



# Every Second Counts. Every Action Matters.



## A Community Response Planning Guide for Sudden Cardiac Arrest



HeartRescue  
PROJECT

Every second counts. Every action matters.



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## SCA Facts

**Sudden cardiac arrest is a public health crisis, killing an estimated 295,000 Americans each year.** (Circulation,2010; 121:e46)

- Nationally, 92% of those who suffer SCA die before reaching the hospital — a rate that hasn't changed significantly over several decades.
- SCA kills six times more Americans each year than breast cancer. And more than AIDS, lung, breast and prostate cancer combined.
- Your chances of survival fluctuate by as much as 500 percent, depending on where you live in the country. (JAMA,2008;300:1423)

**SCA is a treatable disease. Improving survival rates requires measurement and a coordinated community response.**

- No single national data collection standard currently exists to capture incidence and outcomes. Only through measurement can we make informed decisions and replicate best practices.
- Improved survival rates require a collective community response by the general public, first responders, EMS services and in-hospital caregivers.
- Success begins with public bystanders. Communities with higher bystander CPR participation have higher SCA survival rates.
  - Eighty percent of SCA events occur in the home.
  - Everyone should recognize and know how to call 911, start chest compressions and how to find and use an AED.

# Every Second Counts. Every Action Matters.

## A Community Response Planning Guide for Sudden Cardiac Arrest

*A Medtronic Foundation Publication*

The Medtronic Foundation is pleased to provide you with this planning guide to assist your efforts to increase sudden cardiac arrest (SCA) survival rates within your community.

This guide was compiled by experts at The Ohio State University Medical Center and reviewed by HeartRescue Project Partners. It includes current information on many of the individual actions upon which SCA survival depends as well as valuable resources and references.

It is designed to provide a comprehensive, yet practical, step-by-step approach to improving SCA survival at each of three distinct levels of response and care.

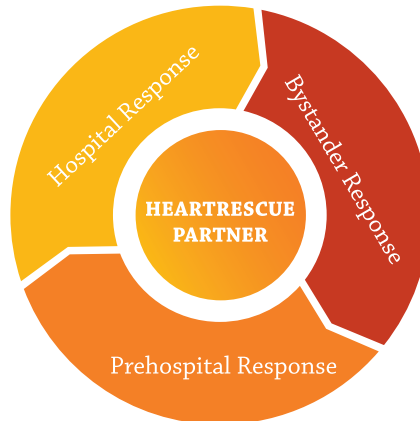
### About HeartRescue

The HeartRescue Project is an unprecedented, collaborative effort to increase sudden cardiac arrest (SCA) survival rates in the United States, improving how SCA is recognized, treated and measured.

Funded by the Medtronic Foundation and working with the country's leading emergency and resuscitation experts, the project is focused on systemically developing and expanding SCA community response systems.

The approach relies on the delivery of best practices at three critical levels of response: prompt action from bystanders, rapid response and quality care delivered by emergency medical services and first responders, and a coordinated approach to the provision of specialized post-arrest care in the hospital.

The vision is for every American who suffers SCA to receive lifesaving, state-of-the-art care at the scene, en route, and in the hospital.



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## The HeartRescue Partners

### **University of Arizona Sarver Heart Center, Arizona Department of Health Services**

Arizona has a unique SCA reporting and education network called SHARE (Save Hearts in Arizona Research and Education), which includes the majority of Arizona residents. The SHARE network implements effective new SCA approaches statewide. On the research side, the University of Arizona Sarver Heart Center has developed a national reputation for its leadership in chest compression-only CPR. Strong partnerships between government agencies, hospitals, and research groups provide this organization with a solid backing.

### **The University of Minnesota, Cardiovascular Division**

The University of Minnesota Medical School-Cardiovascular Division leads the Minnesota Resuscitation Consortium, a state-wide partnership of organizations and acute care physicians focused on providing a new platform of treatments and technologies to more rapidly deploy and evaluate advances in the treatment of sudden cardiac arrest.

