FACT SHEET

A Race Against the Clock
Out-of-Hospital Cardiac Arrest

OVERVIEW
Cardiac arrest occurs when the heart malfunctions and abruptly stops beating. While it is often confused with a heart attack, cardiac arrest is caused by an electrical malfunction in the heart that prevents the heart from beating normally. A heart attack is caused by a circulation problem in the arteries that prevents blood from reaching the heart. Not all heart attacks cause cardiac arrest, however heart attack is a significant risk factor associated with cardiac arrest.[1,2]

There are more than 357,000 EMS-assessed out-of-hospital cardiac arrests (OHCA) each year in the United States, and nearly 90 percent of OHCA's are fatal.[3] Time is one of the most important factors in determining whether an individual experiencing cardiac arrest will survive. Victims of cardiac arrest who receive prompt medical attention including cardiopulmonary resuscitation (CPR) to increase the blood flow to the heart and brain and/or an electrical shock from a defibrillator to stop the abnormal heart rhythm are much more likely to survive than those who do not receive swift medical intervention. Research suggests cardiac arrest victims who receive CPR immediately have double to triple the survival rates of those who do not.[4] Accordingly, cardiac arrests that occur outside the hospital are significantly more deadly than in-hospital cardiac arrests (IHCA)—nearly 2.5 times as deadly in adults and almost 4 times as deadly in children[3]—as those experiencing OHCA are not surrounded by medical professionals that can provide them with aid.

Education about and awareness of cardiac arrest and the importance of providing immediate medical aid can help improve survival outcomes. Unfortunately, public surveys[5,6] suggest a general lack of awareness about cardiac arrest and the need for prompt medical intervention. Even those among the public who are aware of cardiac arrest and the benefit of providing early invention may not do so because of lack of confidence in administering aid, concerns about hurting the victim, a belief that someone else may be able to provide aid more effectively, and personal liability.[6] Providing education about cardiac arrest and training in intervention techniques that are accessible to lay people can improve the likelihood that cardiac arrest victims are identified and provided with the assistance they need to survive.

WHAT IS CARDIAC ARREST?
The human heart has a complex electrical system that regulates and synchronizes the beating of the heart. When this system malfunctions, the heart can be sent into a dangerously erratic rhythm that prevents blood from pumping normally and can lead to cardiac arrest. Unlike the heart attack victim who may exhibit early warning symptoms, such as chest pain or shortness of breath, cardiac arrest strikes without warning. One minute a person may feel fine, and the next be unconscious and close to death.

CAUSES AND RISK FACTORS
Cardiac arrest may occur in individuals with no known history of heart disease.[7] However, heart conditions, including those that are undiagnosed, are often the causes of cardiac arrest.[7] Risk factors of cardiac arrest include:[8]

- Abnormal heart rhythms (arrhythmias)—like ventricular tachycardia, ventricular fibrillation, or bradycardia
- Scarring of heart tissue—due to prior heart attack or other heart trauma
- Thickened heart muscle (cardiomyopathy)—due to high blood pressure or heart valve disease
- Heart medications—including those that are prescribed to prevent arrhythmias
- Electrical abnormalities in the heart—like Wolff-Parkinson White syndrome and Long QT syndrome
- Blood vessel abnormalities
- Use of certain recreational drugs like cocaine or amphetamines

WHO SUFFERS CARDIAC ARREST?

While adults are more likely to suffer cardiac arrest than children, cardiac arrest can affect anyone, regardless of age.[3] Cardiac arrest mortality is high among very young children (<1 year old). Cardiac arrest decreases from ages 1 to 14 and increases each subsequent year from age 15 onward.[3] The mortality rate from cardiac arrest has declined in the past 20 years.[3]

Rates of cardiac arrest also display historical patterns of health disparity. Research suggests racial and ethnic minorities like blacks and Hispanics suffer higher rates of OHCA than their white counterparts.[3] Meanwhile, OHCA rates in lower socioeconomic census tracts are higher than rates in higher socioeconomic census tracts.[3]

SURVIVING CARDIAC ARREST

Treatment of cardiac arrest is a race against the clock. The combination of early, immediate CPR and defibrillation can significantly improve a victim's chance of survival.

