



Australian Resuscitation Advisory Network

BLS Guideline 4 – USE OF DEFIBRILLATORS (AEDs)

Background

The single biggest improvement that can be made to SCA outcome is the early use of a defibrillator, raising survival rates (in combination with good compressions) from under 10% to <75% in adults. With over 33,000 cardiac arrests in Australia each year, time to defibrillation is a key factor that influences a person's chance of survival. A defibrillator should be applied to the person who is unresponsive to pain and not breathing normally as soon as it becomes available so that a shock can be delivered if necessary. The target time from collapse to first shock is 3 minutes and the location of defibrillators should be designed to achieve this goal. Ambulance response times in Australia prohibit the achievement of target times to first shock and mean that AED's need to be readily available for use at the site of the cardiac arrest. Approximately 50% of persons in cardiac arrest will initially be in a shockable rhythm; however 80-85% of adults will develop a shockable rhythm in the first 8-9 minutes.

The time to defibrillation is a key factor that influences survival. For every minute defibrillation is delayed, there is approximately 10% reduction in survival if the victim is in cardiac arrest due to Ventricular Fibrillation (VF). CPR alone will not save a person in VF and 99% of initial shockable rhythm is VF. Hence a defibrillator should be applied to the person in need as soon as it becomes available so that a shock can be delivered if necessary. The development of AEDs has made defibrillation part of basic life support. AEDs can accurately identify the cardiac rhythm as "shockable" or "non-shockable".

Scope

Who does this guideline apply to?

This guideline applies to all persons who are unresponsive to pain and present with absent or abnormal breathing i.e. persons requiring CPR.

Who is the audience for this guideline?

This guideline is for use by BLS first responders, including bystanders, first aiders, and health professionals away from a clinical setting.

Age Classifications for Resuscitation

For the purposes of resuscitation:

- **Adult** is defined as a person > 8 years of age i.e. 9 or above or a person who physically appears to be that age e.g. an 8 year old child that weighs 70kg would be classified an adult because of physical appearance.
- **Child** is defined as a person between the ages > 12 months and ≤ 8 years old or a person who physically appears to be that age.

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- **Infant** is defined as a person between the ages of 0 and ≤ 12 months or a person who physically appears to be that age e.g. a premature infant of 15 months of age, may be a similar size and weight to an 11 months old infant and therefore this person would be classified an infant.

Recommendations

The Australian Resuscitation Advisory Network (ARAN) makes the following recommendations:

1. For all who are unresponsive to pain and not breathing normally, chest compressions should be commenced immediately and continued until an AED is applied. The AED should be applied as soon as it becomes available so that a shock can be delivered if necessary.
2. The use of AEDs is recommended to increase survival rates in those who have cardiac arrest.
3. All defibrillators fitted with defibrillation pads should include a skin preparation kit that should include: a pair of trauma scissors, a dry disposable shaver, alco-wipes and hand towels.
4. Pads are to be placed to ensure that a shock is delivered on an axis through the heart. Typical pad placement in adults and children is the anterior-lateral position.
5. Although modern AEDs are extremely safe, rescuers should take care not to touch a person during shock delivery.
6. Access to AED's in the community (including education campaigns) should be strongly prompted by government and form part of WHS regulations and standards.
7. AEDs should be capable of defibrillation of adults and children/infants and have both types of pads stored with the device.

General Principles

The use of AEDs should not be restricted to trained personnel. Allowing the use of AEDs by individuals without prior formal training can be beneficial and potentially life saving. Since even brief training improves performance (e.g. speed of use, skin preparation, correct pad placement), it is recommended that training in the use of AEDs (as a part of BLS) be provided. The use of AEDs by trained lay and professional responders is recommended to increase survival rates in those who have cardiac arrest.

Public Access Defibrillators (PADs)

The provision and promotion of PADs is a vital part in improving survival rates. Implementation of AED programs in the community are also an effective initiative in increasing survival rates in the community.

When implementing an AED program, community and program leaders should consider factors such as location, development of a team with a responsibility for monitoring and maintaining the devices, training and retraining programs for those who are likely to use the AED, coordination with the local Emergency Services, and identification of individuals who are committed to using the AED on those who are in cardiac arrest.

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Deployment of home AEDs for high-risk individuals who do not have an implantable cardioverter defibrillator (ICD) is safe and feasible. Use of AEDs in public settings (airports, casinos, sports facilities, schools, shopping centres, restaurants, factories, supermarkets and customer service industries – including government services, primary care settings, etc.) where cardiac arrest is more likely to occur, can be useful if an effective response plan is in place and there is easy access to the AED. An AED can and should be used on pregnant women who are in cardiac arrest.

