Trauma System Implementation and Recommendations

Report to the Minnesota Legislature 2010

Minnesota Department of Health

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MINNESOTA MDH DEPARTMENT OF HEALTH

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Executive Summary

"Being a trauma center is a journey, not a destination. But it's a journey our patients will be grateful we made." – Trauma medical director

The Minnesota Statewide Trauma System is a voluntary, inclusive network of trained and equipped trauma care providers throughout the state ensuring that optimal trauma care is available and accessible everywhere.

Why Have a Trauma System?

Trauma (or injury) is a tremendous burden on families and communities.

- For Minnesotans, ages 1 to 44, trauma is the leading cause of death. Overall, trauma is the fourth leading cause of death for Minnesotans.
- Trauma is the leading cause of death for all Minnesotans when measured in years of potential life lost.*
- On average, more than 2,400 Minnesotans die from trauma each year. For every injury death, nine people are hospitalized for injuries.
- Falls are the leading cause of injury death, followed by motor vehicle crashes.
- In 2008, 43 percent of motor vehicle crashes occurred outside the seven county metro area. However, 67 percent (2/3) of *fatal* crashes occurred in rural areas with populations less than 5,000.
- In 2008, the economic cost of motor vehicle fatalities in Minnesota was $514 million.**

* The number of years between death from injury and the average age of death at 70
** Based on the National Safety Council's economic cost figures

For a severely injured person, the time between sustaining an injury and receiving definitive care is the most important predictor of survival—the "golden hour." The chance of survival diminishes with time, despite the availability of resources and modern technology; however, a trauma system enhances the chance of survival regardless of proximity to an urban trauma center.

Benefits of a Trauma System

A system approach to trauma care is the best means to protect the public from premature death and prolonged disability from severe injury. **Trauma systems reduce death and disability** by identifying the causes of injury and promoting initiatives, and by ensuring that the resources required for optimal trauma care are available when and where they are needed *(Bibliography in Appendices A).*

States with a mature, comprehensive statewide trauma system have experienced:

- A 9 percent decrease in motor vehicle crash deaths
- A 15-20 percent increase in the survival rates of seriously injured patients
- An increase in productive working years
- An improvement in disaster preparedness.

Design of a Trauma System

A trauma system ensures that the necessary infrastructure is in place to deliver the right patient to the right hospital, and emergency medical and hospital resources are effectively coordinated to optimize the delivery of trauma care and outcomes.

This diagram's top row represents the flow of care for the severely injured patient.

- **Emergency Medical Services** provides initial stabilization of patients and safe, rapid transportation to appropriate hospitals.
- **Hospitals** provide stabilization and definitive life-saving care and are at the center of the system.
- **Rehabilitation services** are crucial for many patients to realize their fullest post-injury potential.

The trauma system's patient services are supported by:

- **Provider training and education** – The Minnesota trauma system provides access to affordable training for physicians and other hospital staff.
- **Data-based quality improvement and research** – All aspects of the system must be measured and analyzed to ensure the highest quality care is available and provided to all. Research and best practices will provide evidence-based knowledge to modify the system and hold it accountable to the citizens of Minnesota. Data is also used to focus local and regional education and injury prevention initiatives
- **Injury prevention strategies** – Coordination with injury prevention programs is vital to achieving the goals of the system. This includes, in part, prevention programs at trauma hospitals, Regional Trauma Advisory Committees, and the Departments of Public Safety and Transportation's Toward Zero Death program.

Formation of Minnesota's Statewide Trauma System

The Minnesota Legislature and Governor established the state's voluntary trauma system with the passage of legislation in 2005. Minn. Stat. 144.603, subd. 1 and 2 provides, in part, that the Commissioner of Health:

- Adopt criteria to ensure that severely injured people are promptly transported and treated at trauma hospitals appropriate to the severity of injury;
- Adopt minimum criteria to address emergency medical service trauma triage and transportation guidelines as approved under Minnesota Statutes 144E.101, subdivision 14, designation of hospitals as trauma hospitals, inter-hospital transfers, a trauma registry, and a trauma system governance structure;
- Adapt and modify the standards as appropriate to accommodate Minnesota's unique geography and the state's hospital and health professional distribution and verify that the criteria are met by each hospital voluntarily participating in the statewide trauma system;
- Establish a state trauma advisory council (STAC) to advise, consult with, and make recommendations on the development, maintenance and improvement of the statewide trauma system;
- Appoint, as needed, up to eight regional trauma advisory councils (RTACs) to advise, consult with, and make recommendations to the STAC on regional modifications to the statewide trauma criteria that will improve patient care and accommodate specific regional needs; and
- Report to the Legislature by September 1, 2009, on the implementation of the voluntary trauma system.

From the outset, the vision was to build a statewide trauma system that would be inclusive of all hospitals. It was especially important to engage rural hospitals because they are a long distance from definitive surgical care. Severe trauma cases are high-risk, low-volume endeavors, and inconsistencies in emergency care can be present not only throughout a region, but even at a local hospital within a single day. Rural trauma care providers must have a systematic approach to recognizing, stabilizing, and rapidly transferring critical trauma patients. They also require local, regional and state support networks to ensure that efficiencies and quality of care match the needs of their patients.

Three-Phase Implementation

Trauma systems save lives, but it takes time to achieve a mature trauma system, understand the baseline of trauma care and measure statewide results. One researcher concludes that "the [most significant] effect [measurable decrease in crash mortality] does not appear for 10 years, a finding consistent with the progressive implementation of organized systems of trauma care over time."[1]

Framers of the Minnesota Trauma System envisioned a phased approach to building the system, beginning with a solid system infrastructure, progressing to data-driven quality improvement, and resulting in outcome-based clinical guidelines and significant statewide reduction in trauma deaths. At present, the foundation is solid and the system is moving into the implementation phase of quality improvement.

[1] Nathens AB, Jurkovich GJ, Cummings P, Rivara FP, Maier RV. The effect of organized systems of trauma care on motor vehicle crash mortality. *JAMA*. 2000;283:1990-1994

An immediate and future challenge is to explore funding mechanisms to ensure the Minnesota Statewide Trauma System has adequate resources to achieve its goals. The resources to administer the state trauma program through the Minnesota Department of Health have been fixed at the original 2005 appropriation of $352,000/year. Staffing remains the same at 2.75 FTE. Grant funding from one-time federal opportunities have helped offset shortfalls that would have otherwise stalled development. Overall, this level of funding was adequate for the system's early years; however, additional resources will be required to serve a larger and still developing system.

Phase 1: Saving lives through hospital participation and development of system infrastructure

Timeline: 2005 – Ongoing

Summary

The commissioner must establish, implement and modify trauma system criteria based on the comprehensive statewide trauma system plan (Minnesota Statutes, 144.603, subd. 2). Modifications have been made in educational standards, surgeon response for level III trauma hospitals, and inter-hospital trauma transfers. This flexibility to modify criteria as the system evolves has resulted in the ability to substantially improve clinical outcomes and has produced statewide support for the system**.** *The Trauma System should retain the current process for the continued implementation of the trauma system criterion* for trauma triage and transportation guidelines, trauma hospital designations, inter-hospital transfers, a trauma registry, and a trauma system governance structure.

A trauma hospital receives its initial trauma level designation after months of work and coordination with MDH staff. Hospitals must re-designate every three years following the same process. Subsequent designations are more intensive since analysis of the hospital's progress and quality improvement are assessed against prior designations.

There are 129 hospitals eligible for participation in the state trauma system. The first two state trauma hospital designations were awarded in December 2006.

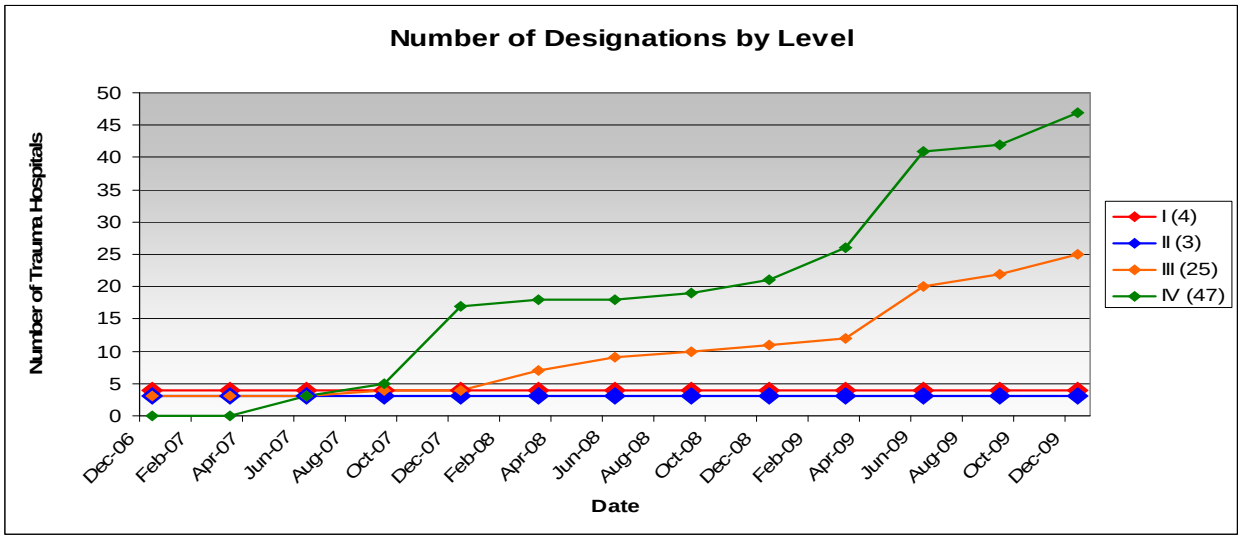
Currently Minnesota has 79 designated trauma hospitals (Table 1, page 6):

- Level I – 4
- Level II – 3
- Level III – 25
- Level IV – 47.

Of these, 45 are Critical Access Hospitals.

An additional 15 hospitals are in the process of designation. An executive level survey of the non-designated rural hospitals revealed that **all** intend to join the system in the future. *This is remarkable, given that participation is voluntary and requires significant administrative and clinical commitment.*

Table 1



In November 2007, the American College of Surgeons (ACS), including a team of eight multidisciplinary national reviewers, conducted a four-day comprehensive assessment of Minnesota's developing trauma system. The objective was to help promote a sustainable, gradual development of an inclusive trauma system.

Their final report contained 79 recommendations, covering 17 core components of the trauma system. Key recommendations for the Legislature to consider include the need *to establish ACS-verified pediatric trauma centers, to clarify trauma system data protection framework to support future quality improvement goals, and to conduct a financial assessment of the trauma system funding needs*. These core areas are developed in detail within the body and Recommendations of this report.

In 2009, the trauma system hired a renowned national trauma systems consultant to develop a comprehensive and scalable quality improvement planning document for Minnesota. The document was completed in June. It includes state, regional, local hospital, emergency medical services, and rehabilitation quality improvement tools. This consultant, independent of the ACS team, stressed that implementation of state and regional quality improvement will require clarification of Minnesota's trauma system data protection framework.

Phase 2: Saving lives through state and regional data-driven quality measurement, analysis, and improvement

Timeline: 2009 – Ongoing

Summary
MDH has begun building a quality improvement system for trauma care at the local, regional and state levels. Baseline system measurement and quality improvement activities will mature over time to provide sophisticated data and outcome analysis for all components of the system.

An important component of quality improvement includes developing regional trauma advisory committees (RTAC). The RTACs provide a forum for neighboring, even competing hospitals to jointly address regional and local issues that affect trauma care, outcomes and efficiencies. RTACs are charged to develop, implement and monitor region-wide trauma care plans that address: injury prevention based on regional assessments, EMS trauma triage and transport criteria based on regional resources, the unique needs of special populations such as pediatrics and geriatrics, educational needs of providers, and identification and integration of rehabilitation resources. Peer review is also core to the mission of the RTAC. As of December 2009, there is one approved RTAC in southern Minnesota. All other parts of the state are developing plans to establish RTACs in their areas.

Currently, the Minnesota trauma system is transitioning into the early stages of phase 2, while continuing to fulfill ongoing phase 1 requirements.

