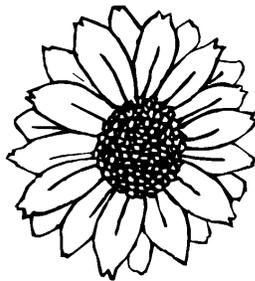


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# **KANSAS**

# **TRAUMA SYSTEM**

# **PLAN**



JANUARY 2001

**Kansas Department of Health and Environment**

**Advisory Committee on Trauma**

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State of Kansas  
Governor Bill Graves

Kansas Department of Health and Environment  
Clyde D. Graeber, Secretary  
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**KANSAS**  
**DEPARTMENT OF HEALTH & ENVIRONMENT**  
BILL GRAVES, GOVERNOR  
Clyde D. Graeber, Secretary

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January 24, 2001

Dear Colleague:

On behalf of the Advisory Committee on Trauma and the Kansas Department of Health and Environment, we are pleased to present you the *Kansas Trauma System Plan*. In 1999, the Kansas legislature charged us to develop a statewide trauma system plan. This document is the result of the committee's recommendations for an inclusive trauma system in Kansas. The Kansas Trauma System Plan describes the structure and components necessary to implement an inclusive system in Kansas from prevention of trauma to rehabilitation.

Over 1,400 Kansas residents die each year from trauma. National data indicates that for every one trauma death, there are 18 injury related hospital discharges and 260 emergency department visits. Injuries occur disproportionately among both younger and older people. During this century trauma has replaced infectious disease as the greatest threat to children. Trauma systems are designed to benefit the whole population with the goal that all injured patients should achieve optimal care and maximum potential for recovery. The development, implementation, and operation of a trauma system is a complex process which requires concerted efforts from all health care providers.

Everyone has a part to play if we are to impact trauma in our state. We hope that you will take time to review this plan and we invite you to take an active role in the implementation of a comprehensive trauma system for Kansas.

Sincerely,

Clyde D. Graeber, Secretary  
Department of Health and Environment

Sincerely,

Paul Harrison, MD, Chairman  
Advisory Committee on Trauma

**Kansas Trauma System Plan  
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**ADVISORY COMMITTEE ON TRAUMA**

**(By appointing authority)**

<b>Governor's Appointments:</b>	
Dr. Paul Harrison, Chairman Kansas Medical Society Wichita	Dr. Craig Concannon Kansas Medical Society Beloit
Mr. Kerry McCue Ellis County Emergency Medical Services Hays	Dr. Scott Sellers Kansas Association of Osteopathic Medicine Hutchinson
Mr. John Broberg Kansas Hospital Association Salina	Mr. Roger John Kansas Hospital Association Phillipsburg
Mr. Jeff Strickler Kansas Hospital Association Overland Park	Ms. Lois Towster Kansas State Nurses Association Overland Park
Ms. Connie Meyer KS Emergency Medical Services Association Greeley	Ms. Darlene S. Whitlock Kansas State Nurses Association Silver Lake
Robert Orth KS Emergency Medical Technicians Association Sublette	Pam Kemp Director of EMS Clay Center
Representative Jene Vickrey House Speaker Louisburg	Senator Chris Steineger Senate President Kansas City
Jack Shearer South West Regional Trauma Council Dodge City	Tim Pitts South Central Regional Trauma Council Hutchinson
Mark Bradford North East Regional Trauma Council Lawrence	Walt Regehr, JR South East Regional Trauma Council Iola
Warren Hixson North West Regional Trauma Council Colby	Patricia Dowlin North Central Regional Trauma Council Glasco
Dr. Dennis Allin, Vice Chairman Board of Emergency Medical Services	Nancy Brown, Designee KS Dept. of Health and Environment Stanley

## ***Executive Summary***

Traumatic injuries represent a serious health problem in Kansas. Injuries are one of the state's leading causes of death. Additionally, many Kansans are incapacitated and may have temporary or permanent disability as a result of injury. These events occur disproportionately among both the younger and older people. During this century trauma has replaced infectious disease as one of the greatest threat to children. Studies have shown that many of these deaths are preventable and that the implementation of a statewide trauma system in other states has reduced deaths and improved outcomes from traumatic injury.

Trauma is damage of the body resulting from exposure to thermal, mechanical, electrical, or chemical injury. While trauma patients account for a small percent of the total emergency system response, trauma accounts for a large percent of total years of potential life lost. An inclusive trauma system incorporates all emergency response resources into a system to match the needs of the trauma patient with the appropriate emergency care resources.

Kansas has been working towards a statewide trauma system since the 1980's. In 1999 as a result of legislation (K.S.A. 75-5663 et seq), an Advisory Committee on Trauma (ACT) was established and the Kansas Department of Health and Environment was charged with developing a statewide trauma system plan including the establishment of regional trauma councils. The *Kansas Trauma System Plan* is the result of the recommendations of the Advisory Committee on Trauma. The *Kansas Trauma System Plan* describes the structure and components recommended for an inclusive Kansas Trauma system. It is expected that implementation of the system described in this plan would result in:

- Reduced numbers of preventable deaths.
- Improved outcomes from traumatic injury.
- Reduced medical costs through appropriate use of resources.

### ***Components of the Proposed Trauma System Plan:***

Using the 1998 Kansas EMS/Trauma Plan as a guide, the Advisory Committee on Trauma has drafted the current document plan. The Kansas EMS/Trauma Plan was the result of the recommendations of the EMS/Trauma Policy Group as to what the model Kansas Trauma System should contain. Localized control and decision-making was emphasized. The proposed system is organized into components: Administration, Statewide Trauma Registry, Prehospital Care, Hospital Care, Performance Improvement, Injury Prevention and Control and Human Resources.

The development, implementation, and operation of a trauma system is a complex process which requires concerted efforts from all health care providers. Coordination of system activities, stable funding, data-driven planning, well-defined infrastructure, and ongoing technical assistance are critical to the success and cost effectiveness of the system. The *Kansas Trauma Systems Plan* describes the essential components of an inclusive Trauma System for Kansas.

***Advisory Committee on Trauma:***

The 1999 Legislature created the Advisory Committee on Trauma (ACT). Members of the committee have significant expertise and commitment to trauma care in Kansas. The ACT is organized to provide necessary technical advice on the development of the Kansas trauma system. It gives major stakeholders a voice in the policy process, and it will function to integrate the activities of the Regional Trauma Councils (RTCs). It is recommended that the ACT be continued with additional members representing Regional Trauma Councils.

***Regional Trauma Councils:***

Regional Trauma Councils are proposed as a way to address topics and issues related to trauma care at the regional or local level. The structure and proposed composition of the various RTCs will foster interagency coordination, ensure local input into the decision making process and maintain strong effective working relationships. A process for creating six Regional Trauma Councils is set out.

***Administering Agency:***

The Kansas Department of Health and Environment was established by K.S.A. 75-5663 as the administering agency for the state trauma system. The statute charges the Secretary of Health and Environment to develop a statewide system plan, establish regional trauma councils, and implement a statewide registry, all in consultation with the Advisory Committee on Trauma. It is recommended that KDHE continue in this role.

***Statewide Trauma Registry:***

Trauma registries provide the mechanism to collect data and to evaluate trauma care systems, which includes injury control and epidemiology, patient care and quality improvement, resource utilization, medical research and education on the local, state and national level. The state will utilize software which will be capable of downloading data in a defined format from each hospital registry. Hospitals have the option to utilize whatever hospital trauma registry best meets their specific needs. The objective is to have all acute care hospitals participate in a trauma registry. The registry will be designed so that hospitals with varying levels of resources and expertise will be able to participate in regional and local prevention efforts and performance improvement activities.

***Prehospital Care:***

The RTCs will provide leadership in system planning, specifically medical direction, triage, dispatch and allocation of resources that require local solutions, and will also work to establish standards of care, treatment protocols and practice guidelines for prehospital care. The Board of EMS will continue to take a leadership role in developing a prehospital trauma data collection system in Kansas.

Because of geographic diversity and population aggregation in our state, triage presents a unique challenge on a statewide level. The Board of EMS has developed sample protocols for services to adopt related to general triage. Local providers need to be aware of what resources are available within their community when making decisions related to triage.

Trauma triage will vary based on resources, geography, population and transport times. Each RTC will develop local triage protocols based on those factors. Each hospital will develop interfacility transfer guidelines in collaboration with prehospital providers to expedite rural trauma triage. Triage guidelines will be based on nationally recognized recommendations for trauma triage.

Kansas lacks a coordinated dispatch program for ambulance and air transport services. The RTCS will review and develop area protocols related to dispatch and communication. The result would be an organized, pre-planned response to the trauma patient and other medical emergencies.

Recommendations have been made which include decision points to be used to assist the practitioner in identifying the types of injured patients who may benefit from early transfer. The medical staff at each hospital will determine hospital specific guidelines for selection of patients who may benefit from early transfer.

***Hospital Care:***

The Kansas Trauma system is being developed as being an inclusive system which allows all hospitals to have a role in providing trauma care. The goal is to assure that all trauma patients receive optimal care, given available resources and the needs and location of the patient are matched with the resources of the system. The Kansas Trauma System model is based upon voluntary participation of each hospital. Verification criteria have been adopted which will allow each facility to determine their individual goals based upon the unique resources available in its community. The purpose of implementing a verification process is to provide a target for improving the outcome of trauma patients.

***Performance Improvement:***

A successful trauma system should be able to monitor its own performance and assess its impact on trauma mortality and morbidity. This goal requires continuous evaluation of operations, demonstrations that the system is meeting its goals, and the documentation of system performance. The system performance improvement program created by the Kansas Trauma System Plan should assure these goals are met.

The Board of EMS will continue to strive for implementation of a system to collect data on performance of the prehospital emergency health care system and its effects on patient outcome. Trauma facilities will collect data and submit this information to KDHE. On a regular basis, KDHE will provide reports generated from the state trauma registry to the RTCs. The RTCs will analyze the reports to identify regional strengths and areas needing improvement.

***Injury Prevention and Control:***

Currently there are several organizations in the state which have a limited focus in the area of injury prevention and education. Under the draft plan, these organizations would be invited to collaborate with hospitals and the RTCs to provide a much more comprehensive and broader scope on injury prevention and education. Programs and partnerships would be developed with a wide variety of organizations to reach the public regarding high risk behaviors and populations at risk for injury. As the trauma plan is implemented, a trauma registry will be instituted statewide. Data from this registry will be used to facilitate and evaluate regional planning for injury prevention education and training.

***Human Resources:***

Providing care for the trauma patient requires the skill and knowledge of a variety of health care specialties. Training and education is currently available in Kansas but not equally accessible within the state. To be effective, comprehensive prehospital and hospital education and training needs to be more readily available particularly advanced trauma training. The RTCs will prioritize the training/educational needs within their respective regions and will facilitate the process of identifying resources for education/training opportunities for those providing injury care. Retention of health care providers particularly in the rural area is critical. Innovative trauma education programs designed to retain experienced provider and recruit new providers should be encouraged.

## ***Purpose***

Trauma is the leading cause of death and disability in children and young adults in Kansas. It has high morbidity and mortality for people across all age groups. The evidence that this disease is preventable is the basis for the development of a statewide plan to provide a framework for the prevention of death and disability from traumatic injuries. The inclusive trauma system allows for the trauma patient to be triaged and transported to the closest hospital with appropriate resources to meet the needs of the trauma patient. The Kansas trauma plan must address both rural and urban concerns. Rural trauma care is complicated by issues associated with geographic isolation including but not limited to, time from injury to discovery, extrication issues, distance to immediate healthcare as well as local health care resource availability. Trauma care includes not only hospital resources but the entire continuum of care including prevention, from prehospital through rehabilitation care. It is a well established fact that an organized system of care for the injured patient reduces mortality and morbidity. The system must be an inclusive system recognizing the importance of all hospitals in providing trauma care.

The purpose of this plan is to provide an organized and logical guide towards assuring a high quality of trauma care to all in Kansas. The Kansas Trauma System Plan is designed as a description of the current capabilities and future goals of the trauma system in the state. This plan recognizes that a vast partnership of organizations, institutions and individuals form the nucleus of a quality trauma system. It is only through this partnership and adherence to the highest standards of trauma care that the goals of this plan will be achieved.

The goal of this trauma plan is to plan, implement and monitor a statewide trauma system in order to:

- a. Prevent unnecessary death and disability from trauma
- b. Improve and enhance the delivery of trauma services to the residents and visitors in Kansas
- c. Establish standards for a trauma system and to encourage provider (prehospital and hospital) preparation and response to the recognition, diagnosis and definitive treatment of major trauma patients
- d. Pursue trauma public awareness and prevention activities to decrease the incidence of trauma
- e. Develop consistent, relevant and accessible trauma education resources statewide
- f. Continue to design the trauma components as a total integrated system of care from event recognition to full patient recovery, including rehabilitation
- g. Continue to coordinate and integrate the trauma system with the EMS system
- h. Coordinate the Kansas trauma system with surrounding states
- i. Assure accountability, objectivity and relevance to the trauma system through information systems and quality management programs

## Advisory Committee on Trauma

### **Background:**

The 1998 *Kansas EMS/Trauma Systems Plan* recommended creation of a Statewide Emergency Medical Advisory Council (SEMAC) to provide technical expertise and recommendations regarding EMS/Trauma care. Members of the SEMAC were to be chosen for their expertise in and commitment to the area of EMS/Trauma care, were to include prehospital personnel, physicians, nurses, and hospital personnel involved with EMS/Trauma care, and were to be representative of urban and rural interests from each of the six regions.

The SEMAC was to be a critical element of the overall system, organized to provide technical advice, insure that the major stakeholders were represented in the policy process, and to provide the statewide coordination of policy necessary to integrate the planning and activities of the regional committees.

