

North Coast EMS Region

Revised Trauma System Plan May 27, 2004

Emergency Medical Services Agency
Del Norte, Humboldt, Lake and
Southern Trinity County

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North Coast EMS Regional Trauma System Plan

Compliance with State Regulation	
Section 100254 Trauma System Criteria	Location in Trauma Plan
a) Rational for trauma system design	Pgs, 5,7,8,14,15,16,`18
1. Trauma patient volume & trauma centers	Pgs. 16, 20
2. Resource to meet trauma center staffing	Pgs. 13,16, 17, 20, & 23-26
3. Transport times	Pg. 19
4. Distinct service areas	Pg 21 & Appendix A, & D (Policy #)
5. Coordination with neighboring trauma systems	Pg. 22 & Appendix C
b) Utilization of Air Transport	Pg. 14, 19
c) Use of Trauma Center Helicopter LZ	Pg. 20, Appendix G, (Policy 2206)
d) Prehospital Provider Training	Pg. 13
e) Communications Equipment	Pgs. 19, 23, Appendix G- (Policy 2501-2508)
f) Hospital notification	Pgs. 19, 22, Appendix G - (Policy 2501)
Section 100255 Policy Development	Pg. 30
Data Collection and Management	Pg 32 & Appendix D - Policy #
Service Areas for Trauma Centers	Appendix D - Policy #
Transfer of Health Care Organization Members	Appendix D - Policy #
Interfacility Transfer -Trauma & Receiving Hosp	Appendix D - Policy #
Integration of Pediatric Hospitals	Pg. 21
Quality Assurance/System Improvement	Pg s. 33-36, & Appendix D - Policy #
Criteria for Pediatric/Adult Trauma Triage & Transport	Appendix D - Policy #
Training pf prehospital personnel inc. Trauma Triage	Pg 13 & Appendix G _ Policy Section 3000
Marketing/Advertising by Trauma Centers& Prehospital	Appendix D - Policy #
Section 100256 Trauma Plan Development	
1) Summary of Plan	Pg. 5
2) Organizational Structure	Pgs 10-12
3) Needs Assessment	Pgs. 14-15
4) Trauma System Design	Pgs. 16-26
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6) Objectives of the Trauma System	Pg. 27
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a) Standardized Data Collection Instrument/Sys. Mng	Pg. 32 & Appendix D - Policy #
b) Inclusion of Prehospital Data Elements	Appendix F
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Section I - Trauma Plan Summary

1. Executive Summary

The North Coast Regional EMS Agency was created in 1975. The Agency originally represented Del Norte, Humboldt, Lake, and Mendocino counties. Two years later Mendocino withdrew from the region and a year later southern Trinity County became part of the North Coast Regional EMS Agency. The Agency is governed by a Joint Powers Governing Board consisting of one supervisor and one alternate from each of the three original member counties.

There are six base hospitals, which provide medical control services for Limited/Advanced Life Support (LALS/ALS) personnel, and a single alternate base hospital in southern Humboldt County. Five of the six base hospitals are also designated as Emergency Departments Approved for Pediatrics (EDAPs). Field care is provided by 19 LALS/ALS Provider Services, which includes seven public providers, four private, one volunteer, and one tribal ambulance service permitted by each county. There are 62 public safety agencies that provide first responder services (40 of which are approved by North Coast EMS).

The efforts to organize trauma care have been a recognized need for several years. A preventable death study was conducted in 1984 that demonstrated high levels of preventable and potentially preventable death associated with long prehospital and emergency department times. Because the former state trauma regulations were not compatible with the needs of rural EMS communities, the EMS Authority funded development of an alternative rural trauma program in 1988-90 that reduced prehospital scene times, upgraded EMT-IIs to paramedics, established trauma triage criteria, activated emergency department trauma teams and reduced unnecessary death in the five participating hospitals. A second special project evaluated major trauma patient outcome throughout the region in 1995-6 relative to two Level I Trauma Centers in Los Angeles County, and documented equivalent survival outcomes for our rural population relative to their urban population despite differences in sex, severity, ethnicity, blunt vs. penetrating trauma and volume. Prior to 1999, California trauma regulations would not allow for more than one trauma center in the region and did not include Level IV standards.

The recent changes in the regulation have encouraged the rural EMS community to consider the establishment of an organized trauma system, which will further enhance the delivery of prehospital and hospital trauma care to the residents and visitors in the region. All of the counties in the North Coast Region have experienced high death and injury rates from motor vehicle crashes, and the entire north coastal area has a significant earthquake/tsunami potential because of the Cascadia Subduction Zone. We are very likely to experience an 8.0 + earthquake within the next ten years. The combination of high death and injury rates and the probability of mass casualties from catastrophic events,

make formal trauma system development essential to the well being of residents and visitors alike.

2. Geographical Area Served

The North Coast EMS region is located in the northwest coastal region of California. The Del Norte, Humboldt portion of the EMS region is bordered by the State of Oregon to the north, Trinity and Siskiyou Counties to the east and Mendocino County to the south. Trinity County is included in the Nor-Cal EMS region, but the southern portion is part of the North Coast EMS Region by contract. The patient flow and access to EMS resources is better served by this configuration. Lake County is not adjacent to the Del Norte/Humboldt portion of the region but is located east of Mendocino County and is bordered on the south by Sonoma and Yolo Counties, and to the east by Glenn and Colusa Counties. The total land mass served by the North Coast EMS Region is approximately, 6840 square miles.

This region is home to many National Park and Recreation areas and enjoys the beauty of over 250 miles of Pacific Coast shoreline. The terrain is rugged, weather conditions extreme and long distances exist between population areas, which can create barriers for the provision of emergency medical services. There are only 10 cities located in the entire region. Two major highways in the region are Route 101 north and south along the coast and Route 299 east to west between Arcata and Redding. Routes 20,29,36 and 199 are secondary two lane roads that run throughout Lake County or out of the region to the north and east. Other roads, some unpaved, traverse the rugged mountains from the coast to the interior through out much of the region.

The climate is as varied as the topography. Along the coastal area the temperature is mild, with an average winter low of 40 to a summer high of 66 degrees. Inland the temperatures fluctuate more with an average low in the winter of 34 to an average summer high of 94 degrees. Rainfall varies depending upon location. Though the entire region is prone to winter floods, northern areas close to the coast see nearly twice as much precipitation as do the southern coastal areas. Crescent City in Del Norte County receives over 65 inches of annual rainfall compared to Eureka about 50 miles south in Humboldt County which receives an average of 37 inches per year. Inland areas receive hardly a trace in the summer to nearly 10 inches in a month in the winter. The significant rains combined with coastal fog, often contributes to major increases in the motor vehicle crashes.

The Coastal areas in Humboldt and Del Norte counties have a significant earthquake/tsunami potential because of the Cascadia Subduction Zone. They are very likely to experience a +8.0 earthquake within the next ten years.

Demographics

The total population in 2002 for the entire EMS Region is approximately 216,200. The breakdown by county shows a high percentage of people living in the more rural unincorporated areas. With this population distribution comes an increased challenge for access to the trauma victim.

