

**REPORT OF THE
DEPARTMENT OF HEALTH ON**

**STATEWIDE PRE-HOSPITAL AND
INTER-HOSPITAL TRAUMA
TRIAGE PLAN**

**TO THE GOVERNOR AND
THE GENERAL ASSEMBLY OF VIRGINIA**



SENATE DOCUMENT NO. 15

**COMMONWEALTH OF VIRGINIA
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COMMONWEALTH of VIRGINIA

Department of Health

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December 16, 1996

TO: The Honorable George F. Allen

and

The General Assembly of Virginia

The report contained herein is pursuant to Senate Joint Resolution 58, agreed to by the 1996 General Assembly.

This report constitutes the response to the Commissioner of Health from a task force he assembled to: (i) develop a statewide pre-hospital and inter-hospital trauma triage plan; and (ii) to include representatives of the State Emergency Medical Services Advisory Board, the State Health Department's Office of Emergency Medical Services, the Critical Care Committee, the regional emergency medical services (EMS) councils, the designated trauma centers, the Virginia Hospital and Healthcare Association, the Virginia Chapter of the American College of Surgeons, the Virginia Chapter of the American College of Emergency Physicians, the Virginia Chapter of the American Academy of Pediatrics, the emergency medical services community, pre-hospital care providers, and other appropriate organizations.

Respectfully Submitted,

A handwritten signature in cursive script, appearing to read "Randolph L. Gordon".

Randolph L. Gordon, M.D., M.P.H.
Commissioner

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- ◆ Karen Head, Critical Care Coordinator

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Statewide Pre-hospital and Inter-hospital Trauma Triage Plan

*A Report of
The Virginia Department of Health
October 1, 1996*

EXECUTIVE SUMMARY

The 1996 General Assembly charged the Commissioner of Health to convene a task force to develop a draft statewide pre-hospital and inter-hospital trauma triage plan. This study was precipitated by a 1995 Joint Commission on Health Care study on *Pre-hospital Triage of Trauma Patients*. Utilizing 1994 Virginia Statewide Trauma Registry data, the Joint Commission on Health Care noted that the vast majority of most critically injured patients were admitted to trauma centers. However, a significant number (24% statewide) of seriously injured patients were not admitted to trauma centers, with variations existing in triage practices among Emergency Medical Services (EMS) Regions. In review of trauma center research, the Joint Commission report concluded that some of Virginia's more seriously injured patients may be experiencing less than optimal outcomes and that statewide trauma triage protocols may enhance the effectiveness of Virginia's trauma system.

In order to develop statewide pre-hospital and inter-hospital trauma triage guidelines, it was imperative to complete a comprehensive review of the literature on trauma care, trauma care systems, and trauma triage tools. Existing research, duplicated in many areas of the United States and abroad, demonstrates the effectiveness of organized trauma care systems and utilization of pre-hospital and inter-hospital triage guidelines to maximize patient outcomes. Trauma system plans, legislation and triage guidelines from other states were reviewed.

In addition to a review of the literature, the Virginia Department of Health's Office of Emergency Medical Services (EMS) convened a statewide task force to draft a statewide pre-hospital and inter-hospital trauma triage plan. Per guidelines in SJR 58, the following were asked to appoint representatives to the Trauma Triage Task Force: the State Emergency Medical Services Advisory Board; the State Office of EMS; the Critical Care Committee; the regional EMS councils (8 councils); the Virginia Hospital and Healthcare Association; the American College of Surgeons Committee on Trauma, Virginia Chapter; the Virginia College of Emergency Physicians; the American Academy of Pediatrics, Virginia Chapter; the Virginia Emergency Nurses Association; the Virginia Association of Volunteer Rescue Squads (pre-hospital care provider); the Virginia Governmental EMS Administrators (pre-hospital care provider); and the State Medical Direction Committee.

The Trauma Triage Plan which follows is a task force product. Experts within their respective fields, whose membership was specifically identified in the Senate Joint Resolution, have arrived at a consensus of what Virginia's Pre-hospital and Inter-hospital Triage Plan would ideally include: a set of criteria which delineate those critically injured pediatric and adult patients who would benefit from the services of a trauma center, and a method for implementation and monitoring of the system. It was the consensus of the task force that all parties participating in the care of trauma patients are responsible for the quality of care delivered, and should participate in the triage and quality assurance process.

INTRODUCTION

Trauma, a term that refers to bodily injury, is the leading cause of death in Virginia and nationwide in persons under age 45. It is the fifth leading cause of death in Virginia and remains the leading cause of disability. Trauma typically involves young adults and results in the loss of more productive work years than cancer and heart disease combined. In addition to lost productivity, traumatic injuries are one of the most expensive health care problems, and nationwide consume an estimated \$180 billion annually. The emotional costs are immeasurable.

Trauma care requires an organized approach, utilizing a pre-established plan or protocols to ensure rapid access to care by dedicated, expert personnel at specialized facilities. A systematic approach to trauma care is the best means to protect individuals from premature death and prolonged disability. Research has shown that organized trauma systems (in which critically injured patients are transported and admitted to designated trauma centers for care) reduce the number of preventable trauma deaths. Trauma research, involving both adult and pediatric patients, has proven that critically injured patients not admitted to a designated trauma center often experience less than optimal outcomes.