### **Duke University, Wake County EMS, North Carolina Office of EMS**

In North Carolina, the RACE CARS program (Regional Approach to Cardiovascular Emergencies Cardiac Arrest Resuscitation System) makes up the largest statewide system of emergency cardiovascular care, coordinating 119 hospitals and 540 EMS agencies to rapidly diagnose and provide emergency treatment for heart attacks and sudden cardiac arrest. Part of this strategy includes community education and reducing disparities in SCA treatment.

### **University of Pennsylvania Center for Resuscitation Science**

The University of Pennsylvania is world renowned for its research and training in therapeutic hypothermia: the cooling of SCA patients to minimize brain and organ damage. Furthermore, Pennsylvania is tackling sudden cardiac arrest deaths through a statewide collaborative effort to increase SCA survival rates and patient outcomes through prompt bystander intervention and EMS response, and to improve data collection and implementation of best practices during post-arrest and in-hospital care.

### **University of Washington, Cascade HeartRescue Program**

Seattle and surrounding King County both report one of the highest sudden cardiac arrest survival rates in the world thanks to longstanding work by dedicated emergency medical services (EMS) providers and physicians in Washington state. Education has played a key role in this success. More than 70 percent of the Seattle area population is trained in CPR. The Cascade HeartRescue program is an ongoing collaboration of the Harborview Paramedic Training Program, the Medic One Program of Seattle Fire Department, King County Emergency Medical Services and the University of Washington-Harborview Center for Prehospital Emergency Care whose goal is to improve cardiac resuscitation care and outcome throughout Washington state.

## How to Cite This Publication

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## Community Initiatives to Improve Survival

Survival from out-of-hospital cardiac arrest is directly linked to the system of care that exists in the community. When the following events occur, the victim has the best possible chance for survival:

- A bystander recognizes what happened and activates the emergency response by calling 911.
- CPR with an emphasis on chest compressions is initiated immediately.
- An AED is rapidly applied and a shock delivered as indicated.
- EMS professionals respond quickly and perform effective resuscitation techniques.
- The receiving hospital provides state-of-the-art integrated post-cardiac arrest care.

Failure to provide any of these critical interventions will significantly decrease survival. To maximize survival, each of the steps described above must be comprehensively evaluated, tested, and improved.

Communities exhibit a wide variation in survival rates, from 0% to 48% (median 18%) for *EMS-treated bystander witnessed ventricular fibrillation arrest*.<sup>[1-3]</sup> The variation between communities is reduced through efforts to increase bystander CPR, ensure AED usage, and provide the highest quality EMS care. A cardiac arrest victim is twice as likely to live when bystanders give CPR, and survival can again be doubled when AEDs are used.<sup>[4-5]</sup>

Members of the general public can help improve survival from cardiac arrest in several ways. They can learn CPR or purchase an AED for their school, church, or business. They can ask their elected representatives how effectively their community's system of care for victims of cardiac arrest is functioning. Finally the public must demand change when the system is failing those victims.

***EMS-treated bystander-witnessed ventricular fibrillation is the standard SCA survival statistic used in this document unless otherwise noted. These victims have the best chance of survival and serve as a sentinel measure for the system of care.***

## Bystander Action

The critical first step is recognizing out-of-hospital cardiac arrest (OHCA) and reacting appropriately. Most Americans are aware that they are expected to activate the EMS system in an emergency and are more than willing to dial 911. Taking the next step to actively intervene is challenging. Nationwide, only about 25-30 percent of OHCA victims receive any CPR prior to the arrival of a 911 responder, and only 2.1 percent receive the benefit of public access defibrillation.<sup>[5]</sup> The reasons for inaction are complex and may include lack of knowledge about what cardiac arrest looks like, a sense of incompetence in performing life-saving actions, a diffusion of responsibility when multiple potential rescuers are present, fear of hurting the victim, and concern about exposure to legal consequences.



