Australasian College
for Emergency Medicine

Early access to defibrillation for cardiac arrest

Policy P40

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Document Review

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Revision History

Version	Date	Pages revised / Brief Explanation of Revision
01	Oct-04	Approved by Council
02	Jul-11	Reviewed and approved
03	Jul-20	Substantial revision throughout; new format applied

1. Purpose and scope

This document is a policy of the Australasian College for Emergency Medicine (ACEM) and relates to the adequate provision for early access to defibrillation of sudden cardiac arrest within healthcare institutions and in public settings.

2. Definitions

Automated external defibrillator

An automated external defibrillator (AED) is a portable electronic device that automatically diagnoses arrhythmias that can be defibrillated, potentially restoring the heart to a stable rhythm with return of spontaneous circulation (ROSC). These include ventricular fibrillation (VF) and pulseless ventricular tachycardia. AEDs are sophisticated, computerised devices that are reliable and simple to operate, enabling lay rescuers with minimal training to administer a lifesaving intervention.

Public Access Defibrillation (PAD)

Public access defibrillation (PAD) involves a bystander, trained first responder (e.g. firefighters, police officers) or recruited trained volunteer initiating cardiopulmonary resuscitation (CPR) and external defibrillation via an automated external defibrillator (AED) before arrival of emergency medical services (EMS).

3. Statistical overview

Survival to hospital discharge after out of hospital cardiac arrest (OHCA) is poor, reported globally to be 7%-8%. [1] Outcomes in Australia and New Zealand are slightly better. For example, Queensland Ambulance Service reported a survival to hospital discharge increase from 9% to 16% between 2000 and 2016 despite a rise in those presenting with non-shockable rhythms. [2] In New Zealand the 2018-19 National Report of the Out-of-Hospital Cardiac Arrest Registry showed an adult rate of survival to 30 days, where resuscitation was attempted, of 14%, with 70% having died at the scene. [3]

The speed with which defibrillation is performed is the major determinant of the success of resuscitative attempts for treatment of VF cardiac arrest. Survival rates after VF cardiac arrest decrease approximately 10% with every minute that defibrillation is delayed, and are approximately 2% to 5% beyond 12 minutes. [4] The performance of CPR while awaiting the arrival of the AED appears to prolong VF, with the decline in survival rates averaging 3–4% per minute delay to defibrillation [5], but is highly unlikely to convert VF to normal rhythm alone.

In Australia, the Australian Resuscitation Council reports that the median emergency-response time by ambulance services throughout Australia is between 7.5 and 10 minutes [6]. Even the highest performing emergency medical services will not be able to arrive at the patient and perform CPR more rapidly than bystanders.

Survival rates from cardiac arrest can be high in the rare event that it is witnessed by AED-trained individuals in a supervised setting. For example, across four studies, 89% of people in supervised cardiac rehabilitation programs who experienced a witnessed cardiac arrest were resuscitated. [4]

In terms of 'bystander' intervention, a 2017 systematic review of observational studies found that median survival is 53% when a non-dispatched lay first responder administers public-access defibrillation [7], regardless of the qualifications of the individual performing it, which indicates how important early defibrillation is in the chain of survival.

However, the intervention of a bystander is still relatively rare. In 2017, the QAS attended 1741 cases where the arrest occurred before the arrival of paramedics and resuscitation was subsequently attempted by paramedics. Of these, only 21 (1.2%) were defibrillated by a bystander using an AED prior to paramedic arrival. [8] It is not clear what proportion of these may have had access to a nearby AED.

4. Policy

ACEM aligns with the following statements.

Early defibrillation (shock delivery within five minutes of EMS call receipt) [4] is a vital link in the 'chain of survival' of collapsed persons suffering sudden cardiac arrest.

Early defibrillation capability, which is defined as having appropriate equipment and trained first responders, should be available throughout hospitals and affiliated outpatient facilities.

The goal of early defibrillation by first responders in all areas of the hospital and ambulatory care facilities is a collapse-to-shock interval of less than three minutes. [4]

Healthcare providers with a duty to perform CPR should be trained, equipped, and authorised to perform defibrillation. All hospital staff including all support staff should have access to hospital-provided BLS/AED training in paid time.

In line with International Liaison Committee on Resuscitation (ILCOR) guidelines, [9] PAD programs to treat out-of-hospital cardiac arrest (OHCA) should be implemented where warranted by evidence of clinical benefit.

