California
State Trauma Plan
2014

Emergency Medical Services Authority
California Health and Human Services Agency

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Executive Summary

The State of California has created a trauma system structure that broadly utilizes the expertise of its stakeholders and combines the strengths of regional EMS oversight with state-wide system coordination in order to improve system cohesiveness, reduce undesirable variability, and improve access to trauma care.

This is the first comprehensive trauma plan for the State of California. It is the culmination of a long process that began in 2010 and was guided by the trauma planning document (*California Statewide Trauma Planning: Assessment and Future Direction*), published in 2006. California, in addition to being the most populous state in the Union, is unique as it is the only state where the administration of the EMS system, including the trauma system, rests predominately with local EMS agencies. While there are statewide planning challenges inherent to a localized system, California's EMS System with 33 local agencies, allows a degree of local flexibility and the ability to tailor regional trauma systems to individual jurisdictional demographics and population density.

State Trauma System Vision Statement
The vision for California's State Trauma System is to develop a statewide inclusive trauma system that ensures rapid access to care for all individuals optimally within one hour following major injury. The system focuses on the entire spectrum of trauma from prevention, prehospital care, timely transport of appropriate patients to definitive care, quality care improvements, and rehabilitation to return injured individuals to a productive life. The system is informed by data for policy decision-making and to demonstrate the effectiveness, and is supported by ongoing funding.

Three overall goals of the State Trauma System supported by the State Trauma Plan are:

1. **Timely Access to Trauma Care** *(Field triage, re-triage, and interfacility transfer)*
2. **Delivery of Optimal Trauma Care** *(Performance Improvement supported by data, acute care and rehabilitation practices, compliance assessment and professional education)*
3. **Community Health and Wellness** *(Public education and primary prevention)*

The American College of Surgeons (ACS) Committee on Trauma, along with the Coalition for American Trauma Care, commissioned Harris Interactive to conduct a public opinion poll on the public's awareness, knowledge, and perception of the importance of trauma care and trauma systems of care. The results were released during a Congressional Briefing on March 2, 2005. Some of the key findings were as follows:

1. Almost all Americans feel it is extremely or very important to be treated at a Trauma Center in the event of a life-threatening injury.
2. Almost all Americans feel it is extremely or very important for their state to have a trauma system.

3. The majority of Americans feel having a Trauma Center nearby is equally as important as or more important than having a fire department or police department.

The California State Trauma Plan represents a blueprint for the structure and function of a State Trauma System. The State Trauma Plan depends on the exercise of regulatory authority by the local EMS agencies and is not designed to interfere with or compromise this authority. The State Trauma Plan development is preceded by and built upon a number of elements including enabling legislation, regulations, trauma planning documents, and the creation of trauma regions within the State.

The structural elements of the State Trauma System, as outlined in this Plan include the State EMS Authority, the State Trauma Advisory Committee, the 33 local EMS agencies (LEMSA), five (5) Regional Trauma Coordinating Committees (RTCC), all hospitals receiving trauma patients, and EMS provider agencies.

RTCCs, created in 2008, function as a conduit between the regions and the EMSA/STAC to aid in statewide Trauma System development and standardization. The regions are a key component of the California State Trauma System and were created to leverage a broad range of expertise within five regions to facilitate communication and collaboration within and between regions, to share and support best practices, to assist with the interpretation of regional data, and to provide requested technical assistance to local EMS agencies and to the State EMS Authority related to the development and operation of a system of trauma care for the State of California. RTCCs may facilitate discussions related to trauma care challenges within the region working towards resolutions to minimize variations in practice. Additional regional issues may include addressing geographic isolation, coordination of trauma care resources, and funding for out-of-county patients. RTCC membership is currently voluntary and is drawn from trauma system partners within each region to include, but not be limited to, Local EMS agency Trauma System Coordinators, EMS Directors and Administrators, Trauma Center Directors, Trauma Center Managers, non-trauma facility representatives, and EMS providers. State level activity includes representation on the STAC, (acting as a subcommittee) reporting regional activities and issues, sharing regional work products, and relaying STAC information and decisions back to the region.

The State EMS Authority continues its responsibility to review and approve LEMSA Trauma Plans, and with assistance from the State Trauma Advisory Committee, provide guidance and technical assistance to the LEMSA and RTCC, advancing the development of a State Trauma System.

This Trauma Plan identifies and analyzes 15 functional components, based on an evaluation guided by the 2006 Health Resources Services Administration *Model Trauma System Planning and Evaluation* document and the American College of Surgeons Committee on Trauma *Regional Trauma Systems: Optimal Elements, Integration, and Assessment* guidance document:

1. Trauma System Leadership
2. System Development Operations
3. Trauma System Finance
4. EMS System: Prehospital Care
5. EMS System: Ambulance and Non-Transporting Medical Units
6. EMS System: Communications
7. Definitive Care: Acute Care Facilities
8. Definitive Care: Inter-Facility Transfer and Re-Triage
9. Definitive Care: Rehabilitation
10. Information Systems
11. System Evaluation and Performance Improvement
12. Education & Training
13. Trauma Systems Research
14. Injury Prevention
15. Emergency/Disaster Preparedness

Priorities for the State Trauma Plan over the next 2-5 years include the following:

1. Strengthen State Trauma System organizational structure and leadership to maximize the effectiveness of the State's unique trauma governance structure
2. Examine sustainable trauma system funding options
3. Establish a statewide Performance Improvement and Patient Safety (PIPS) Program that ensures ongoing assessment of system performance and outcomes
4. Design a standardized State trauma registry to support the PIPS Program and ensure consistent, measurable data for trauma system evaluation across the state, region, and local areas.

The benefits of a successful implementation of this plan with maturation of an effective State Trauma System include a:

- Reduction in deaths caused by trauma;
- Reduction in the number and severity of disabilities caused by trauma;
- Increase in the number of productive working years through reduction of disability;
- Decrease in the costs associated with initial treatment and continued rehabilitation of trauma victims;
- Reduced burden on local communities in support of disabled trauma victims;
- Decrease in the impact of the disease on "second trauma" victims - families.
- Recognition of California by Federal trauma partners as a State Trauma System

The State Trauma Plan is considered a fluid document that will be periodically revised as new components or criteria need to be incorporated. We sincerely appreciate the assistance of all who contributed to the creation of this comprehensive State Trauma Plan. We commend their commitment to California's State Trauma System and desire to improve the delivery of trauma care to the citizens and visitors of California.

Purpose of the State Trauma Plan

In the State of California traumatic injury is the most common cause of death in persons age 1 to 44 and accounts for more productive years of life lost than cancer and heart disease combined.[1] The cost of fatal trauma in California is estimated at more than $18 billion each year with national data showing U.S. costs of over $170 billion.[2] **Appendix E** provides aggregate data derived from the California EMS Information System (CEMSIS).

The Emergency Medical Services Authority and the Trauma Advisory Committee have been coordinating and evaluating trauma care in our State for over 25 years. In 2005, Governor Schwarzenegger requested the following:

> "…*I am directing EMSA, informed by its Trauma Advisory Committee, to complete its statewide trauma care plan…"*

The EMS Authority assessed trauma care in California and made recommendations as requested by Governor Schwarzenegger in the 2006 Report *"California Statewide Trauma Planning: Assessment and Future Direction"*. Guided by this 2006 planning document, this State Trauma Plan is the culmination of an extensive process that began in 2010. It is the first comprehensive State Trauma Plan for California.

California, in addition to being the most populous state in the Union, is unique as it is the only state where the statutory responsibility of the EMS system, including local trauma systems, rests predominately with local EMS agencies (LEMSA). California's 33 LEMSAs provide local flexibility and allow tailoring of regional trauma systems to individual jurisdictional demographics, population density, and available resources.

The LEMSAs design trauma systems that meet minimum state standards and regulations. However, some variability and challenges continue to exist in these locally-governed systems. It is the intent of this State Trauma Plan to reduce some of this unnecessary variability while allowing ample jurisdictional flexibility and promoting best practices throughout the state.

The State Trauma Plan analyzes current trauma care in California, provides updated trauma system status and makes specific recommendations for the implementation of a State Trauma System. The Plan is not immutable and will require periodic review and revision as changes occur within the EMS and healthcare environment.

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[1] CDC Injury Response, United States, 2009 http://www.cdc.gov/injury/overview/leading_cod.html
[2] WISQARS™ Injury Prevention & Control: Data & Statistics 2005

History and Background

What is Trauma?

For the purposes of this report, the trauma patient is a seriously injured person who requires timely diagnosis and treatment of actual or potential injuries by a multidisciplinary team of health care professionals supported by the appropriate resources, to diminish or eliminate the risk of death or permanent disability.

Multidisciplinary Team – Includes an EMS responder, trauma surgeon, emergency physician, anesthesiologist, other medical and surgical specialists, nursing, radiology, laboratory, operating suites, and ancillary services

What is a Trauma System?

A trauma system is an organized, coordinated effort in a defined geographic area that delivers the full range of care to all injured patients and is integrated with the local medical and public health systems. Trauma systems, including specialized Trauma Centers, offer a highly effective, integrated approach to ameliorating the incidence and impact of major injury to society; they exist in most states in the United States of America.[3] The true value of a trauma system derives from the coordinated transition between each phase of care (prehospital, hospital, and rehabilitation), integrating existing resources to achieve improved patient outcomes. Injuries occur across a broad spectrum, and a trauma system must determine the appropriate level of care for each type of injury.[4]

Trauma systems may be regionalized, making efficient use of limited health care resources. Trauma systems are based on the unique requirements of the population served, such as rural, inner-city, urban, or Native American communities, all of which are found in California. Trauma systems emphasize preventing injuries in the context of community health.

The benefits of a successful State Trauma System include a reduction in death and disability caused by trauma, resulting in an increase in the number of productive working years. Years of potential life lost because of injury far exceed those of cancer, heart disease, or stroke.[5] The impact of injuries on society can be mediated by assuring that the more severely injured are treated at Trauma Centers. Opportunities exist for improving overall cost-effectiveness by assuring our systems are inclusive in their design, and that triage guidelines are effective in matching the right patient with the right

[3] "*Access to Trauma Centers in the United States*" Charles C. Branas, PhD; Ellen J. MacKenzie, PhD; Justin C. Williams, PhD; C. William Schwab, MD; Harry M. Teter, JD; Marie C. Flanigan, PhD; Alan J. Blatt, MS; Charles S. ReVelle, PhD, Journal of American Medical Association, Volume 293 Issue 21 pages 2626-2633, June 2005
[4] 2002 Trauma System Agenda for the Future. U.S. Department of Transportation, National Highway Traffic Safety Administration
[5] WISQARS Leading Causes of Death Reports. Available at http://webappa.cdc.gov/sasweb/ncipc/leadcaus10.html.

facility.[6] In addition, being cost effective with initial treatment and continued rehabilitation of trauma victims leads to a reduced burden on local communities in support of disabled trauma victims and a decrease in the impact of the disease on "second trauma" victims - families. Second trauma is the emotional trauma/upheaval of the family when a loved one suffers a life-threatening injury or sudden illness.[7]

An organized trauma system is not only essential to deliver trauma care to seriously injured patients; it is also the foundation for disaster and terrorism readiness. A State Trauma System allows for consistent and effective care of patients across political boundaries, with the ability to expand to meet the medical needs of the community from a human-made or natural disaster. Historically, the overwhelming majority of all human-made disasters or incidents of terrorism has involved explosives that resulted in large numbers of people with life or limb threatening injuries (multi-system trauma). Though future acts of terrorism may include the use of other less conventional weapons of mass destruction (chemical, biological or radiological), they will most likely continue to involve the use of explosives.

Disaster medical response includes planning and integration of trauma system resources into the local Emergency Operational Area Plan operating within the Standardized Emergency Management System (SEMS). As demonstrated by catastrophic events occurring in California such as the Northridge and Loma Prieta earthquakes, La Conchita mudslide, Chatsworth train collision, and the Asiana Airlines crash, emergency preparedness must include a strong trauma system infrastructure that will deal with daily injuries and have the capacity to rapidly expand (surge capacity) to respond to the demands of an unconventional or natural disaster that creates casualties of greater magnitude.

National Efforts in Trauma System Development

In 1966, the National Academy of Sciences White Paper entitled “Accidental Death and Disability: The Neglected Disease of Modern Society,” identified deficiencies in providing emergency medical care in the country. This paper was the catalyst prompting federal leadership toward an organized approach to emergency medical services (EMS) and trauma care.

The Trauma Care Systems Planning and Development Act was developed in response to a 1986 General Accounting Office Report (GAO/HRD-86-132) that found severely injured individuals in a majority of both urban and rural areas of the United States sampled were not receiving the benefit of trauma systems, despite considerable evidence that trauma systems improve survival rates. A subsequent report in 1999 by the Institute of Medicine (IOM), "Reducing the Burden of Injury," called on Congress to "support a greater national commitment to, and support of, trauma care systems at the federal, state, and local levels." An estimated 20-40 percent of deaths due to severe

[6] *The Value of Trauma Center Care*, The Journal of Trauma Injury, Infection, and Critical Care, volume 69, Number 1, July 2010.

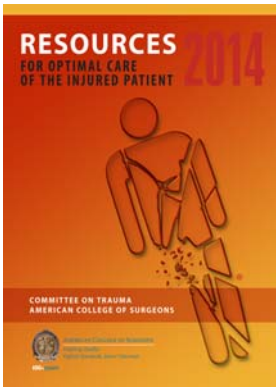
[7] American Trauma Society, *Second Trauma Course*, accessed at http://www.amtrauma.org/courses/2nd-trauma1/index.aspx

injury could be prevented if all Americans lived in communities that are organized to transport severely injured patients promptly to an area hospital that is staffed and equipped to provide expert trauma care.

Multi-system trauma – injury to more than one body system, (e.g. orthopedic, cardiac, pulmonary, renal, neurologic) usually deemed serious.

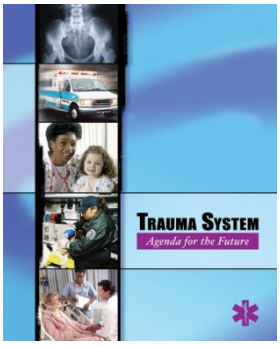
While an emergency department (sometimes referred to as an emergency room) is responsible for evaluation and stabilization with definitive care in some cases, Trauma Centers maintain a higher level of service both within and beyond a basic emergency department for victims of multi-system trauma. Operating rooms, anesthesia, surgical intensive care units, surgical recovery, and a multidisciplinary team of highly trained physicians and nurses is available to respond rapidly.

The American College of Surgeons (ACS) and its Committee on Trauma championed the development of Trauma Centers and trauma systems with the development of "Resources for Optimal Care of the Injured Patient". In 1976, the ACS first published this document that provided guidelines for hospital and prehospital resources necessary for optimal trauma care. Since that time, this document has gone through numerous revisions with the latest published in 2014. These guidelines describe in detail the qualifications and level of commitment required of hospitals, medical and surgical personnel, and local communities to provide high-quality trauma care. The ACS guidelines have been adopted by state and regional trauma systems throughout the nation. Studies have shown that systems employing these standards have significantly reduced preventable deaths due to injury.



In 2002, the American Trauma Society, supported by the U.S. Department of Transportation, National Highway Traffic Safety Administration, issued the Trauma System Agenda for the Future. This report noted that:

Trauma systems should possess a distinct ability to identify risk factors and related interventions to prevent injuries in the community, and should maximize the integrated delivery of optimal resources for patients who ultimately need acute trauma care. Trauma systems should address the daily demands of trauma care and form the basis for disaster preparedness. The resources required for each component of a trauma system should be clearly identified, deployed and studied to ensure that all injured patients gain access to the appropriate level of care in a timely, coordinated and cost-effective manner.



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- Almost all Americans feel it is extremely or very important for their state to have a trauma system.
- The majority of Americans feel having a Trauma Center nearby is equally as important as or more important than having a fire department or police department.

A study published in the September 2010 Journal of Trauma found:

Triaging severely injured patients to hospitals that are incapable of providing definitive care is associated with increased mortality. Attempts at initial stabilization at a non-trauma facility may be harmful. These findings are consistent with the need for continued expansion of regional trauma systems.[8]

Cost of Trauma Based on National Data

The cost of fatal trauma in California is estimated at more than $18 billion each year with national data showing U.S. costs of over $170 billion. These costs include medical and work loss costs.[9] National data shows that in 2000, on the basis of Medical Expenditure Panel Survey (MEPS) estimates, $64.7 billion was spent treating injuries among the U.S. population. When MEPS percentages were applied to annual medical-spending data provided by National Health Accounts (NHA), injury-attributable medical expenditures nearly doubled to $117.2 billion. Injury-attributable medical expenditures were slightly higher for males ($59.8 billion) than females ($57.4 billion). By age group, NHA expenditures ranged from $5.0 billion for persons aged 20--29 years to $37.9 billion for persons aged 45--64 years. The greatest injury-attributable medical expenditures ($23.3 billion) were for women aged 45--64 years. Expenditures per capita for women were greater than for men in the same age group.[10]

Development of California's Trauma System

In California, state EMS leadership began in 1980 when state law added Division 2.5 of the Health and Safety Code that established the Emergency Medical Services Authority. In the early 1980's, some local EMS agencies such as Los Angeles, Orange, San Diego, and Santa Clara established local trauma care systems. In 1983, Article 2.5 Regional Trauma Systems was added to the Health and Safety Code to allow, but not require, development of local trauma care systems. In September 1986, trauma care regulations (California Code of Regulations, Title 22, Division 9, Chapter 7 -Trauma Care Systems)

[8] Journal of Trauma 2010, Scoop and Run to the Trauma Center or Stay and Play at the Local Hospital: Hospital Transfer's Effect on Mortality, Nirula, Ram MD, MPH, FACS; Maier, Ronald MD; Moore, Ernest MD; Sperry, Jason MD, MPH; Gentilello, Larry MD

[9] WISQARS™ Injury Prevention & Control: Data & Statistics 2005

[10] Centers for Disease Control, Morbidity & Mortality Weekly Report, January 2004; Medical Expenditures Attributable to Injuries --- United States, 2000.

were promulgated to provide minimum standards for local trauma systems and locally designated Trauma Centers. These regulations were updated in August 1999 to reflect standards based on the American College of Surgeons 1999 version of "Optimal Resources for the Care of the Injured Patient".

The American College of Surgeons is a scientific and educational association of surgeons that was founded to improve the quality of care for the surgical patient by setting high standards for surgical education and practice.

State leadership of trauma care is vested in the EMS Authority that provides statewide coordination, guidance, and technical assistance to the local EMS agencies in their development of local trauma systems. This includes:

- Reviewing and approving local trauma plans and annual Trauma System Status Reports
- Promulgating trauma system and Trauma Center requirements
- Facilitating participation in a statewide trauma registry
- Coordinating the activities of the State Trauma Advisory Committee and its subcommittees
- Liaising with other State Departments regarding trauma system issues

The following represent milestones in the development of California's Trauma System:

- **Changes to the Health & Safety code (1983)**
  Changes to the Health & Safety code enabled but did not require the development of local trauma care systems. Local EMS agencies may implement a trauma care system contingent upon meeting minimum regulatory standards, and may formally designate as well as limit the number of hospitals meeting a set of specific requirements as Trauma Centers.

- **The California Code of Regulations, Title 22, Division 9, Chapter 7 - Trauma Care Systems (1986)**
  Regulations for development of the trauma systems were first promulgated in 1986 as part of the California Code of Regulations, Title 22, Division 9, Chapter 7 (Trauma Care Systems). By this time, there were already 28 Trauma Centers, designated by their local EMS agencies, throughout California.

- **Trauma Regulations Updated (1999)**
  Trauma regulations were updated to reflect minimum Trauma Center standards better based on the American College of Surgeons 1999 edition of the "Optimal Resources for the Care of the Injured Patient". These regulations established Pediatric Trauma Centers which currently number fifteen and Level IV Trauma Center standards. As the newest edition of the ACS document is released, California will consider revising the trauma regulations.

- **Implementation of Standardized Reporting (2003)**
  The implementation of standardized reporting criteria for trauma patients to local trauma registries was initiated as required in Health and Safety Code Division 2.5 §1797.199 (k).

- **Governor Schwarzenegger Trauma Directive (2005)**
  Governor Schwarzenegger issued the statement: "I am directing the EMS Authority, informed by its Trauma Advisory Committee, to complete its statewide trauma care plan."

- **Formal Assessment of Trauma Care in California (2006)**
  Under the direction of the EMS Authority Director, the Trauma Advisory Committee completed a formal assessment of trauma care in California, making recommendations regarding state trauma leadership, regionalization, a statewide trauma data system, trauma system funding and education. The resulting report "California Statewide Trauma Planning: Assessment and Future Direction," was signed by Governor Schwarzenegger.

- **Assessments Put Into Action at First State Trauma Summit (2008)**
  Following the recommendations made in the 2006 trauma care assessment, the State EMS Authority convened its first Trauma Summit for trauma stakeholders from around the state. Five Regional Trauma Coordinating Committees (RTCCs) were established based on a local EMS agency survey by the EMS Authority of transport and transfer patterns of injured patients to Trauma Centers. The RTCCs formulated their membership and preliminary goals and objectives and began to meet in late 2008. At this time, there were 65 designated Trauma Centers.

- **System Goals Developed at Second State Trauma Summit (2009)**
  Convened by the EMS Authority, the second statewide Trauma Summit identified five (5) major goals for the State Trauma System.

  1. Establish a structured relationship for the RTCCs with the local EMS agencies and the State EMS Authority
  2. Profile best practices of the RTCCs
  3. Implement a state trauma registry with participation from the local EMS agencies
  4. Write an inclusive State Trauma Plan
  5. Involve non-trauma hospitals in a statewide trauma system.

- **Collection of Data with California EMS Information System (2009)**
  The California EMS Information System (CEMSIS) for the collection and analysis of statewide trauma registry data was established and began to collect data from Trauma Centers around the state. The data standards and inclusion criteria were vetted through a public comment process with final approval by the Commission on EMS.

- **Forum for Regional Trauma Coordinating Committees (2010)**
  The EMS Authority convened the third State Trauma Summit that provided a forum for the RTCCs to report on their projects. The State Trauma Advisory Committee membership was updated to include representation from the RTCCs.

- **State Trauma Summit IV (2012)**
  The fourth Trauma Summit was held in conjunction with the *UCSD Trauma and Resuscitation Conference* and presented information on Trauma System Performance Improvement, Access to Trauma Care and provided an update on RTCC activities. It concluded with an open forum: "Where Do We Go From Here"?

- **State Trauma Summit V (2014)**
  The fifth Trauma Summit was held in collaboration with the Stanford University Medical Center and Santa Clara Valley Medical Center Trauma Symposium. Presentations covered "State of the State", the Affordable Health Care Act, Trauma Performance Improvement: A National Program, and Regional Best Practice presentations.

California Trauma Center Funding

In 1987, the Assembly Office of Research described California's trauma care system as being in a medical and financial emergency, pointing to financial losses experienced by Trauma Centers and a need to financially stabilize trauma care systems. Some hospitals, particularly in Los Angeles, had dropped their Trauma Center designation, citing financial losses. The closure or threatened closure of Trauma Centers in several areas of the state resulted in media attention and policy initiatives to increase state subsidies or develop alternative funding sources. Physicians and hospitals indicated that the root problem of emergency and trauma care issues was the high level of uncompensated care. They believed that appropriate funding for Trauma Centers would ensure continued operation of existing Trauma Centers and lead to the establishment of new Trauma Centers. By keeping Trauma Centers viable, stresses on emergency departments would not be exacerbated.

Most of the efforts in improving California's trauma funding has focused on the direct reimbursement for patient care, with shortfalls in the millions of dollars for some Trauma Centers. Many local EMS agencies utilize the Maddy Fund (Health & Safety Code Division 2.5, Chapter 2.5) to compensate hospitals and physicians for uninsured and under-compensated emergency services, including trauma services for adults and children. Revenues from tobacco taxes are earmarked in part for programs to provide health care services to indigent patients. Only two counties; Los Angeles and Alameda, have developed creative funding for trauma care through assessments on property value.

The Trauma Care Fund (Health and Safety Code §1797.199) was established to provide designated Trauma Center funding for trauma care to uninsured patients. The funds were passed through the local EMS agency for distribution, but funds were only allocated for three years (2002-2005). The Trauma Fund has not been funded since 2005.

California statute (Health and Safety Code 1798.162-166) currently allows local trauma system development but does not create a comprehensive State Trauma System. Initial

funding was allocated to local EMS agencies for local trauma centers with a small amount earmarked for Trauma System development at the local level. No funding was provided for state or regional coordination, oversight, and evaluation of statewide trauma care. While the impact is yet to be seen, healthcare reform may result in payment shifts that may drive new care models and fiscally benefit local and state trauma system efforts.

Over the years, several legislative proposals to provide funding for trauma care have surfaced. Many failed, but some were successful in providing funding for uncompensated care or one-time funding for trauma.

Maddy Fund: The Legislature enacted Chapter 1240, Statutes of 1987, allowing counties to establish a Maddy Emergency Medical Services Fund (Maddy Fund) to compensate health care providers (hospitals and physicians) for emergency services for the uninsured and medically indigent and to ensure the population has continued access to emergency care. Maddy Funds are financed through additional penalties assessed on certain criminal and motor vehicles fines and forfeitures. Although this funding does not specifically provide for trauma care, it can be used for uncompensated emergency care reimbursements. A charge of $2 per $10 is levied on applicable fines, penalties, and forfeitures. Courts collect the penalty assessments or surcharges and forward them to the County. Counties use the initial 10% of these revenues for EMS Fund administration. The remaining 90% is allocated to: 58% Physicians Services Account - payments made to physicians who care for patients who have no insurance coverage or are otherwise unable to pay for the emergency room visit; 25% Hospital Services Account - payments made to hospitals for the provision of emergency care to the homeless, uninsured, or undocumented for trauma and medical care services; 17% Discretionary Account - payments made for other EMS purposes, determined by each county. Physicians can receive reimbursement for up to 50% of their claims whereas hospital and optional costs can be reimbursed up to 100%. Of the money deposited into the fund, fifteen percent shall be utilized to provide funding for pediatric trauma care (Richie's Fund[11]). Many local EMS agencies depend on this funding to carry out mandated statutory responsibilities.

AB 430: AB 430 (Cardenas, Chapter 171, Statutes of 2001), created the Trauma Care Fund and a formula for distribution of funds to local EMS agencies for designated Trauma Centers. From 2002 through 2005 a total of $55 million was provided for Trauma Center funding and $2.5 million was provided for planning and implementing trauma care systems for local EMS agencies without a trauma system plan. No funding has been allocated through this mechanism since 2005.

[11] California Health and Safety Code § 1797.98a: California Code - Section 1797.98a - See more at: http://codes.lp.findlaw.com/cacode/HSC/1/d2.5/2.5/s1797.98a#sthash.AhNKhS9Z.dpuf

Local Data System Funding: Limited funds were made available to local EMS agencies by EMSA as part of the Office of Traffic Safety Grant to modify their local data systems to be compliant with national standards and participate in CEMSIS. The total amount of funding provided from 2009 through 2011 was $1,344,754. There has been no funding available for local systems from this source since 2011.

RTCC Funding: Seed monies were provided to the RTCCs by EMSA to assist in regional summits and conference calls. Each RTCC was offered $10,000 for 2010 and 2011 for regional activities. $7,097 was expended. Due to financial constraints at the state and federal level there has been no funding available from this source since 2011.

Current Organization of Trauma Care in California

The EMS Authority is the state department responsible for developing statewide standards for local trauma care systems and Trauma Centers; providing coordination and leadership for the planning, development and implementation of trauma care systems; and reviewing and approving local trauma care system plans.

The EMS Authority actively engages the State Trauma Advisory Committee (STAC) to assist in coordinating statewide activities. The STAC is comprised of physicians, nurses, administrators and other EMS providers and personnel for the purpose of advising the State EMS Authority Director on matters pertaining to the planning, development, and implementation of the State Trauma System (***Appendix B***). The Chair of the State Trauma Advisory Committee has historically been a senior practicing trauma surgeon, recognized nationally for his/her experience and knowledge of trauma care and trauma systems. In 2009, the committee was reorganized to have broad representation with term limits from the major stakeholder groups in California.

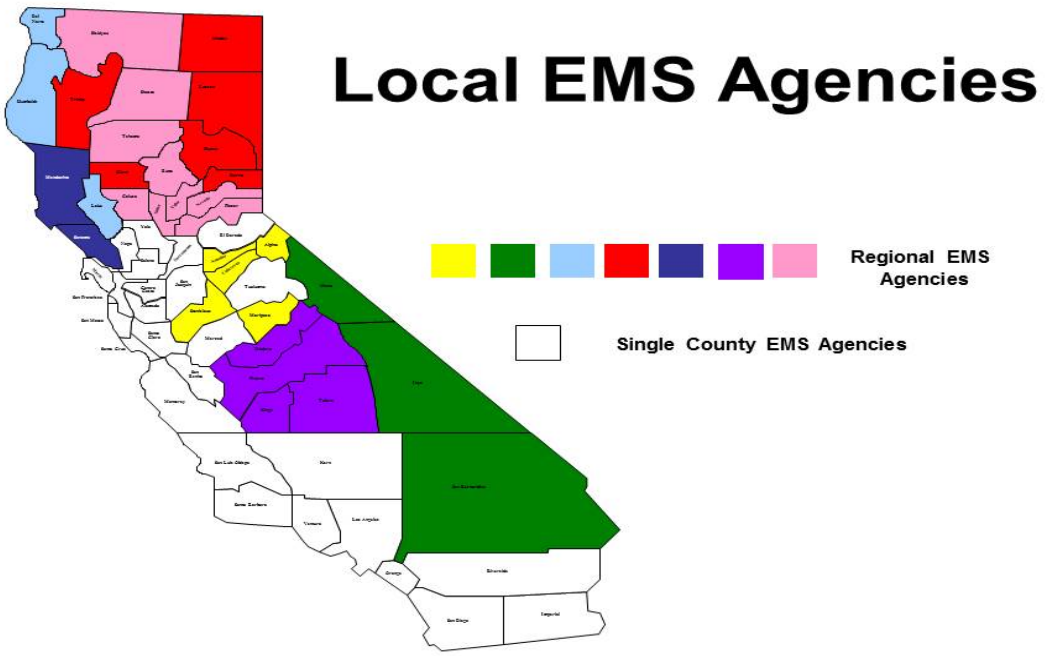


Figure 1

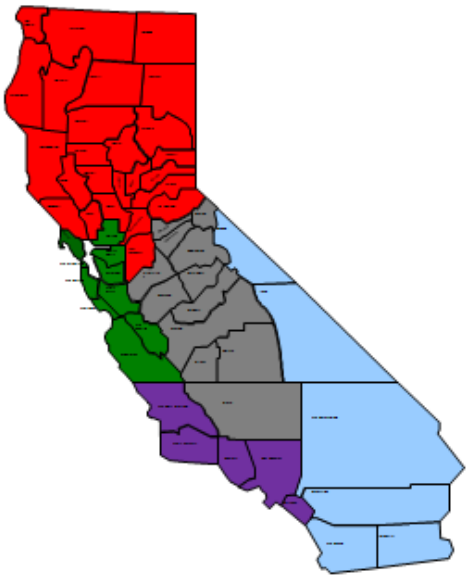
Local EMS Agency

There are currently 33 Local EMS Agencies (Figure 1) within the State of California; 26 are a single county and 7 have a multi-county jurisdiction. The local EMS agency is charged with implementing statute, regulations and local policy for trauma services in their area of jurisdiction ensuring the system components function in concert throughout the continuum of care. The local EMS agency is responsible for:

- Local trauma system plan development and implementation
- Local trauma system policy development
- Trauma Center designation
- Monitoring compliance with contractual agreements in accordance with California statute, regulations and local policy
- Providing Performance Improvement and Patient Safety Programs (PIPS) for ongoing review of trauma system performance and outcomes
- Facilitating a confidential and collaborative local trauma advisory committee
- Maintaining a local trauma database and participating in the State Trauma Registry (CEMSIS-Trauma)
- Participating in injury prevention, public and professional education

Each LEMSA with a Trauma Care System is required by statute and regulation to submit a Trauma Plan for EMSA approval followed by annual Trauma System Status Reports. This Plan is designed to meet state minimum trauma system standards, and address local short and long term trauma system needs. Plans outline the number and level of Trauma Centers and patient destination, but do not necessarily address inter-county needs. All 33 local EMS agencies have approved trauma plans.