Although injury is one of man's earliest recognized afflictions and despite advances in civilization and technology, systems of care for the injured have not kept pace in reducing mortality, morbidity and disability. The efficacy of trauma care systems in reduction of preventable deaths and improved patient outcomes has been established. In many areas of the country, trauma system growth is slow or non-existent. Despite evidence showing trauma system effectiveness, scores of trauma centers have closed amid a myriad of economic and political factors.

Virginia, as with many other states, has an established trauma system dedicated to improving the treatment of trauma victims. Trauma centers form the heart of a trauma system. Trauma centers are distinguished from other hospitals in providing immediate access to specialized surgeons, physicians, nurses as well as hospital surgical, diagnostic and support services. Surgical staffing and early surgical intervention are key to reducing trauma related mortality and morbidity. The American College of Surgeons Committee on Trauma (ACS COT) sets the national standard for trauma care and has established criteria which hospitals must meet in order to be designated as a trauma center. Virginia's standard for trauma centers and trauma care parallel those established by the ACS COT.

A trauma center's value is realized only when severely injured patients are "triaged" there for care. Triage is a process of sorting injured patients based on actual or perceived degree of injury then assigning the injured to the most effective regional care resources to insure optimal care and maximize chances for a positive outcome. Simply stated, "triage" means sending the right patient to the right facility in an appropriate amount of time.

For trauma systems to be effective, there must be a triage system which differentiates the most critically injured patient in need of the specialized resources and services of a trauma center from those patients who can be appropriately treated in other acute care hospitals. A number of triage guidelines have been developed by medical experts to assist in differentiating patients in need of specialized care; however, no single tool is universally accepted as the best.

Although Virginia has an established emergency medical services system incorporating the trauma system, designated trauma centers, and a statewide trauma registry, there are no established statewide trauma triage guidelines to ensure transport of trauma victims to the most appropriate facility. Several years ago, representatives of the State Critical Care Committee and the American College of Surgeons Committee on Trauma, Virginia Chapter, developed trauma triage guidelines. The guidelines were based on trauma care protocols of the American College of Surgeons Committee on Trauma and the American College of Emergency Physicians. However, the guidelines met with great resistance and subsequently were not implemented. Thus, Virginia has neither pre-hospital nor inter-hospital guidelines for triage of trauma victims.

PURPOSE

The purpose of this study was development of a statewide pre-hospital and inter-hospital trauma triage plan. The Commissioner of Health must present this plan to the Joint Commission on Health Care by October 15, 1996. The Commissioner shall report the findings and recommendations of the task force to the Governor and the 1997 Session of the General Assembly.

BACKGROUND/HISTORY

Virginia's trauma system developed with advances in emergency medical services (EMS). Designation of Virginia hospitals as trauma centers began in 1981 and participation remains quasi-voluntary. Designation as a trauma center reflects a hospital's level of resources and commitment to care of the injured patient. Virginia's standards for trauma care at designated trauma center parallels national standards established by the American College of Surgeons Committee on Trauma in *Resources for Optimal Care of the Injured Patient: 1993*. As with the national standards, Virginia's designated trauma centers must provide and maintain specific criteria under numerous categories (Figure 1).

Figure 1

Categories of Requirements for Trauma Center Designation

- | | |
|-----------------------------------|----------------------------------|
| Hospital Organization | Trauma Research Program |
| Clinical Capabilities | Continuing Education |
| Facilities/Resources/Capabilities | Trauma Service Support Personnel |
| Quality Improvement Program | Organ Procurement Activity |
| Outreach Program | Transfer Agreements |
| Public Education | |

The specific criteria which exist within each category are classified as either "essential" or "desired." Those criterion considered "essential" must be met by the hospital. Those criterion considered "desirable" are encouraged but not required.

Three levels of trauma center designation, Levels I, II, and III, are recognized in the Commonwealth. Ten hospitals are currently designated as trauma centers (Figure 2). The Level I trauma centers are tertiary care facilities which serve as a regional resource capable of providing total care for every aspect of injury. Level I centers are expected to maintain a leadership role in the delivery of optimal care, education, research, and system development. Level I trauma centers are uniquely qualified to care for the most severely injured patient, especially in the surgical critical care setting. Level I centers have the greatest number of resources for trauma care available twenty-four hours a day.

Level II trauma centers are generally based in community hospitals and have many of the same clinical and facility requirements as Level I centers. While it is “essential” for Level I trauma centers to provide cardiac surgery, microvascular surgery, hand surgery, infectious disease management and pediatric surgery, these services are classified as “desirable” at Level II trauma centers. Level II centers are not required to have all resources in place on a twenty-four hour a day basis. Surgeons and diagnostic technicians must be on call and able to respond promptly to the hospital. Patients with complex injuries may warrant transfer to a Level I trauma center.

