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# **Alameda County EMS**

# **Trauma System Plan 2011**

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**Emergency Medical Services Agency**  
**Health Care Services Agency**  
**A Division of the Department of Public Health**



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## SECTION I - SUMMARY OF THE PLAN

The Alameda County Trauma System Plan was approved by the State of California and implemented in January of 1987. The purpose of the trauma system, as written in 1985, was to assure optimum preparation, response, and definitive care for the people that incur critical traumatic injuries within Alameda County. The goal remains unchanged. The many changes influencing the health care delivery system in the United States over the last fourteen years have affected the trauma system in the County. Yet, the fundamental components of the trauma system design remain intact and continue to meet the needs of the residents and visitors to Alameda County.

### BACKGROUND

#### Major Problems and Solution

In 1984, it was proposed that a trauma plan would resolve the following five major problem areas in the EMS System.

- An estimated 1,100 critical traumatic injuries were being spread among 16 hospital emergency departments in the County that were not prepared to receive these cases.
- There were 100 surgeons taking trauma call. It was believed that this large number impeded the development of expertise and commitment essential for an effective trauma service. Example: Some surgeons were providing back up to more than one emergency department simultaneously.
- Neurosurgical coverage was compromised when spread among so many hospitals.
- An economic evaluation of the patient occurred that, in some instances, resulted in delay of treatment.
- There was no independent monitoring or evaluation of trauma care.

#### Development

In September 1984 the Health Care Services Agency (HCSA) received approval from the Board of Supervisors of Alameda County to develop a trauma plan under the proposed state regulations for Trauma Systems. The Board of Supervisors authorized the development of a special Trauma Review Committee that began its work in October 1984. This Committee was selected through input from the county medical association, the local hospital association, the county Emergency Medical Care Committee (EMCC) and other interested groups including consumer representation. The Trauma Review Committee completed the trauma plan in seven months. The key component of the proposed trauma system was the designation of two trauma centers that would receive all major trauma victims. Each trauma center would serve a distinct zone: one located in the northern part of the county and the other would serve the southern and eastern



part of the county. The plan called for a competitive application process with the selection of the two hospitals based upon independent review.

**Review**

The trauma plan was submitted for review to the EMCC, the Alameda Contra Costa Medical Association, the East Bay Hospital Association, the City Managers Association, the Health Care Systems Agency, the Alameda Taxpayers Association and other interested groups. The Board of Supervisors approved the plan in 1985. The Trauma System Plan was then submitted to the State Emergency Medical Services Authority and was approved in the same year.

**Hospital Involvement**

All hospitals in the County providing emergency services were kept informed of the planning process. At the start of the process, each hospital received a copy of the committee’s work program, the committee composition, and the state regulations on trauma (final draft). Each hospital was also sent a self-assessment survey, which addressed their current trauma capabilities and requested that they indicate their interest in applying for trauma designation. There was 100 percent response to the survey. There were sixteen hospitals providing basic emergency medical services at that time. Six of these institutions indicated their intention to apply for designation:

- ] Providence Hospital (now closed)
- ] Highland General Hospital (designated a Level II trauma center)
- ] Eden Hospital (designated a Level II trauma center)
- ] St. Rose Hospital
- ] Washington Township Hospital (Washington Hospital)
- ] Valley Memorial, Livermore (Valley Care Hospital, Pleasanton)

Children’s Hospital, Oakland indicated an interest in being designated as the pediatric trauma center.

**Designation Process**

The process to designate one pediatric and two adult trauma centers was initiated in 1986 with a Request for Proposal process. Site visits to competing hospitals by a multidisciplinary team of surveyors was part of this process. In November of 1986, the Board of Supervisors provisionally designated Children’s Hospital, Oakland, as the pediatric trauma center and Eden Hospital Medical Center and Highland General Hospital as the adult trauma centers. The trauma system operations began on January 15, 1987.

A second site survey by this multidisciplinary team occurred in August of 1987 to assess the trauma centers progress in meeting County standards as well as the specific deficiencies identified at the time of the first survey. All three trauma centers achieved



full designation after the second survey. A third and final visit occurred in 1990. These site visits were mandated by contractual agreements between Alameda County Emergency Medical Services, as the oversight agency for the trauma system and each of the trauma centers.

The County of Alameda continues to maintain contractual agreements with each of the designated trauma centers. These agreements have undergone many revisions over the years. The fundamental components of these agreements are based on the California State Regulations for Trauma Systems. Compliance with the standards in these agreements is linked to the quarterly financial payments to each trauma center. Further discussion of financial subsidies will be presented in **Section VIII**.



**SECTION II - ORGANIZATIONAL STRUCTURE**

The trauma system was integrated into the EMS System to assure coordination and accountability. The following is a description of the organizational structure of the EMS System as of 2003.

**A. Board of Supervisors of Alameda County (Figure 1)**

In 1976, the Alameda County Board of Supervisors adopted the EMS Plan for the County and thereby established its role and responsibility for assuring emergency medical services to the citizens of Alameda County. The EMS District was incorporated under the plan and a comprehensive system of emergency medical services was developed.

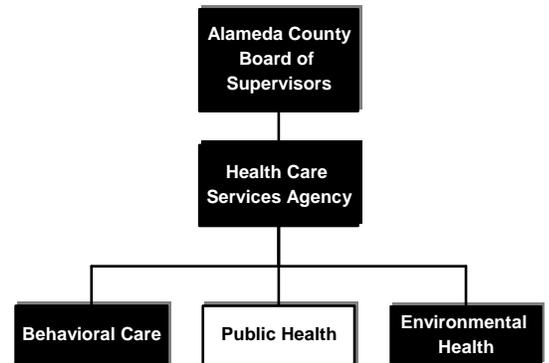


Figure 1: Health Care Services Agency

**B. Health Care Service Agency (Figure 2)**

The Director of the Health Care Service Agency (HCSA) reports directly to the Board of Supervisors. The Director is responsible for carrying out the Board’s policies regarding health care. The HCSA consists of several departments:

1. Behavioral Health
2. Environmental Health
3. Public Health

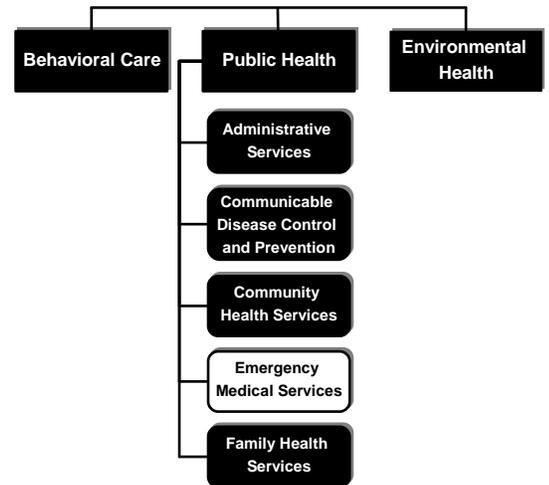


Figure 2: Public Health and EMS

**C. EMS Agency (Figure 2)**

The EMS Agency was designated as the local EMS Agency as required by each county under the California Health and Safety Code. The EMS Agency is a division of the Public Health Department. The Director of EMS reports directly to the Director of Public Health.

**SECTION III - NEEDS ASSESSMENT**

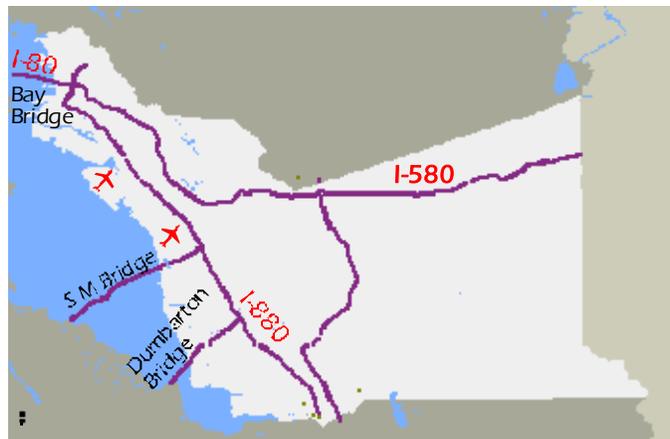
**Geography and Demographics:**



**Figure 3:** San Francisco Bay Area

Alameda County covers 743 square miles on the eastern side of the San Francisco Bay (Figure 3). Alameda County is one of nine counties that make up the San Francisco Bay Area. The county is bordered on the north by Contra Costa County, on the east by San Joaquin County, on the south by Santa Clara County and on the west by San Francisco Bay. The eastern zone has a low population density and vast expanses of open space, working ranches and agricultural areas. The rest of the County population density is characterized as urban/suburban. There is substantial industrial development along the entire length of the western portion of the county.

The Bay Area has many commuters, most of whom use automobiles. Rush hour traffic is particularly heavy on the four major freeways within the County: Interstates 80; 580; 680; and 880. There are three bridges that connect Alameda County with the other counties on the western side of the Bay: the Oakland Bay Bridge; the San Mateo Bridge; and the Dumbarton Bridge (Figure 4).



**Figure 4:** Alameda County highways, bridges, airports



**Figure 5:** BART System

The Bay Area Rapid Transit (BART) District runs north/south and east/west through the county, and services the Counties of Alameda, Contra Costa and San Francisco. The Oakland International Airport is one of the fastest growing airports in the county serving more than eight million passengers a year (Figure 5).

Alameda County’s population estimate as of 2001 was 1,458,420. (Source: U.S. Census Bureau)

**The statistical breakdown by race(2000) is:**

White persons	48.8%
Black or African American persons	14.9%
Asian persons	20.4%
American Indian & Alaska Native persons	0.6%
Native Hawaiian & other Pacific Islander	0.6%
Persons reporting some other race	8.9%
Persons reporting 2 or more races	5.6%

**The gender breakdown(2001) is:**

Female	742,336
Male	716,084

**The age distribution (2000) is:**

<u>Number</u>	<u>Ages</u>
95,250	0 – 4
249,992	5 – 17
139,323	18 – 24
487,565	25 – 44
265,725	45 - 59
123,357	60 – 74
71,892	75 and >

**Incidence of Trauma and the Need for a System in 1985:**

In a well-publicized, somewhat controversial study, Donald Trunkey M.D. (San Francisco General Hospital) evaluated 50 consecutive motor vehicle accident (MVA) deaths in San Francisco Bay Area Counties via the autopsy method. The results indicated a significant number of trauma deaths were either preventable or probably preventable (**Table 1**). Specifically, out of 50 cases, eight were deemed "preventable" and five "probably preventable" in Alameda County, had the patient been taken to a trauma center. Contra Costa County, also comprising the East Bay landmass, had similar rates.

**TABLE 1**  
ANALYSIS OF TRAUMA DEATHS - BAY AREA

County	N	Preventable	Probably Preventable	Possibly Preventable	Not Preventable
Alameda	50	8	5	4	33
Contra Costa	39	5	2	10	22
Marin	32	4	10	4	14
Napa	30	1	3	8	18
Santa Clara	46	7	3	8	28
San Mateo	32	6	1	7	18
Solano	31	6	6	8	11
Sonoma	42	3	3	7	29
<b>TOTAL</b>	<b>302</b>	<b>40</b>	<b>33</b>	<b>56</b>	<b>179</b>

Source: D.D. Trunkey. Bay Area Trauma Care. S.F. Medical Soc J. 2/82.

**Table 2** presents a partial compilation of studies, which have demonstrated a higher death rate due to the lack of a trauma system.

**TABLE 2**  
PARTIAL COMPILATION OF INAPPROPRIATE DEATHS  
IN AREAS WITHOUT ORGANIZED TRAUMA SYSTEMS

AUTHOR(S)	LOCALE	YEAR	NUMBER OF INAPPROPRIATE	
			TRAUMA DEATHS (#)	DEATHS (%)
Perry et al.	Minneapolis	1959-1963	127	50
Frey	Michigan	1962-1969	159	18
Gertner	Baltimore	1964-1969	33	50
Trunkey and Lim	San Francisco	1972	425	5.1
Certo et al.	Vermont	1975-1979	280	22
West et al.	Orange Co.	1974	30	73
West et al.	Orange Co.	1978-1979	21	71
Neuman et al.	San Diego	1979	35	31
Lave et al.	Oregon	1979	135	25
Trunkey	San Francisco Bay Area	1980-1981	302	41

Source: Frome Lowe, Gately, Goss, et al.

California Highway Patrol statistics for Alameda County (1983) included 150 deaths/year from MVAs. The Alameda County Coroners office (1983) reported that there were 228 fatal gunshot and 51 fatal stabbings victims.



Tables 3 and 4 demonstrate the average number of Code 3 responses for the period of January -June, 1984 focusing on trauma responses (MVA and personal injury).