Regional Trauma Coordinating Committees



North
North Coast EMS
NorCal EMS
Coastal Valley EMS
Sierra-Sacramento Valley EMS
Napa County
Yolo County
Sacramento County
El Dorado County
San Joaquin County

Bay Area
Marin County
San Francisco County
Solano County
Contra Costa County
Alameda County
San Mateo County
Monterey County
San Benito County
Santa Clara County

Central
Central CA EMS
Mountain Valley EMS
Merced County
Tuolumne County
Kern County

SouthEast
San Diego County
Riverside County
Imperial County
Inland Counties EMS

South West
Los Angeles County
Orange County
Santa Barbara County
Ventura County
San Luis Obispo County

Figure 2

As a result of recommendations made by the STAC and the 2006 *California Statewide Trauma Planning, Assessment and Future Direction* document, five trauma regions were defined by the EMS Authority and corresponding Regional Trauma Coordinating Committees were created in 2008 (Figure 2). These committees include a voluntary membership and are comprised of trauma system providers, local EMS agency staff, and trauma system stakeholders from within each region. The RTCC's are designed to promote regional cooperation, enhance and develop best practices for regional trauma care, and work collaboratively with the State and local EMS agencies in support of the State Trauma System.

Trauma Centers

Trauma Centers are the key element in a trauma system and the focal point for trauma care. Many Trauma Centers participate in state and regional trauma system planning and development. Lead Trauma Centers (Level I and II) contribute administrative and medical leadership, and academic expertise to the system. Many of these lead Trauma Centers, in collaboration with the local EMS agency, engage all other Trauma Centers (Level III and IV), and a few include non-trauma acute care facilities, in the performance improvement process.

As of December 2014 there are 76 designated Trauma Centers (Table 1) in California (***Appendix C.***) It is estimated that over 85,000 trauma patients were transported to Trauma Centers in the state for 2012.

TOTAL TRAUMA CENTERS BY DESIGNATION	
Level I Pediatric Trauma Center Only	2
Level II Pediatric Trauma Center Only	1
Level I Trauma Center & Level I Pediatric Trauma Center	4
Level I Trauma Center & Level II Pediatric Trauma Center	4
Level II Trauma Center & Level II Pediatric Trauma Center	4
Level I Trauma Center	5
Level II Trauma Center	32
Level III Trauma Center	13
Level IV Trauma Center	11
TOTAL:	76

Table 1

Local EMS agencies may designate Trauma Centers that have the capability and willingness to demonstrate a commitment to trauma care based on population needs and meet state trauma regulation requirements. The designation process is locally controlled and may include a hospital site visit by the American College of Surgeon's Verification Review Team or teams developed by the local EMS agency consisting of trauma care experts. Contracts are developed between the local EMS agency and the Trauma Center, and compliance is monitored by the local EMS agency periodically. Trauma Center designations include Levels I – IV and Pediatric Levels I and II. Level I and II Trauma Centers (including Pediatric Trauma Centers) have the greatest number of specialty personnel, services, and resources. Level I Trauma Centers are also research and teaching facilities. Level III Trauma Centers provide a surgical service for patients with less critical injuries which may or may not need surgery. Level IV Trauma Centers provide initial stabilization of trauma patients. Level III and IV Trauma Centers provide secondary transfer to a higher level of Trauma Center care when appropriate.

The participation of all acute care hospitals in the trauma system, providing initial assessment and care with appropriate transfer to Trauma Centers, is also a key component of an inclusive trauma system. Hospitals that are not Trauma Centers will see both patients brought by private transportation as well as patients not initially identified as having severe trauma by EMS transport providers.

System Challenges

There are many challenges and complexities for California related to trauma care, including the vast geographic area of the state with variation in terrain, population density, (Figure 3) diverse EMS cultures, weather, resources, hospital and health facility locations, and the decentralized nature of EMS in the state.

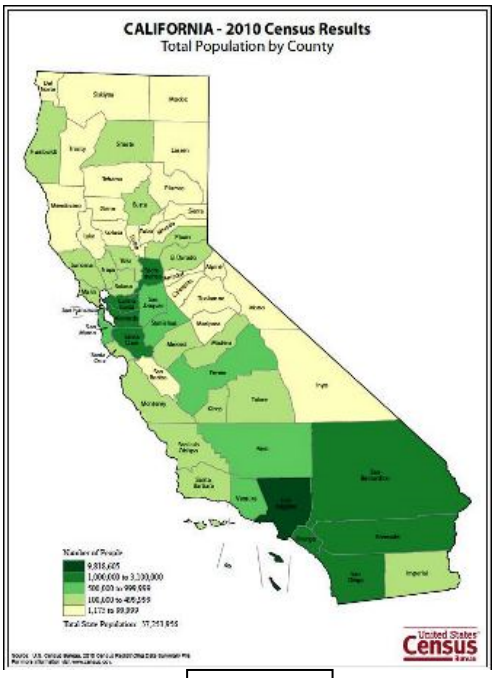


Figure 3

The current trauma care delivery system is an optional, locally based, decentralized trauma system as prescribed in the Health and Safety Code. As a result, trauma care throughout the state is variable. Transportation and access issues exist in varying degrees across the State. Without a statewide system for data reporting, the amount and type of variance are unknown. The issues listed below illustrate some of the variance and transportation and access issues.

- Local System Variations

  - Los Angeles and San Diego Counties have well-established trauma systems that began in the early 1980s with numerous designated Trauma Centers.

- San Mateo County has a coordinated trauma system without a designated Trauma Center, utilizing out-of-county Trauma Centers.

- Monterey County has had an approved trauma plan for many years and is just now in the final stages of Trauma Center designation.

- Rural California

  - The entire northern geographic one-third of the State (counties of the North RTCC as described in Figure 2) has one designated Level I Trauma Center, five Level IIs, nine Level IIIs and eight Level IVs. The higher level centers tend to be in the more populated areas, leaving vast rural and remote sections of the State with no hospitals, few designated Trauma Centers and long transport distances over difficult terrain. Large portions of these areas experience weather extremes, periodic isolation and lack immediately available medical resources.

  - The northern coast of California typically experiences extended patient discovery and transport times due to difficult terrain and winding roads with no air medical resources based within the region. Prompt and efficient transport of patients to higher level Trauma Centers is extended due to distance to urban centers and, as a result, many cases are interfacility transfers. In the more southern portion of the north coast, air medical resources are more readily available resulting in direct transport from the scene to a higher level Trauma Center whenever possible.

  - Geographic areas with gaps in trauma service include Humboldt County, Central California (east of Interstate 5 to the Nevada border including Yosemite), and parts of the Central Coast area including the vacation and college town of Santa Cruz. While transport to a Trauma Center occurs, it requires either use of limited air transport resources or a secondary transfer resulting in delays to definitive care. In addition, these transports remove patients from their community and family support as well as placing additional burdens on the receiving Trauma Center that is already serving its own community.

Trauma Plan: Project Approach and Methods

The State Trauma Advisory Committee (STAC) was tasked by the Director of the EMS Authority to develop a State Trauma Plan. The STAC created an expert writing group for each Plan component to assist in the Plan development. The lead for each group was chosen based on their knowledge of the assigned component. The writing groups reviewed and analyzed information related to current trauma care in the state, including statute and regulations, national standards and guidelines, trauma care costs and losses, and national trauma and emergency care reports to develop recommendations for a State Trauma System.

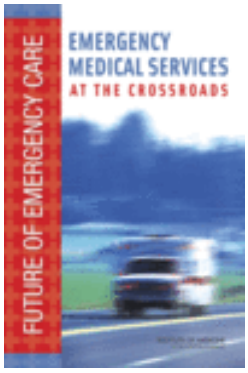
This plan development process included the following:

1. **Review of Current Trauma Care in California**

   Regulations and statutory authority were reviewed to determine the current framework for how trauma care is delivered in California. In addition, this review considered how local optional systems for trauma care delivery in California were developed and the limitations of that approach.

2. **The 2008 American College of Surgeons (ACS) Committee on Trauma "Regional Trauma Systems: Optimal Elements, Integration, and Assessment** offers a guide to assist in trauma system development and implementation in line with the HRSA Model. The California State Trauma Plan is more in line with the context and substance found in the ACS document, taking into consideration HRSA's public health conceptual Model.

3. **Review of the 2006 IOM Report on the Future of Emergency Care in the United States Health System**

   The EMS Authority reviewed the 2006 Institute of Medicine (IOM) Report: **"**The Future of Emergency Care in the United States Health System." The report, released in June 2006, is the first comprehensive look by the IOM at hospital-based emergency and trauma care, emergency medical services, and emergency care for children. The EMS Authority used some of the report's findings in making recommendations contained in this Plan.

4. **Analysis of National Standards for Trauma Care Delivery Systems and How they Relate to California's Trauma Care Needs**

   California's current trauma care system was evaluated based on two nationally recognized authorities in trauma system development. In 2006, the Health Resources and Services Administration (HRSA) revised its previous *Model Trauma Care System Plan* and entitled it *Model Trauma System Planning and Evaluation*.

   This document continues to emphasize the need for a fully inclusive trauma care system. It provides a modern system development guide using the public health approach to the development and evaluation of trauma systems. A primary

Inclusive trauma system - uses all available hospital resources to ensure rapid access to trauma care by prehospital personnel for all injured patients regardless of their geographic location, and will increase surge capacity in a traumatic disaster. The Trauma Center remains the key component in this system; however, all facilities are matched with a patient's needs. Other components include injury prevention, medical examiners and rehabilitation services.

strategy of the public health approach is to identify a problem based on data, devise and implement an intervention, and evaluate the outcome.[12]

The American College of Surgeons' *Regional Trauma Systems: Optimal Elements, Integration, and Assessment* guide takes the concepts from the HRSA document and provides a self- assessment tool for trauma system planning, development and evaluation. In addition, the American College of Surgeons Committee on Trauma's 2006 *Resources for Optimal Care of the Injured Patient* provides detailed descriptions of the organization, staffing, facilities, and equipment needed to provide state-of-the-art treatment for the injured patient at every level of trauma system participation.

The HRSA and ACS documents were consulted in the development of the California State Trauma Plan and provided the major functional components of an inclusive statewide trauma system, which were used to develop the fifteen components in the State Trauma Plan:

1. Administrative Components
   A. Leadership - an identified lead agency with the authority, responsibility and resources to lead the development, operations, and evaluation of the trauma system
   B. System Development – a defined planning process for trauma system development, assessment, and evaluation
   C. Finance – financial forecasting and accountability by the State, local trauma systems, and Trauma Centers

2. Operational and Clinical Components
   A. Prehospital Care
   B. Ambulance and Non-Transporting Medical Unit Guidelines – regulations, medical control, and geographic boundaries for prehospital medical units
   C. Communication System – fully integrated with EMS and emergency/disaster preparedness systems

3. Definitive Care
   A. Trauma Care Facilities – uniform standards for Trauma Center designation; identified role and responsibilities for other acute care facilities
   B. Interfacility Transfer – development of policies and procedures for appropriate and expeditious transfer
   C. Medical Rehabilitation – coordinated post-acute care for trauma patients with permanent or long-standing impairment

4. Information System – timely collection of data from all providers in the form of consistent data sets meeting minimum established standards

5. System Evaluation and Performance Improvement – use data to monitor the performance of the system components

[12] **Model Trauma System Planning and Evaluation,** Health Resources and Services Administration, February 2006.

6. Education and Training – education for all levels of trauma care personnel, both hospital and prehospital as well as public education

7. Trauma System Research – trauma related research to include epidemiologic research in prehospital care, acute care, rehabilitation and prevention

8. Injury Prevention and Control – comprehensive and integrated approach to injury prevention

9. Emergency/Disaster Preparedness – fully integrated with EMS system, local government, private sector and acute care facilities

5. HRSA Model Trauma Guidelines Assessment of California

The **"***2006 Health Resources Services Administration (HRSA) Model Trauma System Planning and Evaluation***"** demonstrates the interrelationship of the core functions, essential services and trauma system benchmarks. It depicts core research that drives the system and essential governance structure that supports system management, system benchmarks that circulate around the core constructs. This model supports assessment, policy development and assurance representing core functions of public health necessary for successful trauma system development.[13] The document also provides an assessment tool to evaluate how California's delivery of trauma care meets the national standards set forth in the document. The document was developed by a group of national experts with input from each state, including California. The intent of the tool is to allow an individual trauma system to identify its strengths and weaknesses, prioritize activities, and measure progress against itself over time. Guidelines are designed to provide trauma care professionals and health policy experts with direction in developing integrated statewide trauma systems focused on a public health model for injury prevention and disability mitigation after injury. The document includes core functions with benchmarks and indicators for planning a statewide trauma system. Each core function in the tool (Assessment, Policy Development, and Assurance) contains a variety of benchmarks. These benchmarks are based, to the extent possible, on current literature on trauma system development. The benchmarks focus primarily on process measures. It is assumed that meeting these process measures should result in improved outcomes.

Using the HRSA document, the Trauma Advisory Committee and the EMS Authority assessed California's current system of trauma care and identified next steps to develop an inclusive and comprehensive State Trauma System. ***Appendix A*** provides California's current status of these benchmarks based on the 2006 Trauma System Assessment Indicators. Although all components of the HRSA assessment are important, because of the nature of California's system, the State Trauma Plan configured the national indicators into fifteen (15) components allowing for a more

[13] **Model Trauma System Planning and Evaluation**, Health Resources and Services Administration, February 2006,

manageable and tailored approach to the implementation of trauma care/system improvements.

6. Surge Capacity Assessment

> *Surge Capacity - health care system's ability to expand quickly beyond normal services to meet the increased demand for medical care in the event of bioterrorism or other large-scale public health emergencies.*

The EMS Authority used the HRSA bioterrorism standards to determine California's readiness related to surge capacity for the care of critical trauma. The HRSA benchmark states that systems shall be established that, at a minimum, can provide triage, treatment and initial stabilization above current daily staffed bed capacity for adult and pediatric patients requiring burn and/or trauma care hospitalization within three hours in the wake of a terrorism incident or other public health emergency. HRSA has established an ad hoc surge capacity target of 500 extra hospital patients per million population in urban areas. To date, this benchmark has not been evaluated independent of general hospital surge capacity. [14]

A trauma/burn bed is much more than an acute hospital bed as it implies that a multidisciplinary trauma team, with trauma care expertise and adequate ancillary support and facilities, is immediately available to perform emergency surgery. Multiple critical trauma and burn patients arriving at a Trauma Center create a unique surge challenge to such a system.

7. Incorporation of the recommendations made in the 2006 *California Statewide Trauma Planning: Assessment and Future Direction*

In addition to the findings from the HRSA assessment, there were three (3) primary recommendations that were cited for the State Trauma System in the 2006 *California Statewide Trauma Planning: Assessment and Future Direction* document. Progress on these recommendations was evaluated, as work continues:

1. Strengthen State Trauma Leadership

The development of trauma systems is not required in statute or regulations; however all 33 LEMSAs have Trauma Plans approved by the EMS Authority. The Annual Trauma Report from each LEMSA must show that the LEMSA is in compliance with its approved Trauma Plan as well as statute and regulations. Since the publication of the *California Statewide Trauma Planning: Assessment and Future Direction* in 2006, fifteen (15) additional Trauma Centers have been designated - a 25% increase.

In 2008, the EMS Authority established five (5) Regional Trauma Coordinating Committees as a method to address gaps and inconsistencies and improve surge capacities. The RTCCs bring together system stakeholders and member LEMSAs to facilitate communication and coordination to minimize variations in practice, and provide

[14] Bioterrorism and Health System Preparedness. Rockville (MD): Agency for Healthcare Research and Quality; Optimizing surge capacity: regional efforts in bioterrorism readiness. Issue Brief No. 4. AHRQ Publication No. 04-P009. Also available from: URL: http://www.ahrq.gov/news/ulp/btbriefs/btbrief4.htm.

regional performance improvement activities to advance the delivery of quality trauma care. Standardization occurs through state coordination, collaboration between RTCCs to support state standards, sharing of best practices, and promoting uniformity of data collection. The EMS Authority participates in each RTCC by providing updates on statewide EMS issues and soliciting feedback on current projects under development. Each RTCC is a subcommittee of the State Trauma Advisory Committee (STAC) and provides representation where RTCC activities are shared and discussed. The STAC provides guidance to the RTCC as needed.

2. Develop Statewide Trauma Registry

The California EMS Information System (CEMSIS) was developed as a demonstration project funded by the Office of Traffic Safety. Data collection at the state level is dependent on the local EMS and trauma data systems managed by the local EMS agencies. Trauma Centers send trauma data into CEMSIS – Trauma either directly or through their local EMS agency (**Appendix E**). From 2009 through 2012, CEMSIS has collected over 250,000 patient care records. The standards for data collection are based on national standards established by the National Trauma Data Bank. In 2013, the State migrated CEMSIS into new data system software. As a result, local EMS agencies are modifying their systems in preparation for submission to the state. Participation is gradually improving over time. **Appendix E** provides aggregate data for the system.

3. Consider Trauma System Funding

Limited funds were made available to local EMS agencies to modify their local data systems to be compliant with national standards and participate in CEMSIS. In addition, seed monies were provided to the RTCCs to assist in regional summits and conference calls. These monies are no longer available due to financial constraints at the state and federal level. There is no dedicated funding for state oversight of the State Trauma System.

State Trauma System Strategies and Policy Directions

Based on the HRSA benchmarks (Figure 4) and a current evaluation of California's trauma system, utilizing the American College of Surgeon's trauma system guidance document, the following 15 components outline the future policy recommendations to continue the successful development and implementation of an effective State Trauma System. Details on the proposed development for each component are found in ***Appendix D.***

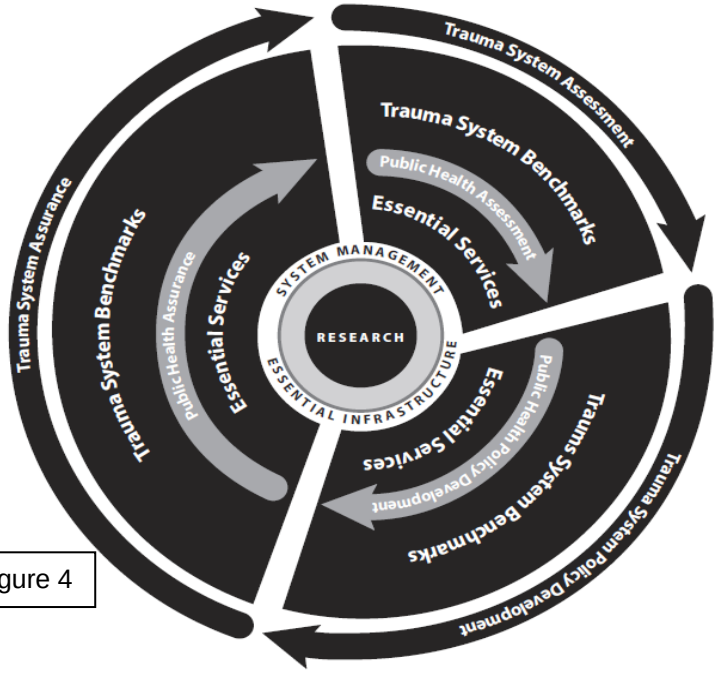


Figure 4

1. State Leadership – HRSA
Benchmark #202 (200 series: policy development). *Trauma system leaders use a process to establish, maintain, and constantly evaluate and improve a comprehensive trauma system in cooperation with medical, professional, governmental and citizen organizations. This requires strong state leadership.*

Barriers
Under the current statutory and regulatory framework, trauma is an optional local program, and the EMS Authority has limited authority to develop a statewide trauma system. The EMS Authority has insufficient staff or central resources to coordinate a statewide trauma system. Limited resources at the state level mean that there is limited oversight of the locally based systems including lack of comprehensive regional and statewide performance analysis to assess such issues as field triage and timely access to care. While California's decentralized approach to EMS permits flexibility, and the tailoring of EMS practices to local needs, it has also led to variability in these practices in some areas of the state that can negatively affect the delivery of trauma care.

Opportunities
Local EMS agency and State EMS Authority leadership remains essential to the overall success of the State Trauma System. The creation and development of Regional Trauma Coordinating Committees (RTCCs) represent a principal change in the structure of the trauma system, including the composition of the State Trauma Advisory Committee (STAC) that now includes regional representatives from each RTCC.

The RTCCs do not replace local EMS agencies or supplant the authority that EMS agencies currently maintain over EMS and trauma systems, but should have State support to build upon existing local EMS jurisdictions to address challenges of access, geographic isolation, coordination and optimal distribution of trauma care resources, and funding of out-of-county patients.

A regional structure, supported by the local EMS agencies and RTCCs encourages optimal sharing of resources and information. Patient flow patterns, provisions for uncompensated care, and quality of care are improved through optimal sharing of resources throughout the region. The State Trauma Advisory Committee and the EMS Authority promote interregional standardization.

> **Goal:** The EMS Authority provides coordination, guidance, and assistance to the local EMS agencies and RTCCs to enhance the consistency of trauma-related standards and guidelines throughout the state and improve the overall quality of trauma care
>
> **Objectives:**
>
> 1. The State will encourage the collaborative efforts of the counties to support and share resources for a regionally-based trauma system.
> 2. The EMS Authority will work with the local EMS agencies, STAC and the RTCCs to develop a consensus compendium of trauma-related policies, procedures, and clinical guidelines that may be shared throughout the state.

3. Local EMS agencies will develop local trauma plans in the context of regional trauma care with input from Trauma Centers and RTCCs.

2. System Development – HRSA Benchmark # 203 (200 series: policy development). *The state lead agency has a comprehensive written trauma system plan based on national guidelines. The plan integrates the trauma system with EMS, public health, emergency preparedness, and emergency management. The written trauma system plan is developed in collaboration with community partners and stakeholders.*

Barriers
Since trauma system development is optional and the commitment to advanced trauma care by an existing facility with the population to support it is necessary, there is a wide range of trauma system models in California. The variance runs from local EMS agencies with well-established trauma systems with designated Trauma Centers at various levels to local EMS agencies that have limited implementation of the plan or no designated Trauma Centers. The ability to help coordinate trauma system activity and facilitate related interactions among all the local EMS agencies by the EMS Authority and STAC has historically been limited.

Opportunities
The local EMS agency may assist the State in providing for a comprehensive analysis of trauma resources throughout the State including access-to-care assessment. The STAC may provide guidance and coordination for specific RTCC activities and projects with statewide implications.

Goal: Develop an inclusive statewide trauma system that assures timely access to an appropriate level of care for all individuals following major injury.

Objectives:

1. Conduct a systematic review of local trauma plans in the context of this State Trauma Plan and the structures and processes it outlines.
2. Develop processes and mechanisms for ensuring optimal access and care to special populations; for example, pediatric populations.

3. Trauma System Finance – HRSA Benchmark #204 (200 series: policy development) and #309 (300 series: assurance). *The financial aspects of the trauma systems are integrated into the overall quality improvement system to assure ongoing "fine-tuning" and cost-effectiveness.*

Barriers
Currently, there is limited statewide funding to support trauma systems, Trauma Centers or emergency/trauma care. At times, legislation has been proposed to identify funding through levying taxes or fees on products associated with trauma, (i.e. alcohol, ammunition, firearms). However, these efforts have not been successful. The Tobacco Tax in 1990 was the last successful tax for uncompensated care. However, the majority of these funds have been redirected to other programs at the State, and the limited remaining funds do not go to the organization, coordination, and development of the

system. The lack of standardized data collection across the State leads to limited assurance that trauma care is being provided in a cost effective and efficient manner.

There are three areas where funding is needed to develop an effective State Trauma System:

Support for uncompensated care
At this time, there are insufficient data to analyze the fiscal status of our trauma system. Trauma system providers express widespread belief that additional trauma center funding is required. However, until financial data are collected consistently statewide, no analysis can be made. Health and Safety Code §1797.199 created the Trauma Care Fund for the purposes of compensating Trauma Centers for high percentages of uninsured patients. This fund has not been appropriated since 2005. As more patients obtain coverage through the Affordable Care Act, the magnitude of uncompensated care will need to be studied under changing payment mechanisms.

Support for state and local agency administration of the program – Under current law, some local EMS agencies receive only a percentage of existing funds (Tobacco, Maddy, etc.) to support administrative, hospital and physician costs. Some LEMSAs support local trauma system administrative and data costs through Trauma Center designation fees. There are currently insufficient funds to support trauma system mandates to meet national standards. In addition, system requirements for performance improvement and evaluation for efficiency and efficacy necessitate stable funding for ongoing efforts including the availability of post-discharge outcome data from rehabilitation facilities. Funds necessary may prove to be minimal in comparison to other business expenses and can be highly leveraged in improvement of the system and improved outcomes. In order to support a change to existing funding statute, additional analysis would be needed.

Increase participation of community hospitals in the trauma system – Funding to increase the participation of community hospitals would help develop regional trauma care capacity. Within coordinated regional trauma care systems, a portion of the amount received by the local EMS agency for trauma system management could be made available for developing system capacity and creating incentives to ensure an inclusive trauma system.

Opportunities
There is a need to align the elements of the California's State Trauma System with the anticipated requirements for federal trauma funding under the Patient Protection and Affordable Care Act. The Affordable Care Act reauthorizes and improves the trauma care program by providing grants, administered by the Health and Human Services Secretary, to states and Trauma Centers to strengthen the nation's trauma system.

The prerequisites for some of this funding may include the establishment of tracking communications systems and participation in the National Trauma Data Bank. The amount of grant funding described in the federal law is unknown and is likely to be very limited after distribution among 50 states.

Goal: The State EMS Authority, in collaboration with the STAC, local EMS agencies, and RTCCs, to explore the feasibility of a State Trauma System Business Plan to identify the system's current financial status, perform a needs assessment to identify specific aspects of the system that need funding, and identify opportunities for future trauma system funding. It is important to recognize that dollars spent on infrastructure are paid back with high performance and quality of care.

Objectives:

1. Identify critical Trauma System components and the cost to develop and maintain.
2. Work with researchers and hospitals to establish a basis for estimating the actual cost for trauma care in California
3. Identify sustainable funding sources to support regional infrastructure and planning.

4. EMS System: Prehospital Care – HRSA Benchmark #302 (300 series: assurance). *The trauma system is supported by an EMS system that includes communication, medical oversight, prehospital triage, and transportation; the trauma system, EMS system, and public health agency are well integrated.*

Barriers

Trauma triage and destination policies often reflect the availability of trauma services within a specific community. With varying availability of resources, along with dense and sparse populations there is variation in trauma triage criteria and destination determinations. The study of under and over triage has been limited due to differing triage policies and definitions.

Opportunities

The Centers for Disease Control and Prevention and the American College of Surgeons Committee on Trauma have developed national trauma triage guidelines. These guidelines have been adopted by many of the local EMS agencies both locally and regionally through RTCC collaboration.

Goal: Develop a minimal statewide standard for the triage of trauma patients to enable study of under and over triage.

Objectives:

1. Utilize the most current national standard for prehospital triage as the foundation for prehospital trauma triage guidelines. Based on specific environments (e.g. urban vs. rural) and presence or absence of Trauma Center resources, some local modifications may be required.
2. Develop definitions to study over and under triage with a mechanism to track on a regional basis.

3. Work with OSHPD in obtaining specified data from non-trauma facilities on major trauma patients transported to the facility and not transferred.
4. Adopt standards for transfer of documented information from field units to receiving hospitals with the goal that prehospital care reports be made available as part of the medical record for all trauma patients.
5. Explore the need for minimal special population field trauma triage criteria, e.g. pediatric and geriatric.
6. Develop EMS protocol guidance for field trauma care

5. EMS System: Ambulance and Non-Transporting Medical Units – HRSA Benchmark #302 (300 series: assurance). *The trauma system is supported by an EMS system that includes communication, medical oversight, prehospital triage, and transportation; the trauma system, EMS system, and public health agency are well integrated.*

Barriers

Non-transporting prehospital medical units are configured in various ways throughout California. In urban regions, it's common for non-transporting units to be fire apparatus staffed by EMT or paramedic level personnel. Rural areas (including state and federal parks, forests, and beaches) may have staff cars or rescue units in various configurations and capabilities staffed with trained first responders, EMTs, or in some cases paramedics. Organized search and rescue teams also fit the category of non-transporting EMS units. Because of the diverse population and environmental challenges in California, response and transport times for EMS units vary significantly from area to area.

Opportunities

National recommendations have been developed for standards for equipment inventories of EMS resources. The EMS Authority enforces EMS Aircraft regulations and publishes statewide Prehospital EMS Aircraft Guidelines.

Goal: Provide a minimum standard and align the use of ground vs. air resources for the transport of trauma patients to the closest appropriate level of Trauma Center that is equipped and staffed to best meet the needs of the injured patient.

Objectives:

1. Develop minimum prehospital equipment inventory for non-transport/transport EMS units specific to trauma needs.
2. Recommend air resource utilization guidelines applicable state-wide including access to air resources.

6. EMS System: Communications – HRSA Benchmark #302 (300 series: assurance). *The trauma system is supported by an EMS system that includes communication, medical oversight, prehospital triage, and transportation; the trauma system, EMS system, and public health agency are well integrated.*

Barriers
The current 911 alert system is slow to advance with communication technology and has limited integration with cell phones or internet-based communication methods. Many small dispatch centers and rural regions are without priority dispatch or protocols.

Opportunities
Performance Improvement and Patient Safety Programs (PIPS) and processes are found in systems utilizing Emergency Medical Dispatching (EMD). Opportunities exist to expand the implementation of PIPS in dispatch centers regardless of implementation of an EMD program.

> **Goal:** Standardized communications to be coordinated between all EMS systems on a given incident, utilizing current technology, to notify the trauma care team of essential information on the injured patient and ensure appropriate destination decisions are made.
>
> **Objectives:**
>
> 1. Develop guidance for priority dispatch protocols for trauma and investigate process changes that improve dispatch effectiveness while improving outcomes.
> 2. Study the hospital alert systems currently in place to identify hospital capability, capacity, and specialty care availability (e.g., burns, pediatrics,) and complete a gap analysis.

7. Definitive Care: Acute Care Facilities – HRSA Benchmark #303 (300 series: assurance). *Acute care facilities are integrated into a resource-efficient, inclusive network that meets required standards and that provides optimal care for all injured patients*
.

Barriers
There are currently 345 acute care facilities with emergency departments in the state of California. Of these, 76 are designated Trauma Centers. Twenty-two California counties currently have no designated Trauma Centers within county lines. The process by which a non-trauma facility applies for and achieves formal local EMS agency designation, as well as the process for re-designation varies throughout the state.

