack of specific knowledge concerning system characteristics, primarily defined by the causes and consequences of trauma, inhibits effective decisions and actions to improve the system.

PREVALENCE OF TRAUMA IN TENNESSEE

The Department of Health's Center of Health Statistics generated a traumatic injury report for the year 2000 from the UB 92 database. Using appropriate ICD-9 codes, there were 30,664 traumatic injuries admitted to hospitals that year and 596,501 injuries treated and released from hospital emergency departments that same year.

Of the inpatient total above, approximately 18,000 (59%) were seen in the then 13 designated trauma centers; there are a total of 137 acute care hospitals licensed in the state.

RURAL POPULATION AND TRAUMA CARE

Of 95 counties in the state, 89 are listed as rural by our state Office of Rural Health. This population is 3,280,000, or 57.5% of the state's total population of 5,700,000. The primary trauma care issue in rural areas is rapid access to definitive care at Level I trauma centers. This problem is ameliorated by the almost ideal location of Level I centers and the fact that five Level I centers operate, or are affiliated with, helicopter ambulance services. Almost every citizen is within 100 air miles of a Level I trauma center.

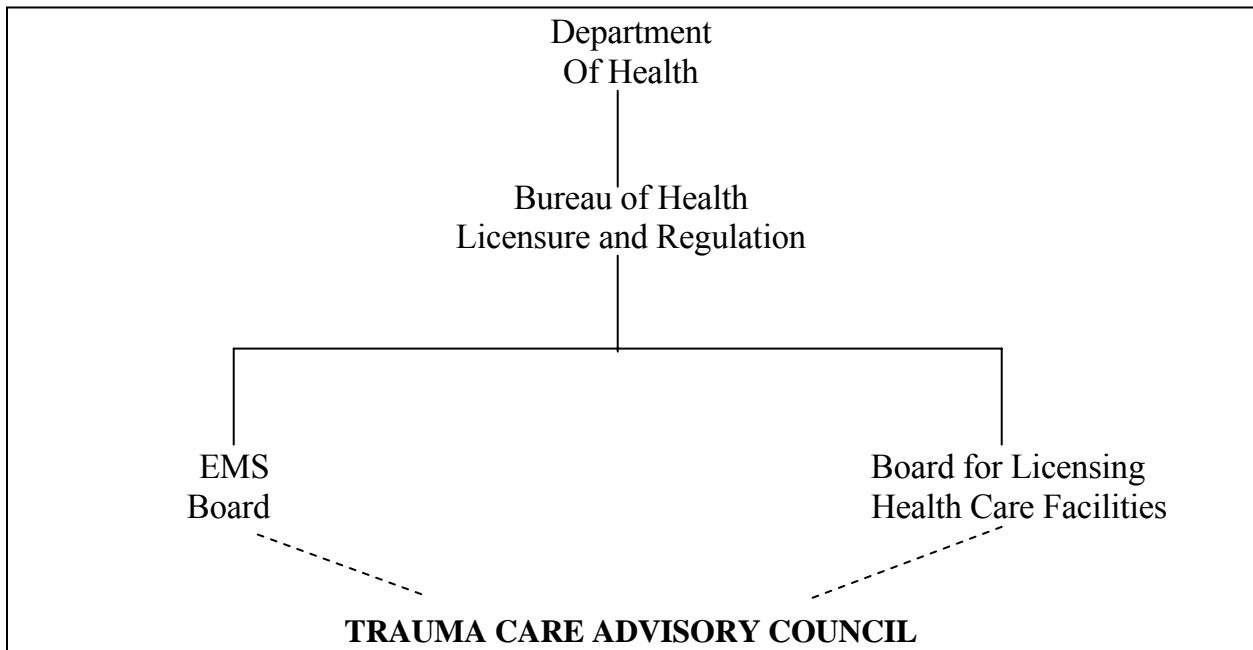
TRAUMA PLAN COMPONENTS

ADMINISTRATIVE COMPONENTS

I. LEADERSHIP

A. Lead Agency

The state lead agency for this project is the Bureau of Health Licensure & Regulation (BHL&R) of the state Health Department. The BHL&R manages the BLHCF and the EMS Board and Division along with other components, including twenty eight health manpower boards.