Phase 3: Saving lives through full system integration, outcome-based clinical guidelines, and contribution to evidence-based bodies of literature

Timeline: 2011 – Ongoing

Rehabilitation of severely injured patients is a core component of the trauma system's continuum of care. Building the system from the front end (i.e., EMS and the acute care phase of hospital evaluation, transfer and admission) has been the early focus of system development. But it is understood that integrating rehabilitation into the system is critical to ensuring that all Minnesotans are receiving optimal care for their life- and limb-threatening injuries. This is a challenging but key goal of Phase 3 system development.

This will require a review of related literature and identifying rehabilitation resources (especially for specialty populations and conditions such as pediatric, burn, spinal cord, brain injury), and develop a work plan to integrate rehabilitation into the system. This also includes integrating outcome data into the trauma registry for a complete record of injury care.

Although many injured patients attain their post-injury recovery goals fairly soon, others require prolonged in-hospital care and post-hospital rehabilitative services. The ultimate outcome is to return patients to their pre-injury state. A coordinated, multidisciplinary approach to early rehabilitative care produces the most favorable outcomes: restoring pre-injury physical status or to an optimal level of functioning.

Recommendations

1. **Add state designations for ACS level I and II Pediatric Trauma Centers**
2. **Clarify trauma system data protection framework to support future quality improvement goals**
3. **Continue with ongoing system implementation as provided in law**
4. **Explore funding mechanisms to ensure Minnesota Statewide Trauma System has adequate resources to achieve the vision of a fully integrated system.**

Report to the Minnesota Legislature 2009:
Minnesota Statewide Trauma System

System Implementation and Recommendations

"Being a trauma center is a journey, not a destination. But it's a journey our patients will be grateful we made." – Trauma medical director

Northern Minnesota – a true story

Thanksgiving night was a cold one in northern Minnesota. Two vehicles carrying eight passengers collided head-on at highway speed around 6 that evening. One patient died at the scene. Six were transported to the local rural hospital; five were in critical condition.

All of the severely injured patients suffered multi-system trauma. Several required chest tubes; others suffered head, abdominal and severe orthopedic injuries. Additional staff responded by protocol to the emergency room from the ICU and med-surgical units to assist. All of the patients were examined quickly and cared for efficiently.

Five patients were emergently stabilized and transferred by three area ambulance services to a regional level II trauma center capable of providing definitive care. Helicopters were grounded due to weather so helicopter crews assisted with the ground transfers. One of the helicopter crew members commented that the emergency department appeared to be functioning as smoothly as a level I trauma center.

Two months earlier this rural hospital was designated as a level III trauma center. In preparation for designation, the staff dedicated time and effort to improve their trauma care. They refined policies and protocols to more effectively manage major trauma patients. Physician and nursing staff attended trauma training. The state trauma system was there to assist throughout the entire process.

That night, staff understood their responsibilities as a level III trauma hospital in their community. Staff from all over the hospital functioned competently and comfortably together to save the lives of severely injured patients.

The staff in this hospital has the renewed energy and desire to continuously improve trauma care. Area emergency medical services have also taken an interest in the changes at the hospital. They, too, want to know how to become involved with the developing trauma program.

The Minnesota Statewide Trauma System is a voluntary, inclusive network of currently trained and equipped trauma care providers throughout the state ensuring that optimal trauma care is available and accessible everywhere. Though early in its development, the lifesaving effects of the statewide system were clearly realized on that appropriately-named Thanksgiving night.

System Implementation

Developing and implementing a successful state trauma system takes time. It is built on the foundation of each individual trauma center's successes and outcome improvements. Over time an integrated system will effectively link local and regional efforts into a cooperative and efficient statewide system.

The Minnesota Legislature began this important work in 2005 with the passage of legislation to form a voluntary statewide trauma system. The first meeting of the Commissioner-appointed State Trauma Advisory Council (STAC) was in December of that year. The system has been steadily and resolutely growing since then.

The vision is that all Minnesota hospitals will participate in a fully-funded trauma system that:

- Is of the highest quality
- Is seamless across the continuum of care (prevention, care delivery, rehabilitation)
- Is safe, timely, efficient, patient-centered and patient-driven
- Uses outcome data and continuous clinical quality improvement to evolve
- Allows many trauma patients to be treated in their own communities
- Eliminates all delays in transfers to definitive care
- Is embraced and valued by citizens and policymakers
- Is fully integrated into the disaster preparedness and public health systems.

Though current trauma hospitals save lives and reduce disabilities every day, three phases of development are envisioned before the system is fully implemented and can be expected to fully produce the public health outcomes of maximum reduction in deaths and disabilities on a statewide scale. At the writing of this report, Minnesota is beginning phase 2, while continuing phase 1.

Phase 1: **Saving lives through hospital participation and development of system infrastructure**

Timeline: 2005 – Ongoing

Goal 1: Develop and implement system infrastructure
Goal 2: Establish 100+ trauma hospitals throughout the state
Goal 3: Refine hospital and system standards

Phase 1
Goal 1: Develop and implement system infrastructure
STAC
The 15-member State Trauma Advisory Council (STAC) is advisory to the Commissioner of the Minnesota Department of Health (MDH). STAC provides system guidance and policy oversight to the trauma system. It includes clinical and administrative expertise from all aspects of trauma care, both rural and urban. The STAC has met quarterly since its inception in December 2005. There has been very little turnover, and meetings are well attended by stakeholders from around the state and from neighboring North Dakota. Current membership is listed in Appendix D.

Trauma Registry

All designated trauma hospitals use a secured web-based registry to submit required data on all major trauma patients. MDH provides and manages the registry for hospitals. MDH staff handle upgrades and enhancements to the registry along with ongoing product support.

Other related trauma data sources that are part of the trauma registry include EMS reports, death records, crash records, hospital billing data, and in the future, rehabilitation outcomes. The data include: a) individual patient demographics such as name and data of birth; b) case data such as injury type, procedures, and final disposition; and c) institutional data such as the hospital, lead physician on the resuscitation team, and surgeon response time to the emergency department.

The data is used to: a) link to other data bases to follow the continuity of care from pre-hospital through final discharge; b) produce public reports; c) monitor compliance with system requirements such as physician response times; c) conduct local, regional and state level quality improvement efforts; and d) conduct epidemiological studies of injury for prevention and resource allocation.

Individual patient data is necessary to link multiple patient records to one event. When a person is critically injured in Minnesota, the local ambulance service transports the patient to the local hospital. Both care providers create a patient record, one for the transport and care, and one for the hospital stay. The patient is typically stabilized and transferred for definitive care to another hospital. Both the transferring providers (ground or helicopter) and the receiving hospital create a patient record based on their ongoing assessments and treatment.

These four disparate patient records all stem from one event or course of care. In order to follow, evaluate and improve the care provided at all levels, these patient records must be linked into one seamless event. This is accomplished by linking individual data from each record.

MDH has existing authority to collect this data and current law protects the patient data as private, though institutional data is public. This is a concern because many trauma hospitals have relatively low volumes of major trauma patients, so a query at the institutional level could inadvertently reveal a specific patient incident.

While protection of patient information is vital, designated trauma hospitals must be accountable. In order to address both issues, it may be necessary to classify non-patient data as non-public while requiring the Commissioner of Health to publish risk-adjusted comparative reports on designated trauma hospitals to ensure accountability for trauma services.

Current registry information technology (IT) allocation has been adequate to maintain the registry, make code changes as needed, troubleshoot and solve issues during upgrades, and coordinate technical support with the registry vendor. Added IT responsibilities and dedicated time will be necessary to support and manage the registry (Described in this report in Phase 2 Goal 1: under the system quality improvement, regional trauma advisory committees, and peer review sections). This should be a priority for any additional funding.

Education

Education is key to the trauma system. Physicians and mid-level providers such as physician assistants and nurse practitioners who care for trauma patients must have taken the Advanced Trauma Life Support (ATLS) course or the Comprehensive Advanced Life Support (CALS) course plus the CALS benchmark lab or trauma skills module. If they are not board-certified by the American Board of Emergency Medicine, the American Board of Osteopathic Board of Emergency Medicine, the American Board of Surgery, or the American Osteopathic Board of Surgery, then they must retake and pass ATLS or CALS and the benchmark lab or trauma skills module every four years.

Minnesota was the first state in the nation to offer several venues for trauma education requirements. The very popular CALS course has anchored rural hospital participation in the system. CALS is a Minnesota grown course that focuses on rural emergency department teams often led by family physicians. The CALS program recently began offering a traveling trauma skills module as a STAC-approved alternative to its Twin Cities-based Benchmark lab. This specifically addresses the access and affordability needs of rural providers.

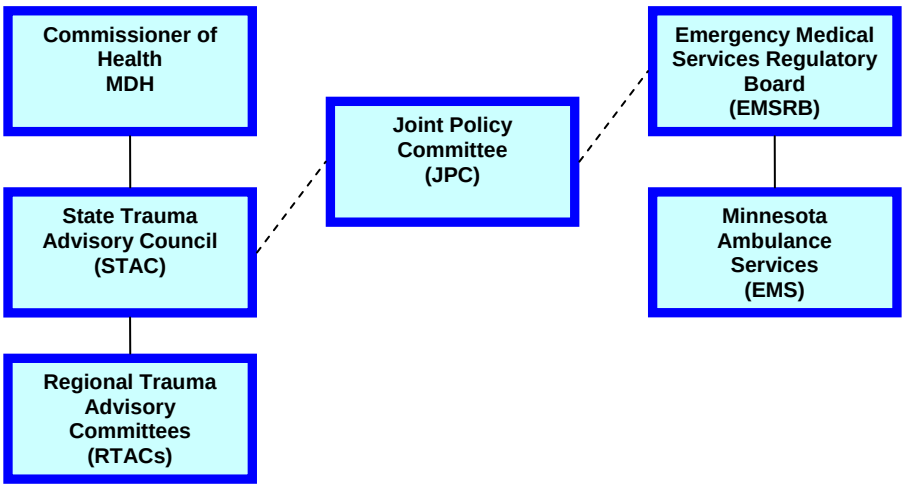
Minnesota was also the first state in the nation to offer rural-based ATLS courses. American College of Surgeons-approved training institutions offer and conduct ATLS. In the past, these courses were only offered at Level I or II trauma hospitals, located in higher population areas. With the widespread growth of the state trauma system, ATLS is now reaching out to the most rural areas of the state.

Nurses who care for trauma patients at designated trauma centers must have taken CALS, Trauma Nurse Core Course (TNCC), Advanced Trauma Care for Nurses (ATCN), Course in Advanced Trauma Nursing (CATN); or complete an in-house trauma training that addresses system-required objectives. There is no requirement for recertification for nurses.

Maintaining current trauma skills proficiencies is an ongoing concern throughout rural Minnesota because the vast majority of trauma care providers only receive this training every four years. Major trauma patients often require high-risk, low-volume procedures in order to stabilize their condition until they can be transferred to a definitive care facility. More frequent hands-on skills training is needed to maintain provider proficiency. This issue will be addressed during Phase 2 of the system development.

System Governance

The Commissioner of Health is the lead authority for the trauma system, advised by the State Trauma Advisory Council (STAC) and the Joint Policy Committee, with its shared MDH and Emergency Medical Services Regulatory Board (EMSRB) membership.



- The STAC is advisory to the Commissioner, and the RTACs are advisory to the STAC.
- EMS components of the system are under the authority of the EMSRB.
- The JPC was established to ensure efficiency and continuity among the agencies responsible for the trauma system. The JPC is advisory to the STAC and the EMSRB; it has three members each from the STAC and the EMSRB.

Collaboration with State Agencies

MDH is integrating with other state agencies and programs with ties to trauma care. The trauma system regularly collaborates with the EMSRB. It is also a partner with the Minnesota Departments of Public Safety and Transportation's Toward Zero Death program. Through coordinating efforts with these like-minded agencies, the trauma system cultivates government efficiency and collaboration.

