

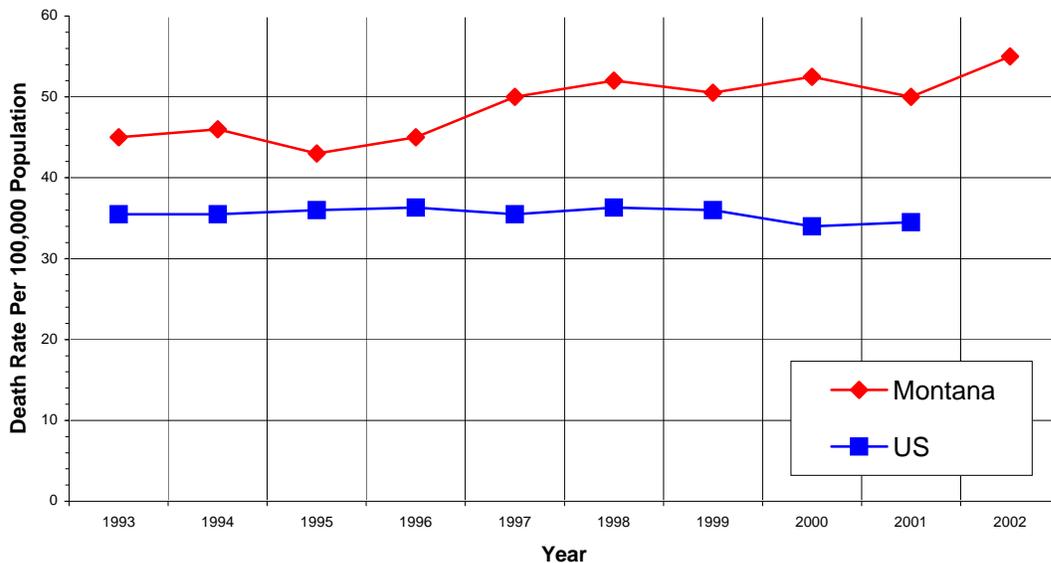
## Montana Trauma System

### INTRODUCTION TO THE PROBLEM

**Trauma** is damage to the human body resulting from the transfer of energy from thermal, mechanical, electrical or chemical sources. The multitude of traumatic injuries sustained by US soldiers in the wars of the 20<sup>th</sup> century have served, historically, to motivate physicians, nurses, and governments to study the physiology of trauma and develop life-saving systems of response that could be applied to civilian environments.

The leading cause of death for Montanans, as for all Americans, between the ages of 1 and 44 is trauma. However, although the national death rates from injury have fallen, in Montana they have risen steadily since 1995 and are now 29% higher than the national norm. American Indians make up 6% of Montana's population yet have an injury death rate three times the national norm. Montana American Indians are dying 10-13 years younger than their Caucasian counterparts.<sup>1</sup> Trauma caused only 8.6% of the Montana deaths in 2002 but accounted for 30.5% of the total years of potential life lost before the age of 75. This disparity in proportions, with less than a tenth of the deaths accounting for nearly a third of all years lost, points to the exaggerated cost of the typical death from traumatic causes.<sup>2</sup> For all Montanans, the need for a trauma system is clear.

2002 MONTANA VITAL STATISTICS  
Age-Adjusted Trauma Death Rates

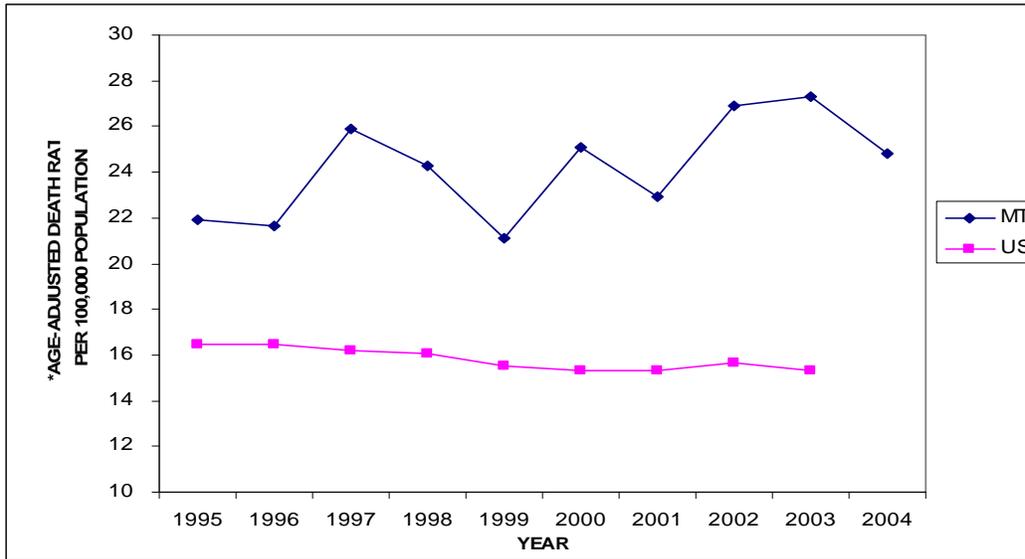


<sup>1</sup> Sanddal, Teri L. *Alcohol and Injury Deaths Among Native Americans in Montana: 1989-1992*. Montana State University. Critical Illness and Trauma Foundation, Inc.

<sup>2</sup> 2002 Montana Vital Statistics, Office of Vital Statistics, Department of Public Health and Human Services.

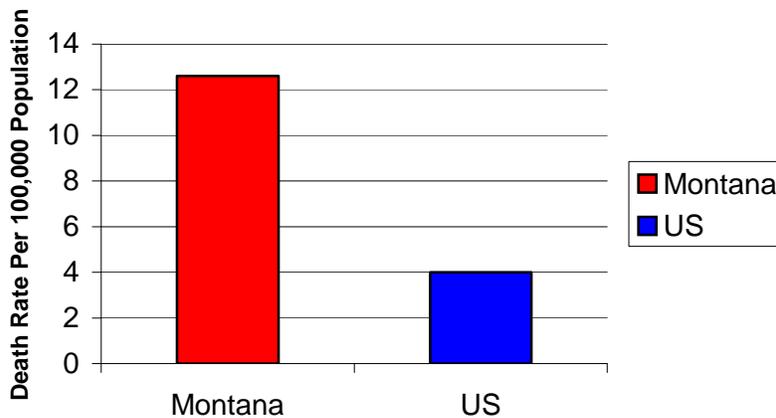
In 2004, there were 229 motor vehicle fatalities and 9,263 injuries. The traffic fatality rate per 100 million miles traveled was 2.05 in 2004, which reached an all time low in Montana, but is still much higher than the national average of 1.5.

2004 MONTANA VITAL STATISTICS  
Age-Adjusted Death Rates for Motor Vehicle Crashes



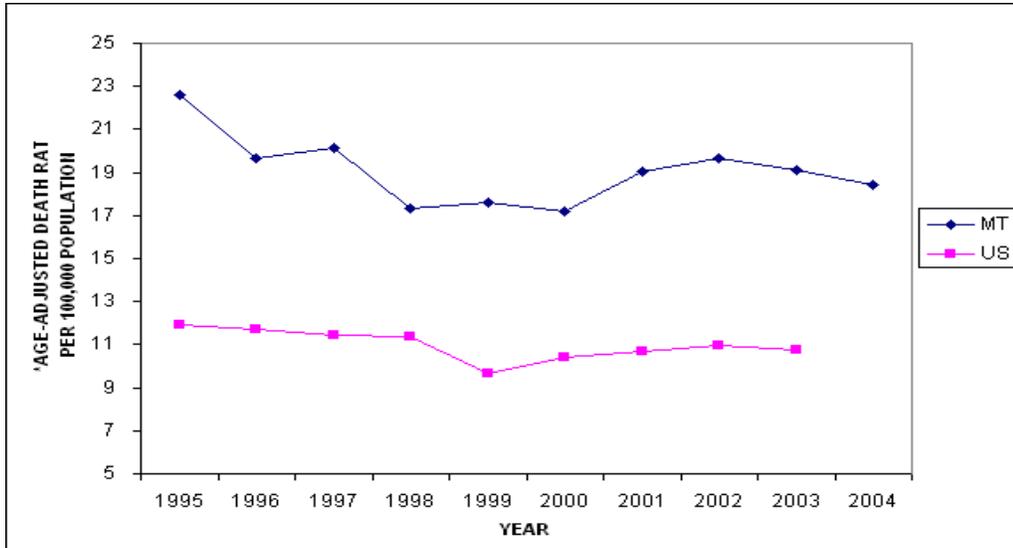
In 2002, there were 111 deaths due to falls. Montana's rate of falls for 2002 is 12.06/100,000. The national rate is 4/100,000 therefore the Montana fall death rate is significantly higher than the national average. Montana's percentage people who are 18 or older is 75.9%. The high percentage of residents over age 18 may partially account for the significant increase above the national average.

### Mortality Rates from Falls



Montana had 205 suicide deaths in 2005 (174 in 2004). The national rate is 10/100,000, but in Montana the rate is 19.2/100,000, which is 53% higher than the national rate.

2004 MONTANA VITAL STATISTICS  
Age-Adjusted Death Rates for Suicides



Montana is a frontier state with a population of 902,195 (2000 Census) spread across 146,000 square miles, making Montana the 4<sup>th</sup> largest state. This reflects an increase from the 1990 Census of 103,310 or 12.9% increase over the last 10 years. The demographic distribution varies widely from the east to the west side of the state just as the topography varies. The western side of the state is the most densely populated and mountainous. The eastern side of the state consists mostly of plains and is the least populated. The general trend of change in census over the last 10 years has been a loss in population in the east and gain in the west. The population is 90.6% white; 6.2% American Indian; 2.0% Hispanic; 0.3% Black; and 0.5% Asian. Indian Nation lands cover 9% of Montana’s landmass. The population density is 6.2 persons / square mile ranking the state as the 48<sup>th</sup> in population density in the United States. There are 56 counties, of which 45 are frontier (6 persons / square mile), 8 are rural, and 3 are metropolitan areas (counties with a city of 50,000 or more). That places 54% of the population in the urban areas and 46% in rural Montana. More than 80% of Montana’s 195 communities have populations less than 3,000 people. We have, in addition, a population that swells considerably during the summer travel and tourism months.<sup>3</sup>

Montana has injury patterns unique to its population demographics, socio-cultural factors, and rural geography. Rural highways are more dangerous due to increased vehicle speeds, poor road conditions, and insufficient access to medical response. More than 60% of motor vehicle-related fatalities occur in rural areas. The difference between rural and urban fatalities has increased 27% from 1990 to 2001.

<sup>3</sup> Prepared by the Montana Office of Rural Health 5/14/2002.

Passengers involved in fatal rural crashes are nearly twice as likely to be ejected from the vehicle and 64% less likely to be transported to the hospital.<sup>4</sup> It is therefore essential that Montana's Trauma Plan include providers and facilities in the rural areas. Its overreaching goal must be to achieve, maintain, and coordinate those elements to provide the right care to the right patient in the right place at the right time.