North Coast EMS Population Demographics			
	Del Norte	Humboldt	Lake
2002 Population	27,844	127,676	60,345
Number of Cities	1	7	2
Incorporated Pop.	7,289	59,775	18,355
Unincorporated Pop.	20,555	67,901	41,990
Per Cap. Income	\$17,722	\$22,871	\$22,925
White Pop	77%	85%	87%
Hispanic	12%	5%	8%
Native American	3%	3%	1%
Asian/Pac. Islander	4%	6%	2%
Black	6%	1%	2%
State of California, Department of Finance, Research Unit - Demographics			

There is some anticipated growth in population

North Coast EMS Population Growth Projections			
	Del Norte	Humboldt	Lake
2000	28,200	127,700	59,100
2005	31,500	132,500	69,200
2010	34,500	136,500	77,600
2015	36,800	139,200	84,400
2020	39,000	142,100	93,000
State of California, Department of Finance, Research Unit - Interim Population Projections			

By 2005, the population is estimated to be 233,200, an 8% increase. The rate of population growth has been consistent across the North Coast EMS region and it is expected to continue. Population projections indicate that, based on the current growth trend, the population in North Coast EMS Region will be over 274,100, a 22% increase, by the year 2020.

4. Trauma System Planning

The seven hospitals located in the North Coast EMS Region are interested in organizing their internal resources to deliver a more effective trauma service to their communities. The prehospital providers welcome the use of defined trauma triage criteria and a destination protocol that will expedite the field disposition of critical trauma victims to the highest level of care possible. The plan to have all

facilities apply for a Level IV designation with the potential for one hospital, St. Joseph's in Eureka, CA., to qualify for a Level III designation, has not materialized in the time frame allotted for this grant. Efforts will continue to engage the hospitals in meeting the requirements for trauma center designation. There is a need to formalize a data collection system for trauma cases so that a quality assurance/system improvement process can be established. With a system assessment method in place the ability to identify the need for injury prevention programs will be apparent. These are addressed appropriately in this inclusive trauma plan.

5. Plan Detail

The following represents a description of each section of the plan:

Section I - Trauma Plan Summary

This section provides an Executive Summary with background information on the development of the North Coast EMS System and factors that will effect trauma system planning. It provides a geographic and demographic description with characteristics that influence plan development and the need for system changes.

Section II - Organizational Structure

This section describes the administrative structure of the EMS and trauma system of the North Coast EMS Agency. North Coast serves as the local EMS agency for specifically delegated functions, including development and implementation of the Regional Trauma System. Counties, however retain responsibility for ambulance operations (via county ordinances) and overall disaster medical system management.

Section III - Needs Assessment

This section describes the need for system development and factors that influence the design. The design, designation and level of trauma centers proposed are defined.

Section IV - Trauma System Design

This section provides a summary of the trauma care system design and the various required system components. It identifies the facilities involved in the care of the acutely injured patients and how the system interfaces with neighboring agencies.

Section V - Intercounty Trauma System LALS/ALS Agreements

This section identifies the role of the counties in the North Coast EMS Region with surrounding county trauma systems and includes copies of proposed interagency trauma system agreements with Sonoma and Napa Counties (located in the Coastal Valleys EMS Region), Sacramento County EMS and Shasta County (located in the Nor Cal EMS Region).

Section VI - Plan Objectives

This section defines the objectives of the North Coast EMS and Trauma System, the proposed action to measure the objective, and implementation of system changes where appropriate.

Section VII - Implementation Schedule

This section presents an overview of the trauma system plan implementation.

Section VIII - Fiscal Impact

This section describes the fiscal impact of the trauma care system on the EMS agency and upon the providers in the care delivery system.

Section IX - Policy Development.

This section identifies the policies that define the structure of the trauma system plan.

Policies are listed in this section and actual policies are included in the appendices.

Section X - Local Approval

This section summarizes the process followed to obtain local approval

Section XI - Data Collection

This section describes the data management instrument and the implementation of the data management system for trauma care.

Section XII - Trauma System Evaluation

This section defines the evaluation process used to monitor system effectiveness.

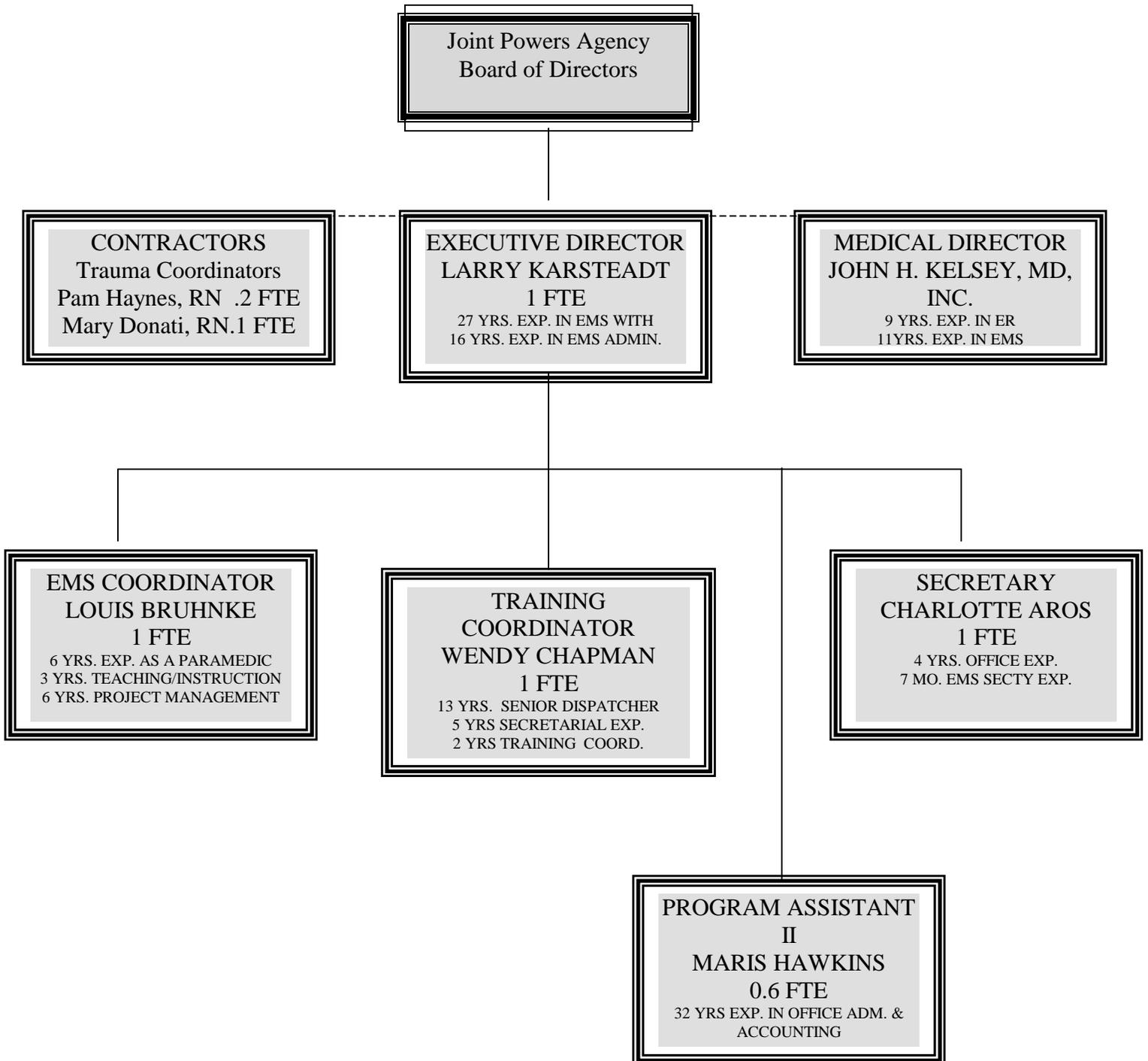
Appendices

Contains Policies and Agreements

Section II - Organizational Structure

1. EMS Agency Organizational Structure

FY 2002-03 NORTH COAST EMS PERSONNEL ORGANIZATIONAL CHART



2. EMS & Trauma Care System

Organization/Personnel

Joint Powers Agency Board of Directors

The Governing Board is comprised of one elected county supervisor member and one alternate from each member county, including Del Norte, Humboldt, and Lake Counties. The JPA Board generally meets four times a year to approve budgets, fees, grants, and oversee agency activities.