Goal 2: Establish 100+ trauma hospitals throughout the state

Hospital Designation

The state trauma system is voluntary for hospitals. Participation is no small endeavor, given the commitment required. All hospitals must meet minimum requirements for trauma education and equipment. They also develop policies to direct the prompt management of trauma patients; secure a substantial commitment from the hospital board, administration and medical staff; and establish a process for continuous quality improvement. *(Appendices F and G)*

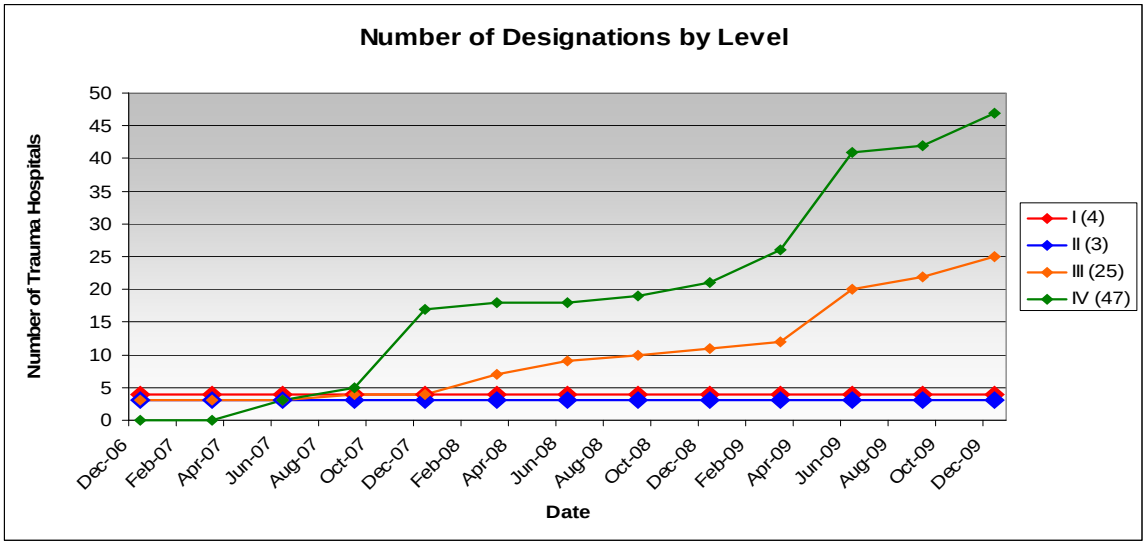
As part of the designation process, a contract physician/nurse manager team must conduct an on-site review of the hospital to determine compliance with trauma policies and to evaluate clinical care. The American College of Surgeons verifies the resources for level I and II hospitals. A site visit is a critical review of trauma cases from the hospital's medical records. This provides the detail needed to verify that the level of care is consistent with the written trauma policies and

guidelines of the hospital. This information is recorded in a report to the Minnesota Department of Health (MDH). Though specific case identifiers are blinded in the report, it would be possible to match a case with a specific patient when the nature of the injury is unique and/or made public. A private data classification for these reports would allow a thorough designation review while protecting patient privacy.

In addition to verifying the necessary resources are in place, contracted site reviewers also share their expertise and best practices, and coach the hospital in the development of their individual trauma program. These efforts have led to the refinement of care in hospitals throughout the state that previously had not had the systematic, organized focus on trauma care that designation brings. State trauma system staff offer technical assistance to candidate hospitals throughout the designation process. This has been widely utilized and has produced valuable feedback for the applicants.

…the required focus on trauma quality improvement has led to improved clinical quality initiatives throughout the entire hospital.

A Minnesota trauma hospital designation is valid for three years, after which a hospital must re-designate with MDH. This re-designation process mirrors the initial designation, except that greater emphasis is placed on the hospital's trauma quality improvement activities. The hospital must demonstrate that it not only is reviewing all of its major trauma cases, but also identifying areas for improvement and making deliberative progress to ensure that the improvements are made. It has been noted that the required focus on trauma quality improvement has led to improved clinical quality initiatives throughout the entire hospital.



Minnesota has 129 hospitals that are eligible for participation in the state trauma system. The first two trauma hospital designations were awarded in December 2006.

Currently, Minnesota has 79 designated trauma hospitals (45 are Critical Access Hospitals):

- Level I – 4
- Level II – 3
- Level III – 25
- Level IV – 47.

There are an additional 15 hospitals in process of designation. An executive level survey of all non-designated rural hospitals revealed that all have the intention of joining the system in the future. This is remarkable, given that participation is voluntary and requires significant administrative and medical staff commitment and networking of resources.

Future Pediatric Designation Needed

In addition to verifying the resources of adult level I and II trauma hospitals, the American College of Surgeons (ACS) recently began a new verification process for level I and II pediatric trauma hospitals. In the past, a hospital could achieve both adult and pediatric verifications as a single award. The new process separates the two verifications. Regions Hospital in St. Paul and Saint Mary's-Mayo Clinic in Rochester have verified as ACS-level I pediatric trauma hospitals under the new process. Other Minnesota ACS-verified trauma hospitals that carry both verifications under the old process will have to re-verify separately at the time of their next ACS review.

The Minnesota Department of Health has the authority to designate four levels of trauma hospitals based on established criteria and resources, but does not distinguish between adult and pediatric designations. As a result, hospitals verifying as both under the new ACS format (current and future) no longer have their pediatric trauma hospital designated by the state trauma system.

Designation by the state trauma system ensures that a hospital is accountable for the care they provide. It requires the hospital to collaborate with emergency medical services and other facilities within its region, participate in quality improvement activities, and abide by state system requirements. The Commissioner should be granted authority to designate pediatric trauma hospitals in order to allow ACS-verified pediatric trauma centers to be part of the state trauma system.

Goal 3: Refine hospital and system standards

Criteria

The commissioner must establish, implement and modify trauma system criteria based on the comprehensive statewide trauma system plan (Minnesota Statutes, 144.603, subd. 2). Modifications have been made in educational standards, surgeon response for level III trauma hospitals, and inter-hospital trauma transfers. This flexibility to modify criteria as the system evolves has resulted in the ability to substantially improve clinical outcomes and has produced statewide support for the system**.** The Trauma System should retain the current process for the continued implementation of the trauma system criterion for trauma triage and transportation guidelines, trauma hospital designations, inter-hospital transfers, a trauma registry, and a trauma system governance structure.

ACS System Review

In November 2007, a team of eight multidisciplinary national reviewers from the American College of Surgeons (ACS) conducted a four-day comprehensive assessment of the developing trauma system. The objective was to help promote a sustainable effort in the graduated development of an inclusive trauma system.

There were 79 recommendations in the final report, covering 17 core components of the trauma system. The report and recommendations were widely distributed and are actively being addressed under the leadership of the Joint Policy Committee.

Key recommendations needing legislative involvement are:

- "Ensure adequate legal protection of the peer review process and address this in legislation if not currently in place." This is developed under Phase 2, Goal 1 - "QI" and "RTAC" sections below.
- "Engage specialty pediatric resources and current trauma centers to establish at least one ACS-verified pediatric trauma center, ideally at Level I status." Progress toward this and subsequent consequences are discussed above under Phase 1, Goal 2 - pediatric section.
- "Achieve integration of…the information system [registry] to allow optimal opportunity for investigation of questions relative to injury epidemiology and outcomes in the state." The need for classification of non-patient data is discussed under Phase 1, Goal 1 - registry section.
- "Designate and re-designate trauma centers based upon established criteria, and performance to those standards." Identified privacy issues related to the designation process are provided under Phase 1, Goal 2 - hospital participation section.
- "Conduct a financial assessment of the trauma system funding needs and distribute the report widely." The trauma system is still operating at its original level of funding. This was adequate for the system's early years; however, with 79 designated hospitals (and more joining quarterly), the development of regional trauma advisory committees and the implementation of state and regional quality improvement initiatives, additional resources would be needed to serve a larger and developing system. Further details are included in Phase 2, Goal 4, and in Appendix H.

EMS Transportation Statute

One component of the trauma system concerns the transportation of trauma patients from the scene to an appropriate trauma hospital. The law initially required EMS providers to transport major trauma patients to the highest designated trauma hospital within 30 minutes transport time and provided that a level II trauma center not be bypassed for a level I. This requirement was to take effect July 1, 2009.

By 2007, stakeholders expressed concern that major trauma patients in both urban and rural areas could experience unintended delays in receiving the best available care under this provision. As a result, the 2008 Legislature extended the implementation date of the EMS component to July 1, 2010, which provided time to build consensus for the necessary changes to the language.

An extensive process was undertaken to collaborate with stakeholders to develop a solution. A compelling body of research showed that certain trauma patients have significantly better outcomes at level I than at level II hospitals. Agreement on a patient-centered solution was reached.

In 2009, the Legislature and Governor changed the statute to allow metro area major trauma patients to be transported to whichever nearby level I trauma or level II trauma hospital is deemed to be in the best interest of the patient, or to the nearest level III or IV trauma hospital if no level I or II is within 30 minutes. This change gives ambulance services the flexibility to

determine a patient's needs and identify the most appropriate resource to meet those needs. The changes also allow rural major trauma patients to be initially transported to the closest trauma hospital (usually a level IV) rather than a more distant, higher designated facility. This expedites stabilization and transfer of these patients to definitive care (level I or II trauma hospitals).

Phase 2: **Saving lives through state and regional data-driven quality measurement, analysis, and improvement**

Timeline: 2009 – Ongoing

Goal 1: Establish statewide and regional quality improvement plans and processes
Goal 2: Implement ongoing educational/skills strategies
Goal 3: Implement EMS trauma transport requirements (July 1, 2010)
Goal 4: Explore funding mechanisms to ensure Minnesota Trauma System has adequate resources to achieve the vision of a fully integrated system

Phase 2
Goal 1: Establish statewide and regional quality improvement plans and processes
System Quality Improvement (QI)

Perhaps the single most important aspect of a mature trauma system is its ability to measure, evaluate and improve the processes and outcomes of care rendered by all levels of the trauma care continuum from 9-1-1 dispatch through rehabilitation.

To accomplish this, MDH contracted with the Trauma Center Association of America, a leading national trauma organization, to develop a comprehensive quality improvement plan for Minnesota. The resulting plan incorporates national best practices that can be scaled for incremental implementation.

In June 2009, the STAC approved this quality improvement planning document. It is comprehensive, covering core areas of state, regional, local hospital, emergency medical services, and rehabilitation quality improvement. The primary objective is to decrease unnecessary death and disability by reducing inappropriate variation in care, and ensuring that system expectations, standards and benchmarks are met.

Ideal trauma system quality improvement will: 1) Establish lines of communication, structure, authority and accountability for monitoring system components; 2) Define standards by which performance and outcomes are measured; 3) Implement plans for corrective action or improvement when indicated; and 4) Modify practice guidelines when appropriate.

The release of the June 2009 plan marked the transition into phase 2 of the system's maturation: to develop data-driven quality measurement, analysis and improvement at all levels of provider care. The framework is completed; the next step is to implement.

To accomplish this, additional IT and QI expertise and dedicated time are needed. The breadth of responsibility includes the entire trauma system at each point and in each region of the state. It will require finding and fixing system issues as well as clinical care issues through data analysis and reporting. Without such a highly focused effort, widespread reduction in trauma deaths and disabilities cannot occur. Current staffing of the trauma system cannot provide this level of expertise, dedicated time and leadership to this foundational trauma system component. Support for this should be the top priority when additional funding opportunities becomes available.

Establishment of RTACs

Minnesota Statute 144.608, subd. 3, allows for the formation of up to eight Regional Trauma Advisory Committees. The statutory functions of the RTACs are to advise, consult with and make recommendations to the STAC on suggested regional modifications to the statewide trauma criteria that will improve patient care and accommodate specific regional needs. In this manner, the Commissioner is better able to make appropriate modifications to the system criteria based on a region's unique geography and the state's hospital and health professional distribution.

Regional trauma stakeholders must self-organize and apply to the Commissioner through the STAC for approval as an RTAC. Stakeholders may be anyone with an interest in the provision of trauma care in the region such as health care providers, hospital administrators, EMS personnel and elected officials. Each RTAC may have up to 15 members. The Commissioner, in consultation with the EMSRB, appoints the members.

RTACs will develop, implement and monitor region-wide trauma care plans that address: injury prevention based on regional assessments, EMS trauma triage and transport criteria based on regional resources, the unique needs of special populations such as pediatrics and geriatrics, educational needs of providers, and identification and integration of rehabilitation resources. Quality improvement and peer review are also core to the mission of the RTAC. (Peer review is detailed below).

The geographical borders of RTACs will closely mirror existing EMS regional lines, yet allow for existing provider relationships and referral patterns. They will include all regional stakeholders and integrate the resources of the region.

To assist in this, the STAC published detailed application guidance in December 2008. The guidance requires RTACs to seek, contribute to, and base recommendations on data-driven evidence and national best practices. All RTAC recommendations to the STAC must have broad-based regional support.

Future fiscal support will be necessary as RTACs form and conduct this level of coordination, trending, surveillance, benchmarking of clinical care, and peer review (see next section). Limited but dedicated professional and clerical time will help the RTACs improve trauma outcomes.