Opportunities
The State Trauma System with respect to its acute care facilities should strive towards universal access to basic trauma care throughout the state, make every effort to ensure timely access to definitive care regardless of the type and severity of injury, ensure that designated centers maintain capabilities commensurate with their level of designation, and improve the consistency of processes related to initial and recurring designation.

> **Goal:** Develop a network of acute care facilities intended to ensure universal access to the appropriate level of trauma care.

Objectives

1. Develop guidelines outlining a process for the assessment of Trauma Center compliance with CCR Title 22, Chapter 7.
2. Outline the responsibilities and expected participation in the trauma system for non-designated acute care hospitals.

8. Definitive Care: Re-triage[15]Interfacility Transfer – HRSA Benchmark #303 (300 series: assurance). *When injured patients arrive at a medical facility that cannot provide the appropriate level of definitive care, there is an organized and regularly monitored system to ensure the patients are expeditiously transferred to the appropriate, system-defined trauma facility.*

Barriers

The frequency, location, and severity of related injuries involved with re-triage and inter-facility transfer within the state are largely unknown. Obstacles to transfer and re-triage include lack of a proximally located Trauma Center, lack of knowledge regarding the capacity and capabilities of potential receiving centers, fear regarding EMTALA violation, local geographical and climatic obstacles to transportation (e.g. remote location, mountains, fog, etc.), or transportation availability.

Opportunities

Re-triage / Interfacility Transfer (IFT) protocols have been developed in several areas in the state, but are not in widespread use, and their effectiveness has just begun to be monitored.

Goal: Develop mechanisms, processes, and guidelines that will optimize timely access to trauma care at a level commensurate with the severity of injury, regardless of geographic location.

Objectives:

1. Capture re-triage and IFT data in CEMSIS for statewide analysis and develop a map of re-triage and IFT traffic within the state.
2. Explore the development of centralized re-triage/transfer coordination within the state.
3. Assist in the development of regional cooperative arrangements between sending and receiving centers that will facilitate re-triage, reduce delays, and ensure that patients are re-triaged to an appropriate level of care.

9. Definitive Care: Rehabilitation – HRSA Benchmark #308 (300 series: assurance). *The lead agency ensures that adequate rehabilitation facilities have been integrated into the trauma system and that these resources are made available to all populations requiring them.*

[15] *For purposes of this document, re-triage means the immediate evaluation, resuscitation and transport of a seriously injured patient from a lower level trauma facility or NTC to a designated Trauma Center at a higher level of care. This process involves direct ED to ED transfer of patients that have not been admitted to the hospital. Interfacility transfer (IFT) refers to the transfer of an admitted patient, under the care of an admitting physician-of-record, from one facility to another.*

Barriers
California regulation Title 22 currently contains specific requirements for early rehabilitation involvement and the utilization of physical, occupational, and/or speech therapies for the trauma patient, some of which may be provided through a written transfer agreement. Most rehabilitation facilities are independent facilities and the degree of integration into the trauma system varies considerably. In addition, the degree of access to level-of-care post-injury rehabilitation throughout the state is unknown.

Opportunities
The rehabilitative needs of trauma patients in the context of a statewide system of care should be systematically addressed using acceptable standards.

> **Goal:** Develop a plan to assess the availability and capabilities of rehabilitation facilities in the state and integrate them into the regional planning and performance improvement process.
>
> **Objectives:**
>
> 1. Improve the data collection for evaluation of rehabilitative needs and degree of access to rehabilitation throughout the state
> 2. Adopt a standardized measure of functional recovery suitable for use throughout the trauma system

10. Information System – HRSA Benchmark #101(100 series: assessment). *There is a thorough description of the epidemiology of injury in the system jurisdiction using both population-based data and clinical databases.*

Development of a statewide trauma data system is imperative to improving and continuously monitoring the State Trauma System. Data is necessary to assess performance, quality, utilization and prevention, benchmark against existing national standards, and to inform future policy decisions and directions.

Barriers
With the exception of the counties included in the multi-county EMS agencies, participation in CEMSIS by local EMS agencies is inconsistent. CCR Title 22 §100257 states that "*trauma data shall be integrated into the local EMS agency and State EMS Authority data management system*" and "*all hospitals that receive trauma patients shall participate in the local EMS agency data collection effort…"* While these regulations exist, compliance with this requirement from local EMS agencies and non-trauma facilities is disparate. In addition, data elements and their definitions vary among local EMS agencies, and thus interpretation of outcomes or processes is inconsistent. In the absence of statewide trauma system data, including financial data, a reliable assessment of system performance and determination of additional system resource needs is imprecise.

Opportunities
The State Trauma Registry should be linked with the EMS Data System (prehospital care data) to create a robust program in support of the EMS system core measures. In addition, the system should be expanded to include a minimal dataset data set from non-trauma facilities. There should be a process to evaluate the quality, timeliness, completeness, and confidentiality of data.

Goal: Establish linkages of databases to create a complete patient record.

Objectives:

1. Improve data sharing
2. Improve data quality and compliance
3. Evaluate data validity

11. System Evaluation and Performance Improvement – HRSA Benchmark #301(300 series: assurance). *The trauma management information system is used to facilitate ongoing assessment/analysis and assurance of system performance and outcomes and provides a basis for continuously improving the trauma system including a cost-benefit analysis.*

Barriers
The role of the RTCCs in overall system performance improvement is still being developed. Participation by non-trauma facilities in the local trauma system Performance Improvement and Patient Safety Program, including contributing data to the LEMSA's trauma registry, is inconsistent across local EMS agencies. Without consistent metrics to measure performance across the LEMSA boundaries effectiveness of a statewide system cannot be demonstrated.

Opportunities
In order to evaluate the State Trauma System, the continuum of care from dispatch to prehospital to hospital disposition must be connected through a data system. Only then can we begin to understand how care provided translates to improved outcomes and system effectiveness.

Goal: A PIPS Program to be developed by The EMS Authority in collaboration with the local EMS agencies and RTCCs to evaluate statewide trauma system performance.

Objectives:

1. In collaboration with the local EMS agencies, and with the participation from the RTCCs, formulate a statewide comprehensive Trauma Performance Improvement and Patient Safety Plan consistent with the elements of the State Trauma Plan. Utilizing State Trauma Registry data:
   a) Measure performance and quality through the development and analysis of system-wide performance improvement standards that are applicable statewide.

b) Develop methodologies for outcomes analysis, using both registry data and Office of Statewide Health Planning and Development hospital and emergency department discharge data and medical examiner/coroner data.

c) Promote case-based performance improvement whereby sentinel events relative to trauma system deficiencies are identified.

d) Develop a methodology to assess over and under triage to support evaluation of field triage protocol.

2. Perform a comprehensive statewide assessment of the State Trauma System based on national standards and California-specific resources. One key objective is to identify opportunities for performance improvement.
3. Evaluate state data, identify regional opportunities for improvement, determine if similar opportunities are occurring in other regions, and explore mechanisms for shared resolution.
4. Create a policy regarding the sharing of data for the PI process, recognizing hospital confidentiality and HIPPA regulations.
5. Benchmark individual systems, hospitals, local EMS agencies and RTCCs to the group as a whole and to an outside standard including a comparative analysis of risk-adjusted outcomes.

12. Education and Training – HRSA Benchmark #105 (100 series: assessment), #205 (200 series: policy development) and #310 (300 series: assurance). *Education for trauma system participants is developed based on a review and evaluation of trauma data. In cooperation with the prehospital certification and licensure authority, set guidelines for prehospital personnel for initial and ongoing trauma training including trauma-specific courses and those courses that are readily available throughout the State. An assessment of the needs of the general public concerning trauma system information should be conducted.*

Barriers

No formal public education process exists for trauma systems. Private and public surveys indicate that the general public regards all hospitals as Trauma Centers and few can indicate where their closest Trauma Center is located; furthermore, many citizens are not aware that the EMS system is the best avenue to receive trauma care.

Education and training of trauma care professionals is compartmentalized into prehospital, nursing, and physician education with limited trauma systems education.

Opportunities

State, regional and local education needs should be identified, and resources readily available to meet those needs. Guidance for education competencies should exist, and each region's individual educational offerings should address local needs.

Goal: Identify statewide educational needs through the Performance Improvement and Patient Safety Program in consultation with the community, EMS providers, hospitals, local EMS agencies and RTCCs.

Objectives:

1. Develop a plan for providing information to the public regarding the structure and function of the State Trauma System.
2. Perform a needs assessment prior to developing new or additional trauma-related professional educational programs.
3. Encourage the use of the ACS Rural Trauma Team Development Course, video conferencing, online education, and telemedicine connections between non-trauma facilities and lower level Trauma Centers with higher level Trauma Centers.

13. Research – HRSA Benchmark #301 and #306 (300 series: assurance). *A process is in place to facilitate the access to data for evaluation and research. The trauma system has developed mechanisms to engage the general medical community and other system participants in their research findings and performance improvement efforts.*

Barriers
Most research projects are being conducted by single institutions or agencies and are not utilizing the opportunities of collaborative, multidisciplinary research.

Opportunities
Trauma system research involving both local and state agencies should be part of local/regional trauma system.

Goal: The CEMSIS, local EMS agencies, and Trauma Centers should become the basis for collaborative systems research.

Objectives:

1. Develop a research agenda (possibly through a local research committee) and collaborate with established investigators to conduct research projects.
2. Periodically review trauma system data derived from CEMSIS, OSHPD and other sources, and make a recommendation to various system stakeholders regarding potential areas of research.

14. Injury Prevention – HRSA Benchmark #203 (200 series: policy development). *A written injury prevention and control plan is developed and coordinated with other agencies and community health programs. The injury program is data driven, and targeted programs are developed based on high injury risk areas. Specific goals with measurable objectives are incorporated into the injury plan.*

Barriers
Statewide injury control in California has been established primarily under the direction of the Department of Public Health; however the EMS Authority recognizes the need to interface these efforts and with state trauma system objectives.

Opportunities
Recommend the application of the public health model in reducing trauma and subsequent injuries by applying basic public health principles and guidelines to identify risk factors and help develop and choose prevention strategies that are comprehensive. It is important to know which injury prevention strategies are proven effective, and those that are less effective, in order to have the greatest impact.

Goal: Improve coordination and utilization of public health and trauma systems injury prevention resources at the state, regional and local levels.

Objectives:

1. Develop a compendium of regional injury prevention programs.
2. Collaborate with the Department of Public Health to evaluate, implement, and determine the effectiveness of initiatives to reduce intentional and unintentional injuries.

15. Emergency/Disaster Preparedness – HRSA Benchmark #203 (200 series: policy development). *The trauma system plan has established clearly defined methods of integrating with emergency preparedness plans (all hazards).*

Barriers
Funding from HRSA and FEMA is limited to assist Trauma Centers in preparing for the next inevitable event when they are already under economic duress. There is inconsistent coordination of Trauma Centers with disaster response planning to utilize the specialty resources of the trauma system.

Opportunities
The EMS Authority and trauma system can advocate utilizing federal hospital preparedness funds, emphasizing the integration of the trauma system into the statement of work. Funds may be used to assess the trauma system's emergency preparedness including coordination with the public health agency, EMS system, and the emergency management agency. Funding through the Affordable Care Act for States, when appropriated, can serve to improve pre-hospital and trauma care at a regional level on a day-to-day basis and could have implications for surge management and regional disaster response.

Goal: Ensure the State Trauma Plan is integrated with, and complementary to, the comprehensive mass casualty plan for natural and manmade incidents, including an all-hazards approach to planning and operations.

Objectives:

1. Incorporate the role of the trauma system in the California Public Health and Medical Emergency Operations Manual.

2. Develop a recommended inventory for a trauma cache to be utilized at Trauma Centers in the event of a disaster.
3. Plan for trauma system surge capacity in collaboration with local Public Health and Emergency Health Management, depending on disaster risk assessment.

Priorities for State Trauma System Objectives

The following priorities are based on the State Trauma System strategies and policy direction:

1. Strengthen State Trauma Organizational Structure and Leadership

(Goal 1: State Leadership; Goal 2: System Development)

The State should explore mechanisms within existing state rules and available funding to increase resources to support its State Trauma System. The EMS Authority's infrastructure should have appropriately trained personnel in Trauma System development to provide management and evaluation of the system in collaboration with the State Trauma Advisory Committee, LEMSAs, and Regional Trauma Coordinating Committees (RTCC).

While California's regional structure is currently not formally recognized in statute or regulations, the RTCCs are well established. They provide for regional needs assessments and set priorities based on the results that encourage optimal sharing of resources to improve access to quality trauma care throughout their regions. To move forward, the RTCCs, LEMSAs and the EMS Authority should work towards standardization within the region as well as inter-regionally were appropriate.

2. Examine Trauma System Funding Options

(Goal 3: Trauma System Finance)

There are three areas where funding is needed to develop an effective State Trauma System:

I. <u>To provide support for state, regional, and local administration of the trauma program</u>

Neither state nor local agencies currently receive state general funds to support administrative development and oversight of the State Trauma System. State funding is dependent in part on the Preventive Health and Health Services Block Grant, which has been targeted for elimination from the President's budget for the past three years. There are other time-limited grants to support data and performance improvement activities. Permanent funding sources are necessary to maintain and advance the State Trauma System.

Local systems receive only a small percentage of existing funds (Tobacco, Maddy, Richie) to support administrative costs. The majority of these funds are applied to trauma care reimbursement. Many local EMS agencies receive designation fees from the Trauma Centers which may be applied to trauma

system costs. Two local EMS agencies receive monies from property taxes to support the trauma system. Stable funding sources are desirable at the local level to maintain essential trauma systems.

II. To help increase system participation by community hospitals
An inclusive State Trauma System requires the participation of all acute care facilities to increase trauma care capacity and to collect and analyze essential data. Some hospitals have limited resources to provide a level of trauma care needed for the critically injured who arrive at their facility. Financial support for these facilities would facilitate an inclusive system and a regional approach to trauma care. Specifically it would provide a coordinated process to stabilize and transfer trauma patients to the level of care commensurate with their injuries. The exchange of data and participation in local and regional performance improvement by all facilities that receive trauma patients advances the system and provides the tools to improve care.

III. Support for Uncompensated Care
At this time, there are insufficient data to determine if additional funding for indigent patient care is needed and at what level to cover uncompensated trauma care. The state should work with researchers and hospitals to establish the basis for estimating the actual cost of trauma care in California. In addition, the effect of the Affordable Care Act on trauma care reimbursement should be studied to determine the future impact of uncompensated care with payment shifts driving new care models and changing payment mechanisms. Decreasing reimbursement may cause some Trauma Centers to downgrade or de-designate. Alternatively, the formation of Medicare Accountable Care Organizations may stimulate interest in Trauma Center designation to keep patients within the service network.

3. Establish a Statewide Performance Improvement and Patient Safety (PIPS) Program *(Goal 11: System Evaluation and Performance Improvement)*

A PIPS Program is a structured effort by the State Trauma System to demonstrate a continuous process for improving care for injured patients. The State should provide the leadership necessary to coordinate the PIPS program supported by a reliable method of data collection that consistently obtains valid and objective information necessary to identify opportunities for improvement. The PIPS method involves guideline development, process assessment, process correction, and monitoring for improvement. The California PIPS program would be characterized by:

- Authority and accountability for the program
- A well-defined organizational structure
- Appropriate, objectively defined standards to determine the quality of care
- Explicit definitions of outcomes derived from relevant standards where available

Patient safety is inseparable from the PIPS process and underscores an important program goal. The patient safety process will direct its efforts at the environment in which care is given, and the PIPS process will be directed at the care itself.

4. Design the State Trauma Registry to support the PIPS Program
(Goal 10: Information System)

Development of a statewide trauma data system is imperative to improving and continuously monitoring the State Trauma System. Data is necessary to assess performance, quality, utilization and prevention, benchmark against existing national standards, and to inform future policy decisions and directions. The State Trauma Registry should be linked with the EMS Data System (prehospital care data) and hospital emergency medical record to create a robust program in support of the EMS system core measures. In addition, the system should be expanded to include a minimal data set from non-trauma facilities.

The National Trauma Data Standard (NTDS) has served as a key mechanism to assess trauma centers. The State Trauma Registry should utilize NTDS as well as additional data elements which will serve to assess trauma system function in the state.

APPENDICES

Appendix A: HRSA/EMSA Benchmark Status

Spreadsheet showing HRSA Benchmarks from the 2006 Model Trauma System Planning and Evaluation document and how California is currently meeting each benchmark.

Appendix B: State Trauma Advisory Committee Membership

Listing of STAC membership with associated affiliation.

Appendix C: Designated Trauma Centers

Listing of current designated Trauma Centers with Level of designation noted.

Appendix D: State Trauma Plan-Planned Development

The functional components of the Statewide Trauma System are divided into 15 components. Each component contains two parts: 1) Background and Current Status; a brief description of the existing component and 2) Planned Development; a listing of objectives outlining how the component is expected to develop over the next 3-5years. At the end of the Assessment there is a matrix summary of objectives per component and assigned responsibility (Appendix D-2).

Appendix E: Trauma System Data Reports

A compendium of aggregate data reports obtained from the submitted data into CEMSIS-Trauma.

Appendix F: Trauma System Research

A selection of trauma system articles reflecting national and California research on trauma system development.

Appendix G: Scudder Oration

The Scudder Oration on Trauma was presented by Brent Eastman, MD, FACS at the American College of Surgeons 95th Annual Clinical Congress in Chicago, Illinois, October 2009. Much of the oration surrounds the development of trauma systems with specific reference to California.

APPENDIX A: System Assessment & Summary

Each indicator from the 2006 HRSA *Model Trauma System Planning and Evaluation* document was evaluated and a 2013 status is provided. Prioritization is as follows: Short Term (within 1 year); Intermediate (within 3 years); and Long Term (3-5 years)

Priority	#	Benchmark	Solution	Status
Short Term	102	There is an established trauma management information system for ongoing injury surveillance and system performance assessment.	Trauma Registry	Met ☒ Partially Met ☐ Majority Met ☐ Not Met ☐ The California EMS Information System (CEMSIS) was created as a demonstration project funded by the Office of Traffic Safety. As of August 2014, 16 of the 26 LEMSAs with designated Trauma Centers were submitting data totaling 52 of the 76 designated Trauma Centers.
Short Term	201	Comprehensive state statutory authority and administrative rules support trauma system leadership and maintain trauma system infrastructure, planning, oversight, and future development.	State Leadership & Coordination	Met ☐ Partially Met ☐ Majority Met ☒ Not Met ☐ The EMS Authority has legislative authority to manage the State Trauma System. In 2008 a regional infrastructure composed of five (5) Regional Trauma Coordinating Committees was established building upon the local EMS agency structure. The

Priority	#	Benchmark	Solution	Status
				development of standardized policies for regions is in process in varying degrees in the regions.
Short Term	202	Trauma system leadership (lead agency, trauma center personnel, and other stakeholders) is used to establish, maintain, and constantly evaluate and improve a comprehensive trauma system in cooperation with medical, professional, governmental, and citizen organizations.	State Leadership & Coordination	Met ☐ Partially Met ☐ Majority Met ☒ Not Met ☐ The State Trauma Advisory Committee is advisory to the Director of the EMS Authority. Membership is multidisciplinary and provides overall guidance to trauma system planning. The draft State Trauma Plan provides a decision-making process for system issues with measurable goals and objectives.
Short Term	203	The state lead agency has a comprehensive written trauma system plan based on national guidelines. The plan integrates the trauma system with EMS, public health, emergency preparedness, and emergency management. The written trauma system plan is developed in collaboration with community partners and stakeholders.	State Leadership & Coordination	Met ☐ Partially Met ☐ Majority Met ☒ Not Met ☐ The draft State Trauma Plan integrates EMS, public health, emergency preparedness and emergency management and was developed in collaboration with trauma system partners.

Priority	#	Benchmark	Solution	Status
Short Term	204	Sufficient resources exist, including those both financial and infrastructure related support, system planning, implementation, and maintenance.	Trauma System Funding	Met ☐ Partially Met ☐ Majority Met ☐ Not Met ☒ Due to ongoing budget constraints, improving the financial support of the State Trauma System was not feasible. Federal Block Grant funding continues to support state trauma program staff. Benchmark will be moved to Long Term priority.
Short Term/ Ongoing	103	A resource assessment for the trauma system has been completed and is regularly updated.	State Leadership & Coordination	Met ☐ Partially Met ☒ Majority Met ☐ Not Met ☐ Many of the Regional Trauma Coordinating Committees have either completed or are working on a resource assessment for their region followed by a gap analysis. Reports on status are given routinely to the State Trauma Advisory Committee. As the CEMSIS program becomes more mature and complete, morbidity and mortality assessment will be done. Each Local EMS agency provides for outside consultation to assist with Trauma Center designation and re-designation.

Priority	#	Benchmark	Solution	Status
Short Term/ Ongoing	302	The trauma system is supported by an EMS system that includes communication, medical oversight, prehospital triage, and transportation; the trauma system, EMS system, and public health agency are well integrated.	Leadership & Coordination	Met ☐ Partially Met ☐ Majority Met ☒ Not Met ☐ The regionalization of the trauma system has provided 5 avenues for support of a State Trauma System. Most regions have worked toward triage standardization utilizing the national CDC standards. Each region encourages communication with the region's trauma partners. The state trauma registry, while still under development, provides data on the system which is shared with its regions and State Trauma Advisory Committee upon request.
Short Term/ Ongoing	303	Acute care facilities are integrated into a resource-efficient, inclusive network that meets required standards and that provides optimal care for all injured patients.	Leadership & Coordination	Met ☐ Partially Met ☒ Majority Met ☐ Not Met ☐ While regions have improved communication with all acute care facilities in the region, standards do not exist specific to trauma. Re-triage standards are under development in some of the regions that improve the coordination of care when a patient
Priority	#	Benchmark	Solution	Status
				requires urgent transport to a Trauma Center with the higher

				level of care needed. The state registry is under revision and will include specific data to describe the transfer.
Short Term/ Ongoing	310	The lead trauma authority assures a competent workforce.	State Leadership & Coordination	Met ☐ Partially Met ☒ Majority Met ☐ Not Met ☐ Regulations only partially require a specific level of training for physicians and/or nurses. The Rural Trauma Team Development Course is being offered throughout the State sponsored by the Trauma Mangers Association, California. Other trauma-specific education is provided by the LEMSA as needed and may be part of the accreditation process for paramedics. Compliance assessment for Trauma Centers is the responsibility of the LEMSA.
Short Term/ Ongoing	311	The lead trauma authority acts to protect the public welfare by enforcing various laws, rules, and regulations as they pertain to trauma system components and the system overall.	State Leadership & Coordination	Met ☒ Partially Met ☐ Majority Met ☐ Not Met ☐ The Trauma Center (through Title 22) and the LEMSA (through statute and Title22) are required to provide for performance
Priority	**#**	**Benchmark**	**Solution**	**Status**
				improvement of the local system. Regions have included system

				case reviews as part of their mission. Local Trauma Plans are required to describe their PI program and how they ensure Title 22 compliance. The majority of LEMSAs require ACS verification and/or consultation for continued designation. The State has developed guidance documents to assist LEMSAs in the compliance reviews. The State is responsible for approving local Trauma Plans prior to system implementation to ensure statute and regulatory compliance. Annual reports are due from each LEMSA to ensure continued compliance.
Intermediate	104	An assessment of the trauma system's disaster/ emergency preparedness has been completed including coordination with the public health and EMS systems and the emergency management agency.	State Leadership & Coordination	Met ☐ Partially Met ☒ Majority Met ☐ Not Met ☐ The EMS Authority coordinates its trauma system with the California Emergency Management Agency. An assessment needs to be completed.
Intermediate	105	The system assesses and monitors its value to its constituents in terms of cost/benefit analysis and societal investment.	Trauma Registry	Met ☐ Partially Met ☐ Majority Met ☐ Not Met ☒
Priority	#	**Benchmark**	**Solution**	**Status**
				The State Registry has been developed and in part collects

				information to assess the fiscal impact of the trauma system. As the registry becomes more complete, the state will publish trauma system information to educate the public and professional population on the trauma system. LEMSAs have a mechanism in place to partially support the system through designation fees. An organized approach to public information about the trauma system is limited to local/regional activities.
Intermediate	205	Collected data are used to evaluate system performance and to develop public policy.	Trauma Registry	Met ☐ Partially Met ☒ Majority Met ☐ Not Met ☐ The State Trauma Registry has been developed based on national standards. 56/76 Trauma Centers participate with 100% participation anticipated by the end of the fiscal year. Linkage has yet to be done. A new system for EMS and trauma data is now in place which should improve the linkage capabilities.

Priority	#	**Benchmark**	**Solution**	**Status**
Intermediate	206	Trauma system leadership, including its	Trauma Registry	Met ☐

		multi-performance reports, in disciplinary advisory committees, regularly reviews system.		Partially Met ☒ Majority Met ☐ Not Met ☐ While data exists for much of the system, performance reports have yet to be developed. A quality and consistency review of the data needs to be completed before the system can rely on the data reports to guide policy.
Intermediate	207	The lead agency informs and educates state, regional and local constituencies and policy makers to foster collaboration and cooperation for system enhancement and injury control.	State Leadership & Coordination	Met ☐ Partially Met ☒ Majority Met ☐ Not Met ☐ The 5 regions are collaborative groups that foster system enhancement. Most projects are focused on post-injury system issues. Some of the regions are beginning to work on prevention activities such as pediatric and elderly falls. The Department of Public Health focuses on prevention. Injury prevention activities are shared through the Strategic Highway Safety Program.
Intermediate	304	The jurisdictional lead agency, in cooperation with other agencies and organizations, uses analytical tools to monitor the performance of population-	State Leadership & Coordination	Met ☐ Partially Met ☒ Majority Met ☐ Not Met ☐
Priority	#	**Benchmark**	**Solution**	**Status**
		based prevention and trauma care services.		Data from the state registry is provided to the regions upon

				request for the monitoring of trauma care in the region. Common mechanisms of injury are also identified which has resulted in prevention activities related to pediatric and elderly falls. The development of a State Trauma Plan is a significant step towards the development of a State Trauma System. Many of the Plan's objectives are already being addressed.
Intermediate/ Ongoing	208	The trauma, public health, and emergency preparedness systems are closely linked.	State Leadership & Coordination	Met ☐ Partially Met ☒ Majority Met ☐ Not Met ☐ The State Trauma System and the Disaster Preparedness Operations are loosely linked with need for more formal integration.
Intermediate/ Ongoing	305	The lead agency assures its trauma system plan is integrated with, and complementary to, the comprehensive mass casualty plan for natural disasters and manmade disasters, including an all-hazards approach to disaster planning and operations.	State Leadership & Coordination	Met ☐ Partially Met ☐ Majority Met ☐ Not Met ☒ Integration of the State Trauma System with all disaster preparedness activities is state as a goal in the State Trauma Plan.

Priority	#	**Benchmark**	**Solution**	**Status**
Intermediate/ Ongoing	306	The lead agency ensures that the trauma system demonstrates prevention	State Leadership & Coordination	Met ☐ Partially Met ☒

		and medical outreach activities within its defined service area.		Majority Met ☐ Not Met ☐ Regional activities may incorporate prevention and medical outreach. Pediatric and elderly falls have become a focus throughout the state. The Strategic Highway Safety Plan links Department of Public Health with EMS.
Intermediate/ Ongoing	307	To maintain its state or regional or local designation, each hospital must continually work to improve the trauma care as measured by patient outcomes.	Registry/Local Trauma System	Met ☐ Partially Met ☒ Majority Met ☐ Not Met ☐ Each Trauma Center and its LEMSA are responsible for measuring patient outcomes. The State will be formalizing its Performance Improvement Program once the State Trauma Registry is complete with quality and consistent data. Outcomes for trauma patients seen at non-trauma centers needs to be addressed with utilization of OSHPD data.
Intermediate/ Ongoing	308	The lead agency ensures that adequate rehabilitation facilities have been integrated into the trauma system and that these resources are made available to all populations requiring them.	State Leadership & Coordination	Met ☐ Partially Met ☐ Majority Met ☐ Not Met ☒ There are no standards to integrate
Priority	**#**	**Benchmark**	**Solution**	**Status**
				rehabilitation services into the trauma system except for minor

				requirements for acute rehabilitation services in Title 22. The State Trauma Registry has minimal information regarding functional outcome and rehabilitation costs.
Long Term	101	There is a thorough description of epidemiology of injury in the system jurisdiction using both population-based data and clinical databases**.**	Coordinate with agencies that collect data/make available to participants.	Met ☐ Partially Met ☒ Majority Met ☐ Not Met ☐ While the State Trauma Registry contains detailed information on the epidemiology of injury, there has been no true analysis. However, coroner and non-trauma facility data is limited and not linked to the trauma registry. Regional reports are provided upon request describing the injury patterns of the region.
Long Term/ Ongoing	301	The trauma management information system (MIS) is used to facilitate ongoing assessment and assurance of system performance and outcomes and provides a basis for continuously improving the trauma system including a cost-benefit analysis.	Trauma Registry	Met ☐ Partially Met ☐ Majority Met ☒ Not Met ☐ 52/76 Trauma Centers provide data to the State Trauma Registry. Regional reports are provided upon request to assist in regional performance improvement. LEMSAs are responsible for local
Priority	**#**	**Benchmark**	**Solution**	**Status**
				system performance review including costs (many require

				Trauma Centers to pay annual fee). Limited state reports are generated due to incomplete participation.
Long Term/ Ongoing	309	The financial aspects of the trauma systems are integrated into the overall quality improvement system to assure ongoing “fine-tuning” and cost-effectiveness.	Trauma System Funding	Met ☐ Partially Met ☐ Majority Met ☐ Not Met ☒ No cost data is available in the State Trauma Registry. Payer mix and charges can be analyzed. While specific financial data is not available, length of stay, ICU length of stay etc. can be evaluated based on cost estimates.

