What is an AED and Defibrillator Training – Quick Tips

Learn about AEDs, from appropriate use to required training.

According to the Centers for Disease Control and Prevention (CDC), nearly 600,000 people die each year from heart disease. Sudden cardiac death is a sudden, unexpected death caused by sudden cardiac arrest. It is responsible for half of all heart disease deaths.

Preventing death caused by sudden cardiac arrest requires fast action and a critical sequence of events, including early activation of the emergency medical services (EMS) system (calling 911), early cardiopulmonary resuscitation (CPR), early defibrillation and early advanced care at a medical facility. A fifth event in this sequence includes post-resuscitation care at a medical facility.

Administering CPR techniques and dialing 911 have been the way to respond to sudden cardiac arrest for years, but the use of automated external defibrillators can more than double a victim's chance for survival.

In the not so distant past, only highly trained individuals in hospitals or EMS personnel had access to manual defibrillators. But technology has now made it possible for nonmedical personnel to perform defibrillation in nonmedical settings. AEDs equipped with an internal computer interpret the heart rhythm to determine if a victim is in ventricular fibrillation (v-fib), a potentially fatal heart rhythm. If v-fib is indeed occurring, the unit instructs the user to press an activation button that causes defibrillation. In cases when the heart is in full cardiac arrest with no sign of v-fib, only medications can restore heart movement.

Operation

In a healthy heart, a natural “pacemaker” delivers organized electrical impulses that generate a steady repeating rhythm. When the heart goes into sudden cardiac arrest, random electrical impulses come from many locations within the heart simultaneously, causing an uneven heart rhythm. This uneven rhythm does not allow the chambers of the heart to fill and pump blood properly through the body. To restore a normal heartbeat, a defibrillator delivers a shock to the heart—momentarily stopping it—which interrupts the electrical chaos and helps restore a normal heartbeat.

Most AEDs operate in a similar manner. Two electrode pads are connected to the unit and the unit is activated. After a brief automatic internal check, the user can place the pads on the victim’s bare chest. The AED’s diagnostics determine whether defibrillation is required. If defibrillation is required, the unit instructs the user to clear the area around the victim and press an activation button. An AED delivers a 3000-volt charge in less than 0.001 of a second. That’s enough electricity to light a 100-watt bulb for 23 seconds. The unit then instructs the user to immediately begin CPR. After two minutes, the unit will perform another analysis to see if defibrillation is needed again.

Audible and/or visual prompts guide the user through the entire process so the possibility of error is very small. Studies indicate that AEDs are capable of accurately detecting v-fib and recommending a shock 90% of the time, and recommending no shock 99% of the time when not required. With this accuracy, an AED has a greater ability to diagnose v-fib than does an emergency response team.

Since an AED only restores a heart’s normal beating pattern, CPR is also required. Rescue breathing and chest compressions are needed to supply oxygen to the victim if breathing and heartbeats are not occurring. After the prescribed sets of breaths/compressions, the unit will analyze the motionless victim and determine if a shock is necessary.

During treatment, the AED records the data it detects on the patient’s condition. Some models can also record a live audio of the incident. This data can be transferred to the physician

treating the patient when he/she arrives at the hospital.

Training

AED manufacturers recommend users undergo training, which normally takes several hours. The defibrillators are so easy to use that most untrained users will be able to attach the pads, allowing the unit to analyze and provide shocks. However, users must still be taught when to use the AED, how to respond if a shock is not required and how to operate an AED safely.

Company Risk Factors

Many large facilities such as airports, sports stadiums and large workplaces are installing AEDs to increase the chance of saving lives.

In order to evaluate whether your facility would benefit from an AED, consider the following: How many people are at your site? Large numbers of people increase the likelihood that an AED would need to be used. What is the response time of the local emergency response service to get to the furthest place on your site? Traffic conditions, elevators, stairs and gates can all cost valuable time to negotiate. What type of workforce or visitor demographics does your facility encounter? Consider the health, age, fitness and stress levels of the people. Are workplace hazards present such as electrical or confined spaces? Electrical shock or asphyxiation could induce heart fibrillation. Is the facility in a remote area? Can an emergency response team reach these areas in time? Does your facility have an emergency response team already in place? If these teams are needed, it’s a good bet an AED would be of use someday.

Automated External Defibrillator Programs

An AED program is a natural extension of an existing first aid program. After purchasing a unit, you should contact your local hospital emergency department and consult with a physician. The physician is responsible for establishing appropriate policies and procedures for the use of the device. Specific requirements vary from state to state so it’s important to discuss details with your

AED supplier, physician or local American Heart Association, American Red Cross chapter or National Safety Council (NSC). Generally, programs contain the following topics:

- Periodic training and evaluation of the user on AED use, first aid and CPR
- Notifying the local EMS service of its presence and meeting their requirements
- Maintenance and regular testing of the AED according to manufacturer guidelines
- When emergency care is rendered to activate the EMS system
- Bloodborne pathogen training may also be required

Commonly Asked Questions

Q: Is liability a concern with AED use?
A: The majority of states have "good samaritan" laws that protect persons rendering good faith emergency treatment with an AED from civil liability. Check with your state's regulations to see about your protection.

Q: Are there specific regulations regarding AEDs?
A: While there are some laws and regulations concerning AEDs at the federal level (e.g., FDA, Congress, etc.), most of the regulatory activity in the past few years centers on the state and local level, where a greater availability of AEDs is encouraged. Most states allow a "Good Samaritan" exemption from liability for any individual who gives emergency treatment with a defibrillator. Here's a link to a comprehensive discussion of State Laws on Cardiac Arrest & Defibrillators.

Q: What is sudden cardiac arrest?
A: Sudden cardiac arrest occurs when the heart unexpectedly and suddenly stops beating normally. It is caused by abnormalities in the heart's electrical system that cause the heart to twitch quickly and chaotically. While twitching, the heart is unable to pump blood to the brain and body. It is commonly called ventricular fibrillation.

Q: Is sudden cardiac arrest the same as a heart attack?

A: No. A heart attack is caused by blood flow blockage to the tissue of the heart, causing the tissue to die. Persons having heart attacks often feel pain in the chest, upper abdomen and arms. Others signs include nausea and sweating. During a heart attack, the heart does continue to beat and pump blood. During cardiac arrest, the heart stops beating and pumping blood.

Q: What is the average useful life of an AED?
A: Typically, the useful life of AEDs is 5 to 10+ years. Every five years or so, the American Heart Association (AHA) and European Resuscitation Council (ERC) issue new or refined guidelines for resuscitation and upgrades may be needed in the AEDs or the software in order to meet the new guidelines.

Q: Is maintenance required?
A: Some maintenance is required. Obvious maintenance would be replacing the non-rechargeable lithium- oxygen battery (LiO2), which is warranted for four years from the date of installation, and pad replacement (two-year shelf life). These units self-test on a daily, weekly, monthly and annual basis. There is some maintenance associated with these self-tests, especially if the test indicates a failure in some mode. Usually, one would check to see if the unit passed the self-test. There are also visual and audible alarms. It is suggested that the voice prompts be checked monthly. The procedure for the annual test is a bit more extensive: opening the unit, unplugging the pads, etc. The protocols are given in the instructions.

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