Peer Review

A core responsibility of the RTACs (and STAC) is to implement a peer review process to allow providers to jointly address issues that affect trauma care and outcomes. Severe trauma cases are difficult to manage for the care provider. They are immediately life-threatening, time-sensitive, often involve minors and small children, and require accurate and rapid assessment, treatment and transfer. Severe trauma cases are high risk/low volume, which makes peer review imperative. Trauma care providers within a region must be able to share their experiences for the purposes of accountability, mutual learning, and identification of barriers to quality performance. These reviews are crucial to ensure optimal outcomes today and into the future.

Peer review protection for this kind of regional and state-level quality improvement is not explicitly provided for under current law. As a result, provider participation will be limited; leaving fixable system and provider problems unknown, unaddressed and repeated—all to the detriment of seriously injured Minnesotans. Peer review of these difficult cases needs to occur for trauma care to steadily and constantly improve. Success hinges on improving the statutory confidentiality protections for regional and state peer review committees.

Goal 2: **Implement Ongoing Educational/Skills Strategies**

Ongoing Educational Challenge

Maintaining current trauma skills proficiencies is an ongoing concern throughout rural Minnesota because the vast majority of trauma care providers only receive the required training every four years (see Phase 1, Goal 1). Major trauma patients often require high-risk, low-volume procedures in order to stabilize their condition until they can be transferred to a definitive care facility. More frequent hands-on skills training is needed to maintain provider proficiency. In addition, the system must incorporate focused skills training based on the findings of the Regional Trauma Advisory Committees and lessons learned through regional and state quality improvement and summary peer review findings. The system needs to complement the four-year cycle of trauma education.

Ideally, the system would establish on-site, ongoing skills training strategies, employ an education position to oversee and help to conduct scheduled trainings through a portable hands-on training lab (capital resources are already available). These training encounters would address the core needs for data-driven, realistic, affordable and accessible training. The changing curriculum would bring the system's data and quality improvement components to the care provider, impacting outcomes of trauma patients throughout the state.

Hospitals would pay for the classes. The state would administer and coordinate the sessions. This model of shared costs allows for efficiencies in development and administration, while providing state and regional-level continuity of life-saving training based on reliable data.

Goal 3: **Implement EMS trauma transport requirements (July 1, 2010)**

EMS Trauma Triage

As described under Phase 1, Goal 3, the new EMS trauma transport statute takes effect on July 1, 2010. By then all EMS agencies must have developed EMSRB-approved trauma triage and transportation guidelines that comply with the law. The EMSRB is providing leadership and resources to ensure that ambulance services successfully meet this deadline.

As part of the 2009 law change regarding EMS transportation (see Phase 1, Goal 3), the Commissioner of Health must begin reporting data on the transportation of major trauma patients from the scene. These reports will go to the RTACs and the STAC.

Goal 4: Explore funding mechanisms to ensure Minnesota Trauma System has adequate resources to achieve the vision of a fully integrated system

Future Funding Needs

The resources to administer the state trauma program at MDH have been fixed at the original 2005 appropriation of $352,000/year. Funding comes from State Government Special Revenue (SGSR) collected annually from hospital licensure fees. Staffing remains the same at 2.75 FTE. This level of funding allowed for the creation of the State Trauma Advisory Council, the beginning of designations of trauma hospitals (there were no state designated trauma hospitals at the time), and elementary data analysis. Grant funding from one-time federal opportunities has helped offset shortfalls that would have otherwise stalled development. Overall, this level of funding has been adequate for the system's early years; however, additional funding will be need to progress through phases 2 and 3, and achieve the full vision for a statewide trauma system.

Today there are 79 designated trauma hospitals, with the remaining 40 eligible facilities confirmed as planning to seek designation. Every designated trauma facility must be re-designated every three years, so this verification and assessment process is ongoing. There is now one established Regional Trauma Advisory Committee (RTAC) in southern Minnesota. With the support of federal grant monies, development has begun in the rest of the state. The goal is for RTAC approval and implementation in all regions within the next year. This will immediately lead to new regional trauma care planning and quality improvement initiatives.

A summary of other states' funding sources is included in Appendix I. The results are widely varied including alcohol and tobacco taxes, moving vehicle violations and registration fees. A sustainable funding strategy needs to be formulated.

Phase 3: Saving lives through full system integration, outcome-based clinical guidelines, and contribution to evidence-based bodies of literature

Timeline: 2011 – Ongoing

Goal 1: Integration of rehabilitation services

Goal 2: Integration of best practices

Phase 3
Goal 1: Integration of rehabilitation services
Rehabilitation

Traumatic injuries are a major cause of short- and long-term disability. Injuries to the brain and spinal cord can result in serious, long-term physical and cognitive disability and secondary conditions such as pressure sores, depression, loss of employment and career, loss of productivity, family stress and dysfunction. Injuries to the lower limbs, long bones, back and eyes can significantly impair mobility and function and have a profound impact on quality of life.

Injuries can also cause a variety of psychosocial problems, such as post-traumatic stress disorder, depression, alcohol and drug abuse or dependence, and difficulty in returning to pre-injury routines and lifestyle.

Although many injured patients attain their post-injury recovery goals fairly soon, others require prolonged in-hospital care and post-hospital rehabilitative services. The ultimate outcome is to return patients to their pre-injury state. A coordinated, multidisciplinary approach to early rehabilitative care produces the most favorable outcomes: restoring pre-injury physical status or to an optimal level of functioning.

The ultimate outcome is to return patients to their pre-injury state.

Rehabilitation of severely injured patients is a core component of the trauma system's continuum of care. Building the system from the front end (i.e., EMS and the acute care phase of hospital evaluation, transfer and admission) has been the early focus of system development. But it is understood that integrating rehabilitation into the system is critical to ensuring that all Minnesotans are receiving optimal care for their life- and limb-threatening injuries. This is a challenging but key goal of Phase 3 system development.

The first step in this process will be to convene a state work group to review related literature, identify rehabilitation resources (especially for specialty populations and conditions such as pediatric, burn, spinal cord, brain injury), and develop a work plan to integrate rehabilitation into the system. This will include a priority on integrating outcome data into the trauma registry in order to achieve a complete record of injury care throughout the state. A tactical plan is also needed to ensure that level III and IV trauma hospitals engage rehabilitative personnel early in the care of the patients who remain at their facilities.

Goal 2: **Integration of best practices**
Clinical Guidelines

One measurement of a mature trauma system is that it produces clinical care standards based on evidenced-based data. This is the natural result of a system that is using outcome data to drive its decision-making. It is at this point that the most significant measurable differences in morbidity and mortality will be experienced at a statewide level. The system should reach this level of maturity during Phase 3 of its implementation.

Recommendations

1. Add state designations for ACS Level I and II Pediatric Trauma Centers

In addition to verifying the resources of adult level I and II trauma hospitals, the American College of Surgeons (ACS) recently began a new process for verifying level I and II pediatric trauma hospitals. In the past, a hospital could achieve both adult and pediatric verifications as a single award. The new process separates the two verifications.

The Minnesota Department of Health has the authority to designate four levels of trauma hospitals based on established criteria and resources, but does not distinguish between adult and pediatric designations. As a result, hospitals verifying as both under the new ACS format (current and future) no longer have their pediatric trauma hospital designated by the state trauma system.

Designation by the state trauma system ensures that a hospital is accountable for the care they provide. It requires the hospital to collaborate with emergency medical services and other facilities within its region, participate in quality improvement activities, and abide by state system requirements. **MDH will need to add a new pediatric designation to its authority in order to allow ACS-verified pediatric trauma centers to be part of the state trauma system.**

2. *Clarify trauma system data protection framework to support future quality improvement goals*

Three areas of the trauma system need explicit data protections: state and regional peer review, the designation process, and institutional level registry data.

Peer Review: A core responsibility of the Regional Trauma Advisory Committees (RTACs) and the State Trauma Advisory Council (STAC) is to implement a peer review process to allow providers to jointly address issues that affect trauma care and outcomes. Severe trauma cases are difficult for the care provider to manage. They are immediately life-threatening, time-sensitive, often involve minors and small children, and require accurate and rapid assessment, treatment and transfer. Severe trauma cases are high risk/low volume, which makes peer review imperative. Trauma care providers within a region must be able to share their experiences for the purposes of accountability, mutual learning, and identification of barriers to quality performance. These reviews are crucial to ensure optimal outcomes today and into the future.

Peer review protection for this kind of regional and state-level quality improvement is not explicitly provided for under current law. As a result, participation by providers will be limited; leaving fixable system and provider problems unknown, unaddressed and repeated—all to the detriment of seriously injured Minnesotans. Peer review of these difficult cases needs to occur for trauma care to steadily and constantly improve. **Naming the STAC and RTACs as peer review organizations under Minnesota Statute 145.61, subd. 5 would address this crucial need.**

Designations: As part of the trauma hospital designation process, a contract physician/nurse manager team must conduct an on-site review of the hospital to determine compliance with trauma policies and to evaluate clinical care. (The American College of Surgeons conducts the site reviews of level I and II hospitals.) A site visit is a critical review of trauma cases from the hospital's medical records. This provides the detail needed to verify that the level of care is consistent with the written trauma policies and guidelines of the hospital. This information is recorded in a report to the Minnesota Department of Health. Though specific case identifiers are blinded in the report, it would be possible to match a case with a specific patient when the nature of the injury is unique and/or made public. **A private data classification for the designation reports would allow a thorough designation review while protecting patient privacy.**

Registry: The Minnesota Department of Health has existing authority to collect trauma registry data and current law protects the patient data as private, though institutional data is not classified. This is a concern because many trauma hospitals have relatively low volumes of major trauma patients, so a query at the institutional level could inadvertently reveal a specific patient incident. While protection of patient information is vital, it is equally important that designated trauma hospitals are accountable for the care they provide. In order to address both issues, **non-patient registry data should be classified as non-public, while requiring the Commissioner of Health to publish risk-adjusted comparative reports on designated trauma hospitals that ensure accountability for quality trauma services.**

3. Continue with ongoing system implementation as provided in law

The commissioner must establish, implement and modify trauma system criteria based on the comprehensive statewide trauma system plan (Minnesota Statutes, 144.603, subd. 2). Modifications have been made when needed, and the system has enjoyed rapid and successful implementation into Phase 2 of its development. This flexibility to modify criteria as the system evolves has resulted in the ability to substantially improve clinical outcomes and has produced statewide support for the system**. The Trauma System should retain the current process for the continued implementation of the trauma system criterion for trauma triage and transportation guidelines, trauma hospital designations, inter-hospital transfers, a trauma registry, and a trauma system governance structure.**

4. Explore funding mechanisms to ensure Minnesota Statewide Trauma System has adequate resources to achieve the vision of a fully integrated system

The resources to administer the state trauma program through the Minnesota Department of Health have been fixed at the original 2005 appropriation of $352,000/year. Staffing remains the same at 2.75 FTE. This level of funding allowed for the creation of the State Trauma Advisory Council, the beginning of designations of trauma hospitals (there were no state-designated trauma hospitals at the time), and elementary data analysis. Grant funding from one-time federal opportunities have helped offset shortfalls that would have otherwise stalled development. Overall, this level of funding was adequate for the system's early years; however, additional resources will be needed to progress through phases 2 and 3, and achieve the full vision of a statewide trauma system.

A summary of state funding sources from around the country is included in Appendix I. The results are widely varied including alcohol and tobacco taxes, and moving vehicle violations and registration fees**. An enhanced, sustainable funding strategy needs to be formulated to achieve a full statewide trauma system.**

Appendices

A. **Effectiveness of Trauma Systems Bibliography**
B. **Minnesota Trauma System Fact Sheet**
C. **American College of Surgeons' Consultation Executive Summary**
D. **STAC Members 2009**
E. **Comparison of Trauma Designation Levels**
F. **Level III and IV Trauma Designation Criteria**
G. **Minnesota Trauma Hospitals – December 2009**
H. **Minnesota Trauma System Budget**
I. **Other States' Funding Sources**

Appendix A: Effectiveness of Trauma Systems Bibliography

Mann NC, Mullins RJ, MacKenzie EJ, Jurkovich GJ, Mock CN. Systematic review of published evidence regarding trauma system effectiveness. *J Trauma*, 1999;47:S25-33

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Appendix B: Minnesota Trauma System Fact Sheet

Why Have a Trauma System?