ACEM supports, within a co-ordinated healthcare framework, the further evaluation of other options beyond traditional responder systems to effect timely availability of CPR and early access to defibrillation of persons in cardiac arrest. This includes evaluation of options to reduce the number of people who die from cardiac arrest in remote and rural Australia by improving access to AEDs for first responders.

ACEM recognises that members of the community obtain information about cardiac arrest from the media and that sometimes their perceptions about possible outcomes may be unrealistically optimistic. This may be due to lack of knowledge of the difference between cardiac arrest and a heart attack and the significantly differing outcomes from each condition.

5. Procedures and actions

All staff within health care settings must be able to access and appropriately use AEDs.

In ambulatory or non-acute health care settings, an AED, oxygen, suction and basic oxygen delivery equipment are considered as basic equipment items for emergency response.

All staff members designated to respond to collapsed persons require adequate training in contemporary resuscitation strategies in keeping with the scope of qualification and intended practice. Performance should be monitored, and proficiency maintained.

AEDs should be placed in open access or public areas of hospitals, and particularly associated dining or trade precincts. AEDs should also be placed in high traffic areas in the community such as airports, airplanes, train stations, pedestrianised areas, shopping malls, casinos and sporting venues. AEDs must be accessible at all hours, including the night-time and weekends which is when approximately 60% of all cardiac arrests in public locations occur. [5]

New AED placement should match country and region-specific OHCA event rates, with further efforts made to improve universal accessibility to existing AED units. The American Heart Association and ILCOR recommend AED placement where the frequency of cardiac arrest events is such that there is a reasonable probability of one AED use in five years. [4]

Reduction in the call–to-shock time interval can be achieved by training and equipping laypersons to function as first responders in the community, with the ability to recognise cardiac arrest, activate the EMS system, provide CPR, and attach/operate an AED with confidence. [4] While no technical training is required to use AEDs in public areas, familiarity with and awareness of PAD programs are likely to improve uptake.

PAD programs function best when incorporating aggressive public awareness campaigns on the benefits and safety of defibrillation, dual dispatch EMS, strategic placement of AEDs, and a system of education and training of first responders (lay or professional), dynamically updated registries of AEDs location, and regular maintenance of AEDs. [4]

A cost/benefit evaluation of the different schemes and pilots being applied in rural and remote locations across Australia and New Zealand should be undertaken.

Further feasibility studies should be conducted on innovative use of mobile and other technologies to improve the morbidity and mortality of OHCA, for example drone-delivery of AEDs. The use of mobile phone applications (for example, GoodSAM / Responder), which can guide potential rescuers to a cardiac arrest as well as locate the nearest AED, should be encouraged and supported

Reporting of non-shockable cases should be standard, as these patients are a growing proportion of the OHCA cohort due to increasing life expectancy. It is important to recognise that almost two-thirds of all OHCAs present with non-shockable rhythm. [2]

6. References

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2 Queensland Ambulance Service (QAS). Survival Trends: Out of Hospital Cardiac Arrest in Queensland 2000-2016. Brisbane: QAS; 2018.

3 Dicker B, Oliver V, Howie G et al. Out-of-Hospital Cardiac Arrest Registry Rēhita Mate Manawa mō waho i te Hōhipera Aotearoa New Zealand, National Report 2018/19. Wellington: St John New Zealand; 2020.

4 American Heart Association in Collaboration with the International Liaison Committee on Resuscitation. ECC Guidelines. Part 4: The Automated External Defibrillator. Key Link in the Chain of Survival. Circulation. 2018;102:I-60–I-76.

5 Kumar, S, Chow, C, Jan, S and Angell, B. Rapid literature review on public access to defibrillation. Newtown: The George Institute for Global Health, 2017.

6 Australian Resuscitation Council. Public Access Defibrillation: ARC NSW Position Paper Summary. arcnsw.org.au/download_file/view/140/320. Accessed 30 April 2020.

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8 Out of hospital cardiac arrest in Queensland 2017 annual report: the importance of bystander interventions. Brisbane: Queensland Ambulance Service; 2019.

9 Perkins GD, Travers AH, Berg RA et al. Part 3: adult basic life support and automated external defibrillation: 2015 international consensus on cardiopulmonary resuscitation and emergency cardiovascular care science with treatment recommendations. Resuscitation. 2015; 95: e43-e69

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