

Trauma System in Colorado

Pre-Review Questionnaire Prepared for the
American College of Surgeons Consultative Visit

May 17-20, 2009



Colorado Department
of Public Health
and Environment

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Emergency Medical and Trauma Services Section
Health Facilities and EMS Division
Colorado Department of Public Health and Environment
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Acronyms

BME	Colorado Board of Medical Examiners
CAMTS	Commission on Accreditation of Medical Transport Systems
CCEC	Community Clinic with Emergency Center (a type of state licensure)
CDC	Centers for Disease Control and Prevention
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CICRC	Colorado Injury Control Research Center
CSTE	Council of State and Territorial Epidemiologists
CTN	Colorado Trauma Network
DMEMSMDS	Denver Metro EMS Medical Directors
DRC	Designation Review Committee
DTRS	Digital Trunk Radio System
EMS	Emergency Medical Services
EMT	Emergency Medical Technician
EMTS	Emergency Medical and Trauma Services
EPRD	Emergency Preparedness and Response Division
FARS	Fatality Analysis Reporting System
FTE	Full Time Equivalent (a full-time position)
HFEMSD	Health Facilities and EMS Division
HPP	Hospital Preparedness Program
ICPG	Injury Community Planning Group
ISS	Injury Severity Score
ISVP	Injury, Suicide and Violence Prevention
MAC	Mutual Aid Channels
MATRIX	Colorado <u>E</u> MS <u>A</u> mbulance <u>T</u> rip <u>R</u> eport <u>I</u> nformation <u>E</u> xchange
MCH	Maternal and Child Health
MCI	Mass Casualty Incident
MDC	Medical Direction Committee
NEMSIS	National EMS Information System
NHTSA	National Highway Traffic Safety Administration
NTDB	National Trauma Data Bank
NTDS	National Trauma Data Standards
NVDRS	National Violent Death Reporting System
OSP	Office of Suicide Prevention
PECC	Pediatric Emergency Care Committee
RETAC	Regional Emergency Medical and Trauma Advisory Council
RPTC	Regional Pediatric Trauma Center (a Level I pediatric trauma center)
SCI	Spinal Cord Injury
SEMTAC	State Emergency Medical and Trauma Services Advisory Council
S(r)NAP	Standardized Regional Needs Assessment Project
STIPDA	State and Territorial Injury Prevention Directors Association

TBI
(the) department

Traumatic Brain Injury
Colorado Department of Public Health and Environment

Introduction

Colorado's History

While Colorado was not settled by Europeans until the 1850s, it was the home to Native American cultures for millennia. The Anasazi developed their cliff dwelling culture from 1 A.D. to 1200 A.D. While the Utes lived in the mountains, the Cheyenne and Arapahoe resided on the plains from the Arkansas to the Platte rivers. The Kiowas and Comanches lived south of the Arkansas River. The Pawnee tribe hunted buffalo along the Republican River and the Sioux sometimes hunted on the outskirts of the Cheyenne and Arapahoe lands.

In 1825, fur traders and trappers began to explore and exploit the state. Several outposts and forts were established to support the fur trade. The earliest permanent European settlements



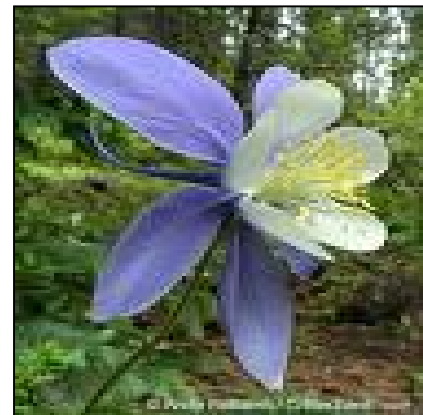
were planted in the San Luis Valley in 1851. The discovery of gold in 1858 in what is now Denver spurred a gold rush and later silver rush leading to the exploration and settlement of many mountain areas. Dry land and irrigated farming spread across much of the state.

Colorado, the "Centennial State," became the 38th state admitted to the union on August 1, 1876. The name "Colorado" comes from the Spanish word for "red" and refers to the color of the soil and sometimes the rivers in

Colorado. Colorado was the 2nd state to extend suffrage to women in 1894 and has been known for its independent spirit since it was first settled. Our state bird is the lark bunting, and the state flower is unparalleled for beauty: the Colorado Columbine.

Colorado's Population

Colorado's population growth has demonstrated cycles of boom and bust beginning in the gold rush days. In 2007, the estimated population of Colorado was 4.9 million, an increase of almost 50 percent over 17 years. Colorado's population, according to the 2000 Census, was majority white with only 2.3 percent of Asian descent, 3.7 percent of African American origin, and 0.7 percent of Native American descent. More than 17 percent of the population is of Hispanic origin, and several counties in the state are majority Hispanic.



Colorado's Medical Resources

Colorado has 77 acute care hospitals across the state. Of the 64 counties in Colorado, 18 of the rural counties have no hospital. Sixty-five of the hospitals are designated as trauma centers.

Of the 12 hospitals that are not designated trauma centers, seven are located close (less than 6 miles) to a designated trauma center, and five are in rural/frontier areas far from other trauma centers.

In addition to designating hospitals as trauma centers, Colorado allows facilities licensed as community clinics with emergency centers (CCECs) to become designated trauma centers, if they meet the minimum requirements. Five of Colorado's CCECs, all located in ski areas or other remote mountain regions, are designated trauma centers. Throughout this document trauma center and trauma facility are used interchangeably and are defined in rule as any hospital or CCEC designated by the state as a Level I – V trauma center.

Trauma in Colorado

Trauma is a major source of morbidity and mortality in Colorado. Trauma is the third leading cause of death overall, behind heart disease and cancer, and results in approximately 3,000 deaths per year. Injury (including both trauma and poisoning) is the leading cause of death for Coloradans ages 1-44. In Colorado, the leading cause of injury death is suicide. As with several other western states, Colorado leads the nation in its suicide rate. Colorado's national rank hovers between 6th and 8th highest. The suicide rate in Colorado is nearly 1.5 times that of the national rate.

While falls are the leading cause of injury hospitalizations, vehicular crashes are the second leading cause of both injury death and injury hospitalization in Colorado. The state's lovely mountains lead to many opportunities for unintentional injury including motor vehicle and ATV crashes, skiing and snowboarding, biking, hiking, horseback riding, etc. With all causes combined, more than 34,500 persons were hospitalized for an injury in 2006, of whom almost 32,000 were Colorado residents.

Colorado's Trauma System

In the late 1980s and early 1990's, as trauma systems were beginning to develop across the country, an unofficial trauma "network" began coalescing in Colorado. A non-profit group, the Colorado Trauma Institute (CTI), provided technical assistance to hospitals interested in becoming verified by the American College of Surgeons.

In 1995, legislation was passed creating a state-regulated voluntary inclusive trauma system, with the Colorado Department of Public Health and Environment as the lead state agency. It took several years of intense community activity to establish the rules and processes necessary to begin the state trauma designation and trauma registry data collection processes. Early estimates were that approximately half of the acute care hospitals in the state would seek trauma designation. Instead, 84 percent of the hospitals are designated for trauma including 24 critical access hospitals and an additional 13 rural acute care hospitals, representing 86 percent of rural hospitals. As a trauma community, Colorado has placed an emphasis on the involvement of rural trauma centers and thus is justifiably proud that so many rural facilities

choose to be involved. The inclusive nature of the Colorado trauma system has been a state focus since inception of a formal system in 1995.¹²⁶

Originally, the trauma system was structured with an advisory council that was separate from the previously established statewide EMS advisory council created through legislation in 1979. In 2000, additional legislation merged the two systems and two councils creating a new EMTS advisory council called the State Emergency Medical and Trauma Services Advisory Council or SEMTAC. The same legislation established a system of Regional Emergency Medical and Trauma Advisory Councils (RETACs) and a funding mechanism to assure that regional system development would also take place.

Since that time, much has been accomplished. The trauma designation process has become well established. Some hospitals are now on their fourth three-year cycle of trauma designation. The Colorado Trauma Registry now contains more than 10 years of data with nearly 240,000 records from Level I-III trauma centers. In addition, the registry has access to hospital discharge data from all acute care hospitals in the state and can create a relatively complete picture of hospitalizations due to injury. Injury prevention activities are required of all designated trauma centers; over time, these activities have grown in scope and are often based on specifics provided by local trauma center or RETAC data.

A lot has been accomplished, but a lot remains to be done. There have been sizable barriers to effective system development, not the least of which is the limitation of funding. The trauma designation process is entirely funded by the fees charged to facilities undergoing trauma designation reviews. Trauma system development occurs largely as a byproduct of trauma designation and related activities, and historically, the total number of department employees carrying out these tasks has been just over 2.0 FTE. Another barrier with this small staff is the limited expertise of the staff; the Trauma Program manager has a strong public health background but no clinical background. Her predecessor had very strong quality improvement skills but no public health background. The trauma community has generously stepped forward and often provided the clinical knowledge and expertise necessary to fill gaps. Trauma centers have shared information, policies, forms and quality improvement tools and have provided coaching, sometimes on-site, for facilities that are struggling. In reality, though, voluntary assistance cannot meet all the developmental needs of a maturing trauma system.

Initially, sufficient funding was available to establish the state trauma registry, however in recent years, funding for the registry has been minimal. The recent hiring of an EMS and Trauma Data Program manager has significantly increased the ability to produce information from the trauma registry. But again, the limitations in time and staffing have hampered efforts to develop additional components of the trauma system. Thus the Trauma Program staff has focused its system development activities on designation of trauma centers, data collection, and collaborative public health efforts.

Many opportunities for growth remain. One such opportunity is better integration of the trauma system with other potential community partners such as mental health, social services

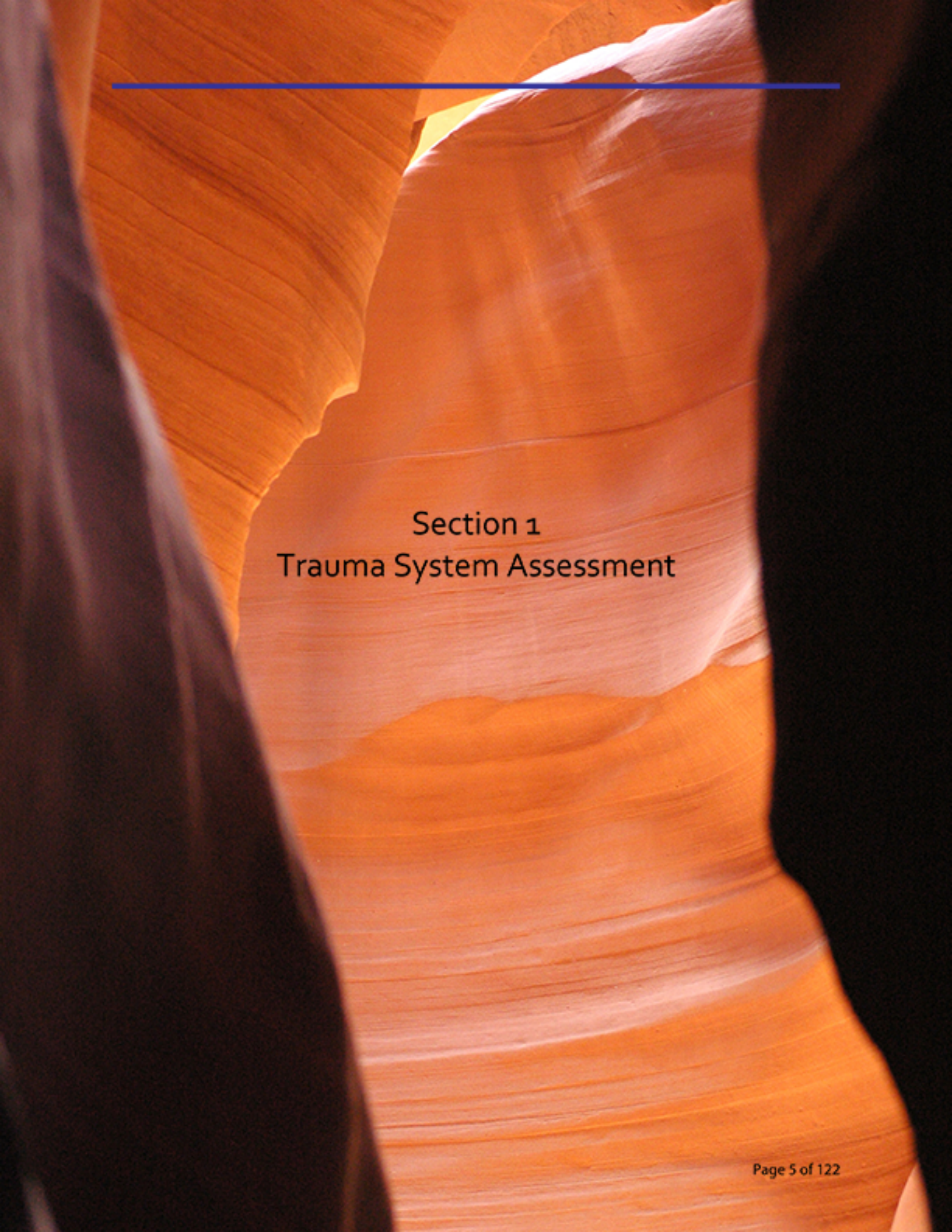
and/or rehabilitation. These potential partners have not been involved and could lend substantial breadth to trauma system development activities. It is the belief of the staff, and the trauma community in general, that the ACS consultation process will be the beginning of a new era with a clarified vision and renewed collaboration that will result in improved trauma care across Colorado.

PRQ Organization

The attached application is laid out in the order that the questions are posed in the *Systems Consultation Guide*. The PRQ (i.e. the answers to the questions) is being provided to you in hard copy and in soft copy on the enclosed CD. The attachments or reference documents are all available on the CD or on the Internet. To find the reference material, simply locate the desired chapter in the soft copy PRQ and click on the link (you must be connected to the Internet to find many of the reference materials). Staff chose this format for several reasons. Colorado's Governor Bill Ritter has made a serious commitment to the greening of government and has ordered that staff eliminate the use of paper whenever possible. In addition, the staff wanted to provide you with an array of information that did not easily lend itself to print copy. If you have any difficulty accessing information, please contact the Trauma Program Manager at (303) 692-2983 or the Trauma Program Assistant at (303) 692-2443 for assistance.

The EMTS Section has worked diligently to accurately depict the current status of trauma system development in Colorado. The PRQ describes system accomplishments and acknowledges where challenges still remain. To the best of our ability we have provided current data, charts, or studies, to assist the reviewers in gaining an understanding of trauma care and the trauma system in Colorado. The EMTS Section as well as the trauma community constituents is looking forward to your consultative visit and final report providing guidance and recommendations for system enhancements, thus improving care to the injured patient in Colorado.

The Trauma Program and the entire EMTS Section says, "Welcome to Colorado!"



Section 1

Trauma System Assessment

Injury Epidemiology

From 1992 to 2007, the department had a defined Injury Epidemiology Program, first in the Disease Control and Environmental Epidemiology Division and in 1997, subsequently moved to the Prevention Services Division. The majority of the funding for the Injury Epidemiology Program came from federal funds through cooperative agreements with the Centers for Disease Control and Prevention (CDC). In 1996, a small amount of state money became available to create the Colorado Trauma Registry (with data collection beginning in 1997) and the Colorado EMS Ambulance Trip Report Information Exchange (MATRIX) (multiple efforts over the past 10 years, with the current system beginning in 2006). The Colorado Trauma Registry and the Colorado MATRIX, described in more detail in the [Trauma Management Information Systems chapter](#), are highly robust databases used to support decision-making by the Trauma Program. In 2007, a restructuring in the Prevention Services Division resulted in the elimination of the Injury Epidemiology Program. As of July 2007, injury epidemiology work is now conducted by staff in three areas of the department: the Health Statistics Section in the Center for Health and Environmental Information and Statistics; the Epidemiology, Planning, and Evaluation Branch of the Prevention Services Division; and the EMS and Trauma Data Program in the Health Facilities/EMS Division.

1. Describe the epidemiology of injury in your region and the unique features of children, adolescents, elderly people, and other special populations.

Detailed information on injury in Colorado is provided in the [Injury in Colorado](#) report and in topic specific [factsheets](#), [briefs](#), and [short reports](#).

The overview chapter of the *Injury in Colorado* report provides information on the leading causes of injury death and hospitalization for each age group through the lifespan. When appropriate, additional information for a given age group is also provided in each topic-specific chapter (for example, discussion of child passengers, teen drivers and elderly drivers in the chapter on Motor Vehicle Traffic).

Injuries are the leading cause of death for Coloradans ages 1-44. Since 1990, the injury death rate in Colorado has remained relatively stable at 60 deaths per 100,000 population. In 2007, there were 3,136 injury-related deaths of Colorado residents. Most individuals who die by injury do not survive long enough to receive inpatient care. Only 19% of injury deaths in Colorado occur after a person has been admitted to a hospital.

The leading causes of deaths from injury in Colorado are:

- a. Suicide (26% of all injury deaths)
 - The number of suicide deaths of Colorado residents increased from 612 in 2000 to 805 in 2007.
 - Colorado's age-adjusted suicide rate did not statistically change from 2001 to 2007. In 2005 (the latest year for national numbers), Colorado's age-adjusted

suicide rate at 17 per 100,000 population was the 7th highest in the nation (the US suicide rate in 2005 was 11 per 100,000).

- Approximately half of the suicides in Colorado result from use of a firearm.
- b. Motor vehicle traffic (18% of all injury deaths)
 - The number of motor vehicle traffic deaths of Colorado residents decreased from 714 in 2000 to 577 in 2007.
 - From 2000 to 2007, Colorado's age-adjusted MV traffic death rate decreased significantly from 16.6 per 100,000 to 11.8 per 100,000.
- c. Unintentional poisoning (18% of all injury deaths).
 - The number of unintentional poisoning deaths of Colorado residents increased from 251 in 2000 to 561 in 2007.
 - Colorado's age-adjusted rate for deaths due to unintentional poisoning doubled from 5.6 per 100,000 in 2000 to 11.0 per 100,000 in 2007.
 - Overall, the age-adjusted death rate for unintentional poisoning for men is nearly twice the rate for women (12.5 per 100,000 vs. 6.9 per 100,000). The death rate for unintentional poisoning is highest for males ages 35-44 (22 per 100,000).
- d. Falls (14% of all injury deaths)
 - The number of fall-related deaths of Colorado residents increased from 263 in 2000 to 441 in 2007.
 - Colorado's age-adjusted rate for deaths due to falls has increased significantly from 7.6 per 100,000 in 2000 to 11.5 per 100,000 in 2007.

In addition to injury deaths, nearly 35,000 injury hospitalizations occur each year. Nearly 8% of the injury hospitalizations involve out-of-state residents. The leading causes of injury hospitalizations in Colorado are:

- a. Falls (47% of all injury hospitalizations)
 - In 2006, more than 16,390 people were hospitalized in Colorado for a fall-related injury.
 - The majority of hospitalizations for fall-related injuries (62%) involve people ages 65 and older. More than one-third (38%) sustain a hip fracture and almost 10% sustain a traumatic brain injury. The leading cause of fall-related hospitalizations for adults ages 65 and older is a fall on the same level by slipping, tripping or stumbling (37% of the fall hospitalizations in this age group), however details regarding the circumstances of the fall are not available for 46% of the medical records for this age group.
- b. Transportation (18% of all injury hospitalizations)
 - In 2006, more than 6300 people were hospitalized in Colorado for a transportation-related injury.
 - The motor vehicle traffic hospitalization rate is highest for young adults ages 15-24 (127 hospitalizations per 100,000 population) and for adults ages 75 and older (128 per 100,000). For most age groups, the motor vehicle traffic hospitalization rate is statistically higher for males than for females.

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- Approximately 10% of the hospitalizations for injuries due to motor vehicle traffic involve out-of-state residents.
 - c. Suicide attempt (8% of all injury hospitalizations)
 - In 2006, more than 2770 people were hospitalized in Colorado for a suicide attempt.
 - The majority of these hospitalizations (80%) involved solid/liquid drug overdose.
 - Although suicide death rates are highest for males ages 75 and older (67 per 100,000), suicide attempt hospitalization rates are highest for females ages 15-24 (122 per 100,000).
 - d. Unintentional poisoning (4.5% of all injury hospitalizations)
 - In 2006, more than 1560 people were hospitalized in Colorado for unintentional poisoning.
 - Males and females are about equally likely to be hospitalized for unintentional poisoning but for different types of agents.
 - e. Assault (4% of all injury hospitalizations)
 - In 2006, more than 1400 people were hospitalized in Colorado for injuries due to assault.
 - Assault/child abuse is the leading cause of injury hospitalization for infants less than a year old.

2. Describe the databases that are used to formulate the injury epidemiology profile.

The following data sources are used by the department to define the problem of injury in Colorado:

- a. Death certificates, maintained by the department's Vital Records Section, are the primary source on deaths due to injury and serve as the point of case ascertainment for several of the injury surveillance systems at the department.
- b. Statewide Hospital Discharge Data, purchased from the Colorado Hospital Association, is an administrative database based on the UB-04 (Universal Billing Form, 2004). Injury records are selected based on ICD-9-CM diagnosis codes and external cause of injury codes. External cause coded data are available from 1995 forward.
- c. The [Colorado Trauma Registry](#) is a state-mandated database that contains data from Level I, II and III trauma facilities. This database, maintained by the EMS and Trauma Data Program, is compliant with the National Trauma Data Standards.
- d. The Colorado Traumatic Brain Injury Surveillance, a data system funded by the CDC that includes information on deaths and hospitalizations due to traumatic brain injury. Data are collected from death certificates and hospital discharge data, with a review of a sample of medical records for additional information. This data system has been in existence since 1991.
- e. The [Colorado Violent Death Reporting System](#), a data system funded by the CDC, includes detailed information on violent deaths (suicides, homicides, and unintentional firearm-related deaths). Data are collected from death certificates, coroner reports, law enforcement investigations, the Supplemental Homicide Report, newspaper clippings, and Child Fatality Review.

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- f. The [Colorado Child Fatality Review](#) is conducted by a state-mandated, multi-disciplinary group that reviews all deaths of children ages 17 and younger. The data collected are compliant with the requirements of the National Maternal and Child Health (MCH) Center for Child Death Review ([MCH Colorado Child Fatality Review](#)).
 - g. The Colorado Behavioral Risk Factor Surveillance System (BRFSS), funded by the CDC and conducted by the Health Statistics Section at the department, contains information on injury risk factors collected from a statewide telephone survey of non-institutionalized Colorado adults. Injury-related topics include seatbelt use, drinking and driving, bicycle helmet use, smoke detectors in the home, a history of falls, and suicidal ideation/attempts.
 - h. The Colorado Youth Risk Behavior Survey (YRBS), conducted by the Health Statistics Section, contains information from a school-based survey of students in grades 9-12 on health risk behaviors, including seatbelt use, alcohol use and driving, suicidal behaviors, and violence/assault risk.
 - i. The Colorado Child Health Survey, conducted by the Health Statistics Section, contains information on health risk behaviors of children ages one through 14. Injury-related topics include use of child safety seats, boosters seats or seatbelts; helmet use while riding a bicycle or scooter, inline skating roller skating or skateboarding; and activities that resulted in an injury requiring medical attention.
 - j. The Colorado [Census of Fatal Occupation Injuries](#), conducted by the Health Statistics Section, contains information on deaths resulting from injuries sustained while on the job.
 - k. Worker's Compensation data, from the Colorado Department of Labor is available but has been rarely used by the department. With additional resources, this database will enhance the department's current understanding of work-related injuries.
 - l. Traffic Accident Reports, from the Colorado Department of Revenue and the Colorado State Patrol, have been linked to hospital discharge data, trauma registry data and prehospital (EMS) data.
 - m. Fatality Analysis Reporting System (FARS) data from the Colorado Department of Transportation provides information on deaths occurring within 30 days of a motor vehicle crash.
 - n. The Colorado [EMS Ambulance Trip Report Information Exchange \(MATRIX\)](#), a database of prehospital patient care reports maintained by the EMS and Trauma Data Program. This data system is compliant with the National EMS Information System ([NEMSIS](#)). Transport agencies are required to submit the National Elements subset of NEMSIS at least quarterly. Currently, about two-thirds of the prehospital transport agencies in Colorado routinely submit data to the database. Data are available from 2007 forward.

3. Have system epidemiology profile results (for example, mortality rates, distribution of mechanism or intent) been compared with benchmark values? If so, please provide comparisons and origins of the benchmarks.

The epidemiology of injury in Colorado is routinely compared to both national and other state profiles. Examples include:

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- a. In the *Injury in Colorado* report, comparisons are made to national and other state rates using information provided by CDC, including data from [WISQARS](#) (Web-based Injury Statistics Query and Reporting System), and [WONDER](#). Comparison is also made to the Healthy People 2010 Objectives established by the U.S. Department of Health and Human Services.
 - b. Colorado submits data annually to CDC for inclusion in the national [Injury Indicators](#) report. This report shows a comparison of rates among states for the leading causes of injury hospitalizations and deaths.
 - c. Colorado participated extensively in the report generated by the 17 states receiving funds from the CDC for the National Violent Death Reporting System. The [Multi-state VDRS report](#) describes the variation in suicide and homicide characteristics among states.
 - d. Comparison has been made to the results provided in the annual reports of the National Trauma Data Bank.

4. Describe how emerging injury control patterns were identified and acted on.

Examples of how injury data and analysis results have been used include:

- a. To inform the statewide injury prevention strategic plan (see [Colorado Injury Prevention Strategic Plan 2003-2008](#)) that addresses the leading causes of injury death and hospitalization in Colorado. The strategic plan has recently been updated with goals and objectives for 2008-2010. The updated injury prevention strategic plan is described in greater detail in the [Prevention and Outreach chapter](#).
- b. Identification of suicide as the leading cause of injury death in Colorado led to the passage of legislation in 2000 establishing the state-funded [Office of Suicide Prevention](#) at the department.
- c. To inform applications to CDC, Substance Abuse and Mental Health Services Administration (SAMHSA), Maternal and Child Health (MCH), the National Highway Traffic Safety Administration (NHTSA) and other federal agencies for funds for injury prevention (for example, funds from the Garrett Lee Smith Act for youth suicide prevention, funds from CDC for core injury prevention activities, and funds from CDC for elderly fall prevention).
- d. To direct the use of state and federal funds for prevention (for example, to identify counties with high rates of suicide deaths and hospitalizations to make decisions regarding the distribution of state funds from the Office of Suicide Prevention and federal funds from the Garrett Lee Smith Act; to identify counties at high risk for deaths/hospitalizations for child abuse to direct state funds from the Colorado Children's Trust Fund and funds from CDC for the ESCAPe (Enhancing State Capacity to Address Child and Adolescent Health through Violence Prevention) project; to identify high risk counties for childhood injuries to direct federal funds through the Maternal and Child Health block grant; to identify and monitor factors contributing to teen driving/motor vehicle-related deaths and hospitalizations to direct federal funds from the National Highway Traffic Safety Administration (NHTSA) through the Colorado Department of Transportation and Colorado State Patrol).

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- e. To provide injury surveillance data to the [Colorado Health Information Dataset](#), an on-line query system that allows users to access several department databases including injury deaths, hospitalizations and BRFSS data.
 - f. To inform public policy (for example, Colorado's graduated licensing law, child passenger safety laws, laws requiring carbon monoxide detectors in newly built homes to reduce rates of carbon monoxide poisoning).
 - g. To evaluate the effectiveness of prevention efforts (for example, an evaluation of a booster seat intervention project in day care centers, conducted in collaboration with the Colorado Injury Control Research Center (CICRC) at Colorado State University in Ft. Collins; an evaluation of an elderly falls prevention program, conducted in collaboration with the CICRC and the University of Colorado Health Sciences Center).
 - h. To evaluate the effectiveness of the state trauma system (for example, admission and transfer patterns, inpatient mortality rates, developing state norms for determining probability of survival (P_s), over-/under- trauma team activation, EMS response times for trauma patients).
 - i. To conduct/collaborate in injury research (for example, research on the relationship between occupation and suicide risk, conducted in collaboration with the Colorado Injury Control Research Center at Colorado State University in Ft. Collins; an exploratory study on the relationship between receipt of care through the Veterans Administration (VA) system and death by suicide, conducted in collaboration with the VA hospital in Denver; analysis of trauma registry data to create logistic regression modules for calculating probability of survival specific to Colorado norms).

5. Describe how on-going and routine injury surveillance is completed and how results are shared with constituent groups.

Each dataset described above has its own requirements and timelines for closure of case ascertainment and data collection. In general, death certificate, hospital discharge, and trauma registry data are available within 6 months of the end of the calendar year (for example, death and hospitalization datasets for 2008 will be closed by July 2009). For death certificate and hospital discharge data, analysis files are generated in August through October. Analysis is on-going throughout the year as needed for project completion.

Results are shared with constituent groups through:

- a. Creation of factsheets and brief reports. All factsheets and reports are distributed through listservs as well as posted to the web.
- b. Oral presentations to constituent groups (for example, injury prevention advocates, local public health departments, trauma hospitals, the State EMS and Trauma Advisory Council, law enforcement agencies, Colorado Dept. of Transportation, the Colorado Public Health Association). Depending on the topic and how general the analysis results, Powerpoint presentations are also posted to the web.
- c. Addition of each new year of injury data to the death and injury hospitalization modules of the [Colorado Health Information Dataset](#) on-line query system. Trainings on how to use COHID have been conducted with staff from local public health departments, safety advocate organizations, and trauma nurse coordinators.

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- d. Responding to *ad hoc* data requests.
 - e. Providing data to CDC for inclusion in multi-state reports.
 - f. Oral and poster presentations at national conferences and webinars, including those sponsored by the State and Territorial Injury Prevention Directors Association (STIPDA), CDC, the Council of State and Territorial Epidemiologists (CSTE), the Society for the Advancement of Violence and Injury Research (SAVIR), and the Association of State and Territorial Health Officials (ASTHO).
 - g. Collaborating with epidemiologists in other states to generate comparison reports (for example, the multi-state report using data from the National Violent Death Reporting System).

Indicators As a Tool for System Assessment

1. Has a multidisciplinary stakeholder group participated in the scoring and consensus process associated with the BIS tool?

No, however in preparation for the system consultation in May, Trauma Program staff has obtained input from constituents on the 16 required indicators mentioned in the consultation guide.

When HRSA's *Model Trauma System Planning and Evaluation* document was published in 2006, a committee of the State Emergency Medical and Trauma Services Advisory Council (SEMTAC) discussed some of the 120+ indicators, however, due to competing priorities and lack of staff time, the implementation of a comprehensive self-evaluation process was put on hold.

In preparation for the trauma system consultation, staff members have had discussions both internally as well as with external stakeholders statewide to generate scores on the 16 required indicators. A [list of locations and participants](#) providing feedback on the required indicators and/or on general system strengths and weaknesses is attached.

The results of the [stakeholder scoring](#) process are also attached.

In addition, the stakeholders were asked to identify both the strengths and the challenges of Colorado's trauma system as it currently exists. Frequently mentioned strengths include:

- Injury prevention efforts;
- Progress in system development;
- Collaboration, sharing best practices;
- Data collection;
- Interfacility transfer; and
- Quality improvement.

Frequently mentioned challenges include:

- Lack of funding/staff/resources for system development
- Lack of funding/poor reimbursement for trauma care;
- Interfacility transfer (especially critical care transport for rural areas);
- Lack of trauma system quality improvement efforts; and
- Recruitment and retention of health care professionals.

The detailed results from the stakeholder discussions are [attached](#).

