Sudden Cardiac Arrest in the Workplace

Considerations in Assessing, Planning and Preparing

Automated external defibrillators (AEDs) are an important lifesaving devices and may have a role in workplace safety. The information is provided here is intended to provide you with some guidance in assessing your needs, as well as planning for and implementing an effective a workplace defibrillation program.

Cardiac Arrest in the Workplace, By the Numbers

Sudden Cardiac Arrest (SCA) is a serious health condition that can affect a seemingly healthy individual of any age at any time, often without warning. Each year, more than 356,000 people in the United States alone experience an out-of-hospital cardiac arrest.

According to OSHA, there are approximately 10,000 annual cases of sudden cardiac arrest in the work setting and accounts for 13% of workplace fatalities.

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As employers and safety professionals, we have a responsibility to see to the safety of our employees and those who visit our workplaces.

Cardiac Arrest Defined

Cardiac arrest is defined as a severe malfunction or cessation of the electrical and mechanical activity of the heart, and results in almost instantaneous loss of consciousness and collapse. **Following a cardiac arrest, each minute without treatment decreases the likelihood of survival with good neurologic and functional outcomes.** Thus, the consequences of delayed action can have profound, and in many cases, avoidable consequences.

Time is the Enemy

Time to CPR and defibrillation is essential and these two measures are proven to help improve outcomes. Immediate CPR followed by rapid defibrillation can double, even triple the chances of neurologically intact survival from this often times life ending condition.

Survival Defined

When we look to define survival, we mean that the victim survives to hospital discharge and is in essence able to return to doing all the things they did prior to having cardiac arrest.

Planning for Sudden Cardiac Arrest

In the words of Benjamin Franklin, “If you fail to plan, you are planning to fail”.

Injury and medical emergencies are a reality. Despite even the very best and rigorous prevention measures, they do happen, often without any warning.

Preparing for sudden cardiac arrest before it occurs is extremely valuable in ensuring that employers and workers have the necessary equipment, know where to go, and know what to do when an emergency occurs. These are critical elements of a functional Emergency Response Plan.

OSHA and a host of other reputable organizations have emergency response planning information as well as templates and resources that provide information on how to prepare and train for emergencies.

Do you have a plan? Is it written? Have you tested it? Do your employees know how to activate an internal and immediate response? Are there opportunities to improve?

These are important questions. Your answers to these questions play an integral role in your safety oriented quality improvement efforts.

Planning, Practice and Reevaluation

Having a plan to deal with disasters and workplace emergencies is essential. Whether a flood, fire, or medical or injury emergency, a plan is needed.

It is likely that you have a workplace emergency response plan already but is it practiced? Does it address sudden cardiac arrest? Have you evaluated the suitability of including an automated external defibrillator or AED? How often do you test and reevaluate your plans, equipment and performance?

OSHA standards and regulations notwithstanding, planning, testing and reevaluation are absolute musts in your ongoing and iterative efforts.

The Cost of Workplace Injuries and Fatalities

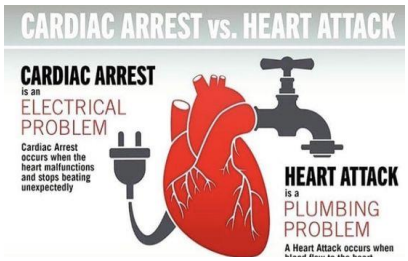
The costs associated with workplace injuries and deaths are staggering. From an economics perspective, workplace safety is an example of loss prevention. Preventing the loss of your most valuable assets, your people.

Ask yourself, how would the loss of one of your employees from sudden cardiac arrest impact your company? How about the loss of one of your customers or visitors?

Workplace safety is ideally a culture and transforms a company and employees into a team of people with a common goal. It is a win-win for everyone.

Heart Attack and Cardiac Arrest: Associated but Different

The term “heart attack” is often mistakenly used to describe cardiac arrest. Although a heart attack may lead to cardiac arrest and sudden death, the terms don’t mean the same thing.