**TABLE 3**  
 EMS RESPONSE VOLUME  
 January - June, 1984

	Sum	Monthly Mean
<b>Total Transport</b>	22,675	3,776
<b>Code 3</b>	1,756	294
<b>Total Trauma</b>	6,328	1,054
<b>Trauma Code 3</b>	360	60

Source: Alameda County EMS District Monthly Dispatch Reports

**TABLE 4**  
 CODE 3 MVA AND PERSONAL INJURY INCIDENTS  
 January - June, 1984

	Sum	Mean
<b>MVA calls</b>	2,205	368
<b>MVA Code 3</b>	143	24
<b>Total Personal Injury</b>	4,193	699
<b>Code 3 Personal Injury</b>	217	36

Source: Alameda County EMS District Monthly Dispatch Reports



Comparing the northern and southern portions of Alameda County (**Table 5**)\*\*, it was identified that a higher proportion of MVA incidents in South County with North County showing a higher incidence of blunt and penetrating trauma cases.

**TABLE 5**  
COMPARISON PERSONAL INJURY WITH MOTOR VEHICLE ACCIDENTS  
January - June, 1984

	North County**	South County
<b>Total</b>	12,274	8,371
<b>Trauma</b>	3,755	2,573
<b>Code 3 Trauma</b>	255	165
<b>MVA</b>	1,118	1,073
<b>Code 3 MVA</b>	46	97
<b>Injury</b>	2,637	1,514
<b>Code 3 Injury</b>	149	68

Source: Alameda County EMS District Monthly Dispatch Reports \*\* North County refers to the urban areas of Albany, Emeryville, Berkeley, Oakland, and Alameda

A variety of formulas were utilized to evaluate the amount of critical trauma in Alameda County. Applying the three most popular formulas (**Table 6**) to Alameda County produces the results:

**TABLE 6**  
FORMULAS TO DETERMINE THE NUMBER OF  
CRITICAL TRAUMA PATIENTS PER YEAR

Formula	Definition	Application	Est.
<b>Trunkey Formula:</b>	Number of Critical Trauma Patient (CTP) = number of motor vehicle accidents fatalities (MVAF) +5\ MVA injuries (MVAI)	MVAF + 5% MVAI 149 + 494	= 643
<b>Population Formula:</b>	CTP = 0.1% of population	CTP = 0.1%x population 0.1% x 1,100,000	= 1,100
<b>Modified Formula:</b>	CTP = MVAF + 5% MVAI + homicides (H)	CTP = MVAF + 5% MVAI + H	= 922

Source: W. L. Teufel, D.D. Trunkey, Trauma Centers: A pragmatic approach to need, cost, and staffing patterns. JACEP, 1977. C. M. Bova, The Request for Proposal Approach to Designation of a Trauma Center, W.J. Med, 1983.



Comparing the Code 3 studies indicated a higher than normal incidence of trauma in Alameda County. The preliminary estimate was that there were between 1,000 and 1,100 people in the County that would require the services of a trauma center.

**Table 7** summarizes the critical trauma patients by ambulance zone using 1984 Code 3 calls. The data gives a clearer indication of the higher incidence of trauma in certain areas of the county.

**TABLE 7**  
ALAMEDA COUNTY CRITICAL TRAUMA PATIENTS (CTP) - ESTIMATED

ALS Zones	Ambulance Sectors	Total CTP	Vehicle/Injury	Population	CTP/100,000
<b>A</b>	1	58	21/37	118,451	49
	2	168	15/153	122,959	137
<b>B</b>	3	21	3/18	66,852	31
	4	348	101/247	238,444	146
<b>C</b>	5	89	64/25	79,835	111
	6	52	28/24	64,939	80
	9	89	49/40	104,406	85
<b>D</b>	7	116	64/52	89,664	129
	8	159	92/67	203,025	78
<b>Total</b>		<b>1,100</b>	<b>437/663</b>	<b>1,088,575</b>	<b>100</b>



**Trauma Capabilities of Licensed, Acute Care Hospitals in 1985:**

In 1985 none of the licensed general acute care hospitals located in Alameda County meet the minimum criteria set forth in the trauma regulations. **Table 8** lists the major trauma seen in the county emergency departments at the time of the trauma system development.

**TABLE 8**  
**CODE 3 TRAUMA PATIENTS -ALAMEDA COUNTY**  
**EXTRAPOLATED 1985 YEARLY VOLUME**

	<b>MVA</b>	<b>Personal Injury</b>	<b>Annual Total</b>
Highland	54	126	180
Washington	60	44	104
Providence	4	68	72
St. Rose	34	34	68
Eden	42	16	58
Valley	32	26	58
Oak Knoll	10	26	36
Vesper SL	18	16	34
Herrick	10	12	22
Merritt	0	20	20
All Other	22	46	68
<b>TOTAL</b>	<b>286</b>	<b>434</b>	<b>720</b>

Source: 1984 Code 3 Transports EMS District

**HOSPITALS INTERESTED IN TRAUMA CENTER DESIGNATION (1985):**

Figure 6 locates the six hospitals that have expressed interest in trauma center designation. The six hospitals are:

- |                        |               |
|------------------------|---------------|
| 1. Providence          | Oakland       |
| 2. Highland            | Oakland       |
| 3. Eden                | Castro Valley |
| 4. St. Rose            | Hayward       |
| 5. Washington Township | Fremont       |
| 6. Valley Memorial     | Livermore     |

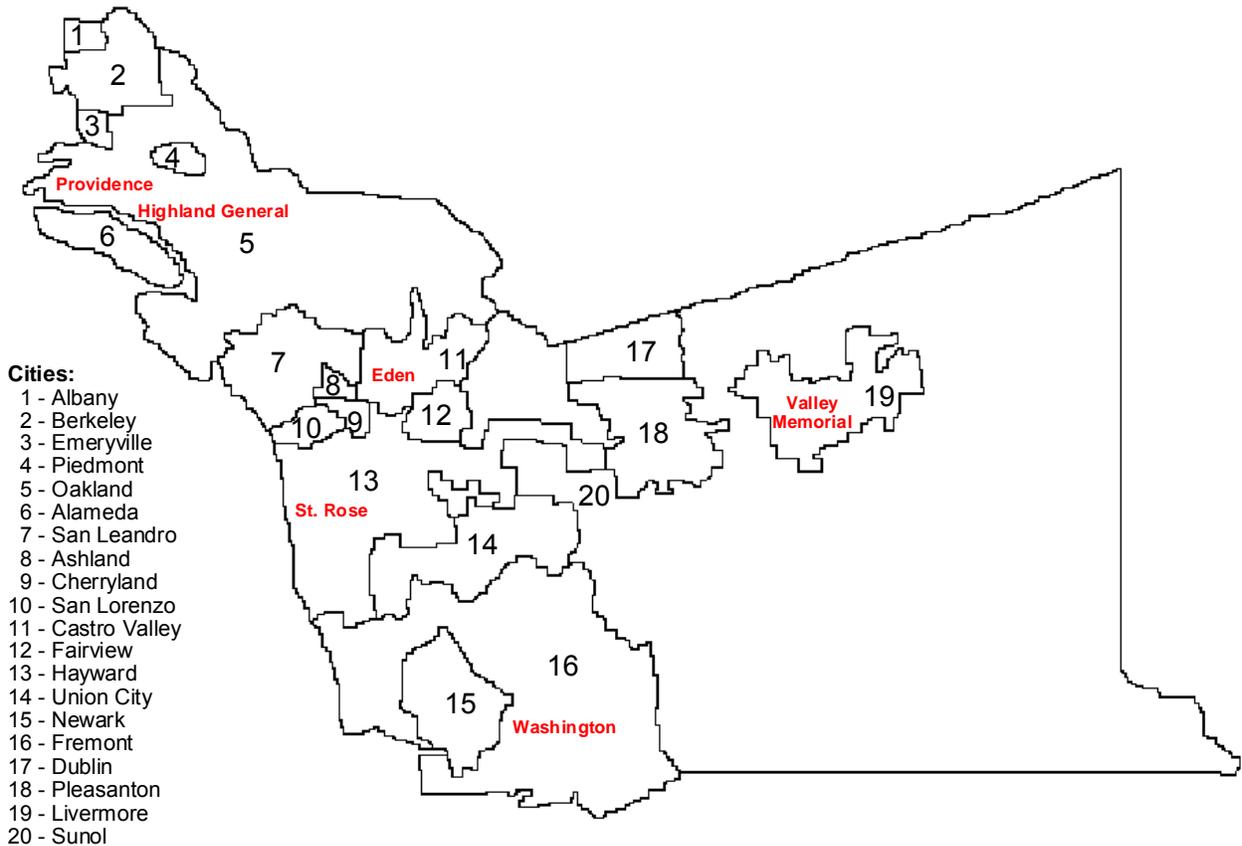


Figure 6: Map

The countywide prehospital response and transport time for 1984 based upon a 25 percent sampling shows the average prehospital time for a Code 3 response and return to a receiving facility to be 26 minutes. Refer to **Table 9** for more detailed analysis. The designed trauma plan created trauma zones, which would provide a maximum 50-minute prehospital response and transport coverage.

**TABLE 9**  
**PREHOSPITAL RESPONSE TIME**  
 Based upon 25% sampling code 3 response time  
 From dispatch to arrival at receiving facility (1984)

<b>City</b>	<b>Sum (Total Minutes)</b>	<b>Average Prehospital Time</b>	<b>Number of Cases</b>
Berkeley	649.0	18.028	36
Emeryville	115.0	38.333	3
Oakland	9,633.0	28.085	343
Piedmont	112.0	22.400	5
Alameda	280.0	23.333	12
San Leandro	1,373.0	26.922	51
Hayward	3,100.0	25.833	120
Newark	405.0	25.313	16
Union City	543.0	25.857	21
Fremont	2,862.0	23.653	121
Livermore	435.0	18.125	24
Pleasanton	798.0	25.742	31
Eden Consolidated	2,531.0	30.131	84
Dublin-San Ramon	321.0	32.100	10
Other unincorporated	389.0	29.923	13
<b>Total</b>	<b>23,546.0</b>	<b>26.456</b>	<b>890</b>

Source: Alameda County EMS District Monthly Dispatch Reports  
 (March, May, August, December 1984)

2008-2010 Trauma Center Summaries

2008	Children's Hospital	Eden Hospital	Highland Hospital
<b>Total TRA Patient Count</b>	688	1791	2477
Trauma Activations	688	1791	2477
Full Activation - Level I	118	1434	671
Partial Activation - Level II	495	348	1703
Pri/Direct Admit	23	0	0
Trauma Consultations	48	0	98
<b>Admissions after TRA/ED</b>	399	803	1039
ICU Admission Phase	171	314	227
OR Admission Phase	45	158	254
TCU Phase	0	0	121
Ward/Floor Phase	183	331	437
<b>Discharged after TRA / ED</b>	261	979	1438
Home / Jail / Other	250	877	1327
AMA / AWOL	1	8	38
Acute Transfers	7	78	22
Morgue	3	17	51
<b>Outcome</b>			
Lived	678	1750	2370
Died	10	43	107
<b>ISS &gt; 15</b>	64	172	462
<b>GCS &lt; 14</b>	118	347	470
<b>GCS &lt; 9</b>	75	160	291
<b>DOA</b>	0	0	43
<b>Death per Phase</b>			
ED / Trauma Room	3	18	51
TCU	1	0	0
ICU	6	22	40
OR	0	1	13
Ward	0	2	3
<b>Mechanism of Injury **</b>			
MVA	273	793	931
Fall	267	493	440
Gun	18	75	494
Stabbing	9	82	166
Assault	53	193	329
Other	56	65	144
<b>Blunt Rate</b>	659	1634	1803
<b>Penetrating Rate</b>	29	157	674
<b>Male</b>	502	1280	1853
<b>Female</b>	216	511	624

2009	Children's Hospital	Eden Hospital	Highland Hospital
<b>Total TRA Patient Count</b>	719	1903	2172
Trauma Activations	719	1903	2172
Full Activation - Level I	132	1077	537
Partial Activation - Level II	514	794	1557
Pri/Direct Admit	9	0	0
Trauma Consultations	64	0	78
Activations (other)	64	0	0
<b>Admissions after TRA/ED</b>	457	904	916
ICU Admission Phase	164	400	215
OR Admission Phase	44	149	178
TCU Phase	0	0	152
Ward/Floor Phase	249	355	371
<b>Discharged after TRA / ED</b>	249	989	1256
Home / Jail / Other	243	859	1122
AMA / AWOL	1	12	41
Acute Transfers	4	94	42
Morgue	2	25	51
<b>Outcome</b>			
Lived	708	1846	2067
Died	11	57	104
<b>ISS &gt; 15</b>	60	247	320
<b>GCS &lt; 14</b>	110	347	468
<b>GCS &lt; 9</b>	54	166	238
<b>DOA</b>	0	1	46
<b>Death per Phase</b>			
ED / Trauma Room	2	25	51
TCU	0	0	4
ICU	9	20	43
OR	0	3	4
Ward	0	9	3
<b>Mechanism of Injury **</b>			
MVA	283	828	716
Fall	293	627	521
Gun	25	87	376
Stabbing	4	82	149
Assault	47	180	312
Other	44	61	132
<b>Blunt Rate</b>	694	1736	1639
<b>Penetrating Rate</b>	25	167	533
<b>Male</b>	466	1315	1632
<b>Female</b>	253	588	540