The obstacles that health care professionals and patients face in rural areas are vastly different than those in urban areas. Rural areas tend to have about half as many physicians as urban areas to serve the population base. The rural residents tend to be poorer and less likely to have employer-provided health care coverage. Medicare payments to rural hospitals and physicians are dramatically less than those to their urban counterparts for equivalent services. This correlates with the fact that nationally more than 470 rural hospitals have closed in the past 25 years.<sup>5</sup>

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<sup>4</sup> Injury Facts Rural Injury, National Safe Kids Campaign, 2003.

<sup>5</sup> What's Different about Rural Health Care?, National Rural Health Association, 2004.

## *Montana Trauma System*

### **EXECUTIVE SUMMARY FOR PROBLEM RESOLUTION**

#### **Vision**

*The vision for the Montana Trauma System is to be a high quality, cost effective statewide system of emergency medical services and trauma care for all state and Indian Nations residents and visitors to the state.*

#### **Background**

Trauma research supports the validity of the limited yet imperative time from injury occurrence to definitive care. As this crucial time expires, the body's organ systems, even those uninvolved in the initial injury, may suffer irreparable and potentially fatal damage. Trauma, as a disease, is time-sensitive in the same fashion as is coronary artery disease where "time is muscle." Most medical providers are well versed in the universally accepted coronary care algorithms. The public understands, due to consistent media coverage and education, the risk associated with coronary artery diseases. This level of system and public acknowledgement does not exist for trauma in Montana. Perceived as an "accident," many Montanans may fail to associate traumatic injury with risk-taking behavior. Rural caregivers receive less training and less regular exposure to the care of trauma victims. These caregivers may not aggressively seek trauma education if the education that is expensive and elusive.

In 1966, the National Resource Council/National Academy of Sciences published "*Accidental Death and Disability: the Neglected Disease of Modern Society*" which identified large deficiencies in prehospital services and a clear need for a coordinated, multi-disciplinary system along the emergency care continuum. Congress responded that same year with the *National Traffic and Motor Vehicle Safety Acts* establishing the need for motor vehicle and highway safety standards, EMS (Emergency Medical Services) programs and EMS education.

The 1973 *National EMS Systems Act*, under the lead agency of the Department of Health, Education, and Welfare, stimulated state EMS development but federal funding was not reallocated in subsequent years and many state programs foundered. In 1986, the National Resource Council and the Institutes of Medicine released the results of a 20-year retrospective study revealing that despite funding and improvement efforts, little had been done to reduce the burden of injury.

Funding provided in 1992-1994 and 2001-2002 through the *Trauma Care Systems Planning and Development Act of 1990* (which created Title XII of the Public Health Service Act) was administered by Health Resources Services Administration (HRSA). These grants gave states the opportunity to achieve consistency with the model trauma system plan, defined by the National Highway Traffic and Safety Administration, in 1988, as:

*" a system of health care delivery that combines prehospital EMS resources and hospital resources to optimize the care and therefore the outcome of injured patients."*

The earliest “trauma centers” were urban emergency departments, often affiliated with medical schools. The volume of medical officers and emphasis on academia resulted in rapid delivery of acute care for the injured patient and advancement in the study of trauma patient assessment and interventions. Replication of this system is an ongoing challenge for more rural communities, regions and states like Montana.

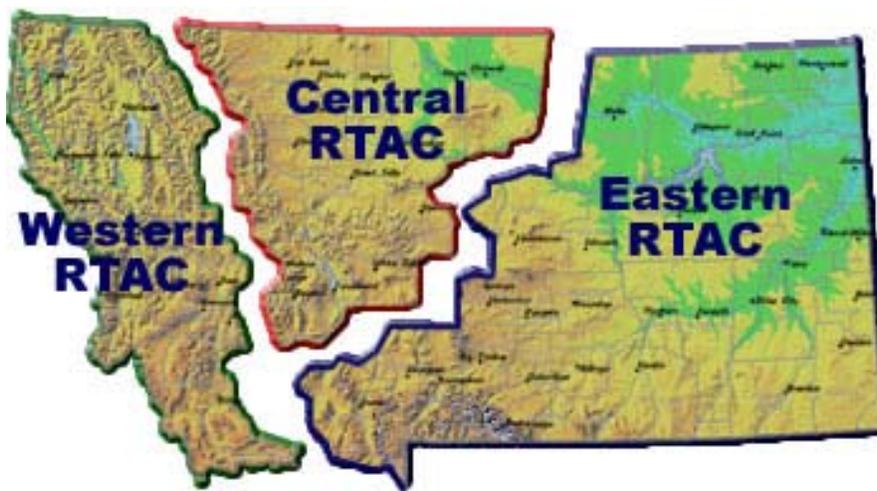
Professional organizations such as the *American College of Emergency Physicians (ACEP)*, the *American Pediatric Surgery Association (APSA)*, the *Emergency Nurses Association (ENA)*, the *American Association of Critical Care Nurses (AACN)*, the *American Association of Operating Room Nurses (AORN)*, the *National Flight Nurses Association (NFNA)*, and the *Society of Trauma Nurses (STN)* have all, over the last 30 years, supported trauma system development through position statements, educational programs, and research.

It was, however, the *American College of Surgeons Committee on Trauma (ACS COT)* established in 1922 that has assumed the leadership role of improving care for the injured patient. Guidelines for care of the injured patient were outlined in the first resources document published in 1976, evolving into the most recent 1999 publication, “*Resources for the Optimal Care of the Injured Patient: 1999.*” ACS COT stratified trauma centers based on resource availability and defined and redefined those activities as being prevention, prehospital care, hospital care, and rehabilitation necessary to maintain excellence in trauma patient care. This document has resulted in a consultation/verification process whereby a hospital can be evaluated to determine if these ACS criteria are being met. In the latest revision of the resource document, the importance of trauma systems was stressed resulting in the ACS COT developing a consultation process for trauma system development. The first state to receive an ACS COT trauma system consultation was Montana. The recommendations made during that review were utilized throughout the revision of this trauma plan.

Rural trauma care in Montana is complicated by geographic isolation, time between injury and discovery, extrication issues, distance to immediate healthcare and local health care resource availability. Due to the vast distances between health care facilities in Montana, all prehospital providers and even some rural clinics must be prepared to provide initial care to injured patients while simultaneously expediting transfer to definitive care. It is this level of preparation and organization that has been proven nationally to reduce the number of preventable deaths and disabilities, and return injury victims to their families and communities earlier. This type of trauma system is reflected by the term “inclusive trauma system.” The vision for Montana is an effective inclusive trauma system that includes private and public health care delivery systems: prehospital providers, clinics, critical access facilities, hospitals, and rehabilitation facilities in both our urban and rural environments. The trauma system will be responsive to local, regional, and state acute care and prevention issues by utilizing on-going assessment of state vital statistics and traumatic injury data. The system will be dynamically guided by a Trauma Plan that formally identifies, organizes, and describes goals and objectives to integrate a continuum of care from the injury event to the full recovery of the injured child or adult.

Major accomplishments include:

1. From 1990-1993, with federal grant support from the United States Department of Health and Human Services, a widely representative, consensus-based process was used in Montana to formalize the state's first Trauma System Plan, published in 1994.
2. State trauma registry selected in 1990 with new software selected in .2003, Financial support and education provided for new users. The registry software is implemented in thirteen facilities; with an alternate format for smaller facilities to submit data. The data is used for Montana Trauma System performance improvement activities.
3. Enabling trauma system legislation was passed in 1995.
4. The Emergency Medical Services and Trauma System Section (EMSTS) of the Montana Department of Public Health and Human Services (DPHHS) serves as the lead agency, by statute, for the ongoing task of developing and implementing an inclusive trauma.
5. The governor appoints members to a State Trauma Care Committee (STCC). The STCC serves in an advisory role on the medical and administrative goals in the trauma system. Subcommittee structure includes:
  - a. Public Advocacy / Legislation
  - b. Injury Prevention / EMS for Children (EMSC) Oversight
  - c. Education
  - d. Information Systems / Performance Improvement
  - e. Organization / Emergency Preparedness
6. Three trauma regions, based on patient referral patterns, have been developed. The three Regional Trauma Advisory Committees (RTAC) meet quarterly, using teleconferencing to include outlying areas in the central and eastern regions. Subcommittees include:
  - a. Education
  - b. Emergency Medical Services
  - c. Performance Improvement
  - d. Injury Prevention
  - e. Area Trauma Plan



7. In a retrospective analysis, using expert panel review methodology, the Critical Illness and Trauma Foundation (CIT) of Montana reviewed all traumatic deaths in the state occurring from 10/1/90 to 9/30/91. The study revealed an overall preventable trauma death rate of 13%. The distribution of inappropriate care rendered for trauma patients was 37% in the prehospital phase and 68% in the emergency department.<sup>6</sup>
8. After the trauma system implementation had begun, a subsequent study of inappropriate care and preventable trauma deaths was conducted by CIT for Montana deaths occurring in 1998 after the trauma system development began. The overall preventable death rate had dropped to 8%. The overall rate of inappropriate care decreased as well to 22% prehospital and 40% in the emergency department.
9. Data from five Montana rural preventable mortality studies have been correlated and integrated into trauma system design and implementation.
10. An Emergency Medical Services and Trauma Systems Section (EMSTS) Website has been developed to disseminate information.
11. A federally funded Emergency Medical Services for Children (EMSC) injury prevention coordinator position was created to help in the improvement of care to children and injury prevention statewide.
12. Pediatric equipment has been provided to all ground and air EMS services in the state and Pediatric Emergency Care Guidelines distributed to 120 schools.
13. A trauma program manager position was created within the Emergency Medical Services and Trauma System Section of the Department of Public Health and Human Services.
14. Advanced Trauma Life Support Courses are offered four times a year for physicians, physician assistants and advanced practice nurses. These courses now rotate through the three state trauma regions.
15. A TEAM Trauma course (Together Everybody Achieves More) was created. This course, taught by a physician, nurse and EMT, is offered to rural facilities to assist in trauma team formation.
16. Trauma and EMS Education is offered in each trauma region with aggressive training of instructors and material support from the State Trauma Program.
17. The annual Rocky Mountain Rural Trauma Symposium with the Montana Trauma System pre-conference for trauma medical directors, coordinators and registrars rotates each year through the three trauma regions.
18. A PowerPoint presentation entitled “White Crosses in the Last Best Place” was created for trauma care providers to present the Montana trauma story to their community organizations.
19. Statewide trauma/EMS consultation site reviews have been conducted.
20. The Regional and Area Trauma Centers in each trauma region have successfully obtained American College of Surgeons trauma center verification as Level II and III Trauma Centers. Each Trauma Center provides leadership for their RTAC.
21. Trauma System Administrative Rules, including trauma center designation with facility standards, have been completed.

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<sup>6</sup> *Analysis of Preventable Trauma Deaths and Inappropriate Trauma Care in a Rural State* Esposito, Sanddal, Hansen, Reynolds in The Journal of Trauma, Injury, Infection, and Critical Care Vol. 39, No. 5, 1995.

The Montana state trauma system statutes and rules outline the working definitions and delegation of authority, and mandate the development of the fundamental parts of the state trauma system along with its clinical and operational infrastructure components.

