

## *A History of the North Carolina Trauma System*

Updated February 10, 2009

In North Carolina, the first tentative steps toward the creation of a trauma system took place in the mid-'70's. Not long after the North Carolina Emergency Medical Services Act of 1973 was implemented, the newly formed North Carolina Office of Emergency Medical Services (OEMS) asked hospitals to categorize themselves with respect to their ability to care for patients suffering from, among other things, trauma, burns, and spinal cord injuries. This was accomplished with only limited success, however, since as many facilities over-categorized as under-categorized themselves.

**Trauma Center Designation:** By 1980, OEMS had developed criteria for Level I and II trauma centers (based upon the American College of Surgeons "Resources for Optimal Care of the Injured Patient" guidelines) and established a site visit process for those hospitals interested in seeking state designation. The impetus for the designation initiative originated with the Federal EMS Act of 1973. OEMS aggressively sought funds through this program that funneled millions into the state in the late '70's and early '80's through the 1201, 1202 and 1203 categorical grants. These funds allowed for significant improvements in emergency department and ambulance equipment across the state. They provided extensive prehospital training programs and, with the added help of Appalachian Regional Commission funding, significantly improved the state's communications system.

By 1982, Duke Hospital, UNC Hospitals, and North Carolina Baptist Hospital had received the first Level I trauma center designations in North Carolina. Pitt County Memorial Hospital was designated the first Level II trauma center in 1983, followed by Moses H. Cone Memorial Hospital in 1984, Carolinas Medical Center in 1986, WakeMed in 1987, New Hanover Regional Medical Center in 1989, and Mission Hospitals in 1995. Pitt County Memorial Hospital upgraded to a Level I in 1985 and Carolinas Medical Center in 1990. Today there are five Level I and four Level II centers in North Carolina. Level III criteria were developed in 1990, and the first Level III center, Cleveland Regional Medical Center, was designated in 1997 with Northeast Medical Center following in 2000 and High Point Regional Health System in 2006. The only recent change in the designation process occurred in 2004. At that time, OEMS agreed to conduct, at a hospital's request, a redesignation visit in concert with an ACS verification visit. The decision on designation and verification, however, remain independent of each other, with state approval a requirement for designation as a trauma center. A number of hospitals seek both accreditations while others seek only state designation.

**State Trauma Registry:** By the late '80's, OEMS realized the importance of establishing a state trauma registry. This endeavor was initiated by OEMS in 1987, with a registry being custom programmed through the Department of Surgery at UNC-CH, and supported by OEMS' operating budget and grants from the Governor's Highway Safety Program (GHSP). The registry, from the outset, was guided by a Trauma Registry Task Force, a group that met quarterly and was comprised of epidemiologists and OEMS staff, as well as hospital administrators, emergency physicians, trauma registrars, trauma nurse coordinators, and trauma medical directors from each of the trauma centers. The strong collegial relationship engendered by this Task Force continues today.

The state's decision from the outset, with Task Force concurrence, to mandate usage of the same software by all trauma centers has been key to the state's ability to operate a successful registry for research and performance improvement purposes. An upgrade was needed to this customized software by the mid-'90's and, in 1994, resulted in a migration to the NTRACS® software originally offered through the American College of Surgeons. As of May 2005, this software is supported by Digital Innovations, Inc. (DI).

Today our NTRACS® users have the ability to enter over 250 data points on each trauma patient who is admitted to a trauma center, transferred out of the hospital or who dies in the emergency department with a trauma-related diagnosis. Fifteen hospitals (including all eleven trauma centers) use this software. By the late '90's, however, OEMS began to search for a way to capture at least key data points on trauma patients from non-participating hospitals (about 117). In 2003 and 2004, the state sought and received funding through the federal EMS and Trauma grant program of the Health Resources and Services Administration (HRSA) to assist with this effort. Hence, in 2003, OEMS was able to offer, free of charge, a mechanism to capture a smaller version of the larger trauma registry from these hospitals. With approximately 35 datapoints, this mechanism (called ISSAC) of the registry is now in use by 17 hospitals. More hospitals are being added each month. The state now has over 185,000 patients (just since 1994) entered via NTRACS® and over 200,000 submitted through the ISSAC mechanism.