Level III trauma centers are generally based in rural community hospitals where access to Level I or Level II facilities is limited. Level III centers need resources available to provide rapid assessment and initial stabilization, surgical intervention as well as expeditious transfer to a Level I or Level II trauma center for definitive care.

Figure 2
Virginia’s Designated Trauma Centers

Level I Trauma Centers

Carilion Roanoke Memorial Hospital	Roanoke, Virginia
Fairfax Hospital	Falls Church, Virginia
Medical College of Virginia Hospitals	Richmond, Virginia
Sentara Norfolk General Hospital	Norfolk, Virginia
University of Virginia Medical Center	Charlottesville, Virginia

Level II Trauma Centers

Bristol Regional Medical Center	Bristol, Tennessee*
Riverside Regional Medical Center	Newport News, Virginia
Virginia Beach General Hospital	Virginia Beach, Virginia

Level III Trauma Centers

Carilion Radford Community Hospital	Radford, Virginia
Columbia Montgomery Regional Hospital	Blacksburg, Virginia

* Hospitals in adjoining states may be recognized as providing “equivalent” services. A facility in an adjoining state must be able to verify that fifty percent (50%) of their injured population reside in Virginia. Furthermore, they must maintain trauma center designation in their home state, maintain Virginia trauma center standards and submit to a periodic trauma center site review by the Virginia Department of Health.

Despite advances in Virginia's EMS system and designation of trauma centers, a 1986 Health Congress report on Virginia's Trauma Care System noted the lack of statewide trauma triage guidelines. In the early 1990's, representatives of the American College of Surgeons Committee on Trauma, Virginia Chapter, and the State Critical Care Committee drafted pre-hospital trauma triage guidelines. These guidelines were met with great opposition and consequently never advanced.

METHODOLOGY

In order to develop statewide pre-hospital and inter-hospital trauma triage guidelines, it was imperative to complete a comprehensive review of literature on trauma care, trauma care systems, and trauma triage tools. Existing research, duplicated in many areas of the United States and abroad, demonstrates the effectiveness of organized trauma care systems and utilization of pre-hospital and inter-hospital triage guidelines to maximize patient outcomes. Trauma system plans, legislation and triage guidelines from other states were also reviewed.

In addition to a review of the literature, the Virginia Department of Health's Office of Emergency Medical Services (EMS) convened a statewide task force to draft a statewide pre-hospital and inter-hospital trauma triage plan. Per guidelines in SRJ 58 (See Resolution), the following were asked to appoint representatives to the Trauma Triage Task Force: the State Emergency Medical Services Advisory Board; the State Office of EMS; the Critical Care Committee; the regional EMS councils (8 councils); the designated trauma centers (10 trauma centers); the Virginia Hospital and Healthcare Association; the American College of Surgeons Committee on Trauma, Virginia Chapter; the Virginia College of Emergency Physicians; the American Academy of Pediatrics, Virginia Chapter; the Virginia Emergency Nurses Association; the Virginia Association of Volunteer Rescue Squads (pre-hospital care provider); the Virginia Governmental EMS Administrators (pre-hospital care provider); and the State Medical Direction Committee.

The Trauma Triage Task Force had monthly meetings scheduled from April through August, with two meetings in September. The initial meeting led to the development of a mission statement, essential to determine the task force' purpose and guide development of a statewide trauma triage plan. The task force drafted the following mission statement:

The purpose of a statewide trauma triage system is to ensure that trauma patients throughout the state arrive at the closest appropriate center in a timely manner. The triage system consists of a uniform plan which should be applicable to all trauma patients. At the same time, the system should reflect local geographic variations and trauma capabilities. Quality improvement and performance monitoring process is essential to record outcomes of trauma patients, insure accountability, and guide future changes. All parties participating in the care of trauma patients are responsible for the quality of care delivered, and should participate in the triage and quality assurance process.

In subsequent meetings, workgroups were formed to address such issues as quality improvement, triage protocols, transport issues, problem areas, and dissemination of information. Large volumes of information were disseminated to task force members. In June, the task force developed the first draft pre-hospital and inter-hospital triage guidelines. Task force members

were charged with sharing this information and soliciting input from pre-hospital care providers and health professionals in their geographic regions.

Final statewide pre-hospital and inter-hospital trauma triage criteria were finalized by the task force in early September (See Appendix A). The criteria introduce the concept of a two-tiered system, with initial triage at the scene (of an accident/incident) and secondary triage at the local hospital. Both pre-hospital and hospital criteria specifically address the pediatric and adult trauma populations.

The pre-hospital criteria delineate, by physiologic parameters (airway; central nervous system; hemodynamics), those patients who should be considered critically injured (See Appendix A, pg. 13). Parameters for pediatric and adult patients were developed and also included penetrating injury and trauma in pregnancy. The pre-hospital criteria were intentionally developed to be basic and follow or parallel current EMT curriculum in order to minimize additional education. Criteria for appropriate scene transports by helicopter were also developed (See Appendix A, pg. 17).