Data to quantify the effect that activities such as public service announcements or mass bystander CPR training have on bystander action are limited. Some communities have invested in these types of activities to encourage bystander action with promising results. A marketing campaign may inform potential rescuers about the opportunity to learn life-saving chest compressions. Marketing campaigns may also change the perception of bystanders from a fatalistic view to one that allows the potential for saving the victim, and can also educate about the lack of potential legal liability. The campaign can also change the social expectations for action. Messaging can raise an expectation for action.

## Enlisting Support for Community Awareness Activities

Raising public awareness around OHCA requires intensive messaging to the public. Identifying, educating and engaging allies from within the community requires an organized approach. Key allies include the local EMS and hospital leaders. Partnering with EMS facilitates getting buy-in from public officials and others.

To organize the approach, the following steps may be helpful:

1. Identify stakeholders and influential leaders in the community. Examples include:
  - Elected officials, including Mayors, City Councilors, and County Commissioners
  - EMS administrators and medical directors
  - Health Department directors
  - Public Safety administrators, including police and fire chiefs
  - Public utility leadership
  - Local radio, television, and media personalities
  - Community organizations and service club leaders for Rotary, Junior League, hospital auxiliaries, etc.
  - Health club and community recreations center directors
  - Businesses with ties to the community, including insurance agencies, auto dealers, grocery stores, beauticians, barbers, financial advisors, and attorneys
  - School administrators, health teachers, and coaches
  - Ministers, priests, rabbis, and other religious leaders
  - Neighborhood group leaders and staff
  - Professional, semi-professional or amateur sports team owners, coaches, and players
  - Youth activity leaders including Boy Scouts, Little League, and softball leagues.
2. Research potential stakeholders' missions and what might motivate them to want to join forces with you.
3. Craft the message individually for each stakeholder with their mission and motivation in mind.

4. Tie the message for the stakeholder to a specific request, examples might include:
  - Sponsor an ordinance
  - Declare a CPR/AED awareness day
  - Produce a public service announcement
  - Request public reporting of SCA survival rates to the community
  - Identify local funding sources for equipment or activities
  - Assist in the organization of CPR/AED training sessions
  - Install an AED in a particular location
  - Require reporting of AED location to local EMS authority
  - Participate in an annual SCA Survivor Celebration
5. Communicate a specific message to the community using a variety of media techniques
  - The more sources from which a message emanates, the more likely it is to be used in planning and decision making.
  - Convey information using flyers, mailings (water bill inserts), reports, web sites, list servers, social media, conferences, hearings, sports scoreboard and half-time announcements, radio, TV, person-to-person communications and networks.
6. Practice community building by empowering individuals and groups of people by providing them with the skills they need to effect change in their own communities. For example:
  - Provide train-the-trainer CPR skills to groups (scouts, service clubs) and assist them to implement a program to provide compression-only CPR/AED training.
  - Create a local SCA Survivor group linked to a national organization and assist them in supporting new survivors and families as well as empowering them to demand system improvement.

## Bystander CPR Training in the Community

Training in CPR is an important component of optimizing the community response. People who have been trained in CPR during the preceding five years are much more likely to help than are those who were never trained or who were last trained more than five years ago.[6]

### Traditional Approaches

Traditional certificate-based CPR courses designed for lay rescuers often entail a several hour time commitment and cost approximately \$50. They are useful for individuals who wish to receive additional training or whose jobs require certification.

In 2010, about a quarter of SCA victims in the CARES registry (Cardiac Arrest Registry to Enhance Survival) received CPR prior to arrival of EMS. That proportion is consistent with training data suggesting 20% of the population had been trained in CPR in the previous five years. CPR is a psychomotor skill which requires practice to create muscle memory, but even a few minutes of practice may be sufficient to perform effective chest compressions in an emergency.[7] Training enough people in CPR to ensure that the lifesaving procedure will be provided for at least half of the witnessed OHCA cases in a community requires reaching a very significant portion of the population. However, with the introduction of short skills training, such as compression-only CPR in ten minutes or less, the task may not be as daunting as it appears.