***The Statute, Rules and Task Forces that Designed the System:*** During the early '90's, OEMS solicited funds from the GHSP to commission the National Highway Traffic Safety Administration (NHTSA) to conduct a comprehensive assessment of emergency medical services in North Carolina. In July 1990, OEMS received the review which included recommendations that OEMS do the following: 1) form a task force to address recommendations relating to emergency/acute care; 2) review legislation to assure it had the authority to designate trauma centers and assist in developing a state trauma system; 3) develop a state trauma system based on the existing injury data resources and epidemiology for North Carolina; 4) coordinate all available resources to ensure that the state's most severely injured patients were taken to trauma centers; and 5) develop pre-hospital triage, inter-hospital transfer, and air medical trauma guidelines.

The chair of the State EMS Advisory Council then convened a trauma system task force and charged it with developing a statewide trauma system. In November 1992, the Trauma System Task Force submitted its report, calling for: 1) a standardized nomenclature for the trauma system and the trauma patient; 2) new legislation to enable development of a statewide trauma system; and 3) the trauma system to remain voluntary and inclusive. Largely as a result of these recommendations, the Trauma System Act of 1993 was passed by the state legislature.

A Trauma System Task Force was then reconvened and charged with drafting a set of rules that would further define many of the specifics of the state trauma system. After two years, the Task Force presented a draft of these rules, which were then revised after seeking input at three public meetings (in March 1996), from each acute care hospital in North Carolina, as well as from numerous other interested parties and professional health care organizations.

The proposed rules specified three levels of trauma centers, the processes to be followed for initial and renewal designation, related enforcement procedures, and the design for an inclusive state and regional trauma system. The basic building blocks of the proposed new trauma system were the Regional Advisory Committees (RACs) that would each be affiliated with a Level I and/or II trauma center. RACs were to plan, establish and maintain a coordinated trauma system on the regional level. Each hospital, as mandated by the rules, had to choose a RAC affiliation. The RACs were to develop medical protocols, transfer agreements and regional plans related to education, training, injury prevention and performance improvement. In addition, as originally envisioned, a "minimum data set" from each hospital would flow to the designated trauma center for each RAC and then be processed for transmission to the state trauma registry. The data set would permit the registry to collect statewide data on injury, with participating hospitals using the aggregate data as a benchmark for quality improvement activities and outcome measures.

In June 1996, in accordance with the state's guidelines, cost projections were developed to cover operation of the trauma system for its first five years. This included costs to be incurred by the state and the state's providers of trauma care, as well as costs for the expanded trauma registry. Unfortunately, since no state funds could be identified, enactment of the rules could not take place during the 1997 legislative session. Subsequently, the trauma rules were revised to exclude the need for additional state funding and were then approved (as the first trauma rules in the state) in the 1998 legislative session. Unfortunately, the "minimum data set" requirement built into the first draft of the rules had to be sacrificed. This in itself had a lasting impact on the ability of the trauma registry to acquire benchmark data from hospitals across the state, rather than from just its trauma centers (whose data is mandated). Only recently has HRSA funding finally enabled us to incorporate into our trauma registry the non-trauma center data originally envisioned in the RAC database. However, this data is now sent directly to the state (versus to a RAC's trauma center) in aggregate form for use by the RACs for performance improvement.

The Trauma System Act of 1993 and the 1998 trauma rules continued to serve as the framework for North Carolina's trauma system for the next few years. Seven RACs were initially developed (increased to 8 in 2005), with Duke Endowment funds assisting with the hiring of seven RAC coordinators who quickly began to address many needs of the trauma system within their respective regions. RACs then took on the additional task of assisting the state with bioterrorism hospital preparedness planning following the September 11<sup>th</sup> events. Out of necessity, this temporarily drew some attention away from trauma as more pressing issues had to be addressed. However, on the plus side, bioterrorism planning greatly integrated trauma with public health, emergency management, law enforcement, and other agencies.