APPENDIX B: State Trauma Advisory Committee

State of California
EMS Authority
State Trauma Advisory Committee

Name	Representation	Nominating Organization	Employment	Term Appoint.	Term Expires
Committee Chair					
Robert Mackersie, MD, FACS	EMS Authority	EMS Authority	San Francisco General Hospital & Trauma	02/01/14	02/01/17
Regional Representatives					
David Shatz, MD, FACS	Region 1 - North RTCC	North RTCC	UC Davis Medical Center	02/26/13	02/26/16
Fred Claridge	Region 2 - Bay RTCC	Bay RTCC	Alameda County EMS Agency	02/01/14	02/01/17
James Davis, MD, FACS	Region 3 - Central RTCC	Central RTCC	Community Regional Medical Center - Fres	08/01/13	08/01/15
Nancy Lapolla, MPH	Region 4 - SW RTCC	SW RTCC	Santa Barbara County EMS Agency	08/01/13	08/01/15
John Steele, MD, FACS	Region 5 - SE RTCC	SE RTCC	Palomar Medical Center	08/01/13	08/01/16
Constituent Representatives					
Cathy Chidester, RN	LEMSA Admin - Urban	EMSAAC	Los Angeles County EMS Agency	08/01/13	08/01/16
Dan Lynch	LEMSA Admin - Rural	EMSAAC	Central California EMS Agency	09/18/13	09/18/16
Jay Goldman, MD	LEMSA Medical Director	EMDAC	Kaiser Permanente Foundation Health Plar	07/20/13	07/31/16
BJ Bartleson, RN	California Hospital Assn	CHA	California Hospital Association	07/01/12	07/01/15
H. Gill Cryer, MD, PhD	Trauma Surgeon	ACS	Ronald Reagan UCLA Medical Center	05/08/13	05/08/16
Ramon Johnson, MD, FACEP	Emergency Physician	CAL ACEP	Emergency Medicine Associates	08/01/13	08/01/15
Jan Serrano, RN	Trauma Manager	TMAC	Arrowhead Medical Center	02/26/13	02/26/16
Robert Dimand, MD	Pediatric Representative	EMSC TAC	State of California - California Children's Se	12/20/13	12/31/15
Ken Miller, MD, PhD	Public Provider	Cal-Chiefs	Orange Copunty EMS Agency	10/10/13	10/10/15
Myron Smith,MBA, EMT-P	Private Provider	CAA	Hall Ambulance Service,INC	11/22/13	11/22/16
At-Large Representatives					
Joe Barger, MD, FACEP	At Large	EMS Authority		04/02/14	04/02/17
Christopher Newton, MD, FACS, FAAP	At Large	EMS Authority	Oakland Children's Hospital	03/14/14	03/14/17
State of California					
Howard Backer, MD, MPH, FACEP			State of California - EMS Authority		
Daniel Smiley, EMT-P, MBA			State of California - EMS Authority		
Tom McGinnis, EMT-P			State of California - EMS Authority		
Farid Nasr, MD			State of California - EMS Authority		
Bonnie Sinz, RN			State of California - EMS Authority		

APPENDIX E California Trauma Centers

Local EMS Agency (LEMSA)	County	HOSPITAL	Level I Pediatric Trauma Center	Level II Pediatric Trauma Center	Level I Trauma Center	Level I Pediatric Trauma Center	Level II Trauma Center	Level II Pediatric Trauma Center	Level I Trauma Center	Level II Trauma Center	Level III Trauma Center	Level IV Trauma Center	Designation Date
ALAMEDA COUNTY EMS	**Alameda**		**1**							**2**			
	Alameda County	Children's Hospital Medical Center - Oakland 747 52nd Street Oakland, CA 94609 Hospital: (510) 450-7600 (Private) Trauma: (510) 428-3045											6/1/1985; 04/26/2005 Designation as Level I Pediatric Trauma Center
	Alameda County	Eden Hospital Medical Center 20103 Lake Chabot Road Castro Valley, CA 94546 Hospital: (510) 537-1234 (Private) Trauma: (510) 727-2717											06/01/1985
	Alameda County	Highland Alameda County Medical Center Campus 1411 East 31st Street Oakland, CA 94602 Hospital: (510) 534-8055 (Public) Trauma: (510) 437-4754											06/01/1985
CENTRAL CALIFORNIA EMS	**Fresno, Kings, Madera, & Tulare**								**1**		**1**		
	Fresno County	Community Regional Medical Center - Fresno 2823 Fresno Street Fresno, CA 93721 Hospital: (559) 459-6000 (Private) Trauma: (559) 459-5130											04/07/2007
	Tulare County	Kaweah Delta Medical Center 400 West Mineral King Visalia, CA 93291-6263 Hospital: (559) 624-2000 (Private) Trauma: (559) 624-2867											01/26/2010
	Fresno County	University Medical Center											**04/17/2007** De-Designated as Level I Trauma Center (Hospital closed)

Local EMS Agency (LEMSA)	County	HOSPITAL	Level I Pediatric Trauma Center	Level II Pediatric Trauma Center	Level I Trauma Center / Level I Pediatric Trauma Center	Level I Trauma Center / Level II Pediatric Trauma Center	Level II Trauma Center / Level II Pediatric Trauma Center	Level I Trauma Center	Level II Trauma Center	Level III Trauma Center	Level IV Trauma Center	Designation Date
	Fresno County	Children's Hospital Central California										**10/04/2002** De-Designated as Level II Pediatric Trauma Center
COASTAL VALLEY EMS	**Sonoma, & Mendocino**								**1**		**1**	
	Mendocino County	Ukiah Valley Medical Center 275 Hospital Drive Ukiah, CA 95482 Hospital: (707) 462-3111 (Private)										07/01/2010
	Sonoma County	Santa Rosa Memorial Hospital 1165 Montgomery Drive Santa Rosa, CA 95405-4897 Hospital: (707) 546-3210 (Private) Trauma: (707) 547-4608										05/01/2000
CONTRA COSTA COUNTY EMS	**Contra Costa**								**1**			
	Contra Costa County	John Muir Medical Center 1601 Ygnacio Valley Road Walnut Creek, CA 94598 Hospital: (925) 939-3000 (Private) Trauma: (925) 947-5224										06/01/1986
EL DORADO COUNTY EMS	**El Dorado**									**1**		
	El Dorado County	Marshall Medical Center 1100 Mashall Way Placerville, CA 95667 Hospital: (530) 622-1441 (Private) Trauma: (530) 626-2784										08/09/2009

Local EMS Agency (LEMSA)	County	HOSPITAL	Level I Pediatric Trauma Center	Level II Pediatric Trauma Center	Level I Trauma Center / Level I Pediatric Trauma Center	Level I Trauma Center / Level II Pediatric Trauma Center	Level II Trauma Center / Level II Pediatric Trauma Center	Level I Trauma Center	Level II Trauma Center	Level III Trauma Center	Level IV Trauma Center	Designation Date
IMPERIAL COUNTY EMS	**Imperial**										**2**	
	Imperial County	El Centro Regional Medical Center 1415 Ross Avenue El Centro, CA 92243 Admin - (760) 339-7111 (Private) Trauma Office - (760) 339-7323										03/24/2004
	Imperial County	Pioneers Memorial Healthcare District 207 W Legion Road Brawley, CA 92227 Admin - (760) 344-2120 (Private) Trauma Office - (760) 351-3888										03/22/2004
INLAND COUNTIES EMS	**San Bernardino, Inyo, & Mono**				**1**				**1**			
	San Bernardino County	Arrowhead Regional Medical Center 400 North Pepper Avenue Colton, CA 92324 Hospital: (909) 580-1001 (Public) Trauma: (909) 580-6116										10/01/1981
	San Bernardino County	Loma Linda University Medical Center 11234 Anderson Loma Linda, CA 92354 Hospital: (909) 824-0800 (University) Trauma: (909) 558-4000, ext 87270										10/1/1981; 07/27/2004 Added Designation as Level I Pediatric Trauma Center
KERN COUNTY EMS	**Kern**								**1**			
	Kern County	Kern Medical Center 1830 Flower Street Bakersfield, CA 93305 Hospital: (661) 326-2161 (Public) Trauma: (661) 326-5658										11/01/2001

Local EMS Agency (LEMSA)	County	HOSPITAL	Level I Pediatric Trauma Center	Level II Pediatric Trauma Center	Level I Trauma Center	Level I Trauma Center	Level II Trauma Center	Level I Trauma Center	Level II Trauma Center	Level III Trauma Center	Level IV Trauma Center	Designation Date
LOS ANGELES COUNTY EMS	**Los Angeles**		**1**		**1**	**3**	**2**		**7**			
	Los Angeles County	Antelope Valley Hospital 1600 W. Avenue J Lancaster, CA 93534 Hospital: (661) 949-5505 (Private) Trauma: (661) 949-5298										5/3/2010; 12/01/1987 De-Designated as Level II Trauma Center; 05/03/2010 Designation as Level II Trauma Center
	Los Angeles County	California Hospital Medical Center 1401 S. Grand Avenue Los Angeles, CA 90015 Hospital: (213) 748-2411 (Private) Trauma: (213) 742-5451										12/1/2004; 07/01/1984 Designation as Level II Trauma Center; 02/01/1985 De-Designated as Level II Trauma Center; 12/01/2004 Designation as Level II Trauma Center
	Los Angeles County	Cedars-Sinai Medical Center 8700 Beverly Boulevard Los Angeles, CA 90048-1865 Hospital: (310) 423-3277 (Private) Trauma: (310) 423-8732										4/1/1984; 04/01/2002 Added Designation as Level II Pediatric Trauma Center
	Los Angeles County	Children's Hospital of Los Angeles 4650 Sunset Boulevard Los Angeles, CA 90027-6062 Hospital: (323) 660-2450 (Private) Trauma: (323) 669-4526										12/01/1983
	Los Angeles County	Harbor UCLA Medical Center 1000 West Carson Street Torrance, CA 90502-2004 Hospital: (310) 222-2345 (Public) Trauma: (310) 222-1912										12/1/1983; 04/01/2002 Added Designation as Level II Pediatric Trauma Center
	Los Angeles County	Henry Mayo Newhall Memorial Hospital Memorial Hospital 23845 W. McBean Parkway Valencia, CA 91355-2083 Hospital: (661) 253-8000 (Private) Trauma: (661) 253-8118										10/1/1984; 01/01/1992 Changed from Level III Trauma Center to Designation as Level II Trauma Center
	Los Angeles County	Huntington Memorial Hospital 100 West California Blvd. Pasadena, CA 91105-3097 Hospital: (626) 397-5000 (Private) Trauma: (626) 397-5900										12/1/1983; 06/30/1992 Changed from Level I Trauma Center to Designation as Level II Trauma Center

Local EMS Agency (LEMSA)	County	HOSPITAL	Level I Pediatric Trauma Center	Level II Pediatric Trauma Center	Level I Trauma Center	Level I Trauma Center	Level II Trauma Center	Level I Trauma Center	Level II Trauma Center	Level III Trauma Center	Level IV Trauma Center	Designation Date
					Level I Pediatric Trauma Center	Level II Pediatric Trauma Center	Level II Pediatric Trauma Center					
	Los Angeles County	LAC + USC Medical Center 1200 North State Street Los Angeles, CA 90033-1083 Hospital: (323) 226-2622 Trauma: (323) 226-7780 (Public)										12/1/1983; 04/01/2002 Added Designation as Level II Pediatric Trauma Center
	Los Angeles County	Long Beach Memorial + Miller Children's Medical Center 2801 Atlantic Avenue Long Beach, CA 90806-1737 Hospital: (562) 933-2000 (Private) Trauma: (562) 933-1315										12/1/1983; 01/01/1992 Changed from Level I Trauma Center to Designation as Level II Trauma Center; 04/01/2002 Added Designation as Level II Pediatric Trauma Center
	Los Angeles County	Northridge Hospital Medical Center 18300 Roscoe Blvd. Northridge, CA 91325-4105 Hospital: (818) 885-8500 (Private) Trauma: (818) 885-8500, xtn 2758										6/1/1984; 10/04/2010 Added Designation as Level II Pediatric Trauma Center
	Los Angeles County	Providence Holy Cross Medical Center 15031 Rinaldi Street Mission Hills, CA 91345-1207 Hospital: (818) 365-8051 (Private) Trauma: (818) 898-4312										05/01/1984
	Los Angeles County	Ronald Regan UCLA Medical Center 757 Westwood Plaza Los Angeles, CA 90095-3075 Hospital: (310) 825-9111 (Private) Trauma: (310) 825-5215										12/1/1983; 04/01/2002 Added Designation as Level I Pediatric Trauma Center
	Los Angeles County	St. Francis Medical Center 3630 E. Imperial Hwy. Lynwood, CA 90262-2678 Hospital: (310) 900-8900 (Private) Trauma: (310) 900-8675										01/01/1996
	Los Angeles County	St. Mary Medical Center 1050 Linden Avenue Long Beach, CA 90813-3393 Hospital: (562) 491-9000 (Private) Trauma: (562) 491-9174										12/1/1983; 01/01/1992 Changed from Level I Trauma Center to Designation as Level II Trauma Center
	Los Angeles County	Daniel Freeman Memorial Hospital										**06/01/1987** De-Designated as Level II Trauma Center

Local EMS Agency (LEMSA)	County	HOSPITAL			Level I Trauma Center	Level I Trauma Center	Level II Trauma Center	Level I Trauma Center	Level II Trauma Center	Level III Trauma Center	Level IV Trauma Center	Designation Date
			Level I Pediatric Trauma Center	Level II Pediatric Trauma Center	Level I Pediatric Trauma Center	Level II Pediatric Trauma Center	Level II Pediatric Trauma Center					
	Los Angeles County	Martin Luther King Jr./Drew Medical Center										**07//01/2004** Changed from Level I Trauma Center to Designation as Level II Trauma Center, **03/01/2005** De-Designated as Level II Trauma Center
	Los Angeles County	Methodist Hospital of Southern California										**01/01/1989** De-Designated as Level II Trauma Center
	Los Angeles County	Pomona Valley Medical Center										**10/01/1986** De-Designated as Level II Trauma Center
	Los Angeles County	Presbyterian Intercommunity Hospital										**08/01/1989** De-Designated as Level II Trauma Center
	Los Angeles County	Queen of Angels Medical Center										**02/01/1987** De-Designated as Level II Trauma Center
	Los Angeles County	Queen of the Valley Hospital										**12/01/1987** De-Designated as Level II Trauma Center
	Los Angeles County	Santa Monica UCLA Hospital										**08/01/1987** De-Designated as Level II Trauma Center
	Los Angeles County	St. Joseph Medical Center										**06/01/1989** De-Designated as Level II Trauma Center
	Los Angeles County	Westlake Community										**06/01/1994** De-Designated as Level III Trauma Center

Local EMS Agency (LEMSA)	County	HOSPITAL	Level I Pediatric Trauma Center	Level II Pediatric Trauma Center	Level I Trauma Center / Level I Pediatric Trauma Center	Level I Trauma Center / Level II Pediatric Trauma Center	Level II Trauma Center / Level II Pediatric Trauma Center	Level I Trauma Center	Level II Trauma Center	Level III Trauma Center	Level IV Trauma Center	Designation Date
MARIN COUNTY EMS	**Marin**									**1**		
	Marin County	Marin General Hospital 250 Bonair Road Greenbrae, CA 94912-8010 Hospital: (415) 925-7000 (Private) Trauma: (415) 925-7251										01/01/2001
MERCED COUNTY EMS	**Merced**											**Approved Trauma Plan & No Designated Trauma Centers**
MONTEREY COUNTY EMS	**Monterey**											**Approved Trauma Plan & No Designated Trauma Centers**
MOUNTAIN VALLEY EMS	**Alpine, Amador, Calaveras, Mariposa, & Stanislaus**								**2**			
	Stanislaus County	Doctor's Medical Center - Modesto 1441 Florida Avenue Modesto, CA 95350 Hospital: (209) 578-1211 (Private) Trauma: (209) 576-3776										02/02/2004
	Stanislaus County	Memorial Medical Center - Modesto 1700 Coffee Road Modesto, CA 95355 Hospital: (209) 526-4500 (Private) Trauma: (209) 572-7147										02/02/2004
NAPA COUNTY EMS	**Napa**									**1**		

Local EMS Agency (LEMSA)	County	HOSPITAL	Level I Pediatric Trauma Center	Level II Pediatric Trauma Center	Level I Trauma Center	Level I Trauma Center	Level II Trauma Center	Level I Trauma Center	Level II Trauma Center	Level III Trauma Center	Level IV Trauma Center	Designation Date
	Napa County	Queen of the Valley Hospital - Napa 1000 Trancas Street Napa, CA 94558 Hospital: (707) 252-4411 (Private) Trauma: (707) 252-4422, ext 2399										12/01/1988
NORTH COAST EMS	**Del Norte, Humboldt, & Lake**										**2**	
	Del Norte County	Sutter Coast Hospital 800 E. Washington Street Cresent City CA 95443 Hospital: (707) 464-8511 (Private) Trauma: (707) 263-5640										05/09/2009
	Lake County	Sutter Lakeside Hospital 5176 Hill Road Lakeport, CA 95443 Hospital: (707) 263-5641 (Private) Trauma: (707) 263-5641										04/04/2006
NORTHERN CALIFORNIA EMS	**Lassen, Modoc, Trinity, Plumas, Glenn, & Sierra**										**2**	
	Glenn County	Glenn Medical Center 1133 W. Sycamore Street Willows, CA 95988 Hospital: (530) 934-1800 (Public) Trauma: (530) 934-1800 *Ask for ED*										07/30/2002
	Plumas County	Seneca Healthcare District 130 Brentwood Drive Chester, CA 96080 Hospital: (530) 258-2151 (Private) Trauma: (530) 258-3673										12/01/2002
NORTHERN CALIFORNIA EMS	Plumas County	Indian Valley Healthcare District										**01/03/2005** De-Designated as Level IV Trauma Center (ED closed)

Local EMS Agency (LEMSA)	County	HOSPITAL	Level I Pediatric Trauma Center	Level II Pediatric Trauma Center	Level I Trauma Center / Level I Pediatric Trauma Center	Level I Trauma Center / Level II Pediatric Trauma Center	Level II Trauma Center / Level II Pediatric Trauma Center	Level I Trauma Center	Level II Trauma Center	Level III Trauma Center	Level IV Trauma Center	Designation Date
ORANGE COUNTY EMS	**Orange**							**1**	**2**			
	Orange County	Mission Hospital Regional Medical Center 27700 Medical Center Road Mission Viejo, CA 92691 Hospital: (949) 364-1400 (Private) Trauma: (949) 364-7754										06/01/1980
	Orange County	UC Irvine Medical Center 101 The City Drive South Orange, CA 92868 Hospital: (714) 456-7890 (University) Trauma: (714) 456-5637										06/01/1980
	Orange County	Western Medical Center-Santa Ana 1001 North Tustin Santa Ana, CA 92705 Hospital: (714) 835-3555 (Private) Trauma: (714) 953-3422										06/01/1980
	Orange County	Anaheim Memorial Hospital										**04/01/1983** De-Designated as Level II Trauma Center
	Orange County	Fountain Valley Regional Hospital										**12/01/1989** De-Designated as Level II Trauma Center
	Orange County	St. Jude Medical Center										**09/01/1983** De-Designated as Level II Trauma Center
RIVERSIDE COUNTY EMS	**Riverside**						**1**		**3**			
	Riverside County	Desert Regional Medical Center 1150 North Indian Canyon Drive Palm Springs, CA 92262 Hospital: (760) 323-6511 (Private) Trauma: (760) 323-6524										09/01/1994

Local EMS Agency (LEMSA)	County	HOSPITAL	Level I Pediatric Trauma Center	Level II Pediatric Trauma Center	Level I Trauma Center / Level I Pediatric Trauma Center	Level I Trauma Center / Level II Pediatric Trauma Center	Level II Trauma Center / Level II Pediatric Trauma Center	Level I Trauma Center	Level II Trauma Center	Level III Trauma Center	Level IV Trauma Center	Designation Date
	Riverside County	Inland Valley Medical Center 36485 Inland Valley Drive Wildomar, CA 92595 Hospital: (951) 677-1111 (Private) Trauma: (951) 696-6210										1/1/1996; 10/1/2013 upgraded from Level III to Level II designation.
	Riverside County	Riverside Community Hospital 4445 Magnolia Riverside, CA 92501 Hospital: (951) 788-3000 (Private) Trauma: (951) 788-3369										09/01/1994
	Riverside County	Riverside County Regional Medical Center 26520 Cactus Avenue Moreno Valley, CA 92555 Hospital: (951) 486-4000 (Public) Trauma: (951) 486-4557										9/1/1994; 12/16/2009 Added Designation as Level II Pediatric Trauma Center
SACRAMENTO COUNTY EMS	**Sacramento**				**1**				**2**			
	Sacramento County	Kaiser - South Sacramento 6600 Bruceville Road Sacramento, CA 95823 Hospital: (916) (Private) Trauma: (916)										08/09/2009
	Sacramento County	Mercy San Juan Medical Center 6501 Coyle Avenue Carmichael, CA 95608 Hospital: (916) 537-5000 (Private) Trauma: (916) 864-5692										08/01/1999
	Sacramento County	UC Davis Medical Center 2315 Stockton Boulevard Sacramento, CA 95817 Hospital: (916) 734-2011 (University) Trauma: (916) 734-7122										06/01/1984

Local EMS Agency (LEMSA)	County	HOSPITAL	Level I Pediatric Trauma Center	Level II Pediatric Trauma Center	Level I Trauma Center / Level I Pediatric Trauma Center	Level I Trauma Center / Level II Pediatric Trauma Center	Level II Trauma Center / Level II Pediatric Trauma Center	Level I Trauma Center	Level II Trauma Center	Level III Trauma Center	Level IV Trauma Center	Designation Date
SAN BENITO COUNTY EMS	**San Benito**											**Approved Trauma Plan & No Designated Trauma Centers**
SAN DIEGO COUNTY EMS	**San Diego**			**1**				**2**	**3**			
	San Diego County	Palomar Medical Center 555 East Valley Parkway Escondido, CA 92025 Hospital: (760) 739-3000 (Private) Trauma: (760) 739-3692										10/01/1984
	San Diego County	Rady Children's Hospital San Diego 3020 Children's Way San Diego, CA 92123 Hospital: (858) 966-1700 (Private) Trauma: (858) 966-4010										08/01/1984
	San Diego County	Scripps Memorial Hospital 9888 Genesee Avenue La Jolla, CA 92037 Hospital: (858) 626-4123 (Private) Trauma: (858) 626-6350										08/01/1984
	San Diego County	Scripps Mercy Hospital and Health Center 4077 Fifth Avenue San Diego, CA 92103 Hospital: (619) 294-8111 (Private) Trauma: (619) 260-7285										8/1/1984; 08/12/2003 Changed from Level II Trauma Center to Designation as Level I Trauma Center
	San Diego County	Sharp Memorial Hospital 7901 Frost Street San Diego, CA 92123 Hospital: (858) 541-3400 (Private) Trauma: (858) 541-3200										08/01/1984

Local EMS Agency (LEMSA)	County	HOSPITAL	Level I Pediatric Trauma Center	Level II Pediatric Trauma Center	Level I Trauma Center / Level I Pediatric Trauma Center	Level I Trauma Center / Level II Pediatric Trauma Center	Level II Trauma Center / Level II Pediatric Trauma Center	Level I Trauma Center	Level II Trauma Center	Level III Trauma Center	Level IV Trauma Center	Designation Date
	San Diego County	UC San Diego Medical Center 200 West Arbor Drive San Diego, CA 92103 Hospital: (619) 543-6222 (Public) Trauma: (619) 543-7200										08/01/1984
	San Diego County	Grossmont Hospital										**08/01/1985** De-Designated as Level II Trauma Center
SAN FRANCISCO COUNTY EMS	**San Francisco**							**1**				
	San Francisco County	San Francisco General Hospital & Medical Center 1001 Potrero Avenue San Francisco, CA 94110 Hospital: (415) 206-8000 (Public) Trauma: (415) 206-4639										02/01/1991
SAN JOAQUIN COUNTY EMS	**San Joaquin County**									**1**		
	San Joaquin County	San Joaquin General Hospital 500 W Hospital Rd French Camp, CA 95231 Hospital: (209) 468-6000 (Public)										08/01/2013
SAN LUIS OBISPO EMS	**San Luis Obispo**									**1**		
	San Luis Obispo	Sierra Vista Regional Medical Center 1010 Murray Avenue San Luis Obispo CA 93405 Hospital: (805) 546-7600 (Private) Transfer: (877) 903-0003										03/01/2012

Local EMS Agency (LEMSA)	County	HOSPITAL	Level I Pediatric Trauma Center	Level II Pediatric Trauma Center	Level I Trauma Center / Level I Pediatric Trauma Center	Level I Trauma Center / Level II Pediatric Trauma Center	Level II Trauma Center / Level II Pediatric Trauma Center	Level I Trauma Center	Level II Trauma Center	Level III Trauma Center	Level IV Trauma Center	Designation Date
SAN MATEO COUNTY EMS	**San Mateo**											**Approved Trauma Plan & No Designated Trauma Centers**
SANTA BARBARA COUNTY EMS	**Santa Barbara**						**1**			**1**		
	Santa Barbara County	Marian Regional Medical Center 1400 East Church St Santa Maria, CA 93454 Hospital (805) 739-3000 (Private)										04/01/2013
	Santa Barbara County	Santa Barbara Cottage Hospital P. O. Box 689 Santa Barbara, CA 93102 Hospital: (805) 682-7111 (Private) Trauma: (805) 569-7451										6/1/2001; Pediatric Level II Designation April 2013
	Santa Barbara County	Goleta Valley Cottage Hospital										**07/01/2008** De-Designated as Level III Trauma Center
SANTA CLARA COUNTY EMS	**Santa Clara**				**1**	**1**			**1**			
	Santa Clara County	Regional Medical Center of San Jose 225 N. Jackson Avenue San Jose, CA 95116 Hospital: (408) 259-5000 (Private) Trauma: (408) 272-6466										05/24/2005
	Santa Clara County	Santa Clara Valley Medical Center 751 South Bascom Avenue San Jose, CA 95128 Hospital: (408) 885-5000 (Public) Trauma: (408) 885-5220										8/1/1986; 10/09/2009 Added Designation as Level II Pediatric Trauma Center

Local EMS Agency (LEMSA)	County	HOSPITAL	Level I Pediatric Trauma Center	Level II Pediatric Trauma Center	Level I Trauma Center / Level I Pediatric Trauma Center	Level I Trauma Center / Level II Pediatric Trauma Center	Level II Trauma Center / Level II Pediatric Trauma Center	Level I Trauma Center	Level II Trauma Center	Level III Trauma Center	Level IV Trauma Center	Designation Date
	Santa Clara County	Stanford University Medical Center 300 Pasteur Drive Stanford, CA 94305 Hospital: (650) 723-7570 (University) Trauma: (650) 723-7570										8/1/1986; 10/09/2009 Added Designation as Level II Pediatric Trauma Center; April 2014 upgraded to Level I Pediatric Trauma Center
	Santa Clara County	San Jose Medical Columbia Center										**12-09-2004** De-Designated as Level II Trauma Center (facility closed)
SANTA CRUZ COUNTY EMS	**Santa Cruz**											**Approved Trauma Plan & No Designated Trauma Centers**
SIERRA-SACRAMENTO VALLEY EMS	**Butte, Colusa, Nevada, Placer, Shasta, Siskiyou, Sutter, Tehema, & Yuba**								**3**	**5**	**4**	
	Butte County	Orchard Hospital 240 Spruce Street Gridley, CA 95948 Hospital: (530) 846-9068 (Private) Trauma: (530) 846-9068 *ask for ED*										06/21/2004
	Butte County	Enloe Medical Center 1531 Esplanade Chico, CA 95926 Hospital: (530) 332-7300 (Private) Trauma: (530) 332-5433										07/01/1988
	Butte County	Oroville Hospital 2767 Olive Highway Oroville, CA 95966 Hospital: (530) 533-8500 (Private) Trauma: (530) 532-8349										12/1/2001; 05/27/2002 Changed from Level IV Trauma Center to Designation as Level III Trauma Center

Local EMS Agency (LEMSA)	County	HOSPITAL	Level I Pediatric Trauma Center	Level II Pediatric Trauma Center	Level I Trauma Center	Level I Trauma Center	Level II Trauma Center	Level I Trauma Center	Level II Trauma Center	Level III Trauma Center	Level IV Trauma Center	Designation Date
	Colusa County	Colusa Regional Medical Center 199 East Webster Street Colusa, CA 95932 Hospital: (530) 458-5821 (Private) Trauma: (530) 458-5821 A*sk for ED*										12/19/2001
	Placer County	Sutter Roseville Medical Center One Medical Plaza Roseville, CA 95661 Hospital: (916) 781-1000 (Private) Trauma: (916) 781-1381										01/01/1995
	Shasta County	Mayers Memorial Hospital District P.O. Box 459 Fall River Mills, CA 96028 Hospital: (530) 336-5511 (Private) Trauma: (530) 336-5511 *ask for ED*										12/18/2001
	Shasta County	Mercy Medical Center Redding 2175 Rosaline Avenue Redding, CA 96001 Hospital: (530) 225-6000 (Private) Trauma: (530) 225-7242										08/01/1990
	Shasta County	Shasta Regional Medical Center 1100 Butte Street Redding, CA 96001 Hospital: (530) 244-5400 (Private) Trauma: (530) 244-5170										12/26/2001
	Siskiyou County	Fairchild Medical Center 444 Bruce Street Yreka, CA 96097 Hospital: (530) 842-4121 (Private) Trauma: (530) 842-4121										12/18/2001; 2007 Changed designation from Level III to designation as Level IV Trauma Center
	Siskiyou County	Mercy Medical Center Mt. Shasta 914 Pine Street Mt. Shasta, CA 96067 Hospital: (530) 926-6111 (Private) Trauma: (530) 926-9367										12/1/2001; 06/27/2002 Changed from Level IV to Designation as Level III Trauma Center

Local EMS Agency (LEMSA)	County	HOSPITAL	Level I Pediatric Trauma Center	Level II Pediatric Trauma Center	Level I Trauma Center	Level I Trauma Center	Level II Trauma Center	Level I Trauma Center	Level II Trauma Center	Level III Trauma Center	Level IV Trauma Center	Designation Date
	Tehema County	St. Elizabeth Community Hospital 2550 Sister Mary Columba Drive Red Bluff, CA 96080 Hospital: (530) 529-8000 (Private) Trauma: (530) 529-8305										12/13/2001
	Yuba County	Rideout Memorial Hospital 726 4th Street Marysville, CA 95901-5656 Hospital: (530) 749-4300 (Private) Trauma: (530) 749-4580										12/01/2001
SOLANO COUNTY EMS	**Solano**								**1**	**1**		
	Solano	Kaiser Foundation Hospital 1 Quality Drive Vacaville, CA 95688 Hospital: (707) 624-4000 (Private) Trauma: (707) 624-2275										11/1/2011; Level II designation 11/20/2013
	Solano	NorthBay Medical Center 1200 B. Gale Wilson Blvd. Fairfield, CA 94533 Hospital: (707) 646-5000 (Private) Trauma: (707) 646-4019										11/01/2011
TUOLUMNE COUNTY EMS	**Tuolumne**											**Approved Trauma Plan & No Designated Trauma Centers**

Local EMS Agency (LEMSA)	County	HOSPITAL	Level I Pediatric Trauma Center	Level II Pediatric Trauma Center	Level I Trauma Center / Level I Pediatric Trauma Center	Level I Trauma Center / Level II Pediatric Trauma Center	Level II Trauma Center / Level II Pediatric Trauma Center	Level I Trauma Center	Level II Trauma Center	Level III Trauma Center	Level IV Trauma Center	Designation Date
VENTURA COUNTY EMS	**Ventura**								**2**			
	Ventura County	Los Robles Hospital & Medical Center 215 West Janss Road Thousand Oaks, CA 91360 Hospital: (805) 497-2727 (Private) Trauma: (805) 370-4424										07/01/2010
	Ventura County	Ventura County Medical Center 3291 Loma Vista Road Ventura, CA 93003 Hospital: (805) 652-6075 (Public) Trauma: (805) 652-5993										07/12/2010
YOLO COUNTY EMS	Yolo County											**Approved Trauma Plan & No Designated Trauma Centers**

Local EMS Agency (LEMSA)	County	HOSPITAL	Level I Pediatric Trauma Center	Level II Pediatric Trauma Center	Level I Trauma Center	Level I Trauma Center	Level II Trauma Center	Level I Trauma Center	Level II Trauma Center	Level III Trauma Center	Level IV Trauma Center	Designation Date
			Level I Pediatric Trauma Center	Level II Pediatric Trauma Center	Level I Pediatric Trauma Center	Level II Pediatric Trauma Center	Level II Pediatric Trauma Center					
TOTAL TRAUMA CENTERS BY DESIGNATION												
Level I Pediatric Trauma Center Only			**2**									
Level II Pediatric Trauma Center Only			**1**									
Level I Trauma Center & Level I Pediatric Trauma Center			**4**									
Level I Trauma Center & Level II Pediatric Trauma Center			**4**									
Level II Trauma Center & Level II Pediatric Trauma Center			**4**									
Level I Trauma Center			**5**									
Level II Trauma Center			**32**		**Designated Pediatric Trauma Centers 15**							
Level III Trauma Center			**13**									
Level IV Trauma Center			**11**									
TOTAL:			**76**									

Appendix D: Statewide Trauma System Components and Assessment

Organized approaches within single facilities to care for victims of severe injury have repeatedly demonstrated improved outcomes, an observation that has led to the development of the trauma center designation process. In addition, regionalized trauma systems should have a process for triaging patients, ensuring that a patient gets to the level of trauma care that matches his or her injury severity and resulting in improved outcomes. Moreover, using a rigorous disease management approach to injury across the entire spectrum, from prevention to rehabilitation, has shown improved outcomes..[1]

A broad approach to policy development through laws and regulations should include the building of system infrastructure that can ensure system oversight and future development, enforcement, and routine monitoring of system performance, the updating of laws, regulation, policies and procedures, and the establishment of standard operating methods across all phases of intervention.[2]

The State Trauma Plan depends on the exercise of regulatory authority by the local EMS agencies (LEMSA) and is not designed to interfere with or compromise this authority. The Plan also relies on the activities of the Regional Trauma Coordinating Committees (RTCCs) and the State Trauma Advisory Committee (STAC) to provide expertise, support, and technical assistance to both the LEMSAs and the State EMS Authority in matters pertaining to state and regional trauma care and trauma system development.

