



Advanced Emergency Medical Technician (AEMT)

An Alternative Pre-hospital  
Advanced Life Support Provider Role

An Informational Guide for  
Contra Costa Fire Services

Prepared by  
Contra Costa Emergency Medical Services

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## Executive Summary

The purpose of this report is to provide Contra Costa County Emergency Medical Services (EMS) System stakeholders with information on the Advanced Emergency Medical Technician (AEMT) role recently recognized in regulation by the California Emergency Medical Services Authority (EMSA).<sup>1</sup> The AEMT role evolved as part of a national interdisciplinary effort to standardize EMS education, training and scope of practice throughout the country.

The new role offers a strategic scope of practice, prioritizing the most essential advanced life support capabilities shown to improve outcome at the scene of a medical emergency.

After extensive review, the Contra Costa EMS Agency recommends that AEMT be considered as a pre-hospital Advanced Life Support (ALS) option within the County. An AEMT program would provide an alternative for communities considering expansion or modification of ALS first response.

Administrative requirements for an AEMT program are virtually identical to a paramedic-level program for all parties involved. The State mandates the oversight requirements. Contra Costa EMS Agency is responsible for the direction and coordination of AEMT program activities and performs these functions in collaboration with participating agencies. EMS provider agencies considering implementation of an Advanced EMT program must plan for adequate personnel and funding to develop, implement and sustain statute required responsibilities. These responsibilities include:

- Compliance with State AEMT certification and recertification procedures and disciplinary requirements.
- Compliance with State operational requirements for AEMT Service Providers including:
  - AEMT Policies and Procedures as approved by the local EMS Medical Director.
  - EMS Quality Improvement Plan.
  - Assuring appropriate telecommunications.
  - Responsibility for assessing and sustaining AEMT personnel training and competency.
  - Maintenance of drug, solution and equipment inventory control.
  - Compliance with State and local requirements for medical control including requirements for patient care documentation and record keeping.

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<sup>1</sup> California Code of Regulations Title 22, Division 9, Chapter 3 Advanced Emergency Medical Technician [http://www.emsa.ca.gov/laws/files/ch3\\_aemt.pdf](http://www.emsa.ca.gov/laws/files/ch3_aemt.pdf)

- Written agreement with the local EMS Agency (LEMSA) to participate in local EMS System in compliance with local and state regulations, policies and procedures.
- Commitment to provide services on a continuous 24-hour basis unless otherwise specified by the LEMSA.
- Compliance with OSHA, Infection Control, HIPAA and HITECH state and federal requirements.

Communities wishing to upgrade from basic life support pre-hospital care should consider the AEMT level as a viable alternative for Fire ALS First Response. Implementation of the any ALS-level role requires a substantial, sustainable financial commitment associated with training, equipment, medications, technology, electronic medical records and personnel.

The Contra Costa EMS Agency is committed working collaboratively with those who wish to explore this exciting new ALS pre-hospital provider role.

Regards,

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This report has been prepared by the staff of Contra Costa Emergency Medical Services and is available on our website at [www.cccems.org](http://www.cccems.org) under Documents.

## Medical Director Analysis

### Comparison of Advanced EMT and Paramedic Levels of Patient Care

Joseph Barger, MD, EMS Medical Director

The purpose of this document is to compare the medical aspects of care provided at Advanced EMT and Paramedic levels. Both levels provide Advanced Life Support interventions and represent significant increase in medical care beyond the EMT-I level.

In current EMS state regulations, three levels of certified or licensed field providers exist: EMT-Basic, Advanced EMT and Paramedic. Recent changes to these levels have been made to align the state's providers more closely to the NHTSA National Scope of Practice. As a result of these changes, Advanced EMT was created as a new intermediate level and replaced the EMT-II provider category (a category that had been limited to rural EMS settings).

The Advanced EMT provider level has significantly reduced training requirements compared to the Paramedic level. It also offers a scope of practice that represents a substantial upgrade in patient care without incurring the more significant training and equipment costs of Paramedic-level care.

In the past 15 years, the first-responder fire agencies in Contra Costa County that upgraded from the EMT-Basic level could only choose a change to Paramedic level. Communities desiring to upgrade EMS response from the EMT-Basic level may now wish to consider Advanced EMT as a lower-cost alternative, providing the core elements of advanced life support.