Use of AEDs is reasonable to facilitate early defibrillation in hospitals. Studies to date have shown AEDs are effective in decreasing the time to first defibrillation during in-hospital cardiac arrest. The positioning of AEDs in hospitals and other health facilities should enable a response within the target time of first shock within 3 minutes of the arrest.

Method

Pad Placement - Adult

The use of defibrillation pads increases the safety of defibrillation over traditional paddles. The effectiveness of pads, however, is reliant on good skin preparation to ensure good electrical conduction. The skin under the pads needs to be fairly hairless and dry. Every defibrillator and/or pad pack should include at least the following: a pair of trauma scissors, a dry disposable shaver, alco-wipes and hand towels.

Effective pad placement ensures that a shock is delivered on an axis through the heart. Place pads on the exposed chest in an anterior-lateral position: one pad slightly below the collar bone (above the breast tissue) on the right side of the person's chest and one pad on the person's left side below the arm pit and under any breast tissue (Figure 1). The lowest part of the left side pad should be no lower than the lowest rib.

In large-breasted individuals it is reasonable to place the right side pad angled and slightly toward the centre of the chest.



Figure 1 – Anterior lateral pad placement

Avoid placing pads over implantable devices, such as pacemakers. Most pacemakers are located on the left upper chest and therefore don't usually present a problem. If there is an implantable medical device the defibrillator pad should be placed at least 8cm from the device. Do not place AED electrode pads directly on top of a medication patch because the patch may block delivery of energy from the electrode pad to the heart and may cause small burns to the skin. Remove medication patches and wipe the area before attaching the electrode pad.

Pad Placement – Child and Infants

Standard adult AEDs and pads are suitable for use in children older than 8 years. Ideally, for those under 8 years paediatric pads and an AED with a paediatric capability should be used. These pads are placed use the front-back position (antero-posterior): one pad placed on the upper back (between the shoulder blades) and the other pad on the front of the chest, as per Figure 2.

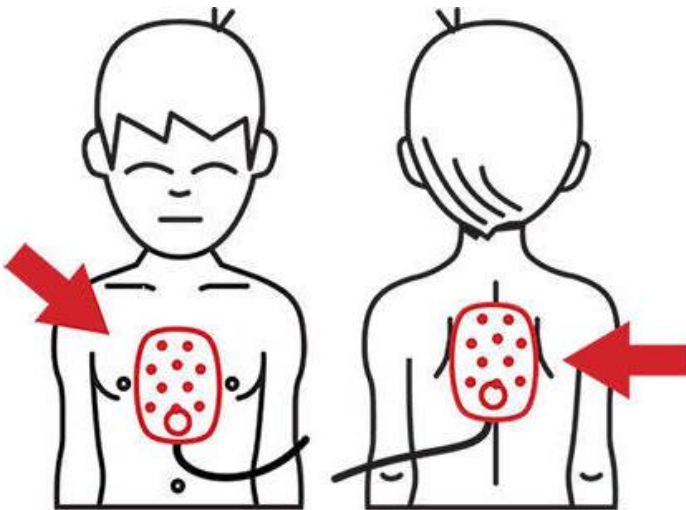


Figure 2 – Child/Infant pad placement

“In cases of emergency, where the AED available is not fitted with a paediatric switch or paediatric pads, the adult pads can be used. The substitution of adult pads for paediatric pads is not a recommended strategy for the management of casualties in cardiac arrest. ARAN recommends that the type of defibrillator available and the pads stored in the machine should reflect the risk associated with the AED's location and intended use. AED pads in these circumstances should be placed in the child/infant position (Figure 2).

AED Safety

Rescuers should listen carefully to voice prompts. This can be particularly difficult in a noisy environment. ARAN does not recommend the use of “automatic” defibrillators, particularly in noisy locations such as industries or areas where large crowds are likely. The use of “semi-automatic” defibrillators provides an added safety step in that a rescuer must press a button to deliver a shock and thus can ensure no other person is in contact with the person.

Care should be taken to ensure no one is in touch with the person's bare skin during shock delivery, as there is risk of interfering with the function of a good heart. There are no reports of harm to rescuers



ARAN from attempting defibrillation in wet environments; however the chest should be wiped dry prior to placing the pads to avoid arcing across the chest. There is no additional risk created in defibrillating a person in the presence of oxygen. Oxygen is an oxidising agent and will support combustion but is not an explosive gas.