Emergency Medical Services Executive Director

The Executive Director of the EMS Agency reports to the JPA Board of Directors and is responsible for the overall management, planning, coordination, monitoring and evaluation of the North Coast EMS Region and Trauma System.

Regional Medical Director

The Regional Medical Director is a contracting physician with emergency department experience who provides medical oversight for all aspects of EMS and Trauma System. This includes: prospective development of medical treatment protocols, policy review and approval of medical issues, issuing of certifications, and oversight of retrospective medical quality assurance and improvement.

Emergency Medical Services Coordinator

The EMS Coordinator is a program manager who reports directly to the Executive Director of EMS. Responsibilities include coordination of prehospital clinical aspects of the EMS and trauma systems, including development of protocols and medical policies, monitoring of LALS/ALS Providers, oversight of the computerized prehospital care reporting system (EPCIS), etc.

Training Coordinator

The Training Coordinator is a program manager who reports directly to the Executive Director of EMS. Responsibilities include: coordination, approval and monitoring of prehospital training and continuing education programs; management of the process to issue certifications; public information and education activities, etc.

Trauma Coordinator

The part time trauma coordinators through a contractual arrangement, are responsible for the overall coordination of trauma system development and implementation with in the region.

EMS Secretary

The EMS Secretary reports directly to the Executive Director and is responsible for the clerical functions for staff, committees and contractors.

Program Assistant

The Program Assistant reports to the Executive Director and is responsible for fiscal management, bookkeeping and contracts.

Standing Committees

Emergency Medical Care Committee (EMCC) – Lake County

The Lake County EMCC is an advisory body to the Lake County Board of Supervisors and North Coast EMS. The committee is charged with the review of operations of ambulance services, and emergency medical care provided in Lake County. The committee is composed of ten members appointed by the Lake County Board of Supervisors and includes representatives of public and private services, the health department and other agencies involved in EMS.

Medical Advisory Committee (MAC) & EMCC– Del Norte/ Humboldt

The MAC is a subcommittee of the Humboldt County EMCC, which is advisory to the Humboldt County Board of Supervisors and North Coast EMS. The EMCC is charged with the responsibility to review ambulance operations, first aid/CPR training and emergency medical care provided in the Del Norte/Humboldt county area. The EMCC is composed of 10 members appointed by the Humboldt County Board of Supervisors and includes representatives of prehospital and hospital personnel involved in EMS. The Medical Advisory Committee is the primary advisory body to North Coast EMS in Humboldt and Del Norte Counties for the development and modification of all North Coast EMS policies and operations. Members on this committee consist of the prehospital medical director and nurse coordinator from each of five hospitals in Humboldt/Del Norte Counties and one EMT representative.

Regional Trauma Audit Committee (Re-TAC)

There are Regional Trauma Advisory Committees in Humboldt /Del Norte Counties and in Lake County. They have functioned as the primary review committee, for all trauma system plan development. Once the trauma system is approved and activated, the Regional Trauma Audit Committee will

be formulated according to the Quality Assurance/System Improvement Policy included in the policy section of this trauma plan. The committees are a multi-disciplinary advisory committee to the EMS Agency on all issues related to trauma care in the Lake County or Del Norte/Humboldt County portions of the North Coast EMS Region. The committee membership for each Regional Trauma Audit Committee will include representatives of the designated trauma facilities in Del Norte, Humboldt and Lake Counties, to include Trauma Directors, Trauma Coordinators, prehospital providers both ground and air, EMS Agency staff, and case specific invited representatives of the surgical community and medical examiners office. Committee activity is defined in the Quality Assurance Policy found in Appendix D.

Trauma Care System

The Trauma Care System will be one component of the overall EMS System in the North Coast Regional EMS Agency. The individuals and committees identified in the organizational structure of the EMS and Trauma plan, will serve vital roles in facilitating the effective operation of the North Coast Regional EMS Trauma Care System. The Regional Medical Director, and Executive Director of the North Coast EMS Agency, will provide the immediate and on going oversight of the trauma system. After implementation, one or more trauma nurse contractors will assist North Coast EMS with the ongoing oversight and maintenance of the regional trauma system as funding allows.

Trauma Centers that are designated will have a Trauma Medical Director and Trauma Nurse Coordinator to oversee the function of their respective trauma services. The Trauma Director shall be a qualified specialist who meets the standards in Title 22, Division 9, Chapter 7, Section 100242, of the California Code of Regulations. The Trauma Director must have experience in trauma care and trained in Advanced Trauma Life Support or board certified in Emergency Medicine.

The Trauma Coordinator must be a registered nurse with administrative ability and emergency department experience, including evidence of educational preparation and clinical experience in the care of adult and/or pediatric trauma patients.

These individuals will provide the administrative and clinical support for their trauma center. The director and coordinator serve as liaisons between the trauma center and the EMS trauma care system. Each trauma center must have an internal structure capable of addressing the needs of the trauma program, while recognizing the multidisciplinary nature of trauma care.

Education and Training

As part of the trauma system funding from EMSA, trauma educational programs have been offered in the North Coast EMS Region. ED nurses caring for trauma patients have been offered the TNCC course and prehospital providers have been offered the Pre-Hospital Trauma Life Support (PHTLS) course. Basic education of the trauma system polices; Trauma Triage and Trauma Patient Destination are included in the Base Hospital educational programs.

Section III – Needs Assessment

1. Background

Several years ago, (1988) the North Coast EMS Region participated in a retrospective study to evaluate trauma outcomes from a rural perspective. This was funded by a grant from EMSA and was identified as the “Model Rural Trauma Project,” (MRTP). The focus was to improve the standard of patient care through the organization of the entire EMS system. A previous study done in the North Coast EMS Region in 1984, identified system deficiencies, including long delays to definitive care and a preventable death rate estimated at 10%. The goal of the MRTP was to reduce the rural death rate and improve patient outcomes. This was accomplished by defining effective trauma triage criteria, early mobilization of organized hospital trauma teams and an organized system review process, with system modifications when indicated.

A second project was funded by the EMSA in 1995-96 to statistically compare major trauma patient outcomes in all hospitals located in the North Coast EMS region relative to two Level I trauma centers in Los Angeles county. Despite statistical differences in the age, sex, ethnicity, severity, volume and the ratio of blunt vs. penetrating trauma, survival outcome was statistically equal in the urban and rural settings. Unfortunately, this rural trauma program eventually deteriorated due to lack of funding.

There currently is no formally approved trauma system in the North Coast EMS Region. There are a significant number of critically injured trauma patients that are transported directly to emergency departments within the region. Some, after stabilization, are transferred out of county to higher-level facilities in the surrounding counties of Shasta, Sonoma, and Sacramento. Air Ambulance resources are provided by Cal Star and Reach which service Lake County and the southern portions of Humboldt County. Mercy Air and Redding Medical Center based in Redding, CA., both provide helicopter transport. Fixed wing transport is provided to the region by Mercy Air Ambulance. The Redding based services are utilized by, the eastern portion of Humboldt County. Del Norte County is supported by the Oregon Trauma system for those patients who are being transferred back into their region and occasionally they may utilize the air transport services from the Redding area. There are two fixed wing air

ambulance services based in Crescent City, Del Norte Air Ambulance and CALOR-Life Flight that provide for the transport needs of Sutter Coast Hospital.