The 1999 Legislature created the Advisory Committee on Trauma (ACT), generally following the recommendations in the 1998 Plan (K.S.A. 75-5664). The ACT is advisory to the Secretary of Health and Environment on the development and implementation of a statewide trauma system. The ACT is composed of 15 members including representation from physician organizations, the hospital association, the state nurse association, and EMS organizations. Of the 15 members, two are legislators, one is a representative of KDHE and one is a representative of the Board of Emergency Medical Services. Members of the committee have significant expertise and commitment to EMS and Trauma Care, and represent both urban and rural interests.

The ACT is charged with directing the development and implementation of the Kansas trauma system, including:

- Take a lead role in development of a statewide template for injury prevention.
- Provide oversight and guidance to the RTC (Regional Trauma Councils) for system evaluation, education and training programs, and public education and prevention strategies.
- Monitor availability of resources statewide, assure compliance with system standards, and work in conjunction with the KDHE to develop a process for review of trauma care.
- Evaluate patient care outcomes at a system level.
- Develop a process to assure trauma centers outside the State of Kansas are fully incorporated into the Kansas Trauma Plan to assure access and mutual aid programs are in place.
- Analyze the impact and results of the system and make recommendations for change as appropriate to assure quality outcomes.
- Assist KDHE in developing and monitoring legislative initiatives as appropriate.
- Identify funding sources for all aspects of the emergency medical and trauma system.

### **Critical Assumptions:**

The system functions for a statewide advisory committee that were identified in the 1998 Plan continue to be critical to the effective development of the state trauma system. The Advisory Committee on Trauma is organized to provide necessary technical advice on the development of the trauma system, it does give major stakeholders a voice in the policy process, and it will

function to integrate the activities of the Regional Trauma Councils.

As an on-going body, the ACT should be structured with staggered terms to assure orderly replacement of members without disruption of the committee's functional ability.

***Implementation:***

The executive branch and the legislature should continue the Advisory Committee on Trauma as established in K.S.A. 75-5664 with an amendment to enable implementation of the staggered terms called for in subsection (c). The staggered terms were not implemented because no central appointing authority made all the appointments. Seven members are appointed by the governor from nominations received from specified organizations with six members appointed directly by four different organizations and two legislators appointed by the Speaker and President of the Senate.

It is recommended that as a means to implement staggered terms, the Governor initially designate the term lengths for all positions on the ACT regardless of the appointing organization. Existing members of the ACT could be reappointed with staggered terms to implement the process without disrupting the existing committee. The statute should authorize each organized RTC to appoint a representative to serve as a member of the ACT. RTC representatives should be eligible to receive reimbursement for expenses related to their participation on the ACT.

## *Kansas Regional Trauma Councils*

### ***Background:***

Currently there is no organized system in Kansas to address trauma system issues at the local level. One of the objectives of the Kansas Trauma Plan is to develop a regional system of trauma care, in coordination with adjacent systems with the goal of reducing the mortality and morbidity of injured patients within a defined region. Regional Trauma Councils (RTCS) are proposed as a way to address topics and issues related to trauma care in a region. In addition, the structure and proposed composition of the various RTC will foster interagency coordination, ensure local input into the decision making process and maintain strong effective working relationships. This structure allows local people to develop solutions to local problems.

### ***Critical Assumption:***

An inclusive trauma system promotes regionalization of trauma care so that citizens in all areas of the state will receive the best possible care. Initial coordination and support of the RTCs will be provided from KDHE. The RTCs will work in coordination with the Advisory Committee on Trauma (ACT) and KDHE to address issues and develop policy based on information from the statewide trauma registry, the prehospital data collection system and input from trauma personnel in the region. The leadership of the RTCs will be elected from the membership of the regional council.

### ***Implementation:***

Coordination and implementation of the RTCs will be based on the following:

#### **I. Mission and Charge**

Regional Trauma Councils (RTCs) are established to act as a local resource for input to and support of the Kansas Trauma Systems Plan. The mission of the Kansas Trauma System is to reduce human suffering and costs associated with preventable morbidity and mortality that result from trauma. The RTCs will be instrumental in analyzing local trauma care trends and in promoting regional quality improvement actions in an effort to deliver appropriate and timely emergency and trauma care. The duties of the RTC are as follows:

- A. To propose for approval by the Advisory Committee on Trauma, a regional component for the Kansas Trauma System Plan after assessing the local trauma needs and resources of the region,
- B. To promote cooperation and to support communication among member organizations and hospitals
- C. To provide a forum to discuss and resolve issues between member organizations.
- D. To promote member education, public awareness and prevention activities regarding regional trauma.

- E. To identify and analyze trends and patient care outcomes based on trauma registry data.
- F. To assure quality improvement activities within the system to achieve the highest level of trauma care.
- G. To advise the Advisory Committee on Trauma on matters relating to regional trauma care.

## II. General Membership Categories

- A. General membership on the Regional Trauma Council is open to:
  - 1. The general membership of the RTC shall include representatives with a vested interest in trauma care. Representatives shall be selected from the following membership groups: *physician providers, nurse providers, hospital administrators, public health departments, and prehospital EMS providers.*

## III. Appointment of General Members

- A. The appointment process for the RTCs shall consist of the following steps:
  - 1. All hospitals in the region will nominate a physician, nurse and administrator to serve as general members of the RTC.
  - 2. Each emergency medical service agency will nominate 2 representatives to serve as general members of the RTC.
  - 3. All public health departments in the region will be asked to nominate one representative to serve as a general member of the RTC.
  - 4. Nominations will be sent to the Office of Local and Rural Health, Kansas Department of Health and Environment, 900 SW Jackson Street, Topeka, KS 66612. The nomination form shall include the following: nominee's name, title, mailing address, telephone number, fax, e-mail address, and the provider group that they represent: hospital, physician, EMS provider, etc.
  - 5. The nomination process will close 30-days after the request for nominations has been mailed to hospitals and emergency medical service organizations in the region. Nominations will be accepted that are post-marked no later than the 30<sup>th</sup> day after the request for nominations was mailed.
  - 6. After receiving all nominations for membership on the RTC, the Office of Local and Rural Health will schedule a "General Membership" meeting of each RTC. To the extent

possible, the “General Membership” meeting will be scheduled at a location that is central to all members of the RTC.

7. The “General Membership” meeting will be scheduled within 90-days after the nomination process has been closed.
8. All General Members will receive written notification of the date, time and place for the first “General Meeting” of the RTC.
9. Once the Executive Committee has been ceded, the General Membership can be appointed in a manner approved by the Executive Committee, but representation shall remain consistent with items 1 – 3 in this section of the Appointment and Operating Procedures.

#### **IV. Appointment of Executive Committee**

- A. The primary purpose of the first “General Meeting” of the RTC will be to elect an Executive Committee and choose officers. The election process will be conducted in the following manner:
  1. General members will assemble with their respective membership groups to elect 2 representatives to serve on the Executive Committee.
  2. Within each membership group, nominations will be accepted from the floor. Nominations will continue until a motion is made and seconded that the nomination process be closed. A simple majority vote will close the nomination process.
  3. A ballot shall be prepared for each membership group that contains the names of all Executive Committee nominees..
  4. Each group member will then vote for two representatives from their group to serve on the Executive Committee. The Executive Committee will consist of 10 members – two members from each membership group.
  5. The two nominees with the most votes, in each membership group, will be appointed to the Executive Committee. Ballots are to be counted by two individuals in each membership group that have not been nominated to serve on the Executive Committee.

#### **V. Executive Committee Officers**

- A. Election to the Executive Committee. Once the Executive Committee’s general body is appointed, the General Membership shall elect executive committee officers to fill the following positions:

- Chairman
- Vice-Chairman
- Treasurer
- Secretary

B. The election shall be conducted in the following manner:

1. Nominations will be accepted from the floor. Nominations will continue until a motion is made and seconded that the nomination process be closed. Members will then vote, by voice or a show of hands, to cease the nomination process. A simple majority will close the nomination process.
2. A ballot shall be prepared with the name of nominees for each position.
3. Voting will be open to all General Members. Three representatives from the General Membership shall count the ballots. After the votes are counted, nominees with the most votes in each category will be appointed officers of the Executive Committee.

## **VI. Role of the Executive Committee**

A. The Executive Committee will be responsible for fulfilling the mission and charge of the Regional Trauma Council. To accomplish its charge, the Executive Committee will be responsible for developing and appointing members to designated subcommittees and developing by-laws for the RTC.

1. Specialty Subcommittees may be appointed by the Executive Committee from the General Membership of the RTC.
2. Proposed bylaw amendments and revisions must be submitted to the Executive Committee for consideration and approval by 2/3 majority of executive members present before presentation to the General Membership in writing at least (30) days prior to the meeting.  
By-laws may be adopted to replace the operating guidelines. The by-laws may be adopted, amended or revised by an affirmative vote of the simple majority of the members present at a general membership meeting designated for this purpose.
3. At least annually, conduct a meeting of the General Membership.

## **VII. Terms of the Executive Committee**

- A. Each officer holds a position for a term of one year, although it may prove necessary for a longer term during initial implementation of the RTC.
- B. Officers shall not be re-elected to more than 2 consecutive terms.

- C. Executive Committee members shall be elected to two-year terms. Following their initial two-year appointment, Executive Committee members shall be elected to staggered terms of office. The process for staggering member terms shall be determined by the Executive Committee of each RTC and included in their by-laws.
- D. Newly elected officers are to be installed at the next meeting of the Executive Committee.

### **VIII. Duties of Officers**

#### **A. Chair**

- 1. Preside at all General Membership and Executive Committee meetings.
- 2. Make interim appointments as needed with the approval of the Executive Committee.
- 3. Sign any/all agreements or contracts with either the Secretary or Treasurer after Executive Committee approval.
- 4. Convene special meetings as needed.

#### **B. Vice-Chair**

- 1. The Vice Chair shall perform the duties of the Chair when the Chair is absent from a meeting.

#### **C. Secretary**

- 1. Call the role and determine if a quorum is present.
- 2. Record minutes of all meetings and distribute to members.
- 3. Sign contracts and/or agreements for the RTC with the Chair or Treasurer.
- 4. Complete all organization correspondence.
- 5. Receive written ballots.

#### **D. Treasurer**

- 1. Maintain accountability for all fiscal matters.
- 2. Sign contracts and/or agreements for the RTC with the Chair or Secretary.
- 3. Perform other duties as assigned by the Chair.

E. Quorum

1. A quorum for conducting the business of the Executive Committee shall be not less than one-third (1/3) of the members

## *Administering Agency*

### ***Background:***

The Department of Health and Environment (KDHE) surveys and licenses hospitals and other health care facilities in Kansas through the Bureau of Health Facilities. The Department also houses the Office of Local and Rural Health which focuses on health systems development and the Bureau for Health Promotion, Injury and Disabilities Prevention Section. This section has done some injury surveillance in the Sedgwick County area and is responsible for developing and coordinating injury prevention activities across the state. In addition, the Office of Health Care Information in the Center for Health and Environmental Statistics has significant experience with large data systems and provides support for the Health Care Data Governing Board.

The Board of Emergency Medical Services (BEMS) is responsible for regulation of all ambulance services operating in Kansas, examination and certification of all ambulance attendants and instructor/coordinators, approval of all initial courses of instruction and continuing education programs, and coordination of the EMS communication system. In 1996, BEMS was awarded a Emergency Medical Services for Children (EMSC) planning grant and in the subsequent years since they have been awarded EMSC implementation and partnership grants. The BEMS has responsibility for developing a state emergency medical service plan and is committed to initiating that planning process in the coming year.

The Kansas Department of Transportation (KDOT), through the Bureau of Traffic Safety, administers the state highway safety program funded by the National Highway Traffic Safety Administration (NHTSA). NHTSA is a strong proponent and technical expert in trauma systems planning. The state highway safety program focuses on injury prevention, including passenger safety, safe driving, emergency medical services, and motor vehicle crash analysis. The Department houses the state's basic (motor vehicle) accident reporting system. The Department has sponsored some injury data linkage system development in the Sedgwick County area.

The 1999 Legislature established the Department of Health and Environment as the administering agency for the state trauma program and charged the Secretary to develop a statewide trauma system plan, establish regional trauma councils, and implement a statewide trauma registry, all in consultation with Advisory Committee on Trauma.

### ***Critical Assumptions:***

Development and administration of the statewide trauma system includes policy development and planning, program and policy implementation, promulgation or coordination of regulatory efforts, and general administrative activities necessary to oversee a trauma system. The administering agency will have a leadership role that will include maintaining consensus among stakeholders, conceptualization of a statewide trauma system that integrates trauma issues into the broader context of the medical system, trauma system monitoring and quality improvement, and legislative initiatives as necessary.

No single state or private agency has the capacity to develop and implement all of the policy and resource development activities necessary to establish and operate a statewide trauma system in Kansas. A central coordinating agency is a functional requirement, but multiple state agencies and private organizations will have to cooperate to achieve the objective of an integrated system that builds on the strengths and capacity already present in the Kansas health care system.

Because of the geographic differences across the state and the differences in capacity between urban and rural communities, the statewide trauma system will have to be sensitive to local problems and allow local solutions to these problems. The legislature accepted the recommendation to establish regional trauma councils to put a priority on local planning and decision making and this plan sets out a detailed process to implement the legislative direction. The administering agency and the Advisory Committee will have to both support and guide the activities of the regional councils to assure a true statewide system.