As first-responder agencies upgraded, the concept was that a full spectrum of higher level care, provided more rapidly by first responders, would significantly enhance emergency care in the communities served. As more emphasis has been placed with regard to evidence-based medicine in EMS as well as by gathering and studying data in our system, we now know more about the value of these interventions.

True life-threatening conditions that EMS responds to constitute approximately 7% of responses, as reflected in the frequency that ambulances transport patients to the hospital with lights and sirens. Cardiac arrest, critical trauma, respiratory distress, cardiac chest pain, stroke, and altered level of consciousness represent the most commonly encountered situations that lead to these emergent transports (these six conditions account for 80% of lights and sirens transports).

The critical elements of care in these most emergent situations have been better defined in the last decade through EMS systems research. Specifics of each are listed below:

**Cardiac Arrest:** Interventions that have been shown to significantly improve survival are limited to two interventions, cardiopulmonary resuscitation (CPR) and rapid defibrillation. Both of these interventions are available at all responder levels in EMS. Besides these two items, there is minimal evidence that other interventions such as intravenous medications or advanced airway control are critical determinants in survival. Defibrillation can be effectively delivered through a manual defibrillator (at a cost of \$20,000-30,000 per machine, operated by Paramedics only) or via automated external defibrillator (at a cost of around \$2,000 per machine, operated by any of the three provider levels). There is no evidence that a manual defibrillator adds a significant advantage in survival in out-of-hospital cardiac arrest.

**Critical Trauma:** The most critical determinants of outcome in trauma relate to prompt transport and expert intervention at trauma centers. EMS interventions have not been shown to improve outcome, and there is evidence that advanced life support interventions may delay care and contribute to increased mortality in trauma. Basic life support interventions, which include provision of oxygen, control of external hemorrhage and spinal immobilization, are available at all three levels of provider and continue to be the most important aspects of pre-hospital trauma care.

**Respiratory Distress:** Basic interventions that can be applied to patients by all levels of providers include oxygen and continuous positive airway pressure (CPAP). Both Advanced EMT and Paramedic providers can deliver albuterol by inhalation for asthma, oral nitroglycerin for pulmonary edema and naloxone for respiratory depression due to narcotics. Advanced airway management is problematic in living patients with respiratory distress and in nearly all situations, the best approach is rapid transport to the hospital for more advanced approaches to airway management.

**Cardiac Chest Pain:** Aspirin is the one pre-hospital intervention that has been linked to better outcomes in patients with heart attack and chest pain. Along with aspirin, symptomatic relief in the form of oxygen and oral nitroglycerin can be provided by both Advanced EMT and Paramedic levels. Morphine, which can only be administered by Paramedics, is also utilized for treatment of pain, but has not shown to improve survival and is generally not utilized in the first few minutes of care for cardiac patients. Identification of heart attack patients with ST-elevation myocardial infarction (STEMI) via 12-lead electrocardiogram (ECG) can only be done by Paramedic providers, but the key intervention remains hospital intervention, not field treatments. Personnel at the EMT-Basic or Advanced EMT level can facilitate rapid acquisition of 12-lead ECG by placement of electrodes prior to Paramedic arrival.

**Stroke:** Stroke care depends on rapid transport to the hospital. Similar care can be provided by Advanced EMT and Paramedic providers.

**Altered Level of Consciousness:** The main intervention that field personnel perform in this situation is treatment of hypoglycemia. Advanced EMT and Paramedic providers have identical tools to provide this treatment. Naloxone may additionally improve level of consciousness and that can be provided by both as well.

**Anaphylaxis:** One time-critical, but infrequently encountered, condition is anaphylaxis. Early administration of epinephrine by intramuscular injection is the standard of care for this condition, and this represents a significant enhancement above EMT-Basic level care. This treatment is available at both the Advanced EMT and Paramedic level.

