

**The Bill Blackwood
Law Enforcement Management Institute of Texas**

Automated External Defibrillator (AED)

**An Administrative Research Paper
Submitted in Partial Fulfillment
Required for Graduation from the
Leadership Command College**

**By
Stephen P. Foley**

**The University of Texas Health Science Center at San Antonio
San Antonio, Texas
June 2007**

ABSTRACT

The purpose of this research is to see if it is feasible to put Automated External Defibrillators (AED) in law enforcement agencies first responding patrol vehicles. Most law enforcement first responding patrol units are usually the first on scene at emergencies. In the case of sudden cardiac arrest victims, minutes count when it comes to their survival. By having an AED in the patrol unit, the officers can attach the AED to the victim upon their arrival and give the victim a fighting chance at survival.

Information about AEDs will be researched by reviewing sources such as: The American Heart Association, other national agencies, current legislation on laws pertaining to AEDs, instructors in CPR and AED use, and AED manufacturers. The outcome will show that AEDs are now smaller, portable and easier to use. With new technology, the prices of the units are becoming more affordable. The rate of Sudden Cardiac Arrest is increasing as the baby boomers grow older. Current laws now protect the trained officer using an AED under the Good Samaritan Act. Funding is available through government federal and state grants, as well as other sources in the community. Training is available through AED manufactures, medical technicians, EMS facilities, medical universities, and hospitals to educate and inform first responders on there use and capabilities.

With all of these recourses available to the law enforcement agencies, it would be feasible for some first responder patrol vehicles, if not all, to be equipped with the AEDs.

TABLE OF CONTENTS

	Page
Abstract	
Introduction.	1
Review of Literature	2
Methodology	10
Findings	11
Discussions/Conclusions	12
References	14

INTRODUCTION

With the introduction of the Automated External Defibrillator (AED) the potential for saving lives of sudden cardiac arrest victims has increased. In the past when first responding Law Enforcement officers arrived to a sudden cardiac arrest victim, the only option was to call for Emergency Medical Services (EMS), and begin cardiopulmonary resuscitation (CPR) until EMS arrived. Now with the introduction of the AED, first responding Law Enforcement officers have another tool at their disposal in the CPR process.

The purpose of this research is to see if it is feasible for first responding law enforcement patrol vehicles to be equipped with the AED. The question being examined 'should the AED be standard equipment in first responding law enforcement patrol vehicles'. In many cases, first responding personnel will be law enforcement officers, and if equipped with the AED, will give the sudden cardiac arrest victim a better chance to survive.

The method of inquiry into the subject will include review of literature and other written material about the AED, interviews with qualified instructors on the AED, and information from AED manufacturers.

Current laws will be reviewed on the liability the law enforcement officers may incur when using the AED in an emergency situation when CPR is needed to revive a sudden cardiac arrest victim.

Literature will be examined on the cost of the AED and what programs may be available to assist law enforcement agencies acquire the AED at a reduced cost and what grants may be available. Review what training is required for the law enforcement

officer to use the AED while on duty through the American Heart Association, other national agencies, and AED manufacturers. The outcome of the research should show an AED used by trained law enforcement officers in the CPR process will greatly increase the chances of survival for the sudden cardiac arrest victim.

REVIEW OF LITERATURE

In today's society, law enforcement patrol officers respond to a variety of incidents and emergencies, from shootings and vehicle accidents to the neighborhood cat caught up in a tree. The patrol officer takes action according to his training and experience. Of the different types of calls the patrol officer responds to, one that will challenge their training and knowledge is the response to a sudden cardiac arrest (SCA) victims. Once at the scene the officer, if trained in cardiopulmonary resuscitation (CPR) will do an assessment of the victim by checking if there is any response to verbal or physical touch. If not, they will then begin airway, breathing and circulation (ABC) checks. If none, they will begin CPR until the victim is responsive, until relieved by another person trained in CPR, or until EMS arrives. The value of early CPR by bystanders is that it can "buy time" by maintaining some blood flow to the heart and brain during cardiac arrest (AHA, 2007).

With the introduction of the Automated External Defibrillator (AED), another tool has been introduced to assist in the CPR process.

