

# Clinical Alert

November 2013

**Maryland  
Department of Health  
and Mental Hygiene**

*Office of  
Health Care Quality*

Spring Grove Center  
Bland Bryant Building  
55 Wade Avenue  
Catonsville, MD 21228

**Martin O'Malley,**  
*Governor*

**Anthony G. Brown,**  
*Lt. Governor*

**Joshua Sharfstein, M.D.,**  
*Secretary, DHMH*

**Patricia Tomsko Nay, M.D.,**  
*Executive Director, OHCQ*

## Automatic External Defibrillators

In 2012, a young woman in an inpatient treatment facility hanged herself. The staff that found her pulseless and without respirations started CPR and called 911. Even though the facility had two automatic external defibrillators (AEDs), neither was used during the emergency situation. Investigation revealed that only a few of the staff had been trained on the use of the AED. The facility was cited for failing to use appropriate and available resuscitation equipment.

In 2013, a patient in a clinic having a minor surgical procedure suffered a sudden respiratory arrest. The staff, including a physician, began chest compressions. This facility also had an AED, which was not brought to the room or used during the resuscitation efforts. The patient later died at the hospital. The clinic staff argued that they had no obligation to use the AED because the patient had a weak pulse.

Since 2001, when the Food and Drug Administration allowed the purchase of AEDs without a prescription, countless of these devices have been installed in health care facilities and in public and private spaces across Maryland. But how many of the people working in those facilities are trained and retrained in using the AED? How many of your facilities practice using the AEDs along with other resuscitation equipment when doing emergency drills?

According to the American Heart Association (AHA), the most common rhythm causing sudden cardiac arrest (SCA) is ventricular fibrillation (V-fib), a dire rhythm in which the ventricles rapidly quiver rather than contract. The AHA no longer recommends trying to find a pulse in an arrest situation, but chest compressions should be started immediately at a rate of 100-120 compressions per minute, with two breaths per 30 compressions. CPR alone is unlikely to restore a viable rhythm, but can oxygenate the heart muscle, making it more likely that a shock from a defibrillator will terminate V-fib and restore a normal heart rhythm. The AHA recommends three things

happen either concurrently or as close together as possible: Activate the emergency medical system, start CPR, and use the AED. The AED is diagnostic and prescriptive. It will tell the user what the rhythm is and what to do about it. If the patient has a rhythm that does not need a shock, the machine will tell you that as well. From a clinical standpoint, there is no reason not to use an AED in arrest situations.

Some staff and facility managers may be reluctant to use an AED, fearing liability. Maryland, like many other states, has Good Samaritan laws limiting liability when the devices are used in a good-faith effort to save someone's life, even by untrained users. In addition, facility-specific statutes cover the use of AEDs as part of the requirement for all facility types to have emergency plans and resuscitation services consistent with the patient population and the standards of practice of the staff.

Another way to reduce the likelihood of a bad outcome leading to a lawsuit is with consistent and frequent training. Most CPR training is predicated on a two-person rescue situation. In a two person rescue, one staff person begins CPR while the other person retrieves the AED and notifies EMS. CPR should be continued while the pads are placed and the AED is readied for use. CPR should be interrupted only briefly for shocks and pulse checks.<sup>1</sup> Use of the AED should be incorporated into all emergency training and code drills. Code drills should be frequent, multi-disciplinary, and cover all shifts. Staff performance during the drills and during patient resuscitations as well as the outcomes of actual resuscitation events should be tracked as quality improvement metrics. Knowing how long it takes EMS to respond to your facility and gain entrance needs to be a part of your emergency plan and response times must be tracked during actual resuscitations. Needless to say, accurate and complete record keeping including response times of staff and EMS is required. Staff may want to maintain a checklist of the required documentation elements with the equipment used in emergency situations.

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**Clinical Alert** is published periodically by the *Office of Health Care Quality*

**For additional information:**

Anne Jones, RN, BSN, MA  
Nurse Surveyor  
Patient Safety  
410-402-8016  
anne.jones@maryland.gov

Patricia Tomsko Nay, MD  
Executive Director  
410-402-8055  
tricia.nay@maryland.gov

In programs that routinely treat children, purchased AEDs should meet the needs of the patient population. While the optimal strength of the shock used for children has not been established, a pediatric AED should be equipped with a dosage reducer or attenuator to reduce the dose of energy to that appropriate to children.<sup>1</sup>

The 2010 AHA Guidelines for CPR note five critical components of effective CPR:<sup>2</sup>

1. Chest compression fraction (the percentage of time during a resuscitation that chest compressions are given). The AHA promotes minimizing interruptions to CPR and says the goal for actual compressions should be 80 percent of the total resuscitation time.
2. Chest compression depth of at least two inches for adults and one-third the anterior posterior (front to back) dimension for children.
3. Complete chest recoil between compressions. Leaning on the patient causes incomplete heart filling and reduces cardiac output.
4. Compression rate of 100-120 beats per minute.
5. Ventilation rate in someone without a protected airway of 6-12 breaths per minute with approximately 1 second per breath and minimal chest rise. The recommendation is for two breaths per 30 compressions to avoid positive pressure ventilation, which can further impede cardiac output and cause vomiting and aspiration of gastric contents.

Along with effective CPR, the recommendation is for the AED to be applied during CPR with the first shock delivered within 2-3 minutes for a witnessed arrest. Chest compressions should be resumed within seconds of the shock, as soon as the AED indicates continued CPR is needed. Many types of AEDs monitor the rate and strength of chest compressions and can assist in determining staff performance.

AEDs that malfunction most often do so because of a lack of maintenance. How many of your facilities have AEDs hanging, forgotten, on the wall? Just like any other piece of medical equipment, AEDs need periodic preventive maintenance. The batteries need to be changed and the pads need to be checked and changed when they dry out. Preventive maintenance of the AEDs should also be tracked as part of performance improvement.

When an emergency happens in your facility and a patient needs resuscitation, staff need to be comfortable and familiar with all available resources. Even if the patient does not need a shock, using the AED can tell the EMS responders what has happened with the patient's heart. Using the AED every time is the only way to ensure that it is there and used when needed. Most medical professionals can tell whether a patient has a pulse, or has no pulse, but very few of us can discern what dysrhythmia an unresponsive patient has just by feeling a pulse. In an emergency situation, staff often mistake their own pulses for those of the patient. The AED is a life-restoring piece of equipment that takes some of the guess-work out of dealing with patient emergencies. We owe it to our patients to use it every time. How do we save lives with the AED? Practice, practice, practice.

## References

1. 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science [http://circ.ahajournals.org/content/122/18\\_suppl\\_3/S706.full](http://circ.ahajournals.org/content/122/18_suppl_3/S706.full)
2. Cardiopulmonary Resuscitation Quality: Improving Cardiac Resuscitation Outcomes Both Inside and Outside the Hospital <http://circ.ahajournals.org/content/128/4/417.full>