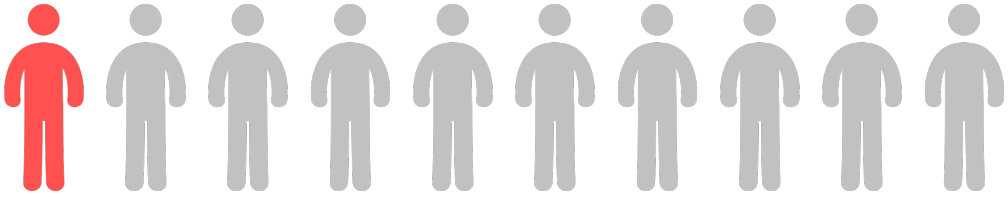
An Introduction to Sudden Cardiac Arrest and Automated External Defibrillators



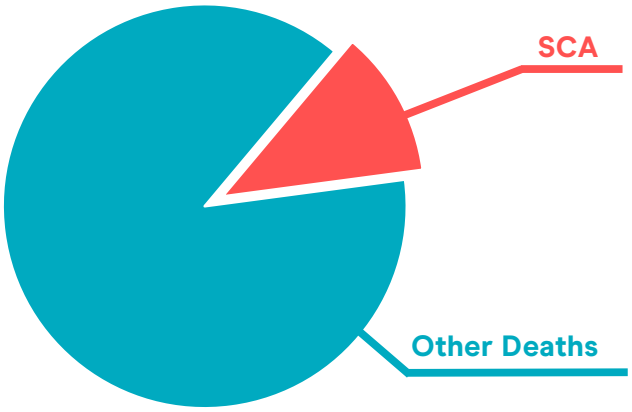
Only 1 in 10 victims of an Out-of-Hospital Sudden Cardiac Arrest (OHSCA) will survive. 350,000 OHSCAs occur each year with a **mortality rate of 90-95%.**[1]

What is a Sudden Cardiac Arrest (SCA)?

An SCA occurs when the heart suddenly stops beating, **causing death within minutes**, even for perfectly healthy people. SCA can result in either a shockable or non-shockable rhythm, and shockable rhythms can be treated via defibrillation. Given enough time, a shockable rhythm will become a non-shockable rhythm, which is untreatable. **About 25% of SCAs**[1] result in a shockable rhythm, most commonly treated using an Automated External Defibrillator (AED).

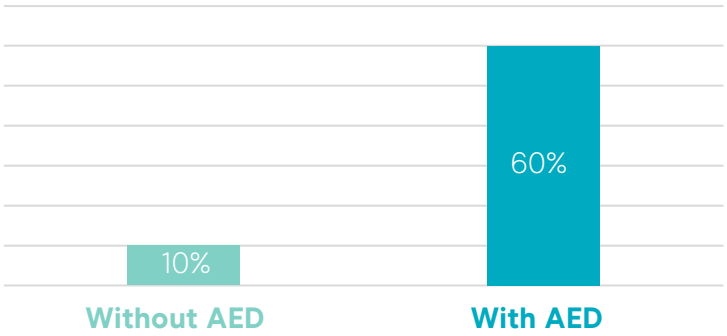
As SCA can lead to death within minutes, a quick response time for treatment is essential. Studies show that **the rate of survival drops by 7-10% for every minute without defibrillation.**[1] The mortality rate for SCA is incredibly high and has remained stagnant for multiple decades, but this can change drastically with improved AED presence.

Annual Deaths in the US



Sudden Cardiac Arrest is the **largest cause of natural death** in the United States, accounting for approximately 325,000 deaths each year.[1]

SCA Survival Rates



In cases that an AED is used within 3-4 minutes, the survival rate from SCAs **jumps up to 60%.**[2]

What is an Automated External Defibrillator (AED)?

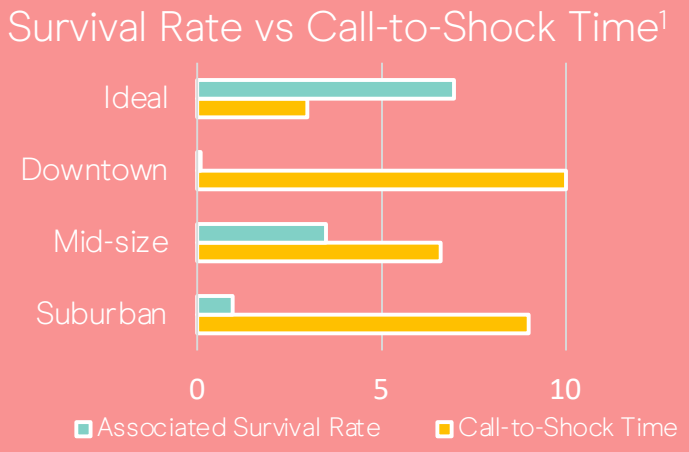
An AED is an automated medical device that delivers a shock to the body from the outside to stop arrhythmia. The electric shock essentially acts as a hard reset on the system, momentarily stopping the heart and then resuming normality.