Hospital criteria for patient transfer to a trauma center were developed with greater attention to specifics and differentiate criteria for adult, pediatric and burn patients. The hospital criteria delineate physiologic parameters as well as injuries and specific patient types (such as elderly, or those with pre-existing cardiac or respiratory disease) who would benefit from resources at a trauma center (See Appendix A, pg. 14). Criteria for appropriate inter-hospital transports by helicopter were also developed (See Appendix A, pg. 17).

The task force adopted the nationally recognized "Pediatric Trauma Score" for use in Virginia (See Appendix A, pg. 15). The "Pediatric Trauma Score" is a tool which utilizes a scoring system to facilitate rapid assessment of the injured child. It consists of six common components: size; airway; consciousness; systolic blood pressure; fracture; and integument (skin). Each component is assigned a score consisting of +2 (minimal or no injury), +1 (minor or potentially major injury), or -1 (major or immediate life-threatening injury). Additional parameters (central nervous system, respiratory and specific injuries) were included to further identify pediatric patients whose injuries warrant transfer to a trauma center.

The task force also adopted the American Burn Association (ABA) criteria for patient transfer to a burn center (See Appendix A, pg. 16). These criteria were accepted by the task force as a nationally recognized standard which should be utilized in the Commonwealth. The ABA has identified types of burn injuries that usually require referral to a burn center. These include specific types of burns (thermal, chemical, electrical) as well as consideration for body surface area (BSA) and special patient types (children, elderly, those with pre-existing conditions).

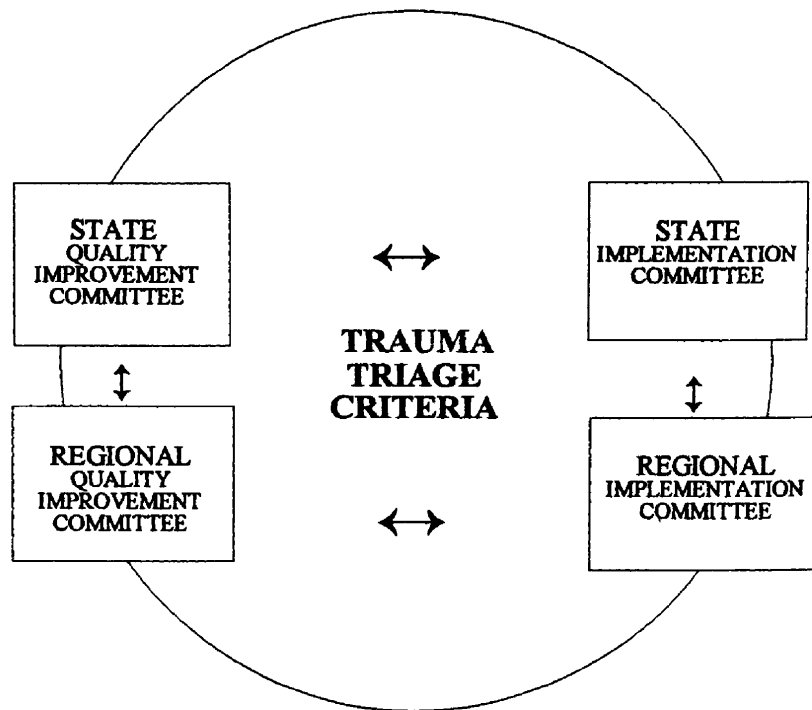
RECOMMENDATIONS

In order to provide a consistent standard of care for trauma victims across the Commonwealth, it is the recommendation of the Trauma Triage Task Force that uniform statewide pre-hospital and inter-hospital trauma triage criteria as developed by the task force be adopted (See Appendix A). It is the belief and recommendation of the task force that the Statewide Pre-hospital and Inter-hospital Trauma Triage Plan incorporate not only criteria for patient triage and transport but an

accepted means for state and regional implementation and quality improvement monitoring (See Figure 2).

Figure 2

Trauma Triage Plan Implementation and Monitoring



It is the belief of the Trauma Triage Task Force that state implementation oversight should be directed through a State Implementation Committee. This committee should include representation from each EMS region, the State EMS Medical Director, and others. It should be the responsibility of this committee: to receive regional implementation plans; assist when requested with regional plan development; and to insure that adjoining regional plans are complementary and well-integrated. The regional implementation plans should go before the State Medical Direction Committee for final review.

At the regional level, the Operational Medical Directors (OMD) should have an integral role in development of an implementation plan. An OMD is a physician who has agreed to work with an EMS agency (or agencies) and allow the agency pre-hospital care providers to function under his or her medical license. In addition to the OMD(s), each region should define committee composition. It should be the task of the Regional Implementation Committee to develop a flexible plan for criteria implementation that would reflect local geographic variations and trauma capabilities. Each regional trauma triage implementation plan should be reviewed by the State Implementation Committee.

Quality Improvement (QI) monitoring of the Trauma Triage Plan should fall under the auspices of the State Critical Care Committee of the State EMS Advisory Board. The Critical Care Committee Chair should appoint a Trauma Quality Improvement Subcommittee (See Appendix B) consisting of eight representatives who have an interest in trauma triage concerns. Representation will consider regional distribution. The Trauma Quality Improvement Subcommittee should review trauma related data from the Virginia Statewide Trauma Registry and from the Pre-hospital Patient Care Reporting system (when available) and, under the auspices of the Critical Care Committee and the Commissioner of Health, should communicate its findings to the Regional Quality Improvement Committee and to the State Implementation Committee.