The state's Trauma System Manager is Joseph B. Phillips, Director of Emergency Medical Services, who works within the BHL&R as Director of the EMS Division. He is responsible to the BLHCF for managing the trauma center inspection process.

EMS and the BHLCF work jointly to develop and promulgate rules and regulations regarding designation of trauma centers and destination guidelines for EMS. Among lead agency responsibilities are:

- Ensure integration of system leadership activities
- Develop and enforce trauma center standards (Appendix 1)
- Manage the trauma center designation process
- Develop EMS trauma patient destination rules (Appendix 6)
- Develop and operate a system of data collection and analysis
- Develop EMS trauma patient care protocol guidelines (Appendix 7)
- Assist with the development of mass casualty/disaster plans
- Development and maintenance of a statewide EMS communication infrastructure (Appendix 8)

The Tennessee trauma care system plan goals are to:

1. Evaluate the system and plan improvements based on the results of this evaluation.
2. Identify other resources which can contribute to the improvement of the system.
3. Develop triage criteria for inter-hospital patient transfer.
4. Establish cooperative agreements with bordering states, which allow the system to fully meet public health needs in spite of geopolitical boundaries. Tennessee trauma centers are regional resources serving the citizens of Tennessee as well as Tennessee's eight border states.
5. Integrate the trauma care system into the state mass casualty/disaster planning and operations systems.
6. Completely integrate the trauma care system with regional EMS communication systems.
7. Develop statewide trauma prevention and education programs based on injury data.
8. Promote financial viability of our statewide trauma system

B. Trauma Care Advisory Council

The Trauma Care Advisory Council (TCAC) is a multidisciplinary standing committee of the EMS Board and the BHCLF. It was created by and is required to report to the BHCLF. The make up of the Council consists of surgeons, trauma coordinators, nurses, hospital administrators, rehabilitation services, consumer and EMS representatives (Appendix 2). The TCAC is responsible for system plan development and evaluation. It meets quarterly to review trauma system related information. The TCAC will develop reports, review data, and analyze reports from the trauma registry database and guide the development of the annual statistical and other reports. The TCAC reports its recommendations for trauma system changes to the EMS Board and to the BHCLF.

II. SYSTEM DEVELOPMENT

A. Trauma System Planning

Up to this point in time, developing the Trauma Care System has been the main focus of the administrative leadership. The designation of trauma centers was performed using guidelines developed by the American College of Surgeons Committee on Trauma and modified for Tennessee. The rules and regulations based on ACS-COT guidelines were promulgated by the Board for Licensing Health Care Facilities. The designation of hospitals as trauma centers has been voluntary on the part of hospitals. EMS destination guidelines were approved by the EMS Board. These guidelines describe a radius within which these destination guidelines apply to EMS (Appendix 5).

Current Objectives:

1. Establish a state trauma registry.
2. Identify the mechanisms and consequences of injury.
3. Develop plans based on available data to prevent injury and optimize care.

B. Trauma System Operations

Tennessee's trauma system consists of several regional trauma care systems operating under state guidelines. Since 1988, the care of seriously injured patients has been concentrated at the six Level I trauma centers. All prehospital care providers also follow these guidelines. Referring hospitals routinely transfer patients to Level I centers, but no state transfer guidelines or agreements are currently in effect, except for burn and pediatric care. Five Level I trauma centers operate helicopter ambulance services which provide both scene and interfacility transfers. EMS crews are required to consult with the pre-defined trauma medical control for any decision where there is not an obvious need for Level I destination. The state EMS Board has approved a telecommunications plan that allocates radio frequencies for ambulance dispatch, ambulance to hospital, and hospital to hospital radio communications.