For a severely injured person, the time between sustaining an injury and receiving definitive care is the most important predictor of survival—the "golden hour." The chance of survival diminishes with time, despite the availability of resources and modern technology; however, a trauma system enhances the chance of survival regardless of proximity to an urban trauma center.

What is a Trauma System?

A trauma system is a predetermined and organized response to managing and improving the care of severely injured people. It spans the continuum-of-care from prevention and emergency care to rehabilitation. Best practices standards guide each stage of trauma care to ensure that injured people are promptly transported to and treated at facilities appropriate to the severity of their injury.

A trauma system also provides a foundation for disaster preparedness and response. As part of its day-to-day activities, a trauma system coordinates the movement and care of severely injured people. Thus, a trauma system expands and contracts based on the needs and resources available at the moment.

Impact of Trauma in Minnesota

Trauma is a tremendous burden on families and communities. In the 1990s, nearly 21,000 Minnesotans died from trauma.

- For Minnesotans, ages 1 to 44, trauma is the leading cause of death. Overall, trauma is the fourth leading cause of death for Minnesotans.
- Trauma is the leading cause of death for all Minnesotans when measured in years of potential life lost.*
- On average, more than 2,400 Minnesotans die from trauma each year. For every injury death, nine people are hospitalized for injuries.
- Falls are the leading cause of injury death, followed by motor vehicle crashes.
- In 2008, 43 percent of motor vehicle crashes occurred outside the seven county metro area. However, 67 percent (2/3) of the *fatal* crashes occurred in rural areas with populations less than 5,000.
- In 2008, the economic cost of motor vehicle fatalities in Minnesota was over $514 million.**

* "Years of potential life lost" is the number of years between early death from injury and the average age of death at 70.
**Based on the National Safety Council's economic cost figures.

Benefits of a Trauma System

States with a mature, comprehensive statewide trauma system have experienced:

- A 9 percent decrease in motor vehicle crash deaths
- A 15-20 percent increase in the survival rates of seriously injured patients
- An increase in productive working years
- An improvement in disaster preparedness.

Minnesota's Trauma System

In 2005, the Minnesota Legislature established a statewide trauma system and charged the Minnesota Department of Health with implementation. Minnesota's trauma system recognizes the vital role that rural communities, ambulance services, hospitals and health care professionals play in the care and management of trauma patients.

Participation remains voluntary, but wide-scale involvement will ensure that a statewide, cooperative effort is in place to care for seriously injured people.

Mission

It is the mission of the Minnesota Statewide Trauma System to create a voluntary, inclusive network of currently trained and equipped trauma care providers throughout the state ensuring that optimal trauma care is available and accessible everywhere.

Vision

It is the vision of the trauma system that all Minnesota hospitals will participate in a fully-funded trauma system that:

- Is of the highest quality
- Is seamless across the continuum of care (prevention, care delivery, rehabilitation)
- Is safe, timely, efficient, patient-centered and patient-driven
- Uses outcome data and continuous clinical quality improvement to evolve
- Allows many trauma patients to be treated in their own communities
- Eliminates all delays in transfers to definitive care
- Is embraced and valued by citizens and policymakers
- Is fully integrated into the disaster preparedness and public health systems.

Values

All Minnesota hospitals will participate in a trauma care system that:

- Is based on obtaining the best outcomes for injured patients
- Is mindful of overall system costs and scarce specialist resources
- Is data-driven, with in-house trauma performance improvement programs that guide trauma care
- Includes a supportive environment for hospitals, which allows for realistic, affordable and accessible
  site-based education
- Allows for existing referral patterns
- Believes that over-triage is better than under-triage.

Trauma and Potential Revenue

Federal law allows hospitals to recover certain costs related to the response to and care of a trauma patient. In Minnesota, eligibility for this revenue is limited to trauma hospitals verified by the American College of Surgeons or designated as a trauma hospital by the state.

System Assessment

November 4-7, 2007, the American College of Surgeons Committee on Trauma conducted a comprehensive review of Minnesota's trauma system. The purpose of the review was to provide an analysis of the current system status and make recommendations for system improvements and enhancements.

The Minnesota Department of Health, together with its State Trauma Advisory Council and the EMS Regulatory Board, formed a Joint Policy Committee to analyze the findings of this review, establish priorities and determine what modifications are necessary as the trauma system continues to develop.

Getting Started

- There is no fee associated with becoming a trauma hospital in Minnesota.
- Access to and use of a secure, Web-based trauma registry is provided to all hospitals at no cost.
- Trauma program staff is available to provide consultation, technical assistance and resources to help hospitals pursue trauma designation.

Important Link

The Minnesota Department of Health trauma system Web site contains more information on the governance and structure of the trauma program, along with fact sheets, and numerous resources for hospitals, including an interactive map of currently designated trauma hospitals.

www.health.state.mn.us/traumasystem

For more information contact:

Tim Held, State Trauma System Coordinator
Minnesota Department of Health
Office: (651) 201-3868
Fax: (651) 201-3830
Email: tim.held@state.mn.us

Appendix C: American College of Surgeons' Consultation Executive Summary

Trauma System Consultation
State of Minnesota
Bloomington, Minnesota

November 4-7, 2007
American College of Surgeons
Committee on Trauma

A multidisciplinary working group prepared this document based on the consultation visit that took place on November 4-7, 2007 and included the following members:

Team Leader:

Michael F. Rotondo, MD, FACS Chair, COT Trauma System Evaluation and Planning Committee American College of Surgeons Professor and Chairman of the Department of Surgery The Brody School of Medicine at East Carolina University Greenville, NC

Team:

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ACS Staff:

Holly Michaels Program Coordinator Trauma Systems Consultation

American College of Surgeons
Committee on Trauma

Appendix C, cont.

Executive Summary

Trauma System Consultation
State of Minnesota
Bloomington, Minnesota
November 4 - 7, 2007

Methodology The Minnesota Department of Health (MDH) and its Trauma System Program located within the Office of Rural Health and Primary Care (ORHPC) requested this trauma system consultation, which was conducted under the auspices of the American College of Surgeons (ACS), Trauma System Consultation program (TSC). The multidisciplinary site visit team (SVT) consisted of: two trauma / general surgeons, one emergency medicine physician, one former state emergency medical services director, a trauma system coordinator, a rural trauma and prehospital specialist, and a pediatric and public health specialist. Biographical sketches for the team are included as Appendix A of this report.

Prior to the visit, the SVT reviewed the ACS Pre-Review Questionnaire (PRQ) completed by the MDH. The format of this report correlates with the components outlined in the ACS Trauma Systems Consultation document. The SVT also reviewed a number of supporting documents provided by the Trauma Systems Program.

The SVT convened in Bloomington, Minnesota on November 4-7, 2007, to review the state of the Minnesota Trauma System. The meetings during the three day visit consisted of plenary sessions during which the SVT engaged in interactive dialogue with a broad range of representative trauma system participants. There was also an opportunity for informal discussion with the stakeholders, and time was devoted to questions and answers. During the survey, the SVT also met in sequestered sessions for more detailed reviews and discussion, for the purpose of developing a team consensus on the various issues and recommendations involved in the survey.

Overview In 2003 the Minnesota Commissioner of Health appointed a committee to "develop and publish a comprehensive statewide trauma system plan" based on the overarching principle that the system would be voluntary and inclusive, both being core values identified by constituents. Since that time, Minnesota's trauma system has been on a relatively rapid development track. Based on previous trauma system development efforts, the Minnesota Department of Health (MDH) acknowledged system impediments and shortcomings, sought outside guidance from other state agencies and consultants, and began development of a "comprehensive statewide trauma system plan."

Steps in the process included:

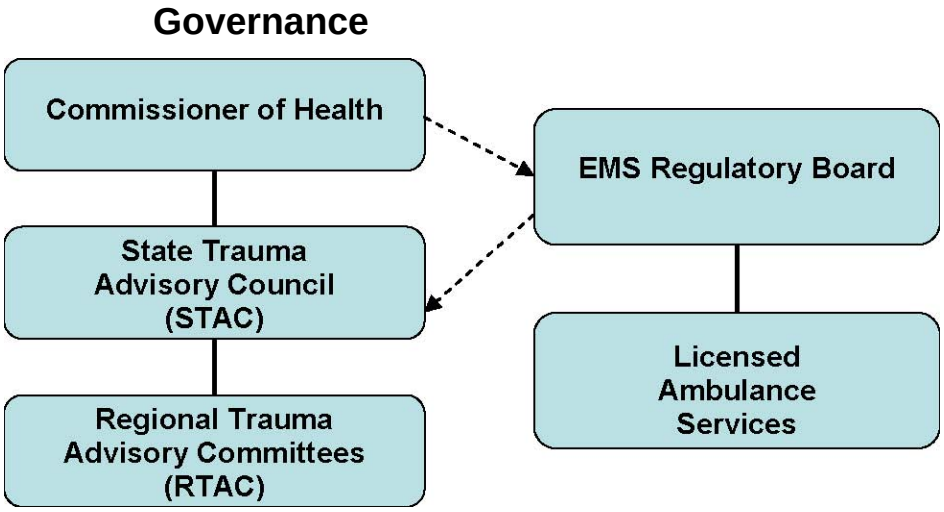
- A committee was appointed to create a statewide trauma plan using a mix of new and veteran leadership.
- Values identified were for the trauma system to be inclusive and to keep referral patterns intact.

Appendix C, cont.

- The system was built on a foundation of previous work.
- Shortcomings and known problem areas were acknowledged.
- Participation and feedback from the Minnesota Hospital Association was sought.
- Stakeholders convened and the trauma plan was developed. The plan was vetted in a process that was devised to encourage consensus building.
- The trauma plan was pilot-tested, and the lessons learned were published.
- Level I & II trauma centers were brought into the process.

Concurrent with these steps, the MDH gathered political support for the creation of enabling legislation. In August of 2005 enabling legislation for the trauma system was enacted into law. The MDH was exempted from rule making. This permitted system development to be based on the state trauma plan and allowed some flexibility to change the plan as development progressed. The Commissioner of Health must submit a report to the legislature in September 2009. The Trauma Systems Program is currently funded from hospital licensing fees at $352,000. The challenge of the Minnesota trauma system is to balance the trauma ideals with Minnesota's rural reality.

Current Status The lead agency for the Trauma Systems Program is the MDH. Of importance to trauma system development, Minnesota is one only of three states in the country in which emergency medical services (EMS) is regulated by an independent state agency, the EMS Regulatory Board (EMSRB). The EMSRB is overseen by a Board of 19 members, 15 of whom are appointed by the Governor. The day to day work is carried out by a staff of 16. The EMSRB is responsible for administering state statutes and rules that regulate EMS services and personnel. The presence of these two agencies has resulted in a shared leadership model between the Trauma Systems Program and the EMSRB, and there is cross fertilization between the entities in an effort to coordinate activities.



Appendix C, cont.

The State Trauma Advisory Council (STAC) is comprised of 15 members, 13 of whom are appointed by the Commissioner of Health. The remaining 2 members are the Commissioner of Public Safety (or designee) and the State EMS Medical Director from the EMSRB. The role of the STAC is to advise, consult with, and make recommendations to the Commissioner of Health regarding the development, maintenance, and improvement of a statewide trauma system. The STAC has an executive committee, an applicant review committee and two established workgroups (Data/QI and Education). Other ad hoc workgroups can be established as needed.

The Trauma Systems Program currently has personnel amounting to 2.75 FTE. This includes the trauma system coordinator (1 FTE), the trauma designation coordinator (1 FTE), information technology support (0.5 FTE), and administrative support (0.25 FTE). Hiring of a part-time research analyst is planned. In-kind epidemiologic support is also provided by the Injury and Violence Prevention Unit (IVPU), and some additional support is provided from the ORHPC.

American College of Surgeons
Committee on Trauma

The state trauma registry, MnTrauma, was created by an outside firm (Image Trend, Inc.). The Minnesota Trauma Data Bank (MTDB) is the legacy state trauma registry that will soon have data merged into MnTrauma. Two other databases have been designed to function in an integrated manner with MnTrauma. MnStar is the database used to report EMS services, and is administered by the EMSRB. MnTrac was developed for the MDH Office of Emergency Preparedness to track hospital bed status, and it can be used to monitor hospital diversion. MnStar is currently fully utilized. MnTrac is operational in the Twin Cities metro area; training and implementation are systematically being rolled out throughout the rest of the state. MnTrauma is operational as a direct data entry and reporting tool. The uploading functionality from other commercial trauma registries will soon be functional. The MTDB legacy data come from the Universal Billing (UB92) Hospital Discharge Data, the Traumatic Brain Injury/Spinal Cord Injury Registry, and vital records.