The **fundamental components** of the Montana state trauma system include:

- Injury Prevention
- Prehospital Care
- Definitive Care
- Post Hospital and Rehabilitation care
- Emergency Preparedness and Disaster Response

The **infrastructure elements** to support the fundamental components include:

- Leadership
- Professional Resources
- Education and Advocacy
- Information Management
- Finances
- Research
- Technology

**Montana Trauma System**  
Fundamental Component

**INJURY PREVENTION**

***Vision***

*Montana will have an injury prevention and control program that is responsive to the needs and epidemiology of Montana and is an integrated component of the comprehensive statewide Emergency Medical and Trauma System.*

***Background***

**Injuries are not accidents** but instead are preventable by changing the environment, enacting legislation, improving education, and using existing/emerging technologies.<sup>7</sup> The public often views injuries as inevitable with the resulting sense of futility hampering prevention awareness and behavioral changes. Acronyms such as “MVA” (Motor Vehicle Accident) have been changed to “MVC” (Motor Vehicle Crash) in an effort to change public perception of the inevitable nature of the event.

Injury prevention activities are the first integral component of Montana’s Trauma System care continuum meant to reduce related health care costs, morbidity and mortality, loss of years of productivity and last the personal pain and suffering. The Montana Trauma System seeks to be an active partner in a state-coordinated system for injury prevention offers the greatest potential for reducing the overall costs of trauma care.

**WHAT ARE THE THREE PHASES OF PREVENTION**

Prevention activities are often secondary or tertiary, addressing either the reduction of risk of re-injury or the impact of the injury once it has occurred. Primary prevention programs must be based not on the demands of a particular situation, but rather on the systematic analysis of regional and state injury data. Injury statistics can illuminate injury realities for state residents.

State and regional injury demographics can be culled regularly from sources such as the Montana Department of Transportation’s *Traffic Safety Problem Identification* and the *Montana Vital Statistics*, published by the Department of Public Health and Human Services. Since its initiation in 1990, the State Trauma Registry has provided injury data from participating hospitals. This information is an important resource for identifying and targeting injury prevention activities and risk behaviors. Data analysis provides for identification of incidence differences between cultures, genders, age groups and methodologies. Prevention activities must incorporate such information and the STCC and RTACS are resource to provides for multi-disciplinary problem identification and evaluation.

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<sup>7</sup>Committee on Trauma Research, Commission on Life Sciences, National Research Council, and the Institute of Medicine, (1989). *Injury in America: A continuing health problem*. Washington, DC: National Academy Press.

The Injury Prevention and Control Program is integrated into the State Trauma Care System as a fundamental component. The plan for injury prevention has been distributed to state, regional, county, city and private stakeholders. The Injury Prevention Coordinator oversees the program under the direction of the Trauma Program and with the oversight of the Injury Prevention subcommittee of the STCC. The injury prevention program facilitates prevention works through the RTACs by providing materials, support, and technical assistance to facilitate local and regional prevention and control efforts

In 1999, the American College of Surgeons Committee on Trauma performed its first Consultation for Trauma Systems in Montana. With respect to Injury Prevention, the resulting recommendations provide a framework for ongoing action planning for the both the STCC and the three RTACs. These recommendations are consistent with the needs-assessment findings of the CIT Injury Prevention Study conducted in 2002 and are incorporated into targeted activities.

### **Goals and Objectives**

1. Injury prevention conclusions will be based on a comprehensive injury surveillance system established through linkage of multifaceted data related to injury demographics, causes and rates will be used to develop educational materials to educate the public and legislators to promote injury prevention activities and related legislation.
2. Age-appropriate and culturally adapted injury prevention materials and programs will be integrated into existing health care delivery systems and venues (specialty clinics, parish nursing programs, schools, and rural clinics) based on state injury data and identified needs.
3. Guidance, support, coordination and technical assistance from STCC and each RTAC. Grassroots networks of interested and involved individuals will conduct injury prevention activities locally and regionally. Activities will be based on collected injury-occurrence data and evaluation criteria will be developed to gauge effectiveness.
4. Injury prevention activities will be viewed as a legitimate health care cost and reimbursable to providers. Funds will be allocated from the stable funding sources secured for the trauma system and ongoing collaborations will be maintained.
5. A statewide Web-based schedule of prevention programs being offered and contact persons will be designed and implemented. A framework will be developed for communities and facilities to submit their scheduled event information electronically.

**Montana Trauma System**  
Fundamental Component

**PREHOSPITAL CARE**

***Vision***

*An effective EMS system that provides for timely and effective coordination of care among the essential prehospital and inter-hospital transfer components of the emergency medical care system.*

**Background**

**Communication:** The broad category of “communication” includes public access to care, Emergency Medical Dispatch (EMD), communication system integration and quality/performance management.

Enhanced 9-1-1 (E9-1-1) remains the optimal form of access to expedient trauma care in that it enables the caller’s location to be automatically displayed on a computer screen. Cellular use is increasing making wireless E9-1-1 coverage even more essential. Recent events have raised awareness of the value of cellular, wireless phone usage in the event of landline destruction in a disaster. EMS and trauma systems nationwide should reevaluate and restructure their emergency access communication systems to be functional in the event of large numbers of casualties from natural disasters or terrorist activities.

Emergency Medical Dispatchers (EMD) receiving 9-1-1 calls make up an important component of the trauma care system as the system entry point. The EMD screens calls and structures questions to determine the best utilization and requisition of resources and then is responsible for dispatching the most appropriate resources. In Montana, with the skill level of services varying from community to community, the closest responder unit may not be fully equipped to manage anticipated patient needs. As a result, knowledge of the resources available is critical. The EMD in many areas may also be the available critical link to alert the receiving healthcare facility as to the extent of the patient injuries thus facilitating both readiness of a trauma team and the initiation of proactive transfer decisions.

There are national standards for EMD communicators but currently, standardized EMD training and/or certification is not required in Montana. The STCC recognizes the need for standardized training courses and dispatch protocols.

Montana also has no central emergency medical communication center. In the event of disaster or situation that overwhelms facilities resources, a central communication center capable of coordinating multi-agency effort across county and regional lines is essential. A Central Medical Resource System would provide a central clearinghouse for dispatch and secondary transport (and possibly primary transport). Through trained EMDs and a Central Medical Resource System, rural medical providers would make a single telephone contact to trigger appropriate inter-facility transport.

**Medical Direction:** Medical direction is a system in which physician-directed oversight provides professional and public accountability for medical care provided in the prehospital setting. In an EMS system, medical direction provides the operational framework and authorization for EMTs and others to provide emergency treatment outside the hospital. EMTs work as an extension of the physician's practice. The American College of Emergency Physicians (1999) defines additional responsibilities of the service medical director as involvement with design, operation, evaluation, and on-going revision of the system including initial patient access, dispatch, prehospital care and delivery to the emergency department.

Medical direction by a physician may be accomplished in two ways:

- On-line: direct voice communication with the physician or through an RN surrogate
- Off-line: protocols, education, evaluation

The prehospital medical direction component of the Montana Trauma System encompasses medical supervision, standard setting, education and performance evaluation of prehospital EMTs with respect to triage, patient care, and transport of trauma patients. Currently, medical direction is required in Montana for Advanced Life Support services, but not at the Basic Life Support level. The Board of Medical Examiners (BOME) has developed and adopted changes to allow for an expansion of EMT roles through the use of "endorsements". These endorsements allow Montana licensed EMT personnel to receive specific training and recognition allowing performance of specific procedures and skills. These endorsements allow the local medical director to tailor the skills provided by the service to the community needs. The curricula for each endorsement are provided by the BOME to assure educational consistency.

**Trauma Triage Criteria:** The goal of trauma triage is to rapidly identify, using standardized and validated criteria, the individual whose injuries may be life threatening or require specialty services. Triage decisions may be based on physiologic and anatomic conditions, mechanism of injury information, pre-morbid conditions, and/or clinical judgment. The American College of Surgeons (ACS) provides a field triage decision scheme that may be used as a framework for developing individualized, region-specific triage algorithms. These triage decision schemes were originally designed nationally to identify which injured patients should be taken to a trauma center. In Montana, the triage decision scheme will additionally be used to identify which patients would benefit from trauma team activation prior to patient arrival at the facility.

The ability of field personnel to accurately utilize triage schemes is dependent on education and experience. The value of a triage scheme is determined by its ability, when used correctly, to facilitate appropriate and expeditious trauma care that minimizes morbidity and mortality.

Both preparation of the users and appropriateness of the triage scheme will affect its ultimate value and success. Standardized and validated triage criteria assist EMS in timely transport and trauma team preparation at the facility.

Nationally, the standard practice for most trauma systems is to take the trauma patient to the nearest designated trauma center. However, in the rural and frontier areas of the Montana, emergent needs of the injured patient may require transport to the closest facility for life-saving interventions. Montana's plan must maximize the potential of all field providers and rural facilities. Universally-implemented triage criteria, combined with trauma education for rural facilities and inter-facility transfer criteria, will ensure the patient consistently receives the immediate care urgently needed with timely transfer to definitive care if necessary.

**Inter-facility Transport:** Optimal outcome for the trauma patient is time-related. It is to the patient's advantage to receive definitive care as promptly as possible. Patients requiring transfer must be identified quickly and the transfer process promptly initiated. The establishment of standardized inter-facility trauma patient transfer criteria assists all providers in rapidly identifying patients who need transfer. Transfer agreements should exist in advance with higher-level and specialty facilities. Preparation and equipment should be standardized so that delay is minimized. Establishing guidelines and procedures for these components facilitates the process.

Referring physicians determine the patient care skill level required for the EMS service transporting the patient to the next facility. This decision may be based on field triage information, patient assessment and clinical criteria, and/or in discussion with the receiving physician, but should be linked to an inter-facility transfer decision scheme to eliminate provider variability.

A regional trauma plan identifies its transportation services in terms of each EMS service's level of care and service area covered. The EMSTS Section of the DPHHS has broad statutory authority for licensing ground, air, transporting and non-transporting units. Currently, re-licensure occurs every 2 years and there is an articulated goal to link re-licensure with the existence of EMS service quality/performance improvement programs and participation in data collection.

### **Goals and Objectives**

1. Regional assessments of emergency radio communication equipment capabilities and needs will be conducted. Uniformity in equipment technology and capacity (interoperability), essential in a mass disaster with large numbers of casualties requiring triage and transport is the goal.
2. STCC will collaborate with EMS, state hospital associations, public safety organizations, military, and bioterrorism planners to integrate prehospital communication interoperability planning into overall emergency preparedness planning.
3. There will be standardized and formalized adult and pediatric trauma triage guidelines. There will be an educational plan for field identification/triage decision tools and a format for ongoing triage educational updates will be designed.

4. The RTACs and STCC will adopt minimal criteria for inter-facility transfer with guidelines regionally adapted from the ACS Committee On Trauma recommendations
  - a. Triage decision schemes will include criteria for identifying patients requiring transfer to the Regional Trauma Centers and to specialty centers, such as spinal cord injury, pediatrics, and burns.
5. The STCC in coordination with the RTACs will utilize trauma registry and prehospital data to evaluate the effectiveness of triage and inter-facility transfer guideline schemes.
6. The STCC and the RTACs will collaborate with other agencies to pursue development of Central Medical Resource System.