2010	Children's Hospital	Eden Hospital	Highland Hospital
<b>Total TRA Patient Count</b>	672	1849	2,206
Trauma Activations	672	1849	2,206
Full Activation - Level I	142	979	569
Partial Activation - Level II	490	845	1,571
Pri/Direct Admit	13	0	0
Trauma Consultations	19	1	66
Activations (other)	8	24	0
<b>Admissions after TRA/ED</b>	457	873	933
ICU Admission Phase	188	283	217
OR Admission Phase	37	140	216
TCU Phase	0	0	139
Ward/Floor Phase	232	450	361
<b>Discharged after TRA / ED</b>	196	967	1,273
Home / Jail / Other	190	839	1,167
AMA / AWOL	0	10	28
Acute Transfers	1	94	26
Morgue	2	27	52
<b>Outcome</b>			
Lived	667	1802	2,111
Died	5	47	95
<b>ISS &gt; 15</b>	81	215	423
<b>GCS &lt; 14</b>	121	324	473
<b>GCS &lt; 9</b>	71	146	239
<b>DOA</b>	0	0	43
<b>Death per Phase</b>			
ED / Trauma Room	2	24	52
TCU	0	0	0
ICU	3	8	32
OR	0	6	9
Ward	0	9	2
<b>Mechanism of Injury **</b>			
MVA	249	742	732
Fall	275	597	484
Gun	35	82	428
Stabbing	8	74	132
Assault	47	206	318
Other	41	62	130
<b>Blunt Rate</b>	626	1693	1,631
<b>Penetrating Rate</b>	40	156	575
<b>Male</b>	444	1270	1,606
<b>Female</b>	228	579	606

## Section IV – SYSTEM DESIGN

The Trauma System design created in 1985 is essentially unchanged. The structure and rationale for the determination of the number and location of the trauma centers was based on the needs assessment described in **Section III** of this document.

As previously mentioned, there have been many changes in the County's health care delivery system as well as the EMS System. Some of the system structure and process changes are:

### 1. Communications

(Refer to the Alameda County Emergency Medical Services Agency, ***EMS SYSTEM PLAN 2010***, Sections 3.01 through 3.10)

### 2. Response/Transportation

(Refer to the ***EMS SYSTEM PLAN 2010***, Sections 4.01 – 4.22)

### 3. Facilities/Critical Care

(Refer to the ***EMS SYSTEM PLAN 2010***, Sections 5.01 – 5.14)

### 4. Trauma Triage Criteria

#### **(Appendix 2, EMS policy, *Trauma Patient Criteria*)**

Prehospital care providers use these criteria to identify the critically injured patient. These criteria are divided into three components: anatomical, physiological and mechanism of injury. All patients meeting the anatomical and/or physiological criteria are transported to the appropriate trauma center. Injured children 14 years of age and under are identified as pediatric trauma patients.

Adult trauma arrest patients: **(Appendix 3, EMS policy, *Determination of Death in the Field*)**

### 6. Advance Life Support Zones

The ALS Zones outlined in the 1985 data are no longer used in Alameda County. The County is divided into North and South zones with the eastern portion being incorporated into the southern catchment area. The Oakland/San Leandro border is the dividing line between the north and south trauma zones. Highland General Hospital serves the north zone, Eden Medical Center serves the south zone and Children's, Oakland as the pediatric trauma center serves both zones.



**7. Medical Control**

Paramedics contact the Trauma Base hospital for authorization to transport a trauma patient to a receiving facility/non-trauma center. This patient population is those that have sustained an injury listed under the mechanism of injury, that is physiologically stable and that the paramedic determines can be safely transported to a receiving facility. The trauma base physician has the ultimate responsibility to determine the patient destination.

**8. Trauma Patient Volume**

The actual number of critical trauma patients transported to each of the trauma centers in the year 2010;

- Children’s – 672
- Eden – 1849
- Highland – 2206

Total critical trauma patients transported to trauma centers in 2010 = 4727  
(see pg 17)

**9. Receiving Facilities/Non-trauma Centers**

The non-trauma facilities in our county receive some patients meeting Trauma Patient Criteria (CTP), as outlined in ***EMS Policy Trauma Triage Criteria (Appendix 2)***. These facilities are directed to call 911 for emergent transfer to the closest trauma center.

**10. Neighboring Agencies**

The 1985 Trauma System Plan stated that there were provisions made to transport trauma patients to the nearest trauma center in the adjacent county if travel time to that hospital was shorter. There have been no written agreements with the adjacent county EMS agencies. The counties adjacent to Alameda County are: Contra Costa, San Joaquin, and Santa Clara counties (Figure 8).

**Contra Costa County.** Alameda County and Contra Costa County EMS agencies have worked closely in developing, implementing and evaluating their trauma systems over the last 15 years. Children are transported from Contra Costa County from the scene of the incident by both ground and air transport. When John Muir is on trauma bypass, their patients may be transported by ground to Highland, in the northern portion of the county and either by ground or air to Eden in south



Figure 8: Neighboring Counties

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and east county. Alameda County trauma patients may be transported to John Muir by ground or by air when Eden is on trauma bypass.

**Santa Clara County.** Trauma patients are transported to Regional Medical Center from the southern most part of Alameda County when based on the patient's presentation and the transport time to Eden, it is determined that it is in the patient's best interest to go to San Jose.

## **11. Injury Prevention**

Alameda County EMS has an Injury Prevention Program that primarily focuses on bike helmet safety, car seat safety and senior injury prevention. These programs provide information, education and resources to providers and the Alameda County community. Community events include health fairs, safety demonstrations, classes and car seat check up events. EMS staff coordinate the local Safe Kids Coalition, staff monthly meetings and provide information on reducing all childhood injuries to the community. EMS staff coordinate injury prevention efforts with the three trauma centers in the County - Alameda County Medical Center, Children's Hospital Oakland and Eden Medical Center. Car seats and helmets are distributed to programs serving low-income populations.

The EMS Division has been working jointly with the Public Health Department to develop a violence prevention program that includes a data collection component entitled Alameda County Violent Injury Reporting System (ACVIRS) and a community based program targeting a neighborhood in East Oakland.

In addition, staff are working with NHTSA Region 9 and the Prevention Institute to identify potential avenues to address alcohol related injuries, which may include developing a youth related program and/or a screening program at local emergency rooms.

The Senior Injury Prevention Program (SIPP) works with over 20 community agencies to provide fall prevention physical activity classes, medication reviews and management, home safety modifications, and trainings for senior service providers. SIPP has organized and hosted an Annual Statewide Senior Injury Prevention Conference since 2001 to help build and sustain an educated network of senior service providers throughout California.

## **12. Marketing and Advertising**

Initially when the Trauma Centers were established, each designed and implemented large campaigns to educate the public via radio commercials, billboards and TV advertisements. For example, Highland Medical Center launched a *Humpty-Dumpty falling off of a brick wall and cracking his/her shell because of not wearing a helmet!* campaign, displayed throughout the hospital.



The Trauma Centers now do more in house marketing and advertising as well as use campaigns to seek funding from various foundations.





## SECTION V - INTERCOUNTY TRAUMA CENTER AGREEMENTS

The EMS directors of Alameda, Contra Costa and Marin counties will be taking the lead role in developing standardized agreements for their trauma centers that routinely triage and transfer trauma patients to their neighboring counties.

Copies of these LEMSA approved agreements can be forwarded to the EMS State Authority as requested.

Alameda County has implicit agreements with neighboring counties regarding Ambulance Diversion (**Appendix 10**) and the Trauma Audit Committee (**Appendix 4**).



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## SECTION VI - OBJECTIVES

The overall goal of the trauma system is to assure optimum preparation, response and definitive care for people that incur critical traumatic injuries within Alameda County.

In 1985, Alameda County established the following objectives of the Trauma Plan:

1. To establish standards for system preparation and response.  
Status: Completed before system started in 1987.
2. To establish a mechanism to assure continuing compliance with system standards.  
Status: Completed before system started in 1987. Structure, process, and outcome standards from prehospital care through discharge at the trauma centers are monitored on a monthly basis. Some of these standards have been refined over the years. EMS Policy **Trauma Audit Process** outlines these procedures. (**Appendix 4**).
3. To integrate and coordinate trauma care with the existing emergency medical system.  
Status: Completed before system started in 1987.
4. To assure that trauma patients will receive definitive care regardless of ability to pay.  
Status: EMS Policy **Trauma Patient Criteria (CTP)** (**Appendix 2**) established the standard of treatment for any patient sustaining a traumatic injury within our county. The agreements between the County of Alameda and the each of the three trauma centers mandates the responsibility of these facilities to care for all patients regardless of their ability to pay. (Refer to Section C.2. & B.1. of the Trauma Center Agreements, Appendices 5 & 6.)
5. To promote system cost-effectiveness and economic viability.  
Status: On-going. (See **Section VIII** - Fiscal Impact.)
6. To coordinate trauma services with services in adjacent counties.  
Status: See **Section V** - Inter-county Trauma Center Agreements.
7. To assure accountability and objective evaluation throughout the trauma system.  
Status: Refer to **Appendix 4 – Trauma Audit Process** and Trauma Center Agreements – Sections C.2.B.2. - 9., and C.2.B.12.
8. To promote public awareness and information regarding trauma services.  
Status: – Trauma Center Agreements – Section C.2.B.10.

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## SECTION VII - IMPLEMENTATION SCHEDULE

The Trauma System Plan of Alameda County was implemented in January of 1987. A chronological list of the development and implementation of the plan is outlined below.

- 1984** The Board of Supervisors of Alameda County approved the development of a trauma plan by the Health Care Services Agency.
- 1985** The Trauma Review Committee completed the Trauma System Plan.
- 1985** The Board of Supervisors approved the Trauma System Plan.
- 1985** The State EMSA approved the Trauma System Plan of Alameda County.
- 1986** The Request for Proposal process was initiated.
- 1986** The site visits of the hospitals that submitted Requests for Proposal and were competing for trauma center designation was completed.
- 1986** The Board of Supervisors gave provisional trauma center designation to Children’s Hospital, Oakland as the Level II pediatric trauma center and Eden Hospital and Highland General Hospital as the two adult Level II trauma centers.
- 1987** The Trauma System started its operations in Alameda County.

For a more detailed description of the implementation of the Trauma System Plan please review **Section I**.

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## SECTION VIII - FISCAL IMPACT

In 1985, the EMS District charged a one time, non-refundable fee of \$10,000 per application for trauma center designation. Once the hospitals were designated the County planned on having each trauma center pay an annual fee for their designation. This plan did not come to fruition.

In 1988, one year after the trauma system was implemented, the County contracted with Arthur Young to conduct a study to determine the fiscal impact of trauma designation to the trauma centers. By determining trauma costs, revenues, and profit/loss margins a formula was created to identify trauma center losses associated with trauma specific costs. In 1989, the Board of Supervisors approved this formula. The “trauma specific” loss formula was used from 1989 through 1993. Due to the labor-intensive methodology of the formula, it was determined that a fixed subsidy should be established. In 1994, the Board of Supervisors approved a fixed subsidy to ninety percent (90%) of the subsidy paid to each trauma center in 1992. These subsidies were funded by the Alameda County benefit assessments on the owners of improved real property. This benefit assessment district was created in 1983.

With the passage of the 1996, Proposition 218, *The Right to Vote on Taxes Act*, the EMS District could no longer be funded with the benefit assessment monies. Therefore in 1997, Measure C was drafted in Alameda County. This measure proposed a special tax of \$21.14 per benefit unit to fund the EMS District services. The taxpayers approved this special tax by a two-thirds majority vote.

In 2000, the Board of Supervisors approved the contract of an accounting firm to perform financial audits of the three trauma centers. The purpose of these audits was multi-faceted. The first objective was to identify the trauma specific costs at each institution. The second was to determine the annual loss at each facility due to non-imburement. This information will be analyzed and a determination made as to the appropriateness of the current fund distribution. Also the District will decide the formula that will be used for future distribution of the trauma subsidy.

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## SECTION IX - POLICY AND PLAN DEVELOPMENT

The structure of the trauma system in Alameda County and the manner in which it utilizes its resources has been previously described in **Section IV SYSTEM DESIGN** of this document. The trauma center standards are outlined in the trauma center agreements.

These agreements are revised and re-negotiated on an annual basis. Please note that the agreements identify the standards required by Title 22 and differentiate the more stringent standards required by Alameda County.