Further needs may include:

1. Develop interhospital transfer guidelines.
2. Integrate the trauma care system into the statewide mass casualty/disaster planning process.
3. Evaluate the need for specialized medical control/consultation based on type of injury (e.g. burns, pediatric, poisoning).

III. LEGISLATION

Specific trauma system legislation has previously been unnecessary because of the broad authority granted to the EMS Board and the BLHCF. Rules and regulations regarding designation of trauma centers and destination guidelines for EMS were promulgated by these Boards. The Bureau of Health Licensure and Regulation is the lead agency for trauma system development, giving it authority to implement the system under the rules of both boards.

Specific legislation may be needed which provides:

1. Protection of access to trauma registry data and of confidential quality management program activities by the TCAC.
2. Adequate reimbursement from all payors to cover system costs.
3. Adequate funding to cover the cost of trauma system administration and operations.
4. Tort reform to ensure continued involvement of health providers in this serious epidemic.

IV. FINANCE

A. Trauma System Administrative Costs

Tennessee's trauma system administrative costs have been kept to a minimum. The cost associated with the designation of trauma centers has been assumed by the trauma centers. An important

challenge in the management of trauma systems is the documentation of the costs and benefits of trauma care. The initial costs associated with the trauma registry will be financed through a start-up grant. Ongoing funding will be required to sustain the registry and other administrative costs associated with the trauma system.

B. Trauma Care Provider Costs

The major costs of trauma care fall on the trauma care providers (EMS, physicians, and hospitals). Trauma care often represents a significant portion of the total unreimbursed care for all trauma care providers. Major hospital reimbursement methods do not provide adequate coverage for the costs of delivering care to patients with multiple injuries. Level I trauma centers receive a disproportionate number of trauma patients with lower socio-economic backgrounds, decreased insurance rates, and increased unemployment rates. Interpersonal violence contributes significantly to the financial problem for major trauma centers. There are limited resources available for development of the rural components of the trauma system. Documentation of costs among individual system components may have been performed, but these costs have not been aggregated. Also, no mechanism exists for accurate documentation of costs, in particular the unreimbursed costs associated with trauma system operation at the prehospital, hospital, and physician level.

C. Trauma System Funding

Funding for a comprehensive trauma system must be dedicated and sufficient to cover its development, implementation, delivery of care, and evaluation. Tennessee has relied upon existing fiscal policies to serve as sources of funding. TennCare has replaced the Medicaid system, applying a managed care approach to the health care needs of its recipients. However, most trauma care falls outside the scope of managed care. Funding allocation has not been appropriately addressed in either amount or distribution. There has been no legislation to authorize or appropriate dedicated revenue sources to support the EMS/trauma system. Tennessee is pursuing available grant funding for trauma system development.

Additional efforts should include:

- 1) Identification of potential sources of funding.
- 2) Commitment of a portion of any dedicated funds for:
 - a) Sustaining a trauma care system, including designating facilities.
 - b) Assisting the hospitals in revising their information systems to accommodate new trauma care reporting requirements.
 - c) System-wide data collection and analysis, with special attention placed on documenting the cost effectiveness of the trauma system, measuring patient outcomes, and supporting quality improvement of each system component.
- 3) Design of a public information and education (PI & E) program that targets legislators and consumers, explaining that good trauma care is cost effect.
- 4) Aggressive pursuit of grant funding for trauma system development.

OPERATIONAL AND CLINICAL COMPONENTS

I. PUBLIC INFORMATION AND EDUCATION

A. Public Information and Education

Tennessee relies heavily upon the individual components of the trauma care system to perform PI&E programs. The Department of Health maintains a small injury prevention section. Rules promulgated by the BLHCF require trauma centers to have prevention programs at their own expense. However, there is no lead agency designated to coordinate PI &E programs in Tennessee, and there is no unified trauma constituency to promote trauma system awareness and prevention activities. Therefore, neither the general public nor elected officials and their staffs have been properly educated about trauma system issues.