Sudden cardiac death (also called sudden cardiac arrest) is death resulting from an abrupt loss of heart function (cardiac arrest). The victim may or may not have diagnosed heart disease. The time and mode of death are unexpected. It occurs within minutes after symptoms appear. The most common underlying reason for patients to

die suddenly from cardiac arrest is coronary heart disease (fatty buildups in the arteries that supply blood to the heart muscle).

About 325,000 people die of coronary heart disease without being hospitalized or admitted to an emergency room. That's about half of all deaths from coronary heart disease – more than 890 Americans each day. Most of these are sudden deaths caused by cardiac arrest (AHA, 2007).

In sudden cardiac arrest, the heart abruptly and unexpectedly ceases to function (cardiac arrest). It is an 'electrical problem' caused by a heart rhythm disorder called Ventricular Fibrillation (VF). In SCA, the heart is no longer able to pump blood to the rest of the body. SCA is NOT a heart attack – a condition technically known as a myocardial infarction (MI). MI is a "plumbing problem" in which a blockage in a blood vessel interrupts the flow of blood to the heart causing an "infarct" – area of dead heart muscle. SCA may, however, occur in association with a heart attack. VF occurs when the electrical signals that control the pumping ability (contractions) of the lower chambers of the heart (ventricles) suddenly become rapid and chaotic. The ventricles begin to quiver and can no longer pump blood from the heart to the rest of the body. SCA is NOT a random event. Although it may occur in outwardly healthy people, most victims DO have heart disease or other health problems, often without being aware of it. Without emergency care help, SCA leads to death within minutes. Victims of cardiac arrest can be saved if a defibrillator device is immediately available to deliver an electric shock to restore the heart to its normal rhythm. (HRF, 2007).

A defibrillator is the only known device/technique that stops the chaotic electrical heart activity and allows the heart to re-pace itself to a normal rhythm. Occasionally,

the heart will re-pace itself (5% of incidents); and if the patient has received CPR in this instance; a patient will survive. Utilizing a defibrillator increases the odds of survival from 5% with just CPR to as much as 80% if a defibrillator is placed on the patient within a few minutes of sudden cardiac arrest. (Bock, 2007).

Every minutes counts. Typically, only 5 to 10 percent of people struck down by sudden cardiac arrest survive. But if people in ventricular fibrillation (VF) get the life saving AED shock within 3 minutes of collapsing, the survival rate can increase to 74 percent. Reducing response time by even 1 or 2 minutes from collapse to shock can mean the difference between death and survival (Metronic, 2007).

That means there can be no delay in the chain of survival. The chain of survival is a four step concept to help improve survival from cardiac arrest: early access, early CPR, early defibrillation, and early advanced care (Thygerson, 2006, p. 36).

The 'Baby Boomers' are persons born from 1946 to 1964. (AHA, 2007). With the increase of new technology the older generation is living longer and are better prepared for the aging process. With the baby boomers aging, the chances for a greater number of people experiencing cardiac arrest increases.

There are many causes of cardiac arrest, these are Myocardial Infarction (heart attack), some kinds of arrhythmias (abnormal heart rhythms), severe blood loss from traumatic injury or internal bleeding, electrical shock injury, lack of oxygen from events like choking, drowning, or a severe asthma attack, cardiogenic shock (heart failure because of inadequate heart pumping function), stroke (sudden loss of blood supply in the brain), heart valve or heart muscle disease, and certain genetic disorders that affect the heart (JAMA, 2006).

