

# LIVES LOST – The Case for AEDs in Your Organization



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### Automated external defibrillator (AED) use can make the difference between life and death.

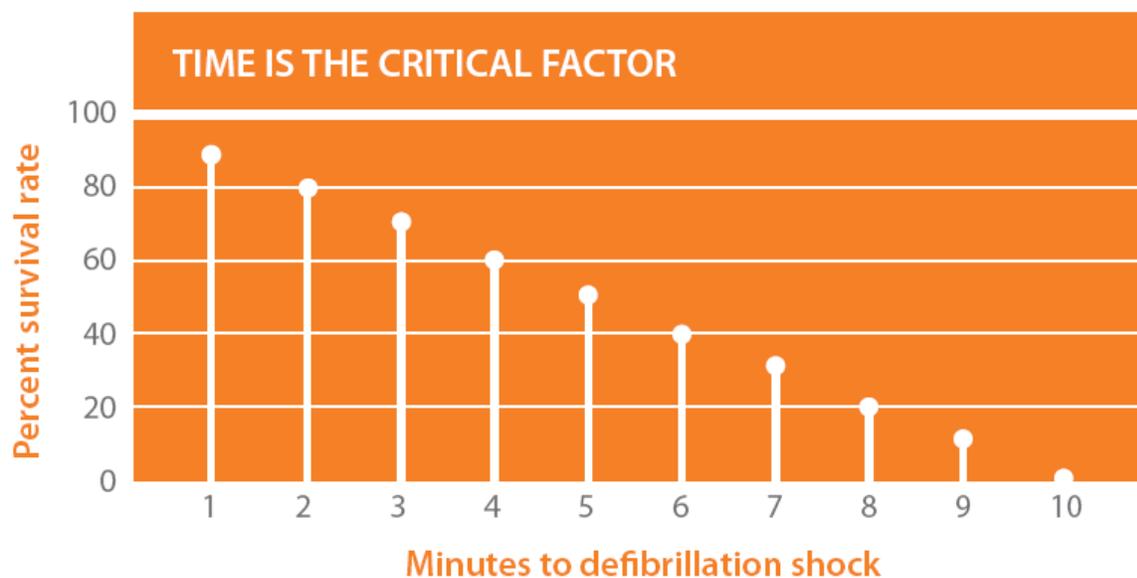
According to the American Heart Association (AHA) and European Resuscitation Council (ERC), a sudden cardiac arrest (SCA) victim requires defibrillation to stop ventricular fibrillation (VF), an often-fatal heart condition. In fact, the only known treatment for sudden cardiac arrest is a shock from a defibrillator, administered as quickly as possible.

The defibrillation shock can originate from a manual defibrillator (administered by a medical professional trained in Advanced Life Support) or from an automated external defibrillator (administered by a trained bystander).

### TIME

It's estimated that more than 95 percent of cardiac arrest victims die before reaching the hospital.<sup>1</sup>

A victim's chances of survival are reduced by 7 to 10 percent with every minute that passes without CPR and defibrillation. Few attempts at resuscitation succeed after 10 minutes.<sup>1</sup>



The sooner the defibrillation shock the better because each minute the brain goes without oxygen diminishes the likelihood the victim will return to a "normal life" – even if resuscitation does occur within 10 minutes.

<sup>1</sup> "Cardiac Arrest," from the American Heart Association Web site, <http://www.americanheart.org/presenter.jhtml?identifier=4481>.



Because time is precious in an SCA emergency, an automated external defibrillator is critical. A typical community without readily accessible defibrillation is challenged to meet the deadline.

- The average call-to-shock time for a “typical community” is 9 minutes.<sup>2</sup>
- Median response time is 6.6 minutes for emergency medical services in mid-sized urban communities.<sup>3</sup>
- In cities, rush hour traffic or crowded elevators in high-rise buildings further delay emergency response.<sup>4</sup>

## PREVALENCE AND RISK FACTORS

Extrapolation of the mortality rate observed in the Resuscitation Outcomes Consortium to the total population of the United States suggests that each year, there are 295,000 emergency medical services (EMS)–assessed out-of-hospital cardiac arrests in the United States.<sup>5</sup>

Sudden cardiac arrest knows no age limit. It can strike anyone, at any time. As many as 7,000 children are struck down by sudden cardiac arrest each year.<sup>6</sup>

For perspective, sudden cardiac arrest takes more lives in America each year than breast cancer<sup>7</sup>, prostate cancer<sup>7</sup>, house fires<sup>8</sup>, firearms<sup>7</sup>, traffic accidents<sup>7</sup>, and AIDS<sup>7</sup> combined.

The risk factors associated with sudden cardiac arrest are similar to those commonly associated with heart disease. They include high cholesterol, high blood pressure, smoking, obesity, congenital heart disease, and diabetes. Other factors can cause cardiac arrest including respiratory arrest, electrocution, drowning, choking, and trauma.<sup>9</sup>

But 50 percent of men and 64 percent of women who suffered sudden cardiac arrest had no previous symptoms of coronary heart disease.<sup>10</sup>

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<sup>2</sup> Mosesso VN Jr, Davis EA, Auble TE, Paris PM, Yealy DM. Use of automated external defibrillators by police officers for treatment of out-of-hospital cardiac arrest. *Ann Emerg Med.* 1998;32:200-207.