A number of other trauma system benefits arose from the bioterrorism focus as a result of the federal bioterrorism hospital preparedness funding, coupled with EMS and Trauma funding (all from HRSA). This funding brought approximately \$16 million into OEMS from 2002 to 2004 alone. The funds enabled OEMS to conduct a 3-day

Trauma Stakeholder meeting in Greensboro, NC in January 2001 that helped identify the strengths, weaknesses, opportunities and threats for the state's trauma system. It provided monies for some rural ATLS classes, for a Trauma Outcomes Performance Improvement Course (TOPIC), for the expansion of our state trauma registry to include non-trauma centers, and for a state hospital bed and inventory software program. It also funded improvements to the state communications system and provided burn courses for over 500 medical professionals on the care of burn patients in the 1<sup>st</sup> 24 to 48 hours after injury. An additional \$13.4 million in 2004 allowed for further funding of state trauma registry activities and for the development of the state's first rural trauma team development courses.

***The State Trauma Advisory Committee:*** Throughout the '90's, membership had been steadily growing in the Trauma Registry Task Force meetings that continued to meet each quarter. Other trauma stakeholders began to set their meetings so they took place on the same day as the Trauma Registry Task Force. This included groups such as the NC Division of the American Trauma Society (NCATS), trauma RAC coordinators, and the American College of Surgeons' NC Committee on Trauma (NCCOT). Consequently, as years passed and the trauma registry matured, Task Force discussions grew to include an extensive array of trauma matters rather than discussion of registry matters alone. By 2002, a change was needed, and by January 2003 the Trauma Registry Task Force was disbanded (with its work being absorbed by a variety of able committees) and the State Trauma Advisory Committee (STAC) came into formal existence. Although members are still being added to the STAC, it was clear from the beginning that the STAC's mission is to provide a public forum to facilitate trauma system development and coordination of trauma activities between the state's various trauma interest groups. In April of 2004, the STAC helped OEMS develop a formal trauma mission statement (see below).

**Statutes and Rules Revisited:** In late 2001, the state recognized the need for major revisions to its EMS and trauma rules, as well as some tweaking to the Trauma System Act of 1993. The trauma center criteria needed to undergo a revision to reflect many of the changes in the American College of Surgeons most recent version of the "Resources for Optimal Care of the Injured Patient." There had been major changes in the state's trauma center designation process. OEMS needed to seek further protection from discovery for its trauma and prehospital databases, as well as for the regional performance improvement activities. Proposed changes were suggested for the Trauma System Act and new rules were drafted and widely disseminated for comment. The statute changes were approved and a majority of the rules became permanent on April 1, 2003 and the remainder on January 1, 2004.

***A Committee on Trauma (COT) Consultative Visit:*** A logical next step in the development of North Carolina's trauma program included a three day Committee on Trauma consultative site visit in August 2004. This was another undertaking funded out of the HRSA bioterrorism hospital preparedness grant and went a long way towards helping shape the future of North Carolina's trauma system. Following the visit, in early 2005, a Trauma Task Force (TTF) convened by recommendation of the NC EMS Advisory Council, to prioritize each of the site team's recommendations. SEE 2005 COT Recommendations. In addition the TTF was tasked with defining what an inclusive trauma system meant. This task was completed by the group and was passed by the NC EMS Advisory Council in November of 2006. (See NC Trauma Inclusive System definition.)

The State Advisory Committee on Trauma Chair Dr. Michael Chang took the helm and with this new opportunity began to then restructure the program based on the recommendations defined by the COT, the HRSA Model for Trauma, and the NHTSA Trauma Agenda for the Future. The redesign of the STAC became an obvious change that was needed to meet the direction of the program. The program was defined by nine critical areas. The areas selected were based upon the model used in the development of the Florida Trauma system. Critical areas were Leadership Injury Prevention, Emergency/Disaster Preparedness, Pre Hospital Care, Definitive Care, Medical Rehabilitation, Performance Improvement, Regional System Development, Trauma Registry and Research.