Rarely, a trauma patient is transported from the scene in the northeastern portion of Del Norte County to a trauma center in Southern Oregon; occasionally trauma patients are directly flown by helicopter from the scene in eastern Humboldt County to a Level II trauma center in Redding; and, routinely, trauma patients are flown by helicopter from the Lake county area into a trauma center in Sacramento, Sonoma, or Napa Counties. An informal system exists for the identification of trauma patients by the prehospital providers, occasionally using the old trauma triage criteria, and they then make appropriate notification to their Base Hospital. Patients are then directed to the closest appropriate emergency department in or around the region, depending upon the patient location and resources available at the time of the call. The emergency departments have established a system of response for all critical patients they receive, but only one has maintained formal use of the internal trauma team response to the critically injured patient.

There are limited resources from clinical sub-specialists of surgeons, orthopedists, anesthesia, and neurosurgical services. There is an informal process established to gain acceptance by out of county trauma centers for those patients who need the resources of a higher level of care. Transfers can occur to any one of a number of facilities surrounding the North Coast Region. The utilization is as follows:

Humboldt County: Santa Rosa Memorial - Sonoma
UC-Davis - Sacramento
UCSF – San Francisco(Pediatrics)
CPMP- Davies – San Francisco (amputations)
Mercy Hospital – Redding, CA.
Lucille Packard – Santa Clara (Pediatrics)
Oakland Children’s – (Pediatrics)

Del Norte County: Higher Level Trauma Centers in Oregon
Legacy-Immanuel – Portland (Pediatrics)
Mercy Hospital – Redding, CA.
UC Davis – Sacramento
UCSF –San Francisco (Pediatrics)

Lake County UC Davis – Sacramento
Santa Rosa Memorial – Sonoma
Oakland Children’s – (Pediatrics)
UCSF – San Francisco (Pediatrics & Adults)
Queen of the Valley – Napa County

Currently, there are no specific agreements for the immediate transport from scene to an out of county trauma center by ground or air service. There are agreements between hospitals for inter-facility transfers. Memorandum of Understanding (MOU's) between EMS Agencies for the transfer of trauma patients between counties, have been drafted and are in the process of approval.

2. Proposed Trauma System Design

A review was made of each of seven hospitals in Humboldt, Del Norte and Lake Counties. Six facilities are licensed as Basic Emergency Departments; one is licensed as a stand-by receiving center. The six basic emergency departments operate 24/7 with in-house emergency department physicians and licensed RN staff. All six hospitals have operative suites available 24/7 with on call staff promptly available after hours and on weekends. Intensive Care Units are located at all six hospitals, beds are available most of the time at all of them, but having available RN's to staff them can sometimes be a problem. A summary of the assessment of hospitals can be located in Appendix B.

The availability of sub-specialty physicians at all hospitals is varied. They lack consistent coverage of all components, to be able to apply for trauma center designation at this time. It is expected that the hospitals will apply to be designated as a Level III or IV Trauma Centers in the next 6 to 12 months. Based upon that assumption, the trauma service area for each of the trauma centers have been defined and are included in Appendix C.

Until trauma centers can be designated in the NCEMS Region, Critical trauma patients defined in the trauma triage policy will be triage directly from the scene to the closest emergency department utilizing the existing patient destination policy. In Lake County, scene transports frequently occur where trauma patients are flown by helicopter from the scene into a Level I or II trauma center in Sacramento or Sonoma, or the Level III in Napa County. The larger helicopters have difficulty transporting into Sonoma County so frequently they are transported to Sacramento or Napa.

Critical trauma patients transported to the closest ED will be stabilized and transferred to an out of county trauma center when the facility lacks the resources to provide the higher level of care needed. All hospitals will have transfer agreements with the Level I, II and III trauma centers in the adjoining counties for acceptance of the trauma patients whose needs exceed the resources they have available.

The total resident population served is just over 216,000 people. The influx of visitors can increase that number significantly, depending upon the season. Over 3 million non-residents visit the region annually. The most recent annual statistics (2002) for patients injured in the North Coast EMS region accounts for 16 % of all ambulance transports. The severity of injury for that statistic shows that

approximately 260 critically injured trauma patients are transported to the hospitals within North Coast EMS region every year. The 1995-96 trauma study verified that there were 337 trauma patients with an Injury Severity of 10 or greater transported to hospitals located within the North Coast EMS region.

Section IV – Trauma System Design

1. System Management

When the trauma system is implemented, the North Coast EMS Agency will have the responsibility for managing the regional trauma care system on behalf of the counties of Del Norte, Humboldt, Lake and southern Trinity. The Agency responsibilities include, but are not limited to:

- Assess the trauma system needs and resources of the region.
- Implement the trauma system plan, including the number and designated level of trauma care facilities.
- Assure that all prehospital providers understand their role in the system, including training in trauma triage, trauma protocols, and patient destination.
- Work with trauma centers that are designated, both within and outside the Region to assure appropriate outreach and mutual aid programs exist.
- Establish and maintain (as funding allow) the regional trauma registry
- Assure, if possible, the interface of the prehospital information data with the trauma registry
- Institute and maintain (as funding and staffing allows) a quality monitoring system assuring compliance with all appropriate state laws, regulations and local policies, procedures and contractual agreements
- Update trauma policies and protocols, monitor designated trauma centers and LALS/ALS providers, and enhance the regional trauma system as needed and funding allows.

To fulfill these responsibilities, the EMS Agency is staffed with an Executive Director, a Regional Medical Director, an EMS Coordinator, a Training Coordinator, a Program Assistant and Secretary. In addition, the Agency contracted with two RN's on a part time basis to function as Trauma Coordinators for the development of the two trauma regions. All agency staff will be involved with system monitoring, evaluation and problem solving. The Executive Director and Regional Medical Director are the principle proponents of the Trauma Care System Plan, trauma registry and Quality Assurance/System Improvement Program. The Program Assistant and Secretary provide program support to the Executive Director and Medical Director.

The region will utilize a multidisciplinary, Regional Trauma Audit Committee (Re-TAC) for the monitoring of the Quality Assurance/System Improvement process.

One will be located in the south (Lake County) and one in the north (Del Norte/Humboldt Counties) the Re-TAC will have responsibility for providing medical, hospital, and pre-hospital provider input into the ongoing day-to-day trauma planning and system oversight responsibilities.

2. System Design and Operation

The primary catchment area of the trauma plan is the entire geographic region of Del Norte, Humboldt, Lake and southern Trinity counties. The surrounding southern counties of Sonoma and Sacramento, and the eastern county of Shasta all participate in mature trauma systems that service their populations. Sutter Coast hospital located in Crescent City, Del Norte County is formally designated as a Level IV trauma center in the Oregon trauma system. All trauma patients that cannot be managed by Sutter Coast are stabilized and transferred into the Oregon system. On occasion trauma patients will be transported directly from scene, or transferred out of county after stabilization at one of the North Coast trauma centers, to one of the higher-level trauma centers in the state of Oregon, or to one of the centers in Sonoma, Shasta or Sacramento counties. Transfer agreements with these out of county trauma centers are a part of the trauma system design. The North Coast EMS Region will establish agreements for trauma care with the surrounding regional or county EMS agencies to facilitate the acceptance of critical trauma patients into their higher-level trauma centers. These agreements will address issues of diversion and the need to provide trauma care on a priority basis to their local communities

North Coast EMS is dedicated to providing quality emergency trauma service through ongoing system improvement, continuing education of EMS personnel, and supporting the efforts toward injury prevention and control. When the trauma system is implemented components of the system such as LALS/ALS providers, base hospital and trauma centers will be monitored as funding and staff size allows, through the periodic audit of designation contracts and agreements. By providing information and data from the regional monitoring activities back to the provider agencies and hospitals, the local EMS Agency assists in evaluating their resource availability for effective system response.