The following EMS trauma policies are included;

1. Trauma Patient Criteria *(Appendix 2)*
2. Trauma Patient Care *(Appendix 5)*
3. Crush Injury Syndrome *(Appendix 6)*
4. Death in the Field *(Appendix 3)*
5. Multicasualty Incidents *(Appendix 7)*
6. EMS Aircraft Transport *(Appendix 1)*
7. Ambulance Diversion *(Appendix 8)*
8. Interfacility Transfers *(Appendix 9)*
9. Trauma Audit Process *(Appendix 4)*



**SECTION X – WRITTEN LOCAL APPROVAL**

The process used to obtain approval of the Alameda County Trauma System Plan is described in **Section I - Summary of Plan** and **Section VI - Objectives**.

A copy of the Board resolution approving the trauma system plan was unable to be located. For an explanation of the approval process for Alameda County can be found in **Appendix 10**.



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## SECTION XI - DATA COLLECTION

### BACKGROUND

In 1987 the Emergency Medical Service District established a trauma data system, referred to as the Trauma Registry. The *Bay Area Trauma Registry (BATR)* was used to collect prehospital and in hospital data on all trauma patients treated in Alameda County. This database was intended to provide information necessary to review system operations, support quality assurance activities, research, and injury prevention planning.

As the Trauma System matured in Alameda County it became evident that a more sophisticated software system was needed. In 1990, the EMS Agency initiated a competitive bid process to select a trauma registry. A comparative analysis was conducted between the *BATR* and Lancet's *Trauma One*. *Trauma One* was selected to become the official Trauma Registry for Alameda County.

### TRAUMA REGISTRY

All three trauma centers and the EMS office have used *Trauma One* since 1990. Each trauma center transmits data to the EMS office on a monthly basis. This data includes information on all patients meeting critical trauma patient criteria that are transported, walk-in or transferred to the centers. These data sets include information from the prehospital setting through discharge at the trauma centers. The EMS central database also includes any patient meeting critical trauma patient criteria who is transported to a receiving facility. Any trauma patient who is determined dead in the field is also entered into the EMS central database. Therefore, the Alameda County Trauma Registry is truly inclusive; containing information from the trauma centers', receiving hospitals, and the field.

In preparing the Alameda County five year Trauma System Report (1994-1998), it was identified that the trauma centers had submitted an unacceptable number of incomplete patient data sets. As a result the EMS Agency initiated a plan to assess the data abstraction, data entry, and transmittal at each trauma center. The Agency also planned to up-grade the *Trauma One* software to incorporate restrictions on transmitting incomplete data to the EMS Agency. These corrective measures should be in place by the end of 2001.

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## SECTION XII - TRAUMA SYSTEM EVALUATION

Review and monitoring of the standards established for the care of the trauma patient in Alameda County are accomplished by several methods. The Quality Improvement Program includes monitoring of structure, process, and outcome standards. The structure and process standards are outlined in the exhibits of the trauma center agreements. In 1990 these standards were reviewed during trauma center visits by a team from the American College of Surgeons (ACS). Since that time the EMS Medical Director and the EMS Trauma Coordinator have conducted on-site visits to each trauma center. These visits audited all components of standards outlined in the trauma center agreements. The process and outcome standards of the medical care provided all trauma patients are reviewed via a monthly chart audit. This auditing process provides comprehensive, objective evaluation of trauma care within the County. This process has several unique features:

1. A trauma director from each of the three Alameda County trauma centers and the trauma director of John Muir Medical Center in Contra Costa County on a rotational basis review cases. (No facility reviews its own cases at this level of the audit process.)
2. Emergency department physicians and the EMS Medical Director review trauma care provided by receiving hospitals.
3. The paramedic representative, the EMS Trauma Coordinator and the ED physicians review the prehospital care by ground and air transport personnel.
4. The EMS Trauma Coordinator reviews all autopsies performed in Alameda County. The autopsies of all trauma patients are then separated out by trauma centers, receiving facilities and scene deaths. The scene deaths are reviewed by the Trauma Coordinator and are audited for policy compliance.

All questionable cases and negative outcomes (e.g., possibly preventable deaths and complications) are referred to the Trauma Audit Committee (TAC).

The TAC committee meets every other month and includes bi-county trauma directors, trauma nurse coordinators, EMS medical directors, EMS trauma program coordinators, receiving hospital emergency physicians, a surgeon representing the local surgical society, trauma center emergency physicians, neurosurgeons an orthopedist, an anesthesiologist, the coroner's pathologist, and paramedics representing the private transport provider and the fire service. The discussion and findings of the TAC meetings are confidential. Cases referred to TAC are reviewed for the appropriateness of care. This audit process determines what affect the care had on patient outcome. Difficult and interesting cases are also referred to TAC for educational purposes.

Alameda County is planning a Trauma Center review by the American College of Surgeons to take place in late 2011, early 2012 with the goal of getting each of our trauma centers verified.

**APPENDIX 1 - EMS AIRCRAFT TRANSPORT**

*NOTE: EMS Aircraft utilized in Alameda County for prehospital emergency care will meet the qualifications specified in Title 22, Chapter 8.*

**1. DEFINITIONS**

- 1.1 **"EMS Aircraft"** any aircraft utilized for the purpose of prehospital emergency patient response and transport, which includes air ambulances and all categories of rescue aircraft.
- 1.2 **"Air Ambulance"** any aircraft specially constructed, modified or equipped and used for the primary purpose of responding to emergency calls and transporting critically ill or injured patients whose flight crew has at a minimum two (2) attendants certified or licensed in advance life support.
- 1.3 **"Rescue Aircraft"** an aircraft whose usual function is not prehospital emergency patient transport but which may be utilized, in compliance with local EMS policy, for prehospital emergency patient transport when use of an air or ground ambulance is inappropriate or unavailable. Rescue Aircraft include:
  - **"ALS Rescue Aircraft"** a rescue aircraft whose medical flight crew has at a minimum one (1) attendant certified or licensed in advanced life support.
  - **"BLS Rescue Aircraft"** a rescue aircraft whose medical flight crew has at a minimum one (1) attendant certified as an EMT-I.
  - **"Auxiliary Aircraft"** a rescue aircraft which does not have a medical flight crew or whose flight crew does not meet the minimum requirements of a BLS Rescue Aircraft.
- 1.4 **"Classifying EMS Agency"** the agency which categorizes the EMS aircraft into groups identified in Section 100300(e). This shall be the local EMS agency in the jurisdiction of origin except for aircraft operated by the CHP, CDF or National Guard.
- 1.5 **"Authorizing EMS Agency"** the local EMS agency which approves utilization of specific EMS aircraft within its jurisdiction. EMS aircraft must be authorized by the local EMS agency in order to provide pre hospital patient transport within the jurisdiction of the local EMS agency.
- 1.6 **"Approved helipad"** a helipad approved for helicopter flight operations by the FAA and CALTRANS.
- 1.7 **"EMS Landing Site"** a site at or near a medical facility, which has been preselected and approved for the landing and taking off of EMS Aircraft but not designed or used exclusively for helicopter flight operations.

**2. INITIATING EMS AIRCRAFT RESPONSE**

- 2.1 The decision to request an EMS Aircraft is based on medical and scene management considerations.
- 2.2 Prior to arrival at the scene - An EMS Aircraft may be activated by any responding agency if there may be a potential need for air transport based on the incident type or location of the victim(s).
- 2.3 All responding agencies shall be notified when an EMS Aircraft has been requested.
- 2.4 When on-scene, the decision to activate an EMS Aircraft shall be made by the IC (Incident Commander or his/her designee). upon:
  - the advice of on-scene medical personnel and/or
  - the suitability of the scene for helicopter operations.

### 3. CONSIDERATIONS FOR REQUESTING EMS AIRCRAFT: (one or more of the following conditions exists)

- 3.1 Long response times to scene (>20 minutes)
- 3.2 Inaccessibility to the scene by ground personnel or equipment
- 3.3 Extended extrication
- 3.4 Extended transport to an appropriate facility > 20 minutes (e.g. remote area, peak traffic, closest most appropriate facility closed)
- 3.5 Patients meeting Critical Trauma Patient Criteria (see policy #7213) with extended transport time to an approved Trauma Center.
- 3.6 Patients requiring advanced skills not in the Alameda County Paramedic scope of practice. (e.g. RSI, Surgically places thoracostomy tubes)
- 3.7 Patient conditions where a decrease in transport time to an appropriate medical facility may be a significant factor.
- 3.8 Patients in cardiac arrest from drowning or penetrating trauma with a short down time. In general, **all other patients with cardiac arrest should not be transported in an air ambulance or rescue aircraft.**
- 3.9 A multi-casualty incident exists with a need for increased resources.

### 4. EMS AIRCRAFT DISPATCH

- 4.1 All EMS Aircraft activations shall be made through ALCO-CMED. ALCO should be given the following information if available:
  - Number of Patients and acuity of each.
  - Type and extent of injuries.
  - Location of Landing Site (use Thomas Brothers Map coordinates or Longitude and Latitude, if possible).
  - Nearest landmarks (e.g., highways, railroad tracks, water towers).
  - Weather conditions, especially high winds, fog or visibility problems.

### 5. COMMUNICATION

- 5.1 ALCO-CMED shall request activation of the EMS Aircraft that has the shortest total response time to the scene/rendezvous site.
- 5.2 The responding EMS Aircraft may contact ALCO on VHF TAC 4 (154.070) while en route to the scene to confirm radio frequency and ground contact/incident identifier.
  - The preferred frequencies for EMS Aircraft responses are: CALCORD (156.075).
  - Alternative frequencies are VHF TAC 4 (154.070) and VHF TAC 5 (154.235) but should be coordinated through ALCO-CMED.
  - Fire White (154.280) is not authorized for cross patch to an ambulance or helicopter.
- 5.3 The responding EMS Aircraft will advise ALCO of ETA in minutes and clock hours. ALCO shall advise the requesting agencies of the EMS Aircraft's ETA.
- 5.4 ALCO shall keep responding/on scene ground personnel updated as to aircraft status (cancellation, delays, inability to respond, etc.).
- 5.5 If multiple aircraft are responding to the scene or in the area of the incident, ALCO shall attempt to notify each aircraft of multiple aircraft response.
- 5.6 The EMS Aircraft shall contact the receiving hospital prior to arrival. A patient care report and an ETA should be given.

## 6. UTILIZATION OF RESCUE AIRCRAFT

- 6.1 A number of public agencies, including East Bay Regional Park District, California Highway Patrol, Coast Guard and various military units, operate aircraft which are classified as ALS Rescue Aircraft, BLS Rescue Aircraft or Auxiliary Aircraft.
- 6.2 The decision to transport in a rescue aircraft should be made by on-scene medical personnel and is based on patient condition and availability of other resources.
- 6.3 Considerations for utilizing rescue aircraft:
  - the patient is in an area that is inaccessible to ground transport vehicle,
  - the ETA of a ground ambulance and/or Air Ambulance exceeds the loading and lift-off time by the rescue aircraft
  - an air ambulance is unavailable
  - the patient clearly does not require the level of service provided by an air ambulance.
  - a rescue requiring the use of a hoist device is indicated.
- 6.4 When an EMT-P accompanies a patient in a BLS rescue aircraft, the EMT-P must:
  - have available all appropriate medical equipment needed to care for the patient;
  - receive orientation to the aircraft and to medical air transport procedures according to Title 22, Chapter 8, Section 100302.

## 7. SAFETY/LANDING - Safety rules at the scene include:

- 7.1 Landing Zone considerations (L-Z):
  - 75' x 75' during daylight, 100' x 100' during night hours,
  - clear of cross wires, debris, or other obstacles, relatively flat
  - Consult CHP/Law Enforcement when landing on roadways.
- 7.2 Ground personnel should coordinate with public safety agency for road closures, if necessary.
- 7.3 The fire department should determine the landing zone and assure scene safety during landing.
- 7.4 Before clearing EMS aircraft to land the IC must ensure that the helicopter will not block the transport of patients out of the scene by ground. If ground transport will be blocked then the IC must make sure that ground units with critical patients have departed before clearing aircraft to land.
- 7.5 The pilot in command shall have the final authority as to the safe operation of the air transport. If, in the pilot's judgment, patient transport by an EMS aircraft would be unsafe, regardless of the patient's condition, the patient should be transported by ground ambulance.
- 7.6 Ground personnel shall not approach the aircraft unless directed to do so and accompanied by the aircraft crew.
- 7.7 Regardless of how the request was initiated, only the IC shall authorize the landing of a helicopter at the scene. Coordination between medical personnel and the IC is essential.

## 8. CANCELING EMS AIRCRAFT RESPONSE

- 8.1 Ground transport should be utilized if:
  - the overall prehospital time will not be decreased by the use of air transport and/or
  - the patient does not meet criteria identified in Section 3 for Requesting EMS Aircraft.