Potential aids to resolve these issues include:

1. Build a trauma constituency involving all trauma system components and consumer groups to promote trauma system awareness and prevention activities. This could include re-implementing an active Tennessee Division of the American Trauma Society (ATS).
2. Collaborate with other organizations, such as the state Committee on Pediatric Emergency Care (CoPEC), in developing and promoting injury prevention activities.
3. Educate public officials and their staff about trauma system issues.

B. Prevention

Injury is a preventable public health problem. The ultimate goal of an organized trauma system is to prevent injuries. Tennessee's Level I trauma centers and CRPC's are required to provide prevention programs in their respective regions. Other agencies are dedicated to specific causes of injuries, such as highway/motor vehicle safety, gun safety, helmet use, water safety, etc. There is no single reliable source of comprehensive injury surveillance data. There is no statewide comprehensive injury prevention program. Prevention goals were not established during the development of the trauma system.

Potential solutions include:

1. Use of new trauma registry, UB92 data, and the ambulance reporting system to assist in injury surveillance. The objective, however, should be to move toward an integrated EMS information system which would provide total injury surveillance.
2. Develop an injury prevention plan, which would:
 - a) Communicate key trauma prevention strategies.
 - b) Coordinate and evaluate existing prevention programs.
 - c) Identify risk groups that are not currently addressed by existing prevention programs.

II. HUMAN RESOURCES

A. Workforce Resources

It appears that Tennessee has adequate numbers of prehospital personnel to support the trauma system. However, a crisis is developing in the trauma system due to critical shortages of providers willing to provide trauma care due to reimbursement, lifestyle and tort issues. Furthermore, hospital systems lack surge capacity to deal with mass casualty/disaster situations.

B. Trauma Educational Preparation

Trauma centers provide trauma education to residents, fellows, nurses and other healthcare providers through ATLS and TNCC. EMS providers have the BTLS and PHTLS programs as the primary trauma education curriculum. Non-trauma center hospitals and personnel provide varied levels of education regarding trauma care. Prehospital providers are not required to have continuing education regarding trauma education. Rural areas have limited resources necessary to implement trauma education programs. Some providers may be unaware of the benefits of a regionalized approach to trauma care and what their respective roles and responsibilities are as a component of the trauma system.

Recommendations regarding further support include:

1. Advocate participation of prehospital care providers in trauma educational programs, such as BTLS and PHTLS.
2. Support ACS-COT rural trauma course.
3. Advocate ATLS training for physicians participating in the trauma system.
4. Advocate additional specialized training courses for nurses such as TNCC and CATN.

III. PREHOSPITAL CARE

A. Communications

Public Access

Virtually all of Tennessee's population has access to the EMS system via 9-1-1 or E-9-1-1 systems. All county 9-1-1 systems have not yet implemented position location technology for cell phone users. The State Emergency Number Board is assisting local 9-1-1 centers with implementation of this capability.

Dispatch Priorities

Most counties utilize a consolidated 9-1-1 dispatch center to dispatch all emergency services, including emergency ground ambulance service. The hospital-based helicopter ambulance services are all dispatched from Level I trauma center communications centers using accepted industry standards. Most counties utilize commonly accepted industry standards for ALS and BLS calls. Most of the larger urban systems use some form of computer aided dispatching systems, which assist in deploying ambulances in regions based on past call history.

Communication System Integration

County 9-1-1 centers centrally dispatch all emergency service agencies and integrate such entities as police, fire, and EMS. This central dispatch capability helps ensure communications interoperability. EMS communications are regulated by the state EMS Telecommunications Plan which allocates VHF and UHF radiofrequencies for ambulance dispatch, ambulance to hospital, and hospital to hospital radio communications.

The EMS Telecommunications Act of 1977 (TCA 68-140-201—208) and EMS Board rules support the designation of regional communication centers (RCCs) that serve as communications hubs for regional EMS systems. A regional EMS system is a multi-county system comprised of all hospitals, ambulance services, dispatch centers and related entities that functions as an interactive emergency medical network coordinated through a RCC for the purposes of providing information and allocating/coordinating medical resources.

