

The Importance of Maintaining Your Automated External Defibrillators (AEDs)

It is clear that AEDs can save lives. Proper maintenance of your AEDs will help ensure they are ready to go in the event of a cardiac emergency.



In 2012, a man's life was lost on a Washington, D.C. train because the AED at the station had a depleted battery. In 2011, a 14-year-old boy in Nova Scotia, Canada, struck by a hockey puck in the chest, was unconscious and not breathing for 10–15 minutes while his parents watched. The rink had an AED but the battery was dead. Fortunately, a local paramedic performed CPR on the teen until an ambulance arrived, and his life was saved. In April 2005, a passenger died at the Philadelphia International Airport after two AEDs failed because the batteries were dead.

These real life stories underscore how important it is to regularly care for your AEDs once your organization has acquired them. An AED program is most effective when placed within the context of an overall strategy to ensure devices are in good working order, accessories are managed and replenished on a regular basis, and rescuers are properly trained. With the proper knowledge and systems in place, you can efficiently and effectively manage your AED program.

An AED is not like other electronic products you may own. It is a medical device and requires ongoing monitoring and maintenance. You cannot just hang it on a wall or install it in a cabinet and then ignore it. AEDs require a bit of time and attention to be rescue-ready, and this small investment can have a huge payoff—saving a life.

Keeping informed in a few key areas will help you keep your AEDs in a rescue-ready state: battery and electronic function, condition of electrode pads, physical condition of the AED, AED life cycle/age, and tools that can help you track and manage all the details.

Battery and Electronic Function

An AED's battery is its sole power source. The device is not plugged into the wall for backup power, as are many electronic devices. This makes it critical to regularly inspect the AED to make sure the battery is functioning properly.

The Annals of Emergency Medicine reported that over a 15 year time span, more than 1,150 AED failures were reported to the FDA. Battery issues accounted for more than 23% of those failures.¹ Health Canada has also released information that during the past five years there have been 562 reports of AEDs failing when a patient was involved, due to multiple causes, including battery failure.²

Although these numbers are relatively small considering there are more than two million AEDs distributed worldwide, the impact of a malfunctioning AED has far reaching effects. You never know who will need the device—your child, family member, co-worker, friend or even you.

"CPR is not enough to save a life in sudden cardiac arrest—defibrillation is the only thing that can. You want to make sure the AED is ready to go."

*Todd Klump, AED Program Director,
Physio-Control*



An AED's internal computer is designed to perform regular self-tests to identify issues before use on a person in sudden cardiac arrest.

These self-tests may evaluate the electronics, memory, microprocessor, ECG circuitry and battery capacity. This is why it is so important to regularly observe the Readiness Indicator on the AED. Readiness Indicators are designed to be visible at a glance if the AED requires attention. The indicators use icons or lights as signals and vary depending on the manufacturer.

It is also vital to track battery expiration dates carefully and replace batteries as recommended by the manufacturer. Some manufacturers synchronize electrode replenishment with battery replacement to make AED maintenance more convenient.

Keep in mind that no matter how superior a battery's quality, certain conditions can cause early power depletion. For example, weather conditions, chlorine from a nearby pool, or an extremely dirty environment can accelerate battery demise. This reinforces the need for regularly scheduled inspection of Readiness Indicator to ensure the battery is operational.

Condition of Electrode Pads

Electrode pads are vital to a successful resuscitation. They are made with a gel that helps

electrical current flow and ensure good contact with the skin. This enables the AED to analyze the heart's rhythm and deliver a shock to the heart, if indicated, via the pads. Good skin contact is essential for the device to accurately read the heart rhythm and provide current if the AED detects a shockable heart rhythm.

Check expiration dates on a regular basis and set up a system for timely reordering. When electrode pads are too old the gel can dry out, making good skin contact difficult. As noted above, some manufacturers synchronize replacement dates for batteries and electrode pads so supply replenishment is convenient.

Physical Condition

As you regularly inspect the Readiness Indicators of your AED, also check the defibrillator and electrode packages for damage or the presence of foreign substances. Be sure to report any concerns to the manufacturer. Consult your device operating instructions to ensure your AEDs are stored within the condition parameters the manufacturer recommends.

AED Life Cycle

Even the best electronic devices eventually degrade with time. A product's lifespan is affected by how it has been used and maintained, storage conditions and other factors.

AED manufacturers provide a recommended age for AED replacement, based on extensive testing. Typically AED life cycles range from five to eight years. Be sure to check with your manufacturer for your AED's recommended replacement timeframe.

Parts for older devices may become obsolete, and warranties expire. Science and technology are continually evolving. As equipment matures and technology advances, consider the age and capabilities of your equipment. Evaluating the latest technology developments, along with manufacturer's recommendations, can help you decide when device replacement is appropriate.

Tools to Help You

You may wish to develop your own tracking system for staying on top of the details about your AED program. Manufacturers may provide simple checklists to help you track device condition, status of Readiness Indicator and date of electrode pad expiration, as well as the presence of a resuscitation kit and other resuscitation equipment. They may also offer comprehensive solutions that help you set up and manage your AED program. This is especially helpful if you have many devices in several locations, with multiple response teams to train. Ask your manufacturer what they offer customers to help manage their AED programs.

REFERENCES

1. Lawrence A. DeLuca Jr., M.D., Ed.D., et al. "Analysis of automated external defibrillator device failures reported to the Food and Drug Administration, *Annals of Emergency Medicine*. Volume 59, Issue 2, Pages 103-111, 2012.
2. Health Canada Reference: <http://www.cbc.ca/m/touch/news/story/2012/05/02/aed-defibrillators.html>

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