Some of this new technology is the introduction of the automated external defibrillator. In 1956 the first external defibrillation in a human was reported (Jevon, 2002, p. 78). AED's are computerized devices that are now about the size of laptop computers. The first out-of-hospital defibrillation device weighed 110 pounds, today they weigh less than 8 pounds. (AHA, 2007). The cost of an AED is between 900 to 2,000 dollars depending on the unit, which is about the same as radar units, or radios. An AED is a device used to administer an electric shock through the chest wall to the heart. Built-in computers assess the patient's heart rhythm, judge whether defibrillation is needed and then administer the shock. Audible and/or visual prompts guide the user through the process. A microprocessor inside the defibrillator interprets (analyzes) the victim's heart rhythm through adhesive electrodes. (Some models of AED's require you to press an analyze button.) The computer analyzes the heart rhythm and advises the operator whether a shock is needed. AED's advise a shock only for ventricular fibrillation and fast ventricular tachycardia. (Fast ventricular tachycardia is a life-threatening arrhythmia in which the contractions of the heart are ineffective. As in VF, an electrical shock can correct this condition.) The electric current is delivered through the victim's chest wall through adhesive electrode pads. AED's strengthen the chain of survival. They can restore a normal heart rhythm in sudden cardiac arrest victims. Also, new portable models allow more people to respond to a medical emergency where defibrillation is required. When a person suffers a sudden cardiac arrest, each minute that passes without defibrillation, their chances of survival decrease by 7-10 percent (AHA, 2007).

An AED is safe to use by anyone who's been trained to operate it. Studies have shown the devices to be 90 percent sensitive (able 90 percent of the time to detect a rhythm that should be defibrillated) and 95 percent specific (able to recommend not shocking when defibrillation is not indicated). Because of the wide variety of situations in which they will typically be used, AEDs are designed with multiple safeguards and warnings before any energy is released. AEDs are programmed to deliver a shock only when they have detected an irregular heart rhythm called ventricular fibrillation or fast ventricular tachycardia. However, there are potential dangers associated with AED use. That's why training-including safety and maintenance – is important. An AED will almost never decide to shock an adult victim when the victim is in non-VF. AEDs 'miss' fine VF only about five percent of the time. The internal computer uses complex analysis algorithms to determine whether to shock. If the operator has attached the AED to an adult victim who's not breathing and pulseless (in cardiac arrest), the AED will make the correct 'shock' decision more than 90 times out of 100 and a correct 'no shock indicated' decision more than 95 times out of 100. This level of accuracy is greater than the accuracy of emergency professionals who must read and interpret the rhythms (AHA, 2007).

When using an AED, the user must have training in its use. As with any tool used by the law enforcement officer, such as firearms, non-lethal use of force devices, training is the key element in their use. Liability issues are a great concern for law enforcement officers in the field. The taking of a life or the saving of a life may have legal issues a police officer will have to face.

On November 13, 2000 President Clinton signed the federal 'Cardiac Arrest Survival Act', in H.R.2498, now Public Law 106-505, regarding the placement of AEDs in federal buildings and providing civil immunity for authorized users. If a Good Samaritan, building owner, or renter acts in good faith to purchase or use an AED to save a life, this law will provide protection from unfair lawsuits (NCSL, 2007).

CPR can be administered without fear of legal action. When one does chest compressions and rescue breathing, the victim must be touched, and the victim is often a stranger. Often the arrest victim dies. In the United States people may sue when they think that one person has harmed another. It is important for lay rescuers to know that they do not have to fear a lawsuit if they give CPR. No lay rescuer has ever been successfully sued for performing CPR because lay rescuers are "Good Samaritans" and are protected by "Good Samaritan" laws. All 50 states have Good Samaritan laws or regulations. These laws and regulations grant limited immunity to anyone who tries to give CPR in an honest, 'good faith' effort to save a life. A person is considered a Good Samaritan if the person is trying to help, the rescuer's actions are reasonable (you can't engage in gross misconduct-for example, doing something that no reasonable person would do), the rescuer does not receive specific compensation for performing CPR. Under most Good Samaritan laws, laypeople are protected if they give CPR even if they have had no formal training. All states now also grant Good Samaritan immunity to rescuers who use an AED. The states differ widely in the working of Good Samaritan regulation and legislation, especially in the conditions for immunity for AED providers and premises owners. Over time, as the public becomes aware of AED efficacy, the

table will turn from being more liable if you have an AED program to being more liable if you don't (Bennett, & Hess, 2001, p. 493).

Limited knowledge and negative attitudes of law enforcement officers regarding their involvement in treating out of hospital cardiac arrest and using AEDs are commonly present. These factors could result in barriers that negatively impact law enforcement AED programs (AEMC, 2007).

