



National Center for Early Defibrillation On-Site AED Placement Guide

Introduction

Early defibrillation is the key to survival from sudden cardiac arrest (SCA). One of the strategies for achieving early defibrillation is placement of AEDs at locations that are readily accessible by designated trained responders, the general public or both. The purpose of this guide is to help entities determine whether an on-site AED program is advisable and to provide an overview on AED placement.¹

Are some locations at higher risk for SCA than others?

The jury is still out on the ideal placement of AEDs in community settings, one of the fundamental issues being addressed by a multi-site clinical trial called the Public Access to Defibrillation (PAD) study, based at the University of Washington. Nevertheless, there is a growing body of research on the location of cardiac arrest.⁴⁻¹¹ This research supports the fact that SCA occurs most often in the home (57%¹²-75%¹⁰). For this reason, there is increasing interest in AED placement in the homes of high-risk individuals.

When SCA does occur in nonresidential or public places, it often occurs as a singular, isolated event. This makes it difficult to predict types of high-risk locations.^{6,8,11} and lends support to the concept of focusing on first responder defibrillation.³ Despite this, some studies have shown a higher incidence in certain locations, listed below.

- Airports⁴
- Community/senior citizen centers⁴
- Dialysis centers^{4,5,8}
- Ferries/train terminals⁴
- Golf courses⁴
- Health centers/gyms⁴
- Cardiology, internal and family medicine practices, and urgent care centers⁵
- Jails⁴
- Large industrial sites⁴
- Large shopping malls⁴
- Nursing homes^{8,9}
- Private businesses⁷
- Sports/events complexes^{4,8}

Should AEDs be placed at this site?

If you can answer “yes” to one or more of the questions below, an on-site AED program should be strongly considered.

- Is it unlikely that the existing EMS system would be able to reliably achieve a “call-to-shock”² interval of five minutes or less at this site?
- Has an SCA incident occurred at this site in the past five years and have the demographics of the population served by this site remained relatively constant?
- Do 10,000 or more persons regularly gather at this location?
- Does this site have a large concentration of persons over 50 years old?
- Is there a high probability of SCA at this site? (See formula below.)

Formula for estimating high probability of SCA¹

1. Take the number of individuals at a particular location and multiply this number by the percentage of people age 50 or over.
2. Multiply this number by the average number of hours spent at the location each day.
3. Multiply this number by 350 if the location is residential or 250 if the location is non-residential. (This equals the number of exposure hours. Locations with 1.4 million exposure hours may experience .48 SCA per year.)
4. If your answer is 600,000 or higher, this location has a high probability of SCA (likelihood of one case every five years).

If it is determined that an on-site AED program is desirable, where should AEDs be placed?

AEDs should be placed in easily accessible, well-marked locations, ideally near telephones. For example, they can be mounted on the wall in the front lobby (if applicable), by exits, near elevators and near fire extinguishers. In settings with mobile units (e.g., golf carts), placement on the mobile units should be considered.

How many AEDs should be placed at this site?

Ideally, AEDs should be placed in such a way that the response interval (time from collapse to arrival of the responder with the AED) is no more than three minutes and the call-to-shock interval is no more than five minutes. The components of the call-to-shock interval include the time it takes designated responders to be notified, access the device, reach the victim’s side, apply the electrodes and deliver the first shock.

Is AED placement enough?

No. Simply placing devices in various locations is not enough. It is important to identify a medical director, develop an on-site AED response plan, train designated responders and conduct periodic AED response drills. For more information on how to address these issues, see www.early-defib.org

¹ Based on a formula developed by the Public Access Defibrillation clinical trial researchers.

References

- ¹This guide is consistent with the Guidelines 2000 for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care, *Circulation* 102(8):I-70-71.
- ² The “call-to-shock” interval refers to the time from 9-1-1 notification to time the defibrillator delivers the first shock. This interval is commonly used as an indication of response time since it is measurable. It is difficult to measure the “collapse-to-shock” interval since the precise time of collapse often is unknown or unrecorded.
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- ⁴Becker L, Eisenberg MS, Fahrenbruch C, Cobb L. Public locations of cardiac arrest: implications for public access defibrillation. *Circulation* 1998;97:2106-2109.
- ⁵Becker L, Eisenberg, Fahrenbruch C, Cobb L. Cardiac arrest in medical and dental practices: implications for automated external defibrillators. *Arch Intern Med* 2001 Jun 25;161(12):1509-1512.
- ⁶Cooper JS, Swor RA, Jackson RE, Chu KH. A critical evaluation of the potential benefits of public access defibrillation. *Prehosp Emerg Care* 1998;2:87-88.
- ⁷Fletcher LM, Persse DE. Locations and characteristics of cardiac arrest in public places. *Prehosp Emerg Care* 1999;3:95.
- ⁸Frank RL, Rausch MA, Menegazzi JJ, Rickens M. The locations of nonresidential out-of-hospital cardiac arrests in the City of Pittsburgh over a three-year period: implications for automated external defibrillator placement. *Prehosp Emerg Care* 2001 Jul-Sep;5(3):247-51.
- ⁹Gratton M, Lindholm DJ, Campbell JP. Public access defibrillation: where do we place the AEDs? *Prehosp Emerg Care* 1999;3:303-305.
- ¹⁰Litwin PD, Eisenberg MS, Hallstrom AP, Cummins RO. The location of collapse and its effect on survival from cardiac arrest. *Ann Emerg Med* 1987;16:787-791.
- ¹¹Millard W, DeMaio VJ, Gant PT, Yahn S. Locations of cardiac arrest in a large urban center (abstract). *Acad Emerg Med* 2000;7:430-431.
- ¹²Cobb LA, Fahrenbruch CE, Walsh TR, et al. Influence of cardiopulmonary resuscitation prior to defibrillation in patients with out-of-hospital ventricular fibrillation. *JAMA* 1998 (Apr 7);281(13):1220-1222.
- ¹³ Some on-site AED programs establish a communications protocol through which 9-1-1 is called first and the 9-1-1 center in turn notifies the on-site response team. Others find it more efficient for the on-site team to be notified first. In either case, the local EMS system, including the 9-1-1 communications center should be notified about the availability of AEDs at the site. On-site locations with computer networks should consider implementation of other internal alert systems.