

*Los Angeles City Fire Department*  
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**AUTOMATIC EXTERNAL DEFIBRILLATORS**

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## **I. Introduction**

The Department has been providing Emergency Medical Technician I (EMT-I) level defibrillation since 1990 using semi-Automatic External Defibrillators (AED). Currently there are three AED models in the Department inventory. They are the Life-Pak 200, the Life-Pak 300 and the Zoll 1600. This bulletin describes the policy and procedures to be followed when using any AED. For specific information regarding the operation of a particular brand and model refer to the Operator's Manual issued with the device. Questions regarding defibrillation and requests for copies of the Operator's Manual for any AED should be directed to the EMT Training Unit in the In-Service Training Section at 485-4361.

## **II. Utilization Policy**

Because the need for defibrillation cannot always be anticipated and must be delivered as quickly as possible; the AED is to be taken to the patient by EMT-I's on all EMS calls, except those dispatched as trauma or obstetric calls. EMT-I's have the primary responsibility for defibrillation when they are on the scene of a cardiac arrest, whether or not there are paramedics on-scene. This provides optimal care to the patient in cardiac arrest by having EMT-I's perform defibrillation while paramedics perform advanced airway management and establish intravenous access.

EMT-I's are authorized to administer two series of three shocks prior to the arrival of paramedics and up to one series of three shocks following the arrival of paramedics. If paramedics arrive on-scene when EMT-I's are partway through a series of three shocks, EMT-I's shall only complete that series of shocks. If paramedics are on-scene with EMT-I's during defibrillation and a "No Shock Advised" message appears on the AED, EMT-I's shall immediately turn-over responsibility for defibrillation to the paramedics. EMT-I's are not to exceed these limits under any circumstances.

## **III. Indications and Contraindications**

The use of the AED is **indicated** for any adult or a child who weighs more than 90 pounds (45 kilograms), who is determined to be unconscious, unresponsive, apneic and pulseless. Although the AED is not taken to the patient on obstetric calls, pregnancy **is not** contraindication to the use of the AED.

The use of the AED is contraindicated if the patient has sustained a cardiac arrest due to trauma (this may require the EMT-I to exercise clinical judgement as to whether the patient's cardiac arrest preceded or resulted from the trauma). Use of the AED is also contraindicated for a child who weighs less than 90 pounds (45 kilograms) or patients who meet the criteria listed in the Pre-Hospital Care Policy Manual (Book 33), References 814 (Determined to be Dead) and 815 (Do-Not- Resuscitate).

#### IV. Procedure

The AED is to be immediately placed next to the unconscious patient's left ear. The patient should next be checked for responsiveness, breathing and pulse. If the patient is determined to be unconscious, unresponsive, apneic and pulseless - CPR is to be initiated. Next, defibrillator pads are to be applied to the patient's chest, to the right of the sternum, just below the clavicle and at the left mid-axillary line between the 4th and 6th intercostal spaces, and the AED turned-on. CPR **must not** be allowed to delay defibrillation.

The Life-pak 200 and 300 use defibrillator pads which must be first, placed on a firm surface to allow the patient cable to be snapped onto the pads and then applied to the patient's chest. The Zoll 1600 uses pre-wired pads, which allows them to be applied to the patient's chest and then connected to the patient cable.

Once the pads have been applied to the patient and the AED turned-on, CPR must be stopped and the "Analyze" button pressed. If a "Shock Advised" message appears on the AED display, wait for the AED to charge and display the "Shock" or "Shock Now" message. Once the AED is charged and ready to shock, give a verbal warning for everyone to "stand clear" of the patient, visually confirm that no one is in contact with the patient and then press the "Shock " button to defibrillate the patient.

Repeat this process twice, the first two shocks are to be given at 200 joules (j), and the third at 360j. **Do not** check the patient's pulse between shocks, shocks should be "stacked" or rapidly administered in a series of three. After three shocks have been administered, check for a pulse. If no pulse is detected, resume CPR for 60 seconds. If a pulse is detected, monitor and assist the patient's respirations as necessary.