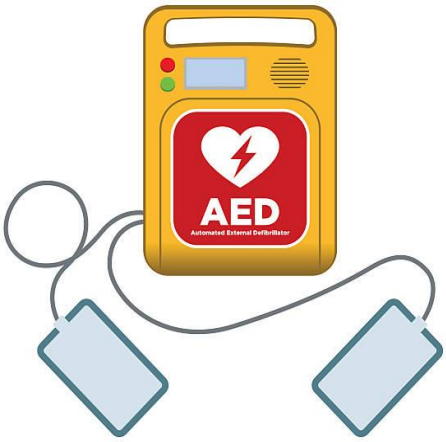
Heart attacks are caused by a blockage that stops blood flow to the heart, leading to death of heart muscle tissue due to the loss of blood supply. The majority of heart attacks involve discomfort in the center of the chest that lasts more than a few minutes, or that goes away and comes back. It can feel like uncomfortable pressure, squeezing or pain. **A heart attack may lead to cardiac arrest, but it is not the same.**

In contrast, sudden cardiac arrest is the abrupt loss of heart function in a person who may or may not have heart disease. It is unexpected and occurs instantly or shortly after symptoms appear. Blood flow to the brain stops abruptly; the victim then collapses and quickly loses consciousness. **Death follows unless a normal heart rhythm is restored within minutes through the application of CPR and the use of an automated external defibrillator.**

Cardiac arrest is highly treatable. However, immediate CPR and rapid defibrillation must occur in order to realize a favorable outcome.

Automated External Defibrillators

Automated external defibrillators or AEDs are lightweight, portable devices that deliver an electric shock through the chest to the heart with a goal of stopping an irregular and chaotic heart rhythm or arrhythmia and allowing a normal rhythm to resume following sudden cardiac arrest.



The person's heart rhythm is analyzed by an integral computer algorithm through adhesive electrodes and the computer determines whether a defibrillatory shock is needed. When a shock is recommended, the AED guides the user through the process of shock delivery. AEDs advise a shock only for ventricular fibrillation or another life-threatening condition called ventricular tachycardia.

If sudden cardiac arrest is not treated within minutes, it will quickly lead to death. Time passes quickly. Consider time to detection, time to first compressions, 911 processing time, retrieval of onsite AEDs and arrival of professional help. Minutes matter and seconds count.

Remember that an AED can only help victim of sudden cardiac arrest; it cannot injure the victim and an AED will not administer a shock to anyone who does not need it. **By administering effective CPR and using an AED as soon as possible, bystanders can continue to provide victims of sudden cardiac arrest the best possible odds of survival.**

Selecting an AED

When selecting an AED for your workplace, it is reasonable to evaluate all available devices. While they all do the same thing, they all having varying features and benefits which may make one a better choice than another.

Because different AEDs vary in certain features, work with trusted representatives from device manufacturers or authorized distributors to determine what type of defibrillator is best suited for your location.

Determining Risk and Need

In evaluating risk related to cardiac arrest, consider the following questions in determining if the risk of cardiac arrest is high as well as where AEDs should be placed.

-How many employees do you have?
-What is the work environment?
-Do employees work in a hazardous setting?
-What is the response time by public safety agencies and trained providers?
-Is your location one that requires special processing of visitors because of security concerns?
-What is the transport time to hospitals with expertise and experience in treating cardiac arrest?

These are all questions that will help you in assessing risk and establishing the need for defibrillators in your workplace.

Risk by the Numbers

A reasonable rule of thumb is to strongly consider AED placement in high-density areas that can anticipate one or more cardiac arrests every 5 years and locations otherwise deemed as hazardous or remote. The Resuscitation Outcomes Consortium, commissioned by the Institute of Medicine Committee on Treatment of Cardiac Arrest provides us with a mean overall incidence estimate for out of hospital cardiac arrest occurrence. In any given community, 1 case of sudden cardiac arrest can be anticipated for every 1,000 persons on an annual basis.

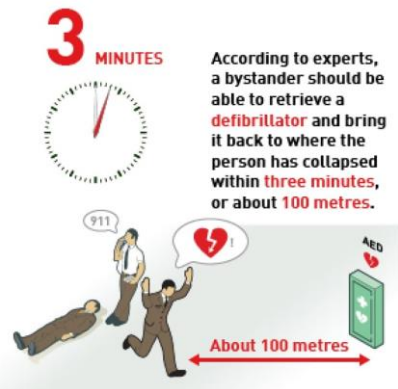
With a bit of arrhythmic, you can determine your risk by numbers.

The reality is that while we can reduce the probability of cardiovascular disease through established means such as physical activity, healthy eating habits and early detection – we cannot eliminate risk of SCA entirely. For all our knowledge, we cannot conclusively determine if someone is at risk, or where and when an incident will occur.

