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# **AUTOMATED EXTERNAL DEFIBRILLATOR**



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# **AUTOMATED EXTERNAL DEFIBRILLATOR**

## **TOPIC**

The Defibrillator Committee of the Los Angeles County 2014–2015 Civil Grand Jury (CGJ) evaluated the feasibility of expanding the installation of Automated External Defibrillators countywide.

## **BACKGROUND**

One of the statutory mandates of the CGJ is to “inquire into the condition and management of the public prisons within the county” (California Penal Code Section 919(b)). In doing so, the CGJ discovered that Automated External Defibrillators (AEDs or defibrillators) were installed in some but not all detention facilities. This inconsistent presence and use piqued the interest of a group of jury members. Which cities and agencies budgeted for and purchased AEDs while others did not, and why, became one of the jury’s investigations.

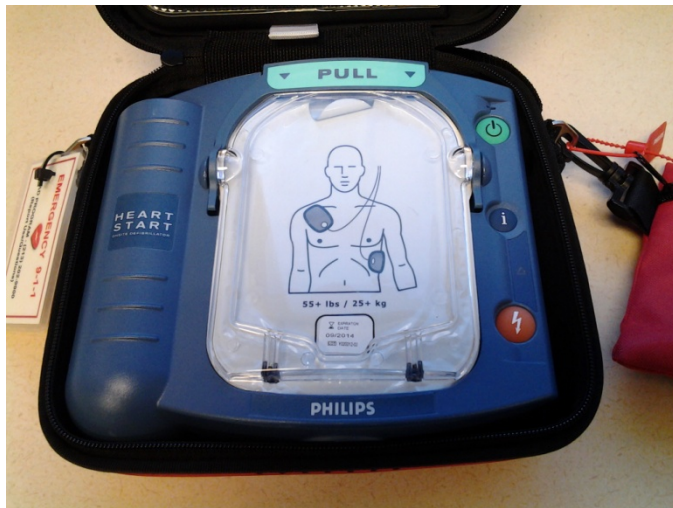
The Defibrillator Committee (committee) of the CGJ was thus formed. In speaking with the custodial staff, police, and sheriffs staffing the facilities, the committee began to consider a more widespread installation of AEDs—in detention facilities and in police vehicles.

As the committee learned more about the functioning of AEDs and the legal requirements for their installation and use by peace officers, the committee took a larger look at a more widespread use of AEDs and began to explore the feasibility of placing defibrillators in county buildings with “public access.”

## **RESEARCH**

### **1. Introduction**

Defibrillation is a health treatment that provides a dose of electricity to the human heart. A defibrillator is a computerized device that delivers this dose. Specifically, an AED is a device, packed in a small suitcase, that when opened and applied can check the heart’s rhythm, recognize whether that rhythm needs a shock, and advise the rescuer when shock is needed. Most AEDs use recorded voices, lights, and text messages to prompt the rescuer regarding its application.



A Philips-brand Automated External Defibrillator, open and ready for use.

Photo courtesy of Los Angeles City Fire Department

Obviously an AED does not work to revive all downed victims. It does not “restart” the heart. It corrects only ventricular fibrillation, a rhythmic disturbance in the heart. For example, it does not revive hearts that have stopped because the patient was hit by a car, drowned, or suffers from heart disease.

Providers of the device—such as Philips, which supplies the city of Los Angeles (city) with AEDs—say no training is needed for members of the public to apply an AED to a fallen victim. According to medical personnel the committee interviewed, however, lay persons who

have been coached on use of an AED are more likely to begin to use, and then successfully use, the device. In addition, say the medical personnel, at least two people should be available to the victim: one to apply the AED and one to seek further emergency medical services (EMS) help.

State and local laws mandate and regulate training of peace officers in the use of AEDs. As set forth immediately below (Section 2, Statutory Schemes), the laws governing the training are many and detailed. The statutory schemes require, in general, approximately 20 hours of first-aid training, plus approximately 12 hours of retraining per year.

As the CGJ began its inspections of local jails and lockups, it became apparent that not all had AEDs onsite. Of the facilities furnished with AEDs, only some of the custodial personnel present during the inspections recalled being trained on use of the device. Other custodial personnel knew the device was somewhere onsite but could not quickly find it.