2. If the process has been completed, how were the findings used?

The process has not been completed; however, the recent discussions with stakeholders about the 16 required indicators have been very insightful. It has been particularly interesting to

learn the field providers' impressions of the EMS and trauma system in their community and the state. The PRQ, including the scores for the 16 required indicators, will be made available to the public prior to the ACS consultative visit. Following the trauma system consultation and the review team's recommendations, it is likely that Colorado will complete the full BIS scoring and consensus process to better form the action plan that will ultimately be developed.

3. Is there a date (year/month) set for a reassessment using the BIS tool to mark progress toward agreed-on goals or benchmarks?

Timeframes for re-assessment will be included in the action plan prepared after the consultative visit.



Section 2

Trauma System Policy Development

Statutory Authority and Administrative Rules

The Colorado Department of Public Health and Environment is clearly established in statute as the lead agency for the development of a trauma system in Colorado. Since the passage of legislation in 1995, the department has worked with the EMS and trauma community to develop rules for trauma center designation, trauma and EMS data collection, mandatory transfer of severely injured patients, and prehospital triage. Rules are written or updated on a regular basis, with input from stakeholders, trauma experts and others, and with consideration of national norms and standards.

1. Describe how the current statutes and regulations allow the state or region to:

a. Develop, plan, and implement the trauma system

The department has statutory authority to develop an integrated trauma and EMS system. Legislation enacted in 1977 provided initial authority for regulatory oversight of portions of the Emergency Medical and Trauma Services (EMTS) system. The Colorado Emergency Medical and Trauma Services Act has been modified several times since then and, in 1995, a new section was added focusing on the statewide trauma care system. Specifically mentioned in the Colorado Emergency Medical and Trauma Services Act ([C.R.S. § 25-3.5-101 et seq.](#)) are the following responsibilities:

- Developing curricula for the training of EMS personnel;
- Certifying Emergency Medical Technicians (“EMTs” - currently done at the basic, intermediate, and paramedic levels);
- Establishing certification rules for EMTs, including training requirements and the use of results of criminal background reports;
- Authorizing the Colorado state Board of Medical Examiners (BME) to regulate the scope of practice of EMTs, subject to the medical direction of a licensed physician;
- Disciplining certified EMTs after investigating potential misconduct;
- Requiring licensure by counties of ground ambulance services, including minimum requirements for equipment, staffing, medical oversight, complaint investigation, and data collection and reporting to the department;
- Establishing and setting forth the duties of a governor-appointed State Emergency Medical and Trauma Services Advisory Council with specific membership requirements to assure that a wide variety of constituents are involved;
- Authorizing the development of special programs for the provision of emergency medical services to children;
- Collecting department-specified data from all transporting agencies in the state;
- Licensing air ambulances (fixed and rotor-wing) including rule development and establishment of fees;
- Using a telecommunications subsystem to interface with all components of the EMTS system and to coordinate with the existing state telecommunications network;
- Establishing and managing the EMS account within the Highway Users Tax Fund (funded by a \$1 per vehicle registration fee);

-
- Funding regional efforts to develop the emergency medical and trauma services system through the Regional Emergency Medical and Trauma Advisory Councils, which receive dedicated funding of approximately \$1.8 million/year;
 - Funding the EMTS grants program, which provides approximately \$1.8 million/year for purchase of EMS equipment, training, injury prevention and data collection;
 - Designating trauma centers including designing the designation process and establishing rules for both trauma centers and for non-designated facilities;
 - Developing the statewide trauma system as funding is available, including the generation of rules for a) minimum services in rendering patient care, b) transport protocols, c) regional emergency medical and trauma advisory councils, d) designation of facilities, e) communications system, f) statewide trauma registry, g) public information, education and injury prevention, h) continuing quality improvement system, and (i) trauma care for pediatric patients.
 - The financing of the trauma system is limited by language in [C.R.S. § 25-3.5-708](#);
“1) The implementation of the statewide trauma system shall be subject to the availability of:
 - (a) Federal transportation highway safety seed moneys that the Department of Transportation transfers to the Department of Public Health and Environment pursuant to an intergovernmental agreement between the two agencies;
 - (b) Moneys from the emergency medical services account within the highway users tax fund that are unexpended portions of state administrative funds that may be allocated pursuant to section [25-3.5-603 \(2\) \(c\)](#) [deleted by amendment]. Nothing in this paragraph (b) shall be construed to authorize moneys that may be allocated pursuant to section [25-3.5-603 \(2\) \(a\) \(I\)](#) or (2) (b) [deleted by amendment] to be used for the financing of the administration of the statewide trauma system.
 - (c) Moneys from the statewide trauma care system cash fund created in section [25-3.5-705](#)
 - 2) In addition to any funds available pursuant to subsection (1) of this section, the executive director of the Department of Public Health and Environment is hereby authorized to accept any grants, donations, gifts, or contributions from any other private or public entity for the purpose of implementing this part 7.”

Also see state regulations regarding trauma and [EMS](#), as promulgated by the state Board of Health or the Board of Medical Examiners.

b. Monitor and enforce rules

The enforcement authority and rules for the components of the EMTS system described above vary. For some components, there is little enforcement authority. For others, including the designation of trauma centers, the enforcement authority is established in the statute and further defined in the rules.

The Colorado State Board of Health has promulgated rules, violations of which are then enforced through a standard state process (the State Administrative Procedure Act, [C.R.S. § 24-4-104](#)). The disciplinary sanctions allowed by statute include revocation, temporary suspension, redesignation or assignment of non-designation status to the facility. In addition, the statute allows for a civil penalty of no more than \$500 to be assessed to facilities, providers, or persons who misrepresent the facility as a trauma center or a higher-level trauma center than is truthful or, who violate any rule adopted by the State Board of Health. The department has never attempted to fine a facility as the costs involved in such a legal action would likely far outweigh the penalties assessed. Rather, the department has chosen other remedies to assist facilities in the process of improvement.

The department has initiated the disciplinary process several times with facilities but has never had to revoke a facility designation, as an agreement for voluntary redesignation at a lower level or a plan of correction has always been achieved.

c. Designate the lead agency

The Colorado Department of Public Health and Environment is clearly identified in the enabling legislation as the lead agency for the development of an integrated trauma and EMS system. The department's responsibilities, as identified in statute, are listed in question 1a above. While the State Emergency Medical and Trauma Services Advisory Council (SEMTAC) generally functions in an advisory capacity to the department, it is also responsible for reviewing and approving trauma and EMS rules for promulgation by the state Board of Health. One of the primary duties of the nine-member, governor-appointed state Board of Health is to adopt or revise standards, rules and regulations to administer the public health laws of the state. Thus, authority to create state rule is centralized in the Board of Health with very few exceptions. One exception is the licensing of ground ambulances, which is statutorily the purview of boards of county commissioners. Other activities, such as the development of scopes of practice for all levels of EMTs, are carried out in conjunction with the state Board of Medical Examiners (BME). In addition to rule-making authority over the duties and functions of EMTs, the state BME also has jurisdiction over the practice of medicine by physicians and thus interacts with the department on medical direction of EMS professionals.

d. Collect and protect confidential data

The Colorado Department of Public Health and Environment is statutorily mandated to collect data from facilities treating trauma patients. The data from the facilities is patient-specific but such data are not released to the public in any format that could identify either the patient or the physician. Current data elements in the Colorado Trauma Registry are consistent with the National Trauma Data Standards. Trauma registry data are protected from open records requests and "any data maintained in the (trauma) registry that identifies patients or physicians shall be strictly confidential and shall not be admissible in any civil or criminal proceeding." [C.R.S. § 25-3.5-704\(2\)\(f\)](#).

The department also has the authority under state statute to regulate the collection of data from ground and air ambulance transport agencies. [C.R.S. §§ 25-3.5-501, 25-3.5-307, 25-3.5-](#)

[704\(2\)\(h\)\(I\)\(E\)](#). These data are required to be reported to the department; however, it wasn't until July 2006 that the department developed a comprehensive system for receiving EMS data from local agencies. The implementation of the [EMS Ambulance Trip Reporting Information Exchange \(MATRIX\)](#) changed the landscape for the collection of EMS data in Colorado. Agencies are required to collect and submit the data elements included the National Elements subset of the National EMS Information System (NEMSIS) version 2.2.1.

In general, the department has relatively broad authority to protect data from discovery and has never been forced to provide patient-level data for any reason to anyone. [C.R.S. § 25-3.5-704](#) and (II). The strict data release policies also preclude the inadvertent release of such data to researchers or other third parties whose abilities to protect the data might be limited.

e. Protect the confidentiality of the quality improvement process

The confidentiality of the trauma quality improvement process is specifically addressed in [C.R.S. § 25-3.5-704\(2\)](#). The department is required "(h)(I)...to oversee a continuing quality improvement system for the statewide emergency medical and trauma care system." One of the requirements of this system is, "(D) That the names of patients or information that identifies individual patients shall be kept confidential and shall not be publicly disclosed without the patient's consent."

In addition, the process and information are protected under the statute as follows:

"(h)(II) Any data or information related to the identification of individual patient's, provider's, or facility's care outcomes collected as a result of the continuing quality improvement system and any records or reports collected or compiled as a result of the continuing quality improvement system are confidential and are exempt from the open records law in part 2 of article [72](#) of title [24](#), C.R.S. Such data, information, records, or reports shall not be subject to subpoena or discovery and shall not be admissible in any civil action, except pursuant to a court order that provides for the protection of sensitive information about interested parties. Nothing in this subparagraph (II) shall preclude the patient or the patient's representative from obtaining the patient's medical records as provided in section [25-1-801](#)."

While the department has the authority to collect data and use those data in a system-wide quality improvement process, the actual implementation of such a process has been difficult as there has been little/no funding for trauma system quality improvement. Moreover, funding issues and the lack of subject matter expertise have stalled the rule-making process required in statute for assessing both the regional system plans and the statewide emergency care system. Additionally, the extent of the protections offered to case level data if entities other than the department are involved is unclear under this particular statute.

At the facility level, two statutes provide protection for peer review and quality improvement activities: [C.R.S. § 12-36.5-101](#) *et seq.* addresses professional review of health care providers, while [C.R.S. § 25-3-109](#) provides that facilities' quality management information relating to the evaluation or improvement of the quality of health care services is confidential. All designated trauma centers are required under trauma designation rules to participate in peer review of

trauma cases and to provide documentation of such during the trauma site review process. Additionally, facilities are also required to demonstrate how peer review or any other quality improvement processes resulted in changes in the delivery of patient care. Assessment of a trauma center's efforts in quality improvement and peer review is a component of the re-verification and re-designation process conducted every three years.

2. Describe the process by which trauma system policies and procedures are developed or updated to manage the system including:

a. The adoption of standards of care

State-defined standards of care have not been a major focus in the development of Colorado's trauma system. Rather, greater effort has gone into setting criteria for the designation of trauma centers. In general, the standards set forth in the American College of Surgeons' *Optimal Care of the Injured Patient* serve as the basis for the standards of care for trauma patients in Colorado. Nonetheless, there are a few Colorado efforts that have touched on the adoption of standards of care.

First, the adoption of a trauma triage algorithm into rule created standards of care for severely injured patients. (See [6 CCR 1015-4, Chapter 2](#)) Severely injured patients should be taken to a trauma center and, in certain regions, prehospital transport agencies are instructed to bypass a lower level center in favor of a relatively close (less than 15 minutes additional) higher level center. This algorithm also serves as the required basis for all facility trauma team activation criteria. While facilities may tailor their activation criteria to their population and to the facility's resources, they must use the algorithm as a starting point.

Second, as part of the designation process, each facility is required to provide information on how it will handle certain types of patients. For example, Level IV and V facilities often have policies about the interim care of a patient until he/she is transferred to a higher level facility. These policies are to be based on current standards of care and are reviewed by the trauma designation reviewers. Reviewers sometimes ask for additional supporting evidence for such policies or may indicate that the facility's policies are out of step with modern trauma care, and either suggest or require that the policy be changed. On an on-going basis, Trauma Program staff provide technical assistance to facilities by identifying examples of acceptable standards of care that are published nationally and by describing how incorporation of these standards might assist the facility in meeting the requirements for designation.

b. Designation or verification of trauma centers

Since 1995, the highest priority of the Trauma Program has been the designation of trauma centers. Initial efforts focused on the development of the Colorado rules for trauma center designation. These rules are based on national standards established by the American College of Surgeons Committee on Trauma and on other national resources.

Currently, the system includes 70 designated trauma centers with one to two newly designated centers added annually. All but five rural hospitals participate as designated trauma centers.

Additionally, five community clinics with emergency centers also participate as designated facilities.

Current programmatic efforts focus on:

- Regularly reviewing facilities on a triennial basis;
- Modifying state rules to improve or update standards;
- Providing technical assistance to the wide range of designated and non-designated facilities; and
- Improving the designation process.

The Trauma Program is committed to open change processes that include collaboration with the trauma community. Rule making starts by developing consensus among the regulated community on issues that are recognized as problematic. Because the Trauma Program has few staff and expertise on certain aspects of trauma care may be limited, technical expertise is often provided by facilities or other resources in the system. SEMTAC members, RETAC coordinators and facility trauma personnel are brought together, in a formal task force or on an *ad hoc* basis, to problem- solve when concerns about the policies, procedures and processes of trauma center designation and system development are identified.

c. Direct patient flow on the basis of designation

As discussed above, the adoption of the prehospital trauma triage algorithm has changed patient flow patterns in some areas of the state. Trauma designation has revamped the destination for major trauma patients in all urban areas. For example, the Mile-High RETAC (much of the Denver metro area) has adopted standards that all seriously injured patients (see triage algorithm Steps 2 and 3 in [Table 4](#)) will go to a Level I or II center. In more rural areas of the state, the selective redirection of patients to alternate facilities is not practical since it is unlikely that a Level I or II center will be close by; in many areas of the state, it may take several hours to transport a patient to a Level I or II facility. In Colorado's rural communities, patients are transported to the nearest hospital and then transferred from that facility to a higher level of care should their condition warrant it.

d. Data collection

As with the development of rules on trauma center designation, the process for developing the rules on data collection has been largely collaborative and consensus-driven whenever possible. With input from trauma coordinators, trauma registrars, injury epidemiologists, injury prevention specialists and others, the policies and procedures that govern trauma registry data collection were created based on conditions identified in statute, requirements within the department, best practices for data collection, use and protection, and national models such as the National Trauma Data Standards.

e. System evaluation

Colorado has struggled in developing policies and procedures for system evaluation. Several factors have contributed to the difficulty in making real progress. There have been few resources (personnel and financial) devoted to trauma system evaluation, thus the efforts at evaluation have largely been led by the community on a voluntary basis. Trauma program staff have not had the time nor, in some cases, the expertise, to develop the conceptual framework that would precede system evaluation.

System evaluation efforts have benefited from the hiring of a new EMS and Trauma Data Program manager in July 2007. This work unit has made significant progress in increasing the availability of analysis results and reports using both trauma and EMS data, a necessary step before system evaluation can be implemented. Thus, the department is closer to being ready to create a system evaluation plan and processes, but this remains an area with significant growth potential.

3. Within the context of statutes and regulation, describe how injury prevention, EMS, public health, the needs of special populations, and emergency management are integrated or coordinated within the trauma system.

Injury prevention

Designated facilities are statutorily required to provide injury prevention services while injury prevention at the trauma system (state) level is permissive. [C.R.S. § 25-3.5-704.](#)

The Injury, Suicide and Violence Prevention (ISVP) Unit in the department's Prevention Services Division is responsible for coordinating injury prevention efforts statewide. Prior to a departmental re-organization in 2004, the ISVP Unit was located in the EMTS Section. Because of this past association, a strong collaborative connection continues to exist between staff in the ISVP Unit and the EMTS Section. For example, staff from the ISVP Unit coordinate the activities of the Injury Community Planning Group (the injury prevention committee of SEMTAC) and provide technical assistance and expertise to trauma coordinators and RETAC coordinators on funding sources, best practices, implementation strategies, and evaluation of injury prevention programs. Additionally, ISVP Unit staff review the applications submitted to the EMS grants program by prehospital transport agencies and others who are requesting state funds for injury prevention projects.

The injury prevention requirements in Colorado's designation rules, particularly for Level I and II facilities, are among the strongest in the nation. The Injury Community Planning Group reviewed the injury prevention standards published by the American College of Surgeons Committee on Trauma and recommended that those standards be strengthened in several ways including establishing requirements for injury program planning and implementation. Representatives from Level I and II trauma centers agreed to the stronger requirements, which were subsequently incorporated in the updated Level I and II designation rules in 2008.

EMS

EMS and trauma are, by state statute, required to work together at both the state and regional levels. The state EMS council and the state trauma council were blended in legislation passed in 2000. While the current integration is far from perfect, there has been noticeable improvement in communication between representatives from the EMS and trauma communities. There is now a greater understanding of why the two systems are “married” and how that relationship can benefit both partners. At the regional level, there has been better integration of educational activities, cooperation on injury prevention, and common work projects that benefit all partners.

Public Health

Since the Colorado Department of Public Health and Environment is designated in statute as the lead agency for EMS and trauma, the relationship between trauma and public health is strong. The EMTS staff work closely with staff in the Injury, Suicide and Violence Prevention Unit at the department (see above). In addition, Trauma Program staff works to coordinate efforts with the state Office of Rural Health that is housed at the Colorado Rural Health Center, a 501(c)(3) organization. Colorado is one of only two states where the Office of Rural Health is not part of state government. This arrangement has actually lent flexibility to collaborative projects since the bureaucracy at the Colorado Rural Health Center is streamlined compared to state processes. Trauma Program staff has also begun to coordinate efforts with the health facilities regulators in the Health Facilities and EMS Division at the department to resolve complaints that involve both trauma designation and licensure issues.

Links with local public health are more random. Some RETACs work with local public health departments or county nursing services, particularly on injury prevention projects and educational offerings. Facilities also may collaborate with local public health departments. Although integration with local public health is not a requirement for trauma center designation, the Trauma Program encourages such collaborations.

Special populations

Colorado has focused on several special populations for the purpose of improving trauma care and preventing injury. Rural Coloradans are at greater risk of injury and of dying from injury compared to their suburban counterparts. Furthermore, there are fewer resources available to rural residents. Thus Trauma Program staff has often directed additional efforts to rural communities to assure that there are EMS and trauma services available to rural residents.

The complex and unique needs of children are specifically addressed in state statute and in rule. Designated trauma centers are required to have appropriate equipment to meet the needs of both adults and children. Furthermore, Level I and II trauma centers that treat and admit seriously injured children have very specific requirements for a quality improvement process specific to pediatric care. Children are also the focus of specific requirements for the EMS for Children grant from HRSA and as such receive additional attention in conjunction with current national priorities.

While the elderly are not mentioned specifically in rule or regulation other than “extremes of age,” the elderly account for the largest population of patients with hip fractures and as such are tracked by the Colorado Trauma Registry. The data from the registry allow trauma site reviewers to review the care of elderly patients and look for patterns of care that are detrimental. Such patterns are addressed at individual facilities when they are identified.

Emergency preparedness

The department is the lead state agency responsible for coordinating public health, medical, and mass fatality response activities for all-hazard emergency or disaster events. The Emergency Preparedness and Response Division (EPRD) in the department is responsible for:

- Developing and coordinating emergency response plans;
- Assessing natural and man-made disasters and enhancing public health response to those events;
- Integrating public health and medical systems with other local and state partners such as law enforcement, emergency management, etc;
- Training public health, medical and emergency response partners on the latest protocols related to health, medical and mortuary response;
- Distributing health information as well as implementing systems for effective and redundant communication among all stakeholders involved in public health detection and response;
- Assessing Colorado's ability to respond to the medical care of victims during an emergency; and
- Identifying best practices for mass casualty response.

The EMTS Section has collaborated with the EPRD on several projects (such as preparing for the Democratic National Convention held in Denver in August 2008), however EPRD more often coordinates directly with hospitals, local public health and the emergency management regions (which in some cases, overlap but are not the same as the RETACs). Colorado’s trauma designation rules do not focus on disaster preparedness but generally require that a facility coordinate its efforts with other local and regional efforts.

System Leadership

Colorado has been fortunate to have strong community leadership as a driving force behind the development of the statewide trauma system. These community leaders have worked diligently over the years to improve trauma care across the state, both in the prehospital setting and in facilities, large and small. This community leadership was responsible for the passage of legislation in 1995 that established a formal trauma system regulated by the state. The Colorado Department of Public Health and Environment, designated as the lead agency for the state trauma system, continues to collaborate with the trauma community to develop, implement, evaluate and revise trauma rules, the trauma center designation process, data collection via the state trauma registry, training opportunities, injury prevention and other components of the trauma system. The work to build a fully integrated system is certainly not “done” but over the past decade, significant progress has been made.

1. How does the lead agency bring constituency groups together to review and monitor the trauma system throughout each phase of care?

The department does not have a comprehensive mechanism for reviewing and monitoring the trauma system through each phase of care. At this point in system development, the department and the SEMTAC have a “big picture” view of the state system, with little monitoring of each individual component. For example, no single group or committee systematically reviews all deaths, complications or other patient outcomes. Current activities have focused more on information exchange than on monitoring the care of individual trauma patients or trauma care practitioners. Thus, while the department does investigate complaints brought to the RETAC’s or to the department’s attention, this is the exception rather than part of an on-going process.

In terms of death reviews, the state-mandated Colorado [Child Fatality Review](#) committee at the department, a multi-disciplinary expert panel, reviews all deaths of children ages 17 and younger to identify possible preventable factors associated with the death. While this group occasionally identifies care issues, its primary focus is on prevention.

Periodic monitoring of the care provided by individual facilities is conducted through the designation review process. During the site review, the review team assesses both the care provided by the facility as well as the facility’s quality assurance processes for identifying care-related issues. Often reviewers bring a fresh perspective on both patient care and quality improvement methods and will make recommendations to the facility on ways to improve and monitor the care it provides.

Individual RETACs have also begun to monitor system issues within their region. For example:

- The [Foothills RETAC](#) has recently begun to study the use of aeromedical resources in its region. The purpose of the study is to determine whether air transports in the RETAC are medically justified and whether they result in reduced transport times. A

multidisciplinary evaluation subcommittee of the Foothills RETAC developed the study design and data collection tool.

- All RETACs recently completed a study to determine how frequently EMS providers leave a copy of the patient care report with emergency department personnel at the time the patient is brought to the facility.
- The [Southwest RETAC](#) is developing a regional continuous quality improvement plan that will allow the RETAC to review trauma cases to look for trends and educational opportunities. The Southwest RETAC has had a longstanding quality improvement committee that explores ways to evaluate the care provided in the region.

Given the current staff resources at the department and the current protections offered in the enabling legislation, the department takes a broader overview of trauma quality (surveillance oriented) while the RETACs review trauma from a more local and regional perspective. If the department receives additional funds and a new trauma quality improvement position is created, then a number of system-wide enhancements are possible including additional opportunities to bring constituents together to evaluate trauma system development.

One of the most effective mechanisms for bringing constituency groups together is the State Emergency Medical and Trauma Services Advisory Council (SEMTAC). Its important roles are described in the answer to question 2 below.

2. Describe the composition, responsibilities, and activities of the multidisciplinary trauma system advisory committee(s) and the working relationship(s) with the trauma lead agency and the EMS lead agency, if they are different.

State Emergency Medical and Trauma Services Advisory Council (SEMTAC)

The State Emergency Medical and Trauma Services Advisory Council (SEMTAC) is the principle advisory body to the department on EMS and trauma issues. The authority establishing the SEMTAC is identified in [C.R.S. § 25-3.5-104](#). SEMTAC membership consists of 25 voting members appointed by the Governor and 7 ex-officio members who represent specific organizations. Members are appointed for three-year terms. There is no statutory limit on the number of terms an appointee may serve, however, as a result of demographic and political affiliation requirements in the enabling statute, membership to the [SEMTAC](#) rotates on a regular basis, providing an opportunity for engaging new participants.

The statutory role of the SEMTAC is to provide advice and guidance to the department on matters related to Colorado's trauma and EMS systems. The SEMTAC's specific responsibilities include:

- Making recommendations to the department about trauma center designation;
- Distributing grants from the EMTS grant fund;
- Reviewing the biennial plans required of Colorado's eleven Regional Emergency Medical and Trauma Advisory Councils (RETACs); and
- Recommending approval of EMS and trauma rules to the Colorado Board of Health.

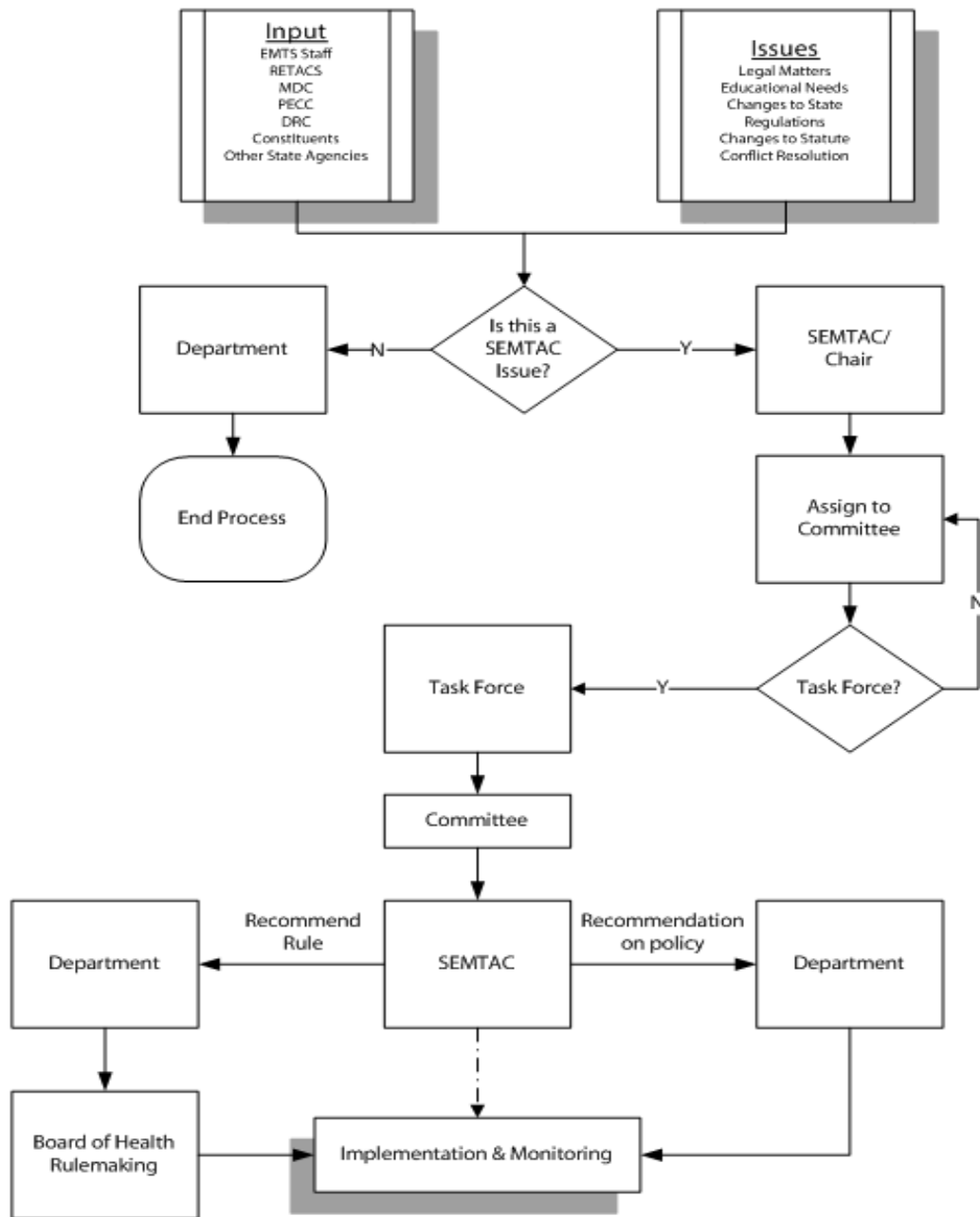
Although the SEMTAC provides advice and guidance to the department, ultimately the department, not the SEMTAC, has final authority over all decisions regarding the trauma system. The one exception is the promulgation of rules, which is under the purview of the state Board of Health.

In addition to its statutory role, the SEMTAC is the principle body through which the department solicits public and stakeholder comment, guidance and opinion on EMS and trauma policy issues, including the introduction of legislation, education policies, system development initiatives and other matters of statewide concern. The SEMTAC is routinely involved in virtually all major policy decisions regarding the statewide trauma system. In this capacity, the SEMTAC serves as one of the most vital components of the department's leadership strategies.

All rule-making processes within the trauma and EMS realm begin with the establishment of stakeholder committees and/or task forces. The creation of working committees is usually initiated by the SEMTAC to ensure statewide communication and transparency. Staff from the EMTS Section or other programs in the department support all SEMTAC committees. Additionally, the EMTS Section Chief serves as the SEMTAC Secretary as well as the ex-officio representative of the department's Executive Director. The close working relationship between department staff and SEMTAC members enhances regular communications on policy decision-making and implementation of action plans.

A summary diagram on the next page outlines SEMTAC's involvement in the decision making process of the department.

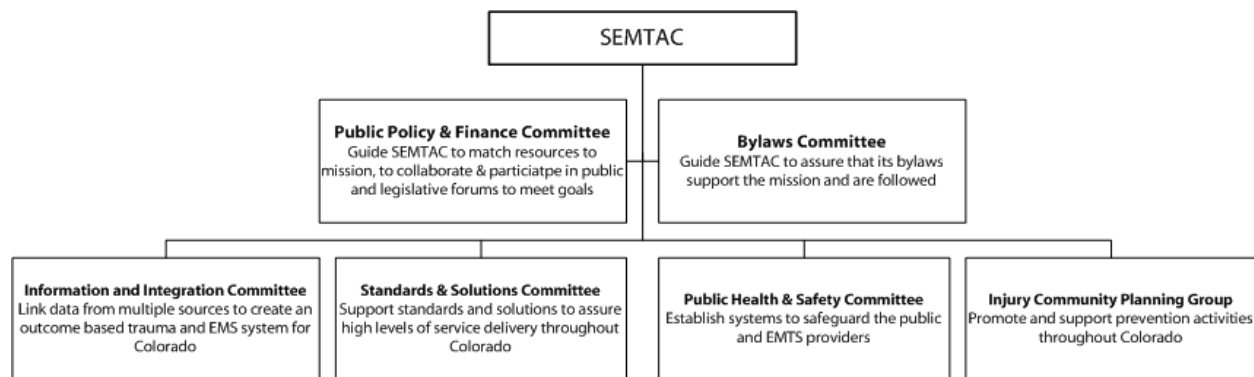
Decision Making Process -- SEMTAC



Glossary

DRC – Designation Review Committee (appointed by Department with recommendation from SEMTAC)
 MDC – Medical Direction Committee (appointed by Department with recommendation from SEMTAC)
 PECC – Pediatric Emergency Care Committee (appointed by Department with recommendation from SEMTAC)
 RETACs – Regional Emergency Medical and Trauma Advisory Councils
 SEMTAC – State Emergency Medical and Trauma Services Advisory Council (appointed by Governor)

In 2007 and 2008, the SEMTAC undertook an internal strategic planning process to re-evaluate its role and identify opportunities to maximize its effectiveness in supporting Colorado's EMTS system. This process resulted in a significant restructuring of the SEMTAC committees to promote a stronger culture of cooperation and support between trauma providers and EMS providers. The current standing committees of SEMTAC are diagrammed below.