The best way to increase chances of surviving is to be prepared.

Where and How Many AEDs?

The actions taken in the immediate time following a cardiac arrest are critical and can save lives. Rapid detection and a call for help to emergency services that provides full and accurate information will help the dispatcher send the right responders and equipment. Employees trained to administer first aid and perform CPR should be alerted and called on for action. These actions can help reduce time to CPR and treatment with a defibrillator and improve outcomes.



Effective Emergency Response Plans that include the use of AEDs are designed to deliver and utilize AEDs for victims within three to five minutes after the person collapses. Use of this three-minute goal as a guideline will help you determine how many AEDs you need, where to place them and who should be trained in their use.

In the event of an actual cardiac arrest emergency, the single most important factor is your readiness to act quickly, bringing an AED to the side of the victim within 3 minutes. Your system will need to be optimized to reach this important goal.

Determining the numbers of AEDs needed and where to locate them requires some assessment. Using the goal of a 3 minute AED delivery is an essential and pragmatic approach that you can use to determine the location and number of devices needed in your workplace. Do a series of timed walkthroughs at your workplace and pay particular attention to remote locations. Also, consider the challenges that are associated with vertical response, such as in high-rise buildings as well as difficult to access areas.

Centralized AED placement near elevators, cafeterias, main reception areas, and on walls in main corridors are among the common locations for AEDs in a vast majority of workplaces.

3 minutes is your magic number and goal!

Practice Like You Play and Play Like You Practice

Vince Lombardi provides an excellent quote; “Practice does not make perfect. Only perfect practice makes perfect”.

Doing practice drills is the best way to determine if your Emergency Response Plan works and to test your response team and system readiness. Simple and effective! All you need is a trained observer, a stopwatch, manikin and AED trainer device. Post-drill reviews allow you to obtain objective data and a realistic framework for your team to work from.

Drills may uncover the need for additional trained personnel, skills re-education, additional AEDs or relocation of existing AEDs and potential gaps in your emergency communication plan. These areas can be identified and addressed in advance of a true emergency and can make a significant difference.

Legal Risk -Good Samaritan Laws, Cardiac Arrest Survival Act, Other Considerations

Companies and organizations are and should be concerned about their liability related to AEDs. As of today, all 50 states and the District of Columbia now include using an AED as part of their Good Samaritan laws.

The Cardiac Arrest Survival Act of 2000 encourages placement of AEDs in federal buildings and ensures federal liability protection for those who acquire or use an AED to help save a life. In addition, this act provides limited immunity to persons using the AED and the purchaser of the AED device. While Good Samaritan Acts vary by state, they limit the liability of rescuers using AEDs and others involved in the AED program.

Companies and organizations interested in incorporating AEDs into their Emergency Response Plans are encouraged to evaluate the specifics of Good Samaritan Acts for their state. Involving your legal counsel, your risk management and safety team is also recommended.

In addition to Good Samaritan Acts, there may be related state and local ordinances that should be taken into account when assessing responsibility and risk.

Indemnification Policies

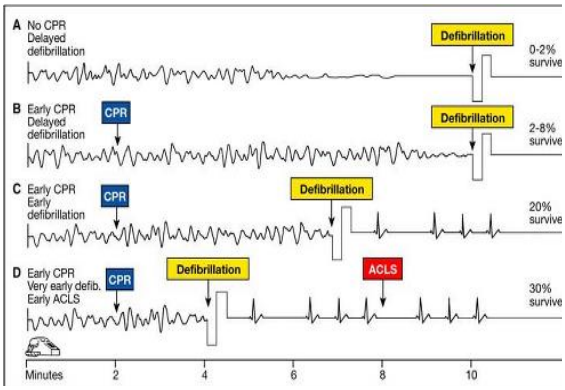
AED manufacturers often provide an additional level of protection by offering limited indemnity to users of their AEDs.

Indemnity is typically defined as “recompense for loss, damage, or injuries; restitution or reimbursement.” These indemnification policies offer additional protection to both the device owner or user. Each indemnification policy varies, so it is important to understand the protection provided by the manufacturer of AEDs you purchase.
These indemnifications limit the liability exposure due to losses or expenses related to a claim of personal injury resulting from mechanical or electrical malfunction of the device. This indemnification requires that the AED must be purchased, leased or rented from the manufacturer or an authorized distributor.