## **2. Statutory Schemes**

Statutory requirements for installation and use of AEDs by peace officers are set forth in California Health and Safety Code and California Code of Regulations.

### **a. Health and Safety Code**

California Health and Safety Code, Division 2.5, Section 1797.196 (effective January 1, 2013), lists the steps to be taken to ensure public safety in the hands of “any person who acquires an AED.” In summary, this requires:

- complying with regulations governing training on, use of, and placement of AEDs;
- notifying an agent of the local EMS agency of the existence, location, and type of AED acquired; and
- ensuring all of the following:
  - (1) that expected AED users complete a training course in cardiopulmonary resuscitation and AED use that complies with regulations adopted by the EMS authority and the standards of the American Heart Association or the American Red Cross;
  - (2) that the defibrillator is maintained and regularly tested according to the operation and maintenance guidelines set forth by the manufacturer, the American Heart Association, and the American Red Cross, and according to any applicable rules and regulations set forth by the governmental authority under the federal Food and Drug Administration and any other applicable state and federal authority;
  - (3) that the AED is checked for readiness after each use and at least once every 30 days if the AED has not been used in the preceding 30 days. Records of these periodic checks shall be maintained;
  - (4) that any person who renders emergency care or treatment on a person in cardiac arrest by using an AED activates the emergency medical services system as soon as possible, and reports any use of the AED to the licensed physician and to the local EMS agency; and
  - (5) that there is involvement of a licensed physician in developing a program to ensure compliance with regulations and requirements for training, notification, and maintenance.

**b. Code of Regulations**

California Code of Regulations, Title 22, Division 9, regulates prehospital emergency medical services. Chapter 1.5, Section 100011 et seq. sets forth first aid standards for public safety personnel.

The statutory scheme defines peace officer as any city police officer, sheriff, deputy sheriff, peace officer member of the California Highway Patrol, marshal or deputy marshal or police

officer of a district authorized by statute to maintain a police department, or other peace officer required by law to complete the training specified in this chapter.

In summary, Chapter 1.5 provides:

- The initial training requirements shall be satisfactorily completed within one year from the effective date of the individual's initial employment and, whenever possible, prior to assumption of regular duty.
- The initial course of instruction shall at a minimum consist of not less than 15 hours in first aid and six hours in cardiopulmonary resuscitation.
- Public safety personnel may use an AED when authorized by a public safety AED service provider. Training for the AED shall consist of not less than four hours and shall include the following topics and skills:

Proper use, maintenance, and periodic inspection of the AED.

The importance of cardiopulmonary resuscitation (CPR), defibrillation, advanced life support (ALS), adequate airway care, and internal emergency response system, if applicable.

Overview of the EMS system, the local EMS system's medical control policies, 9-1-1 access, and interaction with EMS personnel.

Assessment of an unconscious patient, to include evaluation of airway, breathing, and circulation to determine cardiac arrest.

Information relating to AED safety precautions to enable the individual to administer a shock without jeopardizing the safety of the patient or rescuers or other nearby persons.

Recognition that an electrical shock has been delivered to the patient and that the defibrillator is no longer charged.

Rapid, accurate assessment of the patient's post-shock status.

The appropriate continuation of care following a successful defibrillation.

In addition, Chapter 1.5 of the Code of Regulations requires that, in order to be authorized to utilize the defibrillator, a peace officer shall pass a written and skills examination with a pre-established standard, which tests the ability to assess and manage the specified conditions listed in this section.

Pursuant to Section 100020, a local EMS agency that approves public safety AED service providers must:

- Approve and monitor training programs including refresher training within its jurisdiction to assure compliance with this chapter.
- Approve the written and skills exam required for AED training course completion.
- Develop policies and procedures for approval of AED instructors by the local EMS agency medical director. To be authorized to instruct public safety personnel in the use of an AED, an AED instructor shall either:

Complete an American Red Cross or American Heart Association recognized instructor course (or equivalent) including instruction and training in the use of an AED, or

Be approved by the local EMS agency director and meet the following requirements:

1. Be AED accredited or able to show competency in the proper utilization of an AED, and
2. Be able to demonstrate competency in adult teaching methodologies.