3. Other Resources

A. Pre-Hospital Phase

North Coast EMS Region has a coordinated system for the delivery of prehospital care to the residents and visitors of Del Norte, Humboldt, Lake and southern Trinity counties. Any citizen can access the EMS system by dialing 9-1-1 from the nearest telephone or call box that are located along the major highways throughout the region. The 9-1-1 call is

received by one of seven public safety answering points (PSAP), which determines if law enforcement, fire, rescue, ambulance, or any combination of these services are needed. The call is sometimes forwarded to a secondary PSAP for dispatch of fire first responder or ambulance dispatch.

The closest available first responder unit is dispatched with personnel who are first aid/CPR first responder, or EMT-I trained. A few first responder unit, are staffed by EMT II' s or paramedics. In addition, one of several ambulance dispatch centers are notified. They, in turn, dispatch the nearest available ambulance. All responding units have two- way radio communication equipment. Based upon prehospital protocol they make early notification to the receiving facility to report patient status and expected time of arrival. Average transport times to the closest facility are less than 12 minutes 85% of the time and less than 25 minutes 93% of the time. EMS will continue to monitor transport times through the use of their electronic prehospital database.

As of January 1, 2003, there were 1073 EMT Is, 3 EMT II' s, 106 EMT-Ps and 128 MICN' s who are certified, accredited or authorized by North Coast EMS. Field transportation for emergency medical services, are provided by four privately owned ambulance companies, one tribal ambulance service (Hoopa), one volunteer ambulance service, and seven public ambulance services. Each county retains responsibility for permitting ambulance services through their ambulance ordinance, although In Lake County, the ordinance only covers a single private ambulance. In addition, seven public ambulance services provide transport within Lake County. The ordinance is currently under revision and will soon cover the public ambulance providers as well.

Air Transport Services

There is one air ambulance services based in the North Coast EMS Region. REACH Air Ambulance is based in Lake County. Cal Star also supports the needs of Lake County and the southern portions of Humboldt County. Mercy Air and Redding Medical Center based in Redding, CA., both provide helicopter transport. Mercy Air, CALSTAR, and REACH have the capacity to provide fixed wing transport when indicated. The Redding based services are utilized by, the eastern portion of Humboldt County. Del Norte County is supported by the Oregon trauma system for those patients who are being transferred back into their region and occasionally they may utilize the air transport services from the Redding area. There are two fixed wing air ambulance services based in Crescent City, Del Norte Air Ambulance and CALOR-Life Flight that provide for the transport needs of Sutter Coast Hospital. Four of the seven hospitals have on site helipads. The hospitals are identified in the Hospital Resource document in Appendix B

Medical direction is provided by any one of the six Base Hospitals, two are located in Lake County, one in Del Norte and three in Humboldt County. There is coverage in the southern Humboldt County provided by the Alternative Base Hospital in Garberville. Between 15,000 and 18,000 emergency medical calls are made each year on the 9-1-1 system within the three and one half county area.

B. Hospital Phase

There are seven acute care hospitals in the North Coast EMS region ranging in size from 9 to 140 inpatient beds. Six of the seven are licensed as a Basic Emergency Facility and one is a Standby ED. The six Basic ED's function as Base Hospitals, the Standby ED operates as an Alternate Base Hospital. The chart below provides a quick look at the available resources to support trauma. The major resource shortage is in the area of trauma surgeons and orthopedist to meet the requirements for a Level III. All have the capacity to organize resources and meet the requirements of a Level IV. The one facility, St. Joseph's Hospital (SJL) is expected to apply for a Level III trauma center.

Hospital Demographics in North Coast EMS Region							
	MRCH	RCH	RMH	SJH	SLH	SCH	JPCH
Hosp. Beds	80	32	46	140	69	59	9
ED Beds	6	7	8	9	12	12	4
Annual ED Volume	17,500	15,000	11,800	22,300	21,600	35000*	2,100
Helipad on site	yes	yes	no	yes	yes	no	no
Avg Daily RN hrs	60	60	36	96	60	60	24
Avg DailyTech hrs	12	10	12	None	12	12	None
ED MD Staff Dbl Cov	1p-9p	None	None	12n-12m	1p-9p NP	None	None
OR suites	3	2	2	4	4	4	None
ICU beds	6	4	4	8	6	10	None
Lab Cov Inhouse 24/7	yes	yes	yes	yes	yes	7a-12m	9a-5p
Rad. Tech inHs 24/7	yes	7a-11p	7a-8p	yes	8a-9p	7a-11p	9a-5p
Surgeons Avail to ED	3	3	3	7	4	2	0
Ortho Avail to ED	**3	1	2	5	1	2	0
* 21,800 patients triage to clinic ** Frequently no coverage							

A review of the data provided for the first six months of 2002 show there is approximately 1300 trauma transports for the entire region during that time, The acuity of these specific transports is not know but it is estimated that less than ten percent would be critical trauma. This figure is based upon the number of patients triaged with physiologic or anatomic triage criteria. Projecting this number to an annual figure would account for 260 critical trauma victims for the entire region. The distribution of trauma patients by county verses population distribution is as follows:

	<u>Trauma</u>	<u>Population</u>
Del Norte	16%	13%
Humboldt	47%	59%
Lake	37%	28%

The one hospital in Del Norte County, Sutter Coast Hospital, currently functions as a Level IV Trauma Center in the Oregon Trauma System. The four hospitals in Humboldt County have varying resources and will be designated according to the resources available. Lake County which is receiving a higher volume of trauma patients, based upon population density has significant backup by air ambulance transport, one based in Lake County the other originating from out of the area, to move critical trauma patients to a higher-level trauma center, in a timely manner.

All of the hospitals are geographically located greater than 25 minutes from each other and would service a specific population base. The only area of slight overlap will be in the Eureka/Arcata area where the catchment area for St. Joseph’s Hospital would overlap with Mad River Community Hospital in Arcata. Prior to activation of the trauma system the catchment areas will be redefined based on the final trauma center designation levels.

C. Other System Components

1. Pediatric Trauma Center

There are no Pediatric Trauma Centers located within the North Coast EMS Region. Pediatric trauma care is provided primarily at

- Oakland Children’s – (Pediatrics)
- UCSF – San Francisco (Pediatrics)
- Lucille Packard – Santa Clara (Pediatrics)
- Legacy-Immanuel – Portland (Pediatrics)

Arrangements for transfer are defined through a transfer agreement with the pediatric facility used by each of the hospitals in the North Coast EMS Region. All of the hospitals within NCEMS region have the necessary equipment and resources for stabilization and treatment of pediatric emergencies. Four of the seven hospitals are EDAP certified.

2. Burn Care

There are no Burn Center facilities located in any of the counties of the North Coast EMS region. Care is provided at out of county burn centers located at UC Davis - Sacramento, UCSF in San Francisco,

and Legacy-Immanuel in Oregon. Transfer agreements exist at the proposed four rural trauma centers for this service support.

3. Spinal Cord and Head Injury/Rehabilitation Facilities

Major head and spinal cord injuries are transferred out to higher-level trauma centers in the primary care phase. Their rehabilitation needs are met through transfers from these high-level trauma centers.