Attempts to train many community members using traditional methods have had limited impact in most communities. This clearly requires a concerted effort. The menu of activities used to accomplish this training may include:

- Integration into the curriculum of local schools
- Encouragement of businesses to provide CPR training for their employees
- Offering short training sessions at health fairs, and ongoing training at local fire stations or other health or training facilities
- Ensuring that high-risk patients and their families are trained in CPR before discharge from the hospital

One way to get significant media exposure is to hold a mass CPR training event. While these events require extensive planning relative to the number of people trained, many more people are made aware of CPR through the media coverage. Involvement of celebrities and cardiac arrest survivors with compelling stories can facilitate media coverage. Typical events require planning up to a year in advance. Large scale CPR/AED training activities can involve a few or many local groups such as:

- Local celebrities, media and politicians
- Local champions, medical professionals and survivors
- Sports teams
- Churches
- Clubs, community organizations, hospital initiatives
- Colleges and universities, local school groups

Training efforts need to be ongoing and sustainable, necessitating commitment from community institutions such as churches and schools. Large and small organizations and companies can offer CPR training as a part of the company's human resources orientation program so that new employees can be trained as they are hired and existing employees can obtain refresher training on a regular basis. This level of effort requires both personnel and resources and takes a significant commitment.

# Non-Traditional Approaches to Increasing Bystander CPR in a Community

## Reframing the CPR/AED Training Message

The relatively simple compression-only CPR technique has reduced barriers to training. Potential rescuers only need to learn the “3 Cs”:

- Check the victim
- Call 911 and get an AED if one is available
- Compress the chest by pushing hard and fast

Expecting everyone to provide compression-only CPR for adults who suddenly collapse is more practical than the previous approach of recalling a complicated dance involving positioning the victim, counting compressions and changing rescuer positions to deliver a prescribed, but often forgotten, number of breaths. While many health care professionals believed that bystanders were reluctant to provide CPR because of fears of disease, we have learned that the reasons for non-performance were much more about the fear of performing the skills incorrectly, which bystanders thought might be harmful to the victim.[6, 8-9]

The simpler CPR approach offers an opportunity to reframe the message to the public. Establishing the expectation that citizens must help is critical. The CPR message is active and essential as opposed to passive and optional. Many individuals believe that their actions are not needed and that only professionals can be of help. They also believe that someone else will step up and act. Each person in the community must understand that their individual actions are required to ensure that the efforts of EMS and hospital personnel are successful.

### *The Message*

- CPR is essential in order to maximize the victim’s chance of survival.
- If CPR is not provided to a SCA victim within a few minutes, they will likely die.
- No advanced therapy is more important than CPR. Waiting for help to arrive will decrease the chances of survival.

## Training Resources

Both the American Red Cross and the American Heart Association offer compression-only CPR training in addition to traditional CPR instruction.

The Red Cross uses a program called “CPR Made Simple” which takes about one hour and costs \$20. Information about classes and times can be obtained through your local Red Cross chapter. Many locations will arrange group training sessions with advanced notice. [www.redcross.org](http://www.redcross.org)



## CPR Anytime

Many people who receive training in CPR do so as a part of employment training. On average, they are younger than the typical witness to a OHCA. To address the challenge of training adults who are in the age group of interest, the American Heart Association, in association with Laerdal Medical Corporation, produced the CPR Anytime kit which sells for around \$40.00 and can be used for training individuals or groups. [www.cpranytime.org](http://www.cpranytime.org)

The kit includes a small inflatable manikin (light skinned or dark skinned) and a DVD (Spanish and English) with a do-along demonstration of compression-only CPR as well as instructions for using an AED. The training does not have to be delivered by an official instructor, but it does require the availability of a DVD player. The compression-only CPR self-instructional program can be completed in as few as 10 minutes. If the student wants to learn more, such as providing rescue breathing for children, the DVD has additional chapters available.