**Montana Trauma System**  
Fundamental Component

**ACUTE CARE FACILITIES**

***Vision***

*Montana will have an integrated system of committed health care facilities in an inclusive trauma network to provide for optimal care for all injured patients statewide.*

***Background***

Trauma centers provide an essential public service that affects everyone. An integrated system of trauma patient care requires the identification of facilities with the necessary resources to generate a trauma response that optimizes patient outcomes even if the facility will not be the patient's ultimate destination. Montana DPHHS is given the authority by statute to designate trauma hospitals/facilities. Identification, or "designation," can take place only when the state establishes and evaluates facilities using nationally recognized valid criteria for personnel, equipment, and services. Montana's resource criteria for trauma facilities and classification levels are developed based on guidelines published by:

- American College of Surgeons Committee on Trauma (1999): *Resources for the Optimal Care of the Injured Patient: 1999.*
- American College of Emergency Physicians (1992): *Guidelines for Trauma Care Plan.*
- Health Resources Services Administration (HRSA) (1992): *Model Trauma Care Plan.*
- Other states

Ideally, participation in the trauma center designation will include all Montana hospitals, critical access hospitals and some community clinics. The Montana Trauma System model is based upon voluntary participation by each facility. The resource criteria are written to allow each facility to participate based on the unique resources available in its community. There are several hospitals in Montana that have already sought and received national recognition as Trauma Centers under the auspices of the ACS Trauma Center Verification Program.

When patient care needs exceed the capabilities of the facility, inter-facility transfer criteria and transfer agreements facilitate the timely movement of patients to the appropriate care setting. These agreements should include Indian Nations and bordering states. Conversely, when a patient no longer requires specialty or trauma center care and can be moved safely, transfer back to their community hospital should be facilitated. Trauma hospitals should also facilitate the appropriate, safe transfer of patients who are members of Health Maintenance Organizations to hospitals covered by their plans.

Trauma center designation will be done by an onsite survey team that include EMSTS Section staff, a trauma surgeon or a physician with special interest and expertise in trauma care and an experienced trauma nurse coordinator.

The designation review process includes touring the physical plant, interviews with staff, evaluation of medical records, trauma registry, staff rosters and schedules, quality/performance improvement, trauma committee minutes, inter-facility transfer agreements and other documents that illustrate trauma patient care and response. This site review team prepares a confidential performance improvement written report for the facility, as well as a summary report to the STCC designation subgroup for a recommendation to DPHHS on trauma center designation.

The State Trauma Program and a team of consultants have been providing trauma/EMS consultation site visits. These visits assist facilities that are planning to obtain trauma center designation. The facility staff has been introduced to the new UB-92 billing codes, which may be used after designation to charge for trauma team activation. This source of reimbursement may be accessed only by ACS verified trauma centers or those facilities designated by the State of Montana.

During its 1999 consultation review, the ACS advised the Montana State Trauma System to direct its attention to expediting the transfer of all major trauma patients to higher-level trauma centers, bypassing interim centers. It is the state's assessment that this goal, though ideal, is unrealistic based on Montana's limited numbers of air ambulance services, predominance of BLS transport units, distances to be traveled and potential road and weather delays. It is imperative that every facility in Montana is able to participate effectively in initial life-saving trauma care while initiating expeditious transfers to definitive care. Montana recognizes the importance of the smaller medical facilities and to avert the concept that one level is necessarily better than another, numeric indicators for facility designation have been avoided. Rather, a descriptive title of the trauma care capabilities of the facility is used.

### Potential Montana Trauma Centers



## **Montana Trauma Facility Categories**

### **Regional Trauma Center**

As its name suggests, the Regional Trauma Center provides a breadth, depth and immediacy of response not consistently available in the other levels of facilities. The distinguishing characteristics of the regional center are the broad varieties of specialty services (neurosurgery and anesthesia in particular) that are immediately available. Surgeons are required to have achieved defined levels of certification including continuing trauma education and are promptly available on an on-call basis.

The emergency department has trauma-trained emergency department physicians, nurses, radiology technicians, and laboratory services with blood banking and a broad range of available 24 hours a day. There are operating room personnel to expedite the readiness of the surgical suite and assist in emergent surgical procedures. Intensive care units are under medical direction and staffed by nurses with trauma expertise. Physicians, nurses, and EMS all participate in quality/performance improvement via a committee format.

The trauma service, under the direction of the trauma medical director (a board-certified general surgeon with demonstrated competency in trauma care) and the trauma coordinator, focuses on the totality of trauma care provided in the facility: development of policies and procedures, quality/performance improvement, trauma registry, education, injury prevention, and coordination of the trauma care continuum. The Regional Trauma Center functions as a hub in its region's trauma care system and must be integral in outreach support of outlying clinics and clinicians in the provision of trauma care, as well as proactive in regional public education and injury prevention activities.

### **Area Trauma Hospital**

An Area Trauma Hospital is an acute care facility with the commitment and medical staff/nursing/EMS personnel with trauma training necessary to provide primary care to the trauma patient. Generally, an Area Trauma Hospital is expected to provide initial resuscitation with a general surgeon or team promptly available to provide operative intervention to control life-threatening hemorrhage. The management and goals of the trauma service are similar to that of the Regional Trauma Center as are the emergency department, radiology, and laboratory requirements. (Oftentimes, the patient may be admitted and managed by the Area Trauma Hospital, unless the medical needs of the patient dictate transfer.) In collaboration with the RTAC, Area Trauma Hospitals provide outreach support to Community Trauma Hospital and Trauma Receiving Facilities in their service area, as well as to their own pre-hospital providers and nurses. Area Trauma Hospitals participate in the trauma registry, conduct facility-specific trauma quality/performance improvement and actively participate in regional trauma activities.

### **Community Trauma Hospitals**

Community Trauma Hospitals are generally rural facilities with commitment to initial resuscitation of the trauma patient and have written transfer protocols in place to assure that patients requiring a higher level of care are transferred expeditiously. Physicians are available on an on-call basis. There is at least one general surgeon available on-call 24 hours/day but, if that person is out of town, transfer protocols and agreements must be available. If the community surgeon is available, the hospital should be able to provide

initial resuscitation and immediate surgical intervention to control hemorrhage to assure maximal stabilization prior to transfer to a higher level of care. Patients who require complex care and/or mechanical ventilation often require transfer unless the hospital has an intensive care unit with trauma trained nurses and physicians. The facility must have an in house physician to cover the emergency department. Radiology, lab, and OR crew are available on-call to readily respond. Community Trauma hospitals are required to have a trauma program directed by a physician medical director and a part-time trauma coordinator. Participation in the trauma registry with active trauma quality/performance improvement program is required.

### **Trauma Receiving Facilities**

Trauma Receiving Facilities are generally smaller, rural/frontier facilities committed to resuscitating the trauma patient with written transfer protocols in place and timely to assure trauma patients who require a higher level of care are appropriately transferred. The emergency department may not be staffed by a physician but, rather, by a licensed mid-level practitioner (advanced practice nurse practitioner or physician's assistant). These mid-level practitioners require Advanced Trauma Life Support training in order to facilitate the composition, training, and performance of the facility trauma team. The emergency department may not have an in-house physician or mid-level practitioner but must have trauma-trained nurses to assure immediate and appropriate initial care for the critically injured patient. Trauma transfer pre-activation from the field by trained EMS providers would be ideal. Radiology and laboratory services should be available on-call. This categorization does not contemplate the availability of surgeons, operating rooms, or intensive care units. The facility must be committed to a trauma program with medical direction provided by a qualified physician (or designee) and a part-time trauma coordinator to assist with the development of necessary policies and transfer agreements, trauma education, trauma registry and quality/performance improvement.

## **Goals and Objectives**

1. Trauma Administrative Rules will be adopted and will include criteria for designation, de-designation, provisional designation, and re-designation of facilities.
2. The EMSTS Section shall designate trauma centers by levels of care capability as defined by criteria described in the Montana Trauma Administrative Rules.
3. Trauma/EMS pre-designation consultation visits will be available to all facilities in Montana.
4. Regional, Area, Community, and Trauma Receiving facilities will collaborate through RTAC participation to achieve homogenous training and protocol development with the goal of optimal trauma patient care and movement through the trauma system.
5. Interagency, interstate, and inter-facility collaboration, RTACs will assist facilities to identify inter-facility transfer criteria to optimize trauma patient care with a quality/performance improvement structure to evaluate the validity of the criteria over time.

**Montana Trauma System**  
Fundamental Component

**REHABILITATION**

***Vision***

*Rehabilitation facilities within Montana will be integral to the trauma system, participating in STCC and RTAC activities, transfer agreements, data collection, and performance improvement activities.*

**Background**

Medical rehabilitation is an essential component of the trauma care continuum and a crucial part of a comprehensive trauma system. To be most effective, medical rehabilitation must be implemented early in a patient's acute care course and be integrated into all phases of care so that the optimum level of functioning is achieved. Hospitals seeking trauma center designation must include avenues for accessing and integrating rehabilitation for their trauma patients.

There are rehabilitation facilities located in Montana but at the present, the state does not mandate the designation of its state rehabilitation resources. Each trauma region should identify trauma rehabilitation resources within the region, admission requirements, transfer procedures and, if necessary, obtain agreements with facilities outside of the region. Each region should also identify specialty rehabilitation resources for pediatric patients, patients requiring mechanical ventilation, or patients with burns, neurotrauma, and/or extended care needs.

The ACS recommended to Montana in 1999 that policies and procedures be developed relevant to rehabilitation including:

- Treatment guidelines for acute and rehabilitative care
- Minimum requirements and qualifications for rehabilitation medical directors
- Alternative plans for patients with insufficient financial resources for rehabilitation
- Data collection and evaluation of short- and long-term patient outcomes
- Methods of data exchange between facilities that promote quality improvement yet protect patient confidentiality
- A standard set of rehabilitation data that becomes part of the trauma system database with a format for its entry and submission

**Goals and Objectives**

1. RTACs will identify regional trauma rehabilitation resources and those available for specialty patient groups.
2. Transfer agreements between identified rehabilitation facilities and trauma centers will be developed.
3. A representative from the rehabilitation community will be identified and invited to become an ad hoc member of the STCC to add a rehabilitation perspective to trauma system planning and development. Rehab participation at the RMCS is also encouraged.
4. In collaboration with representatives from Montana's rehabilitation community, STCC and RTACs will identify data elements to include in the state trauma registry to evaluate rehabilitation components within the trauma system.

**Montana Trauma System**  
Fundamental Component

**EMERGENCY PREPAREDNESS AND DISASTER RESPONSE**

**Vision**

*The Montana EMS and Trauma System will provide the state with an effective response to disaster through the integration of EMS and Trauma System components with emergency preparedness planning.*

**Background**

An integrated disaster response system capable of all-hazards operational readiness must build upon strong day-to-day EMS and Trauma Systems. Robust daily systems are the key to effective implementation of elastic Emergency/Disaster Response Plans.