Establish policies and procedures for medical control pursuant to Section 1798 of the Health and Safety Code.

Establish policies and procedures for the approval and designation of public safety AED service provider(s) which will include requirements that public safety AED service providers have policies and procedures, approved by the local EMS to:

- (1) Provide orientation of AED accredited personnel to the AED,
- (2) Ensure continued competency of AED accredited personnel, and
- (3) Collect and report data, as required by the local EMS agency but no less than annually, to the local EMS agency, pursuant to Section 100021.

Establish policies and procedures to collect, maintain and evaluate patient care records.

Report annually to the EMS Authority on:

The total number of patients, defibrillated, who were discharged from the hospital alive, and

The data collected by public safety AED service providers pursuant to Section 100021 of this chapter.

In addition, Sections 100021 and 100022 regulate public safety AED service providers (an agency or organization that employs individuals as defined in Section 100015, and who obtain AEDs for the purpose of providing AED services to the general public). The pertinent sections cover maintenance, training and retraining, and data collection and reporting.

### **c. “Good Samaritan Law”**

The so-called Good Samaritan Law, California Health and Safety Code Section 1799.100 et seq., limits liability for members of the public who attempt emergency care at the scene of an emergency. The Good Samaritan Law does not apply to peace officers working in the course and scope of their job. So each entity looking into installing an AED would be considering incurrence of liability for misuse or failure to use the device.

### **3. Interviews**

Everyone the committee interviewed noted the usefulness of AEDs as a lifesaving device. “The more the better,” said a high-ranking medical director in speaking generally about more widespread installation and use of the devices.

But in investigating the use of AEDs in a Public Access Defibrillator (PAD) program, the committee learned of the limits of the device and the restrictions imposed on PAD programs.<sup>1</sup>

According to officials in the Chief Executive Office’s Risk Management Branch, the County of Los Angeles (county) does not mandate countywide the implementation of defibrillator devices in all departments. The county policy is department specific—discretionary only based on each department’s budgetary allocation.

According to the city Fire Department, each year about 10,000 deaths from cardiovascular causes occur in Los Angeles County. Most of these occur in a private setting; only 20 percent to 25 percent occur in a public setting. Sudden cardiac arrest occurs in one in 1,000 people per year.

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<sup>1</sup> PAD programs place AEDs in public and/or private places where large numbers of people gather or where people who are at high risk for heart attacks live.

So, for example, in a governmental department of 100 employees, a sudden cardiac arrest will occur once every 10 years.



An example of an AED (white box on wall) and an identifying sign above it, in the hallway of a city office.

Photo courtesy Los Angeles City Fire Department

According to the Los Angeles County Fire Department, the typical person revived by AEDs is a “slightly overweight male, 50s, hypertensive, diabetic, showing symptoms of indigestion, dropping dead.”

For an AED to be effective, the victim’s collapse probably should be witnessed to provide the quickest possible response. This narrows the effectiveness of the therapy to a smaller window. Every minute that passes while the victim remains unconscious reduces his or her chances of survival by 10 percent.

The device costs \$970 or \$1,255 per unit, depending on which product is purchased.<sup>2</sup> This amount does not include the statutorily mandated training, inspection, and maintenance involved for every device. Inspection involves, for example, ensuring that access to the devices is not obstructed. Maintenance includes replacement of the device’s pads, which dry out, and batteries. In public spaces, a designated site coordinator is responsible for notifying the medical coordinator of needed maintenance.

An AED must be applied to bare skin before the device can start. This requires a rescuer willing and physically able to swiftly remove the victim’s upper-body clothing, and possibly shave the victim’s chest, in a public place.<sup>3</sup> In conducting a small survey of members of the public, the committee found that persons not trained on use of the device are afraid to attempt defibrillation because they don’t want to further hurt the victim.

<sup>2</sup> These figures are based on the city of Los Angeles’s current contract with its PAD provider, Philips. The contract expires shortly. The city program expects the cost of each unit to rise. The higher-priced unit is better-suited for use on children. However, according to a city representative, in the nearly 15 years the city program has been in place, no AED has been used on a child.