- 8.2 Regardless of how an EMS Aircraft activation was initiated, only the IC shall cancel the response. The IC will cancel the EMS Aircraft response if so advised by on-scene medical personnel (see 9.1 below). Coordination among all medical personnel and the IC is essential.
- 8.3 The IC should only cancel an EMS Aircraft response if on scene and aware of the patient's condition.
- 8.4 EMS Aircraft response can be canceled by:
  - notifying ALCO, who will then notify all responding agencies
  - the IC if in contact with the responding Aircraft
- 8.5 The IC shall be immediately advised of the decision to transport by ground.
- 8.6 If the EMS Aircraft arrive on scene prior to the ground ambulance, the responding ground ambulance shall not be canceled until:
  - the EMS Aircraft has left the scene with the patient aboard; and,
  - it has been determined by the IC or his/her designee that there are no additional patients to be transported.

## 9. TRANSPORT

- 9.1 The transporting ALS provider shall have authority and responsibility to determine mode of patient transport (air vs. ground) and patient destination. The transporting ALS provider must consult with first responder personnel and EMS Aircraft crew, if applicable, prior to making this decision.
- 9.2 Alameda County transport policies shall be followed for all patients requiring air transport. Patients shall be transported to the closest hospital most appropriate for the medical needs of the patient with an approved Helipad or EMS Landing Site.
- 9.3 Trauma Centers with approved helipads or emergency landing sites are:
  - Eden Hospital (Castro Valley)
  - Children's Hospital (Oakland)
  - John Muir Hospital (Walnut Creek)
  - Highland General Hospital (Coast Guard Island)
  - Regional Medical Center (San Jose)
  - Valley Medical Center (San Jose)
  - Stanford University Hospital (Palo Alto)
- 9.4 Alameda County Receiving Hospitals with approved helipads or emergency landing sites are:
  - Eden Hospital
  - Washington Hospital
  - Valley Care Medical Center
  - Children's Hospital

## 10. PATIENT CARE RESPONSIBILITIES

- 10.1 Transfer of care shall occur:
  - upon arrival/landing of the responding personnel at the scene when patient contact is made
  - after a verbal patient care report is given to the transporting agency
  - in accordance with the policy, "Transfer of Care."

- 
- 10.2 The EMS Aircraft crew may release the patient to an ALS ground transport unit if ground transport is determined appropriate.
- 10.3 The EMS Aircraft or ALS ground ambulance crew may release a patient to BLS rescue aircraft if the patient does not require ALS care but air transport is determined to be appropriate.
11. **DOCUMENTATION** - Appropriate documentation must be completed on all patients transported by the EMS Aircraft crew and faxed immediately to ALCO EMS at (510) 618 – 2099.

## 12. REQUEST FOR MILITARY AIRCRAFT

- 12.1 Military assistance may be used when non-disaster inland search and rescue operations may exceed local and state capabilities. Examples: water rescue, rescue in inclement weather, hoist rescue.
- 12.2 One hour response time minimum time should be expected. An ETA can only be given after the request is made and an assessment of available resources has been completed.
- 12.3 If hoist rescue requested do not place the patient on a stretcher or stokes basket, although the patient may be placed on a backboard. The hoist equipment requires specialized equipment.
- 12.4 The incident commander determines the need for military aircraft and contact ALCO with the following information:
- Incident location and longitude and latitude if known.
  - Incident description including the number of injured, types of injuries and topography.
  - If a hoist is requested, an estimate of the distance the patient will need to be lifted from the ground to the aircraft
  - Altitude of incident if known
  - Air to ground contact frequencies
- 12.5 **Notification Procedure - ALCO:**
- **For maritime rescue:** call Coast Guard Dispatch directly at **(415) 556-2105/2103**
  - **For land (non-maritime) rescue** or assistance call:
    1. State OES Law Division at **1 (800) 852-7550** for approval
    2. Coast Guard dispatch **1 (415) 556-2103** to give the Coast Guard helicopter flight crew an advanced notification. Since the Coast Guard's primary responsibility is maritime search and rescue, they can notify ALCO of their availability.
- 12.6 If additional information is needed, ALCO will direct the questions to the requesting IC's dispatch center for direct contact.

## APPENDIX 2 - TRAUMA PATIENT CRITERIA

1. **INTRODUCTION** - The goal of the Alameda County trauma system is to transport confirmed Critical Trauma Patient(s) (CTP) or, potential CTPs who might benefit from care at a trauma center directly to a designated Trauma Center in a timely manner, bypassing non-trauma centers.
2. **CRITICAL TRAUMA PATIENT CRITERIA**
- 2.1 A patient is identified as a CTP when any of the following physiologic and/or anatomic factors are present. These patients should be transported code 3.

### 2.1.1 Physiologic criteria

- Glasgow Coma Scale  $\leq$  12 or;
- Blood pressure  $\leq$  90 systolic or;
- Respiratory rate < 10 or > 29

*Please note: Normal vitals for pediatric patients differ (see LBRT).*

**2.1.2 Anatomic injury factors:**

- Penetrating injury to the torso, head, neck, groin, or extremity proximal to the knee or elbow
- Evidence of two or more proximal long bone fractures (femur, humerus)
- Traumatic amputation above the wrist or ankle
- Traumatic paralysis

**2.2 Paramedic Consideration** In addition, the following mechanisms of injury may be used to identify a CTP. In general, these patients are transported code 2, however, differing field circumstances and/or patient condition may require a code 3 transport.

- 2.2.1 Death of an occupant in the same passenger space
- 2.2.2 Extrication time of greater than twenty (20) minutes
- 2.2.3 Auto vs. pedestrian greater than or equal to 20 mph
- 2.2.4 Auto vs. pedestrian ( $\leq$ 14 or  $\geq$ 55 years of age)
- 2.2.5 Submersion with trauma
- 2.2.6 Significant blunt trauma to head, neck, torso or abdomen (e.g. starred windshield, loss of consciousness)
- 2.2.7 Vehicle rollover without restraints
- 2.2.8 Ejection of patient from vehicle
- 2.2.9 Falls greater than or equal to fifteen (15) feet
- 2.2.10 Falls greater than ten (10) feet ( $\leq$ 14 or  $\geq$ 55 years of age)
- 2.2.11 Significant vehicle damage (e.g. front axle rearward displaced; passenger space intrusion of one foot or more; bent steering wheel/column)
- 2.2.12 Ejection from a moving object

**3. TRANSPORT** - Patients identified as a CTP will be transported to **the closest, most appropriate, designated Trauma Center.** **Exception:** The patient is identified as a CTP or Potential CTP but presents with one of the following:

PATIENT PRESENTATION:	ACTION:
<b>UNMANAGEABLE AIRWAY.....</b>	<b>Closest Basic E.D.</b>
<i>The patient requires intubation, and the paramedic is unable to intubate, and an adequate airway cannot be maintained with B.V.M. device.</i>	

**ADULT TRAUMA ARREST**

**BLUNT or PENETRATING. . . . .**

**Determination of Death in the Field policy**

**Note:** Coroner’s personnel must transport all dead bodies. If ordered to move a body by law enforcement, note the time, name, and badge number of the officer, and comply with the request. Ensure that the police officer on scene has contacted the Coroner’s Bureau for permission to move the body

**PEDIATRIC TRAUMA ARREST**

**BLUNT or PENETRATING:**

- ETA to the Pediatric Trauma Center ≤ 20 minutes. . . . . Pediatric Trauma Center
- ETA to the Pediatric Trauma Center >20 minutes. . . . . Closest Adult Trauma Center

**PATIENTS WITH BURNS. . . . .**

**See Burn Patient Criteria** policy unless patient is identified as a CTP, then transport to the Trauma Center.

4. **TRAUMA BASE CONTACT** - Varying field circumstances make rigid application of any set of rules impractical. These criteria should serve as guidelines. Clinical circumstances may dictate that transport be undertaken immediately with Trauma Base contact made enroute.
- 4.1 **Designated trauma base hospital** - Highland Hospital is the Designated Trauma Base for all trauma patients requiring base contact.
  - 4.2 **Trauma base contact is not required** if the patient meets "Critical Patient Criteria" or "Paramedic Consideration Criteria" **and** is transported to an Alameda County Trauma Center.
  - 4.3 If the patient meets any of the "Paramedic Consideration Criteria" and Trauma Base contact cannot be established or maintained, transport the patient to a Trauma Center.
  - 4.4 **The Trauma Base should be contacted if:**
    - ✓ The patient meets the criteria listed in the "paramedic consideration" criteria but the paramedic is requesting transport to a basic ED.
    - ✓ The patient requires medical treatment not covered in the "Critical Trauma Treatment Protocol" (see policy)
    - ✓ An Out-of-County Trauma Center is being considered.
    - ✓ The patient would benefit from consultation with the Base Hospital.
- 5. OUT-OF-COUNTY TRANSPORT**
- 5.1 The physician at the Trauma Base Hospital may route the patient to an out-of-county trauma center if the out-of-county Trauma Center is the closest most appropriate facility for the medical needs of the patient.
  - 5.2 Prior to approving transport to an out-of-county Trauma Center, the Alameda County Trauma Base Hospital must:
    - ✓ Contact the out-of-county Trauma Center by landline to determine if they can accept the patient

- ✓ Give a brief report including E.T.A.
- ✓ If the patient is going to John Muir Hospital, advise them to turn on their MEDNET radio. Advise the paramedics to contact John Muir via MEDNET when they are five minutes out to give an update.
- ✓ If the patient is going to any other out-of-county Trauma Center, the Alameda County Trauma Base will be required to relay information via landline.

5.3 **Out-of-County Trauma Centers:**

TRAUMA CENTER	LOCATION	TELEPHONE
John Muir Medical Center	Walnut Creek	(925) 939-5800
Santa Clara Valley Medical Center	San Jose	(408) 885-6900
Stanford University Medical Center	Palo Alto	(650) 723-4696
San Francisco General Hospital	San Francisco	(415) 206-8111

6. **POST CALL-IN** - If a CTP is transported to a Receiving Hospital and Trauma Base contact was not made (e.g. a patient with an unmanageable airway transported to a basic ED). The paramedics **must** call the Trauma Base from the Receiving Hospital and give a report on a taped line.

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**APPENDIX 3 - DEATH IN THE FIELD**
**SECTION 1 - INTRODUCTION**

- EMTs and paramedics do not pronounce death but rather determine death based on pre-determined criteria. **An assessment by paramedics and consultation with the Base Hospital physician is required for determination of field death not covered by this policy.**
- Prehospital personnel are **not** required to initiate resuscitative measures when death has been determined or the patient has a valid "Do Not Resuscitate" directive. Paramedics should contact the Base Hospital anytime support in the field is needed.
- A cardiac arrest form should be completed anytime a cardiac arrest is suspected to be of primary cardiac origin, including DNR's and discontinuation of CPR. Cardiac arrest not of primary cardiac origin (e.g. trauma, hanging, drug overdose, drowning etc.) does not require the completion of a cardiac arrest form. If in doubt, complete the form.
- If **any** doubt exists, begin CPR immediately. Once initiated, CPR should be continued unless the patient meets the criteria to Discontinue CPR (See Section 4).
- Multi-casualty incidents are an exception to this policy.
- The local public safety agency having jurisdiction will be responsible for the body once death has been determined. **A dead body may not be moved or disturbed until a disposition has been made by the coroner's bureau.**

**SECTION 2 - DETERMINATION OF DEATH**
**CRITERIA FOR DETERMINATION OF DEATH IN THE FIELD:**

- Apnea
- Pulselessness - No heart tones and no carotid or femoral pulses.
- Documented Asystole:
  - ✓ **EMT-Is:** A non-shockable rhythm and asystole on the monitor for one minute.
  - ✓ **Paramedics:** Asystole on the monitor screen for one minute documented in 2 leads

**Only the following patients who exhibit all of the above criteria for determination of death and one or more of the following conditions may be determined dead:**

**PATIENTS WHO ARE OBVIOUSLY DEAD** *\*\*Documentation of all Determination of Death criteria may not be necessary or possible in these patients.*

- Decomposition of body tissues\*\*
- Total decapitation\*\*
- Total incineration\*\*
- Total separation or destruction of the heart or brain\*\*
- Any degree of rigor
- Lividity (*dependant pooling of blood resulting in skin discoloration*)

**PATIENTS WHO ARE IN ARREST:**

- **Medical (Cardiac) Arrest** - following unsuccessful ACLS interventions (see appropriate policies)
- **Trauma Arrest:** Adults only. (*only paramedics may determine death using trauma arrest criteria*)
  - ✓ Blunt trauma arrest
  - ✓ Penetrating trauma arrest

- ✓ Prolonged extrication (> 15 minutes) with no resuscitation possible during extrication.  
**Exception:** Patients with **suspected hypothermia** will be resuscitated and transported to the closest most appropriate emergency department.
- **Actions**
  - ✓ Immediately notify the coroner and appropriate public safety agency (if not already done) and remain on the scene until they arrive.
  - ✓ Complete a Patient Care Report form documenting the above and leave the PCR with the patient at the scene in a safe place. If unable to do so, complete the PCR and fax to Coroner's office (510) 268-7333) as soon as possible, but not later than the end of your shift.
  - ✓ Search for a donor card (see policy #8034).
  - ✓ Rhythm documentation: EKG rhythm strips attached to the PCR, if available.