<sup>3</sup> Braun O, McCallion R, Fazackerley J. Characteristics of midsized urban EMS systems. *Ann Emerg Med* 1990 May;19(5):536-46.

<sup>4</sup> Lombardi G, Gallagher J, Gennis P. Outcome of out-of-hospital cardiac arrest in New York City: the pre-hospital arrest survival evaluation study. *JAMA.* 1994;271:678-683.

<sup>5</sup> Nichol G, Thomas E, Callaway CW, Hedges J, Powell JL, Aufderheide TP, Rea T, Lowe R, Brown T, Dreyer J, Davis D, Idris A, Stiell I; Resuscitation Outcomes Consortium Investigators. Regional variation in out-of-hospital cardiac arrest incidence and outcome [published correction appears in *JAMA.* 2008;300:1763]. *JAMA.* 2008;300:1423–1431.

<sup>6</sup> Berger, S., Dhala, A., Freidberg, D.Z., 1999. Sudden cardiac death in infants, children and adolescents. *Pediatric Clinics of North America*, (46) 2: pp. 221-34.

<sup>7</sup> National Center for Health Statistics. *National Vital Statistics Report.* Hyattsville, Maryland: Public Health Service. 2003;54(13).

<sup>8</sup> Department of Homeland Security/United States Fire Administration. *National Fire Protection Association Fire Loss in the U.S During 2005.* Emmitsburg, Maryland: USFA. 2005.

<sup>9</sup> American Heart Association. *2006 Heart and Stroke Statistical Update.* Dallas, Texas: American Heart Association, 2006.

<sup>10</sup> American Heart Association. *2006 Heart and Stroke Statistical Update.* Dallas, Texas: American Heart Association, 2006.

From OSHA 3317-06N 2006

## Automated External Defibrillators

With recent advances in technology, automated external defibrillators (AEDs) are now widely available, safe, effective, portable, and easy to use. They provide the critical and necessary treatment for sudden cardiac arrest (SCA) caused by ventricular fibrillation, the uncoordinated beating of the heart leading to collapse and death.

Using AEDs as soon as possible after sudden cardiac arrest, within 3-4 minutes, can lead to a 60% survival rate.\* CPR is of value because it supports the circulation and ventilation of the victim until an electric shock delivered by an AED can restore the fibrillating heart to normal.

All worksites are potential candidates for AED programs because of the possibility of SCA and the need for timely defibrillation. Each workplace should assess its own requirements for an AED program as part of its first-aid response.

A number of issues should be considered in setting up a worksite AED program: physician oversight; compliance with local, state and federal regulations; coordination with local EMS; a quality assurance program; and a periodic review, among others.

The OSHA website at [www.osha.gov](http://www.osha.gov) or the websites of the American College of Occupational and Environmental Medicine at [www.acoem.org](http://www.acoem.org), the American Heart Association at [www.americanheart.org](http://www.americanheart.org), the American Red Cross at [www.redcross.org](http://www.redcross.org), Federal Occupational Health at [www.foh.dhhs.gov](http://www.foh.dhhs.gov), and the National Center for Early Defibrillation at [www.early-defib.org](http://www.early-defib.org) can provide additional information about AED program development.

\* American Heart Association in collaboration with International Liaison Committee on Resuscitation. *Guidelines 2000 for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care: International Consensus on Science, Part 4: The Automated External Defibrillator*. *Circulation*. 2000; Vol. 102, Supplement: I 61. Figure 1.

## IMPACT OF AEDs IN THE COMMUNITY

In cities where defibrillation is provided within 5 to 7 minutes, the survival rate from sudden cardiac arrest is as high as 30–45 percent.<sup>1</sup> Other examples show survival rates as high as 86 percent in some cases.<sup>11</sup>

Nearly 60 percent of all cardiac arrests are witnessed<sup>12</sup>, so if an AED is nearby, chances the patient will receive timely defibrillation therapy is improved. It's estimated that improved access to AEDs could save 40,000 lives a year in the U.S. alone<sup>13</sup> — the equivalent of a cure for breast cancer.<sup>14</sup>

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<sup>11</sup> "Lives saved," from the San Diego Project Heart Beat Web site, <http://www.sdprojectheartbeat.com/pages/livessaved.htm>

<sup>12</sup> Litwin PE, et al. *Ann Emerg Med*. 1987;16:787-791.

<sup>13</sup> American Heart Association. *2004 Heart and Stroke Statistical Update*. Dallas, Texas: American Heart Association, 2003.

<sup>14</sup> National Center for Health Statistics. *National Vital Statistics Report*. Hyattsville, Maryland: Public Health Service. 2003;54(13).