#### **Other key differences between Paramedic and Advanced EMT care:**

**Symptomatic relief:** Because emergent conditions are the exception rather than the rule in EMS, symptom relief represents a significant amount of the Paramedic care provided. This includes administration of morphine for pain relief, Zofran for nausea and vomiting, and diphenhydramine (Benadryl) for itching and hives. Although not available at the Advanced EMT level, none of these treatments are life-saving, and the vast majority of these treatments are administered by transport personnel after arrival of the ambulance.

**Seizure control:** Administration of midazolam for seizure control represents one area of care where the Advanced EMT scope of practice differs significantly from Paramedic care – Midazolam is not in the scope of practice for Advanced EMT. The need for paramedic first responders to

provide seizure medication prior to ambulance arrival is rare. Only three out of 133 seizure cases transported by American Medical Response in 2011 received seizure medication prior to ambulance arrival. The medication was given three to four minutes prior to ambulance arrival in each of those three cases.

**Other conditions and interventions:** The Paramedic scope of practice includes several procedures that are done on a fairly limited basis: external cardiac pacing, electrical conversion or medical treatment of unstable cardiac rhythms (other than cardiac arrest) and placement of needle thoracostomy for tension pneumothorax. These are done in a small number of cases each year. Most are not done in the first few minutes of care. Rarely encountered situations such as an overdose needing specific antidote occur no more than one or two times per year, and again are not provided during the early minutes of care.

**Cost/operational considerations:** The Advanced EMT training curriculum requires a minimum of 88 hours (for providers who are already EMT-Basic). The Paramedic training curriculum minimum is 1090 hours. From a medical perspective, it may be prudent to enhance the Advanced EMT curriculum beyond the minimum requirements, but the total number of hours is unlikely to be anywhere close to the time commitment of Paramedic training. Differences in the costs of equipment are not insignificant. Manual defibrillator-monitor systems cost 10-15 times as much as automated external defibrillators (AEDs). Medication costs, particularly with handling of controlled substances (morphine and midazolam) in a secured manner, are also potentially significant in terms of both material and administrative oversight.

One other potential system impact which has been noted with prior expansion of Paramedic services is the dilution of experience with regard to high-risk and infrequently performed skill of intubation. Expansion of Paramedic services would add to further dilution of experience. Advanced EMT providers, as intubation is not within the scope of practice, would not be overlapping with Paramedic providers with regard to this skill performance.

**Proposed Advanced EMT Scope of Practice for Contra Costa County**

The proposed Advanced EMT scope of practice for Contra Costa County was based on a comprehensive review of pre-hospital first responder care by the EMS Medical Director and staff. The goal was to select a “laser-focused” AEMT skill set that is based on patient need and EMS best practices to support patient safety and improved outcome. Cost was also considered, but not at the expense of a known patient care benefit. Based on EMS Medical Director review, the following skills, treatments and medications would be part of the AEMT scope of practice in Contra Costa County.

<ol style="list-style-type: none"> <li>1. King Tube – arrest only</li> <li>2. IV/Saline Lock</li> <li>3. IV Fluids             <ol style="list-style-type: none"> <li>a. Normal Saline</li> <li>b. D10</li> </ol> </li> <li>4. Blood Glucose Measuring</li> </ol>	<ol style="list-style-type: none"> <li>5. Administration of, the following drugs in a route other than IV             <ol style="list-style-type: none"> <li>a. Sublingual Nitroglycerin<sup>2</sup></li> <li>b. Aspirin</li> <li>c. Inhaled beta-2 agonists (bronchodilators)</li> <li>d. Naloxone</li> <li>e. Epinephrine 1:1,000</li> </ol> </li> </ol>
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<sup>2</sup> Discussion of administration of nitroglycerine preparations prior to obtaining a 12-lead ECG requires further study prior to determining final decision on whether to include in AEMT scope.

## **Summary of California State EMS Authority Statutory Requirements for Training and Certification AEMT:**

The AEMT is trained and certified in limited advanced life support (LALS) practices under the California EMS Authority regulations. What follows is a summary of requirements for a local AEMT program.

### **○ Student Eligibility**

- To be eligible to enter an AEMT training program, an individual shall meet the following requirements:
  - Possess a high school diploma or general education equivalent; and
  - Possess a current EMT-Basic certificate in the State of California; and
  - Possess current Healthcare Provider CPR certification.