### SECTION 3 - DO NOT RESUSCITATE

Authority: Health and Safety Code, Division 2.5, Section 1798. Information contained in this policy is based on "Guidelines for EMS Personnel regarding Do Not Resuscitate Directives", Published by Emergency Medical Services Authority.

- **Purpose:** To establish criteria for field personnel (EMTs and Paramedics) to determine the appropriateness of withholding or discontinuing resuscitative measures based on the wishes of the patient.
- **Philosophy:** Despite pre-planning, 9-1-1 is frequently activated when death is imminent. It is the intent of this policy to honor the wishes of the patient not to perform an unwanted resuscitation by establishing procedures whereby legitimate DNR directives are honored.
- **Definition:** Do Not Resuscitate (DNR) means **no**:
  - ✓ assisted ventilation
  - ✓ chest compressions
  - ✓ defibrillation
  - ✓ endotracheal intubation
  - ✓ cardiotoxic drugs.

**Approved DNR Order:** - The DNR form may be **an original or a copy**. All forms require the patient's signature (or signature of appropriate surrogate) and the signature of the patient's physician to be valid. Field personnel may withhold or discontinue resuscitative measures, if presented with **any one** of the approved orders.

- ✓ A Physician Orders for Life-Sustaining Treatment (POLST) Program form. This form will become the standard DNR form for Alameda County
- ✓ An approved medallion ("Medic-Alert") inscribed with the words: *"Do Not Resuscitate-EMS"*.
- ✓ Call the 800 number on the medallion for access to advance directives, including living wills, durable power of health care attorney documents, and organ, tissue, and anatomical gifts.
- ✓ The patient's physician is present on scene and issues a DNR order, or issues a DNR order verbally over the phone to field personnel.
- ✓ A DNR order signed by a physician in the patient's chart at a licensed health facility.
- ✓ An EMSA/CMA "Prehospital Do Not Resuscitate" form.

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- **Medical Treatment of the patient with a DNR directive:** If the patient requests treatment, including resuscitation, the request should be honored. The patient should receive treatment for pain, dyspnea, major hemorrhage, relief of choking or other medical conditions. However, if the patient has stopped breathing and is unconscious, the DNR directive should be honored and respirations should not be assisted.

Although the patient's wishes or instructions should remain paramount, if the patient is unable to state his/her desires and a family member is present and requests resuscitation, it should be initiated. A grief support advisor may be called or paramedics may contact the Base Physician to speak with the family.

- **Patient Identification:** Correct identification of the patient is crucial, but after a good faith attempt to identify the patient, the presumption should be that the identity is correct if proper documentation is present and the circumstances are consistent. A reliable witness may be used to identify the patient if available.
- **PROCEDURE - With an approved DNR directive(The POLST form is preferred):**
  - ✓ Field personnel should not start resuscitation. If CPR or other resuscitative measures were initiated prior to the discovery of the DNR directive, discontinue resuscitation immediately.
  - ✓ EMTs cancel the ambulance response.
  - ✓ If the patient is transported, a copy of the DNR directive should go with the patient.
  - ✓ If the patient arrests enroute: 1) do not start resuscitation and 2) continue to the original destination.

- **Documentation:**

- ✓ If resuscitation was started and then discontinued, document the time on the PCR.
  - ✓ A copy of the DNR directive should be attached to the PCR. If a copy is unavailable, document the following:
    - The type of DNR directive (e.g.: written in the patient chart at a licensed care facility, issued verbally over the phone)
    - The date the order was issued
    - The name of the physician.
  - ✓ If the patient's physician issued the DNR order verbally while **on scene**, document the name of the physician and have the physician sign the PCR.

- **If the validity of the DNR directive is questioned:** Disregard the DNR request and begin resuscitation until paramedics consult with the base hospital physician (e.g. form signed by the patient but not by the physician, or a family member strongly objecting, etc)
- **Other forms or directives:** If an approved DNR directive is not available, CPR should begin until paramedics consult with the base hospital physician to discuss the validity of forms presented. For example:
  - ✓ Advanced Health Care Directive (AHCD) (enacted in 2000) replaces California Durable Power of Attorney for Health Care, the California Natural Death Act and living wills' although all of these forms are considered valid. The AHCD contains a section called "Health Care

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Instructions” that has specific information regarding options selected by the patient regarding resuscitation.

## SECTION 4 - DISCONTINUATION OF CPR

- **CPR may be discontinued:**

- ✓ If CPR was started prior to the discovery of an approved DNR directive
- ✓ Upon further examination the patient meets the determination of death criteria
- ✓ Following an unsuccessful resuscitation - paramedics only

- **Once CPR has been discontinued:** all therapeutic modalities initiated during the resuscitation **must** be left in place until it has been determined by the coroner's bureau that the patient will not be a coroner's case. This includes equipment such as: airways, endotracheal tubes, IV catheters, monitor electrodes, and personal items including clothing, jewelry etc.

- **If the coroner's bureau releases the body while field personnel are still on scene:**

- ✓ Document the name and badge number of the coroner's investigator on the PCR.
- ✓ Remove and properly dispose of all medical equipment used during the resuscitation attempt.

- **Search for a Donor Card** (Authority 7152.5 Health and Safety Code)

- ✓ The following persons shall make a reasonable search for a document of gift or other information identifying the bearer as a donor or as an individual who has refused to make an anatomical gift.
  - A law enforcement officer upon finding an individual who the officer believes is dead or near death.
  - Ambulance or emergency medical personnel upon providing emergency medical services to an individual when it appears that death of that individual may be imminent. This requirement shall be secondary to the requirement that ambulance or emergency medical personnel provide emergency medical services to the patient.
- ✓ If a document of gift or evidence of refusal to make an anatomical gift is located by the search required above, the hospital and/or coroner's bureau (as applicable) shall be notified of the contents and the document or other evidence shall be sent with the patient.
- ✓ The above search and the results of the search must be documented on the PCR (patient care report).
- ✓ A person who fails to discharge the duties imposed by this section is not subject to criminal or civil liability but is subject to appropriate administrative sanctions.

## APPENDIX 4 - TRAUMA AUDIT PROCESS

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The Trauma Quality Assurance Program includes monitoring of structural, process and outcome standards. When a deviation from trauma standards (process or outcome) is identified, the affected provider submits a plan of correction to the EMS Agency for approval.

All questionable cases and negative outcomes (e.g., possibly preventable deaths and complications) are referred to the Trauma Audit Committee (TAC). The TAC is comprised of representatives from Alameda and Contra Costa Counties and meetings are held every other month.

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## 1. TRAUMA AUDIT COMMITTEE (TAC)

### 1.1 Membership:

- 1.1.1 EMS Medical Director (Chair)(1)
- 1.1.2 EMS Trauma Program Manager (1)
- 1.1.3 EMS Trauma Registrar (1)
- 1.1.4 Trauma surgeons from each trauma center hospital (4)
- 1.1.5 Trauma nurse coordinators from each trauma center hospital (4)
- 1.1.6 Physician, emergency department from each trauma center hospital (3)
- 1.1.7 Pediatric intensivist from pediatric trauma center (1)
- 1.1.8 Representative from local medical society, general surgeon (1)
- 1.1.9 Representative from a managed care facility (ED) (1)
- 1.1.10 Forensic pathologist (1)
- 1.1.11 Physician representatives from non-trauma hospital (one each from North and South) (2)
- 1.1.12 County ambulance transport provider Medical Director (1)
- 1.1.13 Anesthesiologist, neurosurgeon, orthopedic surgeon from the hosting trauma center (3)
- 1.1.14 Visiting trauma surgeon (Out-of-County) (1)

- 1.2 **Purpose:** Cases flagged for presentation at TAC are reviewed for appropriateness of care. This audit process determines what effect the care had on patient outcome. Difficult or interesting cases and outstanding cases are also referred to TAC for educational purposes.

## 2. ATTENDANCE:

- 2.1 Attendance at these meetings for the Trauma Medical Directors and Trauma Nurse Coordinators or their designees is mandatory. The Trauma Medical Directors and the Trauma Nurse Coordinators must attend 90% of the scheduled TAC meetings annually.
- 2.2 Resignations from the committees shall be submitted, in writing, to the EMS Agency.
- 2.3 The EMS Medical Director must approve in advance all requests for guests to attend the meeting.
- 2.4 Members should notify the EMS Trauma Program Manager in advance of any scheduled meeting if they are unable to attend.

## 3. MEETING DOCUMENTATION:

- 3.1 The agenda, minutes, monthly EMS reports and chart materials will be kept in confidential. Paperwork will be distributed to each member at the beginning of the meeting and collected at the end of each meeting.

## 4. CONFIDENTIALITY:

- 4.1 All proceedings are confidential and protected under Section 1157.7 of Evidence Code: "The prohibition relating to discovery or testimony provided in Section 1157 shall be applicable to proceedings and records of any committee established by a local governmental agency to monitor, evaluate, and report on the necessity, quality, and level of specialty health services including, but not limited to trauma care services,

provided by a general acute care hospital which has been designated or organized by that governmental agency as qualified to render specialty health care services".

- 4.2 No copies of records are to leave the rooms in which TAC meetings are held; all copies will be shredded at the EMS Agency office.
- 4.3 All confidential records will be kept in a locked cabinet at the EMS Agency office.
- 4.4 Members and guests will sign a confidential agreement on an annual basis.

## APPENDIX 5 – TRAUMA PATIENT CARE

- **Routine Medical Care**
- **Transport Decision** - Determine need for rapid intervention/transport
- **Critical Interventions** - done prior to and/or during transport
  - ✓ Secure airway
  - ✓ Assure adequate breathing, i.e., occlusive dressing, pleural decompression
  - ✓ Control life-threatening bleeding
- **Safety Equipment:** Make a note on the PCR about the use of the following:
  - ✓ Seat belts (lap/shoulder)
  - ✓ Air Bags (deployed)
  - ✓ Helmets
  - ✓ Other safety equipment
- **Transport** - give report enroute

1. Control the Airway - Consider **supraglottic airway device, endotracheal intubation, or cricothyrotomy**,

if indicated. (See #10 below for patients with closed head trauma)

2. Spinal immobilization
3. Administer **Oxygen** - 15L by non-rebreather mask
4. Control major external hemorrhage.
5. Determine patient severity (see policy Trauma Patient Criteria):

### Meets Physiologic and/or Anatomic Factors

- ▶ Transport to the Trauma Center **code 3**.
- ▶ Establish **two (2)** large bore IVs with Normal Saline (NS) - wide open if appropriate.

### Meets Paramedic Consideration Criteria:

- ▶ Transport to the Trauma Center **code 2**.
- ▶ Establish **one (1)** large bore IV with Normal Saline (NS)

See policy Trauma Patient Criteria for additional judgment decisions on code 2 transports

6. Splint fractures and dress wounds ONLY if time permits.
7. Contact the Trauma Base, if appropriate.
8. Contact the Trauma Center, as soon as possible.
9. Administer **Naloxone** and **Dextrose** to a critical trauma patient, enroute to the trauma center, without making base contact in the following situations:
  - ▶ Patient exhibits an altered level of consciousness that does not correspond with the involved mechanism of injury.
  - ▶ The history and/or physical assessment indicate that altered level of consciousness (ALOC) is due to the use of narcotics.
  - ▶ See Altered Level of Consciousness protocol for dose and administration.
10. **Care of the patient with a closed head injury** (GCS < 8):
  - ▶ **Advanced airway (King LTD or ETT)**- End-tidal CO<sub>2</sub> should be between 30-35 mmHg
  - ▶ Track or ventilate to a rate of approx 12 times/minute or 1:5 with 100% O<sub>2</sub>.
  - ▶ **IV/IO NS** wide open for patients with BP < 90/systolic. Recheck B/P q 5 minutes.

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**APPENDIX 6 – CRUSH INJURY SYNDROME**

- Routine Medical Care
- Critical Trauma Patient Care policy
- **Note:** Hypovolemia and hyperkalemia may occur, particularly with extended entrapment (usually > 4 hours). Once the compression is released, cellular toxins and potassium may be released into the body. Administering sodium bicarb alkalinizes the urine, controls hyperkalemia and acidosis.

**1. Crush injury syndrome**

**Definition:** Crush injury syndrome is the name given to the systemic manifestations of muscle crush injury and cell death. Crush injury syndrome should be suspected in patients with certain patterns of injury. Most patients in whom the syndrome develops have an extensive area of involvement such as a lower extremity and/or pelvis. It requires more involvement than just one hand or foot. Also, the crushing force must be present for some time before crush injury syndrome can occur. The syndrome may develop after one hour in a severe crush situation, but usually takes 4 – 6 hours of compression for the processes that cause crush injury syndrome to take place.