Training and knowledge is the key to law enforcement officer's attitudes towards life saving techniques. Unless officers received training in AED use at the police academy, they should take standard training classes that meet the guidelines of a nationally recognized program, such as the American Heart Association, the American Red Cross and the National Safety Council. Typically, classes are about four hours long and give officers both the skills and confidence to intervene in a cardiac emergency. Be sure the training complies with state and local regulations. Often, immunity from civil liability applies only to people who have been trained to use and AED. Options include having courses taught on-site by an independent training company, or at a convenient location in the community through local EMS, a local hospital or community college. Some agencies adopt a "train the trainer" approach, where credentialed staff members instruct the training course. Keep good records of the officers trained, and when they need refresher courses. Plan for renewal training as you would for other periodic in-service training. Retraining should occur at least every two years-sooner if your policy, procedures or equipment changes (Medtronic, 2007).

In many small law enforcement agencies, funding for an AED program can be difficult. In May 2002 President Bush signed into law the Community Access to

Emergency Devices Act (Community AED Act) within H.R.3448 (sections 159, 312 and 313) of the Public Health Security and Bioterrorism Response Act. The President signed the bill on June 12, 2002 as Public Law 107-188. The provisions authorized \$30 million in federal grants in year one of the five-year measure. The grants, to be made available to applying states and localities, would be used for the purchase and placement of AEDs in public places where cardiac arrests are likely to occur. Grant funds would also be used to train first responders to administer immediate life-saving care, including AED use and CPR (NCSL, 2007).

This law makes grants available to law enforcement agencies for assistance in the purchase of AEDs and provides funding available in the training of law enforcement officers. Besides the grants, other sources of funding could include local corporations, insurance carriers and industries that would benefit, business improvement districts or other taxing districts, health plans, local hospitals and hospital guild's, Civic organizations, such as Rotary, Elks, Eagles and Lion clubs, neighborhood Block Watch and other organizations that support police efforts, and private foundations (Medtronic, 2007).

With the many kinds of funding assistance available, it assists in law enforcement agencies starting an AED program. The American Heart Association has some guidelines for implementing a AED program for facilities which include an internal and external communication plan, with documentation of procedures, medical oversight and quality improvement, notification of EMS, selection, placement and maintenance of AED's, and designation and quality training of on-site responders.

Manufacturers of AEDs also have implementation guidelines which include having a project coordinator, reviewing laws and regulations or consult your agency's legal counsel or risk manager, coordinate with local emergency medical services, arrange for medical direction, plan how to dispatch AED-equipped officers, choose your equipment and vendor, design policies and procedures, assess how many AEDs you'll need and where they'll do the most good, develop and fund a budget for equipment, training and public relations, train officers and plan for refresher training. Once these are set up, then acquire and deploy AEDs and other supplies, promote your program to raise awareness and support, build quality assurance into your operation. No two law enforcement agencies or facilities will implement an AED program in exactly the same way (Medtronic, 2007). Ideally, the plan an agency chooses to use will benefit the area and local communities.

METHODOLOGY

The reason for this research is to see if it is feasible for law enforcement agencies to equip their first responding patrol vehicles with AEDs. By analyzing all the information I obtained on how important AEDs are for the survival of cardiac arrest victims anywhere in the United States. How well AEDs work and are portable enough for law enforcement officers to get them on the scene as quickly as possible. The way the laws have changed to avoid prosecution for any trained person in AEDs and the way the Good Samaritan law protects individuals acting in good faith to try and help someone having a cardiac arrest. The many ways of funding an AED program through community involvement and federal, state and local grants. Government organizations, AED manufacturers and EMS supply the necessary training available. I believe it is

possible for law enforcement agencies to equip, if not all, some of their first responding patrol vehicles with AEDs.