During this time, speak into the AED to record your name and assignment that day, the date, time, and location, the age and gender of the patient, the patient's condition on your arrival (e.g., "unconscious, unresponsive, apneic and pulseless"), the number of shocks delivered and the patient's present condition (e.g., " pulseless, CPR in progress" or "unconscious, palpable pulse, assisting respirations"). As the incident progresses continue to periodically speak into the AED to record your actions (e.g. pulse check, CPR, suctioning, etc.) and the patient's condition.

If CPR has been resumed after three shocks, stop CPR after 60 seconds and proceed with a second series of three shocks at 360 j. After the second series of three shocks, check for a pulse. If no pulse is detected, resume CPR until paramedics are on-scene. Once paramedics are on-scene, administer a third and final series of three shocks at 360 j.

If during a series of three shocks, the AED advises "No Shock", check for a pulse. If the patient has no pulse, resume CPR for 60 seconds and then reanalyze. If this sequence of events repeats three (3) consecutive times, perform CPR for one to three minutes and

then reanalyze. If shock is advised, resume the defibrillation sequence where it was stopped. If no shock is advised, continue CPR for one to three minutes and reanalyze.

Continue this sequence until the arrival of paramedics or until the maximum number of shocks (6) have been administered.

If the maximum number of shocks have been administered and the paramedics are not on scene and EMT transportation is available, EMT-I's should transport the patient, if the transport time to the hospital is less than the ETA of the paramedics to scene and the paramedics agree to EMT transportation. In this situation, **EMT-I's must make every effort to notify the receiving facility of their ETA and the patient's condition.** This will allow the receiving hospital to prepare to receive the patient and is essential to providing optimal care to the patient when they arrive at the hospital.

If the patient is transported prior to the arrival of paramedics, the EMT-I who defibrillated the patient, must accompany the patient to the closest basic emergency medical facility. Hospital closure does not affect patient destination when an EMT-I transports a patient in cardiac arrest, except for closure due to internal disaster.

If paramedics are on-scene when the defibrillator advises "No Shock", the EMT-I shall check for a pulse and if there is no pulse, resume CPR and have the paramedics assume responsibility for defibrillation. Because the Life-Pak 200 can only be operated in the automatic mode, the EMT-I in charge of defibrillation must immediately remove the defibrillation pads from the patient so that the paramedics can apply the paddles from their manually operated defibrillator. This will allow the paramedics to analyze the patient's cardiac rhythm and defibrillate, if necessary. If the Life-Pak 300 or the Zoll 1600 is in use, the pads are to be left in place and the AED switched from "semiautomatic" to "manual" mode by the paramedics. This will allow the paramedics to monitor and defibrillate the patient without changing equipment.

When paramedics are on-scene, EMT-I's must always defer to the paramedics in any question or decision regarding patient care.

## **V. Special Considerations**

Defibrillating a patient on a conductive surface or in the presence of water is dangerous. Remove the patient and yourself from any conductive surface or wet area and dry the patient **before** applying the defibrillator pads.

Defibrillator pads will only adhere to dry, hair-free skin. If the patient is sweaty, dry the skin before applying the pads. If the patient has chest hair, the area where the pads will be placed must be shaved before applying the pads.

Nitroglycerin patches can cause arcing between the defibrillator pads resulting in burns to the patient. Nitroglycerin pads must be removed and any residual paste wiped off prior to defibrillation.

Defibrillator pads must **never** be placed directly over a cardiac pacemaker. Placing a pad over a pacemaker may cause the electrical current from the defibrillator to be more directly transmitted to the heart resulting in damage to the myocardium.

If there is any concern about the safe operation of the AED, it shall not be used.

If the AED fails during a resuscitation, and paramedics are not on-scene, continue basic life support and advise the responding paramedic unit to bring their defibrillator to the patient. If EMT transportation is available and the ETA to the hospital is shorter than the paramedic ETA to the scene, with the agreement of the responding paramedic unit, the patient may be transported to the closest emergency room.

If the patient becomes apneic and pulseless during ground transportation, bring the vehicle to a complete stop in order to allow the AED to analyze the patient's cardiac rhythm. Because of the confined space in an ambulance, special caution must be observed to ensure that everyone is clear of the patient and the stretcher prior to defibrillation.