Protection provided by these policies does not cover claims in which the AED was not properly maintained, not in compliance with state/local laws, instances where non-manufacturer supplies were used, or the unit was not used as intended.

Time is the Enemy- An Important Reaffirmation

A number of reports have illustrated that immediate CPR can substantially improve rates of survival from sudden cardiac arrest, particularly when combined with early defibrillation. A bystander is a person who happens to be near the victim and who is not part of the organized emergency response system.



It is critically important to understand that when we perform immediate CPR and use a defibrillator, the person's chance of surviving cardiac arrest can double or triple.

Survival probability decreases by 7-10% each minute without high-quality CPR and rapid defibrillation.

Device Access, the Americans with Disability Act and Visibility

The subjects of accessibility and visibility are important considerations. The goal in regards to accessibility is just that. Making the AEDs accessible. This begins but does not end with selecting locations at your workplace. AED locations should be accessible during all hours of operation and/or occupancy.

During planning and implementation, remove physical barriers to their (AED) visibility and accessibility and keep the following points in mind when placing your AED unit:

- Make sure the AED is accessible to everyone and highly visible.
- Place 3D signs on the wall that are elevated to ensure clear sightlines from all approach angles.

According to the Americans with Disability Act (ADA) guidelines, the height to reach the handle of an automated external defibrillator (AED) in a public place should be no more than 48 inches high. The maximum side reach for an unobstructed approach to an AED is 54 inches.

It is generally not advisable to place an AED in a locked and/or out of sight area for workplace AED programs. Try to find a middle ground between a well-secured AED and an easily accessible AED.

Despite the ubiquity of mobile phones, it may make sense to place an AED near a phone for use when 911 is called.

Consider the purposeful avoidance of messages such as “for use by trained personnel only” on cabinets or enclosures.

Is There a Doctor in the House? Physician Prescriptions and AEDs

The FDA may require a physician's prescription to purchase certain but not all AEDs. Your manufacturer representative or authorized dealer will help you to address this requirement.

The role of the physician may represent more than a provider of a prescription and varies depending on the size and other characteristics of the program and business.

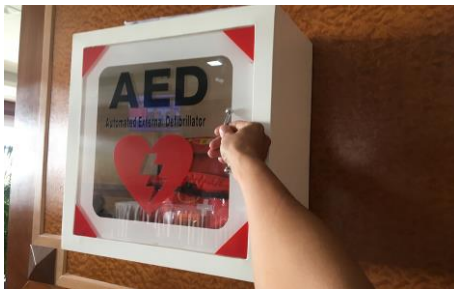
The responsibilities of the physician may include signing off on or making recommendations on training plans and policies and procedures, evaluating data recorded on an AED during a medical emergency and helping assess each use of an AED to recommend any improvements.

Day to Day Program Responsibilities

A designated program coordinator should be responsible for day-to-day program implementation while the program physician serves as a champion and guardian of quality.

It takes a great deal of work in setting up your workplace defibrillation strategy. Now to address routine inspection and program maintenance strategies. Your goal is to have the device, along with accessory equipment to be in a perpetual state of readiness.

It is important to do a weekly or at least monthly visual inspection of the AEDs to ensure they are in working order. A program coordinator or designated person can do these inspections. A written checklist should be established and used to assess and document the readiness of the AEDs and supplies. This checklist supplements regularly scheduled, more detailed inspections recommended by the manufacturer.



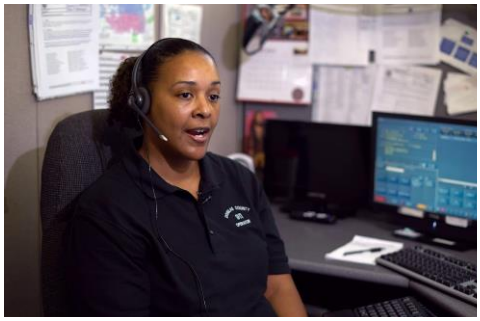
Talk with your manufacturer representative regularly to get the latest information about software updates or upgrades.

Attach Your Accessories!

Additional items should be placed with an AED to help the rescuers to perform CPR and to make sure the AED performs optimally. These may include a CPR mask for delivering safe and effective rescue breaths, gloves for personal protection, a purpose built and specialized surgical prep razor, blunt scissors, absorbent towels and a biohazard bag should be kept in a pouch and attached to the AED. **This should be attached to your AED(s).**

Emergency Medical Services Integration

Working with your local Emergency Medical Services agency and system is a key step to implementing an effective AED program. Most states require you to coordinate your AED program with local Emergency Medical Services and to provide follow-up data after any use of the AED. In states that require registration or application for AED programs, the physician or program coordinator completes this process.