4. Medical Control

Medical Control is provided for the prehospital providers by any of the following methods; prospectively through standing orders, policies and procedures; concurrently through online medical control at the base hospital; and retrospectively through the quality review process. The Regional Medical Director is responsible for all aspects of prehospital medical oversight and control. Each Base Hospital has a Prehospital Care Medical Director PCMD and Prehospital Care Nurse Coordinator (PCNC) who monitors the activities and patient care of prehospital providers and personnel. North Coast EMS designates and monitors the activities of the Base Hospital. Prehospital transport providers are required to make Base Hospital notification as soon as possible of the expected arrival of all trauma patients to allow for emergency care team notification.

D. Coordination with Neighboring Agencies

The North Coast EMS Region has had a collaborative working relationship with the surrounding regional or county EMS agencies for many years. A portion of critically injured trauma patients have been directly transported or transferred to a higher-level trauma centers outside of the EMS region since the inception of trauma systems in those counties. For the past eight years they have had a signed Memorandum of Understanding with the Nor Cal EMS Region for the reciprocal transfer of trauma patients. (Copy of Trauma Agreement in Appendix C.)

Ninety percent of the major trauma that occurs in Lake County is transferred directly from the scene, to trauma centers in Sonoma, Sacramento, or Napa County. The majority of critical trauma in eastern Humboldt County is transferred directly from scene to Mercy Hospital, a Level II trauma center in Redding. The hospitals receiving trauma patients have interfacility transfer agreements with the higher-level trauma centers for those patients that are ground transported to them directly from scene. North Coast EMS is working on obtaining agreements with the neighboring county EMS systems that will address the relationship of

trauma patients being transported into their counties from the North Coast EMS region.

4. Trauma Center Requirements

The resources required of a Level III or Level IV trauma facility are defined in Sections 100263 and 100264 of Title 22, Chapter 7. "Trauma Care System" When North Coast designates trauma centers they will meet or exceed the Level III or Level IV Trauma Center Standards dependent upon their level of designation.

In addition to the stated requirements for Level III and IV Trauma Center Standards it is recommended that all trauma centers have the following equipment available in their emergency department:

Equipment and supplies appropriate for adult and pediatric patients

- Airway control & ventilation equipment

- Pulse Oximetry

- Suction Devices

- Electrocardiograph/Oscilloscope/Defibrillator

- Large-bore intravenous catheters

- Sterile Surgical sets for:

 - Airway control/cricothyrotomy/Chest Tube insertion

- Broselow Tape

- Rapid Infuser system

- Qualitative end-tidal CO₂ determination

- Communication with EMS vehicles

- Drugs necessary for Emergency Care

5. Trauma Center Standards

**North Coast Regional Trauma Center Standards
California Trauma Center Criteria
Summary of California Code of Regulations
Title 22, Chapter 7-Trauma Care System**

CRITERIA	Level	Level	
	III	IV	
1	TRAUMA CENTER (E-essential D-desirable)		
2	Trauma Program Medical Director, Qualified Surgical Specialist		
3	Trauma Program Medical Director, Qualified Specialist		
4	Responsibilities include but not limited to:		
5	recommending trauma team physician privileges		
6	working with nursing administration to support the nursing needs of trauma patients		
7	Developing trauma treatment protocols		
8	Having authority & accountability for QI peer review process		
9	correct deficiencies in trauma care/exclude team members that don't meet standards of the QI Program		
10	assisting with the coordination of budgetary processes for trauma program		
11	Trauma Nurse Coordinator/Manager who is an RN		
12	With qualifications including evidence of educational preparation		
13	And clinical experience in the care of Adult and/or pediatric		
14	Trauma patients, must have administrative ability and		
15	Responsibilities include but not limited to:		
16	organizing services and systems necessary for multidisciplinary approach to the care of the injured patient		
17	coordinating day-to-day clinical process & performance improvement of nursing and ancillary personnel		
18	collaborating with trauma program medical director to carry out trauma program activities		
19	Trauma Service		
20	Which will provide:		
21	implement requirements specified in this section and provide for coordinate with the local EMS agency		
22	capability of providing prompt assessment, resuscitation & stabilization of the trauma patient		

North Coast EMS Regional Trauma System Plan

	CRITERIA	Level III	Level IV	
23	ability to provide treatment or arrange for transportation to higher level trauma center as appropriate	E	E	
24	An Emergency Department, Division, Service, or Section	E	E	
25	Staffed so that trauma patients are assured of Immediate and appropriate initial care	E	E	
26	Intensive Care Services:	E	D	
27	Shall have appropriate equipment and supplies as determined By the physician responsible for the ICU and the Trauma Program Medical Director.	E	D	
28	Shall have a qualified Specialist promptly available to Care for the trauma patients in the ICU	E	D	
29	The qualified specialist may be a resident with two (2) years of training, who is supervised by the staff intensivist or attending surgeon who participates in all critical decision making	E	D	
30	The qualified specialist in (2) above shall be a member of the Trauma team	E	D	
31	A trauma team, must be a multidisciplinary team responsible for the initial resuscitation and management of the patient	E	E	
32	Qualified surgical specialist(s) must be promptly available;			
33	General surgeon	E	D	
34	Orthopedic surgeon	E	D	
35	Qualified non-surgical specialist(s)			
36	Emergency Medicine, in-house and immediately available	E	E	
37	Anesthesia, on-call/ promptly available	E	D	
38	Must be in the OR when patient arrives,	E	D	
39	May be filled by Senior resident, or CRNA who are able to assess emergent situations in trauma patients and provide any required Anesthesia treatment, & supervised by staff anesthesia	E	D	
40	Staff anesthesia must be advised of patient, be promptly Available at all times and in OR for all operations			
41	These services may be available in-house or by transfer agreements			
42	Neurosurgeon	E	E	
43	Burn Care	E	E	
44	Pediatric Care	E	E	
45	Rehabilitation services	E	E	
46	Radiological Services			
47	Must have a radiological Technician promptly available	E	E	
48	Clinical Laboratory			
49	Must have a comprehensive blood bank or access to a	E	E	

North Coast EMS Regional Trauma System Plan

CRITERIA		Level	Level	
		III	IV	
50	Community Central Blood Bank; and	E	E	
51	Clinical laboratory services promptly available	E	E	
52	Surgical Service			
53	Must have an operating suite that is available or being Utilized for trauma patients and that has:	E	D	
54	Operating staff who are promptly available; and	E	D	
55	Appropriate surgical equipment and supplies As required and approved by the EMS Agency	E	D	
56	Written transfer agreements with Level I or II trauma centers	E	-	
57	Written transfer agreements with Level I, II, or III Trauma Centers	-	E	
58	Written transfer agreements with level I or II Peds Trauma Centers	E	E	
59	Written transfer agreements with specialty care centers, for the Immediate transfer of those pts. who need additional resource	E	E	
60	Outreach Program, to include: Telephone and onsite consultations with community physicians And physicians in the outlying areas.	E	E	
61	Trauma Prevention for the general public	E	E	
62	Continuing Education in trauma care shall be provided for:	E	E	
63	Staff Physicians	E	E	
64	Staff Nurses	E	E	
65	Staff allied health	E	E	
66	EMS personnel	E	E	
67	Other community physicians and health care personnel	E	E	

Section V – Intercounty Trauma Center Agreements

1. Coordination with other EMS Agencies

North Coast EMS Region currently has a Trauma Patient Memorandum of Understanding in place with the NorCal EMS region. This agreement addresses the transfer and transport of trauma patients from one jurisdiction to the other. This agreement recognizes the need to share data for the purposes of quality review and when used as such are not subject to the mandated patient authorization procedures of HIPAA. The agreement also stipulates the trauma protocols of the receiving system will be followed. In addition to this agreement hospitals in Humboldt/Del Norte and Lake Counties have interfacility transfer agreements with the facilities they utilize inclusive of:

Humboldt County:	Santa Rosa Memorial - Sonoma UC-Davis - Sacramento UCSF – San Francisco (Pediatrics) CPMP- Davies – San Francisco (amputations) Mercy Hospital – Redding, CA. Lucille Packard – Santa Clara (Pediatrics) Oakland Children’s – (Pediatrics)
Del Norte County:	Higher Level Trauma Centers in Oregon Legacy-Immanuel – Portland (Pediatrics) Mercy Hospital – Redding, CA. UC Davis – Sacramento UCSF –San Francisco (Pediatrics)
Lake County	UC Davis – Sacramento Santa Rosa Memorial – Sonoma Oakland Children’s – (Pediatrics) UCSF – San Francisco (Pediatrics & Adults)

2. Agreements

Intercounty Agreement between North Coast EMS and Nor Cal EMS can be found in Appendix C.