***Implementation:***

The Department of Health and Environment (KDHE) should continue in the administering agency role it is now assigned in K.S.A. 75-5665. The Board of Emergency Medical Services should continue to have lead responsibility for planning and policy development for the prehospital emergency medical services system and the Kansas Department of Transportation and other state agencies should cooperate and participate in the development of the statewide trauma system as necessary. The responsibility for overall coordination of the statewide trauma system should reside with KDHE functioning in close consultation with the Advisory Committee on Trauma. The Advisory Committee on Trauma should continue to be the locus for policy coordination of the system, bringing together all of the stakeholders in the system, whether or not those stakeholders are directly represented on the Committee.

## *Implementation Schedule*

<i>YEAR</i>	<i>ACTIVITY</i>
<b>Phase One</b>	<b>July 1, 2000-June 30, 2001</b>
<b>Year 1</b>	<p><b>Trauma Registry</b></p> <ul style="list-style-type: none"> <li>• Design trauma registry minimum data set and case definition</li> <li>• Purchase software for state system and hospitals</li> </ul> <p><b>Regional Councils</b></p> <ul style="list-style-type: none"> <li>• Develop 1 regional trauma council</li> </ul> <p><b>Trauma Center verification</b></p> <ul style="list-style-type: none"> <li>• Develop self-assessment tool</li> </ul> <p><b>Education &amp; Training</b></p> <ul style="list-style-type: none"> <li>• Identify education and training needs</li> <li>• Develop plan to increase availability of training to meet needs</li> </ul> <p><b>Pre-Hospital EMS</b></p> <ul style="list-style-type: none"> <li>• Begin Development of a Statewide EMS Plan</li> </ul>
<b>Phase Two</b>	<b>July 1, 2001 - June 30, 2003</b>
<b>Year 2 &amp; 3</b>	<p><b>Trauma Registry</b></p> <ul style="list-style-type: none"> <li>• Implement trauma registry in hospital facilities &amp; state level</li> <li>• Provide facility training and develop reporting groups for small facilities</li> <li>• Develop standard reports for regional councils</li> <li>• Begin epidemiological analysis to identify prevention opportunities</li> </ul> <p><b>Regional Councils</b></p> <ul style="list-style-type: none"> <li>• Develop 5 regional trauma councils</li> <li>• Begin development of regional plans</li> <li>• Identify and prioritize training needs</li> </ul> <p><b>Trauma Center Verification</b></p> <ul style="list-style-type: none"> <li>• Facilities self-assess using ACS criteria</li> <li>• ACS verification for level I and II hospitals</li> <li>• Develop state verification process for level III &amp; IV hospitals</li> </ul> <p><b>Education and Training</b></p> <ul style="list-style-type: none"> <li>• Provide training for hospital self-assessment</li> <li>• Facilitate educational trauma programs for health professionals</li> <li>• Public awareness programs developed based on data</li> </ul> <p><b>Pre-Hospital EMS</b></p> <p>Training implemented to support usage of trauma triage guidelines</p>
<b>Phase Three</b>	<b>July 1, 2003- June 30, 2005</b>
<b>Year 4 &amp; 5</b>	<p><b>Trauma Registry</b></p> <ul style="list-style-type: none"> <li>• Provide on-going training to hospitals</li> <li>• Collect data, provide reports to regional councils</li> <li>• Reassess registry software and rebid new contract</li> </ul> <p><b>Regional Councils</b></p> <ul style="list-style-type: none"> <li>• Complete 6 regional trauma plans</li> <li>• Implement performance improvement activities</li> <li>• Implement and assess prevention activities</li> <li>• Coordinate training activities to meet priority needs</li> </ul> <p><b>Education and Training</b></p> <ul style="list-style-type: none"> <li>• Evaluate outcome of educational training efforts</li> <li>• Evaluate public awareness activities</li> </ul> <p><b>Trauma Center Verification</b></p> <ul style="list-style-type: none"> <li>• Implement state verification process for level III &amp; IV hospitals</li> <li>• Evaluate the verification system</li> <li>• Provide training and technical assistance with hospital performance improvement using trauma registry data</li> </ul> <p><b>Pre-Hospital EMS</b></p> <ul style="list-style-type: none"> <li>• Statewide communication system implemented</li> </ul>

## *Statewide Trauma Registry*

### ***Background:***

Rational decision-making regarding trauma care must be based upon the understanding of the causes, treatment, and outcomes of injury. Trauma registry information includes the actual scenario surrounding the event as well as the hospital course and outcome. This information is then utilized by the individual hospital, as well as at the state level for epidemiology and injury control studies. In addition, there is an effort by the American College of Surgeons to collect trauma data at the national level (National Trauma Data Bank) from acute care hospitals.

Trauma registries provide the mechanism to collect data and to evaluate trauma care systems, which includes injury control and epidemiology, patient care and quality improvement, resource utilization, medical research and education on the hospital, state and/or national level. For example, at the hospital level the registry can be utilized to evaluate time efficiencies and resources.

System registries provide a regional perspective with the objective being to evaluate overall system effectiveness, quality improvement and injury epidemiology. In essence, system registries provide a broader, more comprehensive view of the overall trauma care system. System registries achieve this by including all seriously injured patients, and describing their course from injury through final disposition regardless of when and where care was received. Responsibility for the state registry system rests with the state agency.

### ***Critical Assumptions:***

Hospitals have the option to utilize whatever hospital trauma registry best suits their specific needs. The state system registry should have the capability to download data from various hospital registry systems when the data is provided in a defined file format. It is recommended that regardless of commercial registry vendor, the trauma registry must be easily implemented, stable, accessible, reliable, confidential and provide a continuous source of information on the care of the injured patient. It is optimal that the registry for both hospitals and the state be flexible enough to allow for modifications based on the changing local, regional, and national needs. For example, if a hospital or the state system wishes to modify the database to include additional data points, the software should be able to accommodate this with minimal effort.

The registry should be powerful, allowing for customized, user-defined reports as well as standardized reports. The system should use nationally recognized standards whenever possible, including hardware, software, design, and coding standards. Recognized standards include Revised Trauma Score (RTS), ICD-9 codes (diagnoses, E-codes and procedures), the Abbreviated Injury Scale (AIS), Injury Severity Score (ISS), and Outcome Scoring (TRISS) systems.

### ***Implementation:***

The objective is to have all acute care hospitals to participate in a trauma registry. For some hospitals, it may be more feasible to participate in a regional or network registry. Participation in the state registry system may need to be phased in over a period of time with those hospitals treating a larger volume of trauma being first to participate.

The trauma registry implementation plan will need to address mechanisms for data collection, validity, review and outcome reporting. The registry will need to be designed so that hospitals with varying levels of resources and expertise will be able to communicate and collaborate.

***Trauma registry case criteria and minimum data set:***

The criteria for patients which should be included in the trauma registry are:

- A. All injury related deaths pronounced in the emergency department (even if no interventions performed), dead on arrival or died after receiving any evaluation or treatment, during hospital admission.
- B. All patients with at least one ICD-9 diagnoses code between 800.0 and 959.9, **excluding:**
  - 1. 910-924 (blisters, contusions, abrasions, and insect bites),
  - 2. 930-939 ( foreign bodies)  
**and** who were admitted to the hospital for a length of stay greater than 48 hours  
**or** who transferred into or out of the hospital  
**or** who died either during treatment or in the Emergency Department.
- C. Exclude from the registry: patients with isolated hip fractures, acetabular or femoral neck fractures from same level falls. These are identified as patients with only ICD-9 codes 820-820.9, 808.0, or 808.1, **AND** who have an E-code of E885 (fall from same level from slipping, tripping, or stumbling) or E888 (Other and unspecified fall on same level).

The Kansas Trauma Registry will collect a minimum data set for those patients who meet trauma registry criteria as recommended by the ACS, National Trauma Data Bank( NTDB). The NTDB contains a uniform data set that has been limited to those data points selected to produce meaningful and useful reports. The NTDB uniform data set are listed in table 1.

***Trauma registry software and resources:***

Trauma registry costs culminate primarily from personnel, software and hardware. Additional personnel may be required for technical support. Most trauma registries do not require a dedicated personal computer, so other tools such as word-processing, spreadsheet, statistical and graphic programs can be utilized at the same work station.

There are two needs for trauma registry software. One is need for software that can function at the state level and the other is to serve the needs at the hospital level. It is expected that hospitals will be able to utilize whatever commercial software trauma registry they prefer that includes the minimum data elements. It has been proposed that a central entity negotiate for price breaks based upon volume from one or more of the qualified software vendors. The state software will have the capability of interfacing with the various software programs.

***Data reporting processes:***

There are two reporting issues that will need to be addressed with regard to a trauma registry. First is the reporting requirements that the individual facility will have to the state system and the second is the feedback that will be generated from the state trauma registry to various sources. Individual hospitals will need to send their cumulative trauma information to the state system on a periodic basis, in a data format as outlined by the state's requirements..

The Kansas Trauma Registry will then take this accepted hospital data, along with not previously included trauma data obtained from the state's death certification information, to have an accounting of the trauma injury and death information from all sources in the state of Kansas. From this database, reporting will be developed to satisfy informational needs to multiple sources, such as the regional trauma councils, individual hospitals, and the Kansas Department of Health and Environment.

**Confidentiality:**

K.S.A. 75-5666 provides in subsection (d) "The information obtained by the trauma registry, including discussions and activities using the information generated from the trauma registry, shall be confidential and shall not be disclosed or made public, upon subpoena or otherwise, except such information may be disclosed if: (1) no person can be identified in the information to be disclosed and the disclosure is for statistical purposes; (2) all persons who are identifiable in the information to be disclosed consent in writing to its disclosure; (3) the disclosure is necessary and only to the extent necessary to protect the public health and does not identify providers or facilities; or (4) the information to be disclosed is required in a court proceeding involving child abuse and the information is disclosed in camera."

**Table 1**  
**Proposed Statewide Minimum Data Set**  
**(National Trauma Data Bank)**

<p><b><u>DEMOGRAPHICS</u></b>  ID# of Hospital  Registry #  Patient's Gender  Patient's Race  Birth Date  Patient's Age</p> <p><b><u>INJURY</u></b>  Date on Which Injury Occurred  State in Which Injury Occurred  County in Which Injury Occurred  Blunt, Penetrating  Site at Which Injury Occurred  E-Code # and Description  Safety Equipment</p> <p><b><u>PREHOSPITAL</u></b>  GCS Motor Response  Total Glasgow Coma Score  CPR  Airway  Mast  Fluids</p> <p><b><u>REFERRING HOSPITAL</u></b>  Hospital Transfer</p> <p><b><u>ED ADMISSION</u></b>  Arrival/Admit Date  Arrival Time  Time Elapsed Between Level 1  Activation and Patient ED Arrival  Trauma Surgeon Arrival Time (Y/N)</p> <p><b><u>ED ASSESSMENT I</u></b>  Temperature  Systolic Blood Pressure  Respiratory Rate  GCS Motor Response  Total Glasgow Coma Score  Revised Trauma Score  Airway  ETOH Level  Base Deficit  Toxicology/Drug Screen</p> <p><b><u>ED ASSESSMENT II</u></b>  Head CT Results  Abdominal CT Results  Admitting Service  ED Disposition</p> <p><b><u>HOSPITAL DIAGNOSIS</u></b>  ICD-9 Diagnosis Code  ICD-9 Diagnosis Description  Injury Severity Coding Methodology  AIS 90 Code  Injury Severity Score  Probability of Survival</p>	<p><b><u>PRE-EXISTING COMORBIDITY</u></b>  Further Explanation of a Pre-Existing Comorbidity Factor</p> <p><b><u>PROCEDURES</u></b>  ICD-9 Procedure Code  Short ICD-9 Procedure Description  Date of Operation/Procedure  Time of Operation/Procedure</p> <p><b><u>COMPLICATIONS</u></b>  Acute Respiratory Distress Syndrome (3002)  Aspiration Pneumonia (3003)  Bacteremia (5507)  Cardiac Arrest (3502)  Coagulopathy (5001)(5002)  Compartment Syndrome (6501)  Deep Vein Thrombosis (Lower Extremity) (7502)  Disseminated Fungal Infection (5502)  Dehiscence/+Evisceration (4003)  Empyema (3005)  Esophageal Intubation (1002) (2501)  Hypothermia (8504)  Intra-abdominal Abscess (5503)  Jaundice (4503)  Failure of Fracture/Fixation (6506)  Myocardial Infraction (3505)  Pancreatitis (4505)  Pneumonia (3008)  Pneumothorax (3009-3012)  Skin Breakdown (6502-6505)  Progression of Original Neurologic Insult (7008)  Pulmonary Embolus (3014)  Renal Failure (6001)  Urinary Tract Infection (6003) (6004)  Wound Infection (5509)</p> <p><b><u>PERFORMANCE IMPROVEMENT</u></b>  Further Explanation of a Performance Improvement Indicator</p> <p><b><u>HOSPITAL OUTCOME</u></b>  Modified FIM Self Feeding Score  Modified FIM Self Feeding Status  Modified FIM Locomotion Score  Modified FIM Locomotion Status  Modified FIM Expression Score  Modified FIM Empression Status  Discharge Date (includes death)  Hospital Disposition  Discharge Status (Live vs. Die)  Ventilator Support Days  Days in the ICU  Days in the Hospital</p> <p><b><u>FINANCIAL</u></b>  Hospital Charges  Reimbursed Charges  Is Record Ready to Send to ACS (Y?N)</p>
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Source: Am College of Surgeons Committee on Trauma: *Resources for Optimal Care of the Injured Patient*; 1999; Chicago, IL.

## *Prehospital Care*

### **EMS System Resources and Regulation**

#### ***Background:***

The Board of Emergency Medical Services (BEMS), established by statute, assumed the powers, duties, and functions pertaining to emergency medical services which were previously divided under the University of Kansas Medical Center, the Bureau of Emergency Medical Services and the Kansas Highway Patrol. The statutes were most recently amended in 1994.