If a physician is on-scene or arrives on-scene, continue to follow the *EMT I D Protocols* (attached). When paramedics arrive, they will follow the *Physician-at-Scene* policy, outlined in Book 33, the PreHospital Care Policy Manual, Reference 816.

## **VI. Documentation**

Documentation of EMT-I defibrillation consists of both written reports and an audio recording from the AED. For every incident involving the use of the AED, an F-901 Rev. (7/98), Cardiac Arrest Outcome Data Sheet and an F-902M, Emergency Medical Service Report, must be initiated. (**Use only the F-901 Rev. (7/98)**, previous revisions of the F-901 and the F-905 must not be used.) The cassette tape from the Life-Pak 200 or 300 and the F-901 Rev. (7/98) and the F-902M must be given to the paramedics in charge of the cardiac arrest. The PCMCIA\* card from the Zoll 1600 is to **remain in the AED** until it can be either downloaded through the Wide Area Network (WAN), if available, or exchanged with the EMS District Captain for a blank card. **PCMCIA cards are not to be forwarded through Department Mail.** Because of the limited capacity of the cassette tapes (30 minutes) only one run should be recorded on each tape. Since the PCMCIA cards have a greater capacity (two hours), if necessary, more than one run can be recorded on the card.

\* Personal Computer Memory Card International Association

If EMT-I's transport prior to the arrival of paramedics, the responsible EMT-I shall forward the F-901 Rev. (7/98), the yellow copy of the F-902M and the cassette tape, if a Life-Pak 200 or 300 was used, directly to the appropriate EMS District Office.

## **VII. Testing**

The AED is to be tested for proper function, and the battery replaced each morning and after every use. **Use a separate cassette tape when testing the Life-Pak models. Remove the PCMCIA card when testing the Zoll 1600.** Document the test and status of the AED in the station or company journal (F-2).

If the AED fails to perform properly, immediately remove the unit from service and request a replacement unit from the EMS District Captain.

The LifePak 300 and the Zoll 1600 both have internal clocks, which must be reset in the spring and in the fall coinciding with the change from standard time to daylight saving time and from daylight saving time to standard time. This is to be accomplished by following the directions in the Operator's Manual supplied with the AED. The internal clock is to be set to the time displayed on the MDT on the apparatus. This will assure, as nearly as possible, that all AED's are set to the same time as OCD.

## **VIII. Supplies**

Station/Section Commanders shall ensure that an adequate stock of supplies for the AED is available in quarters at all times. At a minimum, a 30 day supply is to be maintained at all times. Prep razors, defibrillator pads, Cardiac Arrest Outcome Data Sheets (F-901 Rev, 7/98), and EMT-ID Skill Sheets (F-907) are ordered from Supply and Maintenance Division using a Stores Requisition Form (F-80) and the following stock code numbers:

Razor Patient Prep	#8650067	EA
Pad Defibrillator (Life-Pak)	#8602016	PR
Pad Defibrillator, Zoll		
Adult	#8612000	PR
Pediatric	#8602003	PR
Cardiac Arrest Outcome Data Sheet (F-901 Rev. 7/98)	#8503000	PD
EMT-m Skill Sheet (F-907)	#8503003	PD
Audio cassettes should be ordered six at a time from the Photo-Video Section using an F-80.		
C-60 Standard Audio Cassette		EA

The PCMCIA card used by the Zoll 1600 is reusable and cannot be ordered through supply channels. If a PCMCIA card is damaged or lost, contact the concerned EMS District Captain for direction.

## **IX. Conclusion**

Early defibrillation has consistently been shown to be the single most important factor in the resuscitation of patients in cardiac arrest. The sooner after the cardiac arrest a patient is defibrillated the more likely the patient is to be resuscitated. For every minute that defibrillation is delayed, the patient sustains a 10% reduction in their chances for survival. Providing EMT-I level defibrillation reduces the time between cardiac arrest and defibrillation thereby increasing the patient's chances for survival following cardiac arrest. The importance of this treatment cannot be overstated.