**Hyperkalemia in the context of dialysis**

**Definition:** Hyperkalemia is common in patients with end-stage renal disease and may result in serious electrocardiographic abnormalities. Dialysis is the definitive treatment of hyperkalemia in these patients. EKG findings are critical to proper treatment decisions. Findings such as peaked “T” waves and absent “P” waves as well as widening QRS complexes are signs that a renal patient in the context of dialysis is suffering from hyperkalemia. Renal patients who are taking ACE inhibitors, ARBs (aldosterone receptor blockers), NSAIDS, beta blockers and or sodium channel blockers have an increased risk of hyperkalemia in the context of dialysis. Obtain a thorough history paying special attention to the patient’s medications. IN the periarrest dialysis patient, correcting hyperkalemia can be vital in the patient’s overall survival.

2. Immediate care of the crush injury patient – prior to release of compression **or** care of a dialysis patient with suspected hyperkalemia :
  - **Cardiac monitor**
  - **12 Lead EKG**
  - **Albuterol** 5.0 mg in 6 cc NS via nebulizer.
  - **Sodium bicarbonate** 1 mEq/kg IVP
  - Prior to release of compression – **Fluid resuscitation** 20 cc/kg NS (crush Injury only)
  - **Pain management policy (Adult and Pediatric policy)** (crush Injury only)
2. Care of the crush injury patient after release of compression
  - If hyperkalemia suspected (entrapment more than 4 hours with abnormal EKG findings – contact the base hospital physician to discuss the patient prior to administering any of the following:
    - 1 **Calcium Chloride** 1 gm slowly IVP (over 60 sec.) *Note: Flush IV tubing after administering CaCl to avoid precipitation*
    - 1 **Sodium Bicarbonate** 1 mEq/kg added to 1000cc NS wide open. *Note: make sure to have a second IV line as other medications may not be compatible.*
3. Consider transport to facility with hyperbaric oxygen chamber (requires base hospital

consultation). Area hospitals that have hyperbaric oxygen chambers are:

- Eden Medical Center – Castro Valley 889-5015
- John Muir Medical Center – Walnut Creek (925) 930-5800
- Travis Air Force Base – Fairfield (707) 423-3987 or 88

## APPENDIX 7 – MULTICASUALTY INCIDENTS

1. **INTRODUCTION:** Multi-Casualty Incident (MCI) is defined as any incident where the number of injured persons exceeds the day to day operating capabilities; requiring additional resources and/or the distribution of patients to multiple hospitals. This will be different for each incident based on time of day, location, resources available etc.

1.1 For example, consider initiating an MCI if there are more than:

- 6 Adult or 3 Pediatric patients triaged as “Immediate”
- 10 patients triaged as “Delayed” or “Minor” (adult or pediatric)
- 6 or more ambulances are needed for transport.
- The number of patients exceeds the “First Round Destination Procedure”.

1.2 Incident organization is based on, and complies with the State of California **Standard Emergency Management System (SEMS)**, principles and practices of standard **Incident Command System (ICS)**, and the **Simple Triage And Rapid Treatment (START)** method of triage.

2. An internal notification procedure should be identified by each agency. This procedure must also include notification of ALCO-CMED.

### 3. MCI ADVISORY

#### Initiating an MCI Advisory

When to initiate a MCI Advisory	In the early stages of an incident to notify the EMS system that a situation may exist that has the potential to overwhelm existing resources or require additional resources.
Who should initiate	Any first arriving unit.
How to initiate	Through internal dispatch and ALCO CMED
How to cancel an MCI Advisory	Through internal dispatch and ALCO CMED

### 4. MCI ALERT

#### Initiating an MCI Alert:

When to initiate a MCI Alert	<p>When the number of injured persons exceeds the available resources.</p> <p>For example, consider initiating an MCI Alert when:</p> <ul style="list-style-type: none"> <li>✓ The number of patients may be more than:                             <ul style="list-style-type: none"> <li>- 6 Adult Immediate or 3 Pediatric Immediate</li> <li>- 15 Delayed/Minor patients (adult or pediatric)</li> </ul> </li> <li>✓ The number of patients may exceed the “First Round Destination Procedure”.</li> <li>✓ An incident that may require the response of 6 or more ambulances.</li> </ul>
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Who may initiate	Any first arriving unit
How to initiate	Through internal dispatch and ALCO CMED
What information should be provided to ALCO-CMED	Type of incident The location of the incident An estimated number of injured
How to cancel an MCI Alert	Through internal dispatch and ALCO-CMED.

**5. PATIENT DISTRIBUTION**

- 5.1 The Transport Group Supervisor will make patient destination decisions.
- 5.2 First Round Destination Procedure may be implemented without prior authorization. All Alameda County receiving hospitals should prepare to receive patients, especially those in close proximity to the incident.

First Round Destination Procedure	
<p><b>Non-Trauma patients**</b> to each Alameda County receiving hospital (for a total of 6):</p> <ul style="list-style-type: none"> <li>✓ Two (2) “Immediate”</li> <li>✓ Four (4) “Delayed” and/or “Minor”</li> </ul> <p style="text-align: center;">** e.g.: Medical incident, Haz-Mat)</p>	<p><b>Trauma patients</b> to each Alameda County Trauma Center (for a total of 7):</p> <ul style="list-style-type: none"> <li>✓ Three “Immediate”</li> <li>✓ Four (4) “Delayed” and/or “Minor”</li> </ul>

- 5.3 Whenever possible, patients should be transported to the most appropriate hospital with out overloading one particular facility.
- 5.4 **Hospital poll:** Upon notification of an MCI, ALCO-CMED will immediately send a Reddinet message to all Alameda County receiving hospitals to confirm bed availability. A phone call will need to be made to Children’s Hospital, Oakland due to no Reddinet at that facility. Highland General Hospital Base will coordinate all of the bed availability information. This information should be made available to the transport group supervisor as needed.
- 5.5 **Hospital notification:** transporting units should contact the receiving hospital enroute to give a brief report on the patient(s)
- 5.6 **Incident Log** - The Transport Group Supervisor should maintain an incident log.

**6. RESOURCE MANAGEMENT-** The Incident Commander has the overall responsibility for developing objectives and requesting the necessary resources required to mitigate the incident. There will be no self-dispatching. Clear communications between all involved agencies is imperative

6.1 The following items are MCI Management points to consider:

- ✓ The three “T’s” ensure that Triage, Treatment and Transport have been addressed.
- ✓ Request resources through the Incident Commander in the early stages of the incident. Ensure adequate personnel and equipment
- ✓ Establish staging areas. Transport Units and/or other units that do not immediately have an assignment should stage one block away from the incident and wait for instructions.
- ✓ Use a one-way traffic pattern. Transport units should be staged to assure good access and egress from Loading Area.
- ✓ all incoming units drop off required EMS equipment at a designated location.
- ✓ County Disaster Trailers shall be requested through ALCO CMED.
- ✓ Use ICS identification vests. At a minimum the IC, Medical Group Supervisor, Triage and Treatment, and Transportation Group Supervisor should be clearly identified with vests.

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## APPENDIX 8 – AMBULANCE DIVERSION

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**AUTHORITY:** *California Administrative Code, Title 13, Section 1105 (c): "In the absence of decisive factors to the contrary, ambulance drivers shall transport emergency patients to the most accessible medical facility equipped, staffed, and prepared to receive emergency cases and administer emergency care appropriate to the needs of the patient."*

### 1. PROTOCOL PHILOSOPHY

Receiving hospitals may divert patients from their emergency departments when certain pre-established conditions exist that negatively and profoundly impact the facility's ability to provide safe patient care. It is the intent of this policy that all hospitals participating in the EMS system abide by equally strict internal procedures for diversion that result in a fair and equitable system.

Ambulance diversion by basic emergency departments shall only occur as the result of circumstances that result in a disruption of essential hospital services. The ultimate goal of this protocol is to ensure patient safety and maximize efficiency during times of over-load.

2. **DIVERSION CATEGORIES** - The Emergency Medical Service system allows ambulances to be diverted when certain predetermined conditions exist. Partial diversion may occur only under specific patient circumstances. Complete diversion is permitted for all transported critical care patients, except as indicated under 2.3 below. The following definitions for system-wide diversion criteria apply. (*See the table at the end of this policy for a summary of diversion categories and actions to be taken*)

2.1 **PARTIAL DIVERSION** – A hospital may request partial diversion under the following circumstances:

- ✓ **Computerized Tomography scanner (CT) failure** - If the CT scanner is inoperative, patients demonstrating neurological signs/symptoms of stroke or acute head injury (e.g. critical trauma patients) may be diverted
- ✓ **Trauma Center Overload – If the Medical Director of Trauma Services determines their trauma center** is unable to meet the established criteria of a Level 1 or Level 2 Trauma Center in Alameda County, patients may be diverted.

2.2 **COMPLETE DIVERSION** – If a hospital desires to divert patients in one of the complete diversion categories, all such patients, except those indicated in section 2.3 below, will be diverted to the closest most appropriate hospital.

- ✓ **Emergency Department (ED) Saturation/ Critical Patient Overload (CPO)** - The hospital's emergency department and/or critical care resources are fully committed to critically and/or severely ill/injured patients and are not available for additional critical patients; all critical care monitoring capability (including ICU, ER, PAR etc.) has been depleted
- ✓ **Physical Plant Casualty – An unforeseeable physical or logistical situation/ circumstance** (e.g., fire, bomb threat, power outage, etc.) that curtails routine patient care and renders continued routine ambulance delivery unsafe. A receiving hospital or trauma center may divert any patient, including critical trauma patients (CTP) as deemed necessary by the facility.

2.3 **EXCEPTIONS (EXCLUSIONS)**- the following patients **may not** be diverted:

- ✓ **Obstetric patients who may require imminent delivery** (e.g. - if baby is crowning, patient exhibiting delivery complications, etc.).
- ✓ **Sexual assault patients** (see policy #7006 for destination information pertaining to sexual assault). Specialized teams are available at Highland, Valley Care and Washington’s emergency department.
- ✓ **Direct admits- Receiving hospital MD has accepted the patient as a direct admit with an assigned hospital bed.**
- ✓ **Patients with any uncontrollable problem in whom diversion would be life/limb threatening.** (e.g. - unmanageable airway, uncontrolled hemorrhage, unstable cardiopulmonary condition, full arrest etc.)
- ✓ **Unstable patients who** in the judgment of the paramedic **may experience greater risk** by being transported past a hospital on diversion. The patient should be transported to the closest most appropriate facility regardless of the diversion status.
- ✓ **Any patient who requests a specific facility.** Field personnel should explain the hospital’s diversion status and that a wait for service is a possibility; however, if the patient continues to insist on transport, the patient should be transported to the hospital on diversion.

3. **RECEIVING HOSPITAL INTERNAL DIVERSION PLAN** – The hospital’s responsibilities prior to requesting diversion are indicated below:

3.1 **Internal measures** - The facility must exercise all measures to resolve the condition(s) resulting in the diversion request, according to its internal diversion plan. These include but are not limited to:

- ✓ Increase in department staff
- ✓ Increase in physician staff
- ✓ Review of attempts by department/ administrative supervisors
- ✓ Increase in ancillary staff
- ✓ Activation of backup patient care areas
- ✓ Cancellation of elective surgical procedures

3.2 **Facility authorization** - Prior to requesting ambulance diversion, the hospital must obtain authorization from all of the following:

- ✓ Emergency department supervisor or house supervisor/designee
- ✓ Emergency department physician director/designee
- ✓ Senior administrative officer on duty

3.3 **REQUESTING AND MAINTAINING DIVERSION STATUS** – Receiving Hospitals that request diversion must make the request on ReddiNet in the “STATUS” module. To be able to go on diversion, the requesting facility must have met the requirements as listed in 3.1-3.2 and in addition, must have updated the following data in ReddiNet as indicated:

- ✓ patient census within the last 24 hours
- ✓ alert status within the last 8 hours
- ✓ number of patients who are waiting in the ED/lobby/waiting room
- ✓ number of patients who are waiting in ambulances awaiting transfer to ED
- ✓ number of admitted patients who occupy med/surg beds
- ✓ number of admitted patients who are awaiting ICU/TCU beds

4. After the hospital enters its diversion request, if all the criteria above are not met, the hospital will be advised, via ReddiNet, that diversion is declined.

- 4.1 The diverting hospital must update ReddiNet, as prompted, every two hours regarding their diversion status. Failure to do so will result in denial of further diversion status.
- 4.2 **For All Diversion Categories except Trauma and Physical Plant Casualty** – If a second hospital in the same area requests diversion, (north and south county hospitals listed below) by ReddiNet, a message box that denies diversion will appear with instructions to notify ALCO-CMED at (925) 422-7595. The EMS on-call representative will determine the continuation of the diversion based on dialogue with the charge nurse/house supervisor or emergency department manager for the affected facilities.