Regional Quality Improvement should be required and should be directed through each EMS Regional Council. Each hospital within an EMS region should have a representative on the Regional Trauma Quality Improvement Committee. Further committee composition should be decided at the regional level. Each Regional Quality Improvement Committee should communicate with its Regional Implementation Committee.

It should be the ultimate responsibility of the Critical Care Committee and Medical Direction Committee to collaborate in periodic review and revision of the Trauma Triage Criteria based on available trauma registry data.

The Trauma Triage task force considered three alternatives pertaining to the Statewide Trauma Triage Plan.

- ▶ Enact the Statewide Trauma Triage Plan into legislation.

Although there was no formal vote, it was the feeling of task force members that enacting the Statewide Trauma Triage Plan into legislation would make it unnecessarily cumbersome to change or amend. The task force does not recommend that the plan be enacted into legislation.

- ▶ Establish the Trauma Triage Plan as guidelines.

It was the feeling of the task force that use of the criteria and structure for implementation and quality improvement as guidelines was insufficient to support the needs of trauma triage within the Commonwealth. It is not the recommendation of the task force that the Trauma Triage Plan be utilized merely as guidelines which could lead to regionalization of care.

- ▶ Place the Trauma Triage Plan under Rules and Regulations.

It was the feeling of the task force that the actual criteria should not be placed under rules and regulations, as even simple criteria modification would require the cumbersome process of regulatory review. However, the actual Statewide Trauma Triage Plan structure (plan implementation and monitoring) could be placed into regulation. This action should be encouraged as it would effectively support the statewide needs of trauma triage within the Commonwealth.

CONCLUSION

It was the desire of the Trauma Triage Task Force that clear legislative authority be given to the Commissioner of Health to develop and direct the Commonwealth's trauma system and components parts. In addition, the task force suggested that the details of the patient triage and transfer criteria of the *Statewide Pre-hospital and Inter-hospital Trauma Triage Plan* not be enacted into legislation or regulated, as both would make change cumbersome. With freedom from legislation or regulation, trauma triage criteria could be modified as deemed necessary through accepted changes in medical practice or data obtained from the Virginia Statewide Trauma Registry. It was the desire of the task force that there be a regulated mechanism for statewide and regional implementation and quality improvement monitoring of the *Statewide Pre-hospital and Inter-hospital Trauma Triage Plan*. The task force believed this would effectively support the statewide needs of trauma triage and protect the best interest of the trauma population within the Commonwealth.

REFERENCES

- American College of Emergency Physicians: Guidelines for Trauma Care Systems. *Ann Emerg Med* 22(5): 1079-1100, 1993
- Baxt WG, Jones G, Fortlage D: The Trauma Triage Rule: A New, Resource-based Approach to the Prehospital Identification of Major Trauma Victims. *Ann Emerg Med* 29(12): 1401-1406, 1990.
- Bazzoli GJ, Madura KJ: *1993 Inventory of Trauma Systems*. The Hospital Research and Education Trust, 1993.
- Bazzoli GJ, Madura KJ, Cooper GF, MacKenzie EJ, Maier RV: Progress in the Development of Trauma Systems in the United States. *JAMA* 273(5):395-401, 1995.
- Boyko SM: Interfacility transfer guidelines: An easy reference to help hospitals decide on appropriate vehicles and staffing for transfers. *J Emerg Nsg* 1(20): 18-23, 1995.
- Champion HR, Mabee MS: An American Crisis in Trauma Care Reimbursement. *Emerg Care Q* 6(2):65-87, 1990.
- Champion HR, Sacco WJ, Gainer PS, Patow SM: The Effect of Medical Direction on Trauma Triage. *J Trauma* 28(2): 235-239, 1988.
- Committee on Trauma: *Resources for Optimal Care of the Injured Patient: 1993*. Chicago, American College of Surgeons, 1993.
- Joint Commission on Health Care: *Study of the Need for and Efficacy of a Statewide Trauma Triage Plan Pursuant to SJR 353 of 1995*. Commonwealth of Virginia, 1996.
- Kilberg L, Clemmer TP, Clawson J, et al: Effectiveness of Implementing a Trauma Triage System on Outcome: A Prospective Evaluation. *J Trauma* 28(10): 1493-1498, 1988.
- McDermott FT, Cordner SM, Tremayne, AB, et al: Evaluation of the Medical Management and Preventability of Death in 137 Road Traffic Fatalities in Victoria, Australia: An Overview. *J Trauma* 40(4): 520-535, 1996.
- Meredith W, Rutledge R, Hansen AR, Oller DW, Thomason M, Cunningham P, Baker CC: Field Triage of Trauma Patients Based upon the Ability to Follow Commands: A Study in 29,573 Injured Patients. *J Trauma* 38(1): 129-135, 1995.
- Narad RA, Becker JL, Frecceri C: A Decentralized Trauma System Design for a Rural Area. *Prehospital and Disaster Medicine* 11(2): 134-140, 1995.