Substantial progress in system development has occurred since the authorizing legislation was passed in 2005. Criteria for trauma center designation were developed, specifically for Level III and Level IV. Level I and Level II trauma centers follow the ACS criteria and verification process. Level III designation can be sought using the ACS criteria and verification or the state's process. Several Level III and Level IV trauma centers have been designated. Grants and consultation were provided to hospitals to prepare for the designation process. Site reviewer training and contracting has occurred. Support for purchase of four TraumaMan simulators is expected to enable greater availability of Advanced Trauma Life Support (ATLS) training. The Comprehensive Advanced Life Support (CALS) program is also widely available to support training needs for rural facility trauma designation status.

Resources & Advantages/Assets

- Enabling legislation
- Committed leadership through the MDH and EMSRB
- A committed State Trauma Advisory Council
- A written trauma system plan
- Funding for trauma system development

Appendix C, cont.

- Trauma center designations and the integration of Critical Access Hospitals
    - Level I ─ 4
    - Level II ─ 3
    - Level III ─ 3
    - Level IV ─ 6
    - Additional Level II trauma centers are available for the population in the neighboring states of North Dakota, South Dakota, and Wisconsin.
- Mechanism for the education of rural trauma care providers.
- Information system framework to support future quality improvement activities.
- Excellent injury surveillance support

Challenges The following were among the challenges to the implementation of a statewide inclusive trauma system:

- A complex organizational structure (two separate agencies) for trauma system management
- Lack of consistency in adhering to trauma center criteria for designation
- Trauma center designation is voluntary, rather than based on need
- The three databases are not functioning in an integrated manner as designed
- A lack of outside benchmarking for quality improvement activities
- Specialty populations (pediatrics, cultural groups) are not well addressed by the trauma system
- Declining volunteer EMS provider base

Opportunities

- Written protocols for EMS for trauma triage and transport
- Protocols and location of air medical services to improve access to trauma care
- Integrated databases to support the state and local quality improvement programs
- Commitment to supporting rural hospital participation by placement of the Trauma System Program within the Office of Rural Health and Primary Care

Key Recommendations

Leadership

Utilize the executive committees of the STAC and the EMSRB to form a Joint Policy Committee that routinely meets to maximize the efficacy of the existing administrative structure of EMS and the Trauma System Program to achieve consensus on policies and approaches to reach the mutually beneficial goals of establishing a comprehensive trauma system in Minnesota.

System Development

Use the Joint Policy Committee (JPC) of the EMSRB and STAC to drive system development beyond coordination between EMSRB and STAC to an integrated trauma system with clear goals and objectives.

Appendix C, cont.

Legislation

Promulgate rules and regulations to help institutionalize and specify criteria for participation in the trauma system

Finances

Conduct a financial assessment of trauma system funding needs and distribute the report widely.

Injury Prevention and Control

Implement the Minnesota injury control plan in collaboration with the Trauma System Program, and make available a menu of effective injury prevention program strategies that can be used by Level I trauma centers, thus providing an ongoing focus on key injury issues and an opportunity for program evaluation.

Prehospital Care

- Hire a State EMS medical director and ensure duties include supporting local service EMS medical directors in their prescribed roles and responsibilities, implementing the prehospital component in the evolving inclusive trauma system.
- Establish regulatory oversight of non-transporting units.
- Obtain statutory authority to require medical oversight for dispatch of air and ground ambulances.

Definitive Care Facilities

- Implement current trauma patient destination policies, with minimal regional variation.
- Designate and re-designate trauma centers based upon established criteria, and performance to those standards.
- Engage specialty pediatric resources and current trauma centers to establish at least one ACS-verified pediatric trauma center, ideally at Level I status.

Information Systems

Achieve integration of all three elements of the information system to allow optimal opportunity for investigation of questions relative to injury epidemiology and outcomes in the state.

Evaluation

Ensure adequate legal protection of the peer review process, and address this in legislation if not currently in place.

Appendix D: STAC Members 2009

State Trauma Advisory Council – June 2009

Position	Name	Employer	Term Expires
Level I or II Trauma Program Nurse Manager	Linda Vogel, R.N	St. Mary's/|Duluth Clinic Healthcare System	January 3, 2011
Rehabilitation Specialist	Allen Brown, M.D	Mayo Clinic	January 3, 2011
Emergency Medicine Physician	William Heegaard, M.D.	Hennepin County Medical Center	January 3, 2011
Rural Family Practice Physician	Mike Wilcox, M.D	Queen of Peace Hospital	January 3, 2011
Orthopedic Surgeon	Marc Swiontkowski, M.D	Regions Hospital and the University of Minnesota	January 3, 2011
Pediatrician	Ron Furnival, M.D	University of Minnesota Medical Center, Fairview	January 3, 2011
Rural EMS Attendant or Ambulance Director	Gary Pearson	North Memorial Medical Transportation / Brainerd Area	January 3, 2011
Emergency Department Nurse Manager	Jane Gisslen, R.N.	Fairview-Red Wing	January 8, 2012
Rural Hospital Administrator	Jesse Tischer	Wheaton Community Hospital	January 8, 2012
Level I or II Trauma Surgeon	J. Kevin Croston, M.D. CHAIR	North Memorial Medical Center	January 8, 2012
Rural Physician Assistant or Nurse Practitioner	Peter Lindbloom, P.A.	Mille Lacs Health System	January 8, 2012
Rural General Surgeon	Chad Robbins, D.O.	Glencoe Regional Health Services	January 8, 2012
Level I or II Neurosurgeon	Mark Larkins, M.D	Regions Hospital	January 8, 2012
State EMS Medical Director	Keith Wesley, M.D	EMS Regulatory Board	Ongoing
Commission of Public Safety Designee	Bob Dahm	State Fire Marshal's Office	Ongoing

Appendix E: Comparison of Trauma Designation Levels

Trauma hospitals in Minnesota are designated as levels I, II, III or IV. These designations are based on the availability of resources needed to resuscitate and care for an injured patient. The levels refer only to resources and do not suggest a ranking of the quality of care. Rather, all designated trauma hospitals are expected to provide high quality trauma care consistent with currently-accepted standards of practice.

In Minnesota, level I and II trauma hospitals undergo a verification process by the American College of Surgeons to confirm the presence of specific resources. Most level III and all level IV trauma hospitals undergo a verification process administered by the Minnesota Department of Health. (Level IIIs may elect to verify via the American College of Surgeons; however, most use the state pathway.) Once a hospital's resources are verified, the Minnesota Commissioner of Health will designate it as a trauma hospital.

Level I

A level I trauma hospital can provide definitive care for any trauma patient. It provides the injured patient with access to the most comprehensive resources for their treatment. Specialists, surgical subspecialists and equipment are available 24 hours a day, including anesthesiology, critical care, emergency medicine, internal medicine, neurosurgery, oral and maxillofacial surgery, orthopedic surgery, plastic surgery and radiology. An emergency physician and general surgeon are immediately available to the trauma patient while other specialties may be on call off site.

The trauma critical care service, also known as the intensive care unit, is under the direction of a surgeon.

Level Is often receive severely injured patients referred from lower level trauma centers.

A level I center must admit a minimum volume of severely injured patients annually in order to maintain its status.

Additionally, the level I hospital must participate in the training of resident physicians and conduct trauma-related research.

Level II

A level II trauma hospital provides definitive care for many complex and severely injured patients. Like the level I, the emergency physician and general surgeon are immediately available to the trauma patient. While several specialists and surgical subspecialists are available, fewer are required for level IIs than for level Is.

Since level II resource requirements are less than level I centers, some severely injured patients will be transferred to a level I. While level IIs may receive trauma patients referred from other facilities, some injured patients will be transferred preferentially to a level I depending on their injury.

Level II trauma hospitals are not required to participate in residency training programs or to engage in trauma research.

Appendix E, cont.

Level III

A level III trauma center can provide initial resuscitation and stabilization of the trauma patient. A general surgeon is available within 30 minutes to assist with the resuscitation and to provide surgical intervention.

Since the level III provides some degree of orthopedic surgery and has a fully-prepared intensive care unit, it may admit some trauma patients and care for them definitively; however, complex patients and those requiring surgical subspecialties must be transferred to level I or II trauma hospitals.

Level IV

A level IV trauma hospital provides initial resuscitation and stabilization to the severely injured patient. Surgical services are not immediately available so patients are typically transferred to a higher level facility for definitive care. Emergency department personnel have trauma-specific training and protocols are in place to facilitate the rapid management of the patient.

Trauma Centers

Level II, III and IV trauma hospitals may exceed the minimum required resources so the capabilities of hospitals can vary within any given level.

All trauma hospitals engage in performance improvement, actively seeking opportunities to improve the trauma care provided within its facility.

All designated trauma hospitals contribute injury data to the state trauma registry, which will be used for epidemiological analysis and continuous improvement of the system.

For more information

Additional resources are online at http://www.health.state.mn.us/traumasystem/ or contact Tim Held at (651) 201-3868 or tim.held@state.mn.us.

Appendix F: Level III and IV Trauma Designation Criteria

MINNESOTA STATEWIDE TRAUMA SYSTEM

www.health.state.mn.us/traumasystem

Annotated Level III and IV Trauma Hospital Criteria

Institutional Organization

Program Component	Level III	Level IV	Criteria Description
Hospital Commitment	E	E	The board of directors, administration, and medical, nursing and ancillary staff shall make a commitment to providing trauma care commensurate to the level at which the facility is applying for categorization and or is verified.
Trauma Program	E	E	The trauma program shall be established by the facility with approval from the medical staff, board of trustees, and administration, and represented on an organizational chart. This may be in conjunction with an existing department; for example, emergency or surgery appropriate.
Trauma Team Activation	E	E	Trauma hospitals shall have a trauma team activation protocol/policy to include: • Lists of all team members • Response requirements for all team members when a trauma patient is en route or has arrived • The criteria, based on patient severity of injury, for activation of the trauma team and the person(s) authorized to activate the trauma team
	E	NA	The trauma team activation policy shall include both physiological and anatomical clinical indicators for when the ED physician is expected to be present in the ED within 15 minutes of EMS notification.
	NA	E	The trauma team activation policy shall include both physiological and anatomical clinical indicators for when the on-call medical provider covering the ED is expected to be present in the ED within 30 minutes of EMS notification.

E = Essential Criteria D = Desired Criteria (not required) NA = not applicable

Appendix F, cont.

MINNESOTA STATEWIDE TRAUMA SYSTEM

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<table>
<tr><th>Program Component</th><th>Level III</th><th>Level IV</th><th>Criteria Description</th></tr>
<tr><td>Trauma Team Activation (cont'd)</td><td>E</td><td>NA</td><td>The minimum criteria for surgeon response to the resuscitation are (1) respiratory compromise/obstruction and/or intubation (2) penetrating trauma to the abdomen, neck or chest (3) Glasgow coma scale (GCS) < 8 with a primary etiology attributed to trauma (unless transfer out is expected to occur within 30 minutes) or (4) two consecutive, pre-hospital systolic blood pressures less than 90 mmHg in an adult or age-specific hypotension in children as follows:
<table>
<tr><th>Age</th><th>mmHg</th></tr>
<tr><td>6 years +</td><td>90</td></tr>
<tr><td>2-5 years</td><td>80</td></tr>
<tr><td>12-24 months</td><td>75</td></tr>
<tr><td>0-12 months</td><td>70</td></tr>
</table>
Exemption Clause
Surgeon response to the resuscitation is not required if:
• The emergency department is staffed 24 hours/day, 7 days/week by an in-house physician and
• The emergency department physician determines that the facility resources cannot provide definitive care and, subsequently, the patient will be emergently transferred and
• The patient's length of stay in the emergency department does not exceed 30 minutes.
A hospital utilizing this exemption clause must monitor the practice by use of a PI audit filter.[1, 2]</td></tr>
</table>

[1] Under the exemption clause, the surgeon must respond if:
- The emergency department physician determines that the patient will be admitted or
- The emergency department physician is uncertain as to whether or not the patient will be admitted or
- The emergency department physician requests the surgeon to respond or
- The emergency department physician knows or suspects that the patient's length of stay in the emergency department will exceed 30 minutes, regardless of whether or not a transfer has been initiated (e.g. waiting for a helicopter).