**North County Hospitals**

- ✓ Alameda
- ✓ Alta Bates
- ✓ Children’s
- ✓ Highland
- ✓ Kaiser Oakland
- ✓ Summit

**South County Hospitals**

- ✓ San Leandro
- ✓ Eden
- ✓ St. Rose
- ✓ Kaiser Hayward
- ✓ Kaiser Fremont
- ✓ Washington
- ✓ Valley Care

4.5 **For Trauma Diversion** – Only one Alameda County trauma center may be on diversion at any time. If a second trauma center requests diversion, ALCO will contact the EMS on-call representative for resolution.

**SPECIAL CONSIDERATIONS – trauma center diversion:**

- 4.5.1 All Alameda County trauma centers (Children’s, Eden, Highland) may request diversion **if the Medical Director of Trauma Services determines his/her trauma center** is unable to meet the established criteria of a Level 1 or Level 2 trauma center in Alameda County.
- 4.5.2 Pediatric trauma patients may be diverted to Highland, Eden, and/or Contra Costa County’s John Muir Medical Center per policy.
- 4.5.3 Adult trauma patients should be diverted to the next closest trauma center but may not be diverted to Children’s Hospital except under disaster or MCI circumstances (refer to policy # 8070).

5. **DIVERSION TIME LIMITS FOR ED/CRITICAL CARE UNIT OVERLOAD DIVERSION:**

- 5.1 In general, a hospital may be on diversion for no more than 6 hours in any 24-hour period. Exceptions require the approval of the on-call EMS representative.
- 5.2 **For CT Failure, Physical Plant Casualty and Trauma Center Overload:** the hospital must come off diversion immediately upon resolution of the issue.

6. **TERMINATING DIVERSION STATUS:**

- 6.1 The diverting hospital will update ReddiNet in the “STATUS” module as soon as it is able to remove its diversion status.
- 6.2 ALCO-CMED will inform helicopter and ambulance providers (via telephone) upon termination of diversion status.

6.3 EMS Agency staff are on-call 24 hours per day and can be reached through ALCO-CMED at (925) 422-7595 to assist with system related problems

**7. MONITORING AND REVIEW**

7.1 The diverting facility shall perform an internal review of the diversion *within 72 hours*. **The review must include:**

- ✓ Date of diversion
- ✓ Reason for diversion
- ✓ Times on and off diversion
- ✓ Name of hospital administrator authorizing diversion
- ✓ Summary of attempts to mitigate conditions requiring diversion

7.2 Any problems associated with patient care for diverted patients will be submitted by the charge nurse or emergency department manager to EMS on an “Unusual Occurrence” report form within 2 weeks. (An Unusual Occurrence form can be found on our website at [www.acgov.org/ems](http://www.acgov.org/ems))

**TABLE 1 – DIVERSION ACTION SUMMARY**

	Type of Diversion	Maximum time allowed	Condition	Types of patients diverted	Appropriate facilities for diverted patients
<b>Partial</b>	Computerized Tomography (CT)	Until resolved	CT inoperative	1. Acute head injury 2. CVA (aphasic, dysarthria, one-sided weakness)	1. Closest trauma center 2. Closest stroke center
	Trauma Center Overload	Until resolved	Trauma resources depleted	Critical trauma patients	Closest designated trauma center
<b>Complete</b>	Emergency Department (ED) Saturation or Critical Patient Overload (CPO)	6 hours	Overwhelming volume of patients in ED resulting in facility’s critical care capacity exhausted	All except noted exclusions	Closest most appropriate facility
	Physical Plant Casualty	Until resolved	Physical plant breakdown	All	Closest most appropriate facility

Exclusions	<u>Transport to:</u>	Exclusions	<u>Transport to:</u>
Obstetrics (OB)	Closest most appropriate facility	Unmanageable airway	Closest most appropriate facility
Sexual Assault	Designated hospital - see policy #7006	Direct admits	Designated receiving hospital
Patient request	Hospital of choice		

## APPENDIX 9 – INTERFACILITY TRANSFERS

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1. **AUTHORITY** - All Interfacility patient transfers (including those to a trauma center) are to be performed according to the patient transfer provisions contained in the Consolidated Omnibus Budget Reconciliation Act (COBRA) of 1985, the Emergency Medical Treatment and Labor Act (EMTALA) of 1986, the Omnibus Budget Reconciliation Acts (OBRA) amended in 1987 and 1989, California Code of Regulations Title 22, and JCAHO.

### 2. POLICY STATEMENT:

The purpose of this policy is to define the appropriate use of EMS personnel utilized during an interfacility transfer and information on how to arrange for transport vehicles. It is not intended to be a substitute for internal hospital policies specific to COBRA/OBRA regulations.

This policy addresses the appropriate transfer of a patient by ambulance with an emergency medical condition, who has been stabilized by the transferring facility, accepted by the receiving facility and transported with appropriately qualified personnel. Prior to initiating any transfer, the transferring physician has the responsibility to perform a medical screening exam to determine if the patient has an emergency medical condition, stabilize (if possible) and prepare the patient for the transfer.

### 3. DEFINITIONS:

- 3.1 **Transfer** - the movement of a patient outside a hospital's facilities at the direction of any person employed by or affiliated with a hospital. This includes transfers to another facility for diagnostic tests. A transfer does not include the movement of a patient who has been declared dead or leaves the facility against medical advice (AMA) or without the knowledge of the facility (elopement).
- 3.2 **Emergency Medical Condition** - a medical condition manifesting itself by acute symptoms of sufficient severity (including severe pain) such that the absence of immediate medical attention could reasonably be expected to result in, 1) placing the health of the individual (or in a pregnant woman, the health of her unborn child) in serious jeopardy; 2) serious impairment to bodily functions; or, 3) serious dysfunction of any bodily organ or part.
- 3.3 **To stabilize** - to provide medical treatment of the condition as may be necessary to assure, within reasonable probability that no material deterioration of the condition is likely to result from or during the transfer. With respect to the pregnant woman having contractions, to stabilize includes delivery of the infant and placenta.

**If the patient has not been stabilized, the patient may not be transferred unless:**

- The patient (or legal representative), who is capable of making rational decisions regarding their medical care and after being informed of the risks, requests in writing, transfer to another facility; or,

- The transferring physician signs a certificate that based upon the information available at the time that the medical benefits provided at another facility outweigh the increased risk of the transfer. The receiving hospital physician must approve the transfer, and the patient must agree to the transfer.

### 3.4 **Appropriate transfer** - A transfer where the transferring physician has:

- 3.4.1 provided a medical screening examination and medical treatment within its capacity that minimizes the risks to the patient's health;
- 3.4.2 confirmed that the receiving facility has an accepting physician, available space and qualified personnel to treat the patient. There should be physician-to-physician communication between the sending and receiving physicians to confirm the acceptance of the patient;
- 3.4.3 made available all medical records to the receiving facility regarding the diagnosis and care of the patient;
- 3.4.4 arranged for qualified personnel to accompany the patient in an appropriate transport vehicle (BLS/ALS/CCT/helicopter) with essential equipment and medications required for the transfer.
- 3.4.5 determined that the patient has no emergency medical condition or a stabilized emergency medical condition. *The receiving hospital still must consent to the transfer.*

### 3.5 **Inappropriate transfer** - a "lateral" transfer of an unstabilized patient between essentially comparable facilities (those with equal capabilities where the benefits of the transfer do not outweigh the risks) or those based solely on financial considerations are not an appropriate reason for transfer. Exceptions: Mechanical failure of essential testing equipment, lack of intensive care bed space or at the request of the patient.

### 3.6 **Qualified personnel**

#### 3.6.1 The transferring physician is responsible for:

- Determining the level of personnel necessary to accompany the patient;
- Maintaining the continuity of care initiated at the transferring facility.

3.6.2 The healthcare practitioner attending the patient must be able to recognize and treat any changes in the patient's condition, taking into consideration the patient's current medical condition and all reasonably foreseeable complications that may occur during transfer.

#### 3.6.3 The decision regarding the level of transport personnel required (ALS vs. BLS) should be made by the transferring physician, based on the level of care required, scope of practice, equipment needs and the ETA vs. the urgency of the transport. A

minimum of one paramedic must accompany the patient for the transfer to be considered an ALS transport.

3.6.4 An **EMT-I** may only transfer a patient:

- without an emergency medical condition; or,
- with an emergency medical condition that has been stabilized and has no potential (within reasonable probability) to deteriorate enroute.

3.6.5 A **paramedic** may only transport a patient who has not been stabilized to a facility that provides a **higher level of care**.

*The transferring physician must determine if the care that may be required during transport is within the scope of practice of a paramedic. If not, appropriate hospital staff and/or equipment should be sent with the patient. A "Physicians Certificate"\*\*\* must be completed documenting that the benefits of the transfer outweigh the risks. (\*\*example may be found in the California Health Care Association consent manual)*

### 3.7 Medical control

3.7.1 All patient care rendered by prehospital care personnel must be within the defined scope of practice according to Title 22, and Alameda County EMS protocols.

3.7.2 A paramedic may only take orders from a base hospital physician. There are no provisions for an EMT to take orders from a physician.

#### 3.7.3 Base Contact by paramedics

- **BASE CONTACT is required prior to transport** if the transferring physician has ordered any ALS treatment and/or the patient has not been stabilized.
- *Paramedics may follow transferring physician's written orders ONLY when: 1) the transferring physician speaks to the base physician, and they mutually agree on the course of treatment; 2) the proposed treatment plan is within the paramedic's scope of practice.*
- **BASE CONTACT shall be made** when there is a request to transfer a patient to a higher level of care facility that is not the "closest" higher level of care facility.
- If the patient being transferred is a **trauma patient**.
- **Base contact is not required** if the patient is stable and no ALS treatment has been ordered by the transferring physician. If the patient's condition changes during transport, SEE THE APPROPRIATE PATIENCE CARE POLICY AND TREAT ACCORDINGLY.
- Base Contact may be made anytime a paramedic has a question regarding patient condition, destination and/or the appropriateness of the transfer.

## 4. INITIATING A TRANSFER

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4.1 Trauma Center transfers

4.1.1 To contact an Alameda County Trauma Center:

- **Highland:** Call the hospital operator and ask to speak to Senior Trauma Chief Resident/Trauma Surgeon on call
- **Eden:** Call the ED directly 510-889-5015 and ask to speak to the on-call Trauma Surgeon.
- **Children's:** Call PICU (800 ICU KIDS) and ask to speak to intensivist on duty

4.1.2 All transfers to Trauma Centers will be designated **Code 3**.

4.1.3 Trauma Centers with patients who are members of PPOs or HMOs must call the appropriate plan hospital to advise them of the patients' status at Trauma Center upon admission.

4.2 **Arranging ambulance transport** (excluding CCT-P transfers. See specific hospital agreement for arranging transport by CCT-P)

4.2.1 **Non-emergent transfers** - Each hospital should initiate, in advance, transfer agreements with an ambulance company able to provide the appropriate level of staffing and equipment required.

**Emergent transfers** - the transferring hospital should contact **ALCO-CMED at (925) 422-7594** for response of a code 3 ambulance. If the patient is not in the Emergency Department, specific information regarding the location of the patient should be provided.

**Appendix 10 – ALAMEDA COUNTY’S BOARD OF SUPERVISORS  
APPROVAL PROCESS**

TRAUMA PROGRAM

On June 20, 1985, the Board of Supervisors of Alameda County approved the Alameda County Trauma Care System Implementation Plan, pursuant to Health and Safety Code Sections 1798.162 and 1798.163.

Alameda County Clerk of the Board is unable to locate a copy of this Board action or the document in the archives.

There are three designated Trauma Centers in Alameda County.

**Adult Trauma**

- **Alameda County Medical Center – Highland Hospital**  
1411 E 31st St, Oakland, CA
- **Eden Medical Center**  
20103 Lake Chabot Rd, Castro Valley, CA

**Pediatric Trauma**

- **Children’s Hospital Medical Center**  
747 52<sup>nd</sup> St, Oakland, CA

Alameda County Board of Supervisors has a commitment to provide financial support for trauma services and provides the following subsidies:

Alameda County Medical Center	\$5,266,393
Eden Medical Center	\$1,982,480
Children’s Hospital Med. Ctr.	\$1,982,480

Each fiscal year, the Alameda County Board of Supervisors reviews the subsidy amount to be paid as part of the budget process. Approval of subsidy amounts for the year are approved “in principal” by Board action and the Health Services Agency Director is delegated the authority to execute a contract for the subsidy amount approved by the Board of Supervisors.

The EMS Division is responsible for monitoring the contract to ensure that each Trauma Center is in compliance with State and County Trauma standards. These standards are incorporated into the contract deliverables.