As described by the American College of Surgeons' *Regional Trauma Systems: Optimal Elements, Integration, and Assessment* the functional components of a State Trauma System are divided into 13 parts:

1. Trauma System Leadership
2. System Development Operations
3. Trauma System Finance
4. EMS System: Prehospital Care
5. EMS System: Ambulance and Non-Transporting Medical Units
6. EMS System: Communications
7. Definitive Care: Acute Care Facilities
8. Definitive Care: Inter-Facility Transfer and Re-Triage

[1] *Resources for Optimal Care of the Injured Patient 2014*, Committee on Trauma American College of Surgeons
[2] *Regional Trauma Systems: Optimal Elements, Integration, and Assessment*, American College of Surgeons Committee on Trauma, 2007

9. Definitive Care: Rehabilitation
10. Information Systems
11. System Evaluation and Performance Improvement
12. Education & Training
13. Trauma System Research
14. Injury Prevention
15. Emergency/Disaster Preparedness

Each component contains two parts: 1) Background and Current Status with a brief description of the existing component and 2) Planned Development with a listing of objectives outlining how the component is expected to develop over the next 3-5 years and assigned responsibility.

It is understood that many objectives require resources (human and capital) that may not be available. These objectives are made for long-term goals and suggested prioritization.

At the end of the Assessment, there is a matrix summary of objectives per component and assigned responsibility.

Component 1 -- Trauma System Leadership

Background and Current Status

State EMS Authority

The State EMS Authority was established in 1980 through the Emergency Medical Services System and Prehospital Emergency Care Personnel Act (SB 125). The EMS authority is one of the 13 departments within the State of California Health & Human Services Agency and has statutory responsibility (Health and Safety Code §1797.103) for:

- Manpower and training
- Communications
- Transportation
- Assessment of hospitals and critical care centers
- System organization and management
- Data collection and evaluation
- Public information and education
- Disaster response

Specific to Trauma Programs, the EMS Authority:

- 1798.161 Required to Establish Regulations
- 1797.199 Trauma Care Fund Distribution
- 1798.166 Approval of local Trauma Plans in Accordance with Regulations

Local EMS Agency

There are currently 33 Local EMS Agencies (LEMSA) within the State of California; 26 are a single county and 7 have a multi-county jurisdiction. The EMS agency has statutory responsibility to plan, implement, and evaluate an emergency medical services system in accordance (in part) with:

- 1797.206/1797.218 Implementation and Approval of ALS & LALS Systems
- 1797.208 Compliance of EMT Training Programs
- 1797.214 Additional Training Requirements
- 1797.220 Local Medical Control Policies & Procedures
- 1797.252 EMS System Coordination
- 1797.100 Designation of Base Hospitals
- 1798.163 Trauma Care System Policies & Procedures
- 1797.151 Coordination of Disaster Preparedness

The LEMSA is charged with implementing statutes (1798.162, 1798.163), regulations and local policy for trauma services in their area of jurisdiction including designation of Trauma Centers. Using State trauma guidelines, LEMSAs design trauma systems that meet minimum State standards and

regulations, which provide a level of consistency between counties. The LEMSA ensures the system components operate in a consistent manner throughout the continuum of care.

State Trauma Advisory Committee
The State Trauma Advisory Committee (STAC) is comprised of physicians, nurses, administrators and other EMS providers and personnel for the purpose of advising the State EMS Authority Director on matters pertaining to the planning, development, and implementation of the State Trauma System.

Regional Trauma Coordinating Committee
As the result of recommendations made by the STAC and the 2006 California Statewide Trauma Planning, Assessment and Future Direction document, five (5) trauma regions were defined by the EMS Authority and corresponding Regional Trauma Coordinating Committees were created in 2008. These committees are composed of trauma system providers, local EMS agency staff, and trauma system stakeholders from within each region for the purpose of promoting regional cooperation, enhancing and developing best practices, assist in the interpretation of regional data, and working collaboratively with the State and LEMSAs in support of a state trauma system.

Trauma Centers
Trauma Centers are a key element in a trauma system and the focal point for trauma care. Lead Trauma Centers (Level I and II) contribute administrative and medical leadership and academic expertise to the system. These lead Trauma Centers, in collaboration with the local EMS agency, engage all other Trauma Centers (Level III and IV) and other non-trauma acute care facilities in the performance improvement process. Many Trauma Centers participate in state and regional trauma system planning and development.

Planned Development
LEMSA and State EMS Authority leadership remain critical to the overall success of the State Trauma System. The creation and development of Regional Trauma Coordinating Committees (RTCCs) represent a principal change in the inclusion of expertise and participants of the trauma system, including the composition of the State Trauma Advisory Committee (STAC), which now includes regional representatives from each RTCC.

State EMS Authority
As part of the State EMS Authority's responsibility to coordinate the planning, development and implementation of the State Trauma System, the EMS Authority, with advisement from the STAC, should work to provide coordination, guidance, and assistance to the LEMSAs and RTCCs with the goal of enhancing the consistency of

trauma-related standards and guidelines throughout the state and improving the overall quality of trauma care.

The EMS Authority's objectives include:

1.1 Develop policy to facilitate communication among the LEMSAs, RTCCs, and STAC for purposes of system development
1.2 Facilitate the utilization of CEMSIS data by LEMSAs and RTCCs
1.3 Coordinate the development and activities of ad hoc working groups for system development projects such as data utilization, performance improvement, and regional transfer network
1.4 Develop a compendium of trauma-related policies, procedures, and clinical guidelines that may be shared throughout the state
1.5 Receive information and advice from the State Trauma Advisory Committee pertaining to the further development, monitoring, and operation of the State Trauma System
1.6 Convene a statewide forum to brief stakeholders and receive feedback on system-wide developments and review the overall operation and performance of the State Trauma System

State Trauma Advisory Committee

Membership on the State Trauma Advisory Committee (STAC) is determined by the EMS Authority Director and includes broad representation from trauma system stakeholders, including representatives from each of the RTCCs. The Chair of the

STAC should be a nationally recognized trauma surgeon with experience and demonstrated expertise in Trauma Center evaluation and trauma system planning. The Vice-Chair of the STAC should ideally be a LEMSA medical director or LEMSA administrator.

The STAC advises the EMS Authority in matters pertaining to the development, monitoring, and operation of the State Trauma System to include the following:

2.1 Assist the EMS Authority in facilitating the activities of the RTCCs
2.2 Set priorities for specific guideline, protocol, and policy development / review for the state-wide work groups
2.3 Receive periodic reports on LEMSA trauma plans and make related recommendations to the EMS Authority Director
2.4 Make recommendations to the EMS Authority Director in regards to modification to existing regulations pertaining to trauma systems
2.5 Respond to requests from the EMS Authority Director to assess trauma-related policies, procedures, regulations, or guidelines proposed by other groups or committees
2.6 Receive and analyze reports from the RTCCs, making specific recommendations to the EMS Authority Director as needed

2.7 Work with EMS Authority in conducting periodic (every 3-5 years) assessment and modifications to the California State Trauma Plan

Local EMS Agencies

The authority and responsibility of the local EMS agencies in implementing and monitoring local/regional trauma systems remain unchanged. The specific responsibilities of each LEMSA, with respect to the future direction of the State Trauma System, should include the following:

3.1 Participate in the RTCC with LEMSA Medical Director, Administrator, or Trauma System Coordinator

3.2 Utilize the expertise, resources, and technical assistance of the RTCCs to assist with regional trauma care issues. This may include:

- 3.2.1 Encourage all hospital to participate in improving regional trauma care.
- 3.2.2 Identify and promote clinical guideline development
- 3.2.3 Implement a system-based Performance Improvement and Patient Safety (PIPS) program
- 3.2.4 Review and modify trauma-related policies within the region
- 3.2.5 Review local trauma plans in the context of regional trauma care, with input from Trauma Centers

3.3 Implement data collection by non-trauma receiving facilities

3.4 Share pre-hospital and trauma registry data via submission to CEMSIS

3.5 Assess Trauma Center compliance with Title 22 regulations

Regional Trauma Coordinating Committees

RTCCs are a key component of the California State Trauma System and were created for the purpose of utilizing a broad range of expertise within the five regions to enhance collaboration, share and support best practices, provide requested technical assistance to the local EMS agencies and to the State EMS Authority related to the ongoing development and operation of a system of trauma care for the State of California. The RTCCs function as a conduit between the regions and the EMSA/STAC to aid in the overall Trauma System development and standardization. Regional roles include the establishment of regular communication and collaboration within and between regions. Examples of regional activities include regular meetings, sharing best practices, exploring common issues and themes and working toward resolutions to minimize variations in practice within the region and ultimately the state. State level activity includes representation on the STAC, (acting as a subcommittee for the STAC) reporting regional activities and issues, sharing regional work products, relaying STAC information and decisions back to the region.

Trauma Center

Each designated Trauma Center should have its own trauma program leadership to:

5.1 Participate on their respective LEMSA and RTCC committees, including Performance Improvement
5.2 Provide expertise to the LEMSA in the development and ongoing updates of the local Trauma Plan
5.3 Minimum compliance with CEMSIS data standards and inclusion criteria

Component 2 -- System Development Operations

Background and Current Status

California is unique insofar as its systems of trauma care are administered at the local EMS level. Currently, 33 local EMS agencies (LEMSAs) administrate trauma care in California's 58 counties. Of these LEMSA jurisdictions, 26 have at least one designated Trauma Center and 7 do not. There is no statutory or regulatory requirement for a regional or county trauma system, making all local systems essentially voluntary. However, all LEMSAs have an approved trauma system plan.

LEMSAs plan, implement and manage local trauma systems based upon state regulations. Local Trauma Plans are submitted to the EMS Authority for review and approval. The plans outline local trauma systems but do not necessarily address inter-county needs. The LEMSAs are responsible for designating Trauma Centers within their jurisdiction that meet state trauma regulation requirements as stipulated in CCR Title 22 Chapter 7.

Since trauma system development is optional and locally based, there is a wide range of trauma system models in California. The variance runs from LEMSAs with well established, trauma systems with designated Trauma Centers at various levels, to LEMSAs that have limited implementation of the plan or no designated Trauma Centers.

Planned Development

The vision for California is to develop an inclusive state trauma system that assures timely access to an appropriate level of care for all individuals following major injury.

The system should focus on prevention, quality care improvements and rehabilitation and be informed by a robust system for data collection and analysis.

State EMS Authority

The State EMS Authority, advised by its State Trauma Advisory Committee, to strengthen state trauma resources by:

1.1 Providing medical oversight for trauma system activities by a clinically active trauma surgeon experienced in trauma systems to act as the Chair of the State Trauma Advisory Committee

1.2 Facilitating participation in and utilization of the state trauma registry

1.3 Collaborating with the Department of Public Health in a comprehensive analysis of injury throughout the State of California utilizing existing databases (EPIC, SWITRS, CEMSIS and OSHPD)

1.4 Working with the LEMSAs to conduct a comprehensive analysis of trauma resources throughout the state including access-to-care at:

1.4.1 Non-trauma facilities with emergency departments
1.4.2 Trauma Centers and their specific (sub-specialty) capabilities, e.g. Neurosurgical Interventional Radiology, re-implantation, etc.)
1.4.3 Re-habilitation facilities and their specific capabilities (e.g. neurological-cognitive rehabilitation)

1.5 Facilitating communication and information transfer among the RTCCs, LEMSAs, and EMS authority through:
1.5.1 Existing website resources
1.5.2 Phone conferencing
1.5.3 Video-conferencing

1.6 Working through the STAC to provide guidance and coordination for specific RTCC activities and projects with statewide implications

1.7 Developing statewide working groups for high priority projects that might include:
1.7.1 Performance Improvement & Patient Safety programs
1.7.2 System-wide trauma data procurement and analysis
1.7.3 Regional Network for re-triage and interfacility transfers

State Trauma Advisory Committee

The STAC to provide expertise, advice and guidance to the State EMS Authority, LEMSAs and RTCCs to include:

2.1 Prioritize the needs of the state system, identifying related issues or problems, and assist the EMS Authority in coordinating efforts to address these specific issues and problems

2.2 Review and make recommendations to the EMS Authority Director for revisions to the State Trauma Plan

2.3 Review reports from the RTCCs and make recommendations for statewide policy

2.4 Advise the Authority on applications for trauma-related prehospital clinical studies

2.5 Develop guidance for consistent and periodic assessment of Title 22 compliance for designated Trauma Centers throughout the state

2.6 Make recommendations regarding revisions to Title 22 regulations

2.7 Make recommendations, as requested by a LEMSA, regarding the number, level, location, and capacity of Trauma Centers in regions throughout the state

2.8 Prioritize the development of state-wide protocols and guidelines that may be adapted to local needs by LEMSAs throughout the state

2.9 Develop processes and mechanisms for ensuring optimal access and care to special populations specifically including pediatric populations.

2.10 Develop guidance for re-triage and interfacility transfer of trauma patients regionally.

2.11 Identify high priority areas for system-wide research projects.

Local EMS Agency

The LEMSAs will maintain the authority and responsibilities as outlined in statute and regulations. In addition, LEMSA activities to include:

3.1 Conduct a review of local trauma plan in the context of this State Trauma Plan and the structures and processes it outlines

3.2 Utilize the expertise of the RTCC to provide technical assistance for the review of local trauma plans as needed

Regional Trauma Coordinating Committees

The RTCCs, by providing a broad range of expertise and experience, are instrumental in assisting the LEMSAs and EMS Authority in ongoing system development and assisting with the implementation of the State Trauma Plan. The role of the RTCCs to include the following:

4.1 Assist with a gap analysis of regional resources including acute care facilities, rehabilitation facilities, prevention programs, prehospital components, etc.

4.2 Assist the LEMSA with Trauma Plans upon request as it relates to regional trauma care

4.3 Participate in the development and implementation of a regional process for ongoing Performance Improvement (as outlined in the "Evaluation" section) that includes data and case-based analyses

4.4 Assist in the development of regional standards for performance improvement

4.5 Work collaboratively with the LEMSA to perform regional analyses of trauma- related data

4.6 Make recommendations to the STAC regarding revisions to state-wide policies and regulations

4.7 With guidance from the LEMSA, contribute to the development of state and regional protocols and guidelines

4.8 Assist in the development of regional trauma-related educational programs or offerings

4.9 Evaluate or collaborate with regional partners on trauma-related research projects

4.10 Provide technical assistance to the LEMSAs as needed for:

- 4.10.1 Assessment and modification of existing trauma-related policies/guidelines/protocols, and the development of new trauma-related policies/guidelines/protocols as they relate to regional trauma care
- 4.10.2 Identification of system Performance Improvement issues and solutions as they relate to regional trauma care
- 4.10.3 Identification of regional resource issues and solutions
- 4.10.4 Assist with the creation of Trauma Center survey teams to work with the LEMSA upon request

4.10.5 Respond to ad hoc requests from LEMSAs for other types of technical assistance

4.11 Submit or present reports to STAC that include:

4.11.1 Assessment of RTCC meetings and attendance

4.11.2 Regional trauma system development & configuration

4.11.3 Regional Performance Improvement activity

Component 3 -- Trauma System Finance

Background and Current Status

Funding for improving outcomes from trauma should be considered to be in one of the two mutually exclusive categories: reimbursement for direct patient care, and funding to support the successful oversight of a statewide trauma system. Most of the efforts in improving trauma funding has focused on the direct reimbursement for patient care. Fewer financial resources are required to support development, oversight, and quality of a state trauma system (including governance, planning, a statewide trauma registry, and performance improvement efforts).

Funding of Trauma Care

An ongoing and stable source of funding is critical to the success of any statewide program. California remains without a statewide coordinated State Trauma System due to insufficient funding for the system infrastructure, Trauma Centers, and physician readiness.

State Funding

The California State legislature memorialized its financial support for trauma care through the passing of Senate Bill (SB) 12/612 the Maddy Fund in 1987, Proposition 99 (Tobacco Tax) in 1990, and Assembly Bill (AB) 430 in 2001 establishing the Trauma Care Fund for the State.

Maddy Fund

Many local EMS agencies utilize the Maddy Fund to compensate hospitals and physicians for uninsured and under-compensated emergency services, including trauma services for adults and children. In 2007, SB 1773 amended the statute to increase the amount of the penalty from $2 per $10 to $4 per $10 penalty. A subsection of SB 1773, known as Richie's Fund, sets 15 percent of the total funds collected to be utilized for all Pediatric Trauma Centers throughout the county. It further defines the expenditure of money with the intent for augmenting pediatric trauma care. SB 1773 will sunset as of January 1, 2017.

Tobacco Tax

Revenues from tobacco taxes were earmarked in part for programs to provide health care services to indigent patients. Over the years Proposition 99 dollars have dwindled because of a decrease in the number of smokers and diversion of funds away from health care to other State programs.

Trauma Care Fund

The Trauma Care Fund was established to provide designated Trauma Centers funding for trauma care to uninsured patients. The funds were passed through the local EMS agency for distribution through a competitive grant-based system. The Trauma Care Fund only allocated funds for three years including $2.5 million

provided to local EMS agencies for the planning and implementation of new local trauma systems. Trauma Care funds have not been allocated since FY 2005-06.

Local Funding
Only two counties, Los Angeles and Alameda have developed creative funding for trauma care through earmarked assessments on property value. Another source for funding local trauma systems is paid by the Trauma Centers to the designating agency for costs associated with audits and in some cases, review by the American College of Surgeons. The fees are also used for data collection and system management.

Planned Development
There is a need to align the elements of the California's State Trauma System with the anticipated requirements for federal trauma funding under the Patient Protection and Affordable Care Act. The Act includes language for grant or contract funding of regional trauma systems.

In addition, establishing health insurance programs for all citizens is expected to have a positive effect on Trauma Center financing. It is unclear how healthcare reform policies will affect the payment for trauma care – specifically the relationship between the percentages covered by the private and public payers.

State EMS Authority/State Trauma Advisory Committee
1.1 Explore the feasibility of a State Trauma System Business Plan to:
- 1.1.1 Research and identify the system's current financial status
- 1.1.2 Perform a needs assessment to include the identification of specific aspects of the system that need funding, i.e. trauma care, infrastructure, data systems, performance improvement programs, rehabilitation, etc.

1.2 Establish relationships with University Business/Financial/Public Policy schools to work on projects of interest the state system to include:
- 1.2.1 Identify critical Trauma System components (including local and State data systems, local EMS agency system oversight, and RTCC activities) and the cost to develop and maintain
- 1.2.2 Research appropriate funding opportunities for identified critical trauma system components
- 1.2.3 Work with researchers and hospitals to establish a basis for estimating the actual cost for trauma care in California

Local EMS Agency
2.1 Research the cost and cost savings of quality trauma care to educate the public and local legislature

Regional Trauma Coordinating Committee
3.1 Identify sustainable funding to support regional activities

3.2 Make recommendations to the STAC regarding potential sources of revenue for funding the trauma system infrastructure

Component 4 -- EMS System: Prehospital Care

Prehospital Care

Background and Current status

In California, the EMS Authority has overall statutory authority for the development of prehospital care program regulations. The LEMSA has local responsibility and oversight of these programs at county and regional government levels. The medical direction and management of EMS is under the medical control of the Medical Director of the LEMSA. This medical control is in accordance with standards established by the EMS Authority. The LEMSA is responsible for trauma system management including the development of local EMS trauma triage criteria, destination policy, and accreditation of local paramedics and EMTs to include assurance of knowledge of the local trauma system.

Trauma education for prehospital providers is incorporated into prehospital training programs as a standard part of the U.S. Department of Transportation EMS curriculums. Multidisciplinary continuing education programs for trauma are available to prehospital personnel through local Trauma Centers, LEMSAs, and continuing education providers. At present, there is no specific trauma continuing education hours considered to be a minimum for prehospital personnel.

Triage, Destination Policies for Trauma

Trauma triage and destination policies often reflect the availability of trauma services within a specific community. The national standards for trauma triage have been adopted by many of the LEMSAs both locally and regionally through RTCC collaboration. While there is still a need for local variation, these guidelines are, for the most part, becoming accepted as the minimum trauma triage standards for all of California.

Medical Direction

The LEMSA, using state minimum standards, establishes policies and procedures including dispatch, patient destination, patient care guidelines, and quality improvement requirements. For trauma systems, medical direction is commonly accomplished by two complimentary methods:

- Trauma system policies and procedures in written form and accepted as valid by and for the trauma community to which they apply
- Policies such as equipment required for field stabilization of trauma victims

Planned Development

While the prehospital component of the State Trauma System is well defined and been functioning as a key partner, there are opportunities for improvement as the system matures.

State EMS Authority

1.1 Support the current national standards for prehospital Trauma Triage Guidelines as the minimum statewide standard.

1.2 Through its State Trauma Advisory Committee, develop definitions and study over and under triage with a mechanism to track on a regional basis

1.2.1 Work with OSHPD in obtaining specified data from non-trauma facilities on trauma patients transported to the facility and not transferred

Local EMS Agency

As part of the local Trauma Plan, LEMSAs to:

2.1 Establish a Trauma System Manager/Coordinator position with appropriate qualifications

2.2 Ensure prehospital care reports are part of the medical record for all trauma victims

2.3 Develop policy to ensure prehospital resources are available for re-triage including roles and responsibilities of prehospital personnel

2.4 Adopt the current national standards for prehospital Trauma Triage Guidelines tailored to local needs and resources, incorporating the needs of pediatric and geriatric populations

Regional Trauma Coordinating Committee (upon request by the LEMSA)

3.1 Assist the LEMSAs in developing California Trauma System-specific continuing education programs for the training of 1st Responders, EMTs, paramedics and MICN's in the region

3.2 Assist the LEMSAs in developing pediatric and geriatric-specific field trauma triage criteria for regional standardization

3.3 Assist LEMSAs in analyzing regional over and under triage

Component 5 - - Ambulance and Non-Transporting Medical Units

Background and Current status

Non-transporting prehospital medical units are configured in various ways throughout California. In urban regions, it's common for non-transporting units to be fire apparatus staffed by either EMT or paramedic level personnel. Rural areas (including state and federal parks, forests, and beaches) may have staff cars or rescue units in various configurations and capabilities staffed with trained first responders, EMTs, or in some cases paramedics. Organized search and rescue teams also fit the category of non-transporting EMS units.

Transport units, ground and air, are regulated and meet policies of the jurisdictional LEMSA and applicable state and federal laws and regulations. EMS transport agencies are managed by public, private and law enforcement agencies. The EMS Authority enforces EMS Aircraft regulations (California Code of Regulations, Title 22, Chapter 8) that are outside of FAA and publishes statewide Prehospital EMS Aircraft Guidelines (EMSA #144).

Minimum ground ambulance equipment standards are established by the California Highway Patrol for basic life support supplies and equipment. Equipment standards to support the scope of practice, are established by the LEMSA and vary between non-transporting and transporting units. Recommendations for national standards for equipment inventories for EMS resources have been developed by Commission on Accreditation of Ambulance Services, Commission on Accreditation of Medical Transport Services and California EMS for Children Program.

Planned Development

California has a complex EMS transport system utilized to expeditiously transport the critically injured patient to the most appropriate facility. As the system expands to provide universal access to trauma care, transport decisions become more multifaceted, coordinating both ground and air resources in a safe manner.

EMS Authority/State Trauma Advisory Committee

1.1 Recommend triage guidance for EMS Dispatch Agencies receiving automated vehicular telemetry data (AACN)

1.2 Develop minimum prehospital equipment inventory guidelines for non-transport/transport EMS units specific to trauma needs

1.3 Develop guidance for EMS Provider Agencies in providing for or allowing scene photography to aid in the assessment of the mechanism of injury and its effect on injury

Regional Trauma Coordinating Committee

2.1 Assist, upon request by the LEMSA**,** in the development of inter-regional agreements for management and transport of mass casualty victims

2.2 Assist the LEMSA, upon request, in the development of re-triage guidelines and transfer processes including necessary prehospital resources for the rapid transport of patients from non-trauma facilities to Trauma Centers that cross LEMSA jurisdictional lines within the region

2.3 Recommend air transport utilization guidelines applicable to regional trauma care issues

Component 6 - - Communications Systems

Background and Current status

The computer aided E911 access system is standard in California. Unfortunately, the 911 system is challenged by changing technology such as expanding cell phone and voice or internet protocol (VOIP) usage. Cellular telephone and VOIP communication systems do not easily fit current computer aided 911 dispatch systems that allow for immediate identification of the location of a caller.

The current state and local 911 alert system has failed to advance with communication technology and does not integrate cell phones or Internet-based communication methods. This often results in a delayed response of first responders to the scene of a trauma event.

In large urban California systems, it is common for ~~priority dispatch~~ Emergency Medical Dispatch Programs (EMD) to be employed. Pre-arrival instructions and protocols are often used. While some non-urban systems utilize EMD, many small dispatch centers and rural regions are without priority dispatch or protocols.

A standard public safety radio frequency has been identified for use in California for communication between all air and ground units.

Some LEMSAs maintain computer logging systems that provide diversion data to hospitals in the region. Some LEMSAs have developed on-line computer communication systems for inter-hospital communication.

Planned Development

Standardized communications should be coordinated between all EMS systems on a given incident, utilizing current technology, to notify the trauma care team of essential information on the injured patient and ensure appropriate destination decisions are made.

State EMS Authority/State Trauma Advisory Committee

1.1 Explore an integrated prehospital-base hospital-receiving hospital communication system to aid in communication during mass casualty and disaster events.
1.2 Promote statewide usage of common communication frequencies between ground and air transport units.

Local EMS Agency

2.1 Continue to advance efforts to develop priority dispatch for trauma and investigate process changes that improve dispatch effectiveness while improving outcomes
2.2 Participate in statewide gap analysis to determine ambulance to ambulance communication capability and formats with identification of shortfalls.

Regional Trauma Coordinating Committee

3.1 Study the statewide and regional hospital alert systems currently in place to identify hospital capability, capacity, and specialty care availability (e.g. burns, pediatrics, etc.) and assist the LEMSA, upon request, in a gap analysis.

Component 7 -- Definitive Care Facilities: Acute Care Facilities

Acute Care Facilities

Background and Current Status

The mainstay of a trauma system is its network of specially designated acute care hospitals that have the resources and personnel capable of providing timely care to victims of serious injury. The current characteristics of local trauma systems, with respect to its acute care facilities, include the following:

- An existing network of designated Trauma Centers that have demonstrated compliance with established standards and regulations for Trauma Center resources, personnel, and processes of care
- The number of Trauma Centers within a system is restricted to allow volume performance by the highest level centers
- An inclusive system of higher and lower level centers providing care to patients with higher and lower injury severity respectively. In the more mature systems, the LEMSA defines a role for all acute care facilities as participants in the delivery of trauma care. Markers for participation include a structured institutional and system performance improvement program, data submission to regional registries, educational outreach, injury prevention, and operational agreements between sending and receiving hospitals within the system

Given the diversity of population density, geography, economics and other factors, California presents unique challenges to the creation of optimally located, appropriately resourced network of acute care facilities. There are currently 345 acute care facilities with emergency departments in the state of California. Of these, 76 are designated Trauma Centers ***Appendix E.*** Twenty-two California counties currently have no designated Trauma Centers within county lines.

Recognizing that under-triage will inevitably occur and that patients with significant injuries will inevitably present to hospitals not specifically equipped or designated, non-trauma facilities play a critical role in the care of trauma patients. With some of the mature local trauma systems, these facilities, are integrated into the regional trauma system with their roles specifically defined and codified in the local Trauma Plan. The “inclusivity” of counties and regions within the state with respect to the spectrum of Trauma Center levels (I-IV and non-trauma facilities) varies from those counties served by a sole Level I Trauma Center (San Francisco), to those areas served by a greater number and wider variety of designated centers (Los Angeles).

Planned Development

The primary goals for the statewide system of trauma care with respect to its acute care facilities is to help guarantee timely access to basic trauma care throughout the state, to ensure timely access to definitive care regardless of the

type and severity of injury, to ensure that designated centers maintain capabilities commensurate with their level of designation, and to improve the consistency of processes related to initial and recurring designation. The further development of the network of acute care facilities should involve the following aims:

EMS Authority

1.1 Periodically assess the number and level of Trauma Centers within the state by region to evaluate access to trauma care and work with LEMSA to identify areas of insufficient coverage

1.2 Identify members of the trauma community (surgeons, EM physicians, trauma program managers) within the state with the expertise, experience & willingness to serve as site surveyors under Title 22 to be provided to LEMSA upon request

State Trauma Advisory Committee

2.1 Develop template for 'operational' agreement between sending (non-trauma facility / lower level TC) and receiving (LII, LI) centers

2.2 Develop guidance document comparing Title 22 requirements with current ACS verification requirements

Local EMS Agency

3.1 Outline the responsibilities and expected participation in the trauma system for non-designated acute care hospitals

Component 8 -- Inter-Facility Transfer and Re-Triage

Background and Current Status

Although accurate field triage and direct transport to an appropriate level of care is a goal for all trauma systems, under-triage to non-trauma facilities or lower level Trauma Centers lacking the capabilities of caring for the most seriously injured will inevitably occur. For purposes of this document, re-triage means the immediate evaluation, resuscitation and transport of a seriously injured patient from a lower level trauma facility or non-trauma facility to a designated Trauma Center for a higher level of care. This process involves direct ED to ED transfer of patients that have not been admitted
to the hospital. Interfacility transfer (IFT) refers to the transfer of an admitted patient, under the care of an admitting physician-of-record, from one facility to another.

There is currently no mechanism for the ongoing monitoring of under-triage or the number of re-triaged or transferred patients within the state. The frequency, location, and severity of related injuries involved with re-triage and inter-facility transfer within the state are largely unknown. In situations where re-triage or inter-facility transfer does occur, it may be delayed, and patients may not be managed according to evidence-based practice guidelines (e.g. traumatic brain injury). Re-triage / IFT protocols have been developed in several areas of the state, but are not in widespread use, and their effectiveness has just begun to be monitored.

Obstacles to transfer & re-triage include lack of a proximally located Trauma Center, lack of knowledge regarding the capacity (e.g. diversion status) and capabilities of potential receiving centers, fear regarding EMTALA violation, local geographical & climatic obstacles to transportation (e.g. remote location, mountains, fog, etc.), transportation availability, insurance or financial status of the patient, and bed availability at receiving facilities.