The Board has 13 members, nine appointed by the governor and four by the legislative leadership. The Board has broad statutory authority; it is responsible for adopting regulations and acting as a quasi-judicial body when those regulations are violated.

Responsibility for day-to-day operation of the agency is delegated to the administrator, who is appointed by the Board and serves at its pleasure. The administrator appoints and supervises all staff.

Program activities include the approval of all initial training and continuing education programs for instructors and ambulance attendants, examination of all students who successfully complete a training program, certification of students who pass the exam and annual certification renewal of those instructors and attendants who meet mandated continuing education.

In addition to these responsibilities, the Board regulates the 184 ambulance services which operate in the state, licenses 660 ambulances, manages a UHF/EMS communications system which provides emergency medical communications for 51 counties and assistance to four EMS regions.

Each of the four EMS regions act autonomously and is responsive to regional needs. Activities vary: some regions meet monthly, some produce informational newsletters, some have sponsored specialized training programs at a reasonable price to participants, and most have purchased equipment for training. These programs may not otherwise be available to the prehospital providers in the region.

The Board provides technical assistance to communities seeking to improve their emergency medical services or communications systems. Complaints concerning emergency medical services are investigated by the Board, which then takes appropriate administrative action.

The EMS Program is made up of nine areas:

1. Regulation of ambulance services
2. Training, examination and certification of instructor/coordinators
3. Approval of initial training programs and continuing education programs
4. Examination and certification of ambulance attendants
5. Coordination and maintenance of the EMS communications system
6. Monitoring of state grants for administration of EMS regions
7. Staff support for the Emergency Medical Services Board
8. EMS/Trauma Policy Group

## 9. Emergency Medical Services for Children

Regulation of all ambulance services principally includes the issuance of permits to, and inspection of, ambulance services operating in Kansas. All initial courses of instruction for instructors and attendants and all continuing education programs must be approved by the BEMS. The examination and certification of ambulance attendants involves the written knowledge and practical skill examination of attendant applicants and the certification and annual certification renewal of applicants and attendants respectively. Coordination and maintenance of the EMS communications system involves the regular inspection of all elements of the system and supervision of all maintenance performed on the system. Staff and budget support for the Emergency Medical Services Board primarily involves ensuring the continued operation of the board, which establishes policy guidelines for EMS development and carries out a number of statutory responsibilities. By statute, the Board meets six times annually.

The governing body of any municipality may make an annual tax levy of not to exceed three mills to establish, operate, and maintain an emergency medical service and ambulance service and may pay a portion of the principal and interest on bonds issued under the authority of K.S.A. 12-1774.

Additionally, the governing body of a county or city may establish an emergency medical service, or enter into a contract for such services, and may establish and collect fees for such services.

Volunteers (who may receive some payment) provide the majority of prehospital care services outside of the urban areas. The majority of rural services are “fee for service” and also rely on community fund-raising or city or county contributions for additional revenues. Fee for service revenue comes from five main sources: Medicare, Medicaid, private insurance companies, private-paying patients and special service contracts. Rates of payment in general are based on customary charges and the prevailing charges in the area. Typically, ambulance services must provide transportation in order to be reimbursed for their services.

The following types of Emergency Medical Services Certifications are issued in Kansas by the BEMS:

- **First Responder (FR):** According to 2000 data there are 1,075 certified first responders. They complete a 45-70 hour training program and pass a written and practical examination. They have statutory authorization to provide basic first aid and stabilization. These individuals work for law enforcement, rescue squads, fire services, and ambulance services.
- **Emergency Medical Technician (EMT):** There are 6,034 certified emergency medical technicians. They complete a 120-200 hour training program and pass a written and practical examination. They have statutory authorization to provide basic first aid, insert oropharyngeal airways, apply medical anti-shock trousers, stabilize injuries, and extricate patients. These individuals work for the 180 ambulance services that provide basic life support. Many of them are volunteers.

- **Emergency Medical Technician-Intermediate (EMT-I):** There are 932 certified emergency medical technicians-intermediate. A person certified as an EMT may take an additional 40-60 hour training program in intravenous therapy and pass a written and practical examination. They have statutory authorization to provide all the activities of an EMT, and in addition, provide intravenous therapy. Most EMTs-I work for volunteer services, although some work as the second attendant on a service which provides advanced life support.
- **Emergency Medical Technician-Defibrillator (EMT-D):** There are 155 certified emergency medical technicians-defibrillator. A person certified as an EMT may take an additional 27-40 hour training program in manual defibrillation and pass a written and practical examination. They have statutory authorization to provide all the activities of an EMT, and in addition, provide defibrillation and cardiac monitoring of heart attack victims. 44% of the state's EMT-Ds work for volunteer services.
- **Emergency Medical Technician - Intermediate - Defibrillator (EMT-I-D):** There are 518 emergency medical technicians certified with a combination of intermediate and defibrillator training.
- **Mobile Intensive Care Technician (MICT):** There are 1,520 certified mobile intensive care technicians. This is the Kansas term for paramedic. These attendants provide advanced life support, including intravenous therapy, drug intervention, and manual defibrillation. This level of certification requires a minimum of 1200 hours of training. Most MICTs work for the 20 ambulance services that provide advanced life support. These services are mostly in medium to larger cities (e.g., Wichita, Topeka, Newton, and Pittsburgh)
- **Instructor-Coordinator (IC):** There are 184 certified instructor-coordinators. These are the individuals authorized to teach training programs for first responders and attendants. All instructor-coordinators have to first be certified as an attendant (EMT, EMT-I, EMT-D, or MICT) and then complete a 90-hour training program. Most instructor-coordinators work full-time in another job and provide training as a part-time job. Many instructor-coordinators are also service directors or work for an ambulance service. All instructor-coordinators must have one-year attendant experience prior to assuming the IC role.
- **Automated External Defibrillator (AED):** On January 1, 1997 automated external defibrillator training became a part of first responder and EMT courses. All attendants in the state have been certified and trained to utilize AEDs.

Curricula and training standards have been adopted for prehospital personnel, which promotes standardization of skills and knowledge. The BEMS adopted the examinations for the National Registry of Emergency Medical Technicians (NREMT) for First Responders, EMTs and Paramedics. Additionally, the Department of Transportation (DOT) national curriculum has been formally adopted and implementation began January 1997. The paramedic curriculum was updated and completed and will be implemented statewide by 2001. This curriculum has significantly

improved, specifically in the treatment of trauma and, therefore, no additional continuing education specific to trauma is suggested at this point. This decision will need to be reevaluated in the next few years, once the course has been fully implemented. Some Kansas services require continuing educational courses for prehospital care providers such as Advance Cardiac Life Support (ACLS) Prehospital Trauma Life Support (PHTLS), Pediatric Advanced Life Support (PALS). All individual services are encouraged to establish realistic educational standards for professional personnel. All licensed air ambulance services must adhere to the minimum guidelines for education and training as regulated by K.S.A. 109-2-7, 109-2-12, and 109-2-13.

All prehospital services are required by statute to have medical advisors. These medical advisors provide assistance with education, quality improvement and setting local clinical and administrative policy. BEMS has developed written job descriptions for EMS medical advisors. In addition, BEMS has developed a workshop targeted to medical advisors to assist them in their role. The medical directors are typically volunteers who provide varying amounts of time commensurate with their private practice and interest. The BEMS does not have the ability to evaluate the role of the medical advisor or to measure the outcomes of the service he or she provides. Currently, there is no forum for medical advisors to meet routinely or share information.

Clinical and administrative protocols are written locally; however, the majority of services have adopted and function under some variation of model protocols developed in 1990 by the BEMS. The emergency medical committee of the local medical society must approve prehospital care protocols. In communities where this committee is not active, the hospital medical staff may approve prehospital protocols. There is no requirement by the BEMS for ongoing evaluation or update of these protocols. Because multiple services and counties have different protocols, it is difficult to measure effectiveness. Additionally the lack of uniformity amongst providers is of considerable concern to the receiving hospital.

***Critical Assumptions:***

The BEMS will continue to provide statutory authority and adopt regulations for prehospital care services. They will continue to regulate and license ambulances and continue to examine and certify prehospital care providers. The Board will continue to play an integral role in training, examination and certification of instructors/coordinators and approval of training officers.

Medical advisors will continue to play a key role in the education, training and quality improvement process of prehospital care. The BEMS will continue to support the development and enhancement of the medical advisor role.

***Implementation:***

The BEMS will continue to provide technical support and leadership to seek local, state and federal funds to continue to support the EMS infrastructure. Technical assistance should be made available to services to develop proactive financial relationships between health care providers, insurers and provider organizations to maximize reimbursement for services rendered.

The BEMS will continue to take a leadership role in developing a standardized data collection system. Data is the key to facilitate continuous quality improvement through the prehospital care system. The data will enable prioritization of system enhancements and validate change.

Recognizing decreased resources, the BEMS will continue to maintain relationships with academic institutions, community colleges and consider alternate funding mechanisms for current training programs. This will also serve to facilitate the recognition of advanced level EMS education as an accomplishment worthy of academic credit.

The Board of EMS will continue to monitor and evaluate all current EMS curriculum used in the state. The BEMS should continue to monitor the need for continuing education as it relates to the trauma patient.

Participation on the RTC's should be encouraged. Each EMS service will nominate two representatives to serve as general members of the RTC. The RTCs, as proposed, will provide leadership in system planning, specifically medical direction, triage, dispatch and allocation of resources that require local solutions consistent with national standards and state regulations. The RTC meetings will foster communication between all providers on a regional level. They are charged with developing a plan to meet the professional education needs of providers in the region and assuring access to continuing education and training including standardized courses such as ATLS, PHTLS, TNCC, and PALS. This training will be coordinated with the local community colleges, vocational schools and the BEMS. Continuous quality improvement is key to the ongoing success of any system and it will be one of the key objectives of the RTCs. The RTCs will work collectively to establish standards of care treatment protocols and practice guidelines for the continuum of care. Collaborative development and consistent implementation of protocols will address many current practice issues.

The BEMS should continue to provide a course for physicians acting in the role of medical advisor. Approximately 1/3 of the State's medical advisers have completed the training. This course of instruction must be continually monitored for its currency with continuing education programs. All training of emergency medical personnel, including course design, supervision of training, continuing education, ongoing performance evaluation through audit review and critiques sessions, and other appropriate components must be under the direction of a physician.

Physician medical control of prehospital emergency care must be accomplished through direct voice communication (on-line) with prehospital emergency personnel or through provision of care in accordance by physicians (off-line), and physician supervised quality improvement activities. To optimize medical control of all prehospital emergency medical services, the physician medical director must be knowledgeable about the care of the critically ill and injured patient.

The BEMS should establish statewide minimum emergency medical dispatch (EMD) training standards and protocols established for EMD. These standards need to allow adequate time for implementation to assure success.

The BEMS has established a quality improvement program, following national standards, so that each service may incorporate these standards into their operations.

## COMMUNICATION SYSTEM

### *Current Status:*

Kansas has made significant progress throughout the state in implementing 911, the universal emergency telephone number. All but two counties in Kansas have 911 service available. In the counties where 911 is not available, there may not be a single access number for EMS. With County commissioner approval, a \$0.75 per phone line per month surcharge statute provides funding to help support the implementation and ongoing cost of 911 service to citizens.

The Board of Emergency Medical Services (BEMS) recognizes the need for standardized training courses for emergency medical dispatch (EMD) and standardized dispatch protocols; however, there is no consistency or statewide guidelines for standardization of training or licensing and certification of dispatch personnel. Within public safety answering points (PSAP), calls for EMS are answered by personnel with greatly varying levels of education, experience, ability to provide lifesaving instructions via telephone, and medical direction. Dispatchers should be able to provide dispatch life support via pre-arrival instructions for appropriate patient populations. Currently Kansas does not have common dispatch frequencies. These frequencies vary in each county and many vary within communities within each county. Once EMS units are dispatched, some providers are isolated from other responders impeding their ability to coordinate appropriate actions.

All ambulances and receiving hospitals in Kansas have radios. However, there are some problems with equipment compatibility. The spectrum of communications equipment currently in use is broad, ranging from antiquated to very sophisticated radios. Radio frequency utilization by EMS varies significantly from very high frequency (VHF) low and high bands, ultra high frequency (UHF), and 800 and 900 MHz trunking systems. As of 1996, 541 vehicles reported the following data: 175 maintained VHF Low frequency radios; 206 maintained VHF High frequency radios; 447 utilize UHF; 67 have the 800 MHz system and 245 ambulances have access to cellular phones. Cellular phones augment current communication systems and may have greater value in the future.

There is no current statewide EMS communications plan in Kansas. Fifty-one counties are part of the EMS/UHF communication system. The Department of Transportation (KDOT) has embarked on an ambitious plan to purchase, install and maintain approximately 90 towers statewide to support an 800 MHz system. In 1992, KDOT installed a 5-channel trunked 800 MHz radio system in Shawnee County. In 1993, KDOT was authorized to implement a complete statewide 800 MHz radio system over the subsequent 14 years. The original purpose of this system was to provide dependable communications for the KHP and KDOT maintenance supervisors and construction programs. EMS was later added to the planning process.

For the purposes of KDOT planning, Kansas is divided into 6 planning districts. Currently, districts one and four are fully operational with plans for additional districts to be added over the next few years. The State has been granted a 10-15 year grace period from the FCC to convert to the 800 MHz system, after which the FCC will no longer grant licenses for other frequencies. KDOT has provided funding to build the infrastructure for the 800 MHz system including towers, base station and repeaters. However, local communities must fund the additional equipment needs to support the new system.