<sup>3</sup> The AED comes equipped with, among other things, a razor.

#### **4. Considerations in implementing a PAD program**

##### **a. Planning for and placement of devices**

According to an official with the Los Angeles County Fire Department, the critical question for planners involved in a PAD program is where to place the devices. As stated above, quick response time is a major factor in success rates for AEDs. Studies show that the critical time for revival is the application of an AED within two to three minutes of the victim's ventricular fibrillation—in other words from the time the victim falls until he or she is revived.

##### **b. Lessons from the city of Los Angeles PAD program**

The city of Los Angeles first explored a PAD program in 1999. The City Council adopted its current program in 2000. Currently, the program covers 1,300 AEDs in city facilities. Many city facilities used by the public do not have AEDs onsite.

According to city officials, in 2014 in the city of Los Angeles, AEDs were used for 11 incidents out of 1,300 units, which is less than a 1 percent usage. Since 1999, there have been 89 incidents of use. In 45 of the 89 incidents, a pulse came back. Of those patients, 14 were saved and returned home; three died in hospital, and the outcomes of 28 were not followed and are unknown.

According to city officials, to install an AED requires significant infrastructure. The city is experiencing serious fiscal problems. Some of the AEDs haven't been touched in five years and are now a liability. The city is instructing those departments to pull them off the walls.

The city department responsible for installation, training, inspection, and maintenance is a one-person operation. This person handles phone calls and drives to each facility throughout the city, replacing pads and batteries according to a schedule she keeps. The city's PAD program's budget is less than \$100,000 per year. This includes training, and training involves sanitizing the mannequins used for training, which requires special cleaning equipment.<sup>4</sup>

The City Council Public Safety Commission recommended placement of AEDS in peace officer squad cars, but not for the purpose of being first responders. A city official knowledgeable about the program reports the existence of “confusion” as to why the commission recommended this installation. This source referred to the program as “cost-prohibitive” and in the “high seven figures,” exclusive of training.

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<sup>4</sup> For each student who practices on a mannequin, a new, clean set of lungs must be installed in the mannequin. The mannequins must be transported to training sites by van, an additional cost.

The committee brought information on the city's PAD program to county officials for comparison. Approximately 4,000 buildings are considered "Los Angeles County buildings." No one interviewed from the county could estimate the number of those that are "public access." Were the county to install AEDs in each of its buildings with public access, the number would far exceed that of the city's program. Clearly, one person alone could not handle installation, training, inspection, and maintenance for a county program.

### **c. AEDs compared with other heart-starting methods**

According to medical staff with the county Department of Public Health, most of the time the heart stops, at least in Los Angeles County, the cause is Coronary Artery Disease. Obviously, reducing factors that cause Coronary Artery Disease will reduce the number of times people have a cardiac arrest.

Under 50 percent of heart attacks occur for electrical reasons. Defibrillation can restart some but not all of those hearts. Of those that are restarted, only a portion will respond to further medical care.

According to county Fire Department and Sheriff's Department sources, Cardiopulmonary Resuscitation (CPR) data show CPR is more successful than AEDs in saving lives. CPR is considered essential in the "chain of survival."<sup>5</sup> Concerning the placement of AEDs in the hands of peace officers, fire personnel stated, "It's better to get police to do CPR until the fire department gets there" armed with an AED.

No matter whether the AED was applied by a civilian or a peace officer, the presence of paramedics is vital once the heart is restarted.

### **d. Alternative life-saving practices of use in the county**

The County Fire Department is moving to teach hands-on-only chest-compression in high schools.

Meanwhile, emergency rooms across the county have been closed. According to a public health official, "We need open emergency departments. And we're still smoking [cigarettes]. So the AED will do little." According to this official, cessation of smoking would produce a 50 percent reduction in sudden death.

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<sup>5</sup> In the "chain of survival," the following are essential, in order of importance: the collapse of the victim is witnessed, the collapse is witnessed and CPR is applied, an AED is applied, a paramedic is present onsite to take care of the victim, and the victim is transported to a hospital for post-arrest care.