Planned Development

The overall goal for the state with respect to re-triage/Interfacility transfer is to develop mechanisms, processes, and guidelines that will optimize timely access to trauma care at a level commensurate with the severity of injury, regardless of geographic location. The specific elements needed to achieve this goal include the following:

State EMS Authority

1.1 Develop a process that will allow ongoing analysis of all re-triage and IFT activity within the state based on CEMSIS data
1.2 Evaluate current paramedic scope of practice to enable and facilitate rapid re-triage & transport of severely injured trauma patients (i.e. TBI)
1.3 Identify receiving centers for special injuries (i.e. spinal cord, reimplantation)

1.4 Develop web-based compendium of Trauma Centers, Burn Centers, Pediatric Trauma Centers, their specialized capabilities & contact information for rapid communication when needed
1.5 Investigate integration of real-time information on California Trauma Center status: open/on-diversion/partial diversion, etc. to all receiving facilities in California 1.6 Explore development of centralized re-triage/transfer coordination within the state
1.6 Develop specific EMTALA-based guidelines for the transfer and acceptance of trauma patients within the state. These should address:
    1.6.1 The EMTALA 'non-discrimination' provision in regards to the obligation (or not) to accept non-level-of-care patients
    1.6.2 EMTALA allowance for the transfer of 'unstable' trauma patients for documented medical need to a higher level of care

Local EMS Agency/Regional Trauma Coordinating Committee

2.1 Identify areas in the state where timely access to Trauma Centers may be improved (needs assessment)
2.2 Develop specific physiological and anatomical indicators for re-triage on a level-of-care basis (e.g. Level III center to LI/LII, etc.)
2.3 Develop models for education and outreach that will promote timely re-triage/IFT where appropriate
2.4 Promote the development of regional cooperative arrangements between sending and receiving centers that will facilitate re-triage, reduce delays, and ensure that patients are re-triaged to an appropriate level of care
2.5 Develop clinical management guidelines for the early (re-triage phase) treatment of high-risk injuries such as TBI, pelvic fractures, mangled or crushed extremity injuries, peripheral vascular injuries, etc.
2.6 Explore the development of clinical management guidelines that would allow lower level facilities in remote areas to manage selected types of injuries (e.g. 'minimal' TBI)
2.7 Develop structured relationships (regional cooperative agreements), including educational outreach between sending and receiving hospitals in order to facilitate the inter-facility transfer and re-triage and clinical management guidance to allow lower level facilities to keep selected patients
2.8 Explore and promote the use of telemedicine for trauma patients where appropriate
2.9 Identify & promote educational resources suitable for improving re-triage and inter-facility transfers (i.e. the ACS Rural Trauma Team Development Course)

Component 9 -- Rehabilitation and Trauma Recovery

Background and Current Status

Rehabilitation services are optimally provided along a continuum beginning with admission to a Trauma Center and continuing through community reintegration. While California regulation Title 22 for Level I/II contains requirements for PT/OT/ST, standardized early treatment guidance does not exist. Most rehabilitation facilities are independent facilities and the degree of integration into the trauma system varies considerably. In addition, the degree of access to level-of-care post-injury rehabilitation throughout the state is unknown. In many cases, the access to post-injury rehabilitation is a function of the needs of the patient but also of their insurance status and rehabilitation resources within the region.

Planned Development

In an effort to more effectively address the rehabilitative needs of trauma patients in the context of a statewide system of care, the following objectives are to be applied:

State EMS Authority

1.1 Develop a compendium of rehabilitation facilities throughout the state to include:
- 1.1.1 A plan to assess the availability and capabilities of rehabilitation facilities in the state and integrate them into the regional planning and performance improvement process including:
  - 1.1.1.1 Specialized centers for Traumatic Brain Injury (TBI) & spinal cord injuries
  - 1.1.1.2 Pediatric centers
  - 1.1.1.3 Burn & other specialty recovery facilities

1.2 Improve the data collection for evaluation of rehabilitative needs and degree of access to rehabilitation throughout the state.

1.3 Explore possible amendments to California Code of Regulations, Title 22, Chapter 7 to incorporate the rehabilitation needs of the trauma patient including rehabilitation as part of the continuum of care.

State Trauma Advisory Committee

2.1 Adopt a standardized measure of functional recovery suitable for use throughout the trauma system

Local EMS Agency/Regional Trauma Coordinating Committee

3.1 Develop guidelines for the current incorporation of rehabilitation into the continuum of trauma care. These guidelines might include:
- 3.1.1 A mechanism to initiate rehabilitation services or consultation upon patient admission

3.1.2 Policies regarding coordination of transfers between acute care and rehabilitation facilities.

3.1.3 A template for operational MOU's between definitive care facilities and rehabilitation centers to include:

3.1.3.1 Complications and outcome follow-up

3.1.3.2 Data sharing for Performance Improvement activities

3.1.3.3 Educational outreach

Component 10 -- Information Systems

Background and Current Status

Data collection at the state level is dependent on the local EMS and trauma data systems managed by the local EMS agencies. The majority of the data is transmitted to CEMSIS from the local EMS agency data systems and not directly from the EMS provider or Trauma Center. CEMSIS is divided into two components: CEMSIS-EMS, that contains prehospital data and CEMSIS-Trauma which contains Trauma Center data. Participation in CEMSIS is voluntary by local EMS agencies and is currently managed for EMSA through a subcontract with Inland Counties EMS Agency with ImageTrend as the vendor.

CEMSIS-EMS

Select prehospital data elements are included in the state trauma data standards. Data is integrated into the local EMS agency's and State's data management systems. The CEMSIS-EMS data standards are in compliance with the National EMS Information System (NEMSIS) standards.

CEMSIS-Trauma

Each designated Trauma Center is responsible for the collection of data on defined patients as outlined in Title 22. This minimum data set is expanded locally to meet the needs of the Trauma Center and trauma system. This data is integrated into the local EMS agency's and State's data management systems. CEMSIS-Trauma is inclusive of Trauma Center data with data standards in compliance with the National Trauma Data Standards (NTDS).

While regulations require all hospitals that receive trauma patients to participate in the local EMS agency data collection efforts, compliance with this requirement is variable as non-trauma facilities have no contractual obligation to comply. All hospitals are required to provide emergency department, and hospital discharge data to the State Office of Health Planning and Development (OSHPD) with specific data standards outlined in regulations.

Other data systems that support CEMSIS-Trauma

- Crash/law enforcement data is collected through the California Statewide Information Traffic Records System (SWITRS) by law enforcement personnel
- (California Highway Patrol) at the scene of a crash on state highways; other law enforcement agencies have the option of participating in SWITRS.
- Coroner data: California has a mixed system of county coroners and medical examiners with no central data repository of data apart from the reporting of data for death certificates to the state Department of Public Health. Coroners and medical examiners report data for death certificates via an electronic (web-based) system. The state Department of Public

Health edits and verifies the information and creates several files. The most commonly used is the Deaths Statistical Master file which contains all the information found in comparable files for other states and territories.

Planned Development

State EMS Authority/State Trauma Advisory Committee/CEMSIS Data Committee

1.1 Explore feasibility of developing linkages of databases to create a complete patient record. This would include:
- 1.1.1 Develop a mechanism for deterministic/probabilistic matching of data
- 1.1.2 CEMSIS-Trauma and CEMSIS-EMS linkage
- 1.1.3 CEMSIS-EMS and Hospital Data (OSHPD) linkage
- 1.1.4 CEMSIS and Statewide Integrated Traffic Records System (SWITRS) linkage

1.2 Evaluate data validity by:
- 1.2.1 Developing a plan to monitor data completeness and accuracy including utilization of the state-defined inclusion criteria

1.3 Improve data compliance by:
- 1.3.1 Development of standard reports provided to local EMS agencies itemizing Trauma Center data compliance
- 1.3.2 Development of a subset of CEMSIS-Trauma to include data on pre-defined injured patients seen at non-trauma facilities
- 1.3.3 Promotion of CEMSIS participation by all local EMS agencies through submission of a minimal data set from non-trauma facilities (e.g. OSHPD data)

1.4 Improve data sharing through:
- 1.4.1 Development of standard aggregate reports to be publically shared on the EMSA website
- 1.4.2 Development of a procedure for all requests for data including a data request form
- 1.4.3 Development of a policy for data sharing in compliance with applicable patient confidentiality laws

Local EMS Agency

2.1 Develop a plan to monitor data completeness and accuracy including utilization of the state-defined inclusion criteria prior to submission to CEMSIS

Component 11 -- System Evaluation and Performance Improvement

Background and Current Status

The purpose of a state Performance Improvement and Public Safety (PIPS) Program ensures that injured patients receive quality care throughout the continuum. This requires monitoring care processes, structures and outcomes, identifying areas for improvement, developing and carrying out corrective action plans, and verifying that these corrective action plans result in desired improvements in outcome. The ideal PIPS Program requires accurate local, regional, and state prehospital and hospital clinical databases. Other components include identification of risk factors and best practices, accurate, standardized measurement of complications, risk-adjusted outcomes measurement, benchmarking, and appropriate feedback of benchmarking results.

The EMS Authority is responsible for developing and implementing a state-wide EMS PIPS Program with the LEMSA Trauma System Coordinators in collaboration with EMS Medical Directors. Regional Trauma Coordinating Committees may assist in case review if it crosses jurisdictional lines within the region. Trauma Centers are required to have a PIPS Program for improving care. In most cases, the PIPS program is linked to the hospital PI department and overall hospital PI Plan. Performance Improvement standards are developed to assist with monitoring care relative to standards of care.

California Code of Regulation Title 22 Chapter 12 EMS System Quality Improvement requires that EMS provider agencies and Base Hospitals develop a PIPS Program with an associated Plan to be approved by the LEMSA. The LEMSA PIPS Plan is approved by the EMS Authority. The regulations do not itemize trauma-specific components of the LEMSA PIPS Plan.

Planned Development

In order to evaluate the State Trauma System, the continuum of care from dispatch to pre-hospital to hospital disposition must be connected through a data system. Only in this way, can we begin to understand how care provided translates to improved outcomes and system effectiveness.

State EMS Authority

A program should be developed by the EMS Authority in collaboration with the LEMSAs and RTCCs to evaluate statewide trauma system performance. This should include:

1.1 Develop a statewide comprehensive Trauma PIPS Plan consistent with the elements of this State Plan
1.2 Create a State Trauma PIPS committee as a subcommittee of the STAC
1.3 Perform a comprehensive statewide assessment of the State Trauma System based on national standards and California-specific resources

1.4 Evaluate state data and identify regional opportunities for improvement, determining if similar opportunities are occurring in other regions and explore mechanisms for shared resolution
  1.4.1 Develop specific database queries
  1.4.2 Create definition for system sentinel event and monitor such events
  1.4.3 Facilitate issue resolution by assisting other system performance improvement committees
  1.4.4 Develop and implement standards for system-wide performance improvement
1.5 Create a recommended minimal data set of information to be submitted to LEMSA system trauma registries from non-trauma facilities to track and trend outcomes of traumatically injured patients retained in non-trauma receiving facilities
1.6 Direct cross-regional issues to specific PI Project Work Groups for study and recommended resolution
1.7 Develop and institute a mechanism for providing data and feedback to LEMSAs to assist in optimizing local PIPS processes
1.8 Explore participation in the American College of Surgeons National Trauma Performance Improvement Project (TQIP) as a state, including a cost-benefit analysis
1.9 Create a policy regarding the sharing of data for the PI process, recognizing hospital confidentiality and HIPPA regulations.
1.10 Explore the development of a HIPPA compliant universal identifier (e.g. PCR# from prehospital patient care report) that allows individual patient data to be tracked throughout the entire spectrum of care including post care outcomes
1.11 Ensure recommended minimum data that set allows for risk adjustment of individual patients so that benchmarking can be carried out
1.12 Develop a process to periodically collect data elements designed to focus on specific patient populations and processes that are deemed to be the most important at any given time; these focused projects may be directed from the State, Region or LEMSA
1.13 Benchmark individual systems, hospitals, LEMSAs and RTCCs to the group as a whole and to an outside standard

Local EMS Agency

2.1 Develop risk-adjusted standardized reports and based on nationally recognized formula
2.2 Show overall progress in achieving goals for significant injury and patient categories
2.3 Create a local/regional Performance Improvement Program (may be integrated into EMS PI Program for small systems) to:
  2.3 1 Develop specific database queries
  2.3.2 Create definition and monitor system sentinel events

2.3.3 Work with local Medical Examiner on guidelines for trauma post-mortem exams
2.3.4 Facilitate issue resolution by individual performance improvement committees
2.4 Represent LEMSA at regional and state Performance Improvement Committees

Regional Trauma Coordinating Committee

3.1 Identify regional system issues and work with member LEMSAs on resolution of these issues
3.2 Recommend audit filters based on the region's population traits, available resources and geography
3.3 Explore tools to identify variations in care and outcomes across respective regions and determine possible ways to reduce detrimental variations in regional structures and care processes that may result in negative outcomes
3.4 Prioritize system issues identified for resolution
3.5 Work collaboratively with each member LEMSA to ensure standardized and accurate data collection and CEMSIS participation

Component 12 -- Education & Training

Background and Current Status

Education consists of two categories: education of the public regarding trauma systems and education and training of trauma care professionals across the continuum of care.

Education of the Public

No formal public education process exists for trauma systems. Private and public surveys indicate that the general public regards all hospitals as Trauma Centers and few can indicate where their closest Trauma Center is located; furthermore, many citizens are not aware that the EMS system is the best avenue to receive trauma care.

Education and Training for Trauma Care Professionals

Education and training of trauma care professionals is compartmentalized into prehospital, nursing, and physician education with very limited trauma systems education. The EMS Authority in conjunction with statewide partners has sponsored five State Trauma Summits providing updates on national trauma system development and clinical care along with an opportunity for local systems to present on best practices.

Regional Trauma Coordinating Committees (RTCC) also offer regional Trauma Summits with a mix of systems and clinical topics. RTCCs partnering with the Trauma Managers Association of California (TMAC) sponsor the ACS Rural Trauma Team Development Course. Standard certification courses such as Basic Trauma Life Support (BTLS) , Prehospital Trauma Life Support (PHTLS) and Transport Nurse Advanced Trauma Course (TNATC) are available and encouraged but not required in most of areas of the State.

While there are national continuing education standards in place for Trauma Centers, they are silent in California regulations. Some education requirements are addressed through the Trauma Center designation process and monitored by the LEMSA. Various national certification programs such as Advanced Trauma Life Support (ATLS), Trauma Nurse Coordinator Course (TNCC), Advanced Trauma Care for Nurses (ATCN), Advanced Cardiac Life Support (ACLS), and Pediatric Advanced Life Support (PALS) are available; however, there is no consistency throughout the State.

Regulations specify Trauma Center physician qualifications related to specialty board certification and Advanced Trauma Life Support certification. It is also a requirement that the Trauma Center participate in continuing education in trauma care. Education standards also exist within the Trauma Center, which are met if the Trauma Center either chooses or is required to be verified by the ACS.

Planned Development

State, regional and local education needs should be identified, and resources readily available to meet those needs. Standard education competencies should apply statewide, and each region's individual educational offerings should address local needs.

EMS Authority

1.1 Identify statewide educational needs through the Performance Improvement and Patient Safety Program in consultation with hospitals, local EMS agencies and RTCCs

1.2 Develop, through its State Trauma Advisory Committee, a plan for providing information to the public regarding the structure and function of the State Trauma System

Local EMS Agency

2.1 Provide public education regarding trauma systems and injury prevention following high profile traumatic events

2.2 Perform a needs assessment prior to developing new or additional trauma-related educational programs

Regional Trauma Advisory Committee

3.1 Promote regional efforts to educate the public on trauma systems and the role and effectiveness of Trauma Centers

3.2 Develop trauma clinical care education for regional trauma professionals

Trauma Centers

4.1 Work with non-trauma facilities and level IV Trauma Centers in providing for the Rural Trauma Team Development Course

4.2 Provide for education based on PIPS Program findings

Component 13 -- Trauma Systems Research

Background and Current Status

Academic research centers performs the majority of trauma research done in California (Level I Trauma Center) and is required by regulation for Level I designation. Important contributions are also being made in the areas of public health, pediatrics, and prehospital. Most of these projects are being conducted by single institutions or agencies and are not utilizing the opportunities of collaborative, multidisciplinary research. Currently, funding is sought by investigators and facilitated by the research institution. Statewide systems research has been limited to date and has included isolated reports from single institutions on issues such as access to care and pediatrics.

The state trauma registry (CEMSIS-Trauma) is an important source of information and data for research. Institutional and regional databases may be used for comparative and outcomes research, and large statewide databases should be used to demonstrate the effectiveness of the system. The CEMSIS-Trauma Registry was started in 2009 and currently does not have a mechanism to request data for the purposes of research. The EMS Authority is responsible for maintaining data integrity and reliability of the state trauma registry, which is compatible with the National Trauma Data Standards (NTDS).

Research using trauma registries may provide information about resource utilization, outcomes, and system performance. Comparative benchmarking using local, regional or statewide trauma registries can be performed by comparing local data with the National Trauma Data Bank (NTDB).

Planned Development

Local EMS agencies and Trauma Centers should be the basis for collaborative systems research utilizing the statewide CEMSIS database. Trauma system research involving both local and state agencies should be part of local/regional trauma systems.

EMS Authority

1.1 Facilitate access to data for individual or groups of investigators through the use of CEMSIS
1.2 Establish internal policies for the request for data from CEMSIS for research purposes
1.3 Identify the research expertise in the system and work collaboratively with experts in the field (e.g. Schools of Public Health, Finance and Economics)

State Trauma Advisory Committee

2.1 Facilitate multidisciplinary collaboration for research
2.2 Develop research agenda (possibly through a research committee) and collaborate with established investigators to conduct research projects

2.3 Periodically review trauma system data derived from CEMSIS, OSHPD and other sources, and make recommendation to various system stakeholders regarding potential areas of research

Component 14 -- Injury Prevention

Background and Current Status

Although an integrated injury prevention system has yet to be established statewide, a number of collaborations between Trauma Centers, LEMSAs and public health departments have successfully been developed at the regional level and can be used as models for injury prevention. In keeping with the public health model, statewide injury control in California has been established primarily under the direction of the Department of Public Health; however, an assessment of the state trauma system in 2006 by the EMS Authority recognized a lack of interface between these efforts and state trauma leadership.

The EMS Authority participates in the Strategic Highway Safety Plan (SHSP) that has 17 Challenge Areas focused on many injury prevention topics. The EMS Authority is the lead agency for Challenge Area 15 that has the goal of "Improving Post Crash Survivability". The EMS Authority is actively forging relationships between EMS partners (local EMS agencies, Trauma Centers, and providers) and SHSP committees to increase statewide injury prevention participation.

The Trauma Managers Association of California (TMAC) utilizes the expertise of many trauma program leaders to develop statewide coalitions for prevention. Some of the Regional Trauma Coordinating Committees (RTCC) are developing organized approaches for injury prevention.

Planned Development

The incorporation of an integrated injury prevention system into the State Trauma Plan is a critical step in reducing the burden of injury morbidity and mortality in California. In recent years, trauma care has shifted from the medical model of treating injuries to a public health approach that defines trauma as a preventable disease. Rather than focusing on the acute care of traumatic injuries, the public health framework allows for the prevention and mitigation of injury by addressing the causes of trauma and subsequent injury.

State EMS Authority/State Trauma Advisory Committee

1.1 Partner with existing agencies focusing on statewide injury prevention (e.g. EpiCenter at the California Department of Public Health) for the purpose of:

- 1.1.1 Establishing best practice recommendations for prevention programs and evaluation based on scientifically evaluated injury prevention strategies
- 1.1.2 Improving coordination and utilization of public health and trauma systems injury prevention resources at the state, regional and local levels
- 1.1.3 Coordinating a statewide strategy to promote injury awareness with the public, media, and elected officials

Local EMS Agency/Regional Trauma Coordinating Committee

2.1 Develop a compendium of regional injury prevention programs with links provided to EMSA for posting on the website

2.2 Implement new and support existing scientifically proven prevention programs in response to regionally specific injury data

2.3 Ensure ongoing program evaluation to determine the effectiveness in reducing intentional and unintentional injuries

2.4 Collaborate with injury prevention programs to collect the necessary data for program evaluation and needs assessment

2.5 Create a public information and education program with consistent messaging on the preventability of injury

Component 15 -- Emergency/Disaster Preparedness

Background and Current Status

The role of trauma systems is a key component of the overall response system for disasters/multiple casualty events. Each LEMSA and Operational Area (county or group of counties) has a defined means of communication and coordination of patient movement. A local jurisdiction engaged in a multicasualty incident (MCI) commands and organizes a given incident using the FIRESCOPE MCI Plan. Triage, using LEMSA protocols and procedures, is conducted under a Triage Unit and patient treatment and staging prior to transport are conducted under a Treatment Unit. Using local procedures, Medcom communicates the number and acuity of survivors to the healthcare system, including Trauma Centers, which in turn communicate their capacity for receiving patients. Designated trauma and burn patients, using LEMSA criteria, are directed to trauma/burn centers. If the magnitude of the MCI begins to exceed the capacity of the local or Operational Area trauma system, patient movement may be directed to contiguous trauma systems.

The State Operations Center (SOC) coordinates State resources to support the affected trauma systems or to coordinate state-wide patient movement through the EMS Authority and Department of Public Health. The SOC, through the Governor, can also make requests for federal medical and health resources through the FEMA Region IX and Department of Health and Human Services Region IX.

All-hazards events routinely include situations involving natural (earthquake), unintentional (school bus crash), and intentional (terrorist explosion) trauma-producing events that test the expanded response capabilities and surge capacity of the trauma system. Funding from HRSA and FEMA is inadequate for the task of preparing Trauma Centers for the next inevitable event when they are already under economic duress.

Planned Development

EMS Authority/State Trauma Advisory Committee

1.1 Perform an assessment gap analysis of the state trauma system's emergency preparedness including Trauma Center surge capacity
1.2 Integrate the State Trauma Plan with the California Public Health and Medical Emergency Operations Manual Plan for natural and manmade incidents
1.3 Explore the use of existing resource monitoring systems to provide real-time trauma capacity and resources assessment
1.4 Incorporate the role of the trauma system in the Public Health and Medical Emergency Operations Manual
1.5 Develop a standardized inventory for trauma caches to be located at strategic locations in the event of a disaster

1.6 Develop the capacity via the EMSA website for the dissemination of guidelines, protocols, programs, etc. relevant to the State Trauma System
1.7 Encourage collaboration, communication, and involvement between LEMSAs, RTCCs, MHOAC/RDMHS, and local Trauma Center staff
1.8 Coordinate and plan with LEMSAs, RTCCs, MHOAC/RDMHS, and local Trauma Center staff for rapid decompression of healthcare facilities during regional mass casualty events.

Local EMS Agency/Regional Trauma Coordinating Committee

2.1 Explore trauma system surge capacity, and best practices to improve disaster response.
2.2 Provide leadership and active participation in the state and regional trauma care system with lead functions for system and disaster planning
2.3 Promote training to Trauma Centers and non-trauma facilities on the medical health disaster system in the region
2.4 Develop template language for MOU's between Trauma Centers to ensure a quick process for sharing recourses' (personnel, equipment and medical supplies) to enhance surge capacity during disasters

Component 1: Trauma System Leadership

EMS Authority	State Trauma Advisory Committee	Local EMS Agency	Regional Trauma Coordinating Committee	Trauma Center
1.1 Develop policy to facilitate communication among the LEMSAs, RTCCs, and STAC for purposes of system development	2.1 Assist the EMS Authority in facilitating the activities of the RTCCs	3.1 Participate in the RTCC with LEMSA Medical Director, Administrator, or Trauma System Coordinator	RTCCs are a key component of the California State Trauma System and were created for the purpose of utilizing a broad range of expertise within the five regions to enhance collaboration, share and support best practices, provide requested technical assistance to the local EMS agencies and to the State EMS Authority related to the ongoing development and operation of a system of trauma care for the State of California. The RTCCs function as a conduit between the regions and the EMSA/STAC to aid in the overall Trauma System development and standardization. Regional roles include	Each designated Trauma Center should have its own trauma program leadership to: 5.1 Participate on their respective LEMSA and RTCC committees, including Performance Improvement

EMS Authority	State Trauma Advisory Committee	Local EMS Agency	Regional Trauma Coordinating Committee	Trauma Center
			the establishment of regular communication and collaboration within and between regions. Examples of regional activities include regular meetings, sharing best practices, exploring common issues and themes and working toward resolutions to minimize variations in practice within the region and ultimately the state. State level activity includes representation on the STAC, (acting as a subcommittee for the STAC) reporting regional activities and issues, sharing regional work products, relaying STAC information and decisions back to the region.	
1.2 Facilitate the utilization of CEMSIS data by	2.2 Set priorities for specific guideline, protocol, and	3.2 Utilize the expertise, resources, and		5.2 Provide expertise to the LEMSA in the development

EMS Authority	State Trauma Advisory Committee	Local EMS Agency	Regional Trauma Coordinating Committee	Trauma Center
LEMSAs and RTCCs	policy development / review for the state-wide work groups	technical assistance of the RTCCs to assist with regional trauma care issues. This may include: 3.2.1 Encourage all hospital to participate in improving regional trauma care. 3.2.2 Identify and promote clinical guideline development 3.2.3 Implement a system-based Performance Improvement and Patient Safety (PIPS) program		and ongoing updates of the local Trauma Plan

EMS Authority	State Trauma Advisory Committee	Local EMS Agency	Regional Trauma Coordinating Committee	Trauma Center
		3.2.4 Review and modify trauma-related policies within the region 3.2.5 Review local trauma plans in the context of regional trauma care, with input from Trauma Centers		
1.3 Coordinate the development and activities of ad hoc working groups for system development projects such as data utilization, performance improvement, and regional transfer network	2.3 Receive periodic reports on LEMSA trauma plans and make related recommendations to the EMS Authority Director	3.3 Implement data collection by non-trauma receiving facilities		5.3 Minimum compliance with CEMSIS data standards and inclusion criteria
1.4 Develop a compendium of trauma-related	2.4 Make recommendations to the EMS	3.4 Share pre-hospital and trauma registry		

EMS Authority	State Trauma Advisory Committee	Local EMS Agency	Regional Trauma Coordinating Committee	Trauma Center
policies, procedures, and clinical guidelines that may be shared throughout the state	Authority Director in regards to modification to existing regulations pertaining to trauma systems	data via submission to CEMSIS		
1.5 Receive information and advice from the State Trauma Advisory Committee pertaining to the further development, monitoring, and operation of the State Trauma System	2.5 Respond to requests from the EMS Authority Director to assess trauma-related policies, procedures, regulations, or guidelines proposed by other groups or committees	3.5 Assess Trauma Center compliance with Title 22 regulations		
1.6 Convene a statewide forum to brief stakeholders and receive feedback on system-wide developments and review the overall operation and	2.6 Receive and analyze reports from the RTCCs, making specific recommendations to the EMS Authority Director as needed			

EMS Authority	State Trauma Advisory Committee	Local EMS Agency	Regional Trauma Coordinating Committee	Trauma Center
performance of the State Trauma System				
	2.7 Work with EMS Authority in conducting periodic (every 3-5 years) assessment and modifications to the California State Trauma Plan			

Component 2: System Development Operations

EMS Authority	State Trauma Advisory Committee	Local EMS Agency	Regional Trauma Coordinating Committee
The State EMS Authority, advised by its State Trauma Advisory Committee, to strengthen state trauma resources by: 1.1 Providing medical oversight for trauma system activities by a clinically active trauma surgeon experienced in trauma systems to act as the Chair of the State Trauma Advisory Committee	The STAC to provide expertise, advice and guidance to the State EMS Authority, LEMSAs and RTCCs to include: 2.1 Prioritize the needs of the state system, identifying related issues or problems, and assist the EMS Authority in coordinating efforts to address these specific issues and problems	3.1 Conduct a review of local trauma plan in the context of this State Trauma Plan and the structures and processes it outlines	4.1 Assist with a gap analysis of regional resources including acute care facilities, rehabilitation facilities, prevention programs, prehospital components, etc.
1.2 Facilitating participation in and utilization of the state trauma registry	2.2 Review and make recommendations to the EMS Authority Director for revisions to the State Trauma Plan	3.2 Utilize the expertise of the RTCC to provide technical assistance for the review of local trauma plans as needed	4.2 Assist the LEMSA with Trauma Plans upon request as it relates to regional trauma care
1.3 Collaborating with the Department of Public Health in a comprehensive analysis of injury throughout the State	2.3 Review reports from the RTCCs and make recommendations for statewide policy		4.3 Participate in the development and implementation of a regional process for ongoing Performance Improvement (as outlined

EMS Authority	State Trauma Advisory Committee	Local EMS Agency	Regional Trauma Coordinating Committee
of California utilizing existing databases (EPIC, SWITRS, CEMSIS and OSHPD)			in the "Evaluation" section) that includes data and case-based analyses
1.4 Working with the LEMSAs to conduct a comprehensive analysis of trauma resources throughout the state including access-to-care at: 1.4.1 Non-trauma facilities with emergency departments 1.4.2 Trauma Centers and their specific (sub-specialty) capabilities, e.g. Neurosurgical Interventional Radiology, re-implantation, etc.) 1.4.3 Re-habilitation	2.4 Advise the Authority on applications for trauma-related prehospital clinical studies		4.4 Assist in the development of regional standards for performance improvement

EMS Authority	State Trauma Advisory Committee	Local EMS Agency	Regional Trauma Coordinating Committee
facilities and their specific capabilities (e.g. neurological-cognitive rehabilitation)			
1.5 Facilitating communication and information transfer among the RTCCs, LEMSAs, and EMS authority through: 1.5.1 Existing website resources 1.5.2 Phone conferencing 1.5.3 Video-conferencing	2.5 Develop guidance for consistent and periodic assessment of Title 22 compliance for designated Trauma Centers throughout the state		4.5 Work collaboratively with the LEMSA to perform regional analyses of trauma- related data
1.6 Working through the STAC to provide guidance and coordination for specific RTCC activities and projects with statewide implications	2.6 Make recommendations regarding revisions to Title 22 regulations		4.6 Make recommendations to the STAC regarding revisions to state-wide policies and regulations
1.7 Developing statewide	2.7 Make recommendations,		4.7 With guidance from the

EMS Authority	State Trauma Advisory Committee	Local EMS Agency	Regional Trauma Coordinating Committee
working groups for high priority projects that might include: 1.7.1 Performance Improvement & Patient Safety programs 1.7.2 System-wide 1.7.3 Regional Network for re-triage and interfacility transfers	as requested by a LEMSA, regarding the number, level, location, and capacity of Trauma Centers in regions throughout the state		LEMSA, contribute to the development of state and regional protocols and guidelines
	2.8 Prioritize the development of state-wide protocols and guidelines that may be adapted to local needs by LEMSAs throughout the state		4.8 Assist in the development of regional trauma-related educational programs or offerings
	2.9 Develop processes and mechanisms for ensuring optimal access and care to special populations specifically including pediatric populations.		4.9 Evaluate or collaborate with regional partners on trauma-related research projects
	2.10 Develop guidance for re-triage and interfacility		4.10 Provide technical assistance to the LEMSAs

EMS Authority	State Trauma Advisory Committee	Local EMS Agency	Regional Trauma Coordinating Committee
	transfer of trauma patients regionally.		as needed for: 4.10.1 Assessment and modification of existing trauma-related policies/ guidelines/ protocols, and the development of new trauma-related policies/ guidelines/ protocols as they relate to regional trauma care 4.10.2 Identification of system Performance Improvement issues and solutions as they relate to regional trauma care 4.10.3 Identification of regional resource issues and solutions 4.10.4 Assist with the creation of Trauma Center

EMS Authority	State Trauma Advisory Committee	Local EMS Agency	Regional Trauma Coordinating Committee
			survey teams to work with the LEMSA upon request 4.10.5 Respond to ad hoc requests from LEMSAs for other types of technical assistance
	2.11 Identify high priority areas for system-wide research projects.		4.11 Submit or present reports to STAC that include: 4.11.1 Assessment of RTCC meetings and attendance 4.11.2 Regional trauma system development & configuration 4.11.3 Regional Performance Improvement activity

Component 3: Trauma System Finance

EMS Authority/ State Trauma Advisory Committee	Local EMS Agency	Regional Trauma Coordinating Committee
1.1 Explore the feasibility of a State Trauma System Business Plan to: 1.1.1 Research and identify the system's current financial status 1.1.2 Perform a needs assessment to include the identification of specific aspects of the system that need funding, i.e. trauma care, infrastructure, data systems, performance improvement programs, rehabilitation, etc.	2.1 Research the cost and cost savings of quality trauma care to educate the public and local legislature	3.1 Identify sustainable funding to support regional activities 3.2 Make recommendations to the STAC regarding potential sources of revenue for funding the trauma system infrastructure
1.2 Establish relationships with University Business/Financial/Public Policy schools to work on projects of interest the state system to include: 1.2.1 Identify critical Trauma System components (including local and State data systems, local EMS agency system oversight, and RTCC activities) and the cost to develop and maintain 1.2.2 Research appropriate funding opportunities for identified critical trauma system components 1.2.3 Work with researchers and hospitals to establish a basis for estimating the actual cost for trauma care in California		

Component 4: EMS System: Prehospital Care

EMS Authority	Local EMS Agency	Regional Trauma Coordinating Committee
1.1 Support the current national standards for prehospital Trauma Triage Guidelines as the minimum statewide standard.	As part of the local Trauma Plan, LEMSAs to: 2.1 Establish a Trauma System Manager/Coordinator position with appropriate qualifications	3.1 Assist the LEMSAs in developing California Trauma System-specific continuing education programs for the training of 1st Responders, EMTs, paramedics and MICN's in the region
1.2 Through its State Trauma Advisory Committee, develop definitions and study over and under triage with a mechanism to track on a regional basis 1.2.1 Work with OSHPD in obtaining specified data from non-trauma facilities on trauma patients transported to the facility and not transferred	2.2 Ensure prehospital care reports are part of the medical record for all trauma victims	3.2 Assist the LEMSAs in developing pediatric and geriatric-specific field trauma triage criteria for regional standardization
	2.3 Develop policy to ensure prehospital resources are available for re-triage including roles and responsibilities of prehospital personnel	3.3 Assist LEMSAs in analyzing regional over and under triage
	2.4 Adopt the current national standards for prehospital Trauma Triage Guidelines tailored to local	

EMS Authority	Local EMS Agency	Regional Trauma Coordinating Committee
	needs and resources, incorporating the needs of pediatric and geriatric populations	

Component 5: EMS System: Ambulance and Non-Transporting Medical Units

EMS Authority/ State Trauma Advisory Committee	Local EMS Agency	Regional Trauma Coordinating Committee	Trauma Center
1.1 Recommend triage guidance for EMS Dispatch Agencies receiving automated vehicular telemetry data (AACN)		2.1 Assist, upon request by the LEMSA**,** in the development of inter-regional agreements for management and transport of mass casualty victims	
1.2 Develop minimum prehospital equipment inventory guidelines for non-transport/transport EMS units specific to trauma needs		2.2 Assist the LEMSA, upon request, in the development of re-triage guidelines and transfer processes including necessary prehospital resources for the rapid transport of patients from non-trauma facilities to Trauma Centers that cross LEMSA jurisdictional lines within the region	
1.3 Develop guidance for EMS Provider Agencies in providing for or allowing scene photography to aid in the assessment of the mechanism of injury and its effect on injury		2.3 Recommend air transport utilization guidelines applicable to regional trauma care issues	

Component 6: EMS System: Communications

EMS Authority/ State Trauma Advisory Committee	Local EMS Agency	Regional Trauma Coordinating Committee
1.1 Explore an integrated prehospital-base hospital-receiving hospital communication system to aid in communication during mass casualty and disaster events.	2.1 Continue to advance efforts to develop priority dispatch for trauma and investigate process changes that improve dispatch effectiveness while improving outcomes	3.1 Study the statewide and regional hospital alert systems currently in place to identify hospital capability, capacity, and specialty care availability (e.g. burns, pediatrics, etc.) and assist the LEMSA, upon request, in a gap analysis.
1.2 Promote statewide usage of common communication frequencies between ground and air transport units.	2.2 Participate in statewide gap analysis to determine ambulance to ambulance communication capability and formats with identification of shortfalls.	