A trauma and EMS system is designed to be an organized response to injury. As such, it has many of the elements needed for a disaster response, including identification of injury, transport of the injured, a communications network, designation of receiving facilities or hospitals, and specific details of medical care that would be appropriate at the point of injury and at receiving hospitals. The response required for a biological or chemical disaster may be proportionally different, but, in principle, is still an organized response to injury.<sup>9</sup>

A well-trained and organized response by EMS and Trauma Systems includes the ability to respond appropriately and flexibly to an event. A mass casualty response requires the system to expand the scope of response to accommodate large numbers of patients requiring transport and treatment. Surge capacity is an important element of system planning.

A regional system of EMS and Trauma response and care in Montana is currently utilized on a daily basis to emergently provide optimum assessment, transport, stabilization and transfer of injured patients for definitive treatment. The EMS and Healthcare providers within Montana's Trauma System are the same providers charged with medical consequence response for all patient scenarios that occur, including Mass Casualty, Communicable Disease outbreaks, exposure to Hazardous Materials, or combination events. These providers represent a statewide network of engaged, committed and actively participating medical and healthcare professionals.

Utilization of the Montana Trauma System in Emergency Preparedness and Disaster Response provides an existing, working structure with committed EMS, Medical and Healthcare providers already responding for medical consequence management and patient care.<sup>8</sup>

As in other states, Montana has received federal funds to develop and enhance emergency preparedness. Montana's EMS and Trauma System infrastructure provides an current,

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<sup>8</sup> American College of Surgeons, report from Committee on Trauma, 2002

active mechanism for incorporating emergency preparedness planning into efforts to improve and enhance EMS and Trauma System development.

A state as geographically vast and diverse as Montana is certainly vulnerable to disaster. The weather, terrain and distance, combined with major industries such as agriculture, mining and logging increase the potential for multiple victim incidents. Many areas are underserved by healthcare providers and facilities and are lacking adequate emergency communications systems. Federal and state funding, coupled with Montana's need for a well developed EMS and Trauma System, provide a critical framework for collaborative development/implementation of readiness and response.

### **Goals and Objectives**

1. The EMS and Trauma System, public health systems, regional and state emergency preparedness and disaster plans will be collaborative and integrated.
2. There will be prioritized, targeted education addressing emergency preparedness and disaster response for all care providers.
3. Emergency Medical Dispatch education and Central Medical Resource planning will include communication strategies to be enacted in the event of mass disaster.
4. Processes will be developed at the state level to provide disaster response actions for and directions to the public.

**Montana Trauma System**  
Infrastructure Element

**LEADERSHIP**

**Vision**

*The lead state agency has the authority, responsibility, and resources to plan, implement, and evaluate a comprehensive EMS and Trauma System for Montana.*

**Background**

The existing Montana statutory language from 1995 gives the EMSTS Section of the DPHHS the authority to implement a statewide trauma system. This section serves as the lead agency for the development, implementation, administration, and evaluation of a comprehensive statewide trauma care system that involves all health care facilities and emergency medical services within the state. This is consistent with the mission of the EMSTS Section: *“to implement a sustainable, comprehensive emergency medical and trauma system for Montanans that measurably prevents and reduces morbidity and mortality.”* The EMSTS Section was also charged by statute with the responsibility to create and implement trauma administrative rules.

Three preventable mortality studies were conducted in Montana by Critical Illness and Trauma Foundation (CIT) prior to the first Montana Trauma Systems Plan. Pediatric, American Indian, and all demographic groups were analyzed. A significant percentage of preventable deaths were identified: 9% for Native Americans and 16% each for pediatric and all Montanans. Correction of identified care deficits contributed to the development of the initial 1994 Montana Trauma System Plan.

Effective components of the Montana trauma system implementation are ideally facility-driven. Each acute care or clinic or critical access hospital is generally responsible for the trauma care delivery in their service area. Service areas are defined by pre-existent patient transport and referral patterns. These facilities, in preparation for trauma center designation, will appoint a trauma medical director and a trauma coordinator to manage the trauma program. The development of internal multi-disciplinary trauma committees is critical to provide oversight, assess educational needs, perform surveillance and programming, implement and evaluate quality/performance improvement, and generates policy and procedure development within each facility for their trauma program.

**State Trauma Care Committee (STCC)**

The members of the STCC by the 1995 statute 2-15-2216 are appointed by the governor and include the following:

- A member of the Montana Committee on Trauma of the American College of Surgeons, who shall serve as presiding officer of the committee;
- Two members from each regional trauma care advisory committee;
- A member of the Montana trauma coordinators;
- A representative of the Montana Hospital Association;
- A member of the Montana Medical Association;
- A member of the Emergency Nurses Association;

- An individual who is or who is employed by a Montana private ambulance operator;
- A member of the Montana Emergency Medical Services Association;
- A nurse or physician representing the Indian Health Service; and
- A member of the American College of Emergency Physicians, Montana chapter.

The STCC serves as advisor to the EMSTS and the DPHHS on medical and administrative goals of the trauma system. The duties of the STCC are provided for in statute 50-6-404 and include:

1. Provide recommendations and guidance to the department concerning:
  - a. Trauma care, including suggestions for changes to the statewide trauma care system;
  - b. Implementation of a hospital data collection system; and
  - c. Design and implementation of a statewide and regional quality improvement system for trauma care that considers the standards recommended by the American College of Surgeons and the Joint Commission on Accreditation of Healthcare Organizations;
2. Assist the department in conducting statewide quality improvement and peer review functions by regularly analyzing the effect of the statewide trauma care system on patient care, morbidity, and mortality;
3. Provide recommendations to and oversight and coordination of the activities of the regional trauma care advisory committees; and
4. Provide recommendations concerning the statewide trauma care system and the integration of trauma care with the emergency medical services delivery system.

During the September 2001 STCC meeting, the following subcommittee structure and mission statements were agreed to by the STCC:

*“The purpose of the State Trauma Care Committee is to reduce the incidence of trauma injuries in Montana and to promote and advance excellence in the care of the injured patient.”*

The STCC subcommittees and mission statements are:

- Organization/Emergency Preparedness  
*“Reduce the mortality and morbidity of traumatic injury through an organized statewide and regional trauma system approach.”*
- Information Systems/Performance Improvement (PI)  
*“Provide for collection, integration and analysis of trauma data in order to derive meaningful and useable information. To use that information to analyze the factors and components of traumatic injury in order to improve the trauma care process and injured patient outcomes.”*
- Education  
*“Reduce the incidence of traumatic injury through identified public injury prevention education and to improve the care of the injured patient through clinical education of caregivers utilizing proven intervention strategies.”*
- Prevention/Emergency Medical Systems for Children (EMSC) Oversight  
*“Develop and maintain a comprehensive statewide injury prevention program as a component of a state trauma system.”*

- Public Advocacy and Legislation  
*“Build executive, legislative, and public support for continued development and maintenance of the trauma system.”*

Involvement of leaders from Montana’s numerous sovereign Indian Nations is critical to the comprehensive EMS and Trauma system in Montana. Though Montana law does not bind these nations, the EMS and Trauma systems recognize them as part of the comprehensive system and seek to integrate tribes and services through state and regional involvement. Ad hoc STCC membership should be investigated for these and other community leaders.

**Regional Trauma Advisory Committees (RTAC)**

A representative of each facility’s trauma committee serves on the Regional Trauma Advisory Committee (RTAC) for the region in which the facility is located. RTACs were mandated and duties charged by 1995 statutes 50-6-411 and 50-6-412:

1. Establish standards, policies, procedures, and protocols for the regional trauma care system;
2. Conduct regional trauma care quality improvement, including receipt of reports prepared by the department containing trauma care data and making recommendations to trauma care facilities within the region based upon those reports;
3. Advise the trauma care committee concerning the statewide trauma care system;
4. Establish trauma education and injury prevention programs;
5. Provide advice concerning trauma care to health care facilities and other providers of health care;
6. Perform other duties required by department rule; and
7. Conduct other activities needed to ensure optimal delivery of trauma care services within the region.

RTACs provide a forum to coordinate a regional approach to the delivery of trauma care with continuous system evaluation based upon quality/performance improvement and utilizing trauma registry data. RTACs assist in developing local solutions to improve consistent trauma care, recommending standards of care and performance criteria to the State Trauma Care Committee. Regional Trauma Center physicians, and trauma coordinators provide leadership for the RTAC activities. The RTACs meet quarterly and have been instrumental, since the last 1994 trauma plan, in providing creative solutions to regional trauma needs.

The Trauma Program is responsible for:

- Trauma system planning, implementation, administration, and evaluation including development and implementation of Montana Trauma System Rules and Trauma System Plan
- Quarterly STCC meetings
- Quarterly RTAC meetings in the three trauma regions
- Trauma registry development, implementation, evaluation, education, data analysis and report generation
- Trauma center consultation and designation
- Trauma and related education management

- Regional and statewide trauma quality/performance improvement development implementation and oversight and related processes
- Injury prevention surveillance, identification and development of strategies for identified prioritized activities and education

### **Goals and Objectives**

1. Montana will have a comprehensive statewide Trauma System that meets identified state needs.
2. Mechanisms will exist, through committee action and interaction, whereby the design may be modified to meet changing needs.
3. Trauma Administrative Rules for designation of trauma centers will be adopted
4. The Montana State Legislature will receive regular information for legislative initiatives on identified trauma system needs.
5. Stable funding for long-term system operation will be sought.
6. The trauma data collection process will continue to be developed and a state and regional system quality/performance improvement plan will be designed to identify patient care and system issues.

**Montana Trauma System**  
Infrastructure Element

**PROFESSIONAL RESOURCES**

**Vision**

*There will be sufficient numbers of appropriately trained health care professionals available throughout Montana to provide care for emergent medical and trauma patients in the field, receiving health care during inter-facility transport, and in the receiving health care institutions.*

**Background**

Many factors affect the size of the EMS and trauma system workforce in Montana. The workforce is comprised of physicians, mid-level practitioners, nurses, EMS personnel, lab x-ray ancillary personnel with various levels of certification, and Emergency Medical Dispatchers. The types and distribution of facilities also constitute a resource and their numbers are addressed in the section “Definitive Care.”

Rural settings rely heavily on volunteer EMS providers who struggle to access the required training and education. This volunteer workforce is also aging with many of Montana’s youth seeking education and employment in our urban settings and in other states. Smaller rural communities may be unable to afford paid responder services. Volunteers may respond from home or the workplace, thus contributing to a potential delay in care. Patient care needs may exceed the current skill level of volunteers, especially First Responders and EMT-Basics, yet these constitute the largest portion of Montana’s rural EMS services.