Similar agreements (MOU’s) are in the process of being obtained with Coastal Valleys EMS and Sacramento County EMS. A draft of this agreement can be found in Appendix C

Section VI – Objectives of the Trauma System Plan

Section VI – Plan Objectives

The trauma system when implemented, will be an integral part of the existing North Coast Regional EMS Plan. A continuing goal of the North Coast Trauma Care System will be to assure a well-prepared, coordinated and appropriate response to persons who incur traumatic injuries in the North Coast EMS Region. System objectives have been developed to provide a means to measure the effectiveness of the trauma system plan.

The following objectives will be used to monitor system effectiveness to the extent that future funding allows:

- 1) Assure that a comprehensive system of emergency medical and trauma services are available to the residents and visitors of North Coast EMS. This will be monitored on a continuous basis through base hospital, trauma center and the quality assurance/ system improvement process.
- 2) Provide impartial and objective administration of the EMS and Trauma System. This will be monitored by system review based upon compliance with established policies and system standards. This will be done routinely as issues arise and at regular intervals through the quality assurance/ system improvement process review.
- 3) Promote system cost-effectiveness and economic viability. This will be accomplished at the facility level by continuous review for cost effective care delivery practices, then shared through the system multidisciplinary review committee. At a system level this is accomplished through collaborative EMS leadership, in combination with trauma committee leadership, to monitor program costs and pursue appropriate funding sources.
- 4) Coordinate local trauma services with trauma services in adjacent regions and counties. This is accomplished through the agreements with out of county trauma centers and air ambulance providers. When care coordination issues arise, resolve is obtained through the out of county provider involvement in the QI process.
- 5) Provide accountability and objective evaluation of the trauma care system through data analysis utilizing the trauma registry. This will be accomplished through the quarterly audit and review process at the trauma facility and the EMS system trauma audit committee.
- 6) Promote public awareness and information regarding trauma services and injury prevention. This will be accomplished, as funding and staffing allow, through health fairs, public service announcements, and injury prevention outreach programs.

Section VII – Implementation Schedule

The North Coast Regional Trauma System has an approved trauma plan but is unable to move forward with implementation at this time. The following dates represent accomplishments thus far:

Locally approved trauma system plan	May 22, 2003
Submitted to the State EMS Authority	June 2003
State approved trauma plan	July 2003
I Continue to work with the hospitals in the region to reach the requirements for trauma center designation.	December 2004

The plan was reviewed and approved by the Regional Trauma Advisory Committee then forwarded to the Regional Medical Director and Executive Director for their approval before being presented at a public hearing for input and comments by system participants. It was then submitted to the Joint Powers Agency Board of Directors in May 2003. Following their approval it was submitted to the State EMS Authority. The EMS Authority approved the plan in July 2003.

Section VIII – Fiscal Impact

The participants in the North Coast Regional EMS and Trauma Care System recognize that adding the responsibility of monitoring the trauma system through the quality assurance process will have a financial impact. North Coast EMS will require at least a quarter to a third of an FTE to provide the resource of trauma data management and quarterly QA/SI review. There would also be additional funded time of the Regional Medical Director and contracted EMS Trauma Coordinator to support trauma QA/SI. The exact number of hours would be based upon the total number of critical trauma patients that would be monitored in the registry. Current estimates would indicate about 32 hours a month to support this responsibility.

The trauma center fiscal impact will be to provide a quarter of an FTE to complete the trauma chart extraction and input into the trauma registry,

produce reports and coordinate the Quality Assurance/System Improvement process. With the anticipated volume of 260 trauma patients for the entire region this would breakdown to approximately 30-40 trauma patients per facility each year. This would produce a monthly workload of approximately 3-4 chart extractions for review.

A Level III trauma center will have the additional responsibility of assuring the surgeon and sub-specialist availability. This would have to be evaluated against their present structure of providing this service to the current Emergency Department.

The current North Coast EMS budget has limitations that are being maximally stretched by increasing operating expenses and the cut back in state funding. Pursuit of special project grant funding is in process to help offset the early stabilizing cost of a new trauma program, and local increases in certification fees, county shares and trauma center fees are also being considered. Currently many trauma programs are evaluating the potential support available from their local communities, along with county supported efforts. Lake County has a high retirement population and is seen as an attractive recreation area. This contributes to the amount of traumatic injuries that occur. Local education of community groups regarding the needs of trauma care may produce potential financial resources. Designated trauma centers have the ability to generate additional revenue to off set expenses by charging a trauma resuscitation fee, newly identified on the UB92 as of October 2002. this is in addition to the current Emergency Department charge.

Because of the rural nature of the region and the low volume of trauma victims, continued oversight, monitoring, maintenance and enhancement of the North Coast EMS Regional Trauma System will most likely be possible only with ongoing state funding to off set administrative and trauma center costs.

Section IX – Policy and Plan Development

1. Supporting Policies

The North Coast Regional EMS Trauma System has developed a trauma plan and supporting policies, which provide a clear understanding of the structure of the trauma system and the manner in which it utilizes their resources.

The following is a list of the available policies that support the system operation. Policy recommendations stated in Section 100255 of the trauma regulations that are not listed below are contained in the narrative description of the trauma plan with their location identified in the index of the plan. In addition to the required policies, North Coast EMS has developed a number of trauma treatment protocols for BLS and ALS prehospital providers. These are listed in the

EMS Policy and Procedure Manual. Copies of all regulatory policies are contained in Appendix D.

- Collection and Management of Data
- Trauma Center Service Area
- Repatriation of Stable Trauma Service Health Plan Members
- Inter facility Transfer of the Trauma Patient
- Quality Assurance/System Improvement including a Multidisciplinary Peer Review Committee
- Identification and Transportation of the Adult and Pediatric Trauma Patient
- Trauma Triage Training of Prehospital Personnel
- Provider Marketing and Advertising
- Collaborative Injury Prevention Efforts with the Public/Private Sector

Section X – Written State and Local Approval

1. Statements of Approval

The North Coast Regional EMS System has been in operation since 1975. It emerged as a result of funding from an EMS System planning grant to create a region wide EMS Agency for residents and visitors of Del Norte, Humboldt, Lake and southern Trinity counties.

The Joint Powers Agreement and JPA-member county contacts authorize North Coast EMS to develop and implement a trauma system for the North Coast EMS Region. Regional Trauma Advisory Committees were formed by North Coast EMS to review the work in developing the trauma system plan in September 2002. The members of the Regional Trauma Advisory Committees were solicited by the Regional Medical Director and Executive Director, to serve in an advisory capacity on the plan and policy development process. The RE-TAC included: Emergency Department Medical Directors, Prehospital Care Coordinators, Paramedics from Public and Private Prehospital Providers from both ground and air services, and EMS Agency Staff. The Re-TAC utilized the existing state trauma regulations and Trauma Plan Development Guidelines from EMSA along with American College of Surgeons guidelines in the formation of the trauma plan.