[2] A hospital utilizing the Exemption Clause must possess all of the capabilities and resources of a level III trauma hospital. The Exemption Clause only provides for an exemption to the deployment of the surgeon on a case-by-case basis.

E = Essential Criteria D = Desired Criteria (not required) NA = not applicable 2

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Program Component	Level III	Level IV	Criteria Description
Trauma Program Medical Director	E	D	Trauma program medical director shall be a board-certified or boards-in-progress physician with special interest in trauma care. Trauma hospitals shall have a physician on staff whose job description defines his/her role and responsibilities for trauma patient care, trauma team formation, supervision/leadership, and trauma training/continuing education and acts as the medical staff liaison for trauma care with out-of-hospital medical directors, nursing staff, administration, and higher level trauma hospitals. The trauma hospital medical director shall have successfully completed ATLS® and/or CALS (including the Benchmark Lab or Trauma Module Course) within the last four years.[3]
Trauma Program Medical Advisor	NA	E	Trauma program medical advisor shall be a physician on staff whose job description defines his/her role and responsibilities for trauma patient care, trauma team formation, supervision/leadership, and trauma training/continuing education and acts as the medical staff liaison for trauma care with out-of-hospital medical directors, nursing staff, administration, and higher level trauma hospitals. The trauma hospital medical advisor shall have successfully completed ATLS® and/or CALS (including the Benchmark Lab or Trauma Module Course) within the last four years.[2]
Trauma Program Coordinator/Manager	E	D	This person shall be a RN with clinical experience in trauma care. Alternatively, other qualified allied health personnel with clinical experience in trauma care may be appropriate. It is expected that the Coordinator/Manager has allocated time for the trauma program.
	NA	E	This individual shall work in conjunction with the medical director/advisor, helping to organize and coordinate the facilities' trauma care response. Ideally this individual should be a RN with emergency/trauma care experience. Alternatively, other allied health personnel with clinical experience in emergency/trauma care may fulfill this role.

[3] For the initial designation only, hospitals may become designated after the medical providers successfully complete the CALS Provider Course only. They must then complete the Benchmark Lab or Trauma Module Course within one year of the Provider Course.

E = Essential Criteria D = Desired Criteria (not required) NA = not applicable 3

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Clinical Capabilities

Program Component	Level III	Level IV	Criteria Description
General Surgery	E	D	The operating room must be readily available for trauma care 24 hours/day.
			Local criteria may be established to allow the general surgeon to take call from outside the facility, but with clear commitment on the part of the facility and the surgical staff that the general surgeon will be available to the ED physician for consultation to assist in the decision for need of surgical interventions or transfer 24 hours/day. General surgeon response to the resuscitation is required if the patient meets the minimum criteria for surgeon response or is otherwise required by hospital policy. Eighty (80) percent of the time the general surgeon response to the resuscitation should be within 30 minutes of the patient's arrival in the emergency department.
			The surgeon must also be available to care for trauma patients in the ICU. Compliance with this requirement and applicable criteria must be monitored by the trauma PI program.
			A formal plan must be in place indicating: ▪ How the trauma patient will be managed should the usual surgical coverage be temporarily unavailable for any reason (e.g., the surgeon is already in surgery) ▪ How surgeon call will be covered when scheduled gaps in the usual coverage occur (e.g., vacations)
			Surgeon must be present at all operative procedures.
Emergency Medicine	E	E	Published and posted call schedules must specifically identify the physician/provider on call for the emergency department.
	E	D	24-hour coverage by a physician who is present at all emergency resuscitations. If the physician is off-site, his/her response to the hospital should be within 15 minutes of EMS notification. (See "Clinical Qualifications for further emergency physician details.)
	NA	E	Physician assistants (PA) and/or nurse practitioners (NP) may provide lead coverage in the emergency department. They must be present at the resuscitation. 24-hour coverage must be provided. If the ED provider is off-site, his/her response to the hospital should be within 30 minutes of EMS notification. (See *Clinical Qualifications for further Other Medical Staff Covering Emergencies.*)
			When the lead emergency department provider is a mid-level practitioner (NP or PA), a physician who meets the training standards of the System must be on call and available to the mid-level practitioner to consult by telephone (or similar means) within 30 minutes.
Anesthesia	E	NA	May be covered by certified registered nurse anesthetist (CRNA).

E = Essential Criteria D = Desired Criteria (not required) NA = not applicable

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Program Component	Level III	Level IV	Criteria Description
Orthopedic Surgery	E	NA	The ED physician, in consultation with the general surgeon, makes critical trauma care decisions in the emergency department. There is no expectation that an orthopedic surgeon be onsite or immediately available.
			While orthopedic surgical capabilities will vary among Level IIIs, it is an expectation that all Level IIIs be able to handle basic orthopedic surgical cases. It is the responsibility of the Level IIIs to have protocols that clearly define which cases they can handle and which cases require transfer to an appropriate facility.
			If necessary, the same individual may cover both general surgery and orthopedic surgery if he/she meets the clinical qualifications for each discipline.
Post Anesthesia Recovery	E	NA	RN available 24 hours/day
Radiology	E	D	24-hour radiologist coverage required (may utilize in-house, on-call or teleradiology resources).
			Radiology technician available or on-call 24 hours/day
	E	NA	24-hour availability of computed tomography
Respiratory Therapy	E	NA	In-house or on-call 24-hour coverage. A nurse with specific in-house ventilator training may provide this coverage. Records of in-house CEUs must be maintained.
Clinical Laboratory	E	E	Must have a comprehensive blood bank or access to community blood bank.
			24-hour availability of a laboratory capable of standard analysis of blood, urine and other body fluids, including micro sampling
	E	NA	24-hour availability of a laboratory capable of: • Blood typing and cross matching • Coagulation studies • Blood gas and ph determination • Microbiology

E = Essential Criteria D = Desired Criteria (not required) NA = not applicable 5

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Program Component	Level III	Level IV	Criteria Description
Trauma Transfer	E	E	An age-specific, pre-determined, pre-written plan/protocol/flow chart that directs the internal process for rapidly and efficiently transferring a trauma patient to definitive care. The plan should address such things as: appropriate ground and air transport services, along with contact numbers and backup providers; and what supplies, records, personnel and/or other necessary resources will accompany the patient. Must also clearly identify the anatomical and physiological criteria that, if met, will immediately initiate transfer to definitive care. Designated trauma hospitals may not transfer adult or pediatric patients to undesignated hospitals.
			The hospital must have the following transfer agreements with facilities capable of caring for major trauma patients: ▪ Hemodialysis ▪ Burn care ▪ Acute spinal cord injury In the case of burn care, a second agreement is necessary in the event the primary burn facility lacks the capacity to receive the patient. A comprehensive transfer agreement with a level I or II trauma hospital may suffice if that trauma hospital has the required capabilities.

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Clinical Qualifications

Program Component	Level III	Level IV	Criteria Description
General Surgeon	E	D	If currently board certified in general surgery, then required to only have successfully completed an Advanced Trauma Life Support (ATLS®) or Comprehensive Advanced Life Support (CALS) course (including Benchmark Lab or Trauma Module Course) once. If not board certified in general surgery, then must have successfully completed ATLS® and/or CALS (including the Benchmark Lab or Trauma Module Course) within the last four years.[3] Physicians who are board-certified in pediatric surgery and practicing in a pediatric hospital are required only to have successfully completed an ATLS® or CALS course (including Benchmark Lab or Trauma Module Course) once.
Emergency Physician	E	E	If currently board certified with an American Board of Emergency Medicine (ABEM)-approved or American Osteopathic Board of Emergency Medicine (AOBEM) certification, then required to only have successfully completed an ATLS® or CALS course (including Benchmark Lab or Trauma Module Course) once. If not board certified with an ABEM-approved or AOBEM certification, then must have successfully completed ATLS® and/or CALS (including the Benchmark Lab or Trauma Module Course) within the last four years.[4]
Other Medical Staff Covering Emergencies (e.g., NPs, PAs, Locum Tenens)	E	E	Must have successfully completed ATLS® and/or CALS (including the Benchmark Lab or Trauma Module Course) within the last four years.[3] This requirement is for those who are regularly scheduled in the emergency department. It does not apply to those who are called in to back-up the attending physician during an unusual and rare event. (See *Performance Improvement* section.)
Orthopedic Surgeon	E	E	May be a surgeon with the ability to do orthopedic surgery and who is credentialed by the hospital to do so. (Note: This is "Essential" for Level IV facilities ONLY if orthopedic surgical services are provided).
	D	D	Successfully complete an ATLS® or CALS course.

[4] For the initial designation only, hospitals may become designated after the medical providers successfully complete the CALS Provider Course only. They must then complete the Benchmark Lab or Trauma Module Course within one year of the Provider Course.

E = Essential Criteria D = Desired Criteria (not required) NA = not applicable 7

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Program Component	Level III	Level IV	Criteria Description
Nursing Trauma Education	E	E	Nurses responsible for emergency and/or critical care must have successfully completed appropriate professional trauma education. (Example: Trauma Nursing Core Course (TNCC), Comprehensive Advanced Life Support (CALS) Provider Course, Advanced Trauma Care for Nurses (ATCN), Course in Advanced Trauma Nursing (CATN), or in-house training that meets the following objectives: • Identify the common mechanisms of injury associated with blunt and penetrating trauma. • Describe and demonstrate the components of the primary and secondary nursing assessment of the trauma patient. • List appropriate interventions, based on the assessment findings, for recognized and suspected life-threatening and non-life-threatening injuries. • Correlate signs and symptoms to specific pathophysiological changes as it they relate to potential injuries. • Describe the ongoing assessment and methods used to evaluate the effectiveness of the interventions. • Examine the facility's specific criteria and protocols for admission or transfer of the trauma patient. This includes nurses who care for trauma patients in the ICU.

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Performance improvement

Program Component	Level III	Level IV	Criteria Description
Performance Improvement Program	E	NA	General surgeon representation and participation at the trauma performance improvement (PI), peer review, and multidisciplinary committees.
	E	E	The PI process should review all cases when medical providers who do not normally provide emergency department coverage are called in to back-up the attending physician during a rare and unusual event.
			The trauma PI program shall be consistent with medical staff and facility policies. All trauma hospitals shall work with the MDH in statewide PI activities
			The PI process may be performed by the trauma hospital's trauma committee or by an appropriate PI standing committee.
			If teleradiology is utilized, this process shall be monitored and evaluated by the trauma PI program.
			Trauma hospitals shall have a formal, trauma-related diversion policy and a mechanism established to review times and reasons for trauma-related diversion.
			The trauma PI program shall consist of a formal policy that includes a minimum of the following: 1. Defined population of trauma patients to be monitored 2. Set of indicators/audit filters to include: a. General surgeon non-compliance to on-call response times b. Emergency department provider non-compliance to on-call response times c. Trauma care provided by physicians who do not meet minimal educational requirements, i.e., ATLS® or CALS d. All trauma deaths e. Trauma patients admitted by a non-surgeon f. Trauma patients transferred out g. Trauma patients received via transfer 3. Frequency of review 4. Multidisciplinary physician involvement 5. Standard of care 6. Demonstration of loop closure and resolution
			The overall responsibility of concurrent and retrospective review of the care of trauma patients lies with the trauma program medical director/advisor and the trauma program coordinator/manager in conjunction with the trauma PI committee and the physician multidisciplinary peer review committee.

E = Essential Criteria D = Desired Criteria (not required) NA = not applicable

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Program Component	Level III	Level IV	Criteria Description
Performance Improvement Program	NA	E	The trauma program medical advisor or designee (who must meet the training standards of the System) must review trauma cases attended by an NP or PA within the 72 hours following the resuscitation.
Morbidity And Mortality Review	E	E	A mechanism shall be established by which all physicians caring for trauma patients are involved in confidential peer review of the care in accordance with facility and medical staff policy. These physicians will regularly review and discuss: ▪ Results of trauma peer review activities. ▪ Problematic cases including complications. ▪ All trauma deaths, identifying each death as non-preventable, possibly preventable, or preventable.* The peer review process and minutes of this committee should be confidential and in accordance with facility and medical staff policy. Utilization of trauma registry data will facilitate the entire PI and peer review process. **The STAC has adopted standardized definitions based on industry standards. See the Trauma Hospital Resource Manual.*
Multidisciplinary Trauma Review	E	D	Must have an established mechanism by which all those involved in caring for trauma patients are involved in a review of the care. In addition to attendance by emergency, surgery, anesthesia, radiology and ICU staff; administration, nursing, radiology, lab, anesthesia and other ancillary personnel might attend.
Trauma Registry	E	E	Collect trauma data using either the state Web-based system or an in-house program and submit the required data to the statewide trauma system within 60 days of the patients' discharge or transfer.