AEDs require no previous experience and will guide a user through the process of defibrillation. On its own, an AED will detect whether there is a shockable heart rate and can prompt the user as necessary. **AEDs are portable, safe, easy-to-use, and essential for emergency response**, especially when considering the importance of response time in treating an SCA.

Understanding the Need for Public Access Defibrillation Programs

A Public Access Defibrillation (PAD) program constitutes an initiative by an area to make AEDs publicly available. Due to response time and the potential for AEDs to save lives, PAD programs are necessary for all areas, as demonstrated by the case studies shown below.

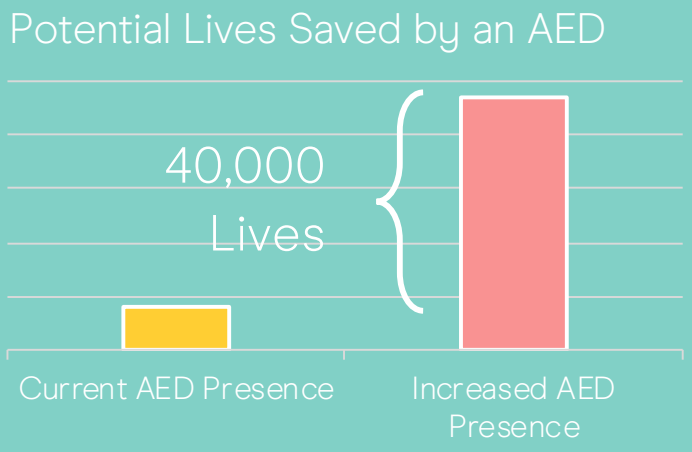
Response Time



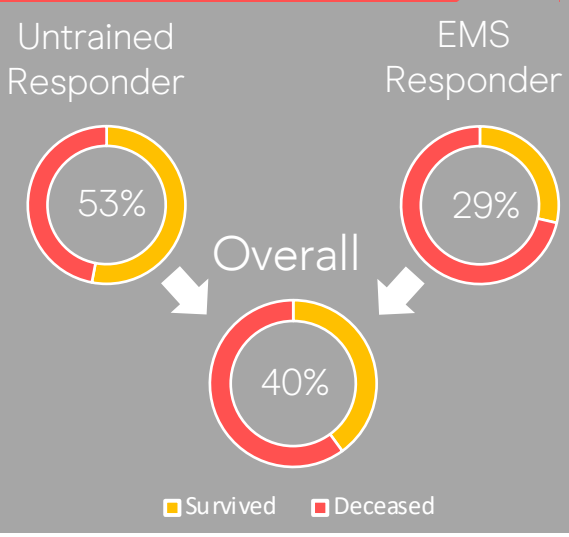
Without an AED present, response to an SCA is entirely dependent on Emergency Medical Services, which often takes too long. **In an ideal situation, response time should be within 3 minutes, leading to a 70% survival rate.** However, EMS at best can arrive in 6 minutes, leading to a survival rate of less than 30%. PAD programs are essential to ensuring that victims of SCA receive treatment in time.

AED Presence

Approximately half of all OHSCAs are witnessed — public access to an AED can greatly improve chances of survival by decreasing response time. **Increased AED presence could save up to 40,000 lives a year,**[3] which is equivalent to curing breast cancer. For reference, breast cancer also claims 40,000 lives each year.



PAD Case Studies



In 41 papers that studied the effect of implementing PAD programs, the median overall survival rate was always higher than the existing survival rate of less than 10%. Along with a **high median overall survival rate (40%),** the survival rate for just untrained responders was much higher (53%) than the survival rate for EMS responders (29%), which emphasizes the **importance of a short response time.**[4] In other words, there are lower survival rates when people cannot take action and wait for EMS.

Endnotes

1. https://cpr.heart.org/AHAECC/CPRAndECC/AboutCPRECC/CPRFactsAndStats/UCM_475748_CPR-Facts-and-Stats.jsp
2. https://www.sca-aware.org/about-sca
3. https://www.nsc.org/safety-training/first-aid/supplies/aeds
4. Bækgaard, J. S., Viereck, S. et. al. The Effects of Public Access Defibrillation on Survival After Out-of-Hospital Cardiac Arrest. Circulation. 2017; 136:954-965. DOI: 10.1161/CIRCULATIONAHA.117.029067.