On May 22, 2003 the Joint Powers Agency, Board of Directors approved the trauma plan for North Coast Regional EMS.

A statement of approval of the North Coast Regional EMS Agency Trauma System Plan from the EMS Authority was received on July 23, 2003.

A copy of all approval documents can be found in Appendix E

Section XI - Data Collection

When designated, the trauma centers will be responsible for submitting all required data to the EMS Agency on a quarterly basis. The minimum data set as defined in the State Trauma Regulations Section 100257, is required by all participating trauma hospitals.

Sources of Data Collected

Prehospital

The prehospital collection system utilizes EPCIS, which is an electronic data collection tool. They are evaluating the possibility of having the hospitals receive their prehospital information at their base hospital computer. This will make for easy and consistent access of the prehospital information. It will provide for linkage to the trauma registry once that program is operational.

Trauma Registry

The statewide minimum data set has been identified by a state sub-committee of the EMSA Trauma Advisory Committee. The goal of the North Coast EMS trauma registry is to be compliant with the recommendations of the state. A comparative analysis was done of the Oregon Trauma Registry, the National Trauma Data Bank and the EMSA recommendations thus far. Sutter Coast Hospital in the North Coast EMS Region is currently utilizing the Oregon Trauma Registry and reports their patient information into the Oregon Registry. A copy of the registry was obtained for evaluation. The program is written in DOS and has limitations on the report structure and initial review does not reflect an ease of use. The EMS staff and ReTAC Committee evaluated the registry products available and selected "Collector" as the Regional Trauma Registry.

Medical Examiner

Autopsy reports are very valuable in identifying accurate injury descriptions. It is not anticipated that there will be many trauma deaths but the availability of the Medical Examiners report will be an enhancement to the system review. The Medical Examiner will be an invited ReTAC committee member whenever there is a trauma death as part of the committee review.

The inclusive list of data elements, to be utilized for quality assurance/system improvement, which are in compliance with the required prehospital and hospital data elements. The minimum data set defined by the State EMSA will be made available to EMSA at their request. They are included in Appendix F.

Section XII Trauma System Evaluation

1. Introduction

The term “ Quality Assessment” implies that an objective mechanism is in place to judge whether or not the medical care provided to patients, and identified as requiring the resources of designated trauma centers is both safe and appropriate, and that such care meets state and local standards. The importance assigned to “quality assessment” in the trauma care system cannot be understated. Legislation in the State of California has delegated to the Board of Supervisors, through the local EMS agency, the authority to plan the trauma system, designate trauma centers and implement and monitor the trauma care system. This is a unique responsibility and provides an opportunity to develop a trauma system reflective of the local standards of care.

2. System Evaluation

Once trauma centers are designated in the North Coast EMS Region, the coordination of the overall trauma care system evaluation process will be the responsibility of the North Coast Region EMS Agency. Quality trauma care depends upon having all the necessary system components in place and functioning. Ideally these components range from the pre-response phase to definitive care at the highest-level trauma center with subsequent rehabilitative services that are provided outside of the North Coast EMS region. A failure of any one component can be a failure of the trauma care system. Each component should be evaluated separately – as well as in the context of the entire system. Problem areas in any of the components should be identified and corrected, if there is to be a quality system. The evaluation process serves to validate the effectiveness of the local trauma care system.

3. Process of Performance Evaluation

A. Internal Review – Trauma Center Quality Assessment/System Improvement (QA/SI)

The trauma center standards require each designated trauma center to have a formalized system of quality review of their trauma program. This can be incorporated as part of an existing quality assurance committee but it must be multidisciplinary, include all the components of the trauma team and meet at least on a quarterly basis. This QA/SI program should include case reviews, special audits, which allow for issue identification and rapid problem solving within the facility.

Responsibility for assessing compliance of the standard of care within each trauma center, as well as compliance with the North Coast EMS Trauma Standards, is that of the Director of the Trauma Service at each hospital. Case identification should be made through reports generation from the trauma registry.

Case identification for review should include the following:

- All hospital trauma related deaths
- Treatment / diagnostic delays
- Errors in assessment or treatment
- Complications
- Physician response delays
- Transfer delays
- All cases with identified prehospital or system problems
- Evaluation of preventable , or potentially preventable deaths

B. System Review – EMS and Regional Trauma Audit Committee

The quality assurance/ system improvement process, which is done on a quarterly basis, begins with a pre-review of the trauma registry data that has been submitted to the EMS agency. This review is established by the trauma coordinator and as needed the Regional Medical Director for the purpose of overall review, monitoring, and selection of trauma cases which, may represent treatment issues, failure to meet system standards, or have a special educational value. Such cases are selected, specific questions on identified issues are formulated and the respective trauma center directors are forwarded this information, in preparation for formal review at the ReTAC meeting.

Pre-review during the EMS review process includes not only the medical care received at the trauma centers, but also review of prehospital care and trauma cases that may have gone to non designated hospitals. Case selection will be based upon:

- Treatment issues
- Failure of system standards
- Delayed scene times, transports, and transfers
- Delayed trauma team activations
- Educational Value

When a case or an issue is identified as a Re-TAC review item, the designated trauma center will come prepared to present the details of trauma care management including the details for which the case is being reviewed, based upon the above listed issues.

C. ReTAC Meeting Format

The quarterly meetings of the Committee will follow a structured format as defined in the Quality Assurance/ System Improvement Policy. All activities of the QA/SI process are covered by Section 1040 and 1157.7 of the California State Evidence Code. Minutes should be taken at each meeting to record the cases/issues discussed and the decisions for corrective measures when indicated. The Committee should appoint a Chairperson who should be one of the Trauma Service Directors from the participating trauma centers. The chairperson will facilitate the meeting, including documenting the case reviews and actions taken. All committee members contribute to the discussions and actions taken. At the conclusion of the discussion the committee will arrive at a conclusion for action that may include one or more of the following:

1. No further comment or action indicated.
2. Request additional information for subsequent meeting.
3. Make a recommendation to the trauma center that is pertinent to the case
4. Suggest that a specific educational program be implemented.
5. Suggest that further action be referred to the EMS Agency.

Ideally, the EMS Agency Trauma coordinator summarizes the collective views of the committee present and specifies any action steps that are recommended by the committee. This will be done on a quarterly basis

D. Regional EMS Agency Monitoring

The EMS Agency may perform independent periodic reviews at each trauma center, which may include random medical record review, Trauma Registry review or inspection of the facility specific to trauma center standard requirements.

Additionally, the EMS Agency monitors the activities of the RE-TAC for necessary action in the form of independent outside expert audits, system policy change or referral issues to the JPA Board of Directors.

All of the activities of the Quality Assurance/System Improvement process are dependent upon funding and staff to support the activities both at the hospital and EMS level.

E. Independent Outside Expert Review

The trauma system will be monitored through the EMS and TAC Committee activities. Periodically it may be deemed necessary to bring in outside reviewers to complete site reviews of all the trauma centers in the system. As determined by the EMS Agency, provided, staffing and funding allows, experts drawn from outside the Region will review trauma care rendered by designated trauma hospitals and submit a comprehensive evaluation of each institution. This information is summarized for each trauma center, specific to their trauma service performance. Outside expert reviews will be used initially for the purposes of trauma center verification.