Prevention

Injury Prevention Activities	E	D	Coordination and/or participation in community prevention activities

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Equipment Capabilities

Equipment must be available in sizes to care for **all ages** of trauma patients.

Emergency Department

Airway control and ventilation equipment	E	E	
Pulse oximetry	E	E	
Suction devices	E	E	
Electrocardiograph/oscilloscope/defibrillator	E	E	
Standard IV fluids and administration sets	E	E	
Large bore IV catheters	E	E	
Drugs necessary for emergency care	E	E	
Nasal gastric & oral gastric tubes	E	E	
Spine immobilization boards and C-collars	E	E	
Pediatric length-based resuscitation tape	E	E	
Thermal control for patient and fluids/blood	E	E	
Rapid infuser system	E	E	May use pressure bag
End-tidal CO_2 detector	E	E	May be disposable
Communications with EMS	E	E	
Mechanism for IV flow-rate control	E	E	
Intraosseous administration sets	E	E	
Supplies for cricothyrotomy & thoracostomy	E	E	
Central lines	D	NA	

Operating Room

Thermal control for patient and fluids/blood	E	E	Essential for Level IV only if operating room is available
X-ray capabilities including C-arm intensifier	E	D	
Rapid infuser system	E	NA	May use pressure bag

Post Anesthesia Recovery

Equipment for monitoring and resuscitation	E	D	
Pulse oximetry	E	D	
Thermal control for patients and fluids/blood	E	D	

Intensive Care Unit

Equipment for monitoring and resuscitation	E	D	
Ventilator	E	NA	Transport ventilator is not sufficient

Many valuable resources and templates are available in the *Trauma Hospital Resource Manual*, accessible from our Web site.

E = Essential Criteria D = Desired Criteria (not required) NA = not applicable 11

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Appendix G: Minnesota Trauma Hospitals – December 2009

Facility Name	Designation Level	First Designation Date
Hennepin County Medical Center	Level I	12/5/2006
North Memorial Medical Center	Level I	12/5/2006
Regions Hospital	Level I	12/5/2006
Saint Mary's Hospital – Rochester	Level I	12/5/2006
Saint Cloud Hospital	Level II	12/5/2006
Saint Luke's Hospital – Duluth	Level II	12/5/2006
Saint Mary's Medical Center – Duluth	Level II	12/5/2006
Abbott Northwestern Hospital	Level III	12/1/2009
Children's Hospital – Minneapolis	Level III	6/2/2009
Children's Hospital - St. Paul	Level III	6/2/2009
Cuyuna Regional Medical Center – Crosby	Level III	9/11/2007
Douglas County Hospital	Level III	6/2/2009
Fairview Red Wing Medical Center	Level III	3/4/2008
Fairview Southdale Hospital – Edina	Level III	12/5/2006
Fairview University Medical Center—Mesabi	Level III	9/9/2008
Fairview University Riverside Hospital – Minneapolis	Level III	6/2/2009
Glencoe Regional Health Services	Level III	6/2/2009
Grand Itasca Clinic & Hospital	Level III	6/2/2009
Hutchinson Community Hospital	Level III	6/2/2009
Immanuel-Saint Joseph's-Mayo Health System	Level III	10/25/2006
Lakewood Health Systems - Staples	Level III	3/3/2009
Mercy Hospital - Coon Rapids	Level III	9/1/2009
Park Nicollet Methodist Hospital	Level III	9/1/2009
Queen Of Peace Hospital	Level III	3/4/2008
Rice Memorial Hospital	Level III	12/1/2009
Ridgeview Medical Center	Level III	12/1/2009
Riverwood Health Care Center	Level III	12/5/2006
Saint Francis Regional Medical Center - Shakopee	Level III	6/3/2008
Saint Joseph's Medical Center - Brainerd	Level III	12/2/2008
Saint Mary's Innovis Health	Level III	6/2/2009
Sanford Regional Hospital Worthington	Level III	6/3/2008
Unity Hospital - Fridley	Level III	3/4/2008
Austin Medical Center - Mayo Health System	Level IV	6/2/2009
Bridges Medical Services - Ada	Level IV	12/4/2007
Cambridge Medical Center	Level IV	6/2/2009
Cannon Falls Medical Center - Mayo Health System	Level IV	6/2/2009
Chippewa County Montevideo Hospital	Level IV	3/3/2009

Facility Name	Designation Level	First Designation Date
Cook County Northshore Hospital - Grand Marais	Level IV	6/5/2007
ELEAH Medical Center - Elbow Lake	Level IV	6/2/2009
First Care Medical Services	Level IV	12/1/2009
Glacial Ridge Hospital	Level IV	9/11/2007
Granite Falls Municipal Hospital & Manor	Level IV	12/4/2007
Holy Trinity Hospital	Level IV	6/5/2007
Johnson Memorial Hospital - Dawson	Level IV	12/1/2009
Kanabec Hospital	Level IV	3/3/2009
Lake Region Healthcare Corporation	Level IV	6/2/2009
Long Prairie Memorial Hospital	Level IV	6/2/2009
Mahnomen Health Center	Level IV	6/2/2009
Melrose Area Hospital - Centracare	Level IV	3/4/2008
MeritCare Thief River Falls NWMC	Level IV	12/1/2009
Mille Lacs Health System Hospital	Level IV	6/5/2007
Murray County Memorial Hospital - Slayton	Level IV	12/4/2007
New Ulm Medical Center	Level IV	6/2/2009
North Country Hospital	Level IV	12/1/2009
Northfield Hospital	Level IV	6/2/2009
Olmstead Medical Center	Level IV	12/4/2007
Ortonville Area Health System	Level IV	12/4/2007
Owatonna Hospital	Level IV	6/2/2009
Paynesville Area Hospital / Koronis	Level IV	12/4/2007
Perham Memorial Hospital	Level IV	9/1/2009
Pine Medical Center	Level IV	6/2/2009
Pipestone County Medical Center	Level IV	12/2/2008
Redwood Falls Hospital	Level IV	6/2/2009
Renville County Hospital & Clinics	Level IV	6/2/2009
River's Edge Hospital	Level IV	12/1/2009
Riverview Healthcare Association	Level IV	12/4/2007
Saint Gabriel's Hospital	Level IV	6/2/2009
Saint Michael's Hospital	Level IV	12/4/2007
Sanford Canby Medical Center	Level IV	3/3/2009
Sanford Jackson Medical Center	Level IV	3/3/2009
Sanford Tracy Medical Center	Level IV	9/9/2008
Sanford Westbrook Medical Center	Level IV	12/2/2008
Sibley Medical Center	Level IV	6/2/2009
Sleepy Eye Medical Center - Hospital	Level IV	12/4/2007
Springfield Medical Center-Mayo Health System	Level IV	9/11/2007
Tri County Hospital - Wadena	Level IV	9/11/2007
Waseca Medical Center - Mayo Health System	Level IV	3/3/2009
Wheaton Community Hospital	Level IV	3/4/2008
Windom Area Hospital	Level IV	12/4/2007

Appendix H: New Needed Phase 2 & 3 Focus Areas and Expected Outcomes

Focus Area	Outcomes / Benefits
Develop Quality Improvement Capacity for Better Care	▪ Data-driven, outcome based decision making ▪ Evidence-based clinical care standards ▪ Accountable and consistent statewide trauma care ▪ Measurable statewide decrease in traumatic morbidity and mortality o Eliminate inappropriate variations in care o Return patients to their pre-injury physical status or to an optimal level of functioning
Build Regional Trauma Coordination	▪ Standardized and efficient regional trauma care that includes: a) data-driven injury prevention; b) EMS trauma triage and transportation to appropriate regional resources; c) the unique needs of special populations such as pediatrics and geriatrics; d) integration with disaster preparedness efforts; and e) integration of rehabilitation resources. ▪ Active peer review that optimizes accountability, mutual learning, and identification of barriers to quality performance. These reviews are essential to ensure optimal outcomes today and into the future.
Improve Provider Skills	▪ Trauma skills proficiencies maintained statewide ▪ QI-driven outcome-based focused training ▪ Consistent care statewide ▪ Confident, skilled, and equipped trauma care providers statewide

Appendix I: Other States' Funding Sources

Name of State	Trauma System Funding
Alabama	$0.60/pack deposited in Tobacco Products Tax Fund with 22% distributed for uncompensated trauma care
Alaska	No direct state funding.
Arizona	Indian gaming proceeds for Level I centers only. Cigarette taxes distributed mainly for Medicaid.
Arkansas	Current proposing $0.56 cigarette increase
California	$2 per $10 on certain criminal motor vehicles fines and forfeitures into Maddy Emergency Medical Services Fund. Not specifically for trauma but can be used to cover uncompensated care.
Colorado	$1 surcharge on motor vehicle registrations.
Florida	Running the red light penalty increased from $60 to $125 w/ additional funds going to trauma centers. HB 1697 imposes fines for persons appearing before a court official following a motor vehicle accident that resulted in bodily injury ($500 fine) or deat
Georgia	Current proposal for an increase in fines for speeders over 85 mph.
Hawaii	$0.25/cigarette pack
Illinois	$5 surcharge on traffice fines of $55 or higher and $100 fine on DUI/OUI.
Indiana	Not yet - HB1215 will provide funding for trauma centers through fines for certain moving violations (if passed)
Iowa	Tobacco trust tax dollars currently fund system, but appropriations will end August 1, 2009.
Michigan	Currently direct appropriation, but seeking to increase fines on convicted criminals.
Minnesota	Hospital licensure fees.
Mississippi	Mixture of direct appropriation and traffic fines.
Missouri	Ambulance districts can pass up to $0.30 tax levy per $100 assessed propery valuation.
Montana	State general funds
Nebraska	$0.50 per motor vehicle registration.
New Jersey	Vehicle registration fees.
New Mexico	Annual legislative funding.
New York	Formerly federal grants; currently none
North Dakota	Direct appropriation for 1.5 FTEs only.
Ohio	Fees from children's motor vehicle seat violations, used to fund pediatric centers only.
Oklahoma	Portion of tobacco tax increase, $1/drivers license, fines and fees on moving violations.

Appendix I, cont., Other States' Funding Sources

Oklahoma	Portion of tobacco tax increase, $1/drivers license, fines and fees on moving violations.
Oregon	Direct appropriation
Pennsylvania	Surcharge on motor vehicle violations and direct appropriations.
Rhode Island	$1 from every moving violation fine.
South Carolina	Direct appropriation.
South Dakota	Direct appropriation
Tennessee	$0.02/cigarette pack and direct appropriation.
Texas	Points are assigned to drivers for traffic offenses, and charges/fines are based on these points. 49.5% of these fees are apportioned to trauma.
Virginia	$50 repeat drug/alcohol violation fine and $40 fee for reinstating license.
Washington	Direct appropriation.
West Virginia	Direct appropriation.
Wyoming	Direct appropriation. Current attempts to pass fuel tax levy.

Appendix I, cont., Other States' Funding Sources

NATIONAL FOUNDATION FOR TRAUMA CARE

STATE FUNDING 1/2008

There are a few States with a variety of methods for funding trauma administration and unfunded care which include traffic fines, vehicle and driver's license surcharges, tobacco settlement funds, sales and property taxes.

State	Traffic Fines	Auto & Driver Fee Surcharge	Other	Total Pool	Distribution	Malpractice Legislation	Proposed/Pending State Funding Legislation
ARIZONA			1. 60 cent increase in state tax on cigarettes 2. Voter gaming initiative (Prop 202)	1. $62 M	1. Subsidies to hospital emergency rooms and trauma centers, medical research and healthcare for the poor. 2. Money Allocation is still being determined.		
CALIFORNIA	$200 for reckless driving, DUI, speeding		1. General funds 2. LA County "Measure B"-a proposal that raises property taxes by 3 cents per square foot	1. $25 M for 2002-3, 25% of $25M in fines 2. $168 M	1. Indigent care fund for Trauma Centers. 2. Emergency rooms and trauma centers.		

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