- National Association of Emergency Medical Services Physicians: Air Medical Dispatch: Guidelines for Trauma Scene Response. *Prehospital and Disaster Medicine* 7(1): 75-76, 1992.
- National Association of State Emergency Medical Services Directors: Trauma Center Designation Survey, 1991.
- Norwood S, Fernandez L, England J: The Early Effects of Implementing American College of Surgeons Level II Criteria on Transfer and Survival Rates at a Rurally Based Community Hospital. *J Trauma* 39(2): 240-245, 1995.
- Sampalis JS, Lavoie A, Boukas S, et al: Trauma Center Designation: Initial Impact on Trauma-Related Mortality. *J Trauma* 39(2): 232-239, 1995.
- Shatney CH, Sensaki K: Trauma Team Activation for 'Mechanism of Injury' Blunt Trauma Victims: Time for a Change? *J Trauma* 37(2): 275-282, 1994.
- Simmons E, Hedges JR, Irwin L, Maassberg W, Kirkwood, HA: Paramedic Injury Severity Perception Can Aid Trauma Triage. *Ann Emerg Med* 26(4): 461-468, 1995.
- Smith JS: Trauma Triage: Alphabet Soup to Numbers Game. *Penn Med*: 47-49, November, 1988.
- Tepas JJ, Mollitt DL, Talbert JL, Bryant M: The Pediatric Trauma Score as a Predictor of Injury Severity in the Injured Child. *J Ped Surg* 22(1): 14-18, 1987.
- Trauma Care System. 1986 Health Congress: 1-10, 1986.
- Trunkey D: Trauma Systems A Model for Regionalized Care. *JAMA* 273(5): 421-422, 1995.
- U.S. Department of Health and Human Services, Division of Trauma and Emergency Medical Services: *Model Trauma Care System Plan*, 1992.

APPENDIX A

Trauma Triage Task Force
Statewide Trauma Triage Plan

Two-tiered System

- ▶ Initial triage at scene
- ▶ Secondary triage at local hospital

SCENE CRITERIA

ADULT PATIENT	PEDIATRIC PATIENT		
Airway* Rate <8 or >30 Assisted ventilation Partial or complete airway obstruction Unable to establish or maintain airway	Airway* Requires constant observation for patency, O ₂ administration, or assisted ventilation Partial or complete airway obstruction Unable to establish or maintain airway Intubation		
CNS Unconscious/Unresponsive Does not follow commands Unable to move extremities	CNS Unconscious/ Unresponsive Not moving extremities		
Hemodynamics Systolic blood pressure <90 Pulse > 120 Uncontrolled Bleeding	} With Signs & Symptoms of Shock		
	Hemodynamics <10 kg (22#) Systolic BP <50 Poor peripheral pulses Poor perfusion Uncontrolled bleeding	11-20 kg (24-44#) Systolic BP <70 Poor peripheral pulses Poor perfusion Uncontrolled bleeding	>20 kg (44#) Systolic BP <90 Poor peripheral pulses Poor perfusion Uncontrolled bleeding
Penetrating Injury Head Neck Chest, abdomen Extremities with uncontrolled bleeding and/or loss of pulse Amputation above elbow or knee	Penetrating Injury Head Neck Chest, abdomen Extremities with uncontrolled bleeding and/or loss of pulse Amputation above elbow or knee		
Trauma in Pregnancy			

*Issue of uncontrollable airway must be addressed by regional & local protocol

Patients with CPR initiated at the scene should be transported to the closest hospital.

Hospital Criteria for Adult Patient Transfer to Trauma Center

CNS

- Unable to follow commands
- Open skull fracture
- Extra-axial hemorrhage on cranial CT, or any intracranial blood
- Paralysis
- Focal neurologic deficits
- GCS ≤ 12

Cardiovascular

- Hemodynamic instability as determined by examining physician
- Persistent hypotension
- Systolic blood pressure (<100) without immediate availability of surgical team

Respiratory

- Bilateral thoracic injuries
- Significant unilateral injuries in patient >60 (e.g. pneumothorax, hemothorax, pulmonary contusion, >5 rib fractures)
- Significant unilateral injuries in patient with pre-existing cardiac and/or respiratory disease
- Respiratory compromise requiring intubation
- Flail chest

Injuries

- Any penetrating injury to head neck, torso, or extremities proximal to elbow or knee without surgical team immediately available*
- Combination of trauma with burns
- Significant abdominal to thoracic injuries in patient where physician in charge feels treatment of injuries would exceed capabilities of medical center