### **○ Training Hours**

- The AEMT training program shall consist of not less than 88 hours.
- The minimum number of hours for each portion of the training program is listed below, although most programs exceed this amount:
  - Didactic and skills - 48 hours
  - Hospital Clinical Training - No less than 16 hours
  - Field Internship - No less than 24 hours
  - A minimum of 10 patient contacts with 5 as lead required for clinical/field)

### **○ Testing**

- To become certified as an AEMT, an individual must pass written and skills exams administered by the local EMS agency. The local EMS agency determines if the testing will be administered by the training facility or the local EMS agency.
  - Written Test
  - Skills Test
- On July 1, 2013, the EMS Authority will transition to the NREMT Advanced EMT written and skills examination.

### **○ AEMT: Summary of Certification Requirements**

- In order to be eligible for initial certification an individual shall:
  - Possess a current EMT-Basic certification in the State of California
  - Have an Advanced EMT course completion record
  - Pass, by pre-established standards a competency based written and skills exam.
  - Obtain a criminal background check.
  - Comply with other reasonable requirements, as may be established by the local Advanced EMT Certifying Entity.

- This includes payment of established fees, completion of an application, disclosure of any certification or licensure actions, proof of affiliation with an approved AEMT service provider, completion of a precertification field evaluation, and any additional training during a trial study.
  - Certification is valid for a maximum of two years from the effective date of certification.
  - Certification as an AEMT is recognized only by the local EMS agency that has policies, procedures and protocols for AEMTs. Therefore, AEMT certification is not valid statewide. In order to be certified in a different area by a different EMS agency, an applicant must provide proof of current AEMT certification and employment with a provider in the new area.
  - An individual currently licensed in California as a Paramedic is deemed to be certified as an Advanced EMT, except when the Paramedic license is under suspension. The Paramedic shall apply to the local EMS agency for Advanced EMT certification.
- **Recertification**
  - In order to recertify, an Advanced EMT shall:
    - Possess a current Advanced EMT Certification issued in California.
    - Obtain at least thirty-six (36) hours of EMS approved continuing education units (CEUs).
    - Complete an application form.
    - Disclose any certification or licensure actions against an EMT-Basic, AEMT certificate or paramedic license, or a denial by the EMS Authority.
    - Submit a completed Advanced EMT Skills Competency Verification Form, documenting competency in:
      - Injection (IM or SQ)
      - Peripheral IV
      - IV Push Medication
      - Inhaled medications
      - Blood Glucose Determination
      - Perilaryngeal Airway Adjunct
- **Reciprocity**
  - An individual who possesses or has possessed a valid EMT-Intermediate or Paramedic license from another state or the National Registry of EMTs may be eligible for certification.
- **Scope of Practice**
  - Advanced EMTs are certified in the use of limited advanced life support (LALS) skills.
  - An Advanced EMT, as part of an organized EMS system while at the scene of a medical emergency or during transport or during interfacility transfer is authorized to do all of the following according to the policies and procedures approved by the local EMS agency:

- Perform pulmonary ventilation by use of a perilaryngeal airway adjunct.
- Institute intravenous (IV) catheters, saline locks, needles or other cannulae (IV lines), in peripheral veins.
- Administer intravenous glucose solutions or isotonic balanced salt solutions, including Ringer's lactate solution.
- Obtain venous and/or capillary blood samples for laboratory analysis.
- Use blood glucose measuring device.
- Administer, the following drugs in a route other than intravenous:
  - Sublingual nitroglycerine preparations;
  - aspirin
  - glucagon
  - inhaled beta-2 agonists (bronchodilators)
  - activated charcoal
  - naloxone
  - epinephrine
- Intravenous administration of 50% dextrose.
  
- During a mutual aid response into another jurisdiction, an Advanced EMT may utilize the scope of practice for which s/he is trained and certified according to the policies and procedures established by his/her certifying LEMSA.
  
- Jurisdictional scope of practice may vary.
  
- **Optional Skills**
  - In addition to the LALS scope of practice, AEMTs who were previously certified as EMT-II's may practice additional skills and administer certain medications. These additional optional skills and medications may be utilized in limited jurisdictions and are approved by the local EMS agency.
  