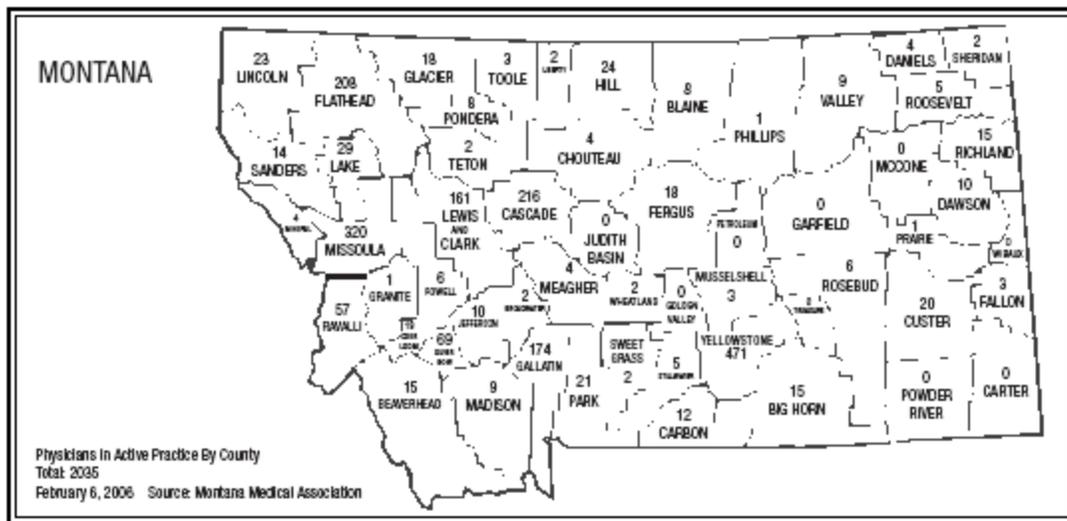
**Montana EMS Service resources include:**

- **115 licensed non-transporting services**
  - **30% paid**
  - **70% volunteer**
- **138 licensed EMS ground transporting services**
  - **23% paid**
  - **77% volunteer or combination**
- **12 licensed air services (fixed and rotor-wing)**
  - **100% paid**
- **4832 Actives EMTs in state**
  - **1287 First Responder / First Responder ambulance**
  - **3100 EMT-Basic**
  - **24 EMT-Intermediate**
  - **421 EMT-Paramedic**

The Montana Board of Medical Examiners has redesigned and broadened the skill levels of Montana’s EMS providers in order to attempt to meet the state’s EMS needs. These new rules became effective Jan. 29, 2004.

The nursing shortage, both real and predicted, is a national crisis. Many nurses in the Montana nursing program leave Montana upon graduation. Many Montana facilities are recruiting from outside the state but struggle to match salaries paid by urban facilities outside Montana. Nurses with trauma training are an essential part of the trauma team, but many of these nurses have little or no formal trauma training and only sporadic experience with critically injured patients and their care. The lack of experienced nurses now and in the future directly affects the management of patients within the trauma system. The number of Montana nurses in 2001 was 7,420 RN's (RNs, APRNs, CNSs)<sup>9</sup>

Rural facilities in Montana frequently rely on a small number of physician providers to provide immediate patient care. Many small facilities are staffed with a Physicians Assistant (PA), advanced practice registered nurse (APRN) . There may be only one general surgeon within the service area and the physicians may not be in-house 24 hours/day. Locum physicians are often “borrowed” from elsewhere to fill vacancies for short-term needs. Smaller community facilities struggle to generate commitment, resources or both in order to consistently staff a trauma team response. Accessing pertinent education and training is challenging.



## Goals and Objectives

1. EMSTS will identify regional categories of professional resources
  2. EMSTS will explore discussions with institutes of higher learning to explore methods of generating nursing interest in Montana medical facilities.
  3. EMSTS will explore discussions with high schools to explore methods of encouraging EMS as a career.
  4. STCC will investigate possibilities for incentives and encouragements to induce physicians and surgeons to participate in the trauma system in their communities.

**Montana Trauma System**  
Infrastructure Element

**EDUCATION AND ADVOCACY**

***Vision***

*Those providing patient care at all points within the Montana Trauma System will demonstrate responsibility, accountability, and reliability in the pursuit and attainment of improvements in clinical aptitude so as to provide excellence in patient care. Entry level and continuing education will be geographically available and affordable. Trauma systems standards will define minimal educational requirements.*

**Background**

Health care providers outside of the trauma network are often unaware of their role in the trauma system. In a state the size of Montana, information dissemination and the provision of comprehensive educational programs are expensive in more ways than just financial. Great distances and expense may be required, on an individual level, to acquire needed knowledge and skills. Many states have establishment of minimum requirements for trauma education for physicians and nurses in designated trauma centers in MT will be included in the Trauma FAC Resources criteria. ACS has set educational requirements for the various levels of trauma facilities. EMSTS has set standards for relic ensure of EMTs of all levels. There is also a national curriculum for EMDs.

Current Trauma related education courses:

- PEPP: Pediatric Emergencies for Pre-hospital Providers
- PHTLS: Pre-hospital Trauma Life Support
- GEMS: Geriatric Education for Emergency Medical Services
- TBI: EMS Traumatic Brain Injury Course
- ATLS: Advanced Trauma Life Support for physicians and mid-level providers
- TNCC: Trauma Nurse Core Curriculum
- PALS: Pediatric Advanced Life Support
- Trauma TEAM: Together Everybody Achieves More (a locally developed pre-designation program for trauma team preparation)
- STN/TERN: Society of Trauma Nurse/Trauma Education for Rural Nurses combined course: STN curriculum amended to Montana specificity
- Montana Trauma System pre-conference for medical directors and trauma coordinators and registrars
- Annual Rocky Mountain Rural Trauma Symposium

An effective infrastructure is required to support on-going trauma education.

“White Crosses in the Last Best Place” is a PowerPoint presentation developed to educate the trauma care providers as well as the public about trauma issues in Montana. This presentation has been widely distributed and is available on the EMSTS web site for trauma stakeholders to present in their local areas. White Crosses has been presented in a number of venues including service club meetings, hospital orientations, and at conferences to name a few. This presentation was the first of its kind and has been distributed for national access.

### **Goals and Objectives for Providers**

1. There will be a standard for continuing trauma education for all levels of providers in designated trauma centers.
2. RTACs will conduct surveys to establish baseline of existing trauma educational levels for:
  - a. EMD
  - b. EMS
  - c. Nursing
  - d. Physicians, physician assistants, and advanced practice nurses
3. Cost-effective educational strategies will be developed.

### **Goals and Objectives for the Public**

Education of the public about the financial impact of trauma, the relevance of a trauma system, and injury prevention strategies are also articulated in the sections on *Finances* and *Injury Prevention*.

1. A plan to educate the public will be developed.
2. Coalitions with other entities, agencies, and organizations who have related goals and seek similar outcomes will be explored.

### **Goals and Objectives for Policy-Makers**

1. Methods of communication and information exchange between facility-based trauma committees, their communities and locally-elected officials and legislators will be formalized.
2. Legislators will be informed about the trauma system in Montana and supporters identified.
3. Legislators supportive of trauma systems in other states will be consulted for insight.

**Montana Trauma System**  
Infrastructure Element

**INFORMATION SERVICES**

***Vision***

*Montana EMS and Trauma Systems quality/performance improvement systems will be data-driven.*

**Background**

Valid decisions regarding trauma care are based on an analysis of the causes, treatment, and outcomes of injury that can be obtained only by evaluating relevant data. Trauma registry information should include data involving the mechanism of injury, pre-hospital care, hospital course, and rehabilitation and patient outcomes. Individual hospitals, the trauma regions, the state and others may use the data for quality/performance improvement through identified needs and targeted, prioritized activities.

Registry data is essential to analyze, modify and improve trauma systems. Registry data may indicate needed changes in local, regional, or state trauma care patterns, process improvement and prevention. Quality/performance improvement studies on registry data confirm the validity and usefulness of such data.

Quality/performance improvement activities in the Montana Trauma System require a systematic trauma registry. Statute 50-6-402 charges the EMSTS Section of the DPHHS with the following tasks:

- Develop and adopt a state trauma registry,
- Specify the information that must be submitted to the department, including information from health care facilities, for statistical evaluation of the state and regional trauma care systems, planning prevention programs, assessing trauma-related education priorities, and determining how trauma facilities and EMS may comply with protocols and standards adopted by the department,
- Establish the electronic format and other standards that a health care facility trauma data system is required to meet in order to qualify as a hospital trauma registry,
- Adopt rules to establish requirements for collection and release of the trauma registry data.

Data on all injured patients who activate a trauma team response require hospitalization and on all injury related fatalities should be recorded in the registry data collection system at each participating facility, including those on Indian Nation lands. Locally collected information is to be uploaded and collated on a regional and state level. State trauma registry data can then be evaluated in conjunction with other linked data sets, including national sources.

Statewide trauma registry initial data collection started in 1989 in some facilities.

In 2002, Montana submitted a request for proposals (RFP) for new registry software, selected a new program with stakeholder input, and began adapting program to the Montana's unique needs. Registrars/trauma coordinators from nine pilot facilities in the state received the software and training, eight of those facilities implemented the program, seven of which were provided with the associated quality/performance improvement registry module.

A Trauma Registry hard (paper) format appropriate for the smaller hospitals with limited resources and consistent with the software has been developed and is being implemented with data documented by smaller facilities and submitted for inclusion in the central state registry. Mechanisms for actively analyzing the data, identifying trends and providing feedback to these facilities regarding specific patient care processes is being implemented.

Montana plans to submit data to the National Trauma registry through the American College of Surgeons in order to benchmark system processes against others participating in the national data bank. Confidentiality of Trauma registry data is provided for in Montana statute 50-6-415.

### **Goals and Objectives**

1. The designation of state trauma centers will require all facility participation in trauma registry data collection of standardized data and submission of the data to the central state trauma registry by trained facility personnel.
2. Rules will be adopted to establish the requirements for collection of trauma register data, specify the information that must be submitted, and the format and other standards required to qualify as a hospital trauma registry.
3. Linkage of the Trauma Registry data to other sources of relevant data bases will be explored.
4. Assist RTACs with regional assessments of educational needs and identified issues associated with the Trauma Registry.

**Montana Trauma System**  
Infrastructure Element

**FINANCES**

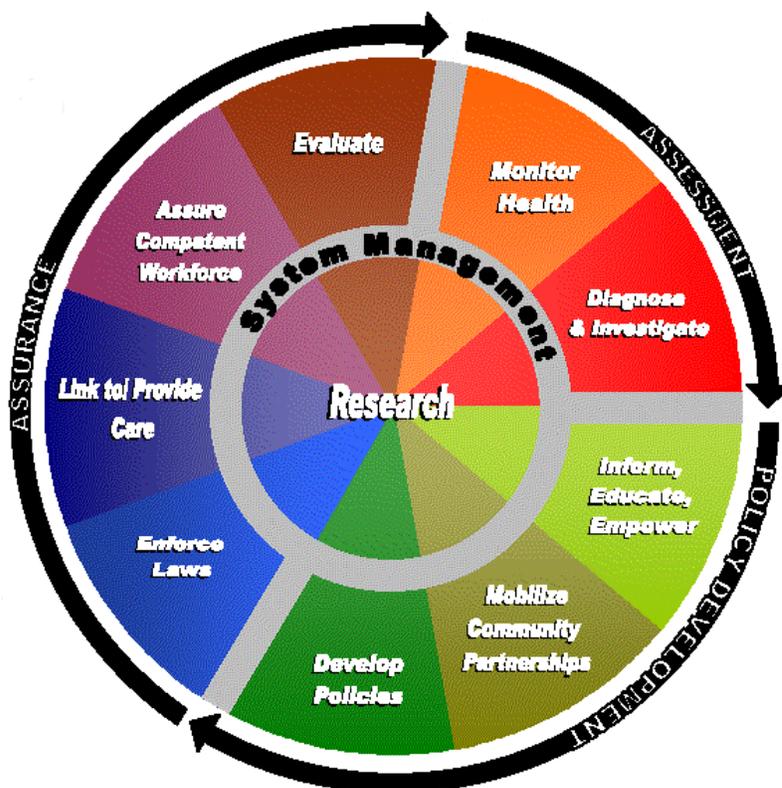
**Vision**

*Montana will have an operational trauma system demonstrating fiscal responsibility. Stability will be sustained through current funding mechanisms, additional allocation of dedicated state funding, development of new funding mechanisms, collaboration with other entities or agencies, and/or development of state and industry reimbursement strategies for system participants.*

**Background**

Costs related to trauma care are incurred not only by the victim but also by multiple organizations within a trauma system, such as public agencies, pre-hospital entities, acute care facilities, and rehabilitation providers. Funding for trauma care, as for health care in general, is currently based on payment for services delivered. Reimbursement by governmental payors (Medicare and Medicaid) does not fully cover the cost of trauma care for their beneficiaries. There is, in addition, the cost burden of uncompensated care provided to the 50 million uninsured Americans. Recent survey data indicates that as many as 18% of Montanans between the ages of 0 and 64 are uninsured (165,600 in 2002).