Regretfully, defibrillators are underutilized in a majority of cases. Contributing factors include a lack of devices, but also a lack of awareness and in some cases a lack of knowledge among employees and visitors regarding device locations. **Your local EMS agency can help you in integrating your device or devices into an existing registry that interfaces with their computer aided dispatch system, which can notify callers of nearby and accessible AEDs in cases of cardiac arrest.**

Training Strategies

Selecting a training curriculum and provider is every bit as important as the device(s) you select to purchase.

AED users should be trained in CPR and the use of an AED. Training can help increase the comfort and confidence level of your responders. The goal is to have designated responders who are trained in CPR and the use of an AED so someone is always available to respond to an emergency.

There are advantages to selecting agencies that not only offer certification from well recognized national organizations, but can also articulate how they aim to meet or exceed the standards established by those certifying bodies such as the American Heart Association, American Red Cross, the Health and Safety Institute and the National Safety Council to name a few.

Questions to ask of your prospect training providers include:

- What is your instructor to student ratio?
- What is your manikin to student ratio?
- Do students receive the printed or digital learning tools in advance?
- Is the course length in accordance with the recommended time established by the certifying organization?
- Do they offer references from recognized companies that are leaders in workplace safety?

There are countless agencies and individuals who offer training. However, because they offer training does not mean it is of high quality.

Of note, training is a significant employee benefit as they could possibly use the skills learned outside of the workplace.

When lives are at stake, quality training can make a difference.

Communication Considerations

Developing an effective workplace CPR and defibrillation program requires more than drilling a few holes to mount the AED cabinet.

Consider internal and external communications with these questions.

- **How will employees respond in a case of a medical or injury emergency?**
- **Do all employees know how to activate an internal response?**
- **Do they call 911 directly?**

Developing your internal emergency communication process is another sometimes forgotten step.

After initial implementation of the AED program, provide information to all employees at your company about the AED program. You may want to use internal newsletters, posters, magnets, signage or other means to promote your AED program and identify where the device(s) are located. **By continually raising awareness of the program, you reinforce to employees that your company is committed to their safety.**

Addressing Fear and Cardiac Arrest Drills

Phobias and fears come in all shapes and sizes: closed places, heights, escalators, tunnels, highway driving, water, flying, dogs, spiders, snakes and the sight of blood are common objects of phobia-like anxiety**. Based on available evidence, it is reasonable to qualify fear as a significant barrier to the initiation of CPR.**

Encountering a victim of sudden cardiac arrest is frightening. Witnessing the collapse of a friend or coworker is terrifying to the point of unwillingness or inability to act.

Conducting routine real-time and virtual exercises is essential and the value of ongoing experience cannot be overstated. By engaging in regular exercises or drills, performance can be assessed using wide a variety of scenarios to measure and improve.

One strategy for helping people address fear that's been around for a while — and that is reported to be pretty effective — is so-called "exposure therapy." The idea is to break the link between the feared situation and the panic reaction through controlled exposure. In the context of CPR, it would obviously be desirable to find a way to overcome the fear without going through the ordeal of actually performing CPR. Drills can be effective in further developing a “rescuer mindset”

Periodic drills have many benefits and should be conducted on a regular, routine and ongoing basis.

Looking After Those Involved in Attempted Rescue

After Emergency Medical Services and the patient have left the scene, the priority is to communicate with the emergency contact person for the victim, notifying them of the incident. Of equal importance is checking in with all those involved in the attempted rescue.

While performing CPR on a collapsed person is the right thing to do, using CPR on someone can be a shocking and traumatic event for many reasons. The recovery is just as important for those who were involved as the person who has had a cardiac arrest.

Even medical professionals with years of training can be affected. This is understandable and it's important to look after all those involved. This might involve taking a break from work if you can. Speaking with others who were involved may help, but you may also seek outside assistance and support to help everyone process what happened.

The time it takes to get back to 'normal' will be different for everyone and there's no right or wrong way to feel after witnessing a cardiac arrest.