An RCC (Appendix 8) is an entity with a regional mission and focus that coordinates hospitals, ambulance services and other medical resources, in real time, to optimize emergency patient care in situations where local governments and health care providers request assistance. The RCC's will therefore coordinate all EMS and hospital resources that respond to any mass casualty events. Statewide implementation of the RCC system is essential for effective operation of the trauma care system in both routine and disaster operations.

This statewide communications system is not complete. It is essential that this system be fully implemented in order to ensure proper management of day-to-day operations and mass casualty incidents.

B. EMS Medical Direction

Paramedics and EMTs are not independent practitioners, but must operate under approved physician protocols. Medical Directors provide the operational framework for field personnel and seek to assure appropriateness of all medical aspects of the prehospital program with the same professional accountability as medical care in the more traditional settings. There is a state sponsored EMS medical director training course held annually.

There is virtually no on-line medical direction outside major urban areas. Regional Communications Centers will be equipped to provide on-line consultation for both rural paramedics and hospital emergency departments.

C. Triage

Trauma Patient Identification

Trauma care systems use the state EMS destination rules for identifying trauma patients, based on ACS-COT guidelines (Appendix 6). EMS destination rules provide guidance to EMS personnel for identifying those injured victims who should be transported to a trauma center.

Hospital Categorization

Trauma centers in Tennessee are designated by the BLHCF. Levels include I, II, and III adult centers. Currently there are 6 Level I, 2 Level II, and 4 Level III adult centers. Pediatric trauma care is provided by comprehensive regional pediatric care centers (CRPC) or Level I Trauma Centers. There are no triage guidelines or transfer protocols guiding interhospital transfer of trauma patients admitted to non-trauma hospitals. No mechanism is in place to measure system performance regarding overtriage and undertriage occurrences.

Efforts to address these issues may include:

1. Triage and transfer guidelines for non-trauma designated hospitals.
2. Ensure that all providers of trauma care contribute to the state registry. This data could be used to measure occurrences of overtriage and undertriage.

D. Transport

Current Demand and Nature of the System

The state of Tennessee is geographically diverse, from the mountains of East Tennessee to the plains and delta of the Mississippi in the west. Although mostly rural, there are 5 large population centers: Memphis, Nashville, Chattanooga, Knoxville and the Tri-Cities. Due to geography and demographics we have no extreme transport distances within Tennessee; all patients are within 100 air miles of a Level I trauma center. Due to the location of the designated trauma centers and state geographics, a significant number of out-of-state patients have access to treatment in the Tennessee trauma system.

No state is bordered by more states than Tennessee. The eight states that border Tennessee send patients to all of Tennessee's Level I trauma centers. The population served from these border states may be the equivalent of an additional state. Further study is necessary to determine the impact on our state trauma system of providing care to these out-of-state patients.

Ground and Air Ambulances

Trauma patients are transported by both ground and air ambulances with ground ambulances providing a majority of the transports. There are 5 hospital based ambulance services and 1 private provider operating 16 helicopter ambulances within the state as well as helicopter ambulances for contingent states. Most emergency ground ambulance services have a class A license and can provide ALS services. A web-based collection system is being developed in order to collect all ambulance run report data. Analysis of ambulance run report data will be required to determine how well EMS is integrated with the trauma care system. This task will be assigned to the state Trauma Registrar.

System Integration

Twelve of the 137 acute care hospitals in Tennessee participate in the trauma system as designated trauma centers. These twelve facilities have dedicated the necessary resources to provide optimal care for the injured. Although the non-trauma hospitals provide some trauma care, they are not required to submit data about injured patients to the state trauma registry, but do provide UB92

data. There is no state mechanism to review pre-hospital performance, although this performance is reviewed at the local ambulance service level (e.g. EMS response times, scene times, protocol adherence, destination guidelines).

Issues to address:

1. All facilities licensed to provide emergency care by the BLHCF should be required to submit trauma data about injured patients that they treat. All now submit UB92 data.
2. Perform analysis of state EMS data regarding:
 - a) Access to the EMS system.
 - b) Response time.
 - c) Level of training and performance on scene.
 - d) Distance to appropriate definitive care.
3. Ensure the state trauma registry has capability to evaluate EMS system performance as it pertains to the trauma care system.