The American Red Cross advocates AED usage. It advises, "Make sure that at least one member of your household is trained in first aid and CPR and knows how to use an automated external defibrillator (AED)."<sup>15</sup>

### **CASE STUDIES: AED USE**

Research studies, communities with public access defibrillation programs, and individuals who have used AEDs agree:

- AEDs are dependable and easy to use.
- AEDs helped revive people who otherwise would have died.

#### **Harrah's Entertainment**

A classic study of the successful use of AEDs by non-medical personnel is in the casino industry: The *New England Journal of Medicine* article described how a combination of good AED placement and training for casino security guards resulted in a 59 percent survival rate for ventricular fibrillation victims when the person was witnessed collapsing.

For victims who received a shock within three minutes of collapse, survival rate was 74 percent.<sup>16</sup> Cardiac Science Powerheart AEDs at Harrah's Entertainment locations have saved more than 200 lives.

#### **St. Margaret's Hospital Foundation**

Cardiac Science Powerheart AEDs are deployed throughout Pittsburgh area as part of St. Margaret's Hospital program called PULSE. Seventeen saves have been made with Cardiac Science AEDs since 2007.

#### **Student Saves on Campus**

Schools often function as community centers and have high number of people on campus at any given time. A recent study showed that 64 percent of SCA victims in US high schools equipped with AEDs survived to hospital discharge.<sup>17</sup>

16-year-old survivor Kaitlin Forbes was saved with a Powerheart AED on school campus. 6-year-old survivor Emiliano Vela was saved by the school nurse with a Cardiac Science defibrillator.

#### **San Diego Project Heart Beat**

Cardiac Science Powerheart AEDs are deployed throughout the San Diego area as part of the community's groundbreaking Project Heart Beat. Since its inception the project has saved 62 lives among 147 attempts, a 42 percent success rate. The project inspired the state of Nevada, the City of Minneapolis, and others to launch Project Heart Beat initiatives of their own (also selecting Cardiac Science as the preferred AED manufacturer).

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<sup>15</sup> "Be Red Cross Ready," American Red Cross, [http://www.redcross.org/www-files/Documents/pdf/Preparedness/checklists/Be\\_Red\\_Cross\\_Ready.pdf](http://www.redcross.org/www-files/Documents/pdf/Preparedness/checklists/Be_Red_Cross_Ready.pdf)

<sup>16</sup> Valenzuela TD, Roe DJ, Nichol G, Clark LL, Spaite DW, Hardman R. Outcomes of rapid defibrillation by security officers after cardiac arrest in casinos. *N Engl J Med.* 2000; 343:1206-9.

<sup>17</sup> Effectiveness of Emergency Response Planning for SCA in US High Schools with AEDs, *Circulation* 2009; 120:518-525.



## **Amtrak**

AEDs, long in use on airplanes, are increasingly common on passenger trains. Amtrak, with 600 Cardiac Science AEDs, has used a defibrillator in an emergency situation 50 times between 2001 and 2009. In 17 cases, the patient was admitted to the hospital in stable condition, a 34 percent success rate.

## **UK Defibrillation Programme**

A 2005 study of public defibrillators in England found that, of 177 witnessed cases of sudden cardiac arrest treated with AEDs, 44 people survived to hospital discharge – a survival rate of 25 percent.<sup>18</sup>

## **Cardiac Science AED Program Management customers**

Among customers who choose Cardiac Science's AED Program Management services to help them manage their AED programs, six reported deployments allowed patients to be admitted to the hospital in stable condition.

## **RECENT AND PENDING AED LEGISLATION**

**Connecticut** Senate Bill 981 was inspired by the 2007 sudden cardiac death of 15-year-old Larry Pontbriant after he collapsed during an annual race. The Connecticut AED in Schools legislation mandates at least one automated external defibrillator (AED) and at least one trained AED responder, provided that the school has money in the budget.

**Oregon** Senate Bill 556 mandates AEDs for businesses with facilities of 50,000 square feet or more that have more than 25 visitors per day.

**California** is now considering a bill to exempt from liability any organization that makes an AED available to the public.

[The law is on your side](#): The Cardiac Arrest Survival Act provides AED users and acquirers with liability protection.<sup>19</sup> In fact, with AEDs becoming common safety devices and becoming the standard of care for sudden cardiac arrest, organizations can be at risk for *not* having these devices on site.

Each state has Good Samaritan laws with language about AEDs. As the name implies, Good Samaritan laws are written to indemnify people who do "good." The laws typically involve three main elements: medical direction (a licensed physician to oversee your program), training (as described above), and record keeping/tracking (of device serial numbers and locations, battery expiration dates, etc.).

## **CLOSING**

Cardiac Science is dedicated to making every community a heart-safe one. We promote AED awareness and publicly accessible defibrillation. For more information, visit [cardiacscience.com](http://cardiacscience.com).

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<sup>18</sup> Whitfield R, et al. The Department of Health National Defibrillator Programme: analysis of downloads from 250 deployments of public access defibrillators. *Resuscitation* 2005; 64: 269-277.

<sup>19</sup> Coverage may vary. Check your local jurisdiction.