***Critical Assumptions:***

Rapid, reliable, on-line medical control is essential to improving patient care. The implementation of a statewide EMS/Trauma system will not change this reliance on medical control, but will increase the role that it plays. This medical control will consist not only of the typical ambulance to hospital communications we now see, but may include everything from multi-agency disaster coordination to telemedicine capabilities. It is imperative that a statewide communications system be in place, which will enable the responding prehospital provider to contact the most appropriate hospital in a rapid and uncomplicated manner.

***Implementation:***

With the advancement of technology and the availability of new services for the emergency medical and public safety provider, a new spectrum of technology is necessary. Along with advancing technology comes the responsibility to develop a system that will allow for the use of this technology. We must ensure that, whatever the system is, it allows for agency interfacing to meet the requirements of multi-agency response. The proposed 800 MHz network must be capable of supporting both voice and data applications, and accommodate the current and future needs of all city, county, and state agencies as well as associated emergency medical services.

The BEMS must establish minimum standards for all EMS dispatch personnel. Consideration should be given to maintaining the requisite combination of education, experience, and resources to optimally make the determination of the most appropriate resources to be mobilized per patient need, and implementation of an effective course of action. The BEMS should promulgate standards for EMD training and enforce these standards. A statewide communications plan must be written with all stakeholders participating in the development and implementation of such a plan to assure its success. We should continue to work with cellular phone companies to resolve cellular phone 911 issues. The communications system currently proposed in Kansas will be most successful if cooperative ventures between communication centers and health providers are forged. Collaboration among users and private interests may be a successful venture to effect shared purchasing of communication technology on a local level.

## Transportation

**Background:**

There are 183 licensed ground ambulance services in Kansas. There are 25 ground services which provide Advanced Life Support (defibrillation, drug therapy and endotracheal intubation) 24 hours a day. These services cover the following counties: Butler, Cowley, Crawford, Douglas, Ellis, Finney, Ford, Harvey, Johnson, Labette, Leavenworth, McPherson, Montgomery, Osage, Reno, Riley, Russell, Saline, Sedgwick, Seward, Shawnee, and Wyandotte. These counties represent 73% of the population of Kansas. In addition, there are twenty services licensed for Basic Life Support but have the resources on a limited basis to provide Advanced Life Support services 76% to 99% of the time. These 20 services cover 14 complete counties and 3 services provide partial county coverage. The following counties are included in this coverage: Bourbon, Cherokee (partial coverage), Coffey, Doniphan (partial coverage), Grant, Gray, Kearney, Kingman, Lane, Linn, Miami, Morris, Morton, Pottawatomie (partial coverage), Pratt, Rice, and Sumner. These counties represent an additional 7% of the population.

Law enforcement operates approximately 2% of all services, while fire departments operate 15%, hospitals 18%, private services comprise 14% and city/county services represent 53%. According to 1995 data, 42% of all prehospital attendants work full-time; 13% work part-time and 45% are classified as volunteers. Currently the fixed wing and rotor wing services licensed in the State of Kansas are located in:

<u>Fixed Wing</u>	<u>Rotor Wing</u>
Dodge City	Kansas City, MO
Hays	Topeka
Wichita	Wichita
Rogers, AR	Olathe
Garden City	Chanute
	Joplin, MO

Additionally, flight programs from Denver, Lincoln, Kearney, Tulsa and Amarillo provide interfacility transport as requested. Air ambulance regulations have recently been updated and passed into law.

All licensed air ambulance services must adhere to the minimum guidelines for education, training and staffing standards as written in state law K.S.A.V109-1-7, 109-2-12, and 109-2-13.

Communication and transportation of patients need to flex beyond state lines. EMS providers must have reciprocity with neighboring states to assure access and continuity for ease of transportation of patients.

There is no coordinated air dispatch program. Helicopters are summoned to the scene without uniform dispatch protocols. There is no central medical resource system to facilitate the appropriate and timely use of air ambulances. EMS responses are dispatched locally, frequently with little or no protocol or coordination of calls or services between air and ground units. This often leads to

abuse or misuse of air/scene rescues. In many areas of the State patients are transferred great distances to the local hospital with little or no resources to care for the patient and subsequently transferred by ground to another hospital. This practice prolongs the definitive care of the patient. In many instances, helicopters could be utilized for scene rescue and primarily transport the patient to an appropriate hospital. Statewide protocols need to be established for the use of aircraft for EMS patients. Further, these protocols should require any responding aircraft to take the patient to the closest, most appropriate hospital, not, necessarily their home base.

***Critical Assumptions:***

The BEMS will continue to license and monitor prehospital care services.

***Implementation:***

Encourage the review and or development of area protocols through the RTCs. Consideration should be given to developing central medical resource systems in each region. The needs of each region will vary and the ability to design a system to meet the individual need of the regions is imperative.

Policies and procedures for dispatch need to be sensitive to the difference between scene rescue and interfacility transport.

Assure dialogue with state and local EMS providers and adjacent states to assure reciprocity for EMS providers.

Basic healthcare is changing rapidly in today's environment. It is imperative that all transportation protocols developed for both ground and air providers stress patient safety and transport to the most appropriate medical hospital.

# Triage

***Background:***

Triage presents a unique challenge on a statewide level because of extreme diversity in geography and aggregation of population. There are no existing statewide guidelines for the specific triage of trauma patients. The BEMS has developed sample protocols for services to adopt related to general triage of prehospital patients, but provides little direction specific to trauma.

***Critical Assumptions:***

It is anticipated that most hospitals in the State of Kansas will participate in the inclusive trauma system. Once the system is fully implemented, qualifications and resource capabilities of each hospital will be identified. Trauma triage will vary based on available resources, geography, population, and transport times. Statewide guidelines should be based on nationally published recommendations for trauma triage.

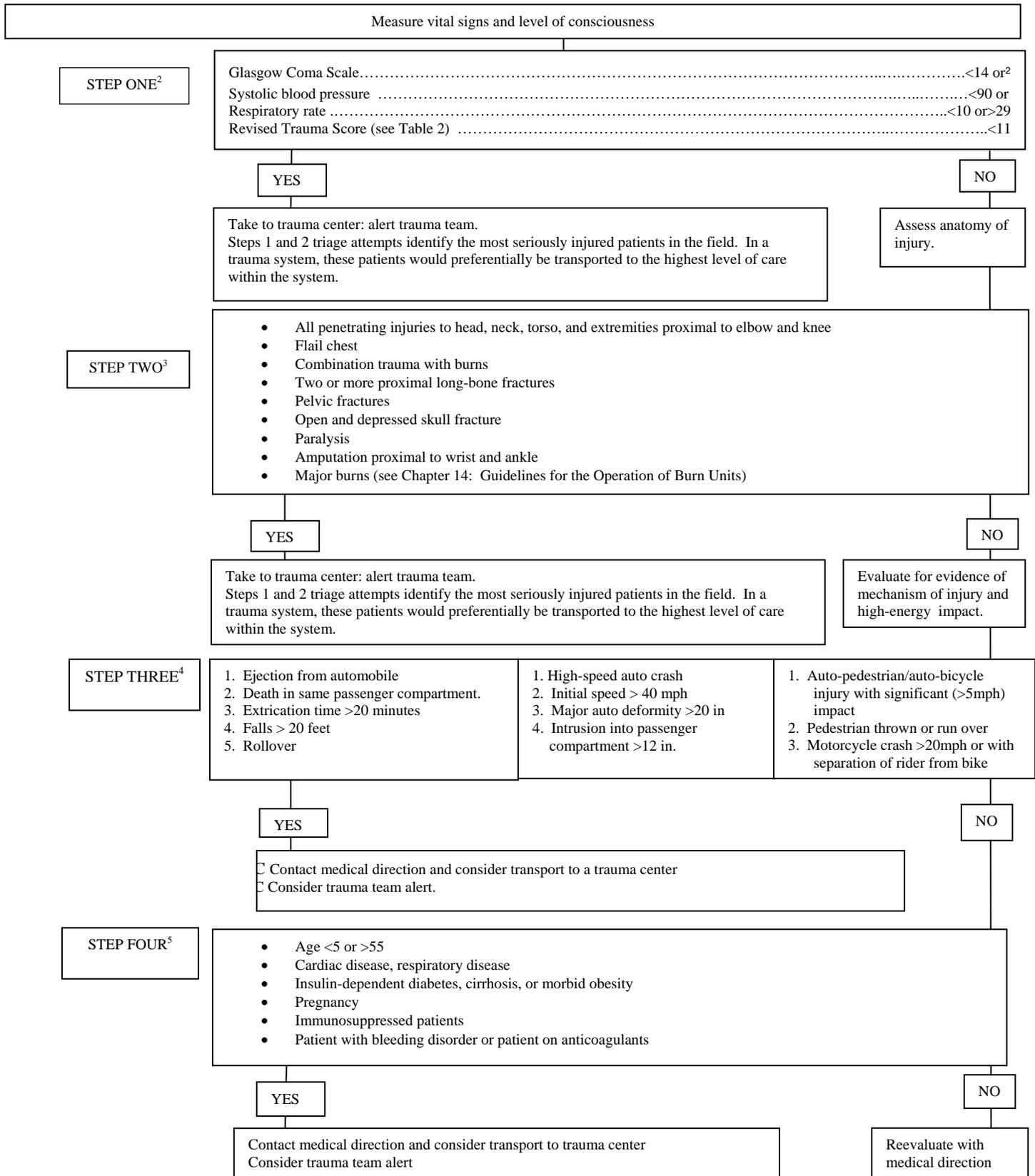
***Implementation:***

Field triage of injured patients must be defined on a local and regional basis to accommodate local medical resources. Once hospital categorization is complete and trauma center verification accomplished each region in conjunction with the RTCs will develop local triage protocols. These protocols should be designed to assure injured patients are transported to the most appropriate hospital in an optimal timeframe utilizing the most appropriate transport mechanism. Each hospital should develop interfacility transfer guidelines in collaboration with prehospital providers to expedite rural trauma triage. Generally, where there is more than one hospital within a thirty-minute transportation range, patients meeting trauma triage guidelines should be transported to the closest most appropriate hospital. Based upon the trauma triage guidelines, it would be helpful if a common set of color triage codes be developed for use statewide

## **FIELD TRIAGE GUIDELINES**

The trauma triage guidelines (Field Triage Decision Scheme, Table 2) have been taken from the American College of Surgeons recommendations and may be used by each RTC in developing local and regional triage guidelines.

**TABLE 2: FIELD TRIAGE DECISION SCHEME**



**WHEN IN DOUBT TAKE TO TRAUMA CENTER**

Source: Am. College of Surgeons (ACS): Resources for Optimal Care of the Injured Patient: 1999 document (Committee on Trauma American College of Surgeons, 1998.) Chicago, IL. Note: For a complete copy including footnotes, please see page 15 in their document

## *Hospital Care*

### **Verification of Trauma Care Hospitals**

#### ***Background:***

There is no statewide, organized system of care for trauma services. Four hospitals in the State have sought and received national recognition as trauma centers under the auspices of the American College of Surgeons (ACS) Trauma Center Verification Program. This program, however, does not look at the system in its entirety; rather it performs an evaluation of an individual hospital to assure compliance with criteria written by the ACS.

#### ***Critical Assumptions:***

The Kansas Trauma System Plan is being developed based on an “inclusive model” which allows all hospitals to participate in the trauma system plan. The goal of an inclusive model is to assure that all trauma patients receive optimal care, given available resources, and that the needs and location of the patient are matched with the resources of the system. If the clinical needs of the patient require a higher level of care, transfer arrangements are made. Therefore, all hospitals in the state will continue to see trauma patients and be able to work more effectively within an organized system of care. There are several options which could be utilized as the model for hospital verification. Before making a recommendation, each of these models should be given serious consideration taking into account the unique needs and resources available within the state of Kansas.

#### ***Implementation:***

The Kansas Trauma System plan is written for all levels of injured patients and coordination is anticipated between all trauma-care providers ( pre-hospital, acute care and speciality care). It is anticipated that there will be four verification levels for trauma care hospitals utilizing the ACS verification criteria with modification appropriate for Kansas. Implementation of the verification criteria will be phased in over a period of time. Consideration should be given to the various options for implementing hospital verification.

At the end of a designated period of time, hospitals will be verified as to their capacity to provide trauma care services. This categorization will be determined by either the verification process of the ACS or meeting a defined state verification process. Hospitals will obtain verification at the level preferred by the individual hospital. With verification and the issuance of a certificate of verification, a hospital agrees to maintain a level of commitment and resources sufficient to meet responsibilities and standards as required by the trauma care criteria.

The trauma system model is based upon voluntary participation of each hospital. The standards are written to allow each hospital to determine their individual goals based on the unique resources available in its community. The decision to meet a certain level of trauma center criteria is made entirely by the individual hospital. The infrastructure of the trauma system in Kansas will rely on the Level III hospital, with strong linkage to Level II and Level I hospitals. This is largely due to geography, population distribution and available resources.

The purpose of implementing a verification process is to provide a target for improving the outcome of trauma patients. Every effort should be made during the first two years of implementation to provide technical assistance to interested hospitals to assist them in successfully achieving the desired facility standards.

### **Implementation Options:**

#### **Option 1:**

Kansas would adopt the ACS verification criteria for all hospital levels 1 thru 4. Hospitals have the option to be verified by either a state survey team or the ACS. An application process will be developed for state verification. If the hospital chooses to be verified by the state, the application would need to be submitted for review prior to the scheduling of a site survey. Upon receipt of an application, the state will review the application for completeness and schedule a site survey within a designated time period. The state survey teams will be comprised of professionals who are knowledgeable of trauma standards and who do not have a vested interest in the facility being verified. Members of the survey team will vary depending upon the level at which a facility is being requesting to be verified. It is recommended that survey team members for verification of the level 1 & 2 facilities do not work or live in Kansas. Therefore, it is expected that a longer lead time will be necessary if a facility chooses to use the state verification process for level 1 or 2 verification. Survey team members for level 3 hospitals may be from the state but not from the region of the facility requesting verification. Verification for Level 4 hospitals could be coordinated with the KDHE Bureau of Health Facilities license process. With the exception of state verified level 4 hospitals, the expenses associated with verification will be paid for by the hospital being verified.