IV. DEFINITIVE CARE FACILITIES

A. TRAUMA CARE FACILITIES

Trauma Centers

Tennessee has adopted designation standards for trauma centers based on the American College of Surgeons Committee on Trauma Optimal Resources Document.

Other Trauma Care Facilities

Some injured patients are treated in acute care hospitals and not designated as trauma centers. These facilities exist in the urban, suburban and rural areas of the state. Most specialty centers (i.e. burn, pediatrics, etc.) reside within Level I trauma centers. There is one burn unit (Chattanooga – 6 beds) and two burn centers (Nashville 10 beds and Memphis 6 beds). Issues regarding facilities include:

1. Non-designated trauma centers must be integrated into the trauma system through reporting of data, educational requirements, trauma protocols etc.
2. Trauma centers should provide support to non-designated trauma centers through assistance with quality management of trauma patients, trauma education and prevention programs.

Designation Process

Each hospital seeking trauma center designation is required to submit a written application followed by an on-site inspection by a team as specified in the rules. The inspection team is comprised of an out-of-state trauma surgeon as the team leader, an in-state trauma surgeon, a critical care nurse, a hospital administrator and the state EMS Director, who functions as the team administrator. Upon successful completion of a site visit the board the BLHCF designates a trauma center for 5 years. The rules further require that there be two site visits within the first 5 years of designation. Trauma center re-designation is approved by the BLHCF following successful completion of the second site visit in the 5 year designation cycle.

B. INTERFACILITY TRANSFERS

Transfer to Trauma Centers

Transfer of patients to trauma centers occurs after contact from the transferring hospital via phone. Some hospitals have transfer agreements within a hospital network, at times resulting in bypassing an appropriate Level I trauma center, resulting in prolonged transport times.

Tennessee has no formal guidelines for promoting the appropriate interfacility transfer of trauma patients. Solutions include:

1. Adopt and implement statewide EMTALA compatible transfer guidelines that ensure the transfer of trauma patients to designated trauma centers.
2. Educate the insurance industry and managed care organizations regarding the transfer of trauma patients and demonstrate the cost-benefit of a regionalized approach to trauma care.
3. Monitor out of state transfers.

Transfer from Trauma Centers to Other Facilities

Trauma centers rarely transfer patients back to "community" hospitals. Reimbursement issues impede this practice. Guidelines have not been developed and approved to facilitate transfer of patients from trauma centers back to "community" hospitals after acute care. This is especially a problem with out-of-state patients. Solutions include:

1. Develop guidelines facilitate the transfer of patients from trauma centers to "community" hospitals when appropriate.
2. Educate the insurance industry regarding the importance of repatriation of patients to their respective communities.

C. MEDICAL REHABILITATION

Rehabilitation Services

Rehabilitation services are utilized on a regional basis often expanding over several states. There are inadequate numbers of beds in rehabilitation facilities for patients without adequate financial reserves or third party payors willing to reimburse for rehabilitative services. Additionally, those patients covered by health insurance may not have access to appropriate rehabilitation services. There are no guidelines established regarding the adequacy of rehabilitation facilities providing trauma rehabilitation services. As a consequence patients are discharged home without rehabilitation or are kept in the trauma center until arrangements can be finalized. This results in increased length of stay and increased financial burdens on trauma centers. Also, acceptance by skilled care and nursing home facilities is often slow. Solution(s):

1. Due to magnitude of the problem, it is recommended that the TCAC form a task force to investigate and present solutions.

V. MASS CASUALTY MANAGEMENT

Tennessee's regional trauma care system is ideal for directing mass casualty incident (MCI) response of both hospitals and ambulance services. Level I trauma centers should coordinate the distribution of injured patients from any MCI, including terrorism, coordinate the development and application of regional disaster protocols, and coordinate these activities with other trauma regions and the state emergency management agency.