This product was designed to be shared with the learner's family members and friends, multiplying the number of individuals trained with one kit and reducing the cost per person of the training. If students use the kits in school, they can be asked to train their parents and grandparents, thereby reaching adults who are most likely to witness cardiac arrest.

While the kits are readily accepted by individuals, they may often be shelved, and unused unless a training session is scheduled. Scheduling a training session using a leader, in a setting such as a brown bag lunch at work, before dinner at home, or after church services, is one strategy for ensuring that the box does get used.

## Reusable, Portable Torso Manikins

While it is not essential to use CPR manikins to teach compression-only CPR to lay rescuers, having a realistic chest upon which they can practice the skill is helpful. The type of manikin shown at right provides an excellent, reusable training platform, is easy to clean, and is simple to package for travel.

The cost may be a barrier for some programs, but if a community group is providing a fair number of classes per year, these "dummies" may work well. Your training group may find that they are able to recoup the cost through donations or a small fee charged for the training.

Information on obtaining these manikins can be found by searching the Internet.



Adult/Child 5-pack CPR Manikins

## Development of Community CPR Training Programs

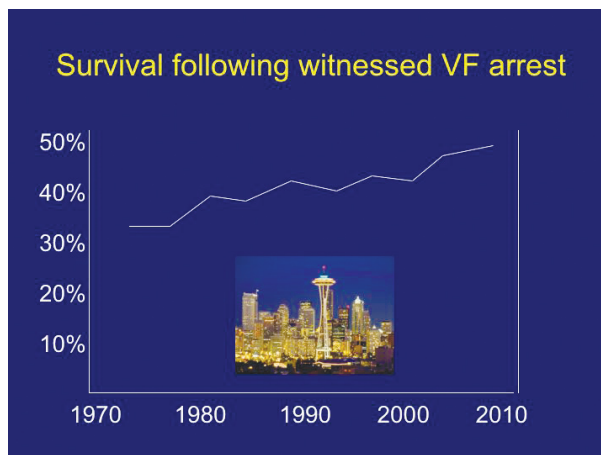
### Seattle Medic Two CPR Training

In Seattle, Washington, the 2009 survival rates for *EMS-treated witnessed VF* have reached 49%, according to Tom Rea, MD, Medical Director of King County Medic One. For decades, the activities of the EMS programs in Seattle and surrounding King County have served as the role models for communities and EMS systems who work to improve their SCA survival rates. Their commitment to excellence has driven a multitude of quality improvement initiatives designed to evaluate the system. To reach a 49% survival rate among witnessed VF SCA victims, Seattle Fire Department, [www.seattle.gov/fire/medics/medicOne.htm](http://www.seattle.gov/fire/medics/medicOne.htm), a fire department based EMS system, has been measuring all aspects of their community's response to out-of-hospital cardiac arrest (OHCA) since the early 1970's.[10] Using the measurements to identify opportunities, the system has made continual improvements in survival over more than three decades.

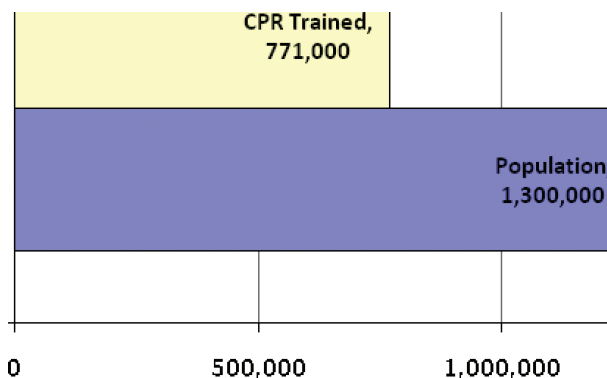
In 1971, to improve a victim's chances of receiving bystander CPR, Dr. Leonard Cobb organized Medic II, the public training arm of the Seattle Fire Department. Over the next two years, the program trained over 100,000 citizens in CPR. The Medic II Program (<http://www.seattle.gov/fire/medics/medicTwo.htm>) taught CPR to more than 771,000 people through 2009, and it continues to provide CPR training for about 13,000 Seattle/King County residents each year. Over time, more than half of the 1.3 million residents of the Seattle and surrounding King County area have received CPR training. During 2008, bystanders initiated CPR for 58% of victims who were in cardiac arrest when EMS arrived, a figure considerably higher than most other communities.[11]