#### **Option 2:**

Kansas would adopt state standards for hospital verification based upon the criteria developed in the 1998 EMS/Trauma Plan. Modification would be made so that we would have 4 levels of verification rather than the proposed 6 level. Application for verification would be submitted to the state requesting a site visit. Survey team composition will be similar to the process described above.

Hospitals with level 1 or 2 capability would be encouraged to be verified by the ACS. However, a process would be developed for state verification at any of the four levels. Cost for verification will be paid by the hospital being verified with the exception of level 4 hospitals. The process for level 4 verification could be coordinated with KDHE Bureau of Health Facilities which licenses health care facilities in Kansas.

**Verification of Trauma Care Facilities - ACS Guidelines**

<p><b>Level I</b>                  The Level I facility is a regional resource trauma center that is a tertiary care facility central to the trauma care system. Ultimately, all patients who require the resources of Level I center should have access to it. This facility must have the capability of providing leadership and total care for every aspect of injury, from prevention through rehabilitation. In its central role, the Level I center must have adequate depth of resources and personnel.</p> <p>Because of the large personnel and facility resources required for patient care, education, and research, most Level I trauma centers are university-based teaching hospitals. Other hospitals willing to commit these resources, however, may meet the criteria for Level I recognition.</p> <p>In addition to acute care responsibilities, Level I trauma centers have the major responsibility of providing leadership in education, research, and system planning. This responsibility extends to all hospitals caring for injured patients in their regions. Medical education programs include residency program support and postgraduate training in trauma for physicians, nurses, and prehospital providers. Education can be accomplished through a variety of mechanisms, including classic continuing medical education (CME), preceptorships, personnel exchanges, and other approaches appropriate to local situation. Research and prevention programs, as defined in this document, are essential for a Level I trauma center.</p>	<p><b>Level II</b>                  The Level II trauma center is a hospital that is also expected to provide initial definitive trauma care, regardless of the severity of injury. Depending on geographic location, patient volume, personnel, and resources, however, the Level II trauma center may not be able to provide the same comprehensive care as a Level I trauma center. Therefore, patients with more complex injuries may have to be transferred to a Level I center (for example, patients requiring advanced and extended surgical critical care). Level II trauma centers may be the most prevalent facility in a community, managing the majority of trauma patients.</p> <p>The Level II trauma center can be an academic institution or a public or private community facility located in an urban, suburban, or rural area. In some areas where a Level I center does not exist, the Level II center should take on the responsibility for education and system leadership.</p>
<p><b>Level III</b>                  The Level III trauma facility serves communities that do not have immediate access to a Level I or II institution. Level III trauma facility can provide prompt assessment, resuscitation, emergency operations, and stabilization and also arrange for possible transfer to a facility that can provide definitive trauma care. General surgeons are required in a Level III facility that can provide definitive trauma care. General surgeons are required in a Level III facility. Planning for care of injured patients in these hospitals requires transfer agreements and standardized treatment protocols. Level III trauma facilities are generally not appropriate in an urban or suburban area with adequate Level I and/or Level II resources</p>	<p><b>Level IV</b>                  This relationship is vital to the development of a rural trauma system in which realistic standards must be based on available resources. Level IV trauma facilities provide advanced trauma life support prior to patient transfer in remote areas where no higher level of care is available (see Chapter 13: Rural Trauma). Such a facility may be a clinic rather than a hospital and may or may not have a physician available. Because of geographic isolation, however, the Level IV trauma facility is the de facto primary care provider. If willing to make the commitment to provide optimal care, given its resources, the Level IV trauma facility should be an integral part of the inclusive trauma care system. As at Level III trauma centers, treatment protocols for resuscitation, transfer protocols, data reporting, and participation in system performance improvement (PI) are essential.</p> <p>A Level IV trauma facility must have a good working relationship with the nearest Level I, II, or III trauma. Optimal care in rural areas can be provided by skillful use of existing professional and institutional resources supplemented by guidelines that result in enhanced education, resource allocation, and appropriate designation for all levels of providers. Also, it is essential for the Level IV facility to have the involvement of a committed health care provider, who can provide leadership and sustain the affiliation with other centers.</p>

Source: *Resources for the Optimal Care of the Injured Patient: 1999*, p. 97

## **Inter–Facility Transfer Guidelines**

The criteria in Table 3 are intended to be used to assist the practitioner in identifying the types of injured patients who may benefit from early transfer to a specialty care service at another hospital. These are intended to be guidelines and are not hospital specific. It is highly recommended that the medical staff at each facility determine hospital specific guidelines for selecting patients who may benefit from early transfer. Physicians should assess their own limitations and those of their institutions so that such patients can be identified early and arrangements can be made for transfer where optimal care can be provided without unnecessary delay. The guidelines should be agreed to by the medical and nursing staff prior to the event. These guidelines should be accompanied by detailed procedures that comply with existing Federal and State patient transfer legislation.

## Table 3 Criteria For Consideration of Transfer

(These guidelines are not intended to be hospital-specific)

### CENTRAL NERVOUS SYSTEM

- Head injury
  - Penetrating injury or open fracture (with or without cerebrospinal fluid leak)
  - Depressed skull Fracture
  - Glasgow Coma Scale (GCS) <14 or GCS deterioration
  - Lateralizing signs
- Spinal cord injury -Spinal cord injury or major vertebral injury

### CHEST

- Major chest wall injury or pulmonary contusion
- Wide mediastinum or other signs suggesting great vessel injury
- Cardiac injury
- Patients who may require prolonged ventilation

### PELVIS/ABDOMEN

- Unstable pelvic ring disruption
- Pelvic fracture with shock or other evidence of continuing hemorrhage
- Open pelvic injury
- Solid organ injury

### MAJOR EXTREMITY INJURIES

- Fracture/dislocation with loss of distal pulses
- Open long-bone fractures
- Extremity ischemia

### MULTIPLE SYSTEM INJURY

- Head injury combined with face, chest, abdominal, or pelvic injury
- Burns with associated injuries
- Multiple long-bone fractures
- Injury to more than two body regions

### COMORBID FACTORS

- Age>55 years
- Children≤5 years of age (see Chapter 10)
- Cardiac or respiratory disease
- Insulin-dependent diabetes, morbid obesity
- Pregnancy
- Immunosuppression

### SECONDARY DETERIORATION (LATE SEQUELAE)

- Mechanical ventilation required
- Sepsis
- Single or multiple organ system failure (deterioration in central nervous, cardiac, pulmonary, hepatic, renal, or coagulation systems)
- Major tissue necrosis

Note: It may be appropriate for the injured patient to undergo control of ongoing hemorrhage prior to transfer if a qualified surgeon and operating room resources are promptly available at the referring hospital

Source: Am College of Surgeons Committee on Trauma: *Resources for Optimal Care of the Injured Patient*; 1999; Chicago, IL.

## *Performance Improvement*

### ***Background:***

Trauma system evaluation is achieved through a comprehensive Performance Improvement Plan (PI). The purpose of the plan is to review system performance as related to patient needs, system resources, medical care and costs. Trends in care and outcome must be identified and appropriate system adjustments made to improve the quality and timely availability of trauma patient care. As trauma care hospitals and systems develop it is essential that ongoing assessment and reevaluation of the care and outcome of trauma patients occurs with a well defined PI plan. Ongoing evaluation of the trauma care system is essential throughout the continuum of patient care.

To deliver the best possible care for the injured patient, both system and individual hospitals must develop performance improvement plans. There must be close cooperation between these programs. Statewide System PI must evaluate management of the overall trauma care system including prehospital care, hospital care and rehabilitation. Individual patient care should be monitored with the hospital based PI program which is essential to specific case management and the ongoing development of individual institutions. The Regional Trauma Councils (RTCs) will provide ongoing assessment of the trauma care system within a defined region.

Performance improvement emphasizes a continuous multidisciplinary effort to measure, evaluate, and improve both the process of care and the outcome. The trauma care providers will gather detailed data regarding services rendered to the trauma patients. Specific data related to system performance will be submitted to Kansas Department of Health and Environment for data analysis. The RTCs will be provided a quarterly report of the data which then can be utilized by the region to identify opportunities for improvement. The process of analysis at the regional level will occur at regular intervals and include multidisciplinary review.

## **Data Collection and Reports**

### ***Critical assumptions***

All quality management programs are dependent upon consistently accurate and comparable data. The quality and completeness of the data submitted will determine the value and credibility of the performance improvement program. The most important source of information and data for the performance improvement program will be trauma registry data collected by the providers participating in the trauma system. All trauma hospitals working within the inclusive trauma system will participate in trauma data collection and report pertinent data to KDHE for system evaluation. During the implementation phase of the trauma system, funding will be identified to support education and training for providers, hardware for the agency, annual registry fees and system resources for ongoing support.

### ***Implementation:***

A system to collect data on performance of the prehospital emergency medical services system and its effects on patient outcome is imperative. BEMS will continue to strive for implementation of a prehospital system and assure integration with existing systems as well as proposed trauma

registry software. The primary benefit, as previously stated, is the continuous quality improvement of each phase of care throughout the continuum. The BEMS should establish minimum standards for a quality improvement program, following national standards for each service, so that the service may incorporate these standards into their operations.

Hospital facilities may collect and report to KDHE trauma data utilizing trauma registry software. They will report on only those patients who meet the state definition of a trauma injury. If submitting data electronically, the data will be sent in a designated file format to the state trauma registry. KDHE will implement a state registry software system that will be adaptable to the trauma registry software utilized by the various hospitals.

KDHE will identify funding and personnel for provider training, hardware for the agency, annual registry fees and system resources for ongoing support. The prehospital system and the trauma registry system will be the principal source for system-wide data. Future goals should include linkages with the KDOT data system and medical examiners information.

Trauma hospitals will collect data on an ongoing basis and submit data elements to KDHE on a quarterly basis. In some instances, where the smaller hospitals have a low volume of trauma patients, it may be appropriate for the referral center to provide assistance with data abstraction and entry for low-volume hospitals. Trauma hospitals must be assured that the data utilized for quality management activities will be maintained in a confidential manner. The implementation of these data systems should be conducted with a phase-in approach that considers the additional burden placed on the providers and KDHE. KDHE will develop standard quality management reports aggregated by region to be utilized by the RTC's to perform quality management activities. Data from the registry will be utilized to identify educational needs for all providers and assist with prioritization of prevention and legislative strategies.

## **Trauma Systems Quality Management Program**

### **Critical Assumptions:**

During the implementation phase of the Kansas Trauma System Plan, a Trauma Systems Performance Improvement Program will be developed under the direction of KDHE and the Advisory Committee on Trauma (ACT). The Trauma Systems Quality Management Program will rely on many data sources, principally the trauma registry data collected by the providers to monitor the quality and outcome of the trauma system.

### **Implementation:**

The Trauma Systems Performance Improvement Program will be comprised of multiple elements. The ACT will provide leadership and statewide input from knowledgeable professionals and organizations and will act in an advisory position to KDHE regarding trauma system development. The ACT is empowered to develop, implement and monitor the Trauma System Quality Management Program. A Trauma System Quality Management program will include the development of reports which will be produced by KDHE from trauma registry data and other data sources. These reports are suggested as

a means to monitor issues on a statewide level. The reports will be used to pinpoint areas of concern and to assist in public and professional trauma education these reports will be useful to participating trauma hospitals to compare with statewide information. Additionally, the system quality improvement reports can be monitored on a regional basis to determine the effectiveness of regional trauma care and to identify needs.

## *Injury Prevention and Control*

### **Public Information/ Education and Prevention**

#### ***Background:***

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

- review of research and data to accurately describe the burden of traumatic injury,
- sharing of data with Regional Trauma Councils (RTC's) and other injury prevention programs so that interventions may target areas of highest risk,
- development and implementation of strategies to decrease individual risk factors and environmental risks, and
- collaboration and coordination at the community level to increase local ability to address needs.

Currently, several state agencies are involved in injury prevention activities. These agencies include:

- Attorney General's office (Youth Violence, Rape Prevention, Domestic Violence, Child Death Review)
- Board of Emergency Medical Services (Emergency Medical Services for Children)
- State Fire Marshall's office (Fire and Burn Prevention)
- Kansas Department of Health and Environment, Injury and Disability Prevention Program (Intentional and Unintentional Injuries, Strategic Planning for Injury Prevention)
- Kansas Department of Transportation, Bureau of Traffic Safety and Bureau of Transportation Planning (Wide Variety of Traffic Safety Issues)

Other entities are involved in injury prevention as well. State universities conduct research, evaluation, and training projects that increase the knowledge base for injury prevention. Examples are the involvement of Kansas State University Research & Extension in activities to prevent agricultural injuries and the work at Kansas University Medical Center in the area of domestic violence. The Board of Emergency Medical Services' EMSC Program, fairly new in Kansas, includes an injury prevention component for the population the program is designed to serve.

KDHE's Injury and Disability Prevention Program activities include:

- Surveillance of injury morbidity and mortality, Statewide planning for injury prevention (Injury Prevention Steering Committee)

- Increasing injury surveillance capacity in the state (i.e., assessing the recommended eleven core data sets for injury<sup>1</sup>),
- Conducting special demonstration projects to measure the effectiveness of injury prevention strategies (i.e., installing smoke detectors in high risk homes, increased use of booster seats and seatbelts by children ages 4-14),
- Technical assistance to communities for developing capacity for injury surveillance and intervention projects, and
- Collaborating with other state entities to fund community collaboration and longitudinal interventions to reduce sexual violence against women.