Component 7: Definitive Care Facilities: Acute Care Facilities

EMS Authority	State Trauma Advisory Committee	Local EMS Agency
1.1 Periodically assess the number and level of Trauma Centers within the state by region to evaluate access to trauma care and work with LEMSA to identify areas of insufficient coverage	2.1 Develop template for 'operational' agreement between sending (non-trauma facility / lower level TC) and receiving (LII, LI) centers	3.1 Outline the responsibilities and expected participation in the trauma system for non-designated acute care hospitals
1.2 Identify members of the trauma community (surgeons, EM physicians, trauma program managers) within the state with the expertise, experience & willingness to serve as site surveyors under Title 22 to be provided to LEMSA upon request	2.2 Develop guidance document comparing Title 22 requirements with current ACS verification requirements	

Component 8: Definitive Care Facilities: Inter-Facility Transfer and Re-Triage

EMS Authority	Local EMS Agency/ Regional Trauma Coordinating Committee
1.1 Develop a process that will allow ongoing analysis of all re-triage and IFT activity within the state based on CEMSIS data	2.1 Identify areas in the state where timely access to Trauma Centers may be improved (needs assessment)
1.2 Evaluate current paramedic scope of practice to enable and facilitate rapid re-triage & transport of severely injured trauma patients (i.e. TBI)	2.2 Develop specific physiological and anatomical indicators for re-triage on a level-of-care basis (e.g. Level III center to LI/LII, etc.)
1.3 Identify receiving centers for special injuries (i.e. spinal cord, reimplantation)	2.3 Develop models for education and outreach that will promote timely re-triage/IFT where appropriate
1.4 Develop web-based compendium of Trauma Centers, Burn Centers, Pediatric Trauma Centers, their specialized capabilities & contact information for rapid communication when needed	2.4 Promote the development of regional cooperative arrangements between sending and receiving centers that will facilitate re-triage, reduce delays, and ensure that patients are re-triaged to an appropriate level of care
1.5 Investigate integration of real-time information on California Trauma Center status: open/on-diversion/partial diversion, etc. to all receiving facilities in California 1.6 Explore development of centralized re-triage/transfer coordination within the state	2.5 Develop clinical management guidelines for the early (re-triage phase) treatment of high-risk injuries such as TBI, pelvic fractures, mangled or crushed extremity injuries, peripheral vascular injuries, etc.
1.6 Develop specific EMTALA-based guidelines for the transfer and acceptance of trauma patients within the state. These should address: 1.6.1 The EMTALA 'non-discrimination' provision in regards to the obligation (or not) to accept non-level-of-care patients 1.6.2 EMTALA allowance for the transfer of 'unstable' trauma patients for documented	2.6 Explore the development of clinical management guidelines that would allow lower level facilities in remote areas to manage selected types of injuries (e.g. 'minimal' TBI)

EMS Authority	Local EMS Agency/ Regional Trauma Coordinating Committee
medical need to a higher level of care	
	2.7 Develop structured relationships (regional cooperative agreements), including educational outreach between sending and receiving hospitals in order to facilitate the inter-facility transfer and re-triage and clinical management guidance to allow lower level facilities to keep selected patients
	2.8 Explore and promote the use of telemedicine for trauma patients where appropriate
	2.9 Identify & promote educational resources suitable for improving re-triage and inter-facility transfers (i.e. the ACS Rural Trauma Team Development Course)

Component 9: Definitive Care Facilities: Rehabilitation and Trauma Recovery

EMS Authority	State Trauma Advisory Committee	Local EMS Agency/ Regional Trauma Coordinating Committee
1.1 Develop a compendium of rehabilitation facilities throughout the state to include: 1.1.1 A plan to assess the availability and capabilities of rehabilitation facilities in the state and integrate them into the regional planning and performance improvement process including: 1.1.1.1 Specialized centers for Traumatic Brain Injury (TBI) & spinal cord injuries 1.1.1.2 Pediatric centers 1.1.1.3 Burn & other specialty recovery facilities	2.1 Adopt a standardized measure of functional recovery suitable for use throughout the trauma system	3.1 Develop guidelines for the current incorporation of rehabilitation into the continuum of trauma care. These guidelines might include: 3.1.1 A mechanism to initiate rehabilitation services or consultation upon patient admission 3.1.2 Policies regarding coordination of transfers between acute care and rehabilitation facilities. 3.1.3 A template for operational MOU's between definitive care facilities and rehabilitation centers to include: 3.1.3.1 Complications and outcome follow-up 3.1.3.2 Data sharing for Performance Improvement activities 3.1.3.3 Educational outreach
1.2 Improve the data collection for evaluation of rehabilitative needs and degree of access to		

EMS Authority	State Trauma Advisory Committee	Local EMS Agency/ Regional Trauma Coordinating Committee
rehabilitation throughout the state.		
1.3 Explore possible amendments to California Code of Regulations, Title 22, Chapter 7 to incorporate the rehabilitation needs of the trauma patient including rehabilitation as part of the continuum of care.		

Component 10: Information Systems

EMS Authority State Trauma Advisory Committee	Local EMS Agency
1.1 Explore feasibility of developing linkages of databases to create a complete patient record. This would include: 1.1.1 Develop a mechanism for deterministic/probabilistic matching of data 1.1.2 CEMSIS-Trauma and CEMSIS-EMS linkage 1.1.3 CEMSIS-EMS and Hospital Data (OSHPD) linkage 1.1.4 CEMSIS and Statewide Integrated Traffic Records System (SWITRS) linkage	2.1 Develop a plan to monitor data completeness and accuracy including utilization of the state-defined inclusion criteria prior to submission to CEMSIS
1.2 Evaluate data validity by: 1.2.1 Developing a plan to monitor data completeness and accuracy including utilization of the state-defined inclusion criteria	
1.3 Improve data compliance by: 1.3.1 Development of standard reports provided to local EMS agencies itemizing Trauma Center data compliance 1.3.2 Development of a subset of CEMSIS-Trauma to include data on pre-defined injured patients seen at non-trauma facilities 1.3.3 Promotion of CEMSIS participation by all local EMS agencies through submission of a minimal data set from non-trauma facilities (e.g. OSHPD data)	
1.4 Improve data sharing through: 1.4.1 Development of standard aggregate reports to be publically shared on the EMSA website 1.4.2 Development of a procedure for all requests for data including a data request form 1.4.3 Development of a policy for data sharing in compliance with applicable patient confidentiality laws	

Component 11: System Evaluation and Performance Improvement

EMS Authority	Local EMS Agency	Regional Trauma Coordinating Committee
A program should be developed by the EMS Authority in collaboration with the LEMSAs and RTCCs to evaluate statewide trauma system performance. This should include: 1.1 Develop a statewide comprehensive Trauma PIPS Plan consistent with the elements of this State Plan	2.1 Develop risk-adjusted standardized reports and based on nationally recognized formula	3.1 Identify regional system issues and work with member LEMSAs on resolution of these issues
1.2 Create a State Trauma PIPS committee as a subcommittee of the STAC	2.2 Show overall progress in achieving goals for significant injury and patient categories	3.2 Recommend audit filters based on the region's population traits, available resources and geography
1.3 Perform a comprehensive statewide assessment of the State Trauma System based on national standards and California-specific resources	2.3 Create a local/regional Performance Improvement Program (may be integrated into EMS PI Program for small systems) to: 2.3 1 Develop specific database queries 2.3.2 Create definition and monitor system sentinel events 2.3.3 Work with local Medical Examiner on guidelines for trauma post- mortem	3.3 Explore tools to identify variations in care and outcomes across respective regions and determine possible ways to reduce detrimental variations in regional structures and care processes that may result in negative outcomes

EMS Authority	Local EMS Agency	Regional Trauma Coordinating Committee
	exams 2.3.4 Facilitate issue resolution by individual performance improvement committees	
1.4 Evaluate state data and identify regional opportunities for improvement, determining if similar opportunities are occurring in other regions and explore mechanisms for shared resolution 1.4.1 Develop specific database queries 1.4.2 Create definition for system sentinel event and monitor such events 1.4.3 Facilitate issue resolution by assisting other system performance improvement committees 1.4.4 Develop and implement standards for system-wide performance improvement	2.4 Represent LEMSA at regional and state Performance Improvement Committees	3.4 Prioritize system issues identified for resolution
1.5 Create a recommended minimal data set of information		3.5 Work collaboratively with each member LEMSA to ensure

EMS Authority	Local EMS Agency	Regional Trauma Coordinating Committee
to be submitted to LEMSA system trauma registries from non-trauma facilities to track and trend outcomes of traumatically injured patients retained in non-trauma receiving facilities		standardized and accurate data collection and CEMSIS participation
1.6 Direct cross-regional issues to specific PI Project Work Groups for study and recommended resolution		
1.7 Develop and institute a mechanism for providing data and feedback to LEMSAs to assist in optimizing local PIPS processes		
1.8 Explore participation in the American College of Surgeons National Trauma Performance Improvement Project (TQIP) as a state, including a cost-benefit analysis		
1.9 Create a policy regarding the sharing of data for the PI process, recognizing hospital confidentiality and HIPPA regulations.		
1.10 Explore the development of a HIPPA compliant universal		

EMS Authority	Local EMS Agency	Regional Trauma Coordinating Committee
identifier (e.g. PCR# from prehospital patient care report) that allows individual patient data to be tracked throughout the entire spectrum of care including post care outcomes		
1.11 Ensure recommended minimum data that set allows for risk adjustment of individual patients so that benchmarking can be carried out		
1.12 Develop a process to periodically collect data elements designed to focus on specific patient populations and processes that are deemed to be the most important at any given time; these focused projects may be directed from the State, Region or LEMSA		
1.13 Benchmark individual systems, hospitals, LEMSAs and RTCCs to the group as a whole and to an outside standard		

Component 12: Education and Training

EMS Authority	Local EMS Agency	Regional Trauma Coordinating Committee	Trauma Center
1.1 Identify statewide educational needs through the Performance Improvement and Patient Safety Program in consultation with hospitals, local EMS agencies and RTCCs 1.2 Develop, through its State Trauma Advisory Committee, a plan for providing information to the public regarding the structure and function of the State Trauma System	2.1 Provide public education regarding trauma systems and injury prevention following high profile traumatic events 2.2 Perform a needs assessment prior to developing new or additional trauma-related educational programs	3.1 Promote regional efforts to educate the public on trauma systems and the role and effectiveness of Trauma Centers 3.2 Develop trauma clinical care education for regional trauma professionals	4.1 Work with non-trauma facilities and level IV Trauma Centers in providing for the Rural Trauma Team Development Course 4.2 Provide for education based on PIPS Program findings

Component 13: Trauma Systems Research

EMS Authority	State Trauma Advisory Committee
1.1 Facilitate access to data for individual or groups of investigators through the use of CEMSIS 1.2 Establish internal policies for the request for data from CEMSIS for research purposes 1.3 Identify the research expertise in the system and work collaboratively with experts in the field (e.g. Schools of Public Health, Finance and Economics)	2.1 Facilitate multidisciplinary collaboration for research 2.2 Develop research agenda (possibly through a research committee) and collaborate with established investigators to conduct research projects 2.3 Periodically review trauma system data derived from CEMSIS, OSHPD and other sources, and make recommendation to various system stakeholders regarding potential areas of research

Component 14: Injury Prevention

EMS Authority/ State Trauma Advisory Committee	Local EMS Agency/ Regional Trauma Coordinating Committee	Trauma Center
1.1 Partner with existing agencies focusing on statewide injury prevention (e.g. EpiCenter at the California Department of Public Health) for the purpose of: **1.1.1 Establishing best practice recommendations for prevention programs and evaluation based on scientifically evaluated injury prevention strategies** **1.1.2 Improving coordination and utilization of public health and trauma systems injury prevention resources at the state, regional and local levels** **1.1.3 Coordinating a statewide strategy to promote injury awareness with the public, media, and elected officials**	2.1 Develop a compendium of regional injury prevention programs with links provided to EMSA for posting on the website 2.2 Implement new and support existing scientifically proven prevention programs in response to regionally specific injury data 2.3 Ensure ongoing program evaluation to determine the effectiveness in reducing intentional and unintentional injuries 2.4 Collaborate with injury prevention programs to collect the necessary data for program evaluation and needs assessment 2.5 Create a public information and education program with consistent messaging on the preventability of injury	

Component 15: Emergency/Disaster Preparedness

EMS Authority/ State Trauma Advisory Committee	Local EMS Agency/ Regional Trauma Coordinating Committee
1.1 Perform an assessment gap analysis of the state trauma system's emergency preparedness including Trauma Center surge capacity **1.2 Integrate the State Trauma Plan with the California Public Health and Medical Emergency Operations Manual Plan for natural and manmade incidents** **1.3 Explore the use of existing resource monitoring systems to provide real-time trauma capacity and resources assessment** **1.4 Incorporate the role of the trauma system in the Public Health and Medical Emergency Operations Manual** **1.5 Develop a standardized inventory for trauma caches to be located at strategic locations in the event of a disaster** **1.6 Develop the capacity via the EMSA website for the dissemination of guidelines, protocols, programs, etc. relevant to the State Trauma System** **1.7 Encourage collaboration, communication, and involvement between LEMSAs, RTCCs, MHOAC/RDMHS, and local Trauma Center staff** **1.8 Coordinate and plan with LEMSAs, RTCCs, MHOAC/RDMHS, and local Trauma Center staff for rapid decompression of healthcare facilities**	2.1 Explore trauma system surge capacity, and best practices to improve disaster response. 2.2 Provide leadership and active participation in the state and regional trauma care system with lead functions for system and disaster planning 2.3 Promote training to Trauma Centers and non-trauma facilities on the medical health disaster system in the region 2.4 Develop template language for MOU's between Trauma Centers to ensure a quick process for sharing recourses' (personnel, equipment and medical supplies) to enhance surge capacity during disasters

EMS Authority/ State Trauma Advisory Committee	Local EMS Agency/ Regional Trauma Coordinating Committee
during regional mass casualty events.	

APPENDIX E: California Data

The following reports reflect 2011-2013 data for the following participating local EMS agencies:

- Alameda County,
- Contra Costa County,
- Los Angeles County,
- Marin County,
- Orange County,
- Riverside County,
- Santa Barbara County,
- Santa Clara County,
- Ventura County,
- Central California EMS Agency,
- Mountain Valley EMS Agency,
- Inland Counties EMS Agency,
- Coastal Valley EMS Agency.
- Sierra-Sacramento Valley EMS Agency.

The California EMS Information System (CEMSIS) is divided into two databases: CEMSIS-EMS and CEMSIS-Trauma. CEMSIS-EMS contains patient care information from the prehospital phase of care for 9-1-1 responses based on national data standards. CEMSIS-Trauma contains patient care information from the in-hospital phase of care at a designated Trauma Center based on national data standards.

The data reflected only represents what is submitted by the local EMS agency into CEMSIS-Trauma. 2011-2012 data was selected for reports 2-7 as the data showed the most consistent volume counts per month for each participating local EMS agency. Currently, participation in CEMSIS is inconsistent. The new CEMSIS-Trauma system, initiated in July 2014, utilizes the National Trauma Data Standards (NTDS) for its data dictionary including the patient inclusion criteria. While the NTDS provides a standard approach to data, the data elements are designed primarily to measure Trauma Center performance. Future adjustment in CEMSIS will need to be made to collect system-related data in order to provide the tool needed for not only the evaluation of patient care but also sytem evaluation. In addition, full participation by all Trauma Centers will be essential for future system analysis and performance improvement.

The following reports are provided:

1. Count of Records by LEMSA showing participation in CEMSIS-Trauma over time. The new system was implemented for 2013 data which shows come inconsistency in counts as LEMSAs migrate to the new system.

2. Count of Records by LEMSA – this report shows the total number of trauma patients transmitted into CEMSIS-Trauma that were admitted to the Trauma Center for 2011 and 2012. The chart reflects the population represented.

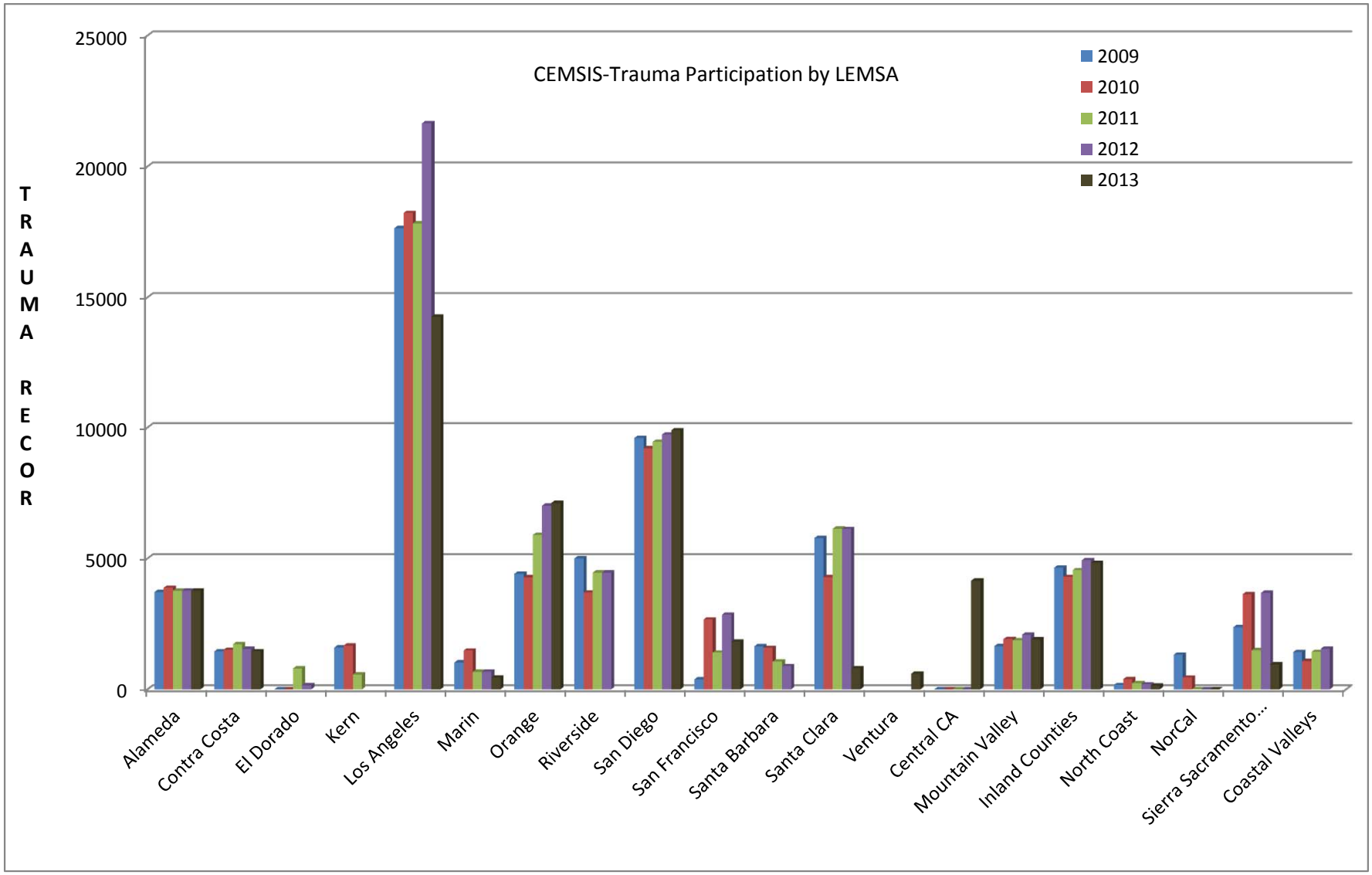
3. Trauma Center Level – This report shows the breakdown of Trauma Center designation level for the above referenced local EMS agencies.

4. Type of Injury – This report shows the breakdown of general type of injury for admitted trauma patients.

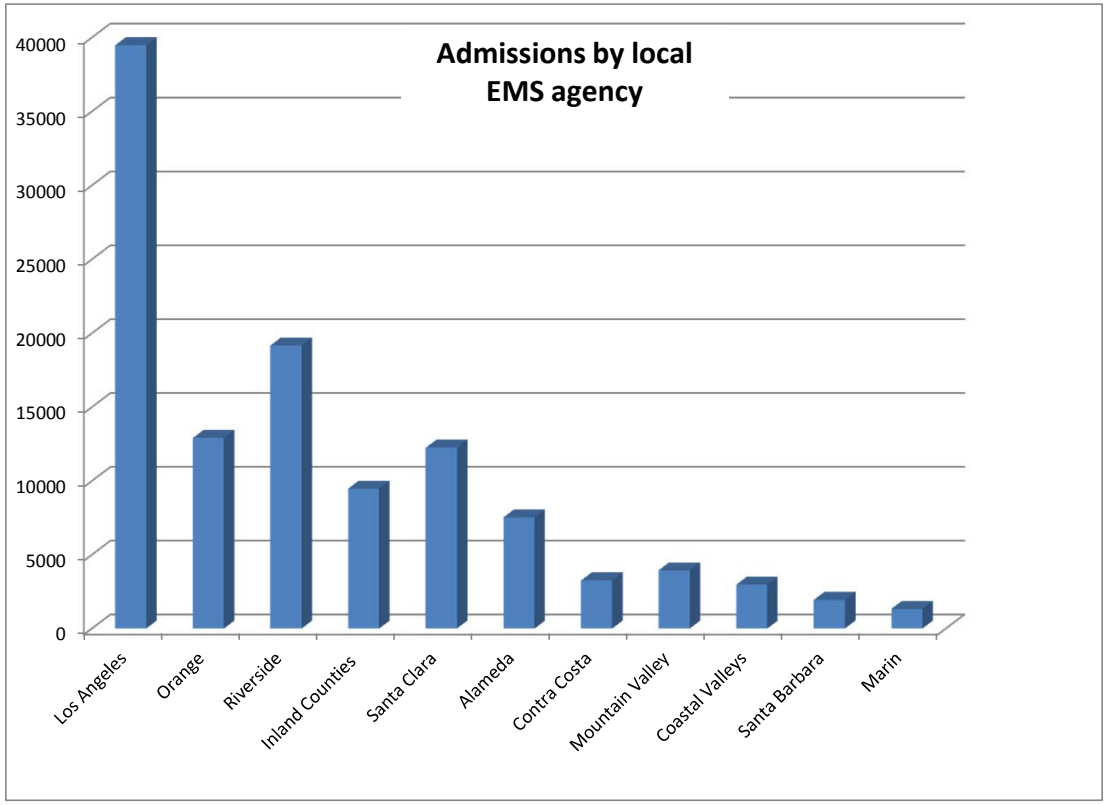
5. Emergency Department Disposition – This report shows the general categories for where patients are admitted directly from the emergency department.

6. Discharge Disposition – This report provides the breakdown of where patients go after being discharged from the Trauma Center.

7. Primary Payor for Admissions – Upon admission, the first payor documented on the admission record; in some cases this changes before the patient is discharged but is not reflected in this data.



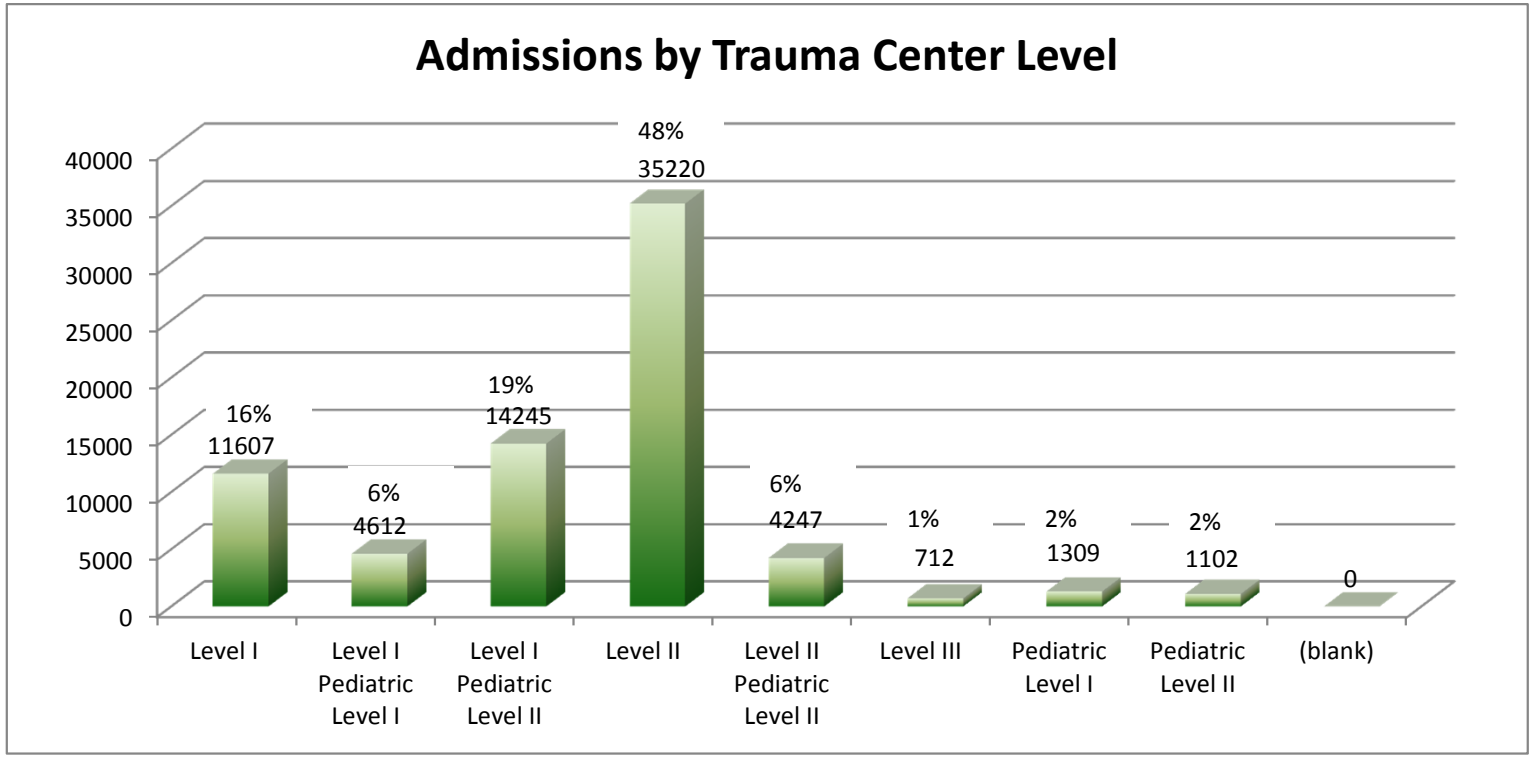
Data reflects the number of patient care records that were transmitted into CEMSIS-Trauma per year. In 2013 a new system was implemented for CEMSIS resulting in a reduction in counts as LEMSAs migrate to the new program. Some variances are shown as LEMSAs changed local traige criteria to reflect national standards. In addition, in 2013 CEMSIS stopped collecting records on patients who were discharged from the Emergency Department.