*Immediately available as defined by Trauma Center criteria

Hospital Criteria for Pediatric Patient Transfer to Trauma Center

1. Pediatric Trauma Score ≤ 6 .

COMPONENT	+2	+1	-1
Size	Child/adolescent, >20kg	Toddler, 11-20kg	Infant, <10kg
Airway	Normal	Assisted O ₂ , mask, cannula	Intubated: ETT, EOA, Cric
Consciousness	Awake	Obtunded; lost consciousness	Coma; unresponsive
Systolic BP	>90 mm Hg; good peripheral pulses, perfusion	51-90 mm Hg; peripheral pulses, pulses palpable	<50 mm Hg; weak or no pulses
Fracture	None seen or suspected	Single closed Fx anywhere	Open, multiple Fx
Cutaneous	No visible injury	Contusion, abrasion; laceration <7 cm; not through fascia	Tissue loss; any GSW/Stab; through fascia

2. CNS

- a. Open skull fracture
- b. Extra-axial hemorrhage on CT scan
- c. Focal neurologic deficits

3. Respiratory

- a. Bilateral thoracic injuries
- b. Significant unilateral injuries in patients with pre-existing cardiac and/or respiratory disease
- c. Flail chest

4. Injuries

- a. Any penetrating injury to head, neck, chest, abdomen, or extremities proximal to knees or elbows without a surgical team immediately available
- b. Combination trauma with burns
- c. Any injury or combination of injuries where physician in charge feels treatment of injuries would exceed the capabilities of the medical center.

Hospital Criteria for Patient Transfer to a Burn Center

The American Burn Association has identified the following types of burn injuries that usually require referral to a burn center:

1. Partial thickness and full-thickness burns greater than 10% of the total body surface area (BSA) in patients under 10 years or over 50 years of age
2. Partial-thickness and full-thickness burns greater than 20% BSA in other age groups
3. Partial-thickness and full-thickness burns involving the face, eyes, ears, hands, feet, genitalia, or perineum of those that involve skin overlying major joints
4. Full-thickness burns greater than 5% BSA in any age group
5. Electrical burns, including lightning injury; (significant volumes of tissue beneath the surface may be injured and result in acute renal failure and other complications)
6. Significant chemical burns
7. Inhalation injury
8. Burn injury in patients with pre-existing illness that could complicate management, prolong recovery, or affect mortality
9. Any burn patient in whom concomitant trauma poses an increased risk of morbidity or mortality may be treated initially in a trauma center until stable before transfer to a burn center
10. Children with burns seen in hospitals without qualified personnel or equipment for their care should be transferred to a burn center with these capabilities
11. Burn injury in patients who will require special social and emotional or long-term rehabilitative support, including cases involving suspected child abuse and neglect

Criteria for Aeromedical Transport (when available and criteria are met)

Scene Transports by Helicopter

1. All patients transported by air must meet the clinical trauma triage criteria for transport to the closest Level I or Level II trauma center or burn center.
2. Patient requires a level of care greater than can be provided by the local ground provider.

1 or 2 ABOVE, PLUS ANY OF THE FOLLOWING:

- a. Difficult access situations:
 1. Wilderness rescue
 2. Ambulance egress or access impeded at the scene by road conditions, weather, or traffic
- b. Time/distance factors:
 1. ETA to local hospital by ground greater than ETA to the trauma center by helicopter
 2. Patient extrication time > 20 minutes
 3. Utilization of ground ambulance leaves local community without ground transport coverage

Inter-hospital Transports by Helicopter

1. All patients transported by air must meet the clinical trauma triage criteria for transport to the closest Level I or Level II trauma center or burn center
2. Patient requires a level of care greater than can be provided by the local ground provider.
3. Patient requires time critical intervention, out of hospital time needs to be minimal, or distance to definitive care is long.
4. Utilization of local ground ambulance leaves local community without ground ambulance coverage.

APPENDIX B

QUALITY IMPROVEMENT FOR TRAUMA TRIAGE PROTOCOLS

OBJECTIVES

- ▶ **ASSUMPTION:** Statewide pre-hospital data points will be adopted that facilitates this process.

Evaluate data to determine the compliance rate with the approved pre-hospital and inter-hospital triage plan.

Provide outcome data of trauma patients whose care was in compliance with pre-hospital and inter-hospital triage plan.

Compare above data with those patients who were variants from the trauma triage plan.

Compare above data with outcomes prior to implementation of trauma triage plan.

Compare education process for promulgation of trauma triage plan to the pre-hospital and emergency department use of the triage plan.
- ▶ Perform an analysis of triage criteria to ascertain what criteria have significance for patient outcomes and those which have no predictive value in sorting patients.
- ▶ Monitor number of patients transferred to trauma centers and discharged in 48 hours or less
- ▶ Periodic modification of the trauma triage plan, based on the above data, should be implemented by the Critical Care Committee to achieve improved patient outcomes.
- ▶ **ASSUMPTION:** Generic group data collection on payor source will be part of task force's approved plan.

Compare payor source to inter-hospital transfers, the time to achieve transfer, and outcome
- ▶ **ASSUMPTION:** The task force will attempt to define utilization criteria for air and ground transport.

Evaluate appropriate use of air and ground medical resources.

Monitor number of patients transported by air to trauma center who were discharged within 48 hours.