KDHE's Bureau of Health Promotion conducts statewide planning for health promotion and disease prevention (*Health Kansans 2010*), including injury prevention via the state Injury Prevention Steering Committee. KDHE is the lead agency for the Kansas SAFE KIDS Coalition, a statewide childhood injury prevention program whose mission is to protect Kansas' children age 0-14 from unintentional injuries. Kansas SAFE KIDS has been successful in developing an effective network of SAFE KIDS local coalitions and chapters throughout the state. Quarterly meetings of the State Coalition provide overall coordination of injury prevention goals and objectives, policy statements and priorities, public awareness, and intervention initiatives.

The Bureau of Traffic Safety (BTS) within the Kansas Department of Transportation plays a key role in injury prevention. The mission of the Bureau is "to reduce traffic crashes and deaths on the state's roadways." They strive to "improve the quality of life for the traveling public by reducing the number of fatalities, injuries and crashes." The Bureau endeavors to influence human behavior by identifying problems and implementing effective educational programs focusing on prevention. The BTS collaborates with other state agencies to implement and evaluate model traffic safety programs and actively participates in many of the statewide coalitions, initiating and frequently supporting funding for many new programs and educational workshops and seminars. The BTS administers federally funded Section 402 and 410 programs through the US Department of Transportation's National Highway Traffic Safety Administration. Section 402 funds are a result of the Highway Traffic Safety Act of 1966 that provides federal funds to the states based on a mandatory formula according to the population and road mileage. The state uses the funds to assist communities in reducing deaths, injuries and the economic losses resulting from motor vehicle crashes. The Section 410 program was established in 1992 as a federal alcohol-related incentive program designed to encourage states to enact strong, effective legislation and improve anti-drunk driving legislation and local enforcement laws. The program also supports educational programs to combat impaired driving.

The Bureau of Transportation Planning maintains the statewide crash data system and uses this data collection system to identify statewide needs and problems to assist in prioritizing plans to address traffic safety issues. KDOT works closely with the National Highway Traffic Safety Administration (NHTSA)

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<sup>1</sup>Injury Surveillance in State Health Departments Working Group. (September, 1999). *Consensus recommendations for injury surveillance in state health departments*. State and Territorial Injury Prevention Director's Association, Atlanta, Georgia.

to provide workshops, courses, videos and curricula focused on topics such as enforcing occupant protection laws, safety belt and air bag education (Kansas Safety Belt Office). Typical courses include developing Public Information, Education and Relations (PIER) programs for EMS providers, Child and Passenger Safety, and Fire and Rescue training. Other collaborative activities include adjudicating impaired driving cases and developing and running effective highway traffic safety programs. The Bureau also provides education and technical assistance regarding roadway design strategies that reduce crashes and injuries (e.g., traffic circles).

NHTSA has developed a program for Safe Communities. The programs are grant funded, and through KDOT, actively assists Safe Communities Projects in Kansas. The goals of the program are to:

- Apply local data to address local injury problems.
- Create new partnerships to deal with ongoing injury issues.
- Intensify public awareness of the community's injury problem.
- Mobilize citizens to take charge of their own health and safety.
- Predict and prevent the causes of injury.
- Produce a safe and healthy environment for all.

Essential to the above initiatives and any other prevention or education program is the ability to establish priorities and make programmatic plans based on data. The trauma registry will provide data on seriously injured patients and information from the various data sources will assist planners to identify patterns and trends on a state and regional level. Priorities can be established for public education, prevention programs, and policy initiatives.

***Critical Assumptions:***

There are several organizations within the state which have a focus on prevention of injuries. These organizations will collaborate with trauma hospitals and regional committees. The existing state organizations listed above may be able to provide relevant information on injury risks, effective prevention strategies, and technical assistance or resources for implementing prevention programs.

As the Kansas Trauma Plan is fully implemented, a trauma registry will be instituted statewide. Data will be available from existing databases and potential new sources to facilitate regional planning for injury prevention. Trauma prevention programs, developed and implemented by trauma hospitals and regional trauma committees, will be stronger and have a higher degree of success if conducted through collaborative community efforts.

***Implementation:***

The Trauma Plan has been developed utilizing a framework dependent upon regional committees. Each hospital in the State of Kansas will participate with a Regional Trauma Council (RTC). The RTC will be asked to evaluate aggregate trauma registry data for their region and develop a plan for trauma prevention. The services of an epidemiologist are highly recommended to assist with this data analysis. The Injury and Disability Program at KDHE has agreed to provide this technical

assistance upon request. Public education will likely comprise a significant part of prevention efforts and will be designed to inform the public about issues related to deaths and injuries due to trauma. Additional prevention efforts may be developed in collaboration with other state and local injury prevention efforts or coalitions. Model programs developed by KDHE, KDOT, or others at the state or local level could be used by the RTCs to further injury prevention in their communities. Collaboration between RTCs, SAFE KIDS local coalitions and chapters, Safe Communities Projects, Communities That Care Coalitions, and others will strengthen these efforts.

E-coding of injuries (identifying the external cause of injury) is an important resource in targeting injury prevention activities and risk behaviors. Hospitals should be encouraged to use E-codes for all injuries/trauma. The Health Care Governing Board currently is working with hospitals to promote the use of E-codes. Use of E-codes strengthens the value of trauma and hospital discharge data for epidemiological analysis and it will describe the most significant problems, identify trends, and provide information on associated risk and protective factors. Opportunities to participate in collaborative efforts to further data access and facilitate complex studies, such as those involving data linkages, should be pursued. The Safe Communities Project in Wichita, involving crime data, trauma registry, vital statistics, and crash files has provided useful information for injury prevention intervention and policy initiatives. This project could serve as a model for a similar state or regional project.

The Trauma System should continue to have active representation on the state Injury Prevention Steering Committee. This will assist with the coordination of services at the state level and open doors for collaboration on injury intervention initiatives at the state and local level, ultimately reducing traumatic injuries across the state.

## *Human Resources*

### ***Background:***

This section addresses the human resources that would be included in a trauma system and the appropriate training and educational needs. Depending upon the situation, each of these specialties have a role in the care of the injured patient. As the level of care within the system increases, these individuals become more involved and are part of the resource commitment for a successful trauma program. Current statistics show a relatively adequate number of health care providers but inadequate distribution of them. The roles of general surgeons, neurosurgeons, orthopaedic surgeons, and emergency medicine physicians are defined by the American College of Surgeons (ACS). Training for the personnel essential to an effective trauma system depends upon the role they have in the system.

### ***Critical Assumptions:***

Identifying the training and educational needs of the personnel involved in providing trauma care will be an essential activity of the Regional Trauma Councils (RTCs) within each of the regions. Training and education is fundamental to having a knowledgeable workforce available to meet the needs of the trauma patient. Resources must be identified which can be utilized to assist with the educational/training needs. The RTCs will develop a pool of “qualified, quality” instructors as identified by program evaluations.. The Board of EMS (BEMS) will continue to provide training for EMS medical directors and oversight of curriculum essential to training of prehospital providers.

Human Resources for trauma system support and development will rely on both training and availability of health care personnel and providers. Kansas is currently (and is expected to continue to follow national trends) experiencing a significant workforce shortage in healthcare. This shortage may have an effect on the implementation of the trauma system in Kansas.

### ***Implementation:***

As outlined in the implementation schedule, existing gaps in injury/trauma education and training for the health care worker and the public will be identified. A plan will be developed to address the identified needs. As part of this process, existing resources will also be identified which could be utilized to assist in filling the gaps in education and training. The ACT will work in conjunction with KDHE to facilitate efforts to perform the needs assessment and to increase availability of training statewide through cooperative efforts with interested professional and provider organizations.

The RTCs will be key to the process of identifying educational needs and resources within their respective regions. It is expected that the RTCs will work with a variety of professional organizations including KDHE and BEMS to establish training priorities based upon the needs and resources of their region. To maximize available resources, it would be expected that the RTCs would work with any number of professional public and private organizations in order to meet the needs of their region.

Examples of the type of personnel and training that are needed in a trauma system include:

1. Personnel providing pre-hospital emergency medical care must be certified by the Kansas Board of Emergency Medical Services. Basic education programs such as Pre-hospital Trauma Life Support (PHTLS), Basic Trauma Life Support (BTLS) or an equivalent course should be encouraged for the prehospital providers to help them develop and maintain their skills to better meet the needs of the trauma patient.
2. EMS medical director: To optimize medical control of all prehospital emergency medical services, the EMS physician medical director must be knowledgeable about the care of the critically ill and injured patients. Participation in the EMS medical director training provided by the BEMS is advised.
3. Hospital Trauma director: The medical director should be certified in the ACS Advanced Trauma Life Support (ATLS) or equivalent course and participate in other continuing medical education (CME) courses related to care of the trauma patient. Trauma service directors of Level I and II hospitals are expected to take a more active role in providing trauma education such as ATLS instruction.
4. Emergency Physicians: Many physicians participate in the care of the severely injured patient in the emergency department. Board certification in an appropriate medical specialty is essential, as is additional specific preparation for care of the injured patient such as ATLS or equivalent. Emergency physicians should be involved with surgeons in the development of trauma care systems as part of the overall development of emergency medical systems in a community, state or region. In addition, they should be active in organizations contributing to the benefit of injured patient.
5. Anesthesiologists and CRNAs have a critical role in the management of the multiply injured patient. In addition to the responsibilities in the operating room, personnel from the anesthesia care team play an important role in preoperative airway control and resuscitation as a postoperative consultant in cardiorespiratory support and pain control. Anesthesiologists/CRNAs who participate on the trauma team should be appropriately certified, have the necessary educational background and engage in trauma quality management including research, teaching and community activities.
6. Nurses: nursing personnel play a crucial role in the care of the injured, both in the prehospital and hospital phases of treatment. This is exemplified by the role of the trauma nurse coordinator who shall be a registered nurse. Credentials for the trauma nurse should include as a minimum TNCC, ENPC or PALS, and demonstrated expertise in trauma care. It is recommended that nurses who are members of the trauma team participate in trauma related continuing education.
7. Orthopedic, Pediatric, Neurosurgeon: Basic to qualification for trauma care for any surgeon is board certification in a surgical specialty recognized by the American Board of Medical Specialties and/or the Advisory Board for Osteopathic Specialties. It is acknowledged that many boards require a practice period, and that complete certification may take three to five years after an Accreditation Council for Graduate Medical

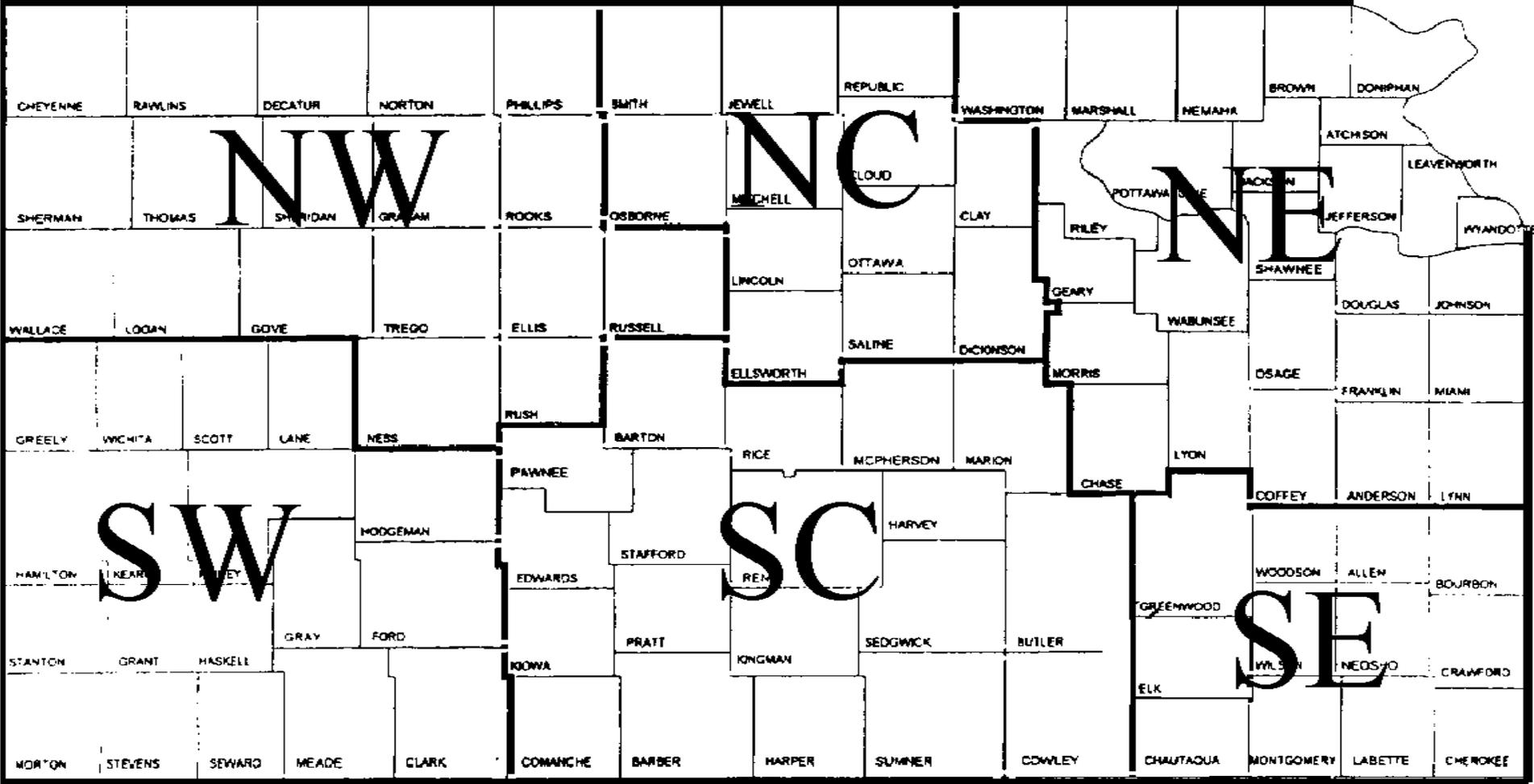
Education (ACGME, the American Board of Osteopathic Specialties or the American Osteopathic Board).