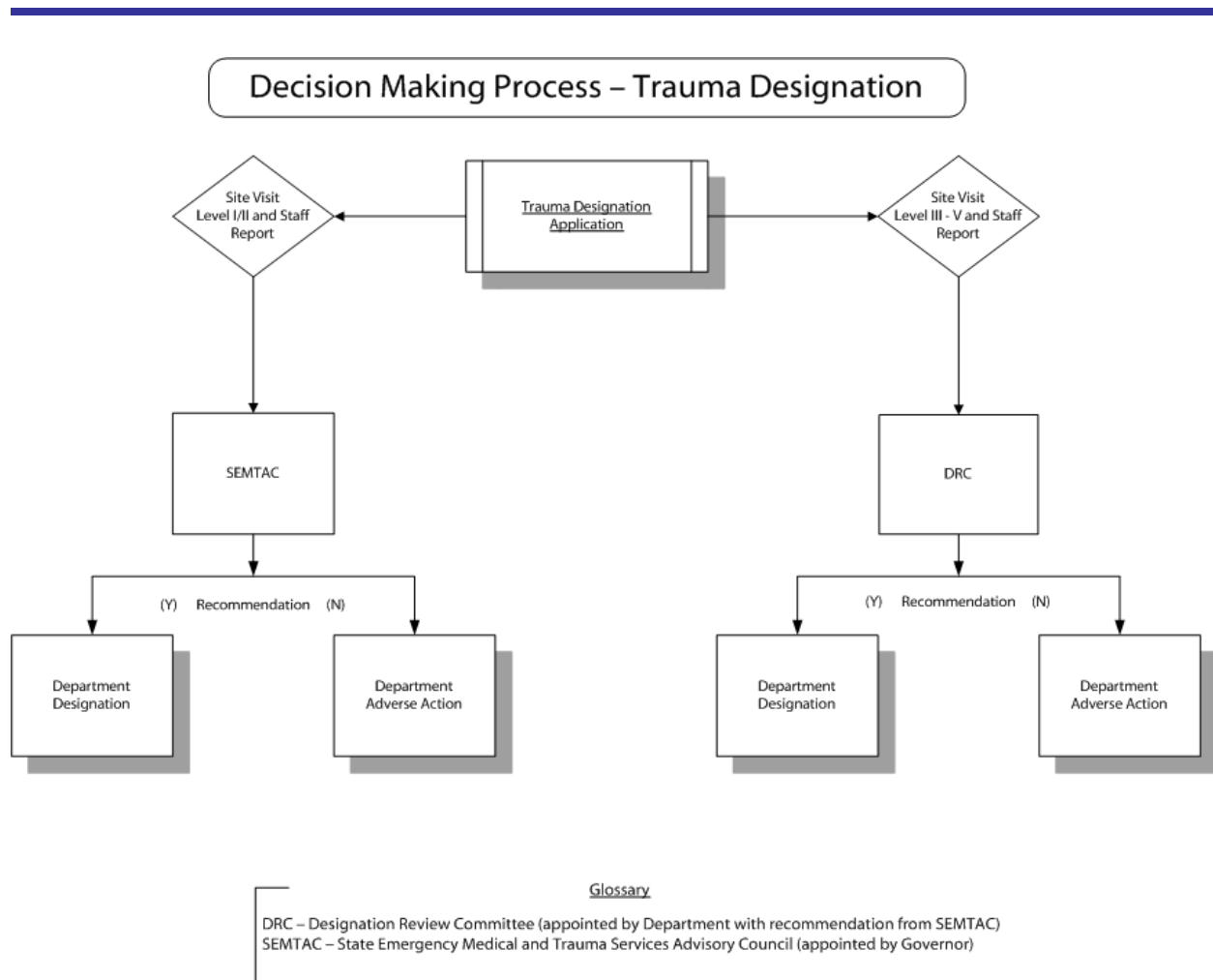


In order for the SEMTAC to be effective, subcommittees and task forces are formed as necessary to address specific projects or issues. Subcommittee and task force meetings are open to the public and any interested stakeholder may attend. The SEMTAC and its committees cannot go into closed session for any reason. By statute, the reports and findings of SEMTAC and its committees are all "open" documents available to the public.

Designation Review Committee

Established in rule, the Designation Review Committee (DRC) provides timely advice to the department on designation recommendations for Level III-V trauma centers. The composition of the committee is established in rule and the membership is based on recommendations from SEMTAC with appointment by the department. The membership includes two surgeons, two emergency physicians, two trauma program managers/ coordinators, one hospital administrator, one RETAC representative and one member representing prehospital/EMS. Due to the large number of Level III-V facilities and the need to ensure the continued ability of these facilities to serve the vast rural and frontier areas of the state, the DRC meets monthly to consider designation reviews and make recommendations.

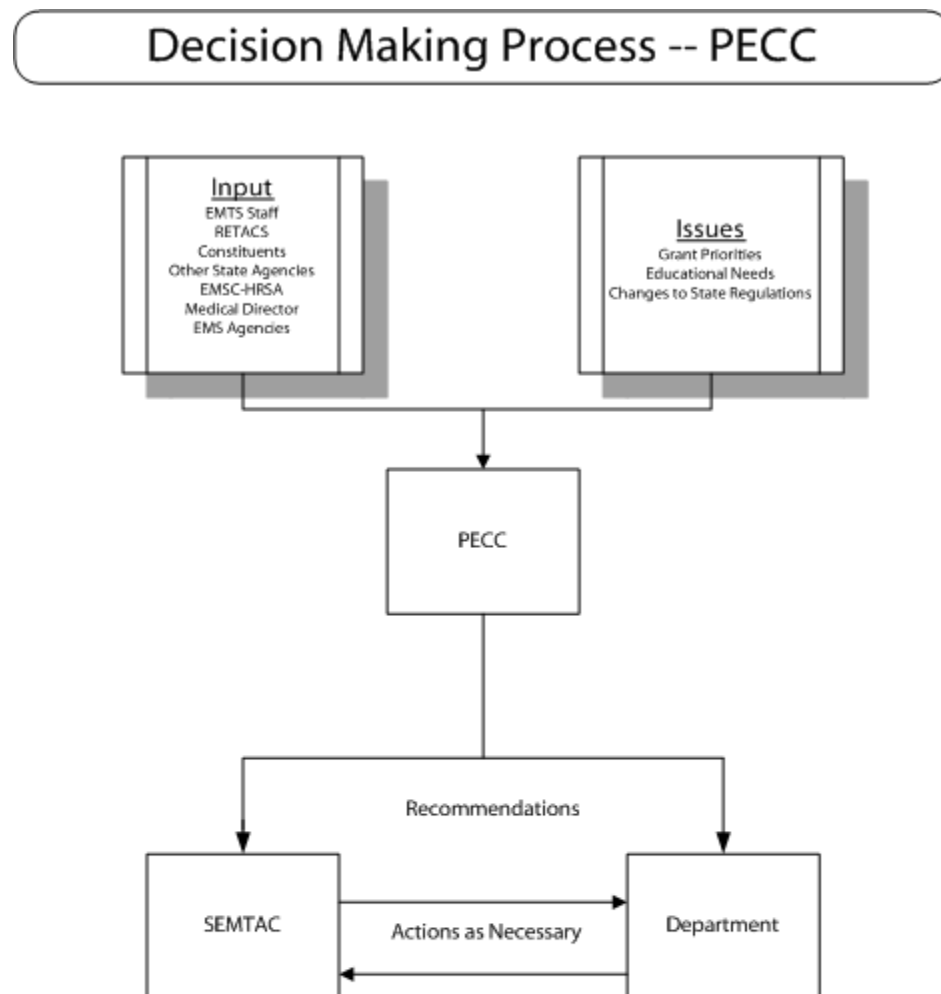
In determining their recommendations, DRC members consider the staff report that describes the on-site review findings, as well as department trends and historical patterns. The committee also has access to any plan of correction submitted by the facility and the facility's application, if requested. In general, DRC members do not review the full application but may review pertinent sections if specific questions are raised. The decision-making process of the DRC is summarized in the figure on the next page.



Pediatric Emergency Care Committee

As a result of the strategic planning that occurred in 2007-2008, the status of the Pediatric Emergency Care Committee ([PECC](#)) previously a standing committee of the SEMTAC, was modified so the committee now reports directly to the department. This new structure allows for a wider variety of representation on the PECC, since membership is no longer limited to SEMTAC members. The chairperson of the PECC is the pediatric emergency physician appointed to the SEMTAC. Other members are recommended by the SEMTAC with appointment by the department. Members are selected based on their specific expertise and interest in the care of children. The membership includes a registered nurse with emergency pediatric experience and experience as a trauma nurse coordinator, a board-certified emergency physician, a Colorado-certified paramedic with experience and interest in pediatric care, a registered nurse with experience as a pediatric nurse, a representative from the Injury Community Planning Group of SEMTAC, a member of the Finance and Public Policy Committee of SEMTAC, and the Family Representative for the EMS for Children state partnership grant from HRSA.

The PECC has not yet met under its new structure so it has yet to establish policies, goals, and objectives. The proposed decision-making process for the PECC is shown below.



Note: This model has not yet been tested

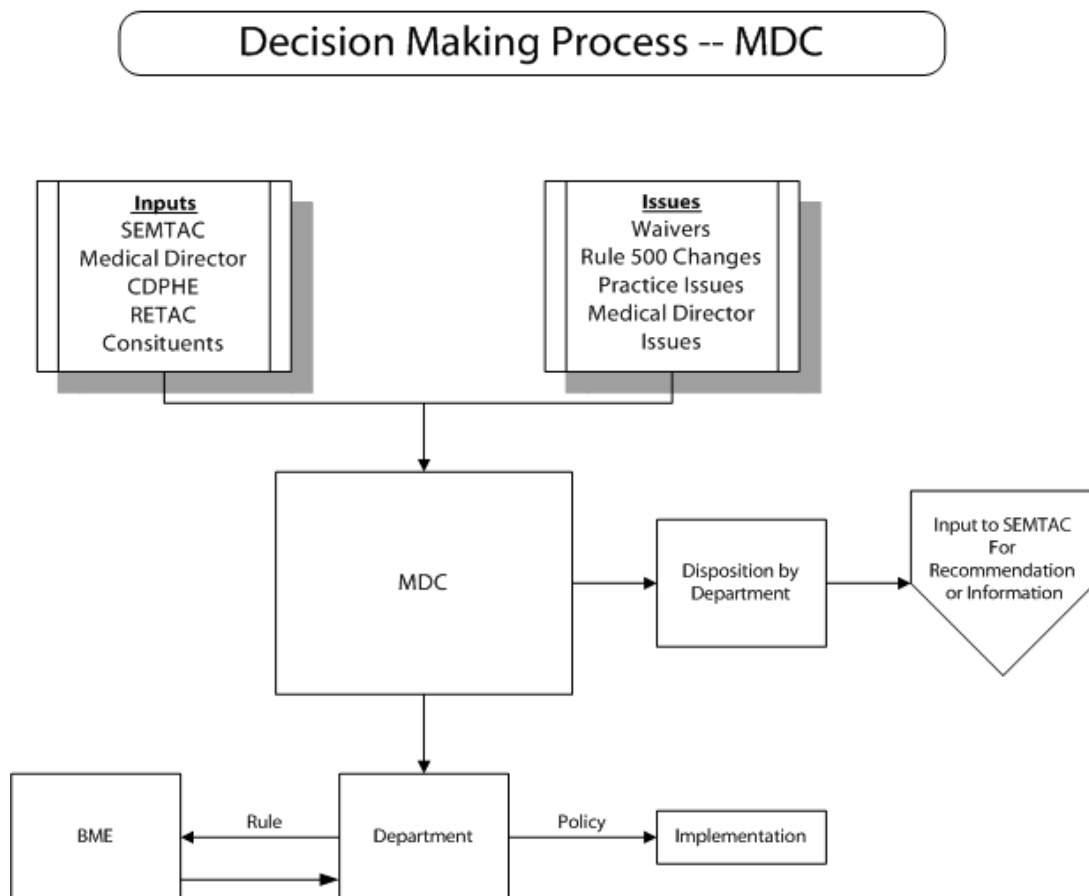
Glossary

EMS – Emergency Medical Services
EMSC – Emergency Medical Services for Children (federal grant funding)
HRSA – Health Resources and Services Administration (provides EMSC funding)
PECC – Pediatric Emergency Care Committee (appointed by Department with recommendation from SEMTAC)
RETACs – Regional Emergency Medical and Trauma Advisory Councils
SEMTAC – State Emergency Medical and Trauma Services Advisory Council (appointed by Governor)

Medical Direction Committee

The Medical Direction Committee (MDC) provides expertise and guidance to the department and the Colorado Board of Medical Examiners (BME) on matters pertaining to medical

direction and the scope of practice of EMTs in Colorado. The chair of the MDC is the [State EMTS Medical Director](#) at the department. Committee membership includes four physicians active in EMS medical direction and four currently licensed or certified health care professionals active in EMS. Members are recommended by the SEMTAC and appointed by the department. The MDC reviews applications from EMS agency medical directors for waivers to the standard scope of practice. The committee's recommendations are forwarded through the department to the BME where formal action is then taken.



Glossary

BME – Board of Medical Examiners
 MDC – Medical Direction Committee (appointed by Department with recommendation from SEMTAC)
 RETACs – Regional Emergency Medical and Trauma Advisory Councils
 SEMTAC – State Emergency Medical and Trauma Services Advisory Council (appointed by Governor)

a. Identify pediatric representatives on the multidisciplinary trauma system advisory committee and any pediatric advisory groups that provide input into trauma system development.

As required in statute, a physician who is board-certified in pediatrics serves as a member of the SEMTAC. This individual is also responsible for chairing the Pediatric Emergency Care Committee (PECC) described above. In addition to input from the PECC, nurse representatives from The Children's Hospital and other hospitals with commitment to pediatrics also frequently participate on subcommittees and task forces and attend SEMTAC meetings.

b. Describe the process of involving experts in, and advocates for, special populations and how they help drive regional trauma system policy.

The department generally looks for experts as it becomes aware of problems that disproportionately affect special populations. The Colorado Rural Health Center is the most frequently contacted expert on rural populations. The department has several injury prevention staff members who are experienced in working with different ethnic/racial/language groups. In addition, experts from The Children's Hospital provide advice and skills for working with children and teens. As issues arise, the department seeks guidance from individuals and groups with expertise appropriate to the particular issue.

All trauma centers in Colorado are required to have injury prevention and education programs. Many of the trauma centers have programs that impact special populations, including:

- Fall prevention for the elderly;
- Bike and ski helmet programs for children;
- Car seat/booster seat programs for children and their parents;
- Teen driving initiatives; and
- Multi-lingual injury prevention information.

Trauma centers are allowed to choose their own priorities for injury prevention but are encouraged to base their efforts on their data and the populations they serve. Thus, through these programs, the needs of a number of special populations are addressed, although not in a united, statewide effort.

Likewise, RETACs participate in injury prevention and education activities that target special populations. Again, the RETACs are free to choose their own priorities, work with their own experts and select their own high-risk populations; however, the RETAC coordinators are responsible to their councils, and the councils are responsible to the state for use of state funds on any projects undertaken by the RETAC.

c. Describe how the multidisciplinary advisory committee is involved in trauma system performance evaluation (for example, review of system performance reports).

Prior to the reorganization of the SEMTAC committees in October 2008, a standing committee of the SEMTAC, the System Evaluation Committee, was responsible for reviewing information on system performance. Unfortunately, due to limited staffing and expertise in system evaluation, this committee was never fully functional or effective. The committee was eliminated in the recent reorganization of the SEMTAC committee structure. Currently, no single SEMTAC committee is formally charged with conducting performance evaluation,

however the new Information Support Committee, tasked with providing analysis of EMS and trauma data to support the development of an outcome-based EMS and trauma system, is working on assessments of the delivery of EMS and trauma care. For the next year, the Information Support Committee will be addressing the issues of triage criteria and over/under triage, trauma team activation, integration and linkage of EMS and trauma data, and modification of the EMS and trauma data collection rules to incorporate national standards.

3. Provide examples of how the lead agency and trauma system leadership (for example, trauma centers, trauma medical director, nurse coordinator, trauma administrator, and other stakeholders) inform and educate policy makers, elected officials, community groups, and others about the trauma system, its strengths, and its improvement opportunities.

The department is required to provide an [annual report](#) to the Legislature about the EMTS activities of the previous year. EMTS Section staff works to make this an interesting and informative document so that legislators who wish to learn more about the trauma system can, in fact, find that information. The annual legislative report, which provides an overview of department and community efforts and the current status of the EMTS system, is also made available to the public via the EMTS Section's website.

A recent example of collaboration among Colorado's trauma system leadership to inform policy makers about EMTS system needs occurred this legislative session. On January 29, 2009, a regularly scheduled SEMTAC meeting was shortened so that SEMTAC members could go to the Capitol to testify on a bill. The proposed legislation would provide an additional \$1 per motor vehicle registration to help support rural EMS and trauma needs. If passed, this legislation would provide an additional \$4-5 million per year to the EMTS community. SEMTAC members proceeded, en masse, to the room where the bill was being heard. Some SEMTAC members testified on behalf of the bill and no one testified against the bill. Additionally EMS and trauma stakeholders have contacted their State elected officials expressing support and need for this legislation. The bill passed the Senate, and is now under consideration by the House of Representatives. As of this writing, the bill has now passed two House committees and has one more committee hearing before the final floor vote.

4. Describe the process to build or expand effective trauma leadership within the trauma system (for example, succession planning, leadership courses, workshops), including the lead agency and trauma centers.

The Trauma Program has not devoted much effort to this issue due to limited resources. EMTS Section staff share information with trauma stakeholders about opportunities to obtain leadership training, both at the state and national levels. Additionally, an annual EMS conference in northwestern Colorado provides leadership training to members of the EMS community.

Coalition Building and Community Support

The status of the state coalition and the levels of community support for the development of an EMTS system have changed significantly over time. Trauma and EMS constituents in Colorado have been involved in a variety of multidisciplinary task forces/councils over the last 15 years. In 2000, as a result of a statutory change, the department merged the State Trauma Advisory Council with the State EMS Council to form one advisory group known as the State Emergency Medical and Trauma Services Advisory Council (SEMTAC). In 2007, the merged council undertook a major strategic planning process that resulted in a completely revised committee structure to address the more comprehensive and integrated goals and objectives identified through this process. The SEMTAC and its committee structure are described below.

Other coalition building efforts have developed based on the common interests of groups and the identification of appropriate organizational structures necessary to address them. The trauma nurse managers and registrars have formed their own coalition called the Colorado Trauma Network ([CTN](#)). The state enjoys a very active chapter of the American College of Emergency Physicians and of the Society of Trauma Nurses. In addition, the Colorado Rural Health Center has been the focal point for uniting rural constituents around rural issues. Each of these coalitions has played, and continues to play, a role in the development of Colorado's trauma system.

1. What is the status of the trauma system's coalition (for example: What is the status of recruiting members and building a coalition? Is the coalition a strong and active coalition? Does the coalition need new energy? Who is not currently involved but should be a part of your coalition?)?

Colorado has worked over the years to develop a broad EMS and trauma constituency that represents the viewpoints of many stakeholders and functions in a highly transparent environment. While not called a coalition, there have been numerous multidisciplinary groups that have come together to assist policy makers in developing EMS and trauma rules on system standards and procedures. Over the years, the individual trauma and EMTS stakeholder processes have merged and become more focused around the efforts of the State Emergency Medical and Trauma Services Advisory Council (SEMTAC). This structure has fostered an environment where the mutual interests of these communities can be developed to ensure a more comprehensive approach to patient care.

Colorado's EMTS constituents have been active participants in the development of an emergency medical and trauma services system for more than twenty years. The extent of involvement of trauma personnel vs. EMS personnel has varied over time depending on the issues facing the system(s). In 1989, legislation was enacted to provide a \$1 assessment on each registered motor vehicle with funding going to the Colorado Department of Public Health and Environment. That funding went toward development of a comprehensive EMS system to

serve all Coloradans, with focus on both urban and rural/frontier system development. This fee was also used to provide state support to the local and regional councils to further EMS system development.

During this same time period, the trauma system was developing through the efforts of a number of larger facilities that collaborated to form the Colorado Trauma Institute. This voluntary organization “designated” trauma centers in conjunction with the American College of Surgeons verification process. While this voluntary effort extended to many of the larger trauma centers, it did not, with one or two exceptions, reach outside the metropolitan regions of the state.

In 1995, legislation authorizing a state system of trauma designation was passed by the Colorado legislature. This statutory change placed the responsibility for development of the emergency medical and trauma system in the Colorado Department of Public Health and Environment and the gubernatorial-appointed State Trauma Advisory Council. This board was merged with the EMS Advisory Council through legislation passed in 2000 to create the State Emergency Medical and Trauma Services Advisory Council (SEMTAC).

Since that time, the mission and vision of the two councils have been merged into a single more comprehensive mission, with a better understanding that hospital and prehospital constituents must cooperate to achieve system improvements. The SEMTAC meets quarterly and all meetings are public with many members of the community attending both the council meetings and associated committee meetings. The public is allowed and strongly encouraged to provide input at all meetings, and often the discussions are focused on the issues brought by constituents who are not formal committee members. This open process is designed to encourage input from all of the trauma and EMS community and has served the council well in developing a sound process for decision-making over the past eight years.

Recruitment for SEMTAC members has resulted in multiple applications for each of the 25 appointed positions on the council. More importantly, there are many additional participants from both trauma and EMS communities who contribute to the committee meetings, task forces, etc. These stakeholders represent a wide variety of interests and are able to contribute to the development of the trauma system even if they do not have a formal role on the SEMTAC. The system, as it exists today, encourages participation, information sharing, and collaborative decision-making, with multiple opportunities for public involvement before any policy decisions are made by the department or before new rules are adopted by the Board of Health. There are no specific standing committees designated to discuss trauma issues except in the broader concept of better patient safety. However, each of the standing committees routinely develops task forces to address specific issues as becomes necessary. This process allows appropriate flexibility in terms of the organizational ability to address specific trauma issues as necessary without diluting the energy of the SEMTAC over the long term.

Although there have been discussions about who may be missing from the coalition and who should officially sit on SEMTAC, there is “room at the table” in this system for anyone to participate under the current structure. This is important since the membership of SEMTAC is

outlined in statute and changes would require legislative action. All meetings are announced in compliance with the Colorado Open Meetings Act, and information on how to attend, either in person or remotely, is provided to a variety of groups including SEMTAC members, RETAC coordinators, RETAC chairs, the Colorado EMS listserv, all EMTS section staff and appropriate department staff, fire chiefs, trauma nurse coordinators and other trauma program staff. Many documents such as proposed rules or policy revisions are also sent out in draft form for written comment so that people who cannot attend the meetings at which decisions are made can submit comments to be read at the meetings. Thus, while communication may have been a greater issue in the past, the EMTS Section now rarely receives feedback from stakeholders about their not being aware of trauma system issues or that the department has not requested their input.

One portion of the trauma system that is not represented well is the rehabilitation sector. The composition of SEMTAC does not require a rehabilitation specialist as a member. In addition, the state rules regarding the rehabilitation service requirements are relatively general and do not address long-term rehabilitation.

a. What is the role of the coalition members (constituents and stakeholders) in promoting trauma system development?

The EMTS stakeholders are at the core of promoting trauma system development. Since the EMTS Section's Trauma Program staff consists of just over 2 FTE, the participation of trauma system stakeholders is the key to success. Many stakeholders go above and beyond what is expected in rule. For example, the larger designated trauma centers routinely reach out to smaller facilities to help develop expertise at the local level. While submission of trauma registry data is mandatory for Level I, II, and III facilities, facilities have voluntarily taken on other data projects (for example, an assessment of current practices in treatment of splenic injuries and an assessment of over/under trauma team activation rates). Thus it has been the EMTS community that has led the way in system development by initiating legislation, collaborating to develop common standards (rules) and working with state staff to develop a common vision of what progress would look like. It is at the request of the EMTS community that this ACS consultation is taking place.

b. What is the method and frequency for communicating with coalition members?

Since the advent of high-speed electronic communication, EMTS constituents routinely receive regular communication from the EMTS office, regional offices and a variety of other state and local agencies. Within the EMTS section, program managers have been assigned staff support duties to specific committees and constituent groups. Although the overall communication effort is coordinated through the EMTS Section chief and the Section's public information officer, staff members handle their individual constituent groups in different ways depending on the needs of the group at any specific time. However, all constituents receive regular notice of meetings, draft documents for comment and information about departmental activities. As an example, the trauma coordinators and other trauma program staff at trauma facilities and any staff at non-designated facilities who have requested to be

included receive e-mails several days a week from the state Trauma Program office. Staff passes along information on educational opportunities, requests for assistance from facilities, general information on rule changes, helpful hints on preparation of site review documents, information on other trauma system activities of interest, public notice of meetings, etc.

In addition, the SEMTAC meetings are a major source of information sharing between the department and coalition members. SEMTAC meetings are well attended by representatives of the EMS and trauma communities. Likewise, RETAC regional council meetings bring together regional constituents to work to solve regional problems, share information and build local coalitions. Additionally, in 2005, the EMTS Section implemented an electronic quarterly newsletter to ensure regular and on-going communications about issues of interest to both the trauma and EMS communities. All programs in the EMTS Section have dedicated space in the newsletter. [View a sample newsletter.](#)

2. Describe how the trauma system leadership mobilizes community partners to improve the trauma system through effective communication and collaboration. As described above, the department has the responsibility for serving as the focal point for trauma system development and regulation. Staff members have worked hard to develop and maintain open relationships with community partners as many of those partners were integral in the establishment of a trauma system in Colorado. Through department staff, the SEMTAC has worked to ensure that all stakeholders are aware and involved in system development.

In addition to the formal structures of SEMTAC and RETACs, Colorado's trauma and EMS leadership staff and constituents work through a variety of professional associations and venues to ensure community-wide communication and support. The EMTS Section collaborates closely with these organizations to solicit guidance and invite participation in the development of public policy that affects the state's trauma system. These agencies, organizations and venues include:

- Colorado Safe Kids Coalition
- Colorado Emergency Medical Services Association
- Colorado ACEP (American College of Emergency Physicians)
- Colorado Committee on Trauma
- Western Slope Trauma Group
- Colorado State EMS Conference
- Rocky Mountain Trauma Conference
- Town Hall Meetings
- Colorado Stroke Alliance
- American Heart/Stroke Association
- Colorado Rural Health Center
- Colorado Fire Chiefs Association
- EMS Association of Colorado

These collaborative efforts concentrate on ensuring open communication between local, regional and state stakeholders so that information flows both ways at all times.

a. How has the community been approached to identify injury control concerns?

While not currently linked organizationally in the same work section at the department, the staff in the Injury, Suicide and Violence Prevention (ISVP) Unit and the staff in the EMTS Section have worked to maintain a unified focus on injury prevention. Because the SEMTAC requires expert advice on injury prevention and the primary funding agency for the ISVP Unit (CDC) also requires input from an advisory council, the two efforts have been unified under one committee, the Injury Community Planning Group, which serves both needs. This group has sought guidance from a variety of participants in an effort to coordinate and facilitate the injury prevention efforts carried out by many state and local partners across the state. These collaborative efforts have clearly advanced the cause of injury prevention in a time of relatively little funding.

Furthermore, since all designated trauma centers are required by state rule to participate in injury prevention efforts/programs, all have been involved in identifying injury control concerns. This occurs largely at the local and RETAC levels where some facilities have become major participants in efforts aimed at fall prevention in the elderly, safe driving, seatbelt and helmet use and even suicide prevention. The four Level I trauma centers in the Denver Metro area identified teen seatbelt use as an issue, wrote a grant together and have, for the past several years, been carrying out a teen seatbelt challenge at schools across the metro area. The project has demonstrated significant increases in seatbelt use based on pre-post observational studies.

b. What key problems has the community identified?

Colorado's trauma community has been helpful in both identifying and solving trauma system issues. During the inception of the formal trauma system, 1995-1999, many facilities both within and outside the Denver metro area identified patient divert as being a significant problem. Frequently, local EMS agencies transporting trauma patients were re-routed away from Level I and II facilities, and rural facilities were having difficulties transferring patients to Denver because the larger trauma centers were often on divert, sometimes several of them simultaneously. The community came together, identified the scope of the issue and came up with a solution that has satisfied all participants. Today, the metro trauma centers essentially never go on divert for trauma. If facilities reach the saturation point, then the hospital identified as the "zone master" in each of the four metro Denver zones, will start assigning patients to each facility in that zone so that no one facility becomes completely overwhelmed.

Another issue identified by the community early in the development of the trauma system was the need for a prehospital trauma triage algorithm. Trauma Program staff and the community worked together for several years to come to agreement on a statewide algorithm. Each RETAC was then required to review the statewide algorithm and adapt it to their regional situation. Each RETAC now has a prehospital destination protocol that accounts for local resources and makes sense in the local geographic context.

The community tackled a tough system issue when it identified that the existing air ambulance statute did not allow the type of air ambulance licensing requirements that the community felt were necessary. The rule writing process stalled over the department's inability to require CAMTS certification as part of the licensing process. The community launched a successful initiative to modify the statute so that the department could then write rules that the community and the department felt were protective of patient safety.

Finally, the community has identified a number of injury control concerns over the past decade:

- At the state level, the Injury Prevention Planning Group has worked on suicide prevention, child safety seat/booster seat use, helmet use, seatbelt laws, and falls in the elderly.
- The RETACs have sponsored regional efforts including motor vehicle safety initiatives, Safe Kids activities, Think First, bike helmet distribution and proper use, car seat safety, reflective clothing, teen driving, and occupant protection.
- Individual facilities or a collaborative of facilities have worked on issues such as teen seatbelt use, suicide prevention, motor vehicle safety, helmet use, and senior fall prevention. These efforts tend to spring from the data seen in each facility and special characteristics of the catchment area.

c. How do stakeholders bring system challenges or deficiencies to the attention of the lead agency?

The EMTS stakeholders in Colorado are not shy. If a problem is identified by a transport agency or at a facility or in any part of the EMTS system, the stakeholder(s) will bring it to the attention of both the EMTS Section and/or the SEMTAC. Those communications may occur via phone, e-mail or often at the quarterly SEMTAC meetings where people still gather face to face. The department listens to all concerns, investigates what needs to be investigated, works to change what is immediately fixable, and works towards long-term solutions wherever appropriate. More difficult problems and those requiring long-term solutions are sometimes placed into a "parking lot" for later consideration as may be necessary.

Whether or not the department has the authority and/or ability to fix that problem is another matter. Often there are problems that the department cannot fix either immediately or at all. If some other entity has the authority to resolve the issue, the department staff works to connect the complainant with that entity. Other times, the department identifies that not all challenges have solutions that will satisfy every stakeholder.