FINDINGS

With 325,000 people that die each year from coronary heart disease, and more than 890 Americans die each day, most of these from sudden cardiac arrest. This is one of the leading causes of death in the United States. It has become a serious problem, especially with the 'baby boomers' getting into their senior years. All of us at one time or another has had a friend, family member, or someone we know, die from sudden cardiac arrest. Now there is a safe, reliable device we can use when someone is struck down with a sudden cardiac arrest. The AED. With only 5 to 10 percent of people struck down by sudden cardiac arrest survive, and with the use of an AED, the odds of survival increase from 5 percent with just CPR to as much as 80 percent if a defibrillator is placed on the patient within a few minutes of sudden cardiac arrest. This means the odds have just risen for survival of victims of sudden cardiac arrest. With these kinds of statistics, it is imperative we find ways of getting the AED to the people. As law enforcement is usually the first on the scene in most cases, having the ability to save a victim of sudden cardiac arrest by taking an AED to the scene and possibly saving there life is what law enforcement officers can feel good about.

Laws in all 50 states have been enacted protecting the use of AEDs by trained personnel, including law enforcement officers. The Good Samaritan law has expanded to include the use of AEDs by trained personnel using 'good faith' and what a 'reasonable person' would do in trying to save a person. This lifts a burden off the

police officer responding knowing he will be able to do the best he can to help save the person without worrying about being sued.

Training classes and courses are offered by many agencies, as long as they meet guidelines set forth by the American Heart Association, American Red Cross and National Safety Council. The training usually lasts 4 hours. This can be accomplished by in-service classes and officers can schedule times where it won't interfere with their regular duties. The training includes CPR as well as AED training. After an officer receives the training he has a better understanding of how it works and has the confidence to go out and use them.

With funding available from federal and state grants, and local communities, departments should be able to implement an AED program in their agencies at a reasonable cost. AED manufacturers have guidelines on how to implement a program and can help in establishing a program for a department and community needs.

DISCUSSION/CONCLUSIONS

The purpose of the study is to see if it is feasible for law enforcement agencies to equip their first responding patrol vehicles with AEDs. With the increasing number of sudden cardiac arrests occurring in the United States today, and more to come with the aging of the baby boomers, the addition of a portable defibrillator allows the law enforcement officer the chance to save a life by arriving to the scene with the AED within minutes of the sudden cardiac arrest. They don't have to worry about being sued for using the AED while trying to save a life because they fall under the good Samaritan law as long as they have had the proper training required for their use. With the different kinds of funding available to agencies, the money question is no longer a

deterrent to implement a program. The training requirement for using the AED is usually a four hour course and gives the officer the knowledge and skills to use the AED in emergency situations. He will no longer have the fear about using an AED. With most of the obstacles for implementing an AED program reduced or eliminated, agencies can look at programs that best suit their needs. With technology increasing, the AED may become smaller and more portable and less expensive, and should result with many agencies looking at implementing an AED program. Most departments now have the ability to equip some, if not all, of their first responding patrol vehicles with the AED. This will benefit the community in which the agency responds to giving its citizens a better chance at surviving a sudden cardiac arrest.

REFERENCES

- Academic Emergency Medicine. (2007). *Attitudes of law enforcement officers regarding automated external defibrillators.*
- American Heart Association. (2007). *Cardiopulmonary resuscitation (CPR) Statistics.*
- American Heart Association. (2003). *CPR and AED use: legal and ethical issues.*
- American Heart Association. (2007). *Statistical fact sheet – Populations.*
- American Heart Association. (2007). *Sudden cardiac arrest.*
- American Heart Association. (2001). *Questions and answers about AEDs and defibrillation.*
- Bennett, W., & Hess, K (2001). *Management and supervision in law enforcement (3rd ed.).* California: Waldsworth/Thompson.
- Bock, J. (2007). *Winter 2007 report automated external defibrillators.*
- Heart Rhythm Foundation. (2007). *Sudden cardiac arrest key facts.*
- Jevon, P. (2006). *Advanced cardiac life support: a practical guide.* Great Britain: MPG books Ltd.
- Journal of the American Medical Association. (2006, January). *Cardiac Arrest*, 295(1).
- Medtronic Physio-Control. (2007). *Law enforcement AED implementation guide.*

National Conference of State Legislatures. (2007). *State laws on heart attacks, cardiac arrest & defibrillators.*

Thygerson, A. (2006). *First aid, CPR, and AED (5TH ed.). Massachusetts: Jones and Bartlett.*