8. Medical specialists including cardiologists, pulmonary medicine specialists, cardiovascular surgeons, nephrologists, and their respective support teams, ( e.g. respiratory therapy and dialysis teams) provide specific expertise as planning resources and for consultation. In addition to appropriate board certification, such medical consultants should have an awareness of the unique problems of trauma patients.

# APPENDIX

# Boundaries for Regional Trauma Councils

January, 2001



The following table shows levels of categorization and their essential (E) or desirable (D) criteria.

	Levels			
	I	II	III	IV
<b>INSTITUTIONAL ORGANIZATION</b> (See Chapter 5)				
Trauma program .....	E	E	E	E
Trauma service .....	E	E	E	—
Trauma team .....	E	E	E	E
Trauma program medical director .....	E	E	E	D
Trauma multidisciplinary committee .....	E	E	E	D
Trauma coordinator/TPM .....	E	E	E	E
<b>HOSPITAL DEPARTMENTS/DIVISIONS/SECTIONS</b>				
Surgery .....	E	E	E	—
Neurological surgery .....	E	E	—	—
Neurosurgical trauma liaison .....	E	E	—	—
Orthopaedic surgery .....	E	E	E	—
Orthopaedic trauma liaison .....	E	E	E	—
Emergency medicine .....	E	E	E	—
Anesthesia .....	E	E	E	—
<b>CLINICAL CAPABILITIES</b> (Specialty Immediately Available 24 hours/day)				
Published on-call schedule .....	E	E	E	E
General surgery .....	E	E	E	D
Published back-up schedule .....	E	E	D	—
Dedicated to single hospital when on-call .....	E	E	D	—
Anesthesia (see Chapter 11) .....	E	E	E	D
Emergency medicine <sup>1</sup> .....	E	E	E	—
On-call and promptly available 24 hours/day				

	Levels			
	I	II	III	IV
Cardiac surgery .....	E	D	—	—
Hand surgery .....	E	E	D	—
Microvascular/replant surgery .....	E	D	—	—
Neurologic surgery .....	E	E	D	—
Dedicated to one hospital or back-up call (see Chapter 8) .....	E	E	D	—
Obstetrics/gynecologic surgery .....	E	E	D	—
Ophthalmic surgery .....	E	E	D	—
Oral/maxillofacial surgery .....	E	E	D	—
Orthopaedic surgery .....	E	E	E	D
Dedicated to one hospital or back-up call (see Chapter 9) .....	E	E	D	—
Plastic surgery .....	E	E	E	D
Critical care medicine .....	E	E	D	—
Radiology .....	E	E	E	D
Thoracic surgery .....	E	E	D	—
<b>CLINICAL QUALIFICATIONS</b>				
General/trauma surgeon (see Chapter 6)				
Current board certification .....	E	E	E	—
16 hours CME/year .....	E	E	D	D
ATLS completion .....	E	E	E	E
Peer review committee attendance >50% .....	E	E	E	—
Multidisciplinary committee attendance .....	E	E	E	—
Emergency medicine (see Chapter 7)				
Board certification .....	E	E	D	—

Source: Am College of Surgeons Committee on Trauma: *Resources for Optimal Care of the Injured Patient*; 1999; Chicago, IL.

	Levels			
	I	II	III	IV
Trauma education: 16 hours				
CME/year .....	E	E	D	—
ATLS completion .....	E	E	E	E
Peer review committee attendance >50% .....	E	E	E	—
Multidisciplinary committee attendance .....	E	E	E	—
Neurosurgery (see Chapter 8)				
Current board certification .....	E	E	—	—
16 hours CME/year .....	E	E	D	D
ATLS completion .....	D	D	D	D
Peer review committee attendance >50% .....	E	E	E	—
Multidisciplinary committee attendance .....	E	E	E	—
Orthopaedic surgery (see Chapter 9)				
Board certification .....	E	E	D	—
16 hours CME in skeletal trauma .....	E	E	D	D
ATLS completion .....	D	D	D	D
Peer review committee Attendance >50% .....	E	E	E	D
Multidisciplinary committee attendance .....	E	E	E	—
<b>FACILITIES/RESOURCES/CAPABILITIES</b>				
<b>Volume Performance</b>				
Trauma admissions 1,200/year .....	E	—	—	—
Patients with ISS >15(240 total or 35 patients/surgeon) <sup>2</sup> .....	E	—	—	—
Presence of surgeon at resuscitation .....	E	E	E	D
Presence of surgeon at operative procedures .....	E	E	E	E
<b>Emergency Department (ED)</b>				
Personnel				
Designated physician director .....	E	E	E	D
Equipment for resuscitation for patients of <b>all ages</b>				
Airway control and ventilation equipment .....	E	E	E	E
Pulse oximetry .....	E	E	E	E
Suction devices .....	E	E	E	E

	Levels			
	I	II	III	IV
Electrocardiograph-oscilloscope-defibrillator .....	E	E	E	E
Internal paddles .....	E	E	E	—
CVP monitoring equipment .....	E	E	E	D
Standard IV fluids and administration sets .....	E	E	E	E
Large-bore intravenous catheters .....	E	E	E	E
Sterile surgical sets for				
Airway control/cricothyrotomy .....	E	E	E	E
Thoracostomy .....	E	E	E	E
Venous cutdown .....	E	E	E	E
Central line insertion .....	E	E	E	—
Thoracotomy .....	E	E	E	—
Peritoneal lavage .....	E	E	E	D
Arterial catheters .....	E	E	D	D
Ultrasound .....	D	D	D	D
Drugs necessary for emergency care .....	E	E	E	E
X ray availability 24 hours/day .....	E	E	E	D
Cervical traction devices .....	E	E	E	D
Broselow tape .....	E	E	E	E
Thermal control equipment				
For patient .....	E	E	E	E
For fluids and blood .....	E	E	E	D
Rapid infuser system .....	E	E	E	D
Qualitative end-tidal CO <sub>2</sub> determination .....	E	E	E	E
Communication with EMS vehicles .....	E	E	E	E
<b>Operating Room</b>				
Immediately available				
24 hours/day .....	E	D <sup>3</sup>	D	D
Personnel				
In-house 24 hours/day .....	E	D <sup>3</sup>	—	—
Available 24 hours/day .....	—	E	E	E
Age-specific equipment				
Cardiopulmonary bypass .....	E	D	—	—
Operating microscope .....	E	D	D	—

	Levels			
	I	II	III	IV
Thermal control equipment				
For patient .....	E	E	E	E
For fluids and blood .....	E	E	E	E
X-ray capability, including c-arm image intensifier .....	E	E	E	E
Endoscopes, bronchoscope	E	E	E	D
Craniotomy instruments .....	E	E	D	—
Equipment for long bone and pelvic fixation .....	E	E	E	D
Rapid infuser system .....	E	E	E	D
<b>Postanesthetic Recovery Room</b> (SICU is acceptable)				
Registered nurses available 24 hours/day .....	E	E	E	—
Equipment for monitoring and resuscitation .....	E	E	E	E
Intracranial pressure monitoring equipment .....	E	E	D	—
Pulse oximetry .....	E	E	E	E
Thermal control .....	E	E	E	E
<b>Intensive or Critical Care Unit for Injured Patients</b>				
Registered nurses with trauma education .....	E	E	E	—
Designated surgical director or surgical co-director .....	E	E	E	D
Surgical ICU service physician in- house 24 hours/day (see Chapter 11) .....	E	D	D	—
Surgically directed and staffed ICU service .....	E	D	D	—
Equipment for monitoring and resuscitation .....	E	E	E	—
Intracranial monitoring equipment .....	E	E	—	—
Pulmonary artery monitoring equipment.....	E	E	E	—
<b>Respiratory Therapy Services</b>				
Available in-house 24 hours/day .....	E	E	D	D
On call 24 hours/day .....	—	—	E	D
<b>Radiological Services (Available 24 hours/day)</b>				
In-house radiology technologist .....	E	E	D	D
Angiography .....	E	E	D	—
Sonography .....	E	E	E	D

	Levels			
	I	II	III	IV
Computed tomography .....	E	E	E	D
In-house CT technician .....	E	D	—	—
Magnetic resonance imaging .....	E	D	D	—
<b>Clinical Laboratory Service (Available 24 hours/day)</b>				
Standard analyses of blood, urine, and other body fluids, including microsampling when appropriate .....	E	E	E	E
Blood typing and cross-matching .....	E	E	E	E
Coagulation studies .....	E	E	E	E
Comprehensive blood bank or access to a community central blood bank and adequate storage facilities .....	E	E	E	E
Blood gases and pH determinations .....	E	E	E	E
Microbiology .....	E	E	E	E
<b>Acute Hemodialysis</b>				
In-house .....	E	D	—	—
Transfer agreement .....	—	E	E	E
<b>Burn Care—Organized</b>				
In-house or transfer agreement with Burn Center .....	E	E	E	E
<b>Acute Spinal Cord Management</b>				
In-house or transfer agreement with Regional Acute Spinal Cord Injury Rehabilitation Center .....	E	E	E	E
<b>REHABILITATION SERVICES</b>				
Transfer agreement to an approved rehabilitation facility .....	E	E	E	E
Physical therapy .....	E	E	E	D
Occupational therapy .....	E	E	D	D
Speech therapy .....	E	E	D	—
Social Service .....	E	E	E	D
<b>PERFORMANCE IMPROVEMENT</b>				
Performance improvement programs .....	E	E	E	E
Trauma registry				
In-house .....	E	E	E	D
Participation in state, local, or regional registry .....	E	E	E	E
Orthopaedic database .....	D	D	—	—
Audit of all trauma deaths .....	E	E	E	D

	Levels			
	I	II	III	IV
Morbidity and mortality review .....	E	E	E	E
Trauma conference— multidisciplinary .....	E	E	E	D
Medical nursing audit .....	E	E	E	E
Review of prehospital trauma care .....	E	E	E	D
Review of times and reasons for trauma-related bypass .....	E	E	D	D
Review of times and reasons for transfer of injured patients .....	E	E	D	D
Performance improvement personnel dedicated to care of injured patients .....	E	E	D	D
<b>CONTINUING EDUCATION/OUTREACH</b>				
General surgery residency program (see Chapter 17) .....	E	D	—	—
ATLS provide/participates .....	E	D	D	D
Programs provided by hospital for:				
Staff/community physicians (CME) .....	E	E	E <sup>4</sup>	D
Nurses .....	E	E	E	D
Allied health personnel .....	E	E	E	—
Prehospital personnel provision/participation .....	E	E	E	D
<b>PREVENTION</b>				
Injury control studies .....	E	D	—	—
Collaboration with other Institutions .....	E	D	D	D
Monitor progress/effect of prevention programs .....	E	D	D	D
Designated prevention coordinator-spokesperson for injury control .....	E	E	D	—
Outreach activities .....	E	E	D	D
Information resources for public .....	E	E	D	—
Collaboration with existing National, regional, and state program .....	E	E	D	—
Coordination and/or participation in community prevention activities .....	E	E	E	D

	Levels			
	I	II	III	IV
<b>RESEARCH</b>				
Trauma registry performance improvement activities .....	E	E	E	—
Research committee .....	E	D	—	—
Identifiable IRB process .....	E	D	—	—
Extramural educational presentations .....	E <sup>5</sup>	D	D	—
Numbers of scientific publications .....	E <sup>6</sup>	D	—	—

<sup>1</sup> When emergency medicine specialists are not involved with the care of the injured patient, these criteria are not required.

<sup>2</sup> The mechanism to calculate ISS should be through use of AIS 90 and handcoding.

<sup>3</sup> An operating room must be adequately staffed and immediately available in a Level I trauma center. This is met by having a complete operating room team in the hospital at all times, so if an injured patient requires operative care, the patient can receive it in the most expeditious manner. These criteria cannot be met by individuals who are also dedicated to other functions within the institution. Their primary function must be the operating room.

An operating room must be adequately staffed and available when needed in a timely fashion in a Level II trauma center. The need to have an in-house OR team will depend on a number of things, including patient population served, ability to share responsibility for OR coverage with other hospital staff, prehospital communication, and the size of the community served by the institution. If an out-of-house OR team is used, then this aspect of care must be monitored by the performance improvement program.

Brasel KJ, Akason J, Weigelt JA: The dedicated operating room for trauma: A costly recommendation, *J Trauma* 1998; 14: 832-838.

<sup>4</sup> In areas where the Level III hospital is the lead institution, these educational activities are an essential criteria. When the Level III is in an area that contains other hospital resources, such as a Level I or II, then this criteria is no longer essential.

<sup>5</sup> Four Educational Presentations per year for the program. These presentations must be given outside the academically affiliated institutions of the Trauma Center.

<sup>6</sup> Publications should appear in peer-reviewed journals. *Index Medicus* listing is preferable. In a three-year cycle, the minimum acceptable number is 10 for the entire trauma program. This must include a minimal activity of one publication (per review cycle) from the physicians representing each of the four following specialties: emergency medicine, general surgery, orthopaedic surgery, and neurosurgery.