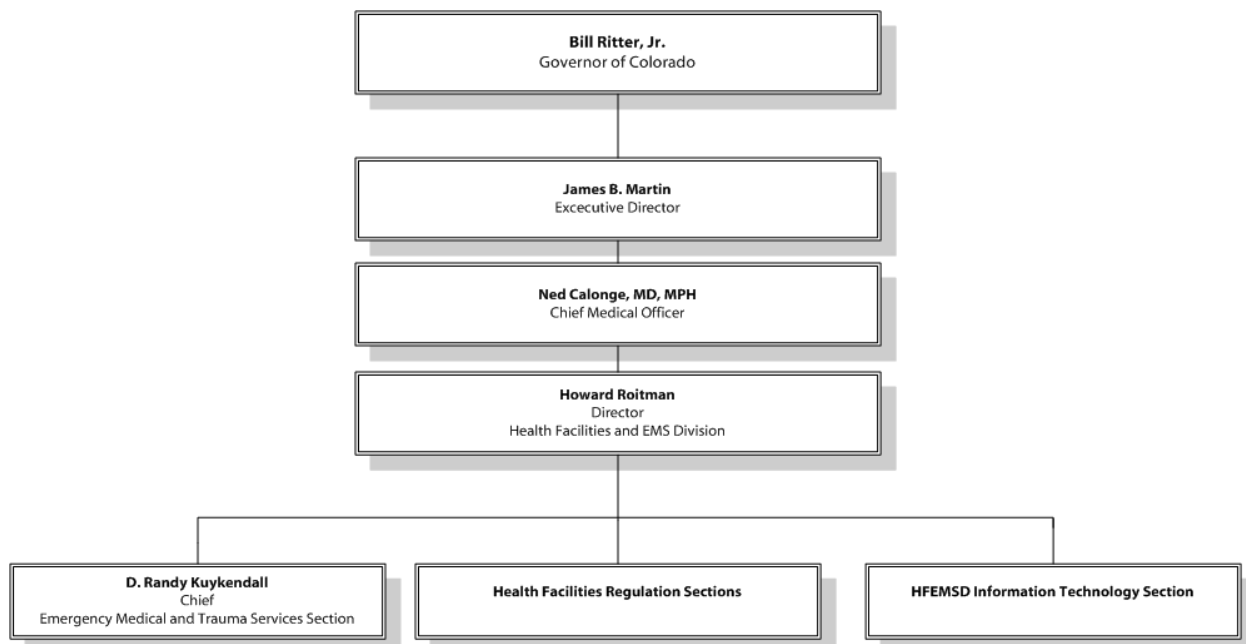
Lead Agency

The lead agency for trauma system development was clearly identified in 1995 in state statute as the Colorado Department of Public Health and Environment. Since that time the department has worked with constituents to build on the trauma system that had developed informally through the efforts of a voluntary organization, the Colorado Trauma Institute. The department works with the Regional Emergency Medical and Trauma Advisory Councils (RETAC) to promote regional system development efforts, largely focused on training and injury prevention. The combined state/regional/ community efforts have moved the system toward maturity; however, efforts have been limited by funding, staffing and authority constraints.

1. Describe the number, position titles, and percentage of full-time equivalency of all personnel within the lead agency or contract personnel who have roles or responsibilities to the trauma program.

Emergency Medical and Trauma Services Section (EMTS section)

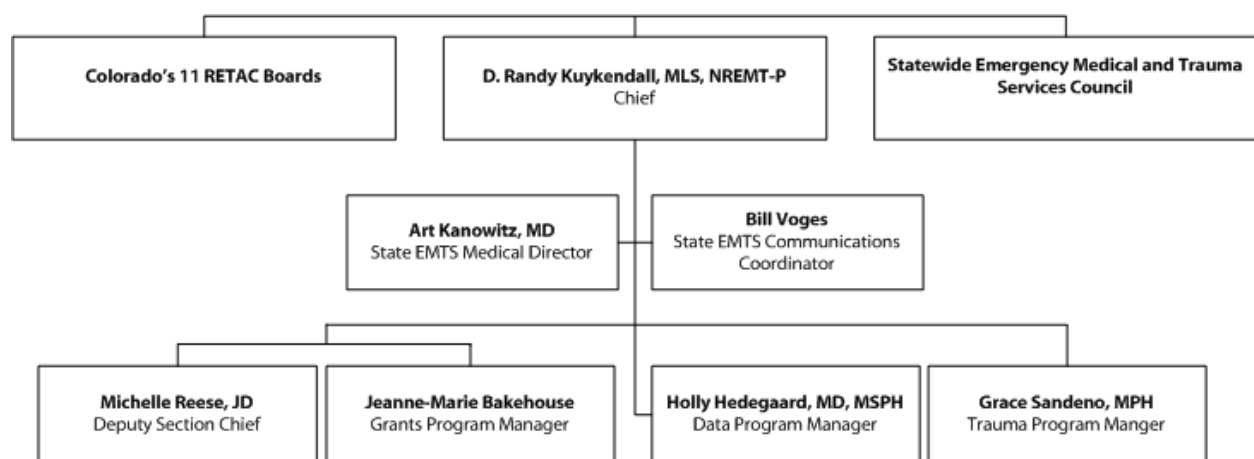
The Emergency Medical and Trauma Services Section is administratively located within the Colorado Department of Public Health and Environment's Health Facilities and EMS Division (HFEMSD). The HFEMSD is responsible for the regulation of health facilities throughout Colorado. The addition of the EMTS Section to the division in 2003 has brought the trauma center designation process closer to the administrative organization that regulates facilities. The organizational structure of the HFEMSD within the Colorado executive branch is as follows:



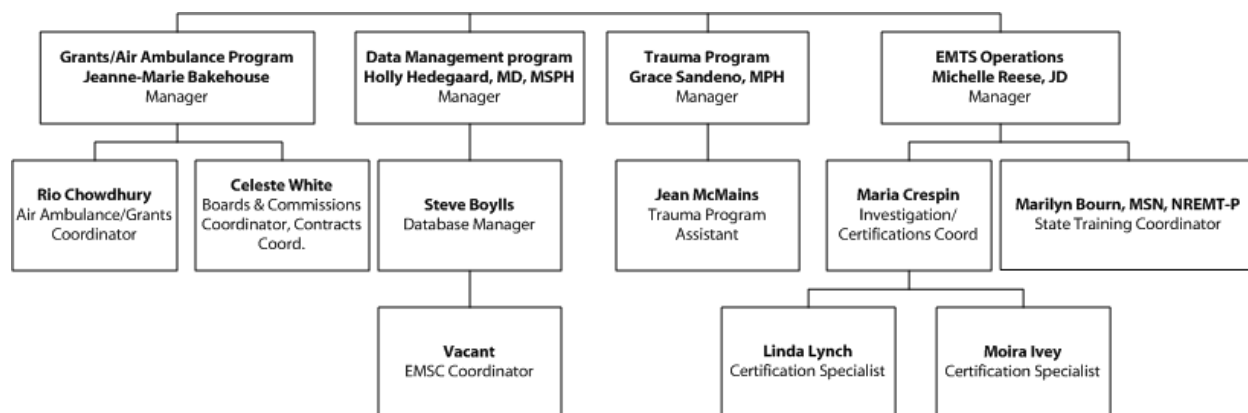
The EMTS Section is responsible for the execution of the statutory responsibilities identified in [C.R.S. § 25-3.5-101](#) *et. seq.* that relate to the oversight and support of Colorado's trauma and EMS system. These responsibilities include the designation process for trauma centers, education and certification of Emergency Medical Technicians, oversight and distribution of grant funds to EMTS system agencies, collection and analysis of data from both trauma centers and licensed ambulance services, licensing of air ambulance services that serve the state, administration of the EMS for Children program, funding and administrative oversight of the eleven RETACs and providing support and technical assistance to trauma and EMS agencies throughout the state. These responsibilities include the development and promulgation of rules governing these activities. Rule promulgation is conducted through the Colorado Board of Health.

In addition to the responsibilities identified in statute regarding oversight of the statewide EMTS system, the EMTS section is administratively responsible for funding dedicated to the Rocky Mountain Poison Control and Drug Center as well as fiscal coordination of the Colorado Coroners Training Board.

The organizational structure of the EMTS section's leadership team is demonstrated below:



Each program within the EMTS section is staffed to meet the essential services provided by that program. Staffing for each of the section's programs is outlined in the diagram on the next page.



Currently, the FTE assigned to trauma is slightly more than the 2.0 indicated in the staffing diagram. Jean McMains and Grace Sandeno spend almost 100 percent of their time on trauma activities. In addition, the Section Chief provides guidance and assistance on trauma issues and the EMTS Operations Manager provides guidance on rule writing and interpretation. The fiscal section of HFEMSD (not shown in the staffing diagram) supports the Trauma Program by writing contracts and purchase orders, coordinating any purchases, and paying the many bills generated in the trauma designation process. Furthermore, the EMS and Trauma Data Program manager provides support to the trauma registry and has regularly supported the trauma community through data analysis.

At the time of this writing, legislation is pending that, if passed, will provide significant increases in funding for the continued support of rural and frontier EMS and trauma services. This legislation will also provide support for an additional 3 staff FTE within the EMTS Section. One of these positions will be the addition of a trauma program specialist to provide technical assistance and support to the state's 70 designated trauma centers and eleven RETACs. This effort will concentrate on providing assistance in the development of robust quality improvement programs, which will enable facilities and the EMS agencies they work with to better identify issues and improve care to trauma patients in advance of the facility's triennial review. Rural and small facilities often lack the staff expertise to create a trauma quality improvement program that moves past counting how many times appropriate documentation was missing in the patient medical record. The new position would provide hands-on assistance to rural programs to create or improve protocols and quality improvement processes. The goal is to assist facilities in developing and then measuring their ability to provide quality patient care. The remaining two positions will be assigned to the EMS and Trauma Data Program and the Grants/Air Ambulance Program respectively.

2. Identify other personnel resources that support the trauma program activities of the lead agency (for example, epidemiology support from other units within the health department, public health interns).

The Injury, Suicide and Violence Prevention (ISVP) Unit in the Prevention Services Division coordinates the department's injury prevention activities. Lindsay Myers of the ISVP Unit staffs the Injury Community Planning Group of SEMTAC and coordinates access to information on

current injury prevention activities in Colorado. ISVP Unit staff have provided assistance to facilities and RETACs on injury prevention program planning and can refer interested individuals to evidence-based programs or best practices.

Other resources that indirectly support the trauma program include the Epidemiology, Planning and Evaluation branch of the Prevention Services Division and the Health Statistics Section in the Center for Health and Environmental Information and Statistics at the department. These programs provide additional databases and analyses to the EMS and Trauma Data Program manager that help to define the profile of injury in Colorado. The databases managed by these programs are described in more detail in the [Injury Epidemiology](#) chapter.

3. Describe the adequacy of personnel resources available to the lead agency to sustain trauma program assessment, policy development, and assurance activities.

Personnel resources within the lead agency are limited to the Trauma Program manager and assistant, the part time commitment from the EMS and Trauma Data Program manager, fiscal support, and EMTS Section leadership support, as described in question 1 above. These limited personnel resources have allowed the Trauma Program to manage the trauma center designation process and the trauma registry. These two program areas provide some assessment of the current status of injury in Colorado and a limited (triennial) clinical review of trauma centers. Rule writing for trauma center designation has been accomplished but resources have not been available for system wide quality assurance activities. Some of the limitations for enacting quality assurance activities also relate to the peer review statutes in Colorado.

While there has been a great deal of progress since the state trauma system was created in 1995, there are still many opportunities for growth. Policy development has occurred with the assistance of SEMTAC and its committees, but much more remains to be done. For example, while there is collaboration between trauma and injury prevention activities, funding for issues identified as priorities through the trauma registry have been limited or inconsistent. And while RETACs and SEMTAC committee have voluntarily worked on efforts at developing system quality assurance guidelines, there has not been funding to support dedicated state staff to work on this issue.

a. Identify impediments or barriers that hinder system development.

As discussed elsewhere in this document, the confidentiality issues around peer review and system quality improvement remain to be addressed. Trauma physicians participate in quality improvement activities within their own institutions as required by state trauma rules; however, trauma physicians are not confident that their honest feedback will not be disclosed to the public, and thus are reluctant to participate in system-wide quality improvement activities.

The current funding source (fees charged to trauma centers) and FTE authority are sufficient for designation activities, per se, but not adequate for the requirements of building a strong statewide trauma system. Additional funding for trauma system development activities including, staffing, epidemiology and quality improvement could greatly benefit the further development of the system.

Trauma System Plan

The absence of a current integrated emergency medical and trauma services system plan has long been recognized as a weakness in Colorado's system development efforts. While there is no current plan, there have been several planning processes over the years that have contributed to growth in the system. As the statewide community of stakeholders looks to the future, they believe that this ACS trauma system consultative visit will be the start of a new planning process that will result in a concrete "roadmap" for advancing the system.

1. Describe the process for the development or revision of the trauma system plan. There have been several efforts at development of a trauma system plan and/or an EMTS strategic plan for Colorado.

In 1988, NHTSA provided an initial assessment of Colorado's EMS system. The focus was on EMS with minimal mention of trauma. The assessment was the basis for the activities that ultimately led to EMS legislation in 1989 establishing a stable funding source that has since become the foundation of many state, regional and local EMS improvements. This funding base has been invaluable in supporting the long-term growth of Colorado's EMTS system as it exists today.

In 1993-4, the state undertook an "EMS and Trauma Services Assessment Project" which looked at: resources available in facilities; resources in the prehospital arena; trauma costs; and the development of a blueprint for state trauma facility standards, state pre-hospital delivery standards and state data collection and quality assurance standards. The resulting report provided some guidance to the department after the passage of legislation in 1995 that authorized the development of a state trauma system.

In 1997, Colorado hosted a second NHTSA statewide EMS assessment. While this assessment again focused largely on EMS, by this time NHTSA's vision of EMS had broadened to include facilities, trauma centers, trauma system development, and injury prevention. Clearly one of the needs identified in the assessment was additional planning efforts to better integrate components of the EMTS system.

In 1999, the Department conducted a facilitated EMS and trauma system planning meeting. The goals of this meeting were to: work on a merged (EMS and trauma) council model; work at the conceptual level to develop a state plan; prioritize elements of a plan; and identify resources necessary to implement the plan. This meeting resulted in a very rough draft of an EMTS plan that was a work in progress through March 2004.

In March 2004, the *Colorado EMTS Strategic Plan* was almost completed. It focused on the integration of EMS and trauma, following the format of the national *EMTS Agenda for the Future*. While it had recommendations for progress for each of the components of a model system, particular focus was given to six key action areas: EMTS workforce; communications;

mass casualty incidents; legislation/regulation; information systems/data collection; and medical direction.

The *Colorado EMTS Strategic Plan* was designed to work in conjunction with the required biennial plans that are submitted by each RETAC as a part of their contractual deliverables every other year. Unfortunately, this planning process was abandoned in the midst of a significant organizational change within the EMTS Section that occurred in March 2004.

In early 2004, issues of significant concern related to the organizational effectiveness of the EMS and Trauma Section within the department surfaced in a variety of public venues. Questions regarding the security of EMT certification examinations, ineffective investigation techniques and symptoms of overall administrative structural collapse within the EMTS Section became public. During the six-month period that followed, more than 75% of the staff within the EMTS Section either resigned or otherwise left the department. This vacuum in state level leadership was addressed as quickly as possible by the department, resulting in new leadership, management and operational personnel. By the end of 2004, the new personnel were able to begin addressing the challenges before the statewide trauma and EMS system. With the support and assistance of the department's senior leadership, the SEMTAC and the RETACs, all available energy was put into a major re-structuring effort that has resulted in numerous policy and operational changes that have redesigned the landscape of Colorado's EMTS community.

As a result of these events, the newly reformed EMTS Section and the community stakeholders have come to understand that the premise upon which the *Colorado EMTS Strategic Plan* was structured no longer existed, and much of the information was no longer reflective of the current environment. Although the restructuring of the EMTS Section occurred more than 4 years ago and many of the challenges have been addressed, the community has not yet reached a point where a comprehensive formal planning process has risen to the top of the lengthy priority list. On the positive side, all of the emergent issues that precluded carrying on regular business have been addressed. In addition, it is clear that projects such as the ACS Trauma System Consultation, the [Standardized Regional Needs Assessment Project](#) (S(r)NAP) and a major legislative initiative to improve funding are presently laying the groundwork for the development of a contemporary comprehensive strategic plan that will appropriately address the needs and opportunities of the future.

a. Include the role of advisory and stakeholder groups in the process.

Throughout the history of the EMTS system in Colorado, stakeholders have played a crucial role in all aspects of system development. Without Colorado's active constituents, the system would not exist. The department is required to conduct open meetings and develop processes for public input on decisions. In addition, the department is required to involve the SEMTAC in decision-making processes. However, under the leadership of Randy Kuykendall (EMTS Section chief since November 2004), the staff has become even more rigorous in creating open dialogue with stakeholders so that each person or organization has the opportunity to provide input before decisions are made. Thus it is often the constituents who drive change by suggesting new ideas or adding their insight to any process changes.

The SEMTAC has taken a lead role in organizing stakeholders to re-visit the strategic planning process. Based on work done at SEMTAC meetings in 2008, the Council, with input from a wide variety of constituents, adopted the following strategic goals to guide efforts, not only by SEMTAC, but also by the department.

SEMTAC Strategic Goals 2008

1. Link data from multiple sources to create an outcome-based EMS and Trauma System for Colorado
 - a. Establish a data-based integrated performance improvement system
 - b. Enable patient tracking from incident through hospital discharge
2. Support standards and solutions to assure quality EMS and Trauma service delivery throughout the state
 - a. Explore and define how EMTS can be better coordinated to provide high quality access to services throughout the state
 - b. Identify opportunities to use grant funding to better support standards and solutions
3. Establish systems to safeguard the public and EMTS providers
 - a. Support comprehensive EMTS oversight
 - b. Promote statutory/legal authority to protect quality improvement activities (peer review)
 - c. Initiate and support provider/patient safety initiatives
4. Promote and support prevention
 - a. Communicate and support prevention initiatives to RETACS, EMTS providers and public health organizations

These goals are foundational to the strategic planning that is necessary in the near future. The information gleaned from this consultative visit by the ACS will also be used to guide that process.

2. Is there on-going assessment of trauma resources and asset allocation within the system?

See chronology above for some projects which crossed over between assessment and planning.

One of the most significant projects to assess the trauma and EMS resources is the Standardized Regional Needs Assessment Project (S (r)NAP). Pursuant to statutory requirement, each of Colorado's eleven RETACs is required to conduct an assessment of its respective trauma and EMS system needs. The objective of this project is to use a standardized assessment tool to gather information common to all regions, while recognizing the diversity of these regions by also collecting data germane to local systems. This project has resulted in a cooperative effort by the eleven RETACs to perform assessments in each

region using a standardized tool. The tool also allows each RETAC to add “individualized” questions that apply to their communities and not necessarily to the state as a whole.

This project is funded through “special projects” grant monies as recommended by the SEMTAC and administered by the department. A contractor has been identified and during the next three years, each RETAC will be assessed with respect to trauma resources and asset allocation. The data obtained from these assessments will be compiled in a statewide database that will be made available to the EMTS community. The regional data collected by each RETAC will be maintained locally. Administrative issues have delayed the start of this important project, but at this point in time, the project is scheduled to begin in March 2009.

The ultimate goal of the S(r)NAP project is to develop a statewide repository of information that can then be maintained on an on-going basis and used to develop a 10+ year strategic plan to guide the continued development of Colorado’s trauma and EMS system at the state and regional levels. In conjunction with the various other databases and informational repositories available to policy makers, this project will result in a comprehensive process of on-going development, system enhancement and oversight.

In addition to the above efforts, there is a hospital preparedness program in the Emergency Preparedness and Response Division at the department that focuses on hospital surge capacity and readiness. Historically, this program has provided funding to hospitals to purchase additional resources that would help during a disaster. In addition, the program catalogs the resources available so that if there were a disaster, it would be clear where system resources are allocated.

Some state EMS resources and asset allocation are monitored on an annual basis through agency profiles provided by each transport agency. These profiles are mandatory for any agency applying for state grant funding; unfortunately, agencies that do not apply for grant funding might not submit information regularly or at all. Regional assessments have been carried out on an individual basis in previous years; however, the S(r)NAP project will provide additional standardized information on a regional level.

3. Describe the process used to determine trauma system standards and trauma system policies.

In Colorado, trauma system “standards” consist of the four chapters of trauma system rules that have been formally adopted by the Colorado Board of Health. [Chapter 1](#) focuses on the trauma registry. [Chapter 2](#) contains a mixture of trauma center standards and requirements of other system components. [Chapter 3](#) contains the trauma center designation standards; it is the longest and most well developed chapter and has recently undergone a major revision to account for changing from the ACS “gold book” to the “green book.” [Chapter 4](#) encompasses standards for the RETACs. As with all state rules, they are written in conjunction with the regulated community and any members of the public who are interested. State rules are based on national standards where applicable, approved by SEMTAC and ultimately promulgated by the Colorado Board of Health.

Colorado's trauma system has few written policies, and those that exist focus on process issues for trauma center designation. The policies are more oriented on how to do an activity rather than on the specifics of patient care. This has been driven by several factors including the lack of clinical expertise on the part of the Trauma Program staff and the inability to write one-size-fits-all policies in an environment as diverse as Colorado. Rather, the approach is to encourage, or in many cases require, facilities to write policies that address certain issues such as the transfer of burn patients, assessment/transfer of patients with head injuries, and scope of care. These policies must be specific to the resources of the facility, and if the facility is not following its own policies, a plan of correction to fix the disconnect between policy and practice must be filed with the department. These policies must also integrate with RETAC triage and transport protocols when applicable.

a. How are they reviewed and evaluated?

Trauma rules are reviewed on an on-going basis and modified whenever there are changes that warrant the initiation of the rule change process and when there is sufficient staff time to devote to these efforts. Staff time is often the limiting factor in reviewing and revising rules since the process of rewriting rules, obtaining public input, again rewriting, and again obtaining public input takes a minimum of six to eight months.

Evaluating the standards is a much more difficult process. As Trauma Program staff identifies issues/problems with the rules, staff works to see if there are alternatives that meet the needs of protecting the public's health while at the same time easing the regulatory burden on facilities. In most cases it is left to common sense, input from the regulated community and review by staff to ensure that current state standards are in step with national standards and with best practices.

Since the department's focus has been on trauma system policies that are about process and not about clinical care, the method for reviewing and evaluating the policies is quite simple. If something doesn't work, staff looks for options to fix it, usually writes up those options, seeks guidance from other staff and finally has trusted community members, quite often SEMTAC members, review those changes and provide input. Under the current structure, there is no single advisory group to approach for recommendations on trauma designation operational policies. However, the department often convenes a task force on specific issues that are large enough to be of broad interest. The advice of a task force, informal advisory group or other public comment is considered in the final product. Ultimately, it is the department that has the authority to establish policy, but it attempts to work collaboratively with other interested parties to ensure accuracy and community acceptance.

b. What standards and policies exist for special populations, including rural and frontier regions?

The standards and rules that exist for trauma designation are the same regardless of rural or frontier locations (see [Chapter 3 rules](#)). The standards for prompt scene arrival by EMS are

different for urban, rural and frontier transports (see [Chapter 2 rules](#)). Facility policies certainly can vary by hospital. However, as explained above, most policies are written by the facility or the RETAC and should take into account special circumstances, special populations and local resources.

c. How are specialized needs addressed, including burns, spinal cord injury, traumatic brain injury, and reimplantation?

There are specific state standards and rules for consultation and referral of burn patients.

There are no state standards for the care of traumatic brain injury and spinal cord injury, however, each facility is required to have their own policies about the care and, in many cases, transfer of patients with these types of injuries.

The issue of the reimplantation of severed limbs is one that SEMTAC hopes to address in 2009. At the SEMTAC meeting in January 2009, there was consensus that the Level I community in conjunction with the department should convene a committee to examine the availability of reimplantation services to better serve Colorado's trauma patients. This issue has risen in priority as the pool of specialists to perform reimplantation is diminishing. In addition, one of Colorado's Level I trauma centers has been involved in a [study](#) of the transfer of patients from rural areas to an urban center for reimplantation. This study showed that less than half of the patients transferred for reimplantation actually were candidates for that service and brought to light the need for telehealth solutions that might prevent unnecessary transfer. In addition, there are potential options for assuring that reimplantation services are coordinated among the Level I centers statewide.

System Integration

Colorado's trauma system came into being largely by the efforts of the medical community. The trauma medical community works with other partner agencies (EMS, non-profits, law enforcement) and particularly with the prevention and public safety communities to further the development of the trauma system. This has been even more apparent since the integration of the trauma and EMS councils in 2000. The various communities have developed a better understanding of each other and in some cases have worked together to leverage their efforts in providing prevention programs and in developing various trauma system components. Other resource agencies remain largely on the periphery and are integrated only at the local level in some select locations.

1. What is the trauma system's collaboration and integration with EMS, public health, and emergency management?

Although there is always more to do in terms of ensuring the successful integration of the trauma system into the various components of EMS, public health and emergency management, the current system of policy development and oversight can be described as inclusive. As discussed in other parts of this document, the merger of the State EMS Advisory Council and the State Trauma Advisory Council in 2000 set the foundation for many opportunities to integrate trauma care into various arenas. In addition to the 25 gubernatorial appointed members of the SEMTAC, there are seven ex-officio members that represent stakeholders from law enforcement, coroners, state department of transportation and the Colorado community college system. Thus, at the state level, the opportunity for these stakeholders to work together exists on a routine basis.

At the local and regional level, the cornerstone of system integration is the eleven Regional Emergency Medical and Trauma Advisory Councils (RETACs). Under current statute, each member county is responsible for the appointment of three individuals to represent its county perspective as members of a RETAC board of directors. Although there is no specific guidance in terms of representative origin or representation, the RETAC boards have developed in a way where trauma centers, EMS agencies, emergency managers, public safety and law enforcement are represented on most regional councils. While there is a cross-section of multi-disciplinary representation on most of the RETAC boards, the representation does not usually include mental health, social services or child protective services.

Cooperation between the department and organizations such as the National Ski Patrol, Colorado Search and Rescue, Colorado State Patrol and others occurs in a variety of venues. These opportunities range from informal communications on training and grants programs to more formal relationships such as presentations at various conferences. The EMTS Section routinely participates in presentations at the annual Colorado All-Hazards Conference in Grand Junction each spring. This opportunity allows issues of patient care and transportation to be included in the broader issues of disaster preparedness, etc.

Relationships with various areas of public health concern are handled at the state level through the department itself. On-going efforts to ensure intra-organizational communications are of prime concern to the EMTS Section. However, there are many opportunities to better communicate and integrate with both state and local agencies responsible for child protective services and social services. As with most components of the trauma system, opportunities to further integrate trauma into the broader spectrum of health care in Colorado are important and should be seized as they arise.

a. Prevention Programs

The integration of injury prevention programs with trauma has been extensive and systemic. Trauma centers are required to do public education and injury prevention, and the department has encouraged and directed building of those programs on public health principles such as collaboration, identification of true needs and implementation of best practices. In addition, RETACs have implemented regional injury prevention efforts sometimes through the EMTS system and sometimes through other community partners.

b. Mental Health

There has not been much integration between trauma and mental health services except on the issue of screening and intervention for substance abuse and indirectly on suicide prevention, through the department's state-funded Office of Suicide Prevention. Even this integration is in its early stages. Integration with mental health services in Colorado remains an area of potential growth.

c. Social Services

There has been little integration with social services except in the arena of Child Fatality Review. Again, as the system matures, this connection represents an opportunity for system enhancement.

d. Law Enforcement

An ex-officio member from the Colorado State Patrol and another ex-officio member from the State Sheriff's Association officially represent law enforcement on the SEMTAC. Law enforcement representatives also sit on a number of RETAC boards and on the Child Fatality Review committee.

e. Child Protective Services

This has not been an area of emphasis except in limited injury prevention efforts and the Child Fatality Review. Other opportunities for improved integration remain.

f. Public Safety (such as fire, lifeguard, mountain rescue, and ski patrol)?

Public safety is represented on SEMTAC through two voting positions, one held by an official providing urban EMS service and the other by an official providing rural EMS service. In addition, there is integration at the RETAC level where public safety is also represented. Integration efforts with public safety have largely focused on on-scene interaction with EMS,

prehospital triage and scope of practice issues for the purpose of transport. There remain additional opportunities to integrate other activities such as cross training and injury prevention.

Financing

In Colorado there is no direct funding mechanism for trauma system participation. The trauma designation process is supported via the fees paid by participating trauma centers; thus, trauma system development has focused largely on issues related to trauma center designation. On occasion, the SEMTAC has recommended funding for special projects, particularly in training and injury prevention, that have benefited the trauma system. In addition, there is limited funding for regional system development through the RETACs. While the RETAC funding is for both EMS and trauma purposes, projects that have a trauma component have generally focused on training and injury prevention as well.

1. How does the lead agency track and analyze internal trauma system finances?

The lead agency, the Colorado Department of Public Health and Environment, has data only on its own finances. The Trauma Program budget is tracked by a fiscal unit in the HFEMS Division. This work unit operates under the oversight of CDPHE Financial Services. All Trauma Program functions are carried out within the context of Colorado state law, rule and policy.

The lead agency does not collect facility or agency information on the financing of trauma care or the trauma system throughout the state.

a. How does the advisory committee participate in the financial review process?

The SEMTAC participates regularly in reviewing the funding that comes to the department for the purposes of supporting the EMTS system. The majority of that funding comes from the \$1 per vehicle registration surcharge that is used mainly to support RETACs, fund grants to the EMS community and provide the fiscal operating foundation of the EMTS Section. This funding amounts to approximately \$4.5 million per year. Trauma designation activities are self-funded by the fees charged to facilities for the designation process. At the quarterly Council meetings, the SEMTAC receives a financial report showing how departmentally controlled funds have been disbursed.

b. How frequently are trauma system financial reports published?

An attempt to look at trauma system funding was first conducted 15 years ago. That report focused on charges, not reimbursements, and thus did not present a full picture of trauma system funding. Since that time, there have been massive modifications in Colorado's trauma system – in particular, a change from voluntary designation by an informal organization (the Colorado Trauma Institute) to voluntary inclusive designation by the state, and a change from no-fault auto insurance to a tort system. The landscape in Colorado today is much different than it was 15 years ago.

Since the change in auto insurance systems in July 2003, there have been several efforts to quantify the impact of that change. Clearly this is only a portion of the funding picture for the system; however, it is one portion that stakeholders have worked on assessing. The Trauma Care Preservation Coalition was a statewide group composed of EMS providers, hospitals, fire

chiefs, physicians and nurses who committed, in the wake of the insurance changes, to “finding pragmatic solutions to the severe funding crisis facing Colorado’s emergency trauma service providers.” This coalition published several documents addressing the financial impact to EMS, facilities, health care providers, etc. (See [Report on Switch to Tort System](#), [Colorado's Trauma Care Funding Crisis](#), and [Colorado's Trauma System Failing](#))

In addition, the Governor’s Office of Policy and Initiatives commissioned a study by an outside consultant on the result of the switch to a tort auto insurance system. This report detailed losses to the trauma system that were incurred largely because of a doubling in the percentage (from 13.4% to 27.2%) of self-pay patients involved in motor vehicle crashes between the years 2002 and 2006. Also documented was a very significant shift in insurance coverage from auto to health insurance. Health insurance has often negotiated lower payment rates than the auto companies, leading to another potential source of lost revenue. (See [Auto Insurance Trauma System study](#)) This ONLY applies to motor vehicle crashes and does not apply to funding for other injuries handled by the trauma system.

c. Which financial data are reported (lead agency data, health facility data, or both)? Currently, only lead agency data are reported, which includes costs incurred by the EMTS Section at the department and grants to RETACS and other constituents.

2. What is the lead agency’s budget for the trauma system?

The Trauma Program is part of the EMTS Section at the department. The Trauma Program has slightly more than 2 FTE and focuses on trauma designation, provision of technical assistance and trauma rule writing. The budget for trauma designation, which includes these system development activities, is approximately \$300,000 per year and is covered by the trauma designation fees. Additional activities are funded through grants and through administrative support funded by the \$1 fee per registered motor vehicle.

3. What is the source of funding available to support the development, operations, and management of the trauma system (for example, general funds, dedicated funds)? See above.