The American Heart Association recommends implementing the **Chain of Survival**[9] to rescue cardiac arrest victims:

- Immediate recognition of cardiac arrest and activation of the emergency response system
- Early CPR with an emphasis on chest compressions
- Rapid defibrillation if indicated
- Basic and advanced emergency medical services
- Advanced life support and post- cardiac arrest care

TRAINING CURRENT AND FUTURE LIVESAVERS

Administration of CPR is critical to the survival of victims of cardiac arrest. Unfortunately, not enough people are able to deliver effective CPR. Expanding the population of bystanders-turned-rescuers through training and education can help empower non-medical professionals to identify the signs of cardiac arrest and act to assist victims.

A growing body of research is exploring what aspects of training and education will affect the willingness of bystanders to intervene in cardiac arrest emergencies, provide quality medical intervention, and improve patient outcomes.[4] Evidence suggests both instructor-led and/or self-directed CPR training sessions with real-time or delayed feedback can be effective at preparing bystanders to respond to cardiac arrest.[4] Periodic refresher training courses that focus on developing skills and confidence to intervene are also beneficial.[4] Traditional CPR training teaches both compression and ventilation techniques, but newer evidence suggests compression only CPR training may also be appropriate and effective.[4]

In the fall of 2017, there were 59.5 million students enrolled in public, public charter, or private primary or secondary schools.[10] With the proper training and education, these millions of students represent an enormous population of bystanders-turned-rescuers. Universal CPR training in high schools can teach a substantial portion of the population how to deliver this lifesaving technique and help increase the likelihood that individuals suffering a cardiac arrest will receive high quality CPR. As of 2018, thirty-eight states and Washington, DC require CPR training as part of their high school curriculum.[11] Still, there are 12 states that do not require such training. Training students in every state across the country in CPR will fill schools, as well as entire communities, with lifesavers.

GREATER ACCESS TO AEDS

When CPR cannot restart normal heart rhythm during cardiac arrest, rescuers can also turn to automated external defibrillators (AEDs). An AED is a simple-to-use portable device that is used to shock the heart of a person suffering a cardiac arrest to return the heart to a normal rhythm. AEDs are available in a variety of public settings – from schools to offices to airports. Used by both trained emergency responders and bystanders, the AED is attached to the victim and delivers an electric shock when it detects a dangerous heart rhythm. The devices provide audible step-by-step instructions to the user and independently determine if a shock is needed, making them very easy for almost anyone to use.

In cardiac arrest emergencies where bystanders used AEDs before emergency medical services arrived, patients were over two and a half times as likely to survive their cardiac arrest and had better functional outcomes than those who did not receive bystander defibrillation.[12] Lay responders play a crucial role in achieving high survival rates, and more AEDs and CPR training for these individuals are needed to provide this life-saving treatment. Despite widespread public support for increasing federal funding for cardiac arrest research, education and treatment, such funding has been cut.

THE ASSOCIATION ADVOCATES

The American Heart Association advocates for a comprehensive approach to addressing out-of-hospital cardiac arrest, including:

- Greater research into its underlying causes.
- Improved data collection on out-of-hospital cardiac arrest; how it affects different populations; and the effectiveness of treatment methods.

- Promoting the use of recognized emergency medical dispatch protocols and appropriate quality improvement programs among 911 dispatch agencies to assure that bystanders promptly receive effective CPR coaching and support for efforts to train dispatch personnel to provide pre-arrival medical instructions.
- Supporting legislation and policies that encourage bystander CPR, including requiring all students to be trained in CPR and AED prior to graduating from high school.
- Championing public policy initiatives that promote the development of Medical Emergency Response Plans (MERPS), which includes placing AEDs in public places where cardiac arrest is likely to occur.
- Advocating for funding the *Rural and Community Access to Emergency Device Program* at the FY 2005 level of $9 million annually, so that more lives can be saved each year.
- Extending Good Samaritan law coverage to all AED users and program facilitators.
- Increasing public awareness of out-of-hospital cardiac arrest and its causes through activities such as CPR and AED Awareness Week each June.[1]

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