The proven public health approach for systematic problem identification and problem solving are demonstrated in the three core functions and ten essential services. The following table illustrates how these three core functions and ten essential services can be applied to the trauma system to develop a common framework for coordination of efforts.



Recognition of the value of optimum trauma care should translate into financial benefits for facilities seeking designation. Absorbing non-reimbursed costs and paying ever-increasing liability costs reduces the funding available for proactive trauma education<sup>11</sup> Smaller facilities that see major trauma patients infrequently require assistance in appropriate coding to bill efficiently for trauma services provided.

The following table estimates the cost of traumatic deaths in Montana for a single year as being \$1,271,655,000. This estimate does not include the costs incurred by those surviving the traumatic event who recover or those left with temporary or permanent disabilities. It is imperative to understand how expensive trauma is to Montana.

## Total Cost of Fatal Injuries by Age Group

### Montana

Based on 2000 Incidence (Cost in 2002 Dollars)

<b>Mechanism</b>	<b>Total</b>	<b>0-20</b>	<b>21-44</b>	<b>45-64</b>	<b>65-84</b>	<b>85+</b>
<b>Total Costs</b>	<b>\$1,271,655,000</b>	<b>\$343,182,000</b>	<b>\$628,221,000</b>	<b>\$221,313,000</b>	<b>\$64,722,000</b>	<b>\$14,217,000</b>
<b>Unintentional Total</b>	<b>\$844,636,000</b>	<b>\$257,578,000</b>	<b>\$384,831,000</b>	<b>\$137,922,000</b>	<b>\$50,883,000</b>	<b>\$13,421,000</b>
Cut/Pierce	\$0	\$0	\$0	\$0	\$0	\$0
Drowning/Submersion	\$41,851,000	\$20,511,000	\$18,201,000	\$1,311,000	\$1,828,000	\$0
Fall	\$75,812,000	\$14,440,000	\$23,131,000	\$11,442,000	\$18,214,000	\$8,585,000
Fire/Burn	\$11,679,000	\$5,899,000	\$0	\$4,958,000	\$665,000	\$157,000
Firearm	\$16,072,000	\$11,916,000	\$2,955,000	\$1,200,000	\$0	\$0
Machinery	\$7,646,000	\$0	\$2,525,000	\$4,597,000	\$269,000	\$255,000
Motor Vehicle Traffic						
Subtotal	\$480,829,000	\$158,151,000	\$241,541,000	\$63,334,000	\$15,582,000	\$2,221,000
<i>Occupant</i>	\$388,801,000	\$137,599,000	\$189,026,000	\$49,824,000	\$10,835,000	\$1,517,000
<i>Motorcyclist</i>	\$23,197,000	\$0	\$16,815,000	\$5,642,000	\$740,000	\$0
<i>Pedal Cyclist</i>	\$19,836,000	\$11,940,000	\$4,661,000	\$3,235,000	\$0	\$0
<i>Pedestrian</i>	\$20,095,000	\$5,625,000	\$9,763,000	\$2,892,000	\$1,339,000	\$476,000
<i>Unspecified</i>	\$28,901,000	\$2,986,000	\$21,277,000	\$1,741,000	\$2,668,000	\$228,000
Pedal Cyclist, Other	\$2,436,000	\$0	\$2,436,000	\$0	\$0	\$0
Pedestrian, Other	\$11,743,000	\$8,620,000	\$2,154,000	\$968,000	\$0	\$0
Land Transport, Other	\$14,857,000	\$2,995,000	\$4,877,000	\$6,515,000	\$469,000	\$0
Transport, Other	\$29,142,000	\$6,022,000	\$14,870,000	\$6,158,000	\$2,091,000	\$0
Natural/Environment	\$43,238,000	\$8,786,000	\$17,830,000	\$14,632,000	\$1,716,000	\$274,000
Poisoning	\$52,356,000	\$5,597,000	\$39,274,000	\$6,845,000	\$442,000	\$199,000
Struck by/Against	\$6,425,000	\$0	\$2,525,000	\$3,463,000	\$437,000	\$0
Suffocation	\$27,780,000	\$11,643,000	\$7,737,000	\$6,094,000	\$1,921,000	\$385,000
Other	\$8,230,000	\$0	\$2,399,000	\$1,842,000	\$3,601,000	\$388,000
Unspecified	\$14,540,000	\$2,997,000	\$2,375,000	\$4,562,000	\$3,648,000	\$957,000
<b>Self-inflicted total</b>	<b>\$307,739,000</b>	<b>\$53,718,000</b>	<b>\$176,535,000</b>	<b>\$64,360,000</b>	<b>\$12,330,000</b>	<b>\$795,000</b>
Cut/Pierce	\$6,319,000	\$0	\$5,502,000	\$0	\$817,000	\$0
Firearm	\$203,238,000	\$41,724,000	\$110,633,000	\$40,632,000	\$9,454,000	\$795,000
Poisoning	\$44,871,000	\$3,000,000	\$26,503,000	\$15,062,000	\$306,000	\$0
Suffocation	\$50,241,000	\$8,994,000	\$31,453,000	\$8,667,000	\$1,127,000	\$0
Other	\$626,000	\$0	\$0	\$0	\$626,000	\$0
Unspecified	\$2,444,000	\$0	\$2,444,000	\$0	\$0	\$0
<b>Assault total</b>	<b>\$85,197,000</b>	<b>\$25,889,000</b>	<b>\$49,761,000</b>	<b>\$8,508,000</b>	<b>\$1,040,000</b>	<b>\$0</b>
Cut/Pierce	\$14,343,000	\$2,798,000	\$11,545,000	\$0	\$0	\$0
Firearm	\$42,303,000	\$14,742,000	\$22,384,000	\$5,178,000	\$0	\$0
Struck by/Against	\$793,000	\$0	\$0	\$0	\$793,000	\$0
Other	\$26,443,000	\$8,349,000	\$15,832,000	\$2,015,000	\$247,000	\$0
Unspecified	\$1,315,000	\$0	\$0	\$1,315,000	\$0	\$0
Undetermined	\$29,849,000	\$5,997,000	\$14,723,000	\$8,660,000	\$469,000	\$0
Legal or Military	\$4,234,000	\$0	\$2,371,000	\$1,863,000	\$0	\$0

Source: Children's Safety Network Economics & Data Analysis Resource Center, at Pacific Institute for Research and Evaluation, Calverton, MD, 2004. Incidence based on the National Center for Health Statistics Multiple Cause-of-Death File, 2000. The costs were adapted using state-specific price adjusters.

**Goals and Objectives**

1. Montanans will recognize the value of the Montana trauma system.
2. Funding sources for sustaining trauma system development and implementation will be explored.
3. An open dialogue with managed care organizations, public and private, and other payers will facilitate greater mutual understanding of the costs of providing health care, ultimately leading to equitable payment mechanisms.
4. Prevention of traumatic injury will be a strong component of the system to proactively reduce overall system costs.
5. The trauma system will partner with others to advocate for key safety legislation.

**Montana Trauma System**  
Infrastructure Element

**RESEARCH AND EVALUATION**

**Vision**

*Montana will identify, through quality/performance improvement activities using data and other data sets, areas that require investigation for potential change as they relate to rural trauma care.*

**Background**

The EMSTS Section of Montana’s DPHHS, responsible for trauma system implementation, commissioned The Critical Illness and Trauma Foundation (CIT) in 1992 for the first rural preventable mortality studies in Montana. Montana was the first state to conduct a statewide preventable mortality study prior to trauma system implementation. The initial studies of deaths occurring in 1990 due to mechanical trauma highlighted both that Montana’s injury rates were higher than the national average and that there were preventable mortalities related to specific processes in patient care. Those specific patient care processes occurring in pre-hospital and acute care settings, identified issues that directly affect trauma care for the trauma system to address.

**1998 Mechanism of Injury**

Mechanism	#	%
Motor Vehicle Crash	199	57.3
Fall	47	14.0
Gunshot Wound	28	8.0
Pedestrian Struck	13	3.7
Motorcycle Crash	9	2.5
Agricultural	8	2.3
Aircraft	8	2.3
Stab Wounds	5	1.4
Industrial	3	0.8
Train	3	0.8
Other	24	7.0
Total	347	100

A subsequent study of mechanical trauma deaths occurring in 1998 was undertaken to compare the preventable death rate, the nature and degree of inappropriate trauma care in Montana both prior to and after efforts to initiate a voluntary trauma system.

Gender distribution was 73% male and 28% female. Mean age of patients evaluated was 44 with a range from < 1 to 96 years, and a median of 42 years.

The racial distribution was 82% Caucasian, 15% American Indian and 3% Other. The table illustrates the injury cause for those patients included in the 1998 study.

Information was obtained on alcohol use for 72% of all cases reviewed. Of these, 45% tested positive for alcohol use, 35% of whom were legally intoxicated (>.10gm/100 DL)

according to Montana statutes. Positive blood alcohol levels were noted in 68% of those dying as a result of motor vehicle crashes. For motor vehicle occupant fatalities where information on restraint use was available, 27% of occupants were restrained and 73% were unrestrained.

For all motor vehicle crashes reviewed, 43% involved single vehicle rollovers and 74% of those decedents were reportedly ejected from the vehicle.

### Preventable Deaths 1990 and 1998

Preventability	1990 Deaths		1998 Deaths	
	#	%	#	%
Frankly Preventable	5	2	2	1
Potentially Preventable	36	11	23	7
<b>Total Preventable Deaths</b>	<b>41</b>	<b>13</b>	<b>25<sup>†</sup></b>	<b>8</b>
Non-Preventable Deaths	283	87	322	93
Total Cases	324		347	

<sup>†</sup>Significance p = .02

In comparison to the results of the 1992 preventable mortality study, the 1998 preventable death rate decreased (8% vs. 13%; p=.02). The overall 1998 preventable death rate was 8%. In those patients who died after being treated at a hospital, the preventable death rate was 15%. The overall rate of inappropriate care was 36% with 22% in the pre-hospital and 54% in-hospital phases of care. The majority of inappropriate care in all phases of care revolved around airway and chest injury management. The emergency department was the phase of care in which the majority of deficiencies were noted.