### *Trauma Sub Committee Chairs*

Leadership –Chair Dr. Michael Thomason, Carolinas Medical Center  
Injury Prevention and Control- Chair Dr. Leigh Shepler, UNC CH  
Emergency/Disaster Preparedness Plan-Chair Dr. Bruce Cairns, UNC-CH  
Pre-Hospital Care – Transport – Dr. Scott Sagraves, Pitt Memorial Hospital  
Definitive Care – Trauma Centers-Chair Mike Chang, Wake Forest Baptist Medical  
Definitive Care – Medical Rehabilitation –Dr. Mike Buechler, Mission Hospitals  
Evaluation, Quality Management & Performance Improvement- Dr. Steve Vaslef, Duke University Medical Center  
Regional System Evaluation- Dr. Mike Barringer, Cleveland Regional  
Trauma Registry/Research-Chair Dr. Oci Udekwu, Wake Med

Each subcommittee is chaired by one of the lead trauma surgeons from the state's Level I, II, and III trauma centers and is made up of stakeholders from all areas of healthcare. The charge of the nine sub committees is to prioritize the goals for the state and write a 5 year strategic plan for the state's trauma system by July of 2008. This 5 year plan will act as the report card for the progress of the state's trauma system and serve as a road map to meet clear and measurable goals. The 5 year plan will also build consensus on where NC needs to go and in what timeframe and by what mechanism.

In addition to the writing of the 5 year strategy for the NC Trauma System, NCOEMS, UNC Department of Surgery, and UNC School of Public Health have jointly completed a disaster economic study submitted to the General Assembly in January of 2008. This study focused on the amount of money it would require to maintain all disaster medical assets placed statewide since the inception of the National Bioterrorism Hospital Preparedness Program. This study focused on the State medical Assistance Teams and numerous Technology based programs required to keep the state's capability for medical surge at a minimal level.

The NC Trauma Registry made a major change in late 2007 and all of 2008 to be upgraded to a web based program and placed onto a central server. This conversion was to incorporate all hospitals submitting data across the state. This conversion would allow for updated report writing to take place and allow more options on data manipulation. A State Registrar was hired to assist with the conversion and assist the centers as well as work with the data.

January 2008 marked the beginning of the state's Trauma Economic Study. This study was recommended in the 2005 COT report and will be a joint effort between numerous academic centers and agencies. The study will take a close look at the cost of trauma care in NC to the citizens and the ultimate cost of not having trauma care in the state under the current conditions plaguing our state such as increased population, uninsured, underinsured, on call capability, and work force shortages to name a few.

March of 2008 multiple stakeholders began revising the NC EMS rules. After numerous revisions and six public meetings across the state the rules have been approved by the NC EMS Advisory Council to move on to the Medical Care Commission for their approval. The rule revisions are posted on the web site for reference and once approved will be effective January 2009. Additional changes to the trauma rules are expected with the addition of the NC State PI document. This document will stand as the source for Educational requirements, Performance Improvement guidelines, and Research requirements for trauma centers in the future.

### ***North Carolina Trauma System Mission Statement***

To provide optimal trauma care and services to the people in North Carolina by:

- Facilitating injury prevention activities;
- Enhancing knowledge of and education about the trauma system;
- Monitoring and improving quality of care;
- Identifying resources to meet system needs;
- Facilitating research that enhances evidence-based practice;
- Assuring that quality trauma care is available for under-served and special needs populations through expansion of and equitable utilization of existing resources; and
- Collaborating with agencies with similar interests.

### ***Definition of Inclusive Trauma Center***

North Carolina's inclusive trauma system is an organized, multi-disciplinary, evidence based approach to provide quality care and to improve measurable outcomes for all defined injured patients. EMS, hospitals, other health systems and clinicians will participate in a defined manner through leadership, advocacy, injury prevention, education, clinical care, performance improvement and research resulting in integrated trauma care.

For questions or inquiries please email or call the NCOEMS office of trauma at 919-855-3957 or [nc.trauma@ncmail.net](mailto:nc.trauma@ncmail.net).