### 911 Dispatchers Are Critical

All communities should provide CPR instructions over the telephone when someone calls 911 to request assistance for a sudden cardiac arrest. Dispatchers who assertively provide CPR instructions to the caller at the time of the emergency significantly increase CPR rates, and that saves lives.



Survival to discharge from the hospital following OHCA improved in Seattle over 35 years.



Impact of CPR training in Seattle and King County, WA over 38 years (1971-2009).

Providing dispatcher-assisted CPR instructions requires meticulous training of the defined group of 911 dispatchers and call takers, but they are an accessible group to train. Since the number of 911 call takers is a small fraction of the community's population, this strategy provides a very effective approach for increasing the rate of bystander CPR. The EMS Medical Director can tell you more about your community's plan to increase bystander CPR using telephone CPR instructions.

### *The Seattle & King County Experience*

Dispatcher-assisted CPR instructions were first implemented in Seattle in 1981. The original goal was to provide CPR instructions over the telephone to bystanders while waiting for EMS help to arrive. In recent years, the instructions have evolved to consist of a very quick assessment of whether CPR is required followed by especially assertive instructions to motivate the caller to start CPR as quickly as humanly possible.

The program is successful. In 2010 in Seattle and surrounding King County, the overall rate of bystander CPR is above 50%. Among all victims who receive bystander CPR in these communities, 60% is provided by citizens who know CPR, and 40% is provided by citizens who are directed by the 911 dispatchers. The Seattle and King County programs includes comprehensive quality improvement activities, with targeted training for the dispatchers and routine review of all 911 calls possibly related to OHCA. The time it takes to get CPR started as well as other benchmarks are routinely shared with the dispatchers to improve their performance.

## Improving Bystander CPR in a Community: Examples

Communities outside of Seattle and King County also have noteworthy approaches to CPR training. Some use marketing messages to encourage prompt action. Others use cardiac arrest survivors to facilitate CPR training classes.

### **Arizona SHARE Bystander CPR Initiative**

The Arizona SHARE (*Save Hearts in Arizona Registry & Education*) Program promotes a comprehensive, standardized system of out-of-hospital cardiac arrest care throughout Arizona encompassing all "links" in the "chain of survival"—bystander response, emergency medical dispatcher CPR instruction, Emergency Medical Services provider resuscitation, and standardized care at hospitals.

The AZ SHARE website, [www.azshare.gov](http://www.azshare.gov), offers a large number of resources and tools targeted for SCA survivors, the general public, and other groups (businesses, schools, hospitals) that can be used to improve awareness of SCA and to encourage bystander CPR Training.

Since 2005, the SHARE program focused on raising bystander CPR rates. It was the first program to train lay persons to deliver compression-only CPR. By using a variety of methods, the Arizona SHARE program reached over 500,000 individuals in the state through training classes, video viewing, and other marketing methods.

Audio and video messages promoting bystander CPR include a one minute podcast that discusses the rationale for using compression-only CPR. Available YouTube videos include a 6 minute video on compression-only CPR and a five minute video showing how to use an AED. Visit [www.azshare.gov](http://www.azshare.gov) for links to YouTube videos.