Common feelings may include:

- **shock**
- **feeling emotional**
- **anxiety or flashbacks**
- **self-blame or doubt**
- **wanting to be alone**
- **hopelessness**
- **difficulty sleeping and fatigue**
- **agitation or a racing heartbeat**
- **difficulty concentrating**

If these feelings don't go away or get worse, further professional assistance should be sought.

It is important that those involved in the rescue be mindful not to discuss incident particulars with their peers. In matters confidential, silence is essential.

Returning Your AED and Equipment to a State of Readiness

Any time your AED is attached to someone you must replace the electrode pads. Whether or not you need to replace the battery or charge pack depends on the make and model of your AED--follow your manufacturer's guidelines.

When replacing these items, check the "use by" or "install by" dates on the replacements to be sure they have not expired. In some cases, the unit may need to be cleaned or disinfected. Furthermore, your accessory pack and contents may need attention.

Other important matters include:

- Gathering AED Event Information
- Retrieval of data from your AED
- Completing Written Documentation
- Notifying your Medical Oversight representative
- Quality improvement activities and debriefing of rescuers
- Returning the AED to a state of readiness for subsequent use in a future emergency

Common Program Pitfalls

In no particular order, errors include failure to develop a written medical emergency response plan, failure in training an adequate number of rescuers in cardiopulmonary resuscitation and AED use, failure to maintain ongoing training, failure to coordinate efforts with emergency medical services, failure to conduct regular maintenance checks, failure to conduct regular response drills and failure to monitor the program in general.

AEDs cannot save lives by themselves. Like other medical and safety devices, their effectiveness depends on human planning and intervention.

Negligence and inattention are the enemy to quality and reliability.

Quick Start Guide

- Do your risk-benefit assessment
- Identify your goals in emergency response plan development, high-quality training, devices and related activities such as integration with your Emergency Medical Services system.
- Seek out trusted and accomplished vendors. Ideally they are able to help you through all phases of program development.
- Select what type of device or devices best suit your needs.
- Select a training program and reputable training vendor.
- Coordinate a program launch.
- Assess and establish a rigorous program maintenance strategy. Strongly consider the value of outsourcing.

Work through each facet with diligence as each component in your system is essential and required!

Summary

Planning, implementing, managing and continually improving workplace safety and defibrillation strategies require a great deal of work. After many hours, many tasks, many meetings and often significant financial investments in equipment and training, related details to enable reliable delivery CPR and rapid defibrillation is often a low priority and only a marginal consideration.

Make no mistake, to truly achieve program and system goals, these related aspects must be considered as mission critical. Few life threatening medical emergencies are as time sensitive as sudden cardiac arrest. System performance is key. It really isn't about the device but rather a cohesive plan for all the pieces.

It's true-no one can put a price on a life. If only one life is saved, the effort was worthwhile-especially if the survivor is someone you work with or know personally.

Useful References and Resources

What Is Sudden Cardiac Arrest? - National Heart, Lung and Blood Institute
https://www.nhlbi.nih.gov/health/cardiac-arrest

CPR and Cardiac Arrest Statistics - American Heart Association
https://cpr.heart.org/en/resources/cpr-facts-and-stats

Heart Attack and Sudden Cardiac Arrest Differences - American Heart Association
https://www.heart.org/en/health-topics/heart-attack/about-heart-attacks/heart-attack-or-sudden-cardiac-arrest-how-are-they-different

Understanding the Public Health Burden of Cardiac Arrest: The Need for National Surveillance - NIH
https://www.ncbi.nlm.nih.gov/books/NBK321501/

Approved AEDs and Other Important Information - US Food and Drug Administration
https://www.fda.gov/medical-devices/cardiovascular-devices/automated-external-defibrillators-aeds

AEDs in the Workplace - OSHA
https://www.osha.gov/aed/workplace

AEDs, Inspections and Maintenance – Code One Training Solutions
https://code1web.com/learning-center/do-aeds-require-maintenance/

AED Practices, Standards and Legal Perspective - Readiness Systems
https://readisys.com/get-to-know-the-aed-program-rules/

Mock Drills - Arizona Share
https://www.azdhs.gov/documents/preparedness/emergency-medical-services-trauma-system/save-hearts-az-registry-education/mock-drill.pdf

Automated External Defibrillators - US Department of Labor
https://www.osha.gov/SLTC/aed/aed_programs.html

AED Program Implementation - American Heart Association
https://cpr.heart.org/en/training-programs/aed-implementation

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