- **California EMS Authority Statutory Requirements for a Local EMS Agency (LEMSA) implementing AEMT**
  - The LEMSA, which approves a LALS service provider, shall develop and maintain policies and procedures that comply with guidelines established by the Authority for training and maintenance of knowledge, skills and abilities as outlined in the regulations.
  - The LEMSA shall:
    - Develop or approve, monitor, and enforce standards, policies, and procedures for the EMS system which relates to the Advanced EMT.
    - Approve, deny, revoke approval, and suspend training programs, Advanced EMT base and alternative base stations, and Advanced EMT service providers.
    - Assure compliance of the Advanced EMT training program and the EMS system
    - Submit annually to the EMS Authority the names of approved Advanced EMT training programs.
    - Monitor and evaluate the EMS system as it applies to Advanced EMT personnel.
    - Develop and approve implementation and enforcement of policies for medical control and medical accountability for the Advance EMT including:

- General treatment and triage protocols.
- Patient care record and reporting requirements.
- Field medical care protocols.
- Medical care audit system.
- Role and responsibility of the Advanced EMT base and alternative base stations and Advanced EMT service provider.
- System data collection and evaluation.

### **Feasibility of Local Contra Costa AEMT Program Development and Implementation**

Implementation of the AEMT role is dependent on each community's current resources and capabilities to support the program. The following are important considerations that should be considered when exploring local implementation:

- While there may be a number of eligible student candidates, there are few AEMT programs currently available in the Bay Area and no programs in Contra Costa County. AEMT programs established within Contra Costa County would have to be approved by the local EMS Agency in accordance with EMS Authority regulation prior to establishing operations in Contra Costa County.
- Hospital Clinical hours and Field Internship hours may be difficult to fill as hospitals and ambulance companies currently have more requests than they can accommodate. Traditional EMT programs are having difficulty meeting the current requirements of their programs.
- Prospective AEMT first responder agencies will be required to support patient safety and quality improvement activities to the same level as paramedic provider agencies.
- The EMS Agency and prospective AEMT provider agencies would be required to jointly develop an orientation process to all local protocols and procedures. This is a significant commitment for all parties involved. The AEMT program development is considered by some to be equivalent to establishing an entire new EMT-Basic or paramedic program from scratch.
- Current EMS and participating provider agency policies and procedures would require review and modification to accommodate the new Advanced EMT role.
- Fire agencies who do not participate in the current electronic patient care record system utilized by fire agencies in Contra Costa County would need to be prepared to purchase, implement and maintain hardware and licenses and invest in initial and ongoing training required to achieve pre-hospital electronic medical record competency on that system. Electronic patient care records must comply with the local and state data systems used to evaluate and support patient safety, quality improvement and oversight EMS System performance.

### **Timeline Considerations**

For those agencies and/or communities wishing to explore the feasibility of this new role the following timeframes should be considered:

- It is estimated that the AEMT program development and implementation process would likely take 18-24 months.
- Development of an accredited training program through the community college districts in the county may add significantly to the timeline. Currently there are no approved AEMT training programs in the County.
- To accelerate the timeline, prospective AEMT first responder agencies could recruit EMT-Paramedics to fulfill the AEMT roles. This could reduce deployment start up by up to 12 months.
- EMT-Paramedics hired into the AEMT role would be restricted to the AEMT scope of practice.