## ***Chest Compression-Only CPR Campaign in Arizona***

- Website (www.azshare.gov)
- Brief online video training
- In-person, free training in many locations throughout the state, primarily sponsored by fire departments
- Free training kits sent to schools with 6th – 12th grades—students were encouraged to teach family members
- Public service announcements made by the Governor and local sports celebrities
- Inserts mailed in utility bills
- Tables at health and safety fairs by Boy Scouts, fire departments, schools, etc.
- Newspaper articles and editorials
- Training video looped on public access cable channels
- Summer youth classes taught by youth corps volunteers
- Local radio spots and interviews
- Special features on local and national TV
- Frequent email updates distributed to stakeholders

The SHARE program tracked the bystander CPR rates across the state. The multiple efforts paid off. Bystander CPR increased from 28% of cardiac arrests in 2005 to 40% in 2009. The increase in bystander CPR was associated with increased survival, as well.[12]

## **Minnesota Bystander CPR Training**

Using the American Heart Association’s Family and Friends CPR Anytime® Kit, the Minnesota SCA Survivor Network, <http://www.mnscasurvivor.org/> conducts school and community CPR and AED training throughout the state. When there is a need for a bystander CPR class, the survivors travel to the location to teach the class. The survivors are a dedicated group of volunteers that spend hundreds of hours every year making sure citizens of Minnesota are trained. Because the survivors tell their stories, learning CPR has a memorable impact on the participants.



SCA survivors and their families help to increase public awareness of SCA as well as to provide CPR training for bystanders. The Minnesota survivors are among the most active advocates of CPR training and SCA awareness in any area of the country.



Survivors wear bright orange Survivor t-shirts when teaching CPR classes and pulling wheeled duffle bags embroidered with the MN SCA Survivor Network logo. The MN survivors have 10-15 CPR Anytime manikins in each bag, along with a DVD player and AED trainer.

## Impact of optimizing bystander CPR

Overall, survivors comprise only about 8% of the nearly 200,000 people for whom EMS attempts resuscitation each year in the United States and Canada.[13] This leaves much room for improvement. Improving the survival rate by just 2 percentage points across the country, from 8% to 10%, would save 4,000 additional lives each year.

To extend survival rates into excellent territory requires choreography of the care provided for OHCA victims. This begins with bystander CPR, and must involve clear and direct EMS dispatch CPR instructions, as well as the effective efforts of EMS professionals and hospital personnel. Because of the interdependence of each of layer of care, it is essential that participants at all levels understand the necessity of a continuous commitment to success. OHCA survival can be substantially improved, and stakeholders must ensure that programs and initiatives in their communities are successful.

Incremental Benefit of Improving OHCA Survival Rates in the U.S. and Canada*		
Survival Rate	Number of Lives Saved	ADDITIONAL Lives Saved
8%	16,000	0
10%	20,000	4,000
12%	24,000	8,000
15%	30,000	14,000
20%	40,000	24,000

*\*200,000 estimated resuscitations annually*

## Checklist of Community Involvement Activities

Each community must assess both its strengths and limitations when generating an action plan for improving survival from sudden cardiac arrest. The following activities and steps to encourage community involvement have been successfully implemented across the country.

Ensure that there is committed leadership with physician involvement.

- Physician leadership can bring together citizen, government, EMS system, and hospital stakeholders to ensure a comprehensive, iterative system for improving SCA survival.

Measure and publicly report OHCA survival to hospital discharge rates annually.

- Continuous quality improvement efforts must be linked to clinical outcomes and reported accurately to the community.

Educate community leaders and stakeholders about cardiac arrest survival in their community.

- This may be best accomplished in person. Go armed with FACT SHEETS emphasizing the details you want to be remembered.

- Visit stakeholders from local government, public safety, school systems, faith-based organizations, service organizations and businesses. Involve them in your efforts by harnessing the people-power they represent to provide education and training to their constituents.

Obtain written commitment from local stakeholders to use toward building a true community partnership.

- Examples of “asks”:
  - Generic letters of support for later use as documentation for funding or other support
  - Letters of commitment to a particular activity, such as CPR/AED training
  - Letters of commitment to a particular resource, such as the provision of space, advertising or public service announcements
- Community groups can raise funds to purchase and place AEDs in locations that matter to the community, such as a local church, a community sports field, or other community gathering place.
- Sports teams can sponsor mass CPR training events at their stadiums or arenas.