4. What financial incentives and disincentives exist to encourage trauma center participation in the trauma system?

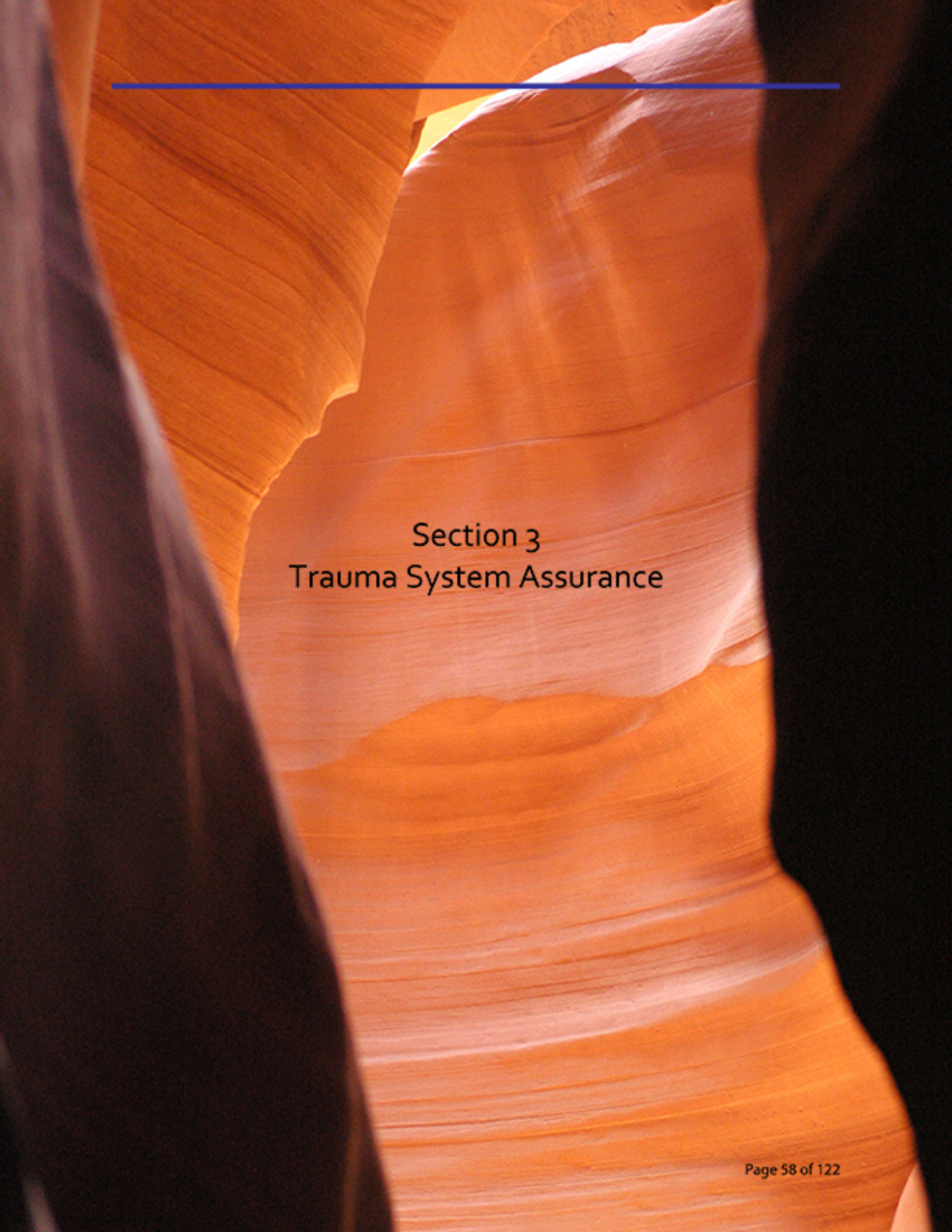
The only real financial incentive to participate is the trauma team activation fees charged by designated trauma centers. Several years ago, most facilities were not charging for these fees; however, after a concerted effort by staff to encourage charging for services rendered, most facilities are now charging.

The financial disincentives are clear. Facilities must pay between \$26,600 (Level I) and \$6,800 (Level IV/V) triennially to participate in the system by being a designated facility. In addition there are the extraordinary costs of running a trauma program which include equipment, education for staff, on-call pay, time for trauma data collection/trauma registry, time for a

trauma nurse coordinator, time and/or money spent on injury prevention efforts, etc. Some of these costs might be incurred even without a trauma program (training for staff) but most of these costs are directly attributable to being a trauma center.

a. Specifically include arrangements for uncompensated care.

There is no special mechanism to pay for uncompensated trauma care in Colorado at this time.



Section 3

Trauma System Assurance

Prevention and Outreach

The Injury, Suicide and Violence Prevention (ISVP) Unit in the Prevention Services Division at the department is the primary state agency responsible for coordinating injury prevention efforts in Colorado. The ISVP Unit is the leader in building capacity and sustainability at the community and state levels by providing culturally appropriate programming, quality technical assistance, and maintaining diverse community partnerships. The ISVP Unit values and applies strategic decision-making, visionary leadership and effective systems while supporting a balance of innovative and research-based programming. The ISVP Unit has eleven staff members who work on a variety of unintentional and intentional injury prevention issues. Programs within the ISVP Unit are summarized in Table 2 below.

The ISVP Unit coordinates activities with the trauma community through the Injury Community Planning Group (ICPG), a standing committee of the SEMTAC. ICPG meets quarterly to coordinate injury prevention initiatives with RETACs, EMTS providers, facilities, non-profits, public health organizations and others. In April 2003, ICPG completed the [Colorado Injury Prevention Strategic Plan 2003-2008](#) that provided a comprehensive framework for injury prevention efforts at both the state and local levels, focusing on broad, system-level initiatives that address the priority needs of all Colorado citizens. This strategic plan was revised and extended in 2008 to serve as a blueprint to guide Colorado's injury prevention activities through 2010 (the new plan is not yet posted to the web). Recognizing that a strategic planning effort cannot solve all of the state's injury prevention issues, the *Revised Colorado Injury Prevention Strategic Plan, 2003–2010* prioritizes the types of injuries to be addressed based on the leading causes of injury death and hospitalizations in Colorado. These include motor vehicle-related injuries, falls, suicide, and unintentional poisoning.

1. List organizations dedicated to injury prevention within the region and the issues they address (for example, MADD, SADD, SafeKids Worldwide, Injury Free Coalition for Kids, American Trauma Society, university-based injury control programs).

Table 1. Injury Prevention Activities by Community/Hospital Partners

Agency	Primary focus/Injury Prevention Activities
AAA of Colorado	Teen Driving Safety
Asian Pacific Development Center	Sexual Assault Prevention
Aurora MHC	Child Abuse Prevention
Baby Bear Hugs	Child Abuse Prevention
Big Brothers Big Sisters	Youth Violence Prevention
Blue Sky Bridge (Boulder)	Sexual Assault Prevention
Broomfield Co. Health and Human Services	Child Abuse Prevention
Carson J Spencer Foundation	Suicide Prevention

Agency	Primary focus/Injury Prevention Activities
Catholic Charities and Community Services	Suicide Prevention
Catholic Charities of Pueblo	Child Abuse Prevention
Chaffee County Dept of Health & Human Services	Child Abuse Prevention
Colorado Injury Control Research Center	Rural Injury Prevention Research and Program Support
Colorado Department of Revenue	Teen Driving Safety
Colorado Department of Transportation	Motor Vehicle Safety, Pedestrian Safety, and Bicycle Safety, Safe Routes to School
Colorado State Patrol	Motor vehicle safety
CPS Team Colorado	Statewide Child Passenger Safety Programs
Denver Children's Advocacy Center	Sexual Assault Prevention
Denver Health	Child Passenger Safety, Teen Driving Safety, Bicycle Safety and Helmet Use
Denver Indian Family Resource Center	Child Abuse Prevention
Our Sister's Keeper Coalition	Sexual Assault Prevention
Drive Smart Colorado	Teen Driving Safety, Child Passenger Safety, and DUI Prevention
El Paso County Dept of Health and Environment	Youth Violence Prevention
Elbert Co. Dept. of Social Services	Child Abuse Prevention
Gunnison Dept. of Human Services	Child Abuse Prevention
High Plains Community Health Center	Suicide Prevention
Hilltop Community Resources	Child Abuse Prevention
Hinsdale Public Health	Child Abuse Prevention
Jefferson Center for MH	Child Abuse Prevention
JFK Partners	Child Abuse Prevention
Light for Life Foundation-Yellow Ribbon	Suicide Prevention
Littleton Fire and Rescue	Teen Driving Safety
Lutheran Family Services	Child Abuse Prevention
MADD	Teen Driving Safety
Medical Center of the Rockies	Older Adult Fall prevention, child passenger safety, teen driving safety
Memorial Hospital	Think First, Child Passenger Safety, Safe Kids Worldwide
Mental Health America of Colorado	Suicide Prevention
Mental Health America of CO-Suicide Prevention Coalition of Colorado	Suicide Prevention
Mesa County Health Department	Teen driving safety, Child Passenger Safety, Older Adult Falls
Midwestern Colorado Mental Health Center	Suicide Prevention
Mile Hi RETAC	Teen Driving Safety
Montezuma County Health Dept.	Child Abuse Prevention

Agency	Primary focus/Injury Prevention Activities
NW CO Visiting Nurse Assoc.	Child Abuse Prevention
Parents Surviving Suicide of Metro Denver	Suicide Prevention
Pikes Peak Family Connections	Child Abuse Prevention
Pinon Project Family Resource Center	Suicide Prevention
Plains to Peaks RETAC	Child Passenger Safety
Prowers County Dept. of Social Services	Child Abuse Prevention
Pueblo City/County Health Department	Teen driving safety
Pueblo Suicide Prevention Center	Suicide Prevention
Rape Assistance and Awareness Program (Denver)	Sexual Assault Prevention
Rocky Mountain Insurance Information Association	Teen Driving Safety
Rocky Mountain Research and Prevention Institute	Kids 1 st License plates, injury prevention mini-grant program
Rural Solutions	Suicide Prevention
Safe Kids Worldwide	Unintentional Injury Prevention for children ages 0-14
San Juan Basin HD	Child Abuse Prevention
San Juan Basin HD	Child Abuse Prevention
San Luis Valley Comprehensive Community Health Center	Youth Violence Prevention
San Luis Valley MHC	Child Abuse Prevention
Sexual Assault Services Organization (La Plata)	Sexual Assault Prevention
SHARE, Inc.	Sexual Assault Prevention
Sisters of Color United for Education (Denver)	Sexual Assault Prevention
South Metro Fire and Rescue	Teen Driving Safety
Southeast RETAC	Child Passenger Safety
Suicide Prevention Partnership of the Pikes Peak Region	Suicide Prevention
Suicide Resource Center of Larimer County	Suicide Prevention
Swedish Medical Center	Teen Driving Safety
TBI Trust Fund	Support services for people with Traumatic Brain Injuries
The Children's Hospital	Shaken Baby Prevention, Childhood Falls, Child Passenger Safety, Safe Kids
The Conflict Center	Youth Violence Prevention
Tri-County Health Department	Older Adult Fall prevention
Tu Casa (Alamosa)	Sexual Assault Prevention
University of Colorado at Boulder	Suicide Prevention
University of Denver	Suicide Prevention
Western Colorado Suicide Prevention Foundation	Suicide Prevention

Agency	Primary focus/Injury Prevention Activities
Western Regional Occupant Safety Coalition	Child Passenger Safety, Teen Driving Safety, Adult Seatbelt Use in 6 counties
Western RETAC and Northwest RETAC	Older Adult Falls
YEMA: Hispanic Advertising	Suicide Prevention

2. Describe how the trauma lead agency has funded and coordinated system-wide injury prevention or outreach activities.

Funding for the department's injury prevention activities comes primarily through grants and cooperative agreements between the department and federal agencies such as the CDC, Maternal and Child Health (MCH), Substance Abuse and Mental Health Services Administration (SAMHSA), and the Health Resources and Services Administration (HRSA). Limited state funds are provided to the Office of Suicide Prevention for their activities (general funds) and to the ISVP Unit for prevention of child abuse (through the Colorado Children's Trust Fund). State funds have also been distributed through the EMS grants program to EMTS providers interested in implementing local injury prevention programs, however the amount of funding has been minimal. From 2006-2009, five projects were funded for a total amount of approximately \$40,000.

The ISVP Unit works with its hospital and community partners to address the recommendations outlined in the *Revised Colorado Injury Prevention Strategic Plan, 2003–2010* through a variety of programs and projects.

Recent ISVP Unit programs/projects include:

- **Marketing Plan for Injury Prevention**
Contents of this plan have been introduced to the injury prevention community through a series of marketing symposia.
- **Teen Motor Vehicle Leadership Alliance**
This multidisciplinary, statewide coalition formed in November 2005 with the purpose of bringing together different state agencies, local agencies and private partners concerned about teen driving safety. During the last three years, the Alliance has completed its own strategic plan to improve teen motor vehicle safety statewide. Components of the plan include increasing enforcement of Colorado's Graduated Drivers' Licensing law, increasing safety belt use statewide, and providing technical assistance and consultation to local Colorado communities. Alliance members participate on workgroups that focus on social marketing, community programs, legislative issues, and technical assistance. Additionally, the Alliance works to leverage funding and resources to complete a variety of teen driving safety projects.
- **Marketing Fall Prevention Classes to Older Adults in Faith-Based Congregations: Cluster Randomized Controlled Trial**
There is good evidence that community-based group exercise classes focusing on strength and balance prevent older adult falls, but uptake by older adults is limited. This

study will test a new approach to promote participation in group balance-retraining exercise classes, using social marketing to target older adults in faith-based congregations.

- **Project Safety Net**

The Office of Suicide Prevention received a grant from the Substance Abuse and Mental Health Services Administration to facilitate a youth suicide prevention initiative called Project Safety Net. This program has trained more than 2,000 people in Colorado in suicide awareness and intervention skills, in addition to building community networks to connect at-risk youth to care and resources. A robust evaluation of the suicide awareness and intervention skill training has shown that the training increases adults' confidence and willingness to intervene with youth who are suicidal.

- **Office of Suicide Prevention Grant Program**

The Office of Suicide Prevention (OSP) was established by the 2000 Colorado General Assembly to reduce the number of suicide deaths in Colorado by providing resources, outreach, training, and funding for prevention and intervention activities across the state. Colorado's annual suicide rate declined by 6.5 percent between 1998 and 2007. During this time, OSP has funded several successful projects, including the Pueblo Suicide Prevention Center Hotline. The number of calls coming into the Pueblo Suicide Prevention Hotline increased from 2,018 in 2002 to 6,068 in 2007, secondary to grant support from OSP. The suicide rates in Pueblo remained steady between 2002 and 2007, suggesting that more people are seeking help.

- **Child Fatality Review**

The Child Fatality Prevention System is a statewide, multidisciplinary, multi-agency effort to prevent child deaths. Although not codified in Colorado Revised Statutes until 2005, the Child Fatality Prevention System has been reviewing child deaths in Colorado since 1989 with the goals of describing trends and patterns of child death in Colorado and identifying prevention strategies. Each year, the Child Fatality Prevention System Review Team (State Review Team) conducts retrospective reviews of child deaths (ages 0-17) that are related to the following causes: child abuse and neglect, violence, motor vehicle, accidental/unintentional, natural, and Sudden Infant Death Syndrome (SIDS)/undetermined deaths.

a. Which injuries (including pediatric injuries) have been identified and prioritized for intervention strategies?

As mentioned above, the *Revised Colorado Injury Prevention Strategic Plan, 2003–2010* prioritizes the injuries to be addressed based on the leading causes of injury death and hospitalization. These include motor vehicle-related injuries, falls, suicide, and unintentional poisoning.

Each year, the Injury Community Planning Group (ICPG) selects the highest priority recommendations from the strategic plan that are best implemented by ICPG or other SEMTAC committees. The priority recommendations selected for 2009 include:

- Improve and maintain data collection and dissemination to focus injury prevention efforts by: a) recommending that motor vehicle restraint use become a required field in the MATRIX (EMS Ambulance Trip Report Information Exchange); and b) working with the Colorado Health Foundation to add injury prevention measures to the next Colorado Health Report Card;
- Establish guidelines and evaluation measures for injury prevention programs that are based on current evidence-based research and literature by developing a Best Practices in Injury Prevention symposium for Colorado;
- Coordinate and link emergency medical services, trauma care, and public health agencies with other injury prevention programs at the state and local levels to increase collaboration and maximize the use of resources by starting a Rural Traffic Safety Task Force to tackle the traffic safety issues in rural Colorado;
- Develop leadership to identify and respond to injury prevention needs to initiate policy changes, provide technical assistance, training and support to injury prevention efforts at the state and local level by encouraging the development and dissemination of a suicide first responders training course for EMS and working with SEMTAC to add suicide prevention to the training requirements for EMS personnel; and
- Strengthen state and local legislation and policies that lead to the prevention of injuries by advocating to strengthen Colorado restraint laws to include a primary seatbelt enforcement law and stronger laws for booster seats.

b. Identify any dedicated lead agency or other agency staff member (full- or part-time) responsible for injury prevention outreach and coordination for the trauma system. There are eleven ISVP Unit staff members. The projects that they staff are listed in Table 2. This work unit is responsible for injury prevention, outreach and coordination with entities across the state, not just for the trauma system. The ISVP Unit is funded through grants and is part of the line item budget of the department.

Table 2. Programs in the Injury, Suicide and Violence Prevention Unit

PROGRAM	PRIMARY FOCUS/ACTIVITIES	FUNDING SOURCE	PARTNERS
Unintentional Injury Prevention	General unintentional injury prevention, childhood injury prevention, teen driver alliance, elderly falls prevention, injury prevention strategic plan, injury prevention marketing plan	CDC, MCH	Department of Transportation, Colorado State Patrol, Department of Revenue, Local Teen Driving Safety Coalitions, Denver Health, Rocky Mountain Insurance Information Association, State Farm Insurance, Allstate Insurance, Farmers Insurance, AAA, Metro Denver Safe Kids, the Children's Hospital, various local health departments, hospitals throughout the state, Colorado Injury Control Research Center

PROGRAM	PRIMARY FOCUS/ACTIVITIES	FUNDING SOURCE	PARTNERS
Office of Suicide Prevention	Suicide prevention (all ages)	State funds, SAMHSA	Suicide Prevention Coalition of Colorado, Second Wind, program grantees, Colorado Injury Control Research Center
Sexual Assault Prevention Program	Sexual assault prevention	CDC	Colorado Coalition Against Sexual Assault, program grantees
Colorado Children's Trust Fund	Child abuse prevention	State funds	Department of Human Services, Department of Education, program grantees, Family Resource Center Association
Family Resource Center Program	Child abuse prevention and family support	HRSA	Family resource centers
ESCAPE	Youth and adolescent violence prevention	CDC	Program grantees, Violence Prevention Advisory Group
Child Fatality Prevention System	Multi-disciplinary review of all deaths of children ages 17 and younger	MCH	Colorado Department of Transportation, Colorado State Patrol, Colorado Coroners' Association, Department of Human Services, Angel Eyes, Colorado District Attorney's Office, local health departments, hospitals throughout the state, local law enforcement agencies.
Colorado Traumatic Brain Injury Surveillance	Surveillance of TBI deaths and hospitalizations	CDC	Hospitals throughout the state, TBI Trust Fund

c. What is the source of funding?

Funding sources are described in the table above.

3. Explain the evaluation process for injury prevention projects that are conducted by the lead agency, trauma facilities, or other community-based organizations.

The evaluation process for injury prevention projects that are conducted by the ISVP Unit varies depending on the project funding source and the amount of money available for evaluation. External evaluators evaluate some projects, such as Project Safety Net and the Older Adult Falls Prevention Trial; other activities, such as those performed by the Teen Motor Vehicle Leadership Alliance, have limited or no resources for evaluation. ISVP Unit staff work to assure that all projects are evaluated at least at a basic level and require their grantees to incorporate evaluation into their project work plans.

a. Identify any gaps in injury prevention efforts for population groups in the state.

Although the ISVP Unit, ICPG, and our community partners have made progress on the recommendations outlined in the *Revised Colorado Injury Prevention Strategic Plan, 2003–2010* related to motor vehicle safety and suicide, we have not had the resources to address older

adult falls or unintentional poisoning in a comprehensive way. Funding for injury prevention efforts remains limited and is often focused on a specific issue identified by the funding agency.

Emergency Medical Services

For more than 25 years, the Colorado Department of Public Health and Environment has been responsible for the oversight of the delivery of emergency medical services in Colorado. The Emergency Medical and Trauma Services Section ([EMTS Section](#)) of the department is statutorily established as the state lead agency responsible for the planning, development, and regulation of the statewide emergency medical services and trauma system in Colorado. The regulatory responsibilities of the EMTS Section include the certification of Emergency Medical Technician (EMT)-Basics, EMT-Intermediates and EMT-Paramedics, the certification of educational institutions that deliver initial EMT training and continuing education, data and information collection and record keeping, the licensure of air ambulance agencies, the administration and management of the EMS Provider Grants program, and the designation of hospitals as trauma centers.

1. Provide information on the last assessment of EMS, including assessor and date. The National Highway Traffic Safety Administration (NHTSA) last conducted an [assessment of the EMS program](#) in Colorado in November 1997. With funding from and collaboration with the Colorado Department of Transportation, the EMTS Section is considering a request to NHTSA for a reassessment in late 2009 or 2010.

a. Describe the EMS system, including the number and competencies of ground transporting agencies, nontransporting agencies and air medical resources. Locally, EMS services are provided by a variety of agencies that include approximately 190 ground ambulance services, 17 air transport agencies, and approximately 245 non-transporting agencies (for example, fire departments, ski patrol, search and rescue teams). EMS provider agencies are a diverse group, ranging from frontier search and rescue teams to highly sophisticated urban, multi-tiered response systems. Licensure of ambulance agencies is conducted at the county level, with the [minimum requirements for licensure](#) established in state rule.

Based on information from the agency profile submitted to the department each year by licensed ambulance services, of the 190 ground transport agencies, 98 identify as being ALS, 29 as BLS, 32 as both ALS and BLS, 2 as other, and 29 did not provide information as to ALS/BLS status. Approximately 60 percent of Colorado's ground ambulance agencies provide emergency care and transportation in rural and frontier areas of the state. Many of these agencies respond to fewer than 500 ambulance calls per year; in extreme frontier communities, local ground ambulance agencies may transport fewer than 20 patients per year. In contrast, large urban agencies such as those in the Denver metro area and Colorado Springs transport more than 55,000 patients annually. (See [map](#))

There are approximately 15,000 certified EMTs in Colorado, however only about 70 percent of them indicate that they work (either paid or volunteer) in providing emergency medical services (49 percent paid, 17 percent volunteer and 5 percent both paid and volunteer). Of the

certified EMTs, approximately 11,700 are EMT-Basics, 700 are EMT-Intermediates and 3,000 are EMT-Paramedics.

b. How are these resources allocated throughout the region to serve the population? Resources are allocated locally, and there is no state mandate that requires any political entity to fund or provide EMS services. Each town or city determines its own needs and financial ability to provide services. Towns and cities may decide to join forces with nearby municipalities; in these situations, a special district or the county may control resources and services. See maps showing the location of [ground](#) and [air transport](#) agencies. Also see [map](#) showing the distribution of urban, rural, and frontier populations.

c. Describe the availability of enhanced 911 and wireless E-911 access.

Communication throughout the EMTS system includes access through 911 services, dispatch of prehospital services, pre-arrival instructions to callers, communication with physicians for on-line medical control and notification of facilities.

Colorado's [EMS Communication Plan](#), last revised in December 2007, is patterned on NHTSA planning guides. As of 2009, all Colorado counties have enhanced 911 (E-911). Additionally, 10 of Colorado's 64 counties have wireless 911 able to locate to the nearest cell site and 50 counties have wireless 911 able to locate to within 0.1 mile of the call.

Colorado has also deployed an 800 MHz Digital Trunk Radio System (DTRS) that emergency medical and trauma care providers can use for communication with each other and with facilities. Each user agency radio on the DTRS is programmed with 21 Mutual Aid Channels (MAC), which are available for inter-agency mutual aid communications across public safety disciplines (Police, Fire, EMS). There are thirteen EMS-specific mutual aid talkgroups. Each of the eleven RETACs has one of these talkgroups assigned for EMS mutual aid within the RETAC's geographical boundary. Two RETAC talkgroups are assigned for statewide EMS mutual aid. Each radio is programmed with the 800 MHz National Interoperability Channels (formerly known as ITAC), which are conventional channels outside of the DTRS. Additionally, each radio is programmed with five simplex digital frequencies and one repeated/direct analog channel.

Unique to the North Central All Hazards Region (Denver Metropolitan Area and surrounding counties) is a gateway patch used to connect the DTRS to other disparate systems used by Denver and other area agencies. There are thirteen talkgroups associated with this patch, two are command and control, eight are used across public safety disciplines, one for communicating with Federal agencies, and two dedicated for EMS use.

Additional information describing Colorado's EMS communications system is available from the [Consolidated Communications Network of Colorado](#) and the [Governor's Office of Information Technology](#).

d. Identify any specialty pediatric transporting agencies and aeromedical resources. In 2000, legislation was passed that gave the department the authority to license, regulate and investigate air ambulance agencies that transport patients within and to Colorado. The Air Ambulance Licensure Program in the EMTS Section is designed to improve safety, establish coordination between air ambulance agencies and assure that patients in Colorado are transported by agencies that meet or exceed the minimum standards.

The Air Ambulance Licensure Program relies on the expertise provided by the Commission on Accreditation of Medical Transport Systems (CAMTS). An air ambulance provider is required to be CAMTS accredited to be eligible for a Colorado air ambulance license. Although CAMTS accreditation is required for licensure, the decision to issue or suspend a license rests solely with the department.

The regulations for [licensing of air ambulances](#) became effective in February 2006. Since that time, 16 air ambulance agencies have been licensed to operate in Colorado with a current total of 25 fixed wing air ambulances and 12 rotorwing air ambulances located in-state. An additional eight agencies have are licensed in Colorado but fly from neighboring states.

All of the air resources have at least the minimum equipment required for transporting children; however, the state does not track whether those resources include pediatric intensive care unit capabilities. The department has even less information on the availability of specialty pediatric ground transport units as information about those would be available only at the local level since they are licensed by counties, not the state.

e. Describe the availability of pediatric equipment on all ground transporting units. In Colorado, the inspection and certification of ambulances and the licensure of ambulance agencies occurs at the county level. Counties must follow the minimum standards and required equipment list that has been established in [rule](#) by the department and the Colorado Board of Health. The state requirements for pediatric equipment and supplies are those outlined in the AAP/ACEP Joint Guidelines, with a few exceptions. For example, the Colorado minimum list for BLS does not include simple oxygen masks and water-soluble lubricant. The Colorado minimum list for ALS does not include nasogastric tubes, nebulizers, and specific sizes of needles, although both nasogastric tubes and nebulizers are within the scope of practice as defined by the Board of Medical Examiners.

As a component of Colorado's EMS for Children grant from HRSA, in January 2008, staff in the EMTS Section surveyed EMS transport agencies about availability of pediatric equipment on ambulances. Completed surveys were received from 118 of 186 ground transport agencies (63 percent of the agencies in Colorado).

Forty-four agencies reported having at least one BLS ambulance. Of these agencies, 57 percent reported having all the ACEP-recommended equipment on *all* their ambulances; 66 percent reported having all the ACEP-recommended equipment on *at least one* ambulance. The equipment most frequently not available included pediatric stethoscopes, pediatric

backboards, size 6 (smallest) suction catheters, infant-size simple oxygen masks, and infant and adolescent cervical immobilizers. Of the 19 agencies that did not have all the ACEP-recommended equipment, the most common reasons cited were infrequent use to justify the expense and limited funding.

Ninety-nine agencies reported having at least one ALS ambulance. Of these agencies, 68 percent reported having all the ACEP-recommended equipment on *all* their ambulances; 81 percent reported having all the ACEP-recommended equipment on *at least one* ambulance. The equipment most frequently not available included nasogastric tubes (not required by Colorado rules and out of scope of practice for some providers due to agency protocols), various size needles (not required by Colorado rules), infant- and child-size simple oxygen masks (not required by Colorado rules), pediatric non-rebreather masks, and pediatric stethoscopes. The most frequent reasons cited for not having all the ACEP-recommended equipment included: 1) limited funding and infrequent use to justify the expense, 2) no state requirement to carry a specific piece of equipment (for example, simple oxygen masks and needles), and 3) the item was out of scope of practice for the agency providers (for example, nasogastric tubes).

2. Describe the procedures for online and off-line medical direction, including procedures for the pediatric population.

a. Describe how EMS and trauma medical direction and oversight are coordinated and integrated.

As defined in Colorado rule, all licensed EMS agencies in Colorado are required to have medical directors that provide medical oversight and continuing education. Medical oversight includes the establishment of a medical continuous quality improvement program that ensures the competency of all field personnel and includes protocols, patient care audits, observation and critiques. Additionally, the service medical director is responsible for being actively involved in the provision of emergency services in the communities served by the EMS agency. Active involvement includes being a liaison between the EMS agency and receiving facilities, public safety agencies and the medical community. As a liaison, the medical director ensures coordinated care within the local system as well as the medical oversight necessary to maintain competency and quality patient care. The Colorado Board of Medical Examiners (BME) regulates EMTS medical directors through the provisions outlined in the BME's [Rule 500](#). The BME and the department work closely together to ensure that the Rule 500 requirements are contemporary and support the operation of EMS agencies throughout the state.

On-line medical direction is developed on a local or regional basis, usually driven by the agency's medical director, and is generally provided through either the medical director's hospital base station or through the receiving hospital's base station. In virtually all areas of the state, field personnel have access to on-line medical direction via either radio and/or cell phone systems. However, the ability to make radio or cell phone contact varies throughout the state based on the geographic constraints caused by mountains interfering with the direct line-of-

site necessary for most radio and cell phone communications. Over the past several years, Colorado has developed and implemented a statewide Digital Trunk Radio (DTR) communications system. At the present time, the majority of the state's geography is covered by the DTR system, however not all EMS agencies have chosen to use this method of communication.

Currently, Colorado does not have statewide EMS protocols and there are no specific statutory requirements for the department to create them. However, the majority of the protocols in use have been taken from core protocols developed by the Denver Metro EMS Medical Directors (DMEMSMDs), a large group of EMS physicians responsible for the majority of agencies in the Denver Metro area. Many agencies have "borrowed" the core protocols from the DMEMSMDs, and their agency medical directors have then tailored them to meet local community needs. Additionally, there are several regions with very strong medical direction that have not only completely developed their own agency protocols but have required standardized protocols throughout their region. The RETAC coordinators work closely with agencies in their regions to encourage the development and implementation of standardized protocols. For example, the Southern RETAC, serving five counties around the Pueblo area, has implemented a Regional Medical Director program, with Dr. Kevin Weber as the single medical director for all prehospital care agencies in that RETAC. The department encourages RETACs to adopt this model for prehospital medical direction wherever it is appropriate.

All protocols used at the local level are inclusive of pediatric and other special populations. Pediatric EMS Specialists from The Children's Hospital in Denver, a Level I Regional Pediatric Trauma Center, provide expertise to EMS physicians throughout the state in the development of pediatric specific protocols. The Children's Hospital also maintains statewide availability to provide on-line medical control as necessary; local EMS agencies need only to establish contact with The Children's Hospital. In addition, Memorial Hospital, a Level II trauma center in Colorado Springs, provides support to agencies throughout southern Colorado as requested.