The panel identified the following factors as they affect the care of a patient, regardless of preventability; activation of a full resuscitation team, pre-notification by pre-hospital providers, timeliness of team arrival, destination of transfer, timeliness of transfer, delay in discovery of patient, and cultural considerations.

Other issues considered;

EMS at the scene but no report generated; inability of pre-hospital personnel to pronounce patient dead in the field; and inaccessible or missing records. Added to the review for the 1998 study was a category titled "Trauma System Issues" The following table summarizes distribution of identified trauma system issues.

### Trauma System Issues (N = 347)

Death Was	Frankly/ Possibly Preventable	Non- Preventable No Care	Non- Preventable Care Appropriate	Non- Preventable Care Inappropriate	Total	
	n = 25	n = 156	n = 66	n = 100	N = 347	
Trauma System Issue	#	#	#	#	#	%
Activation of full team	4	0	1	8	13	4
No pre-notification		1	1	1	3	1
Arrival of team	1	0	1	4	6	2
Destination of transfer	0	0	0	3	3	1
Timeliness of transfer	2	0	1	9	12	3
Delay in discovery	1	39	1	4	45	13
Cultural considerations	2	4	0	0	6	2
PH transport of deceased	1	0	0	3	4	1
Futile pre-hospital care	0	0	0	2	2	1
Denied/Missing reports	0	3	6	2	11	3

Lack of PH documentation	1	55	0	0	56	16
Other	3	1	8	15	27	8
<b>Total</b>	<b>15</b>	<b>103</b>	<b>19</b>	<b>51</b>	<b>188</b>	

The rate of inappropriate care also decreased for the pre-hospital and emergency department phases of care (37% vs. 22% p < .01; and 68% vs. 40%, p = .02). The inappropriate care rate in the post ED phase of care remained similar. Population characteristics influencing inter panel reliability were similar for the two groups compared. Inter-panel reliability was good. ( $\kappa = .80$ )

### Adjusted and Unadjusted Rates of Inappropriate Care 1990 and 1998

Phase of Care	Inappropriate Care Related to	Occurrences		% Patient Contacts		% Total Patients N=324 N=347	
		1990	1998	1990	1998	1990	1998
<b>Pre-hospital</b>	Airway management	22	29	16.8	15.1	6.8	8.0
<b>(n = 131) 1990</b>	Bleeding control	0	1	0.0	.5	0.0	0.2
<b>(n = 191) 1998</b>	C-spine immobilization	10	20	7.6	10.4	3.1	5.7
	Fluid resuscitation	4	0	3.1	0.0	1.2	0.0
	Fracture stabilization	2	0	1.5	0.0	0.6	0.0
	PASG use	7	0	5.3	0.0	2.2	0.0
	Other	9	7	6.9	3.6	2.8	2.0
<b>Total PH</b>		<b>54</b>	<b>57</b>				
<b>Emergency Dept.</b>	Airway management	18	27	15.0	17.6	5.6	7.7
<b>(n = 120) 1990</b>	Chest injury management	26	16	21.7	10.4	8.0	4.6
<b>(n = 153) 1998</b>	Fluid resuscitation	18	22	15.0	14.3	5.6	6.3
	Intravenous placement	8	6	6.7	3.9	2.5	1.7
	PASG use	3	0	2.5	0.0	0.9	0.0
	Intra-abdominal injury eval.	11	8	9.2	5.2	3.4	2.3
	Use of vasoactive drugs	15	15	12.5	9.8	4.6	4.3
	Injury recognition	10	17	8.3	11.1	3.1	4.8
	Radiographic imaging	10	13	8.3	8.4	3.1	3.7
	Other	9	17	7.5	11.1	2.8	4.8
<b>Total ED</b>		<b>*128</b>	<b>141</b>				
<b>Post ED</b>	Inappropriate operation	6	8	10.5	10.3	1.9	2.3
<b>(n = 57) 1990</b>	Fluid management	5	6	8.8	7.7	1.5	1.7
<b>(n = 77) 1998</b>	Head injury management	7	8	12.3	10.3	2.2	2.3
	Management of infection	3	**0.0	5.3	0.0	0.9	0.0
	Management of re-bleeding	1	3	1.8	1.9	0.3	0.8
	Ventilator management	3	9	5.3	11.6	0.9	2.5
	Other	10	12	17.5	15.5	3.1	3.4
<b>Total Post ED</b>		<b>35</b>	<b>46</b>				
<b>Total All Phases</b>		<b>217</b>	<b>244</b>			<b>66.9</b>	<b>70.3</b>

\*Some patients were noted to have multiple errors in a single phase of care.

\*\*While there were 4 deaths in this sample that died of sepsis, the panel attributed errors in care to the underlying etiology rather than sepsis per se.

The conclusion of the 1998 study in comparison to that of 1992 was that efforts to initiate a voluntary trauma system have had a positive effect on the preventable death rate and rate of inappropriate care.

The most significant steps taken for trauma system development were; increased trauma education, ACS verification of the Regional Trauma Centers, and STCC and RTAC implementation. However, rates of preventable death have not yet reached those attained in mandated, funded, and mature rural trauma systems. The study suggested that adopting mandated policies and allocating appropriate levels of resource may be the most effective strategies to move the Montana Trauma System forward.<sup>10</sup>

The goal is for the entire trauma system to be driven by data and based on quality/performance improvement. Trauma registry is an excellent source of state data for quality/performance improvement purposes. Linking this data with other sources such as the pre-hospital registry and other databases will provide additional information on which to improve the system.

The STCC quality improvement subcommittee is developing a comprehensive quality improvement and system evaluation plan. Evaluating the preventable death rate is a critical outcome measure of a system's effectiveness. Identification of other outcome measures and pertinent process improvement strategies continues. The goal is to develop a plan that focuses on the processes of the regional and statewide trauma system. Assessment of facility quality/performance improvement will occur during trauma center designation.

### **Goals and Objectives**

1. STCC will identify trauma system elements requiring evaluation and develop action plans for data collection and interpretation.
2. The trauma registry will be modified for use by smaller facilities.
3. STCC will research existing trauma system quality/performance improvement programs for "best practices" in the development of a comprehensive quality improvement and trauma system evaluation plan.
4. There will be an organized approach to quality/performance improvement in the trauma system based on standards and procedures for data collection, reporting, feedback mechanisms, and committee structure evaluation.
5. STCC will develop working relationships within secondary education systems to foster interest in trauma research in graduate health programs.
6. EMSTS Section will continue to partner with pertinent entities for future trauma research in Montana.

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<sup>10</sup> *1998 Rural Preventable Mortality Study with a comparison to the 1990 Preventable Mortality Study*  
Esposito, Reynolds, Sandaal Critical Illness and Trauma Foundation, Inc. Bozeman, MT, June 2002

## **Montana Trauma System**

### Infrastructure Element

## **TECHNOLOGY**

### **Vision**

*Montana's Trauma System will be supported by technological strategies that optimize communication and expedite patient care delivery. Technologies will be utilized to increase availability and economic feasibility of continuing education.*

### **Background**

Technology plays an important role in the organization, delivery, and effectiveness of trauma services and will continue to do so.<sup>11</sup>

**Automobile:** In Montana, completion of enhanced 9-1-1 services throughout the state is a technological imperative to assist in alleviating the delay-in-discovery inherent to rural roads and single-vehicle crashes.

**Data Technology:** The EMSTS Section is developing a comprehensive, web-based pre-hospital database. Being phased in over several years, the project consists of an office management module, a resource inventory module, and pre-hospital data collection module. The management module will replace an outdated database, which is currently being used to collect basic demographic information about personnel, agencies and other contacts needed for daily operations. Additionally, it serves as a management tool for the EMS service-licensing program. The new database offer better functionality for daily office activities and for making EMS licensing electronic, facilitating additional time for staff to focus on training, education and quality/performance improvement roles. The resource inventory module will inventory personnel, emergency and disaster response agencies, hospitals and other components of the EMS, trauma and disaster response systems. This module will provide the information needed to support an ambulance mobilization plan for EMS mutual aid response to large-scale incidents and hospital surge capacity scenarios. The last module for pre-hospital data collection will be the web-based tool for EMS services to input their patient care record, which is now done universally on paper. Not only will this electronic system provide for better documentation, it will support a long-term goal of providing information for the local, regional and state to manage resources, do long-term strategic planning and promote quality/performance improvement.

**Telemedicine:** The development of telemedicine networks, connecting the large medical centers with hospitals and clinics in their service regions, has been flourishing in Montana.

Telemedicine uses in a state with such vast travel distances are numerous and continue to develop. Teleradiology is the most widely deployed application of telemedicine. In an ideal world, there would be a radiologist physically available at every facility capable of

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<sup>11</sup> American Trauma Society "Trauma System Agenda for the Future" Draft, April 2002

taking radiographs, but in our rural environment this is not feasible. In the past year teleradiology, which refers to the transmission of images between enterprises, has begun to integrate with PACS (Picture Archive and Communication Systems), which refers to image acquisition, management, and transmission within a single enterprise. Telepathology has also been accomplished utilizing the telemedicine networks. Telemedicine technology connects rural and urban physicians for routine or emergency teleconsultation for treatment purposes. Montana also employs the use of telemedicine for patient consultations with specialty physicians.

From its inception, telemedicine has been a natural partner to distance learning. Physician, nursing and EMS continuing education is being provided via telemedicine. Both the Eastern and Central RTACs have successfully utilized telemedicine to link facilities for the quarterly regional meetings. The capacity of this technology in a state the size of Montana cannot be underestimated.

**Communications:** Much of the current EMS and hospital communications system is aged and in need of replacement. Additionally, FCC is moving forward with a requirement that all radios meet the Project 25 digital standards by 2013. Therefore a statewide inventory of the hospital and EMS radios is being conducted. A communications plan will be developed to provide for the replacement of this radio system well in advance of the FCC requirement; and grant funding will be sought to assist with the purchase of needed equipment. The P-25 standard enables a more extensive 'farming' of radio frequencies allowing less congested and more reliable communications among agencies. Additionally, the digital standard allows for more secure and encrypted communications of patient care information. A demonstration project of this technology is underway in several counties in northeastern Montana. The project, funded by an emergency preparedness grant, includes placing digital base stations and mobiles in the hospitals and ambulances of the area. Additionally, other technologies which complement this system will be tested for utility and cost effectiveness. They include electronic transmission of EKG and other patient information, transmission of video and GPS vehicle tracking data.

### **Goals and Objectives**

1. Montana will achieve 100% enhanced 9-1-1 coverage
2. Development, implementation, and evaluation of the EMSTS web-based database will occur.
3. Alternate technologies will maximize the dissemination and sharing of trauma care information statewide.
4. A statewide inventory of the hospital and EMS radios will be conducted, a communications plan for the replacement of the current radio system will be developed, and grant funding will be sought to assist with the purchase of needed equipment.