## Addendum I

### Eligibility, Training, and Skill Requirements for AEMT

#### (Advanced EMT)

<b>Student Eligibility</b>	<ul style="list-style-type: none"><li>• 18 years of age</li><li>• High School diploma or equivalent</li><li>• EMT certificate</li><li>• CPR Card</li></ul>
<b>Minimum Training Requirements</b>	<ul style="list-style-type: none"><li>• 88 hours total</li><li>• ≈48 hours didactic &amp; skills lab</li><li>• ≈ 16 hours hospital clinical training</li><li>• ≈ 24 hours field internship &amp; 10 ALS patient contacts</li></ul>
<b>Minimum Scope of Practice</b>	<ul style="list-style-type: none"><li>• All EMT skills</li><li>• Perilaryngeal airways</li><li>• Intravenous infusion</li><li>• Obtain venous blood</li><li>• Glucose measuring</li><li>• 8 medications*<ol style="list-style-type: none"><li>1. Sublingual nitroglycerine preparations;</li><li>2. aspirin</li><li>3. glucagon</li><li>4. inhaled beta-2 agonists (bronchodilators)</li><li>5. activated charcoal</li><li>6. naloxone;</li><li>7. epinephrine;</li><li>8. Intravenous administration of 50% dextrose.</li></ol></li></ul> <p>(*scope of practice varies by area)</p>
<b>Written and Skills Exams</b>	<ul style="list-style-type: none"><li>• Administered by training program or local EMS Agency</li></ul>
<b>Length of Certification</b>	<ul style="list-style-type: none"><li>• 2-Year certification with retesting every 2 years</li></ul>
<b>Refresher Course/ Continuing Education</b>	<ul style="list-style-type: none"><li>• 36 hours of CE every 2 years</li></ul>
<b>Certification Provisions</b>	<ul style="list-style-type: none"><li>• Certified locally/valid statewide</li></ul>

## Addendum II

### Comparison of EMT, Advanced EMT, and Paramedic

#### Scopes of Practice

<b>Medications</b>	<b>EMT</b>	<b>Advanced EMT</b>	<b>Paramedic</b>
Glucose (oral)	X	X	X
Oxygen	X	X	X
Activated Charcoal*		X*	X*
Albuteral		X	X
Aspirin		X	X
Dextrose (10%, 25%, 50%)		X	X
Epinephrine IM		X	X
Glucagon		X	X
Naloxone IM / Intranasal		X	X
Nitroglycerin (oral)		X	X
Adenosine			X
Amiodarone			X (optional scope)
Atropine			X
Calcium			X
Diazepam*			X*
Diphenhydramine			X
Dopamine**			X**
Epinephrine IV			X
Furosemide*			X*
Lidocaine			X
Midazolam			X
Morphine Sulfate			X
Naloxone IV			X
Pralidoxime*			X*
Sodium Bicarbonate			X
Zofran (Ondansetron)			X (Optional Scope)
<b>Procedural Skills</b>	<b>EMT</b>	<b>Advanced EMT</b>	<b>Paramedic</b>
Defibrillation	AED	AED	Manual or AED
CPR	X	X	X
IV Access		X	X
Perilaryngeal Airway (King)	Optional Scope only*	X	X
Endotracheal intubation			X
Pediatric intubation			X (>40 kg only)
Needle cricothyrotomy*			X*
Needle thorascotomy			X
Cardioversion			X
External Cardiac Pacing			X (optional scope)
Intraosseous Access			X (optional scope)

\* Not currently used in Contra Costa County. \*\* To be removed from Contra Costa paramedic scope January 2013

## Addendum III

### Recommended Economic Evaluation

Human Resources Costs	Unit cost	Number of items or personnel	Total
Regular time pay			
Overtime pay			
Training time pay			
Stipend /differential for AEMT			
Administrative Support (1 FTE)			
QI Review/Training (1 FTE Senior EMS Chief)			
Medical Director (if not provided by LEMSA)			
<b>Total</b>			
<b>Equipment</b>			
AEMT ALS supplies			
Training equipment and supplies			
Medication supply and inventory			
Replacement equipment and supplies			
<b>Total</b>			
<b>Other Costs</b>			
Additional personnel time associated with AEMT Program Administrative Meetings (Medical Advisory, Quality Improvement, Fire-EMS Consortium, Trauma, STEMI, Stroke)			
Malpractice/Liability Insurance			
Staff time to maintain medical supply inventory			
Certification Fees			
Information Systems (Zoll) ePCR <sup>9</sup> software license and license maintenance costs			
ePCR Computer Stations/Tablets			
IT support/data personnel time			
<b>Total</b>			
<b>Training</b>			
Continuing Training AEMT			
ePCR Initial and Upgrade Training			
Initial Training AEMT			
Quarterly EMS Training			
<b>Total</b>			

<sup>9</sup> ePCR = Electronic Pre-hospital Care Record

## References

California Code of Regulations (January 14, 2011) Title 22, Division 9, Chapter 3; Advanced Emergency Medical Technician

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