As a component of Colorado's EMS for Children grant from HRSA, in January 2008, staff in the EMTS Section surveyed EMS transport agencies about the availability on-line and off-line pediatric medical direction. Completed surveys were received from 118 of 186 ground transport agencies (63 percent of the agencies in Colorado).

Of the 118 respondents, 77 percent indicated that pediatric on-line medical direction was always available, 15 percent indicated usually available, 3 percent indicated sometimes available, 3 percent indicated rarely available and 2 percent indicated never available. Of the 9 agencies reporting sometimes, rarely or never available, 6 were listed as ALS agencies, 2 were listed as BLS and 1 was listed as both ALS and BLS. The number of pediatric patients ages 0-14 treated annually by these 9 agencies ranged from 3 to 208. The most common reason cited for not always having on-line medical direction was limitations in reception or communication issues from remote or mountainous locations. Only 2 agencies mentioned that "occasionally a physician was not readily available in the ED."

In terms of the level of training of the person providing the on-line pediatric medical direction, 77 percent indicated an emergency physician, 9 percent indicated a family practice physician, 9 percent indicated an MD (specialty unspecified), 2 percent indicated a pediatrician and 3 percent indicated other/unknown.

With regard to off-line pediatric medical direction, 92 percent of agencies indicated they had written or electronic pediatric treatment guidelines/protocols, and 89 percent reported that these items were either on the ambulance, carried by the provider or the provider was expected to have memorized the protocol.

3. Describe the prehospital workforce competencies in trauma:

The EMTS Section at the department has the authority to [certify Emergency Medical Technicians](#). In contrast, medical first responders are trained and certified under the authority of the Division of Fire Safety at the Colorado Department of Public Safety. The Division of Fire Safety is responsible for writing rules regarding the roles and responsibilities of first responders in Colorado. First responders are trained under the First Responder National Standard Curriculum published by NHTSA in 1995. First responder training is not necessarily aligned with EMT training and centers approved for training of first responders sometimes differ from those approved for training of EMTs. This sometimes leads to confusion within the EMT and first responder communities as to who is eligible to complete first responder training and where to obtain training.

a. Initial training and certification/licensure requirements

Requirements for first responders can be found on the [Division of Fire Safety's](#) homepage. Requirements for EMT training are described below. Colorado's requirements for training for all levels of EMTs meet or exceed the National Standard Curriculum.

Initial Certification for EMT-Basic

Based on National Standard Curriculum and not specified in Colorado rule.

Classroom Didactic Hours: Not specified

Classroom Laboratory Hours: Not specified

Clinical Hours: Not specified

Field Internship Hours: None required

Total Minimum Hours Required: 110 hours

Clinical Skills Required: Interview, assess, and write a field trip report on no fewer than five (5) patients encountered in a clinical setting that is approved by the training program.

Initial Certification of EMT-Intermediate

Classroom Didactic Hours: 112 hours

Classroom Laboratory Hours: 80 hours

Clinical Hours: 50 hours

Field Internship Hours: 75 hours

Total Minimum Hours Required: 317 hours

Clinical Skills Required: All must be completed through a clinical site that is approved by the training program.

Properly administer medications at least 15 times to live patients.

Successfully intubate at least 5 live patients.

Successfully access the venous circulation at least 25 times on live patients of various age groups.

Ventilate at least 20 live patients of various ages.

Perform an advanced patient assessment on at least:

- 15 pediatric patients (including newborns, infants, toddlers, and school age)

- 25 adult patients

- 15 geriatric patients

- 5 obstetric patients

- 20 trauma patients

- 10 psychiatric patients

Perform an advanced patient assessment, formulate and implement a treatment plan on at least:

- 15 patients with chest pain

- 10 adult patients with dyspnea/respiratory distress

- 4 pediatric patients (including infants, toddlers, and school age) with dyspnea/respiratory distress

- 5 patients with syncope

- 10 patients with abdominal complaints (for example: abdominal pain, nausea/vomiting, GI bleeding, gynecological complaint, etc.)

- 10 patients with altered mental status

Serve as the team leader for at least 25 prehospital emergency responses.

Initial Certification of EMT-Paramedic

Colorado requires that all paramedic programs in the state maintain CAAHEP accreditation.

Classroom Didactic Hours: 328 hours

Classroom Laboratory Hours: 101 hours

Clinical Hours: 135 hours

Field Internship Hours: 495 hours

At least ½ of these hours must occur following the completion of the didactic and clinical phases. Must be on an ALS vehicle in an EMS system.

Total Minimum Hours Required: 1,059 hours

Clinical Skills Required: Minimum of 135 clock hours in a training program approved hospital setting

- 15 patient medication administrations

- 5 patient endotracheal intubations

- 25 patient venous accesses

- 20 patient supplemental ventilations

- 30 advanced patient assessments - peds

- 50 comprehensive patient assessments - adult

30 advanced patient assessment - geriatric
10 advanced patient assessments - obstetrics
40 advanced patient assessments - trauma
20 advanced patient assessments - psychiatric
9 advanced patient assessments - dysp/resp distress - peds
10 advanced patient assessments syncope
20 advanced patient assessments abdominal complaint
20 advanced patient assessments - altered mental status
50 team leader - prehospital response

At least ½ of all patient encounters shall include on-scene treatment and subsequent transportation of patients encountered in an EMT-P ALS EMS setting. Simulations may be used in lieu of live patient contacts.

b. Continuing education and recertification/relicensure requirements

The educational [requirements for recertification](#) vary by certification level with a minimum of 36 hours for EMT-Basics and 50 hours for EMT-Intermediates and Paramedics.

c. Pediatric trauma training requirements for recertification

See the chart referenced in 3.b. above. EMT-Basics are required to have a minimum of 3 hours of OB and pediatric patient assessment and treatment; EMT-Intermediates and Paramedics are required to have a minimum of 8 hours of OB and pediatric assessment and treatment.

With regard to other types of training, BTLS and PHTLS courses are available sporadically through the state, although they are offered more frequently in urban areas than in rural. Additionally, the ACS Rural Trauma Team Development Course has been offered several times in western Colorado. Trauma Program staff encourage Front Range Level I and II trauma centers to provide outreach and additional trauma training to frontier communities in eastern Colorado.

Definitive Care Facilities

Since 1995, the department has had the authority ([C.R.S. § 25-3.5-701](#) et. seq.) to designate trauma centers. Because Colorado is a large, geographically diverse state with many frontier counties, the department has worked to develop an inclusive trauma system that accommodates the needs of large urban facilities as well as small frontier clinics. Ideally, the department would like all acute care and critical access hospitals as well as community clinics with emergency centers to participate in the trauma system. Described below are the processes used to verify, designate and oversee the trauma care facilities at all levels of participation.

1. Describe the extent to which all acute care facilities participate in the trauma system. State law requires that all facilities receiving trauma patients by ambulance or other means shall follow the process for designation or non-designation. In Colorado, this means that all facilities licensed as general acute care hospitals, critical access hospitals or clinics licensed as “community clinic with emergency centers (CCECs)” must participate in the system either by being designated or by signing a non-designation agreement with the department. Thus the Colorado system of designation is inclusive and voluntary with those facilities that do not choose to seek designation being required to acknowledge that they are not designated and ensure that trauma patients are not kept for care in their facilities.

Currently, Colorado has 70 designated trauma centers:

- Four Level I facilities (including one Regional Pediatric Trauma Center);
- Ten Level II centers;
- Sixteen Level III centers;
- Thirty-six Level IV centers; and
- Four Level V centers.

Of the 70 trauma centers:

- Forty-one are licensed as general acute care hospitals;
- Twenty-four are licensed as critical access hospitals; and
- Five are licensed as CCECs.

Only seven general acute care hospitals do not participate as designated trauma centers. Of these, six are in urban areas where there are multiple trauma centers nearby. The other is located in a smaller city, functions mostly as an ambulatory surgical center and is only six miles from a Level III trauma center.

Of the 29 Critical Access Hospitals in Colorado, all but five participate as designated trauma centers. One of the non-designated critical access hospitals was previously designated but dropped out because it could no longer meet the minimum standards. Of the five non-designated Critical Access Hospitals, several would have problems meeting the minimum standards because they are sometimes staffed only by mid-level practitioners. Unfortunately,

this means that under current state standards they will remain non-designated for the foreseeable future.

There are 14 licensed community clinics with emergency centers (CCECs). Of these, four are urban stand-alone emergency departments. None of these four is designated as a trauma center and urban ambulances do not transport trauma patients to them. Minor trauma brought by private vehicle is treated within the freestanding emergency facility, while more significant trauma is transferred, according to the scope of practice of non-designated facilities as described in question 2 below.

Ten of the CCECs are rural facilities, and five of them are designated as Level IV and V trauma centers – all in locations where there is no hospital nearby. One of these facilities is 65 miles from the nearest acute care hospital. The department would like to see additional rural CCECs become trauma centers; however, most of these CCECs do not meet the minimum requirement of having a physician available within 20 minutes during all hours of operation, i.e., they are currently staffed by mid-level practitioners much of the time.

a. Describe the availability and roles of specialty centers within the system (pediatric, burn, TBI, SCI)

In general, Level III, IV and V facilities in Colorado do a good job of quickly transferring children, particularly those six and under, to appropriate facilities. It is rare that the pediatric transfers reviewed during trauma site visits demonstrate an inappropriate transfer pattern for children. In the past, state rules addressed special qualifications required to achieve “pediatric commitment.” As this concept disappeared in the ACS literature, it was also dropped from most Colorado regulations. The state has enacted standards for a specific type of trauma center that admits only children, the Regional Pediatric Trauma Center. In step with the new ACS standards, Colorado has also adopted similar, although more specific, standards for Level I and II trauma centers that treat children with injuries more severe than a single limb fracture or a minor head injury with a negative CT (see [6 CCR 1015-4, Chapter 3](#)).

Colorado has only one regional pediatric trauma center, The Children’s Hospital, located in the Denver metro area in the city of Aurora. The Children’s Hospital is generally recognized across the state as the destination of choice for the most severely injured children needing transfer. The Children’s Hospital’s services are augmented by Swedish-Health One and Denver Health Medical Center, both Level I trauma centers located in the metro Denver area. Denver Health Medical Center has developed special expertise in the treatment of complex pelvic fractures in all age groups; pediatric patients are often transferred there for stabilization of a complex pelvic fracture. In outlying areas of the state, Memorial Health Systems, a Level II trauma center in Colorado Springs, treats many children and is in the process of seeking ACS verification as a Level II pediatric center. St. Mary’s Hospital in Grand Junction, also a Level II trauma center, by virtue of its location has developed significant expertise in the care of the injured child and is able to handle most pediatric trauma brought to their facility. St. Mary’s Hospital is more than 250 miles from the nearest Level I trauma center in Colorado.

Colorado, with one of the lowest burn hospitalization rates in the nation, has only one verified burn center, the University of Colorado Hospital, a Level II trauma center located in the Denver metro area. Expertise in burn treatment is also available at The Children's Hospital and at the Western States Burn Center located at the North Colorado Medical Center, a Level II trauma center in Greeley. All trauma centers must consult with a burn unit and, if necessary, transfer the patient to a facility with a burn unit. The types of burns that require consultation and potential transfer are consistent with the current guidelines published by the American Burn Association.

Trauma patients with a significant TBI or SCI can be managed by any of the Level I facilities in the state. Most of the Level II facilities also have significant expertise in the care of severely injured TBI patients, although some Level II facilities choose to transfer the most severely injured patients to a Level I, if the neurosurgeon believes that the patient may require more extensive treatment available only at a Level I facility.

Colorado is also home to several rehabilitation facilities for SCI and TBI patients. Craig Hospital is known nationally, and Spaulding Rehabilitation Hospital also offers extensive inpatient rehabilitation for more seriously injured patients.

2. Describe the roles of the non-designated acute care facilities in the trauma system. In the urban areas where trauma centers are nearby, EMS agencies do not transport patients who are more severely injured or have a mechanism that may indicate significant injury to the non-designated facilities. Instead, they will bypass the non-designated hospital for a Level I or II trauma center. In many rural/frontier areas of Colorado (see [map](#)), there is no choice about where the patients will be transported -- there is only one hospital per town and that's where the patient is taken. An exception to this is those rare cases where a scene flight is called and the helicopter transports the patient directly to a Level I or II facility. Thus most hospitals in Colorado will provide initial triage of trauma patients and as necessary, transfer those needing a higher level of care to the closest trauma center, matching patient needs with system resources.

There are six rural and five urban non-designated acute care hospitals in Colorado representing only 14% of the licensed hospitals in the state. Facilities that decide to be non-designated must sign a non-designation agreement with the department indicating that:

- The facility chooses NOT to seek designation as a trauma center at this time.
- The facility acknowledges and agrees that it may only treat patients who have single system injuries that are not threatening to life or limb and whose care is not complicated by co-morbid conditions.
- Interfacility transfer of single system injuries that are not threatening to life or limb and whose care is not complicated by co-morbid conditions shall be made in accordance with RETAC protocols.
- Within TWO hours of recognition that a patient has experienced a significant injury or mechanism as defined in [6 CCR 1015-4, Section 202.C, 202.D](#) or the prehospital

algorithm, the facility shall resuscitate, stabilize and/or initiate transfer of the patient, after consultation with a trauma surgeon or emergency physician at the closest designated trauma center, as required by Section 202.C.4. Transfer shall be to the closest appropriate trauma facility as defined by RETAC protocols and as determined in consultation with the trauma surgeon or emergency physician.

Thus, non-designated facilities play an important role in the trauma system by screening, stabilizing and transferring those trauma patients whose injuries are significant. This function is critical in the rural areas where no other nearby trauma care is available. The non-designated hospitals also treat many less injured patients who do not necessarily need specialized trauma care and may only require observation or pain management.

There is relatively little data available on the patients admitted to the non-designated facilities. The only dataset containing this information is the hospital discharge dataset from the Colorado Hospital Association. Limited data combined with the relative dearth of resources for data analysis have resulted in little attention to or analysis of the data on trauma patients who go to non-designated facilities, except in the investigation of specific complaints.

a. Address their representation on the regional trauma committee.

The requirements for SEMTAC membership do not specifically include representation from non-designated facilities, however all Council meetings are widely publicized and open to the public.

There is representation of at least some non-designated facilities at the RETAC level. Urban facilities that have chosen not to be part of the system have not traditionally become involved in regional EMS and trauma activities. However, rural facilities often represent the only health care resource in the community and thus tend to be more active participants in RETAC activities. In return, RETACs provide resources including educational opportunities and funding not only to EMS agencies and designated facilities but also to non-designated facilities.

State Trauma Program staff work to keep most of the non-designated facilities involved in or at least aware of educational opportunities, changes in trauma rules or protocols, opportunities for collaboration, injury prevention strategies, etc. When possible, a contact from each non-designated facility receives the same notices that the trauma coordinators at designated facilities do. If there is a proposed rule change or something of particular interest, Trauma Program staff will send e-mails or even letters to ensure that non-designated facilities receive notice of issues that may affect them.

b. Do they submit registry and/or financial data?

Only Level I, II and III facilities submit trauma registry data. All hospitals, both designated and non-designated, submit hospital discharge data to the Colorado Hospital Association (CHA). The department purchases the hospital discharge data from CHA for analysis.

No hospital in Colorado submits financial data to the department; however, information on hospital charges is included in the hospital discharge dataset from CHA.

c. What is their degree of engagement in the system-wide performance improvement process?

There is little system-wide performance improvement taking place at this time, even among designated facilities. The non-designated facilities are not involved in any of the efforts that do occur.

3. Describe the process for verification and designation. Briefly outline the extent of authority granted to the lead agency to receive applications and to verify, designate, and de-designate regional trauma centers.

The Colorado Department of Public Health and Environment has been granted relatively broad authority in state statute ([6 CCR 1015-4, Chapter 3](#)) to designate trauma centers. The department is responsible for:

- Writing trauma rules which are then promulgated by the Colorado Board of Health, after approval by SEMTAC;
- Receiving and reviewing applications;
- Selecting an appropriate review team that meets the requirements outlined in the rules;
- Conducting the review including providing feedback to the facility;
- Working to establish a plan of correction if there are any deficiencies;
- Designating the facilities based on recommendations by SEMTAC; and
- Monitoring the facilities during their designation periods.

Level I and II facilities are encouraged to complete a joint ACS/state review. Under current rules, ACS verification is not required to maintain state designation as a Level I or Level II trauma center. However, most Level I and II centers have routinely opted for a joint triennial review. In these cases, the American College of Surgeons provides a review team for the facility and works closely with Trauma Program staff to assure that both ACS and state requirements are met. The review team must meet state requirements by including two surgeons, one emergency physician and one trauma program manager, all of whom must meet other Colorado-specific requirements. The review team, along with the state observer(s), verifies that the facility meets both the standards set by the American College of Surgeons and the rules set by the State of Colorado. The team provides detailed information to the facility at the exit interview on the results of both the ACS verification visit and the state site review process. If a Level I or II facility does not wish to undergo the ACS verification process, the department will secure a review team and carry out only the state designation process in accordance with all applicable rules.

Site review of Level III-V facilities is the responsibility of the EMTS Section. There are slightly different processes for current facility renewal, for designation of new facilities or

redesignation of a facility at a higher level and for designation of a replacement facility. These processes are described in state rule. (see [6 CCR 1015-4, Chapter 3](#))

If a new facility wishes to be designated as a trauma center or a current facility wishes to become designated at a higher level, the facility must:

- Notify the department;
- Complete an application as required by the department;
- Pay the required fee;
- Work with staff to arrange an onsite review;
- Prepare paperwork required to be available at the on-site review;
- Submit to the required review and adequately answer the questions of the reviewers;
- Demonstrate an adequate quality improvement process to protect the health of trauma patients;
- Correct any deficiencies identified during the review; and
- Undergo a full re-review 12-14 months after initial designation to verify progress toward program maturity. This full re-review, conducted 12-14 months after initial designation, begins the first full three-year “renewal” cycle for the facility.

If a trauma center wishes to renew its current designation, the process is the same as above except for the re-review. However, if a current trauma center does not pass all aspects of its review, the department reserves the right to conduct a re-review at any time to document compliance with trauma standards.

If a currently designated trauma center is moving its physical plant, it must:

- Notify the department of the date of the move;
- Provide the department with any policies, protocols or procedures changing because of the move;
- Pay the required fee;
- Work with staff to arrange an abbreviated onsite review within 30 days of the move;
- Submit to the required review and adequately answer the questions of the reviewers; and
- Correct any deficiencies identified during the review.

4. Describe your standards for trauma center verification (including pediatric standards) and the extent to which they are aligned with national standards.

The department undertook a 26-month stakeholder process of reviewing the new standards published in the ACS “green book” and adapting them to Colorado for Level I and II trauma centers. The resulting set of rules was, in almost all cases, a consensus document that received no opposition during the promulgation process. These new rules became effective on November 30, 2008. Staff developed a document that compares the rules developed for Colorado with the current ACS standards (see [ACS Comparison Document](#)). The vast majority of Colorado’s rules are consistent with the ACS document. The document highlights only those criteria where state rules differ from ACS standards. Most of the differences resulted

from the department and the stakeholders wanting stricter criteria than those required nationally.

A case in point is the standard developed for Level I and II facilities that admit pediatric trauma. The committee felt that the ACS requirement of “admitting more than 100 peds/year” was not as strong a position as Colorado’s facilities wanted to take. Thus all Colorado Level I and II facilities must have the equipment to care for pediatric emergencies, but a Level I or II that admits ANY children having other than a single extremity orthopedic fracture or minor head trauma with a negative CT must meet an additional set of criteria.

Level III-V trauma centers must meet state rules that were developed in collaboration with the community similar to the process described above. However, these rules have NOT received a major overhaul since the publication of the “green book”. That work remains to be done as there are a number of improvements that could help bring additional clarity to the Level III-V rules.

a. Describe any waivers or program flexibility granted for centers not meeting verification requirements.

There are several courses of action for facilities that fall out of compliance with state rules. Sometimes facilities self-report that they are out of compliance with a rule such as current ATLS for all emergency physicians or that a physician has been sick and the facility had to go on trauma divert until they were able to secure another physician. In this case, the facility reports its own deficiency and submits a plan of correction to remedy the deficiency. The Trauma Program staff work with the facility to negotiate the terms of that plan of correction and the facility must report on a regular basis until the deficiency is resolved.

A plan of correction may also be developed when the department reviews a facility and finds deficiencies. Sometimes the plans are very short-term and concrete, such as ATLS cards or CMEs that need to be acquired, and other times the plans are quite complex and involve issues more difficult to track, such as deficiencies in the quality improvement program. In cases where full compliance is difficult to assess, the department will require a re-review within approximately 12 months of the first review. Staff will take a team commensurate with the deficiencies identified and conduct either a complete review or a focused review depending on the needs of the facility.

Facilities that have a long-term inability to meet a designation requirement can apply for a waiver. A waiver can last up to as long as the facility’s designation period. Facilities may apply for a waiver of any criteria; however, they must propose a reasonable alternative to that criteria. They must produce evidence that the alternative proposed will not negatively affect patient care and must document how the waiver will be monitored to assure that patient safety is protected. The proposed waiver is submitted to the department, and Trauma Program staff reviews and writes a summary for SEMTAC. SEMTAC discusses the proposed waiver at one of its quarterly meetings and makes a recommendation to the department. The

department makes the final decision with regard to the granting of waivers. Departmental actions on waivers may be appealed by the facility if the department denies the request.

The final policy mechanism for dealing with facilities that cannot meet trauma designation requirements is to either request that the facility voluntarily step down a level or for the department to remove the facility's designation. There have been several situations where a facility has identified that it has no mechanism to come into compliance with the state rules at that point in time. In most cases, the department has been able to successfully negotiate voluntary re-designation at a lower level. This has allowed several facilities to still remain as trauma centers as they come back into compliance, thus maintaining the contributions that the facility makes to the overall system.

b. Describe the process and frequency of use for de-designation of trauma centers. If the trauma center cannot work out an appropriate plan of correction with the department, or if the trauma center is deemed to be dangerous to the public's health, the department can deny a facility's application, summarily suspend the trauma designation of that facility, re-designate the facility at a lower level and/or initiate a process to permanently revoke designation of the facility. The terms of these legal actions are described in [6 CCR, 1015-4, Chapter 3, Section 302](#).

Fortunately, the department has never had to de-designate a trauma center. The department has moved in that direction several times but has always identified a less punitive solution. In the past, the department has convinced at least one facility to voluntarily relinquish its designation because it was clear that it could not meet the standards. Several times, the department has worked with facilities to change their requested trauma designation level to one more in keeping with the resources available to trauma patients at that facility. Nonetheless, the department is prepared to take significant legal action such as summary suspension, if such an action were the only solution to protect trauma patients.

5. Outline how the geographic distribution and number of designated acute care facilities is aligned with patient care needs.

Geographic distribution of trauma centers has not been a consideration in Colorado's voluntary and inclusive designation system as presently allowed in statute. The statute that authorizes the development of a trauma system does not give the department authority to limit the number of participating trauma centers. Rather, the system has been developed such that any facility that meets the minimum standards as determined by an on-site review team can be a designated trauma center. This has resulted in potential competition in several urban areas of the state. For example:

- Colorado Springs has two Level II trauma centers, one Level IV, and one non-designated hospital.
- Pueblo has two Level II trauma centers.
- The Denver metro area has all four of the state's Level I centers, including the regional pediatric trauma center, three Level II centers, three Level III centers and two Level IV

centers. Additionally, there are four large medical centers in the Denver metro area that remain non-designated for trauma.

Since most rural hospitals and even five rural clinics have become designated trauma centers, the distribution of trauma centers in rural areas is quite broad across the vast spaces of Colorado. Only six rural hospitals have chosen not to be designated and the only cluster of those is in the very rural southeastern section of the state.

a. Describe the process by which additional trauma centers are brought into the system.

During the past five years, Colorado has enjoyed a significant expansion of both new hospitals, as well as the upgrading of existing facilities. As new facilities open, the department contacts the new facility to determine its interest in becoming a trauma center. If the facility wishes to pursue trauma designation, the Trauma Program staff works with that facility to arrange a trauma designation site review. If that review is to take place after the opening of the facility, then the facility signs a non-designation agreement for the time until designation can take place.

If the EMTS Section is contacted by an existing facility that is considering joining the trauma system, the Trauma Program manager will generally make an on-site visit to discuss the process with the staff, provide information and technical assistance as applicable and answer questions about the trauma system and the process. If the facility wishes to apply to be a trauma center, the process described in detail above begins.

b. Describe the system response to the voluntary withdrawal of designation by acute care facilities.

Colorado is fortunate that this has only happened once in the 12-year history of the EMTS system. The facility simply did not have the resources to maintain a trauma designation as it was unable to devote staff time to the training and quality improvement efforts required for designation, nor did the facility's leadership truly support providing the resources to be a trauma center. In this case, there was not a system solution that was manageable.

In other cases, where the de-designation of a facility has been considered, the community has worked very hard to make sure that de-designation did not happen. The EMTS Section has requested assistance from some of the Level I and II facilities and in almost every case, the Level I or II facility stepped up to the plate to provide education, on-site mentoring, off-site mentoring, coaching for re-reviews, expert peer review, and on-site performance improvement training – all at no cost to the recipient facility. The larger urban partners have worked very hard to keep some of the rural facilities in the system regardless of the direct benefit to their own facility.

c. Describe the mechanism for tracking and monitoring patient volume and flow between centers and how this influences the overall configuration of designated facilities.

While patient volumes are tracked, and there are quarterly volume reports (see [report](#)) as well as periodic looks at special volume-related topics, this information does not change the geographic distribution of trauma centers as the department does not have the authority to carry out such resource allocation restrictions. Moreover, the department has generally been more aligned with the market driven approach to trauma center development. The department has no mechanism or authority to limit trauma center development, and many stakeholders do not seem to believe that a “certificate of need program” would likely be an acceptable solution in a home rule state such as Colorado. In addition, the volume of severely injured patients along the Front Range, specifically the I-25 corridor, is such that during a disaster event, all currently designated facilities would be needed to handle the extra patient load.

6. Describe your system for assessing the adequacy of the workforce resources available within participating centers.

The state has no formal system to assess the adequacy of the workforce resources available within trauma centers other than the site review process. When a site review takes place, the review team might make recommendations regarding the need for additional providers but only in the context of resources available to the trauma patient.

There are a few state requirements regarding training of staff including requiring TNCC trained nurses available 24/7 to care for trauma patients and ATLS certified physicians at Levels III, IV and V. In addition, all trauma centers must have a physician available to the patient on arrival (the type of physician varies by trauma level) or within 20 minutes of being called, if taking call from outside the hospital. Rules also require the availability of radiology technicians, laboratory technicians, and other allied health professionals. The specifics vary by trauma level and by specialty.

State rules do not address the number of staff available at any given time or patient/nurse ratios.

a. Address nursing and subspecialty needs (trauma or general surgery, intensivists, neurosurgeons, orthopedic surgeons, anesthesiologists, pediatric surgeons, and others, as required).

Colorado, like much of the nation, has struggled with obtaining trauma surgeons, neurosurgeons and orthopedic surgeons who are willing to take trauma call as there simply are not enough of them to go around. In general, the urban areas have fared relatively well, and the rural areas have struggled greatly. Rural Level IIIs are required to have a trauma surgeon available in 20 minutes and an orthopedic surgeon in 30 minutes. Even some of the more rural Level IVs try to keep a full schedule of surgeons available. However, this becomes very difficult in some areas, particularly those with living conditions deemed to be less than desirable, such

as communities where the hospital is downwind from the local feed lot with virtually no extracurricular activities for the kids and no job for the physician's spouse. The more rural and remote areas of Colorado have significant recruitment and retention issues for most levels of health care providers.

This will continue to be a struggle in the future as even board-certified family practice doctors who want to practice in a rural area become more and more rare.

b. What human resource deficiencies have been identified, and what corrective actions have been taken?

Human resource issues are identified at virtually every facility in the state; however, in rural areas, there are particular shortages of primary care physicians, nurses, laboratory techs, and pharmacists, in addition to the on-going difficulties of recruiting and retaining general surgeons in these communities. Even in urban areas, where the accommodations are perceived to be more desirable, it is a struggle to find surgeons and specialty surgeons. Rural Level III facilities across Colorado struggle particularly to recruit physicians boarded in emergency medicine, and rural Level IV and V facilities find this to be almost impossible. The only rural areas that recruit emergency physicians with relative ease are those in close proximity to ski areas and then mostly during ski season.

There are few resources within the control of the department to correct workforce issues at facilities; however, the Colorado Rural Health Center has a very active program to recruit a wide variety of health professionals for rural areas of the state. The work is not easy, nor is it always successful; however, the program has been able to match a number of providers with rural sites in Colorado. These efforts will continue into the foreseeable future as the challenges of workforce development in rural America continue to be addressed.

Rural and underserved communities may also benefit from the loan repayment programs that are administered by the Colorado Rural Health Center. These programs target areas in which placement has been difficult and can provide significant financial benefit to the health professional that is placed in these communities. Unfortunately, many of these health professionals stay for their required commitment and then leave for more lucrative jobs in the city.

In addition to the efforts described above, the University of Colorado Medical School initiated a program to help medical students learn about service in rural areas with the goal that eventually many of them would return as physicians to rural communities. This program has generated considerable interest as it provides some tangible benefits to the students. Whether the students return to rural areas after they complete their residencies remains to be seen.

7. Describe the educational standards and credentialing for emergency physicians and nursing staff, general surgeons, specialty surgeons, and critical care nurses caring for trauma patients in designated facilities.

Educational standards for both physicians and nurses caring for trauma patients vary depending on the level of the facility as well as by the type of provider. A detailed chart describing those requirements is provided in Table 3.