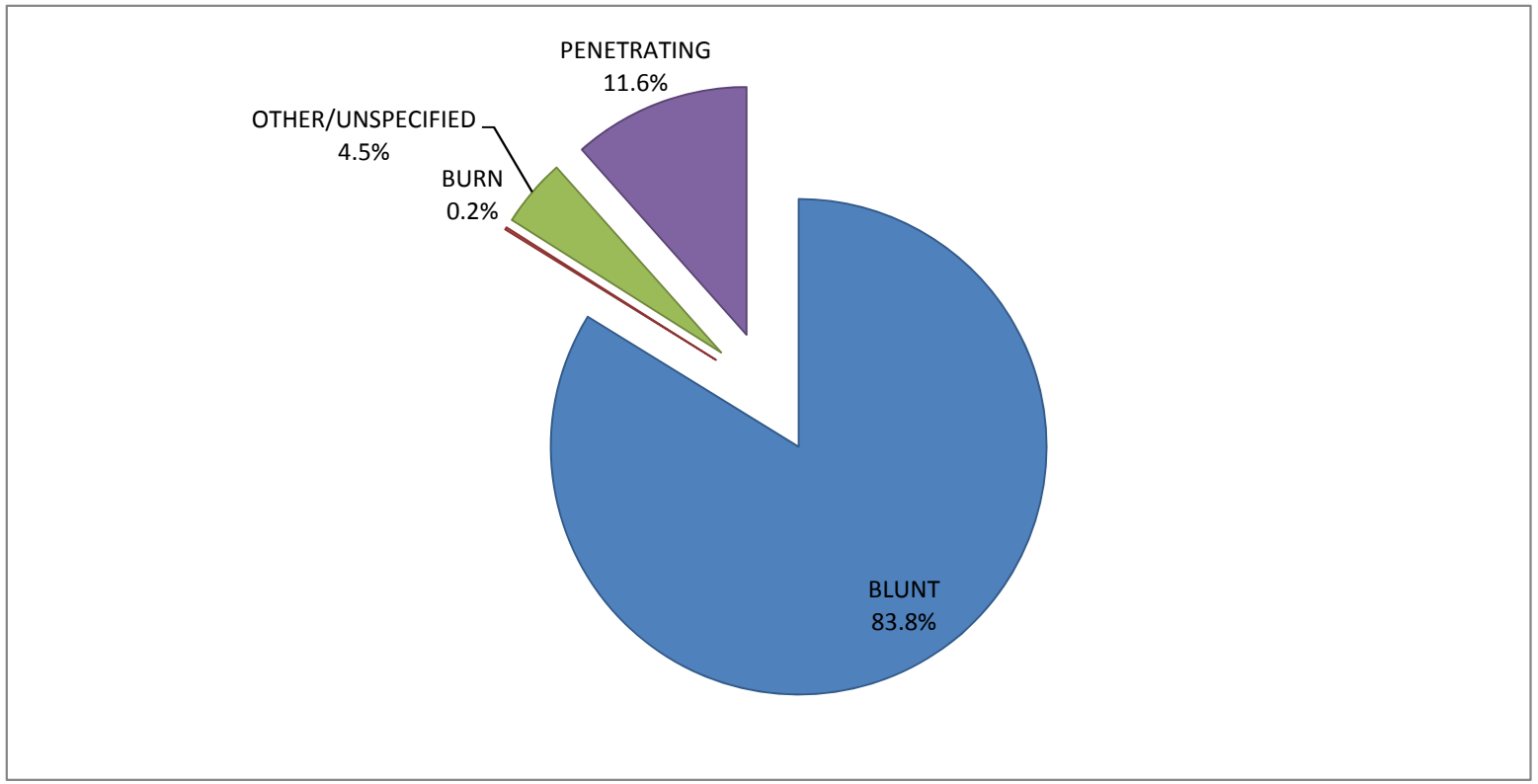
LEMSA	2010 Population	patients/1000 population
Alameda	1,510,271	2.0
Contra Costa	1,049,025	3.2
Los Angeles	9,818,605	2.5
Marin	252,409	1.9
Orange	3,010,232	2.3
Riverside	2,189,641	1.1
Santa Barbara	423,895	2.2
Santa Clara	1,781,642	1.5
Mountain Valley (Alpine, Amador, Calaveras, Mariposa, Stanislaus)	617,548	1.6
Inland Counties (San Bernardino, Inyo, Mono)	2,067,958	2.2
Coastal Valleys (Mendocino, Sonoma)	571,719	1.9

The chart reflects the number of admissions to the Trauma Centers in the select local EMS agencies. It shows a close correlation with population of the counties and the number of Trauma Centers in their jurisdiction. The difference noted in Riverside and Santa Clara counties is because they recieve patients from their neighboring counties.

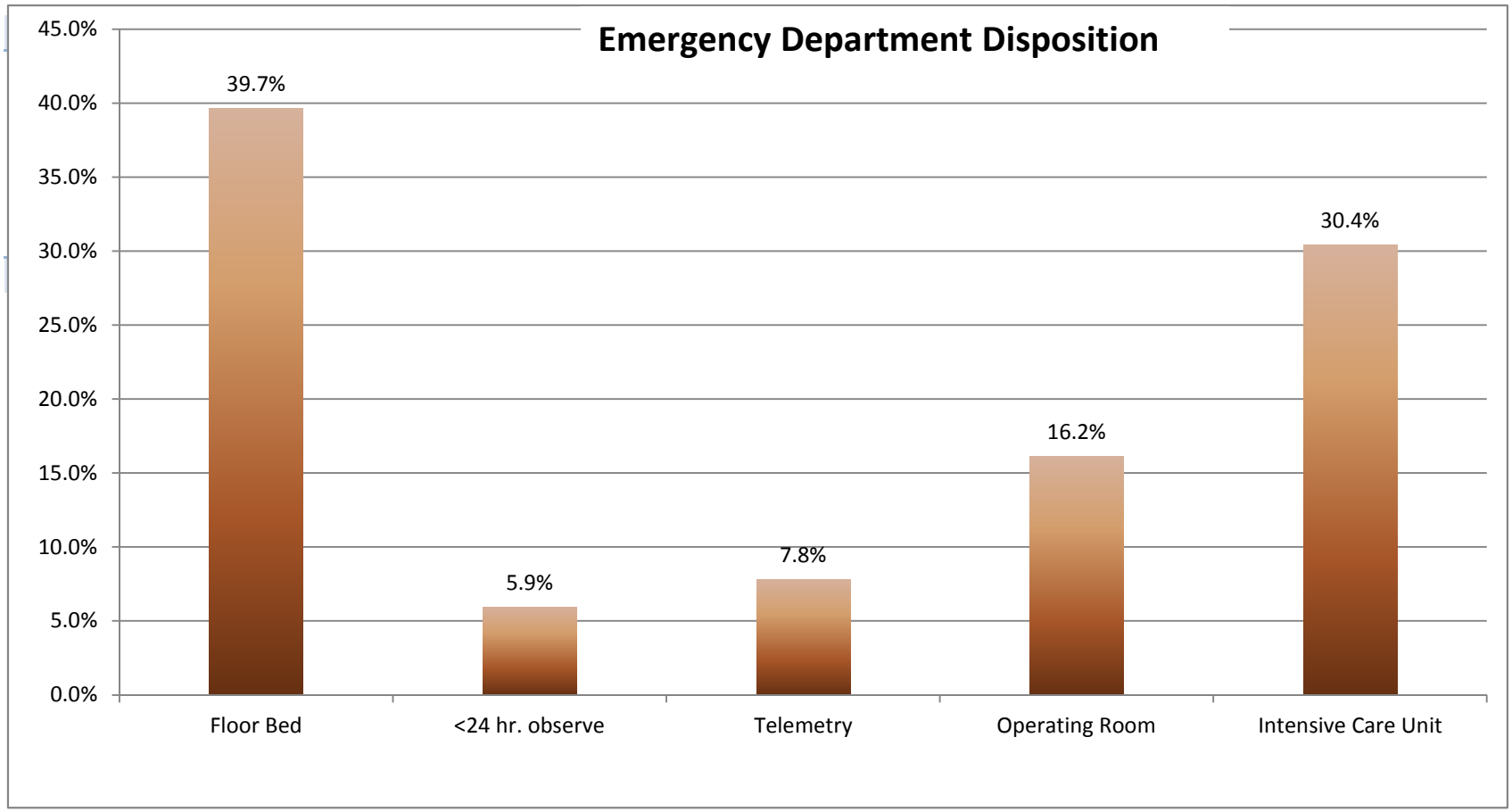
23,292,945 - 63% of Total State Population Represented



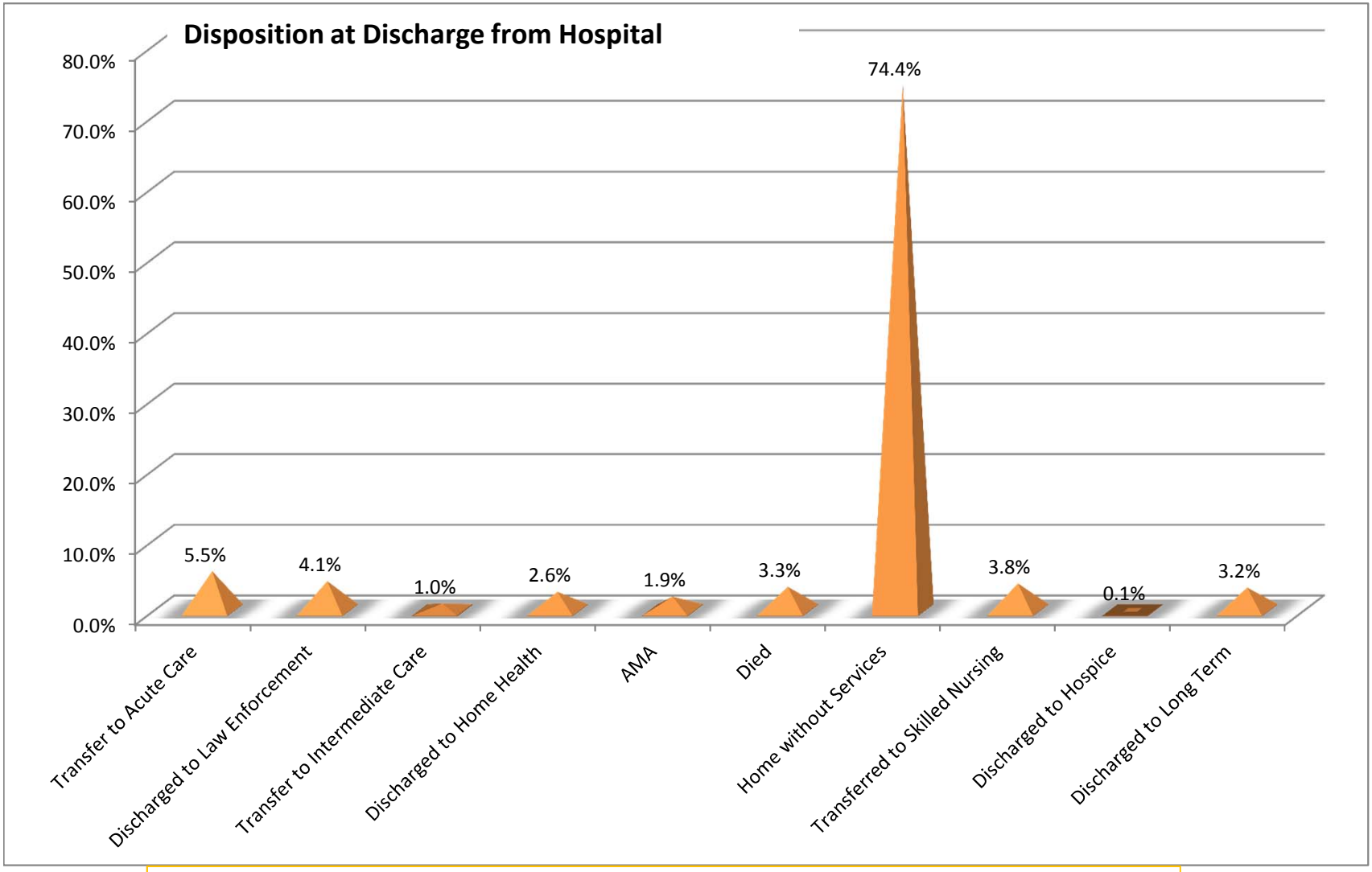
This graph showes the total number and percentage of admissions to the Trauma Centers based on the designated level. 48% of the admissions were in Level II Trauma Centers which is the most common level of designation with 32 out of 76 total designated Trauma Centers in the entire state and 21 in the represented sample.



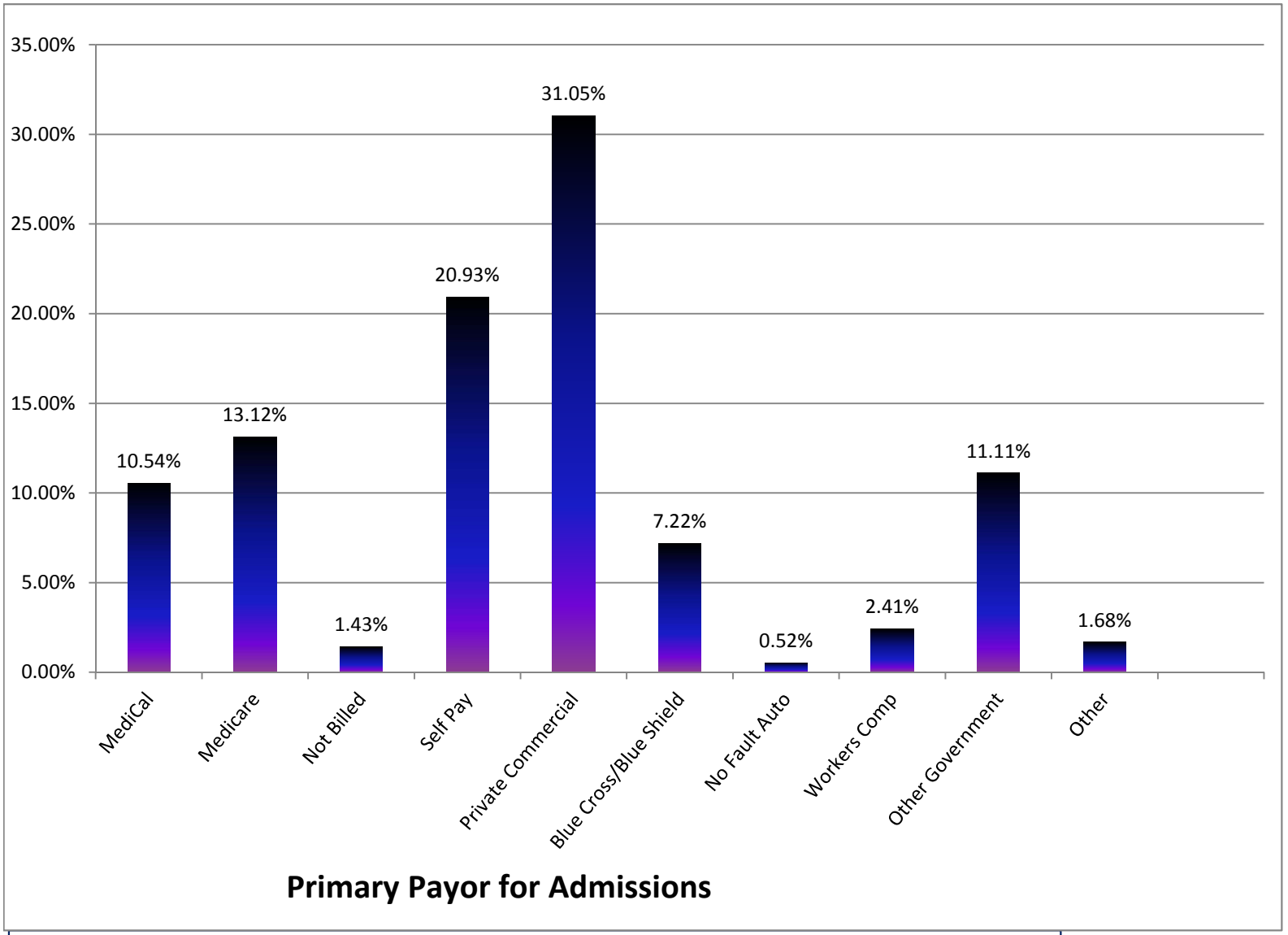
The date reflects the distribution of blunt vs. penetrating trauma which is comparable to other large trauma systems. The percentage of distribution for a given Trauma Center varies based on the demographics surrounding the designated Trauma Center.



These data show where the patient was admitted directly from the emergency department. What is does not show is the number of cases that went to the operating room after admission.



This chart reflects the number and percentage of patients discharged from Trauma centers based on discharge code . The highest percentage of patients were discharged without any services needed. The lowest percentage is for those patients discharged to Hospice care.



While the data shows a 21% self pay status at the time of admission, this payor source may have changed after the patient was admitted. Some patients are enrolled in MediCal or Medicare and in a few cases no-fault auto insurance is identified.

APPENDIX F: Research Articles

The following journal abstracts reflect National and California specific research on trauma system development.

Arch Surg. 1979;114(4):455-460
Systems of Trauma Care, A Study of Two Counties
John G. West, MD; Donald D. Trunkey, MD; Robert C. Lim, MD
Summary:
Cases of motor vehicle trauma victims who died after arrival at a hospital were evaluated in both Orange County (90 cases) and in San Francisco County (92 cases), Calif. All victims in San Francisco County were brought to a single trauma center, while in Orange County they were transported to the closest receiving hospital. Approximately two thirds of the non-CNS-related deaths and one third of the CNS-related deaths in Orange County were judged by the authors as potentially preventable; only one death in San Francisco County was so judged. Trauma victims in Orange County were younger on the average, and the magnitude of their injuries was less than for victims in the San Francisco County. These data suggest that survival rates for major trauma can be improved by an organized system of trauma care that includes the resources of a trauma center.

J Trauma. 1999 Apr;46(4):565-79; discussion 579-81.
Trauma care regionalization: a process-outcome evaluation.
Sampalis JS, Denis R, Lavoie A, Fréchette P, Boukas S, Nikolis A, Benoit D, Fleiszer D, Brown R, Churchill-Smith M, Mulder D.
Summary:
Regionalization of trauma care services was initiated in 1993 with the designation of four tertiary trauma centers. The process continued in 1995 with the implementation of patient triage and transfer protocols. Since 1995, the network of trauma care has been expanded with the designation of 33 secondary, 30 primary, and 32 stabilization trauma centers. In addition, during this period emergency medical personnel have been trained to assess and triage trauma victims within minimal prehospital time. The objective of the present study was to evaluate the impact of trauma care regionalization on the mortality of major trauma patients.
This study produced empirical evidence that the integration of trauma care services into a regionalized system reduces mortality. The results showed that tertiary trauma centers and reduced prehospital times are the essential components of an efficient trauma care system.

Crit Care Med. 2004 Jul;32(7):1477-83.
Impact of between-hospital volume and within-hospital volume on mortality and readmission rates for trauma patients in California.
Marcin JP, Romano PS.
Summary:
Previous research assessing the impact of between-hospital trauma volume (high volume centers vs. low volume centers) and outcomes has been inconsistent. Furthermore, previous research has not considered temporal variations in within-hospital volume (a center having higher than average volume vs. lower than average volume) as a covariate. The objective of this study was to determine the relationship of between-hospital and within-hospital trauma volume and two measures of hospital quality of care. The study analyses a population-based non-concurrent cohort included in the California Patient Discharge Data Set from 1995 to 1999 on thirty-nine nonfederal California hospitals designated as adult trauma centers .
The findings of this study suggest that relationships between trauma volume and outcomes exist but depend on which patient populations are studied and how the data are analyzed. Furthermore, trauma centers may be subject to the detrimental effects of high temporal volume overextending existing services and capacity. Since this study found that both between-hospital volume and within-hospital volume measures are associated with outcomes, we recommend that both measures be included in future volume-outcome investigations.

J Trauma. 2005 Jan;58(1):136-47
Trauma system structure and viability in the current healthcare environment: a state-by-state assessment.
Mann NC, Mackenzie E, Teitelbaum SD, Wright D, Anderson C.
Summary:
Anecdotal reports suggest that some state trauma systems are struggling to remain solvent while others appear stable in the current health care environment. The purpose of this research is to characterize the current structure and viability of state trauma systems in the U.S. Expert panels were convened in all 50 states to characterize the current structure of trauma care and to identify strengths, weakness, opportunities and threats facing trauma care delivery in each state. States continue to value the formalization of trauma systems. System operations, evaluation/research methods and trauma leadership are highly valued by states with mature systems. However, all states consider their trauma system severely threatened by inadequate funding and difficulty recruiting and retaining physicians and nurses. Trauma care systems are valued and demonstrate potential for future expansion. However, economic shortfalls and retention of medical personnel threaten the viability of current systems across the U.S.

J Trauma Nurs. 2010 Jul-Sep;17(3):126-34
Trauma systems origins in the United States.
Boyd DR.
Summary:
A historical narrative is presented. The US Civilian Trauma and Emergency Medical Services Systems (EMSS) started in the 1970s. The conceptual basis, strategic, and tactical implementation approaches used to establish the national program are described. The trauma and other clinical systems were extensions of proven clinical methods initially from cardiac and trauma units and deployed in new settings. The overall systems design was regionalization. Professionals, governmental agents, the public, and politicians all worked together to establish local, regional, state, and a nationwide comprehensive trauma/EMSS program that touch every state, territory, and community.

J Trauma. 2010 Apr;68(4):783-9
Improved trauma system multicasualty incident response: comparison of two train crash disasters.
Cryer HG[1], Hiatt JR, Eckstein M, Chidester C, Raby S, Ernst TG, Margulies D, Putnam B, Demetriades D, Gaspard D, Singh R, Saad S, Samuel C, Upperman JS.
Summary:
Two train crash multi-casualty incidents (MCI) occurred in 2005 and 2008 in Los Angeles. A post-crash analysis of the first MCI determined that most victims went to local community hospitals (CHs) with underutilization of trauma centers (TCs), resulting in changes to our disaster plan. To determine whether our trauma system MCI response improved, we analyzed the distribution of patients from the scene to TCs and CHs in the two MCIs.
This study, showing a trauma system performance improvement program, allowed us to significantly improve our response to MCIs with improved utilization of TCs and improved distribution of victims according to injury severity and needs.

J Trauma. 2011 Jun;70(6):1345-53.
Out-of-hospital decision making and factors influencing the regional distribution of injured patients in a trauma system.
Newgard CD[1], Nelson MJ, Kampp M, Saha S, Zive D, Schmidt T, Daya M, Jui J, Wittwer L, Warden C, Sahni R, Stevens M, Gorman K, Koenig K, Gubler D, Rosteck P, Lee J, Hedges JR.
Summary:
The decision-making processes used for out-of-hospital trauma triage and hospital selection in regionalized trauma systems remain poorly understood. The objective of this study was to assess the process of field triage decision making in an established trauma system. A total of 64,190 injured patients were evaluated by EMS in this study, which showed that the provider cognitive reasoning for field trauma triage is driven primarily by provider judgment, rather than specific triage criteria.

J Trauma Acute Care Surg. 2012 Sep;73(3):716-20.
The mortality risk from motor vehicle injuries in California has increased during the last decade.
Waxman K[1], Izfar S, Grotts J.
Summary:
Organized trauma systems and trauma centers are thought to improve trauma outcomes. It is clear that injured patients who receive care in trauma centers have survival advantages. However, large regions of California still do not have access to trauma centers. Many injured patients in California continue to receive their care in non-trauma center hospitals. The purpose of this study was to compare outcomes in California counties with and without trauma centers and to query the efficacy of the current statewide trauma system by asking whether mortality after motor vehicle trauma in California has improved during the last decade. The mortality was significantly lower in counties with trauma centers in this retrospective outcome study using California Highway Patrol data from all motor vehicle crashes (MVCs) and mortality during the years 1999 to 2008 for the 58 counties in California. Low population and hospital density independently correlated with increased mortality. Injury mortality rates after MVCs increased during the decade, both in counties with and without trauma centers. Overall, the presence of a trauma center improved the chances of survival after an MVC in California counties. However, mortality rates after injuries increased during the decade both in counties with and without trauma centers. Future efforts to improve outcomes for injured patients in California will require new approaches, which must include improving both access to trauma centers and the care provided in non-trauma center hospitals.

Ann Emerg Med. 2013 Feb;61(2):167-74.
Emergency medical services out-of-hospital scene and transport times and their association with mortality in trauma patients presenting to an urban Level I trauma center.
McCoy CE, Menchine M, Sampson S, Anderson C, Kahn C.
Summary:
This study determines the association between emergency medical services (EMS) out-of-hospital times and mortality in trauma patients presenting to an urban Level I trauma center. In this analysis of patients presenting to an urban Level I trauma center during a 14-year period (1996 to 2009), we observed increased odds of mortality among patients with penetrating trauma if scene time was greater than 20 minutes. We did not observe associations between increased odds of mortality and out-of-hospital times in blunt trauma victims. These findings should be validated in an external data set.

J Am Coll Surg. 2013 Apr;216(4):687-95; discussion 695-8
Fifteen-year trauma system performance analysis demonstrates optimal coverage for most severely injured patients and identifies a vulnerable population.
Ciesla DJ[1], Tepas JJ 3rd, Pracht EE, Langland-Orban B, Cha JY, Flint LM.
Summary:
Trauma systems are designed to deliver timely and appropriate care. Prehospital triage regulations and interfacility transfer guidelines are the primary determinants of system efficacy. This study analyzed the effectiveness of the Florida trauma system in delivering trauma patients to trauma centers over time. Severe injury discharges increased at designated trauma centers (DTCs) and decreased at non-trauma centers (NTCs). The proportion of patients with severe injuries discharged from DTCs increased for all age groups, capturing nearly all severely injured children and adults. Access to DTCs was dependent on proximity for severely injured elderly but not for severely injured children and adults. Triage improved over time, enabling near complete capture of at-risk children and adults independent of DTC proximity. Because distance from a DTC does not limit access for children and adults, existing trauma system resources are sufficient to meet the current demands. Efforts are needed to determine the trauma resource and triage needs of the severely injured elderly.

J Trauma Acute Care Surg. 2013 Oct;75(4):704-16
The effect of trauma center care on pediatric injury mortality in California, 1999 to 2011.
Wang NE[1], Saynina O, Vogel LD, Newgard CD, Bhattacharya J, Phibbs CS.
Summary:
Trauma centers (TCs) have been shown to decrease mortality in adults, but this has not been demonstrated at a population level in all children. We hypothesized that seriously injured children would have increased survival in a TC versus non-trauma center (nTC), but there would be no increased benefit from pediatric-designated versus adult TC care. This was a retrospective study of the unmasked California Office of Statewide Health and Planning Department patient discharge database (1999-2011).
The TC outcome models use improved injury severity and case mix adjustment to demonstrate decreased mortality for seriously injured California children treated in TCs. These results can be used to take evidence-based steps to decrease disparities in pediatric access to, and subsequent outcomes for, trauma care.

Health Aff (Millwood). 2013 Dec;32(12):2091-8.
Sustaining a coordinated, regional approach to trauma and emergency care is critical to patient health care needs.
Eastman AB, Mackenzie EJ, Nathens AB.
Summary:
Trauma systems provide an organized approach to the care of injured patients within a defined geographic region. When fully operational, the systems ensure a continuum of care involving public access through 911 calls, emergency medical services, timely triage and transport to acute care, and transfer to rehabilitation services. Substantial progress has been made in establishing statewide trauma systems, which are seen as the prototype for regionalized care for other time-sensitive, emergency conditions such as stroke. Trauma systems provide a model of care that is consistent with the goals of the Affordable Care Act, which authorizes $100 million in annual grants to ensure the continued availability of trauma services. Full funding of these provisions is needed to stabilize statewide systems that are struggling to survive. We describe the components of a regionalized trauma system, review the evidence in support of this approach, and discuss the challenges to sustaining systems that are accountable and affordable.

J Emerg Trauma Shock. 2014 Jan;7(1):41-6.
A comparison of rural versus urban trauma care.
Lipsky AM, Karsteadt LL, Gausche-Hill M, Hartmans S, Bongard FS, Cryer HG, Ekhardt PB, Loffredo AJ, Farmer PD, Whitney SC, Lewis RJ.
Summary:
This study compared the survival of trauma patients in urban versus rural settings after the implementation of a novel rural non-trauma center alternative care model called the Model Rural Trauma Project (MRTP). Authors conducted an observational cohort study of all trauma patients brought to eight rural northern California hospitals and two southern California urban trauma centers over a one-year period (1995-1996). This study demonstrates that rural and urban trauma patients are inherently different. The rural system utilized in this study, with low volume and high blunt trauma rates can effectively care for its population of trauma patients with an enhanced, committed trauma system, which allows for expeditious movement of patients toward definitive care.

Characteristics of Pediatric Trauma Transfers to a Level I Trauma Center: Implications for Developing a Regionalized Pediatric Trauma System in California

Colleen D. Acosta, MPH, M. Kit Delgado, MD, Michael A. Gisondi, MD, Amritha Raghunathan, MD, Peter A. D'Souza, MD, Gregory Gilbert, MD, David A. Spain, MD, Patrice
Christensen, RN, and N. Ewen Wang, MD

Summary:

Since California lacks a statewide trauma system, there are no uniform interfacility pediatric trauma transfer guidelines across local emergency medical services (EMS) agencies in California. This may result in delays in obtaining optimal care for injured children. This study sought to understand pattern of pediatric trauma patient transfers to the study trauma center as a first step in assessing the quality and efficiency of pediatric transfer within the current trauma system model. The hypothesis was that transferred patients would be more severely injured than directly admitted patients, primary catchment transfers would be few, and out-of-catchment transfers would come from hospitals in close geographic proximity to the study center. Trauma patients brought directly to the emergency department (ED) and patients transferred from other facilities to the center were compared. From the perspective an adult Level I trauma center with a certified pediatric intensive care unit (PICU), delays in definitive pediatric trauma care appear to be present secondary to initial transport to non-trauma community hospitals within close proximity of a trauma hospital, long transfer distances to accepting facilities, and lack of capacity at the study center. Given the absence of uniform trauma triage and transfer guidelines across state EMS systems, there appears to be a role for quality monitoring and improvement of the current interfacility pediatric trauma transfer system, including defined triage, transfer, and data collection protocols.

N Engl J Med. 2006 Jan 26;354(4):366-78.

A national evaluation of the effect of trauma- center care on mortality.

MacKenzie EJ1, Rivara FP, Jurkovich GJ, Nathens AB, Frey KP, Egleston BL, Salkever DS, Scharfstein DO

Summary:

Hospitals have difficulty justifying the expense of maintaining trauma centers without strong evidence of their effectiveness. To address this gap, we examined differences in mortality between level 1 trauma centers and hospitals without a trauma center (non-trauma centers). Mortality outcomes for patients 18 to 84 years old with a moderate-to-severe injury were compared among 18 hospitals with a level 1 trauma center and 51 hospitals non-trauma centers located in 14 states. After adjustment for differences in the case mix, the in-hospital mortality rate was significantly lower at trauma centers than at non-trauma centers. The effects of treatment at a trauma center varied according to the severity of injury, with evidence to suggest that differences in mortality rates were primarily confined to patients with more severe injuries. These findings show that the risk of death is significantly lower when care is provided in a trauma center than in a non-trauma center and argue for continued efforts at regionalization.