There are problems with implementing this system because the state medical communications system, which allocates regional communications centers in the eight public health regions, is not complete. Issues:

1. Complete the implementation of the RCC system. (See III A. Communications, page 16). This is the single most important improvement that can be made in improving Tennessee's medical readiness.
2. Develop regional disaster protocols covering all forms of injury (burns, chemical, blunt and penetrating trauma, and special populations such as pediatric, special needs, etc.)

VI. EVALUATION

A. System Data Requirements

Tennessee developed a state trauma registry in 1988 and identified the data elements all trauma centers were required to collect and report to the state. The Elvis Presley Memorial Trauma Center assumed responsibility for maintaining the database. The data reported by the trauma centers was received as reported. No quality data filters were present. The database was not designed to generate reports, only to receive data. A significant problem with the data in the state database was that it was considered to be public record, subject to review by the general public. This does not provide appropriate patient and provider confidentiality. That trauma registry is no longer functional and the accumulated data has been lost. All designated trauma centers now use TRACS the trauma registry software developed by the American College of Surgeons (ACS) and data is sent to the National Trauma Data Bank (NTDB). We plan to establish a state trauma registry with the assistance of federal grant monies. The BHLR is responsible for the state trauma registry operations. Issues to address:

1. All facilities licensed to provide emergency care by the BLHCF should be required to submit data about injured patients.
2. If required, implement measures to make the state trauma registry data confidential.

Data Collection Tools. We will purchase the state version of TRACS, collect patient data and link this with existing trauma related databases. Development of a web based registry will be considered.

B. Trauma System Performance

Evaluation of System Performance. Through site visits, the lead agency monitors trauma centers performance. Individual system components can evaluate their own performance but composite information to evaluate the overall system is not available. Implementation of the state trauma registry will link TRACS with other available databases and will assist with overall system evaluation. There is little current capability to assess the effectiveness of the system relative to meeting the needs of the injured, availability of resources, and costs, and assess the effectiveness of the system. Therefore, recommendations include:

1. Submit state TRACS data to the NTDB.
2. Develop trauma system performance indicators.

C. Trauma Center Evaluation

Trauma Center Quality Management. All currently designated trauma centers are required to perform acceptable quality management activities within their own institutions and are monitored by site visits. Quality management is evaluated through state re-inspections and focus on the trauma center's process of identifying system problems and implementing appropriate resolutions. Therefore, trauma center performance indicators should be developed and implemented.

D. Research

Trauma Care Research. Tennessee continues to struggle with how to organize and use the wealth of trauma data contained at the various trauma centers. One of the most significant research related documents published was the 1966 report by the National Research Council titled *Accidental Death and Disability: The Neglected Disease of Modern Society*. It was followed in 1973 by the Emergency Medical Services Systems Act. These documents made an appeal for increased federal and voluntary support of basic and applied research, long-term support of clinical research centers, expansion of research related to war wounds and the establishment of a National Institute of Trauma. These recommendations have not been adopted though they are still valid today. More recently the Major Trauma Outcome Study was done in an effort to provide comparison and baseline trauma data for research. This study was disbanded several years ago with the initiation of the NTDB database. Trauma research is conducted at Level I Trauma Centers and the results of existing trauma research in Tennessee is disseminated nationally in a variety of forums. The TCAC will oversee the production and coordination of reports from the new state trauma registry. Participation of AAST and EAST in multi-institutional study groups should be encouraged.

Research Funding. Since trauma is a multi-causative disease process, research must be multidisciplinary and funding must come from a broad support base. Federal injury research funding is disproportionately low compared to other diseases. Since trauma is not seen as a public health issue, substantial public monies have not been committed to injury research and prevention. It is recommended that the TCAC form a sub-committee to investigate alternative methods to funding trauma care and injury research in Tennessee. This same group should review prevention and education funding, as these are parallel with the need for research funding.