Table 3: Education Standards

Trauma Level	Type of Staff	Educational Standards and Credentialing Requirements
I	Emergency Physicians	Board certified in emergency medicine or board eligible, working on certification and less than five years out of residency Successfully completed ATLS course at least once Reviewed annually by the emergency medicine liaison or designated representative to assure compliance with the facility's CME policy Trauma service liaison must accrue 16 hours/year external trauma-related CME or 48 hours/3 years
	ED Nursing Staff	Qualified nurse with special capability in trauma care (facility defined)
	General Surgery	Trauma medical director must be board-certified in surgery or FACS, take trauma call and have successfully completed ATLS TMD shall have 16 hours/year external trauma-related CME or 48/3 years, including no less than one national meeting per 3 years Fully credentialed in critical care and board certified in surgery or board eligible, working toward certification and less than five years out of residency Successfully completed ATLS course at least once Must accrue 16 hours/year external trauma-related CME or demonstrate participation in an internal educational process conducted by the trauma program Reviewed annually by the trauma medical director or designated representative to assure compliance with the facility's CME policy
	Orthopedic Surgery	Board certified in orthopedic surgery or board eligible, working on certification and less than five years out of residency Reviewed annually by the liaison or designated representative to assure compliance with facility CME policy Trauma service liaison shall accrue 16 hours/year of external trauma-related CME or 48 hours At least one orthopedic traumatologist with a minimum of 6-12 months of fellowship training or equivalent shall be part of the trauma team
	Neurosurgery	Board certified in neurosurgery or board eligible, working on certification and less than five years out of residency Reviewed annually by the liaison or designated representative to assure compliance with the facility's CME policy Trauma service liaison must accrue 16 hours/year of external trauma-related CME or 48 hours/3years
	Anesthesiology	Board certified or board eligible, working toward certification and less than

Trauma Level	Type of Staff	Educational Standards and Credentialing Requirements
		<p>five years out of residency</p> <p>Reviewed annually by the anesthesia liaison or designated representative to assure compliance with facility CME policy</p> <p>Trauma service liaison must accrue 16 hours/year of external trauma-related CME or 48 hours/ 3 years</p>
	Critical Care Nursing Staff	<p>Qualified nurse with special capability in trauma care</p> <p>Nursing staff for the pediatric patient has specialized training in the care of the injured child</p>
II	Emergency Physicians	<p>Board certified in emergency medicine or board eligible, working on certification and less than five years out of residency if hired after effective date of the rules (November 30, 2008)</p> <p>Successful completion of ATLS course at least once</p> <p>Physicians certified by boards other than emergency medicine shall remain current in ATLS</p> <p>Trauma service liaison shall accrue an average of 16 hours/year of external trauma-related CME or 48 hours/3 years</p> <p>Reviewed annually by the emergency medicine liaison or designated representative to assure compliance with the facility's CME policy</p>
	Nursing staff in ED	Qualified nurse with special capability in trauma care (facility defined)
	General Surgery	<p>Trauma medical director must be board-certified in surgery or FACS, take trauma call and have successfully completed ATLS</p> <p>TMD shall have 16 hours/year external trauma-related CME or 48/3 years, including no less than one national meeting per 3 years</p> <p>Fully credentialed in critical care and board certified in surgery or board eligible, working toward certification and less than five years out of residency</p> <p>Must have successfully completed ATLS course at least once</p> <p>Must accrue 16 hours/year of external trauma-related CME or demonstrate participation in an internal educational process conducted by the trauma program</p> <p>Reviewed annually by the trauma medical director or designated representative to assure compliance with the facility's CME policy</p>
	Orthopedic Surgery	<p>Board certified in orthopedic surgery or board eligible, working on certification and less than five years out of residency</p> <p>Trauma service liaison must accrue an average of 16 hours/year of external trauma-related CME or 48 hours/3years</p> <p>Reviewed annually by the liaison or designated representative to assure compliance with facility CME policy</p>
	Neurosurgery	<p>Board certified in neurosurgery or board eligible, working on certification and less than five years out of residency</p> <p>Trauma service liaison shall accrue an average of 16 hours/year of external trauma-related CME or 48 hours/3 years</p> <p>Reviewed annually by the liaison or designated representative to assure compliance with the facility's CME policy</p>
	Anesthesiology	Board certified or board eligible, working toward certification and less than five years out of residency

Trauma Level	Type of Staff	Educational Standards and Credentialing Requirements
		Trauma service liaison shall accrue 16 hours/year of external trauma-related CME or 48 hours/3years Reviewed annually by the anesthesia liaison or designated representative to assure compliance with facility CME policy
	Critical Care Nursing Staff	Qualified nurse with special capability in trauma care Nursing staff for the pediatric patient has specialized training in the care of the injured child
III	Emergency Physicians	All physicians hired or contracted after 2005 must be board certified in emergency medicine or board qualified working toward certification 10 hours of trauma related CME/year or 30 hours/3 years Current ATLS for all physicians providing emergency department coverage who are not board certified in emergency medicine Successful completion of ATLS course for all emergency physicians who are board certified in emergency medicine.
	Nursing staff in ED	One RN in the Emergency Department 24 hours/day with current TNCC
	General Surgery	Board certified or board qualified working toward certification 10 hours of trauma related CME/year or 30 hours/3 years Documentation of successful completion of ATLS
	Orthopedic Surgery	Board certified or board qualified working toward certification Orthopedic surgeons or neurosurgeons with special qualifications in acute spinal cord management (or a transfer agreement) 10 hours of trauma related CME/year or 30 hours/3 years
	Neurosurgery	Neurosurgeons or ortho with special qualifications in acute spinal cord management (or a transfer agreement) 10 hours of trauma related CME/year or 30 hours/3 years
	Anesthesiology	Board certified or board-qualified working toward certification or CRNA 10 hours of trauma related CME/year or 30 hours/3 years
	Critical Care Nursing Staff	No particular requirements
IV/V	Emergency Physicians	Credentialed by the facility to provide emergency medical care Current ATLS verification 10 hours of trauma related CME/year or 30 hours/3 years
	Nursing staff in ED	One RN in the Emergency Department 24 hours/day with current TNCC
Not required	General Surgery	(If providing trauma care) 10 hours of trauma related CME/year or 30 hours/3 years (If providing trauma care) Current ATLS verification
Not required	Orthopedic Surgery	(If providing trauma care) 10 hours of trauma related CME/year or 30 hours/3 years
Not required	Anesthesiology	(If providing trauma care) 10 hours of trauma related CME/year or 30 hours/3 years
Not required	Critical Care Nursing Staff	If available and if used for trauma patients, must have policies that identify and define scope of car, including supervision, staffing and equipment requirements

a. What regional educational multidisciplinary conferences are provided to care providers? Who is responsible for organizing these events?

Listed below are many of the multidisciplinary conferences offered in Colorado to trauma care providers. Each conference is listed with the location and sponsors.

- Memorial Health System Trauma Conference, in Colorado Springs, sponsored by Memorial Health Systems
- Pediatric Trauma Conference 2009, in Aurora, The Children's Hospital
- Penrose - St. Francis Trauma Conference, in Colorado Springs, sponsored by Penrose – St. Francis Health Services
- Plains to Peaks EMS/Trauma RETAC Conference, in Limon, sponsored by Memorial Hospital and Penrose – St. Francis Health Services.
- Regional Trauma Series, in Denver, sponsored by HealthONE EMS & Trauma
- Rocky Mountain Trauma and Emergency Medicine Conference, in Breckenridge, sponsored by Denver Health Medical Center, The University of Colorado Hospital, Colorado Committee on Trauma, Colorado ACEP, Colorado ENA
- Trauma Perspectives 2009, in Durango, sponsored by Mercy Regional Medical Center and Denver Health Medical Center
- Western Colorado Trauma Conference, in Delta, sponsored by Community Hospital, Delta County Memorial Hospital, Montrose Memorial Hospital and St. Mary's Hospital and Medical Center
- Western Slope Trauma Meetings, in Redstone, sponsored by St. Mary's Hospital and Medical Center
- Wilz Trauma Symposium, in Pueblo, sponsored by St. Mary-Corwin Medical Center

In addition, RETACs have sponsored regional educational opportunities on such trauma topics as Non-accidental Trauma, Advances in Pre-hospital Pediatric Care, Pediatric Trauma and Burn Care, Management of Head Trauma in the ED, and Basic EKG.

System Coordination and Patient Flow

The EMTS Section, SEMTAC, SEMTAC committees and RETACS have spent a great deal of time discussing patient flow in Colorado's system. Each RETAC has developed an algorithm for patient destinations based on the state's generic algorithm. Each trauma facility has developed its trauma team activation criteria also based on that generic algorithm. Thus, while the basis for patient flow is the same starting point (state rule), the implementation of the regional protocols is unique to each region. Furthermore, the implementation of those protocols is rarely monitored on a regular basis and is generally reviewed only in the case of an adverse outcome or complaint. Thus, while there is evidence that a much higher percentage of severely injured trauma patients reach a Level I and II trauma center than before the implementation of a trauma system (see [System Impact Assessment](#)), the system has not progressed as far as it could on this issue.

1. Describe the source of prehospital trauma triage protocols, and specify whether they are consistent with national guidelines.

Prehospital guidelines for Colorado are written into state rule in [6CCR, 1015-4, Chapter 2](#). This is commonly referred to as the "prehospital algorithm" (see the algorithm in [Table 4](#)) and is the required basis for regional guidelines. In rule, the RETACs have the responsibility to review and adapt these destination guidelines based on regional resources. The RETACs may not modify the left side of the algorithm; however, they may strengthen the right side of the algorithm to better direct patients to appropriate facilities. For example, in the [Mile-High RETAC](#), patients meeting the Step 2 or Step 3 criteria are directed to a Level I or II trauma center. In the [Northeastern RETAC](#), much of which is very rural, prehospital crews are allowed to bypass a lower level facility (usually a Level III or IV) with Step 2 and Step 3 patients if they can make it to a higher level facility (Level II is the highest level facility in northeastern Colorado) within an additional 15 minutes of transport time.

These rules have existed in the current format since 2003. They are not consistent with the national ACS guidelines published in 2006 in the "green book" and the identical guidelines published by the Centers for Disease Control and Prevention in January 2009. Updating these rules has been identified as a task to be accomplished as resources and staff become available to do so over the next two years.

There is a voluntary, but effective, system in the Denver metro area for times when the metro area facilities are saturated or nearly saturated with patients. The metro area is divided into several zones, each with a facility that serves as a "Zone Master." In the event of near saturation, the Zone Master starts assigning patients to facilities so that no one facility is overwhelmed while another nearby facility is underutilized. This system was recently tested when a plane crashed at Denver International Airport. The closest facility did NOT receive all the patients, but the 33 patients were divided among at least four Level I and II centers.

Table 4. Colorado Emergency Medical & Trauma Care System
Prehospital Trauma Triage Algorithm Guideline

STEP 1 – RESPIRATORY				
1. UNABLE TO ADEQUATELY VENTILATE			YES →	Transport to closest appropriate facility as defined by RETAC protocols
NO ?				
STEP 2 – PHYSIOLOGY				
	CHILDREN (AGE 0 –12) OR < 5 FT IN HEIGHT	Adult	YES →	Transport to closest appropriate trauma center as defined by RETAC protocols
	1. Intubation or 2. Respiratory distress or 3. Capillary refill > 2 sec or b/p abnormal for age (<70 + 2x age) or 4. GCS motor score ≤ 5	1. Intubation or 2. Systolic BP < 90 or 3. Respiratory rate < 10 or > 29 with distress or 4. GCS motor score ≤ 5		
NO ?				
STEP 3 – ANATOMY (any one of the below)				
1. Penetrating injuries – head, neck, torso, pelvis 2. Flail chest 3. Bilateral femur fractures 4. Unstable pelvis or suspected pelvic fracture 5. Paralysis or evidence of spinal cord injury 6. Amputation above the wrist or ankle 7. Significant burns 8. Unreactive or unequal pupils			YES →	
NO ?				
STEP 4 – MECHANISM (any one of the below)				

1. Ejection from motor vehicle / conveyance 2. High energy dissipation 3. Extrication > 20 min with an injury 4. Falls > 15 feet (adults); 2x's height of child or elderly with suspected rib fractures 5. Pedestrian, motorcyclist or pedal cyclist thrown >15 ft. or run over 6. Unrestrained occupant in vehicle roll over 7. Death of same car occupant 8. Significant assault 9. Exposure to blast or explosion 10. Significant crush injury 11. Intrusion of vehicle of $\geq 12''$ in occupant compartment 12. Suspected non accidental trauma	YES →	Consider transport to a trauma center as defined by RETAC protocols
NO ☐		
STEP 5 – CO-MORBIDITY CONSIDERATIONS (any one of the below)		
1. Extremes of ages <5 and > 55 years of age 2. Extreme heat or cold 3. Medical illness (such as COPD, CHF, renal failure, diabetes, etc.) 4. Presence of intoxicants 5. Pregnancy 6. EMT clinical suspicion of occult injury	YES →	
NO ☐		
TRANSPORT TO CLOSEST APPROPRIATE HOSPITAL		

Notes:

This algorithm may be modified in multiple casualty events

Applies to air and ground scene transport

a. Describe how children and patients with severe TBI and SCI are triaged from the field to appropriate facilities.

As described above, pediatric patients with any type of severe injury are triaged according to RETAC protocols. This means that in areas where there are many resources, those patients would bypass Level III, IV or even Level II facilities for a Level I or sometimes Level II facility. Pediatric patients are directed to a facility with special ability to care for the injured child or to the nearest Level I or II trauma center. Pediatric patients with TBI or SCI are generally transported to one of the Level I trauma centers, including The Children's Hospital or to St. Mary's, a Level II trauma center in Grand Junction, or to Memorial Hospital, a Level II trauma center in Colorado Springs.

About 84% of Coloradans live in the 17 "urban" counties that make up much of the Front Range and include Mesa County (Grand Junction) on the Western Slope. The remaining 16% of Coloradans live in the 24 rural and 23 frontier counties. (See [Map](#).) In almost all rural and frontier counties there is no choice about where the patient is taken from the field. The nearest hospital may be 45 miles away, and that is usually the default patient destination. There are occasional helicopter scene flights with one of the medical helicopters landing on roadways, fields or even mountainsides; however, this is the exception rather than the rule. Often the weather may contribute to the crash that caused a major head or spinal cord trauma; thus precluding the use of air evacuation. In other cases, the ground crew may call ahead and rendezvous with a medical aircraft at a known location closer to the destination, but this is again the exception. In most cases of rural trauma, the patient, regardless of the injury, will be taken to the nearest hospital or, in some very remote areas, to a community clinic with an emergency center, to be stabilized there to the ability of the local medical provider, while transfer to a higher level of care is arranged (if necessary).

2. Within the system, what criteria are used to guide the decision to transfer patients to an appropriate resource facility and are these criteria uniform across all centers? Colorado's rules address certain types of patients for whom transfer or consultation is required. These rules are found in [Chapter 2](#), and in the burn criteria described in [Chapter 3, Section 309](#). These patients are more seriously injured patients or patients who are likely to exceed the ability of Level III or IV facilities or sometimes even the abilities of a Level II. The facilities are reviewed during the trauma designation process to assure compliance with these rules. Non-compliance results in a deficiency and a plan of correction with monitoring to assure future compliance.

The list of mandatory transfers/consults is relatively short. Patients not meeting the mandatory transfer criteria are considered for transfer based on facility resources and patient need. Each facility is required to describe its ability to care for various types of patients based on the resources available at that facility. For example, some Level III trauma centers have neurosurgical coverage and some do not. In each case, the facility is responsible for writing a policy to describe what type of head and spinal cord injuries it is able to manage and in what response timeframe. The management of those types of patients is then reviewed in the chart

review portion of the designation visit and compared to the facility's policy. Deviations from standards of care are noted, and facilities are required to show how they identified and fixed those issues. If the facility did not self-identify the issue, this becomes part of its plan of correction. Thus, while some transfer criteria are uniform across all centers of a given designation level, others are uniquely based on the resources available within the facility.

3. Specify whether there are interfacility transfer agreements to address the needs of each of the following:

The Colorado trauma center designation rules ([6 CCR 1015-4, Chapter 2](#) and [Chapter 3](#)) focus on transfer protocols/guidelines rather than transfer agreements. The rationale is that, for designation purposes, it is more important that facilities identify which patients should be transferred than for the state to know the specific Level I or II facility the patient will be transferred to. Thus, the department generally requires transfer guidelines rather than transfer agreements.

This is not to say that transfer agreements aren't important; review teams encourage facilities to have transfer agreements in place and ask if Level III-V facilities have any difficulty finding a facility to transfer to. If there is any indication that a facility has had difficulty with transferring a patient to a Level I or II center, the state Trauma Program manager generally has a timely discussion with the trauma program manager at the Level I or II facility. Although it occurred more frequently in the past, denial of transfer is rarely a problem now, particularly since the metro Denver Level I and II facilities have agreed to never be on divert for trauma patients (thus they generally accept all transfer patient as well). In recent (January and February 2009) discussions with some of the frontier facilities, there was universal agreement that the Level I and II trauma centers quickly accept patients who need more specialized trauma care.

Transfer agreements are a required element for non-designated facilities. These facilities must agree, in writing, to transferring trauma patients within two hours of the recognition of the trauma. For non-designated facilities, there is no current mechanism for monitoring whether the transfer agreements exist or whether the transfers always occur. This is seen as a growth opportunity for the Trauma Program.

a. Transfer to an appropriate resource facility

This falls under the interfacility transfer criteria rules described in question 2 above.

b. TBI

Level III-V facilities are required to have transfer guidelines. Level I and II facilities are required to have transfer agreements only as a contingency plan for TBI if the facility cannot readily handle more patients with major traumatic brain injuries.

c. SCI

Level III-V facilities are required to have transfer guidelines. Level I and II facilities are required to have transfer agreements only as a contingency plan for SCI if the facility cannot readily handle more patients with a spinal cord injury.

d. Reimplantation

Level I and II facilities are required to have reimplantation guidelines if they do not have a reimplantation service available. This is not addressed specifically in Level III-V rules, although clearly anyone coming to a Level III-V facility with a severed extremity will be transferred or at least consulted for consideration of transfer.

e. Burns

All facilities, Level I-V, are required to have burn transfer and consult guidelines based on the most recent ABA guidelines, if they do not have a burn service in-house.

f. Children

Level I and II trauma centers are required to have both pediatric transfer guidelines and transfer agreements with a regional pediatric trauma center if they do not have full-service pediatric care.

g. Repatriation

Repatriation is not addressed in Colorado standards.

4. Describe the system-wide policies addressing the mode of transport and the type and qualifications of transport personnel used for interfacility transfers.

There are no system-wide policies addressing the mode of transport for trauma patients; however, each Level III-V facility is required to develop a fixed and rotor-wing policy to indicate which patients are preferentially sent by air, if the weather conditions allow.

Furthermore, the Colorado-based air services have an agreement that if one service turns down a flight because of weather, it will notify the other services so that no one will be tempted to take a flight in marginal weather conditions. For some Level III-V facilities that are either very close to other resources or very remote from flight resources, a ground transport is the norm.

Neither trauma policy nor rule addresses the qualifications of transport personnel used for interfacility transfer. However, Colorado's air ambulance licensing regulations require agencies to be accredited by CAMTS or in the process of accreditation in order to obtain a license to transport patients. In turn, CAMTS requires that agencies specify their own minimum requirements for qualifications of the crew and CAMTS either approves or disapproves of the agency's policy.

The scope of practice for EMTs is specifically defined in [Rule 500](#) of the Colorado Board of Medical Examiners. Thus, whether on calls from the scene or on interfacility transfers, EMTs are limited in their scope of practice to the “Acts Allowed.” EMTs practicing outside their scope are subject to disciplinary actions. While there is some access to critical care ground transport, this service is not well defined. Thus, there are times when rural facilities send a nurse or physician with a patient whose condition is outside the scope of practice allowed for other transport personnel who might be available. In some rural/frontier areas this may constitute a 4-hour (one way) transfer to reach a Level I or II facility.

5. Specify whether there is a central communications system to coordinate interfacility transfers. Describe how this system has access to information regarding resource availability within the region.

Colorado does not have a central system to coordinate interfacility transfers; however, there is a web-based system monitored by facilities that can assist in interfacility transfer decision-making. EMSsystem is a web-based patient transport system that is used by communication centers, hospitals, EMS/Fire, and emergency managers. During a mass casualty incident (MCI), communication centers use the system to query hospitals for their ability to take specific types of patients. On a daily basis, hospitals along the Front Range use this tool to monitor the availability of various resources such as ICU beds and psych beds. This can also help rural facilities seeking to transfer patients as they have access to this system as well.

A number of the Level I facilities and some of the Level II facilities also offer a “one call does it all” system for interfacility transfer. The concept is that the transferring facility is already busy trying to take care of one or more seriously injured patients. The transferring facility does not have the staff or the time to make numerous calls to arrange transfer for the patient. Thus, facilities that offer this service agree to make the multiple calls even if they cannot take the patient. They will arrange for transport, even if the transport agency is not theirs and even if their “usual” transport agency is unable to take the transfer. They arrange for the transferring facility to speak with a specialist, if that is necessary. Finally, if they cannot accept the patient because of a lack of necessary resources or believe that the patient really should go elsewhere (for example, a regional pediatric trauma center), then they arrange for transfer to a more appropriate facility. This voluntary system does not work perfectly, but it works most of the time.

Rehabilitation

In addition to the inpatient rehabilitation services available at many of the Level I and II trauma centers, several independent rehabilitation hospitals are located in Colorado, including [Spalding Rehabilitation Center](#), specializing in brain injury, amputee and stroke rehabilitation, and [Craig Hospital](#) which is exclusively dedicated to spinal cord injury and traumatic brain injury rehabilitation. [The Children's Hospital](#), Colorado's Regional Pediatric Trauma Center, also has inpatient rehabilitation services specializing in brain injury, spinal cord injury, amputations, and other conditions. Individual hospitals coordinate with these and other rehabilitation facilities to address the rehabilitation needs of the trauma patients in Colorado.

1. Provide data about the number of rehabilitation beds and specialty rehabilitation services (SCI, TBI, and pediatric available within the trauma system's geographic region. On average, how long do patients need to wait for these rehabilitation beds? Does the average wait vary by the type of rehabilitation needed?

According to the Health Facilities section at the department, there are 3 licensed stand-alone rehabilitation centers and 14 Short-term Acute Care Hospitals that have licensed inpatient rehabilitation units. Craig Hospital is licensed as a Long-term Acute Care Hospital rather than as a rehabilitation center.

Table 5: Rehabilitation Services in Colorado

FACILITY	NUMBER OF REHAB BEDS	TRAUMA HOSPITAL? (DESIGNATION LEVEL)	SPECIALTY AREA	COMMENT
Rehabilitation Hospitals				
Healthsouth Rehabilitation Hospital of Colorado Springs	64	No	Stroke, amputee, TBI, SCI, orthopedic	Accredited by the Joint Commission
Northern Colorado Rehabilitation Hospital	40	No	Stroke, amputee, TBI, SCI, orthopedic, major multiple trauma	Accredited by the Joint Commission
Spalding Rehabilitation Hospital	78	No	TBI, Amputee, Stroke	Accredited by the Joint Commission and CARF
Craig Hospital	93	No	SCI, TBI	Designated by the National Institute on

FACILITY	NUMBER OF REHAB BEDS	TRAUMA HOSPITAL? (DESIGNA- TION LEVEL)	SPECIALTY AREA	COMMENT
				Rehabilitation and Research (NIDRR) as a Model System Center for SCI and TBI rehab. Ranked among the top 10 rehabilitation centers in the US.
Rehabilitation Beds In Short-Term Acute Care Hospitals				
Poudre Valley Hospital	10	Yes (III)		Licensed by Health Facilities
Boulder Community Hospital	20	Yes (III)		Licensed by Health Facilities and accredited by CARF
North Colorado Medical Center	20	Yes (II)		Licensed by Health Facilities
Centura Health-Porter Adventist Hospital	13	No		Licensed by Health Facilities
Centura Health-St Anthony Central Hospital	17	Yes (I)		Licensed by Health Facilities
University of Colorado Hospital Anschutz Inpatient Pavilion	12	Yes (II)		Licensed by Health Facilities
Swedish Medical Center	24	Yes (I)		Licensed by Health Facilities
Memorial Hospital Central	34	Yes (II)		Licensed by Health Facilities and accredited by CARF
Centura Health-Penrose St Francis Health Services	27	Yes (II)		Licensed by Health Facilities and accredited by CARF
Parkview Medical Center Inc	15	Yes (II)		Licensed by Health Facilities and accredited by CARF
Centura Health-St Mary Corwin Medical Center	12	Yes (II)		Licensed by Health Facilities
San Luis Valley Regional	8	Yes (IV)		Licensed by Health

FACILITY	NUMBER OF REHAB BEDS	TRAUMA HOSPITAL? (DESIGNATION LEVEL)	SPECIALTY AREA	COMMENT
Medical Center				Facilities
St Mary's Hospital and Medical Center	20	Yes (II)		Licensed by Health Facilities
Montrose Memorial Hospital	10	Yes (IV)		Licensed by Health Facilities
The Children's Hospital	8	Yes (RPTC)	Peds, SCI, TBI, Amputee	
Denver Health Medical Center	11	Yes (I)		
Spaulding Rehabilitation At Presbyterian St. Luke's		No		Accredited by CARF
Denver Veteran's Administration Hospital		No		Accredited by CARF

No information is available on the average wait time for a rehabilitation bed or whether the average wait varies by type of rehabilitation needed.

2. Describe how existing trauma system policies and procedures appropriately address treatment guidelines for rehabilitation in acute and rehabilitation facilities.

Colorado's rules for trauma center designation specify requirements for the availability of rehabilitation services. The requirements vary by each designation level:

Level I and II facilities:

"Rehabilitation services shall be available to the trauma patient:

1. Within the hospital's physical facilities; or
2. At a freestanding rehabilitation hospital. In this circumstance, the trauma facility shall have appropriate transfer agreements.

The following services shall be available during the trauma patient's ICU and other acute phases of care:

1. Physical, occupational and speech therapy, and
2. Social services"

Level III facilities:

"A Level III trauma facility shall have rehabilitation services with:

1. A physician who is credentialed by the facility to provide leadership for physical medicine and rehabilitation, and

-
2. Policies and procedures for the early assessment of rehabilitation needs of the injured patient; and
 3. Physical therapy, and
 4. Occupational therapy, and
 5. Speech therapy, and
 6. Social Services, or
 7. Transfer guidelines for access to rehabilitation services”

Level IV facilities:

“A trauma program with policies that identify and establish the scope of trauma care for both adult and pediatric patients, including but not limited to: ...
Rehabilitation capabilities if available; ...”

Regional Pediatric Trauma Center:

“Must have rehabilitation services with:

1. Leadership of the service by a physician who is a physiatrist or who specializes in orthopedic or neurologic rehabilitation, and
 - a. Protocols/procedures for the early assessment of the rehabilitation needs of the injured child;
 - b. Physical therapy;
 - c. Occupational therapy;
 - d. Speech therapy; and
 - e. Social services.”

3. Identify the minimum requirements and qualifications that rehabilitation centers have established for physician leaders.

The Trauma Program does not have access to this specific information for each rehabilitation hospital or for the distinct rehabilitation units in Short-term Acute Care hospitals. Each facility identifies those standards themselves through their credentialing and privileging activities.

4. Describe how rehabilitation specialists are integrated into trauma system planning and advisory groups.

To date, there has been little input from rehabilitation specialists in trauma system planning. Rehabilitation specialists are not statutorily required to be represented on the State EMS and Trauma Advisory Council, however a person with this type of expertise could participate as an ex officio member, without requiring a change in existing statutes.

Disaster Preparedness

Although the primary authority and responsibility of the EMTS Section revolves around issues of routine/daily operations, the EMTS Section also is involved in the work of disaster preparedness, an important component of overall trauma system development. Colorado is fortunate in that significant effort has been expended on developing an appropriate statewide plan for disaster response. This effort has resulted in the development of several agencies and initiatives to address improved "All Hazards" capabilities. Although there has been significant effort by many agencies, this process has also presented significant challenges in terms of interagency coordination and inclusiveness.

As a result of events such as the recent Democratic National Convention in Denver in August 2008 and several local disasters such as tornadoes and winter storms, the interagency cooperation has improved. Within the department, the Emergency Preparedness and Response Division (EPRD) has primary responsibility for ESF8 functions and developing disaster response from a public health perspective. The EPRD and EMTS Section have significantly improved their routine communications and work together on appropriate projects. Nonetheless, there continue to be opportunities for improvement.

1. When was the last assessment of trauma system preparedness resources conducted, and what were the significant findings of the assessment as they relate to emergency preparedness?

Assessments are being conducted on an on-going basis. The last one conducted by the Hospital Preparedness Program (HPP) dealt with NIMS compliance and 800MHz radios. Homeland security conducts a yearly assessment that is derived from the National Response Framework Target Capabilities. Just as the HPP assessment, it is targeted toward specific capabilities or capacity. The most significant finding in the 800MHz assessment was that 800MHz capacity is 100% statewide, although there are places in the mountains, particularly in canyons, where reception remains an issue. Unfortunately, the capability of hospital personnel to properly use the radios in talkgroups and throughout the system is only about 50%. The survey results revealed that radios were purchased by the hospitals, but many hospitals never had the radios properly programmed. In addition, there were gaps in the training of hospital personnel on how to use the radios.

The Hospital Preparedness Program, in coordination with the EMTS Section, works with facilities and agencies to support the continued exercising and updating of personnel in preparedness skills. Although the primary responsibility of all hazards preparedness for EMS and trauma falls within the Emergency Preparedness and Response Division, there are efforts to coordinate between the EMTS Section, RETACs, trauma centers and local response agencies. Over the past five years both communication and cooperation between these stakeholders have steadily improved; nonetheless, there are still opportunities for improvement.

2. What actions were taken to remediate or mitigate the gaps identified through tabletop or simulated responses in disaster drills among the acute care facilities participating in the system?

The Hospital Preparedness Program has developed deliverables that facilities must accomplish in order to receive funding. These deliverables are derived in part from previously identified gaps. One of the requirements for funding of any exercise or drill is that an "After Action Report," following the federal Homeland Security Exercise and Evaluation Program (HSEEP) guidelines, must be provided before funding is released. There are sections within HSEEP guidance dedicated to remediation plans and timelines for mitigating identified gaps.

The 800MHz drill provided information about the lack of programming and the training gap, resulting in the Hospital Preparedness Program setting aside additional funding for the proper programming to occur. Funding has also been allocated to follow up the remediation step to ensure the gap has been mitigated.

3. What is the trauma system plan to accommodate a need for a surge in personnel, equipment, and supplies?

Currently, there are supply caches placed throughout Colorado. These caches are under the control of local jurisdictions, which are responsible for placing them where and when an emergency incident occurs. These caches can surge up to 500 beds within each of the eleven RETAC regions, and 2 extra caches were added to the Denver Metro area based on population. This totals 6500 additional beds within the state of Colorado.

Currently, a volunteer registration system is being populated with medical, public health, and general volunteers to assist with personnel surge. Local administrators are being trained on this volunteer registration system to give local jurisdictions control and information if an emergency incident occurs in that region. Each volunteer that signs up within the system is screened by license verification and criminal background check.

4. How is the trauma system integrated into the state's incident command system and the communications center?

EMSystem is a web-based patient transport tracking system that is used by communication centers, hospitals, EMS/fire, and emergency managers. During an MCI, communication centers use the system to query hospitals for their ability to take specific types of patients. During an event, communication centers talk with first responders and use EMSystem to share information about the event as well as to inform hospitals of how many and what types of patients they will be receiving.

Communication centers are configured to utilize radio channels as dictated by local requirements. Trauma related communications traffic could be handled on VHF (150 MHz), UHF (450 MHz) or on the DTRS (800 MHz) as appropriate. EMS Public Safety Channels and DTRS EMS talkgroups have been identified and incorporated into interoperability plans structured on the Incident Command System.

5. What strategies and mechanisms are in place to ensure adequate interhospital communication during an MCI?

Hospitals use EMSsystem to receive information about MCIs taking place, how many patients there are, injury specifics, and which hospitals will be receiving patients. Additional information released by the Colorado Information Analysis Center is posted on EMSsystem, and hospital staff members have the ability to download guidance documents from EMSsystem. For example if there is a tuberculosis outbreak, a guide for treatment practices may be released by the Colorado Information Analysis Center in which case it is posted on EMSsystem. Hospitals also use another web-based system called HC Standard, which tracks internal hospital resources (ventilators, N95 masks, patients, etc.) Hospitals can use this tool to communicate about other information such as staff availability, phone numbers, hours worked, location, etc.

Additional interhospital communication paths are to be had via radio. Regional-use channels are available for intersystem mutual assistance. These include the VHF 155.340 MHz HEAR channel and the ten UHF (450 MHz) Medical Channels. For wide area, statewide communications, the 800 MHz Digital Trunked Radio System (DTRS) has designated EMS, mutual aid channel talkgroups for Emergency Department inter-facility communications and transporter coordination.

System-wide Evaluation and Quality Assurance

Colorado's trauma system has struggled to implement system-wide evaluation and quality assurance. Part of that struggle has been the lack of resources, both personnel with appropriate expertise and the money to fund activities. Despite these barriers, Colorado has made significant progress toward developing the data sets that are required to look at quality across the system. The Colorado Trauma Registry contains more than ten years of data. The addition of the EMS Ambulance Trip Report Information Exchange (MATRIX) in July 2006 was another major step toward effective data collection. Finally, the addition of the EMS and Trauma Data Program Manager in July 2007 brought expertise to begin to establish data reporting and benchmarking functions.