IMPLEMENTATION

PROCESS:

A subcommittee of the Critical Care Committee (CCC) will be appointed by the CCC Chair. It will consist of eight representatives with regional distribution having an interest in the trauma triage concerns. Membership of this subcommittee will be rotated so that all interested groups will have a chance to participate over a three year cycle. The Critical Care Coordinator and the Chair of the CCC will be ex officio members. The group will meet at the request of the CCC and will report its findings to the CCC. It shall be known as the Trauma QI Subcommittee.

AUDIT:

Initially, on a quarterly basis, the trauma registry will be queried using the following filters to identify patients that may have been incorrectly triaged:

- ▶ Patients admitted to non-designated hospitals (NDH) with GCS ≤ 8 .
- ▶ Patients admitted to NDH with ISS >15, AIS = 9* in 3 or more body areas.
- ▶ Monitor compliance with the pre-hospital triage criteria by method determined by Critical Care Coordinator once pre-hospital run sheets have been approved and implemented. Each EMS region should have a focused monitor audit at least once each year.

REVIEW:

- ▶ Outlier records, which are identified by the auditing process shall be reviewed by the QI sub-committee and they shall decide if record is:
 1. Indeterminate - Insufficient information to decide if incorrect triage occurred.
 2. Possible incorrect triage - Information noted leads to conclusion that incorrect triage occurred; however, it is not within a reasonable degree of certainty.
 3. Incorrect triage - A reasonable degree of certainty indicates that incorrect triage occurred.

ACTION:

The Commissioner of Health will issue a report for each EMS region on quality improvement aggregate data observed based on the input from the CCC and Trauma Triage Subcommittee. The report shall be a matter of public record and shall identify the frequency of incorrect triage as compared to the total number of trauma runs. The frequency of the report shall be no less than once per year for each EMS region.

The CCC shall send individual letters which shall identify specifics of incorrect triage to hospital administrators and/or the EMS medical directors.

RESOLUTION

**SENATE JOINT RESOLUTION NO. 58
AMENDMENT IN THE NATURE OF A SUBSTITUTE**

**(Proposed by the House Committee on Rules
on February 20, 1996)**

(Patron Prior to Substitute--Senator Woods)

Requesting the Commissioner of Health to convene a task force to develop a draft statewide pre-hospital and inter-hospital trauma triage plan.

WHEREAS, trauma is the leading cause of death in Virginia and across the country for persons under age 45, and is the fifth leading cause of death in Virginia for all ages; and

WHEREAS, trauma is the leading cause of disability for all ages; and

WHEREAS, research has shown that trauma systems in which critically injured patients are transported and admitted to specially designated trauma centers for medical care can reduce the number of preventable trauma deaths; and

WHEREAS, appropriate trauma triage protocols assess the extent of a patient's injuries and direct more seriously injured patients to designated trauma centers for specialized care; and

WHEREAS, Virginia has established a statewide trauma system with 11 designated trauma centers and a trauma registry, but has not established statewide trauma triage protocols for adults or children; and

WHEREAS, pursuant to Senate Joint Resolution No. 353 (1995), the Joint Commission on Health Care studied the feasibility of establishing a statewide pre-hospital and inter-hospital trauma triage plan; and

WHEREAS, in its study, the Joint Commission on Health Care found that there is significant variation in the triage of trauma patients across the state; and

WHEREAS, an analysis of the statewide trauma registry data indicated that approximately 24 percent of the more seriously injured patients across the state were not admitted to a designated trauma center and that, in some areas of the state, approximately 32 percent of the more seriously injured patients were not admitted to a trauma center; and

WHEREAS, on a statewide basis only 11 percent of the more seriously injured patients admitted to a non-designated hospital were transferred to a trauma center; and

WHEREAS, trauma research in both adult and pediatric patients has proven that critically injured patients not admitted to a designated trauma center often experience less than optimal outcomes; and

WHEREAS, a statewide pre-hospital and inter-hospital trauma triage plan would enhance the effectiveness of Virginia's trauma system; now, therefore, be it

RESOLVED by the Senate, the House of Delegates concurring, That the Commissioner of Health be requested to convene a task force to develop a draft statewide pre-hospital and inter-hospital trauma triage plan. The task force shall consist of representatives of the State Emergency Medical Services Advisory Board, the State Health Department's Office of Emergency Medical Services, the Critical Care Committee, the regional emergency medical services (EMS) councils, the designated trauma centers, the Virginia Hospital and Healthcare Association, the Virginia Chapter of the American College of Surgeons, the Virginia Chapter of the American College of Emergency Physicians, the Virginia Chapter of the American Academy of Pediatrics, the emergency medical services community, pre-hospital care providers, and other appropriate organizations.

The State Health Department's Office of Emergency Medical Services shall provide staff support to the task force. All agencies of the Commonwealth shall provide assistance to the Department's task force, upon request.

The Commissioner of Health shall submit the draft statewide pre-hospital and inter-hospital trauma triage plan to the Joint Commission on Health Care by October 15, 1996, and the Commissioner shall report the findings and recommendations of the task force to the Governor and the 1997 Session of the General Assembly in accordance with the procedures of the Division of Legislative Automated Systems for the processing of legislative documents.