MEMORANDUM

TO: Board for Licensing Health Care Facilities

FROM: Judy Eads, Assistant Commissioner, Bureau Health Licensure and Regulation
Joe Phillips, State EMS Director
Katy Gammon, Director, Health Care Facilities
Cathy Green, Director, Board for Licensing Health Care Facilities

DATE: September 17, 2002

RE: Trauma Care Advisory Council



The Department of Health, Bureau of Health Licensure and Regulation, requests the Board adopt the following recommendations as policy for oversight and re-vamping of the existing Trauma Care Advisory Council:

1. **Officers –**

The Chair is to be the current chairman of the State Committee on Trauma as appointed by the American College of Surgeons and will change when this appointment changes every 3 years. The Vice-Chair will be elected by the Council every 3 years at the time the Chair is appointed.

2. **Structure –**

The Council will meet at least two (2) times per year.
The Council will establish sub-committees as they see fit to accomplish their mission/goals. The Chair will submit a report to the Board for Licensing Health Care Facilities after each meeting.

3. **Mission –**

The mission of the Council is to develop a Statewide Trauma Care System Plan for Tennessee to include a trauma care registry.

4. **Composition –**

Core membership to include: Medical Directors from all six (6) Level I Trauma Care Centers, 1 Medical Director from a Level II Trauma Center and one Medical Director from a Level III Trauma Center (both appointed by Board for Licensing Health Care Facilities Chair), 1 EMS Board member, 1 BLHCF Board member, 1 Trauma Nurse Coordinator, Chair of Committee on Pediatric Emergency Care (CoPeC), 1 Trauma Center Hospital Administrator, 2 Consumers.

**DESIGNATED TRAUMA CENTERS
IN TENNESSEE**

Memphis

Level

Regional Medical Center at Memphis/
Presley Trauma Center
877 Jefferson Avenue
Memphis, TN 38103
Martin Croce, MD, Director

I

Methodist Hospital of Memphis
1265 Union Avenue
Memphis, TN 38104
Raza Dilawari, MD, Director

II

Nashville

Vanderbilt University Medical Center
Division of Trauma
1161 22nd Avenue South
Nashville, TN 37232
John Morris, MD, Director

I

Knoxville

University Health Systems, Inc.
Trauma Service
1924 Alcoa Highway
Knoxville, TN 37920
Blaine Enderson, MD, Director

I

Chattanooga

Erlanger Medical Center
Trauma Service
975 East Third Street
Chattanooga, TN 37405
Philip Burns, MD, Director

I

Kingsport

Wellmont Holston Valley Medical Center, Inc. I
130 West Ravine Road
Kingsport, TN 37660
John Hall, MD, Director

Bristol

Wellmont Bristol Regional Medical Center II
1 Medical Park Boulevard
Bristol, TN 37620
Eugene McClintic, MD, Director

Maryville

Blount Memorial Hospital III
907 East Lamar Alexander Parkway
Maryville, TN 37801-5193
Melissa Trezell, MD, Director

Johnson City

Johnson City, Medical Center I
Hospital, Inc.
400 State of Franklin Road
Johnson City, TN 37601
Julie Dunn, MD, Director

Athens

Athens Regional Medical Center III
1114 West Madison Avenue
P.O. Box 250
Athens, TN 37303-4150
Joseph Kalister, MD, Director

Etowah

Woods Memorial Hospital District III
Highway 411 North
P.O. Box 410
Etowah, TN 37331-0410
Charles Cox, MD

Cleveland

Bradley Memorial Hospital III
2305 Chambliss Avenue
Cleveland, TN 37311-3847
Janet Coombs, MD, Director

**COMPREHENSIVE REGIONAL
PEDIATRIC CENTERS**

East Tennessee Children's Hospital
P.O. Box 15010
2016 Clinch Avenue
Knoxville, TN 37901

T.C. Thompson Children's Hospital
910 Blackford Street
Chattanooga, TN 37403

LeBonheur Children's Medical Center
50 Dunlap
Memphis, TN 38103

Vanderbilt Children's Hospital
2200 Children's Way
Nashville, TN 37232

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