The opportunity now exists to expand the use of these data and begin the development of a system quality improvement program. The ability to protect information from discovery at the local level has been identified as a barrier to the development of local and regional quality improvement efforts.

1. What is the membership of the committee charged with on-going monitoring and evaluating of the trauma system?

Currently there is no single committee charged with the on-going monitoring and evaluation of the trauma system. Various SEMTAC committees are responsible for monitoring different aspects of the integrated EMS and trauma system. To date, these monitoring activities have been limited in scope; however, if the department receives additional funding for EMS and trauma through Senate Bill 02, as described elsewhere in this document, there will be additional resources and personnel to work toward evaluating the EMTS system. Three SEMTAC committees are involved to some degree with quality improvement efforts:

The *Public Health & Safety Committee* establishes systems to safeguard both the public and EMTS providers. This committee provides oversight in the regulation and monitoring of system standards, such as:

- Medical standards for EMS and trauma;
- Criteria for designation of facilities as trauma centers;
- Prehospital provider education; and
- Equipment standards (for prehospital care providers and for designated trauma centers).

The Public Health & Safety Committee is also responsible for establishing statutory/legal authority to protect quality improvement activities.

The *Standards & Solutions Committee* establishes service standards in areas such as:

- EMS and trauma service access;
- Communications;
- Staffing availability and education; and

-
- Coordination of services.

This committee also provides solutions for effective delivery of EMS and Trauma services throughout the state by:

- Identifying the resources necessary to implement the service standards;
- Identifying a mechanism/source for on-going funding and growth of the EMTS Section at the department; and
- Making recommendations to improve coordination of the EMTS system.

Finally, the *Information Support Committee* is responsible for addressing the data needed to support an outcome-based EMS and Trauma System. The development of trauma and EMS information management systems includes such activities as:

- Acquiring, storing, and linking data from multiple sources;
- Improving data quality and completeness;
- Analyzing the data and disseminating the results;
- Supporting data-based interventions; and
- Evaluating the outcomes resulting from interventions or system changes.

a. To whom does it report its findings?

Each committee reports its findings and recommendations to the SEMTAC, which then advises the department on next steps. All reports and information prepared for and presented at SEMTAC or committee meetings are public documents that are available to the EMTS community and the general public.

b. How does it decide what parameters to monitor?

Each committee identifies, selects and prioritizes issues of interest based on suggestions from committee members as well as the general EMTS community.

c. What action is it empowered to take to improve trauma care?

Both the SEMTAC committees and the SEMTAC itself serve in an advisory capacity to the department. For items requiring changes in state rule, the SEMTAC is required to review proposed rule changes and recommend adoption during the development process. Based on input from the SEMTAC, the department makes final recommendations that are presented to the Colorado Board of Health for approval and/or promulgation into rule.

2. Describe the trauma system performance improvement efforts as they pertain to the system for the following groups of providers in the context of system integration:

a. Dispatch centers:

The department has not participated in performance improvement efforts in dispatch centers.

b. Prehospital provider agencies:

The department periodically helps train and on an individual basis provides technical assistance to prehospital medical directors on developing a quality improvement program for the EMS providers that they supervise. System-wide performance improvement is only just

beginning. The new statewide EMS database (MATRIX) began collecting data from local EMS providers in July 2006.

c. Trauma centers:

Trauma centers participate in facility trauma performance improvement as part of their commitment to being a trauma center. This process is reviewed at their triennial trauma designation site reviews. They also participate in system performance improvement through their voluntary participation in special projects such as the RETAC prehospital trip report survey and the trauma team over/under activation study. Both of these projects were one-time efforts and are described in detail elsewhere in this report.

d. Other acute care and specialty facilities:

The department has not participated in performance improvement efforts in other acute care facilities (non-designated).

e. Rehabilitation centers:

The department has not participated in performance improvement efforts in rehabilitation centers.

3. List the process and patient outcome measures that are tracked at the trauma system level, including measures for special populations.

The number of newly certified and re-certified trauma centers is reported to the SEMTAC quarterly.

Quarterly volume reports using data from the Colorado Trauma Registry provide regular assessments of:

- The total number of patients reported by Level I-III trauma centers;
- The number of patients with a traumatic brain injury; and
- The number of patients who died.

These volumes are stratified by ISS, patient status (all patients vs. inpatients only) and facility designation level.

Annually, an assessment is made of the percent of severely injured trauma patients (ISS 16-75) who are not admitted to or reported by a Level I or II trauma center.

Annually, an assessment is made of the mean, median and 90 percent fractal of EMS response, scene and transport times for trauma patients.

4. As part of your system-wide performance improvement, specify whether each of the following is assessed on a regular basis:

a. Time from arrival to a center and ultimate discharge to a facility capable of providing definitive care. If yes, specify the mean time to transfer.

This measure has not been assessed on a regular basis. However, according to the data reported in the Colorado Trauma Registry in 2008, 4,594 patients were identified as being transferred from a hospital emergency department to a Level I-III trauma center. The length of time in the ED at the first hospital was available for 2,978 patients (65%). For these patients, the average length of time in the ED at the first hospital was 175 minutes (<3 hours) with a range of 3 to 1,355 minutes. Additionally, 218 patients were identified as being transferred from inpatient status at the first hospital to a Level I-III trauma center. Length of time at the first hospital was available for 106 patients (49%). For these patients, the average length of time at the first hospital was 1.6 days with a range of 0 to 14 days.

b. Proportion of patients with injury more severe than a predefined injury severity threshold (for example, ISS >15, or other criteria) who receive definitive care at a facility other than a Level I or II trauma center (undertriage)

This measure is routinely assessed in the quarterly volume reports of trauma registry data. Using data from 2008, for all trauma patients reported (including DOA, ED deaths, ED transfers and inpatients), 2,535 of the 3,066 patients with an ISS of 16-75 (83%) were reported by a Level I or II facility, and 531 (17%) by a Level III facility. When considering inpatients only, of the 1,628 inpatients with an ISS of 16-24, 1,355 (83%) were treated at a Level I or II facility. Of the 1,065 inpatients with an ISS of 25-75, 972 (91%) were treated at a Level I or II facility. Of the 366 inpatients with an ISS of 16-75 admitted to a Level III facility, 95 were reported by a single facility (the most remote Level III in the state).

Only Level I-III facilities submit data to the Colorado Trauma Registry. To determine "undertriage" for all hospitals in Colorado (including Level IV and undesignated facilities), an assessment was done in 2006 using hospital discharge data from the Colorado Hospital Association. ISS was determined from the ICD-9-CM diagnosis codes using ICD-Map90 software set to a high estimate for AIS. In 2006, 81 percent of patients with an ISS of 16-24 and 90 percent of the patients with an ISS of 25-75 were admitted to a Level I or II trauma center.

c. Proportion of patients with injury less severe than a predefined injury severity threshold (for example, ISS <9) who are transferred from any facility to a Level I or II trauma center (overtriage)

This measure has not been assessed on a regular basis. However, according to the data reported in the Colorado Trauma Registry, in 2008, 4,510 patients were reported as being transferred to a Level I or II facility from some other facility. Of these patients, 2,040 (45%) were identified by the Level I or II trauma center as having an ISS of 0-8. Of the 2,040 patients, 470 (23%) were transferred from an out-of-state facility. Of the 1,570 patients transferred from an in-state facility:

- 603 patients (38%) went to a Level II trauma center and 967 (62%) went to a Level I trauma center
- 412 patients (26%) were age 0-14, 924 (59%) were age 15-64, and 234 (15%) were age 65+

-
- The mechanism of injury was a fall for 534 patients (34%), a motor vehicle/ motorcycle/other vehicle crash for 283 patients (18%), ski- or sports-related for 234 patients (15%), burn-related for 109 patients (7%) and other injury mechanisms (stab, GSW, pedestrian, bicycle, assault, pediatric non-accidental trauma, etc.) for 410 patients (26%).

5. Describe how your system addresses problems related to significant overtriage or undertriage, both primary and secondary.

The system has not yet addressed the issue of significant over- or under-triage.

Trauma Management Information Systems

The Colorado Department of Public Health and Environment has been collecting trauma data from Level I, II and III trauma centers for the past eleven years and data from EMS providers for the past two years. In addition, the department has multiple other databases (described in the Injury Epidemiology chapter) that can be analyzed to create a relatively comprehensive view of all hospitalized injuries in Colorado (although specific information on patient care is somewhat limited). Taken together, these information sources have been useful in describing the problem of injury in Colorado and in informing decision-makers on prevention and other priorities.

1. Which agency has oversight of the trauma MIS?

The EMS and Trauma Data Program in the EMTS Section of the department has oversight of the trauma MIS.

a. Describe the role and responsibilities of the lead agency in collecting and maintaining the data.

The EMS and Trauma Data Program is responsible for managing two primary data systems, the Colorado Trauma Registry and the [EMS Ambulance Trip Reporting Information Exchange \(MATRIX\)](#) and for integrating these data with multiple other datasets (see the list in the [Injury Epidemiology chapter](#)). The EMS and Trauma Data Program oversees all aspects of data management from training of coders/registrar, database and software design, data collection, assessment of data quality and completeness, data analysis, interpretation of results and dissemination of reports.

The [Colorado Trauma Registry](#), established in statute, was first developed in 1995-1996. Data collection began in July 1997. All hospitals designated as Level I-III trauma centers must submit clinical information on patients meeting the case inclusion/exclusion criteria described in detail in question 3 below. Briefly, these include patients with a principal diagnosis of trauma who: 1) die anywhere in the hospital (ED, OR, or inpatient); or 2) are transferred by EMS into or out of a facility for care; or 3) are hospitalized for ≥ 12 hours, regardless of ISS; or 4) have an ISS ≥ 9 and are not discharged from the ED; or 5) are readmitted for missed diagnosis, complications or iatrogenic injuries. Data to be submitted are based on the National Trauma Data Standards (NTDS). The Colorado Trauma Registry was updated in 2008 to reflect the latest version of the NTDS, with a few exceptions to allow for greater detail in the data collected at the state level.

Facilities are required to submit their data to the EMS and Trauma Data Program within 60 days of the end of the month of discharge/death (see [CTR rules](#)). Staff in the EMS and Trauma Data Program upload new data files monthly. Approximately 23,000 records are received/processed annually.

The Colorado MATRIX has been successfully collecting data from EMS transport agencies since 2006. All ground and air transport agencies licensed in Colorado are required to submit data to

the department on all responses that result in patient contact (see [Rules for EMS data collection](#), Section 11). At a minimum, agencies must submit the National Elements subset of the National EMS Information System (NEMSIS) dataset. Agencies may collect the data in one of three ways:

- By use of the on-line data entry system developed and maintained by staff in the EMS and Trauma Data Program;
- By use of the desktop version of the data entry system developed and maintained by staff in the EMS and Trauma Data Program; or
- By using a third party vendor software product and submitting data via XML export.

At a minimum, agencies must submit their data quarterly, within 60 days of the end of the quarter. Currently, approximately 70 percent of the 190 EMS ground transport agencies are submitting data to the MATRIX. Since going “live”, this system has collected data on more than 660,000 patient care reports. Most of the largest EMS agencies presently submit their data; EMS and Trauma Data Program staff estimate that data has been collected on approximately 80 percent of the annual patient transports that occur. Staff in the EMS and Trauma Data Program continue to work with ambulance agencies to identify and solve data collection and submission problems so that all agencies will be in compliance with the EMS data collection rules. When all agencies are submitting data, the department anticipates receiving approximately 400,000 records annually.

b. How are the completeness, timeliness, and quality of the data monitored?

Colorado Trauma Registry:

Completeness: Most of the trauma facilities use Traumabase® software for data collection (one Level I facility recently changed to Trauma One® for its data collection). For facilities using Traumabase®, failing edits in the software will not allow a case to be submitted if information is missing in required fields. Completeness of each variable is also assessed at the state level prior to analysis and reporting. In terms of completeness of case ascertainment, two methods have been used:

- Comparing trauma registry records to trauma records identified through the hospital discharge database from the Colorado Hospital Association, and
- Identifying whether or not transferred patients are mentioned in data received from both facilities.

Timeliness: Each month, when data are uploaded into the state database, a report is generated that shows the number of months of data submitted for each facility. Any facility that is more than two months behind in data submission is contacted to identify and solve any problems or issues regarding data collection/submission. Staff in the Trauma Program are also notified. If a facility is persistently behind in data submission, the facility must submit a plan of correction for return to compliance. If the trauma center receives a site review during a time of non-compliance, this is noted as a deficiency also prompting a plan of correction.

Quality: As mentioned above, most facilities use Traumabase® software. EMS and Trauma Data Program staff have worked extensively with Clinical Data Management (the commercial vendor that developed and manages the Traumabase® software) to design edit checks that are built into the software to identify problems at the time of data entry as well as at the time of data submission. Once the data are received at the health department, data are also assessed prior to analysis. Examples of quality checks include:

- Comparing the injury description information with the assigned external cause of injury code (E-code);
- Comparing the diagnosis description with the assigned ICD-9-CM diagnosis code and AIS score; and
- Comparing the diagnoses assigned in the trauma registry to the diagnoses assigned in the corresponding record in the hospital discharge database.

To improve consistency in coding, staff from the EMS and Trauma Data Program:

- Meet with the trauma registrars and trauma nurse coordinators at the quarterly Colorado Trauma Network meetings to answer registry questions;
- Support a trauma registry listserv so registrars can connect with peers and discuss coding questions; and
- Conduct annual trainings to review variables in the registry, discuss changes to the coding manual, review difficult cases, etc.

In 2007, the Trauma Program in collaboration with the Colorado Trauma Network sponsored two AIS05 coding classes, with instructors from AAAM, so all registrars would be trained in AIS05 coding.

Colorado MATRIX:

Completeness: As mentioned above, approximately 70 percent of the ground transport agencies in Colorado submit data to the Colorado MATRIX. Of the remaining 60 or so agencies that are not submitting data, approximately 10 have fairly high volumes, defined as more than 500 patient transports each year. EMS and Trauma Data Program staff members are working with these agencies to resolve the barriers to data collection/submission. As additional incentive for participation, agencies applying for the \$1.8 million in EMS grant funds available each year are now required to be compliant with data submission requirements in order for their application to be considered for funding.

Timeliness: Current efforts of the EMS and Trauma Data Program staff are focused on getting all agencies to participate, rather than on improving the timeliness of the data currently being submitted. An assessment in February 2009 showed that 80 percent of the 290,163 records submitted between January 2008 and February 2009 were received within 90 days of the patient encounter.

Quality: Although agencies are required to submit a standard set of variables (the National Elements subset of NEMSIS), for many agencies using third party vendor software, there is an issue with mapping of existing variables and response options to the standard NEMSIS fields/responses. Staff in the EMS and Trauma Data Program prepare data quality reports for each agency each quarter to identify variables have data that are missing, inaccurate or inappropriately mapped. These reports are provided to agencies to help identify problems in data quality.

2. Specify which of the following data sources are linked to the information system. Describe the method of linkage (probabilistic or deterministic).

Table 6. Linkage between Data Sources

DATA SOURCE	LINKED TO:	LINKAGE METHOD	COMMENT
Motor vehicle crash data	Trauma Registry, HDD, EMS	Probabilistic	Pilot projects funded by the Colorado Dept. of Transportation (CDOT) in 2000 and 2007. See full report to CDOT for more details.
Law enforcement records			Law enforcement records are included in the Colorado Violent Death Reporting System and in the Colorado Child Fatality Review
EMS records			See description of the Colorado MATRIX above.
ED records			A centralized statewide ED database is not available in Colorado; however, the Colorado Hospital Association may have this data beginning in 2010.
Hospital trauma registries			See description of the Colorado Trauma Registry above.
Hospital administrative discharge data	Trauma Registry	Probabilistic	Due to limited staff resources, this linkage has not been routinely completed since 2005.
Rehabilitation data			A centralized statewide rehabilitation database is not available in Colorado.
Coroner/ME data			C/ME records are included in the Colorado Violent Death Reporting System and in the Colorado Child Fatality Review. No centralized, statewide database exists; each county coroner must be contacted individually.
Financial/payer data			A centralized statewide financial/payer database is not available in Colorado. Data on payer source are collected in

			the Trauma Registry and in hospital discharge data. Data on hospital charges are included in the hospital discharge database.
Dispatch			A centralized statewide dispatch database is not available in Colorado.

3. What are the regional trauma registry inclusion criteria?

Trauma registry inclusion/exclusion are summarized in the [trauma registry coding manual](#).

Trauma patients are defined as patients who have a *principal* diagnosis of trauma with:

1. At least one ICD-9-CM diagnostic injury code between 800-904.9, 910-929.9 940-959.9, 994.0, 994.8, 995.5, or 995.81

OR

2. Injuries that result from the mechanisms defined by the following E-codes:
E800-E848 E916-E925 E970, E971, E973-E976
E880-E899 E955-E958 E985-E988
E906, E907 E960, E965-E968

The time between the date of injury and presentation at the facility should be no more than 3 weeks, and the patient should not have had previous work-up or treatment for that injury event.

Level I-III trauma centers are required to provide data on any patient meeting the following inclusion criteria:

INCLUSION:

ALL trauma patients (defined above) who:

1. Die anywhere in the hospital, regardless of length of stay or ISS (for example, deaths in the emergency department, DOA deaths, deaths in the OR, deaths as an inpatient).

OR

2. Are transferred by EMS into or out of the facility for care, regardless of length of stay or ISS. Information should be downloaded to the state registry from both the transferring facility and the receiving facility for any patient transferred (even if the patient is discharged from the ED of the receiving facility).

OR

3. Are in the hospital for > 12 hours from the time of arrival at the emergency department, regardless of ISS, and are not discharged from the ED (that is, the ED disposition is OR, ICU, FLOOR, ADMIT, OBS, DIRECT). The only exception to this is if the patient was transferred from another facility and transported by EMS. If the patient was transferred by EMS from another facility, the patient should be reported to the state registry regardless of ED disposition, ISS or length of stay (see number 2 above).

OR

-
4. Have an ISS > 9 and are not discharged from the ED (that is, the ED disposition is OR, ICU, FLOOR, ADMIT, OBS, DIRECT). The only exception to this is if the patient was transferred from another facility and transported by EMS. If the patient was transferred by EMS from another facility, the patient should be reported to the state registry regardless of ED disposition, ISS or length of stay (see number 2 above).

OR

5. Are readmitted for missed diagnoses, complications or iatrogenic injuries. Patients who are readmitted as part of standard or planned care for a given injury (for example, removal of hardware after an orthopedic procedure) should NOT be included as a readmission. The readmission should occur within 30 days of when the patient was last discharged.

EXCLUSION:

- Late effects of injuries (ICD-9-CM codes 905-909, E929, E959, E969, E977, E989, E999)
- Blisters and insect bites (919.2, 919.3, 919.4, 919.5)
- Cellulitis resulting from an injury not previously treated
- Injuries that are admitted for elective, planned surgical intervention
- High altitude sickness (E902)
- Drowning and near drowning
- Hanging and near hanging
- Hypothermia
- Envenomations
- Smoke inhalation
- Any E-codes not listed above

4. Which stakeholders had a role in selecting the data elements for inclusion into the regional registry?

Stakeholders involved in the initial design of the Colorado Trauma Registry in 1996-1997 included trauma surgeons, trauma nurse coordinators, trauma registrars, representatives from public health, injury epidemiologists, the State Trauma Advisory Committee (in existence in 1996-1997, but now incorporated into the SEMTAC) and others.

Over the past decade, any modifications to the Colorado Trauma Registry have involved discussion and input from trauma nurse coordinators, trauma registrars, the Information Support committee of the SEMTAC (or its predecessors), injury epidemiologists and representatives from public health.

At the time of the initial design of the trauma registry, many hospitals were already using Traumabase software. The original design of the Colorado Trauma Registry incorporated many of the variables already included in the Traumabase software.

a. From what source(s) were the data field definitions derived?

The initial data dictionary for the Colorado Trauma Registry resulted from modification of the Traumabase® data collection guidelines. Over time, the data dictionary has been modified to incorporate additional variables, update definitions and add additional response options. In 2008, the data dictionary was updated to be in alignment with the National Trauma Data Standards. Several variables not previously required (including information on trauma team activation, procedures and complications) were added. The new requirements must be followed for discharges beginning in 2009.

b. What pediatric data elements are captured?

The Colorado Trauma Registry is based on the National Trauma Data Standards. All variables are required for patients of all ages. The only variable unique to the pediatric population is "Child Specific Restraint Use". Additionally, for both ED disposition and inpatient disposition, choices include the Department of Social Services (for possible child abuse cases).

5. What local or system-wide reports are routinely generated and at what frequency?

The EMS and Trauma Data Program generates [volume reports](#) showing the number of patient records stratified by ISS, presence or absence of TBI and patient outcome (alive/dead) for each facility each quarter. Aggregate reports (for all Level Is, all Level IIs, and all Level IIIs) are posted to the web for comparison purposes. Most other reports tend to be on an *ad hoc* basis as requested by individual facilities, the Information Support committee of SEMTAC, staff in the Trauma Program, staff making presentations at state or national conferences or other constituents. Reports and presentations are posted to the web and distributed through the Trauma Registry listserv.

6. Are data contributed to the National Trauma Data Bank (NTDB) or other outside agencies? If so, please specify which agencies.

Individual facilities (primarily Level Is and IIs) submit data directly to the NTDB. In 2006, data were submitted to NTDB from the state registry, however trauma registry stakeholders decided not to continue with this process for several reasons: 1) as Level Is and IIs are required to submit data to NTDB for ACS verification, hospitals wanted to control download of their data to the NTDB, rather than be subject to problems/delays that might result from submission via the state registry, and 2) hospitals that submit data receive comparison reports directly from the NTDB. It was unclear if hospitals would still receive these reports if data were submitted via the state registry.

Case-level data from the state registry are not submitted to other agencies/organizations; however, aggregate results have been provided upon request.

Research

1. Describe the current procedures and processes investigators must follow to request access to the trauma system registry.

As stated in the Board of Health Rules and Regulations regarding the Trauma Registry:

1. Any trauma registry data that identifies patients or physicians or is part of the patient's medical record shall be strictly confidential according to [C.R.S. § 25-3.5-704\(f\)\(III\)](#).
2. The data in the trauma registry may not be released in any form to any agency, institution, or individual if the data identifies the patients or physicians.
3. The department may provide access to information in the registry by outside agencies, institutions, or individuals. Such information shall not include data that identifies patients or physicians.

For investigators requesting case level information, [C.R.S. § 25-1-122\(4\)\(b\)](#) states that identifying data may be released "to the extent necessary for the treatment, control, investigation, and prevention of diseases and conditions dangerous to the public health; except that every effort should be made to limit disclosure of personal identifying information to the minimal amount necessary to accomplish the public health purpose." The decision to invoke C.R.S. § 25-1-122(4)(b) is made by officials at the department. In order to release case level data from the trauma registry, the health department official must:

1. Obtain a copy of the research protocol from the investigator
2. Make a judgment as to whether the protocol provides sufficient rationale for release, i.e., the release is *necessary for treatment, control, investigation, or prevention*
3. If approval is given for release of case level data, write a short memo to the file documenting the decision and rationale
4. Require the researcher and anyone having access to the data to sign a confidentiality agreement

The health department official may also refer requests to an *ad hoc* committee consisting of the relevant division director, other researchers, epidemiologists, scientists or persons with relevant backgrounds and experience as appropriate. The requesting researcher may appeal any unfavorable decision to the Executive Director or his/her designee, who will convene an *ad hoc* committee to review the request. See the full data release [policy](#) and [confidentiality agreement](#).

In addition, any research proposals that involve human subjects must undergo review by the Department's [Institutional Review Board](#).

2. What are the mechanisms used to ensure patient confidentiality when regional trauma registry data are used by investigators?

Please see the response to Question 1 above.

3. Provide examples of where research was conducted for the purpose of providing evidence that the processes of care and outcome of injured patients in the system's region are within acceptable standards.

Colorado's trauma registry has been underutilized, largely because there has been no funding to staff the registry for many years. However, despite the dearth of resources, the data have been used for some research demonstrating system effectiveness.

A [study](#) presented at the World Injury Conference in 2004 demonstrated that with the development of Colorado's trauma system, from 1993 (before the trauma system) to 2002 (after full implementation of the trauma system):

- A higher percent of injured patients were admitted to Level I-III trauma centers
- A higher percent of severely injured trauma patients (ISS 16-75) were taken directly to a Level I or II trauma center
- A higher percent of severely injured trauma patients (ISS 16-75) admitted to a Level III, IV or undesignated facility were transferred to a Level I or II trauma center sooner.
- The age-adjusted inpatient mortality rates for patients with moderate (ISS 9-15) and severe injuries (ISS 16-24) significantly decreased, and while not statistically significant, there was a trend in reduced inpatient mortality rates for critically injured trauma patients (ISS 25-75).

A more recent [study](#), conducted in 2008 and presented at the 2008 Rocky Mountain Trauma Conference and the 2009 annual meeting of the Society for the Advancement of Violence and Injury Research, used Colorado trauma registry data to develop logistic regression models for predicting probability of survival for blunt and penetrating trauma (using methodology similar to the Major Trauma Outcome Study). The state norms developed from the 2000 data were used to predict probability of survival for trauma patients in 2001-2007. Results showed a significant improvement in the observed vs. expected number of deaths for blunt trauma patients ages 15 and older. No statistically significant difference was seen for patients ages 15 and older with penetrating trauma. A review of the characteristics of "unexpected survivors" with blunt trauma (patients with a probability of survival of less than 50 percent who survived) suggests that contributing factors included having more than one "leg" of prehospital transport and that at least one transport "leg" included transport by helicopter or fixed wing aircraft.

In addition, individual facilities and in some cases, whole hospital systems have used their own data in [research projects](#). All Level I trauma centers are required to have robust research agendas. These centers have added information to the practice of trauma across the country through their publications.

4. How has research been used to modify policy or practice within the system?


As an example, in 2005, a [retrospective review](#) was conducted looking at over/under trauma team activation. Trauma team activation is not standardized throughout Colorado's trauma system; hospitals set their own criteria for activation as well as the levels of trauma team

activation they support. The results of the study showed wide variation in over/under activation rates, with 9 of 19 hospitals reporting over activation rates of >50 percent and 8 of 19 hospitals reporting under activation rates of >10 percent. The results from this study contributed to the discussion among facilities about the need for standardization of trauma team practices and protocols. Based on this and other input, many hospitals have modified their trauma team activation criteria. By sharing observations and protocols, trauma centers share their best practices with other facilities throughout the state.

5. What resources (for example, personnel and fiscal) are available to the lead agency to assist in conducting system research?

At the moment, no resources are specifically dedicated to assisting the Trauma Program or the EMS and Trauma Data Program in trauma system research. Due to the need to address other priorities, the Trauma Program has generally not viewed research as a major focus of its activities.

Staff from the EMS and Trauma Data Program and from the Injury, Suicide and Violence Prevention Unit at the department have collaborated with researchers at the University of Colorado Health Sciences Center and the Colorado Injury Control Research Center at Colorado State University, Ft. Collins on projects involving injury prevention efforts and best practices (for example, effectiveness of a booster seat program conducted in daycare centers, effectiveness of enhanced enforcement efforts to increase seatbelt use rates, effectiveness of an older adult falls program conducted in churches, evaluation of a marketing campaign for suicide prevention). Possible collaborative projects involving trauma system research have been discussed, but to this point, no formal projects have been implemented.

The background of the slide is a photograph of the interior of Antelope Canyon, showing smooth, undulating sandstone walls illuminated by warm, golden light. A solid blue horizontal line spans the width of the slide near the top.

State Focused Questions

State Focused Questions

1. Does Colorado have too many Level I/II trauma centers along the Front Range? The Front Range is the entire area along Interstate-25 from Fort Collins in the north to Pueblo in the south. The number of trauma centers along the Front Range has been an on-going debate since the inception of the system.

Table 7. Current Front Range Trauma Assets

Geographic Location	Approximate Population	Level I	Level II	Level III/V	Non-designated Hospitals
Denver Metro area (Denver, Adams, Arapaho, Broomfield, Douglas, Jefferson counties)	2,440,000	3 plus 1 RPTC	3	3 Level III 3 Level IV	4
Colorado Springs (El Paso County)	590,000	0	2	1 Level IV	1
Pueblo County	160,000	0	2	0	0
Northern Colorado (Boulder, Larimer)	583,000	0	1	6 Level III	1
Northern Colorado (Boulder, Larimer, Weld)	828,000	0	2	6 Level III	1

2. The regulation, certification and oversight of care delivered by prehospital personnel are fragmented in Colorado.

The responsibility for the regulation of EMS providers is divided between:

- The Department of Public Health and Environment, which certifies and disciplines EMTs;
- The Department of Regulatory Affairs, Board of Medical Examiners, which determines the scope of practice for EMTs and oversees physicians providing prehospital medical direction of EMTs;
- The Colorado Department of Public Safety, Division of Fire Safety, which is responsible for training and certifying medical first responders and determining their scope of practice; and
- Colorado counties, which are statutorily responsible for the development and implementation of ambulance licensing standards in their jurisdiction.

This fragmentation results in confusion for the public, lack of consistency in training, confusion regarding oversight responsibilities and difficulty in coordinating the various functions. How do we simplify regulatory oversight of the care delivered by prehospital personnel?

3. What activities and/or policies can Colorado consider to keep rural trauma centers interested/willing/able to stay in the trauma system and remain designated?

Complicating factors include:

- Rural centers are usually the only facilities in the area – there may be nowhere else to take the patient for 45+ miles.
- There is no requirement or incentive to participate in the trauma system.
- There is financial disincentive for participation as the facility must pay to be part of the trauma system, through trauma designation fees, training/education of employees, additional data collection requirements, etc.

4. What should the leaders of the EMTS system throughout Colorado be doing today to ensure appropriate succession planning at all levels of the system?

The generation of people who founded the Emergency Medical and Trauma Services System are retiring and/or moving on. How does Colorado develop another generation of leaders who are committed to and enthusiastic about improving the system?

Complicating factors include:

- Exodus of young people from rural areas.
- Centralization of collective wisdom/history/knowledge among one or two people.

5. How can the Colorado EMTS system more effectively transport critically ill patients from outlying facilities across vast distances to the Level I or II care that the patient needs?

Complicating factors include:

- Trained personnel are relatively unavailable (both EMS, doctors, nurses, lab techs, etc.)
- The care of critically ill patients may be out of scope for the EMS personnel available to transport.
- Rural facilities have limited resources, in terms of both personnel and equipment. A transport may take up to 12 hours round trip potentially leaving the area uncovered for additional 911 calls.
- No political entity (town, city, district) in Colorado is required to provide EMS services.
- Colorado is a local control state. Authority for licensure of ambulance agencies rests with county, not the department.

What are other large western states doing to address this problem?

Additional Information

Staff resumes

EMTS Section Chief	D. Randy Kuykendall
Trauma Program Manager	Grace Sandeno
EMTS Data Program Manager	Holly Hedegaard
EMTS State Medical Director	Arthur Kanowitz
EMTS Section	Organizational Chart

Maps

Urban, rural, frontier counties	map
RETACs	map
Location of designated trauma centers	map
Location of ground transport agencies	map
Location of air transport agencies	map

System legislation and rules

Colorado Emergency Medical and Trauma Services Act	C.R.S. § 25-3.5-101 et seq.
Index of EMS and Trauma Statutes and Rules	Index



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