Build a strong partnership with EMS leaders and providers in your community. Enlist EMS to assist in encouraging and providing CPR and AED training, and to assist in coordinating survivor events.

Establish an annual survivor celebration event to honor the 911 call takers, EMS professionals, and bystanders who helped save a life.

- Survivors are generally interested in relating their stories. These events can bring survivors together and may stimulate the development of local advocacy and support groups among survivors.
- EMS Week during May is a popular time to hold these annual events, as is Heart Month in February.
- While the focus will be on the survivors over the preceding year, inviting survivors and families from previous years can help the event have greater impact.

Involve and educate local celebrities who may help to serve as masters of ceremony for OHCA survivor celebrations and training events.

- Sports stars, local media personalities, and well known community leaders have contributed in many cities.

Establish a system/clearinghouse for handling requests for public appearances, training sessions, and media opportunities in your community.

Establish a web presence with up to date national and local facts about OHCA that individuals (media, advocates, laypersons) can refer to for reliable information. Be sure to include a training session calendar and links to related resources such as the Medtronic Foundation HeartRescue program ([www.TheHeartRescueProgram.org](http://www.TheHeartRescueProgram.org)).

Create a local chapter of a national group of survivors such as the Sudden Cardiac Arrest Association ([www.SuddenCardiacArrest.org](http://www.SuddenCardiacArrest.org)).

- Local survivor chapter members can be powerful allies in advocacy. They can also help with survivor events and serve as a resource to “new” survivors.

Train and empower local groups to provide CPR training. Facilitate their efforts by providing needed supplies, encouragement, support, and reporting of number of people trained.

## Tips for Developing OHCA Fact Sheets

Fact sheets are one-page documents (can be two-sided, if needed) that provide basic information in an easy-to-read format. They are particularly useful to policymakers who need clear and concise information to help them make decisions. These can be distributed in person, via e-mail, or reprinted in newsletters; and they can be adjusted easily to accommodate different audiences.

### Content

- Use a short but compelling title.
- Ensure that the fact sheet can stand alone.
- Keep text brief, use present tense and active language understandable to non-medical people
- Do not bury the headline. Put the most important information in the first paragraph. For example, “100 people died in the City of Metropolis last year who should have lived.” Use highlighting or text boxes to emphasize information.
- Contact information should be visible on the front page.

### Layout

- Using 10-14 point font and a two column format often works well for quick readability.
- Begin the document with the words “Fact Sheet” followed by a brief headline explaining the subject in lay terms.
- List the date the fact sheet was produced.
- Use one or two key graphs in color.
- Ensure that there is adequate white space, headings, and subheadings to keep content clear and easy to read.
- Provide references and electronic links for more information.
- Print on heavier stock paper.
- Make sure electronic copies are readily available to allow users to share and access information quickly.

### Related Links with Community Resources

The Heart Rhythm Society: [www.hrsonline.org/PatientInfo](http://www.hrsonline.org/PatientInfo)

The Sudden Cardiac Arrest Foundation: [www.sca-aware.org](http://www.sca-aware.org)

The Sudden Cardiac Arrest Association: [www.suddencardiaccarrest.org](http://www.suddencardiaccarrest.org)

### Essential Reading

Rea TD, Page RL: Community Approaches to Improve Resuscitation after Out-of-Hospital Sudden Cardiac Arrest. *Circulation* 2010;121;1134-1140.[10]

Resuscitate! How Your Community Can Improve Survival from Sudden Cardiac Arrest, Mickey S. Eisenberg 2009, Seattle: The University of Washington Press.[14]

## Public Access Defibrillation Programs in the Community

Automated external defibrillators (AEDs) have been shown to be safe and effective for treating ventricular fibrillation when used by professional rescuers [15] and also when used by trained volunteers in community public access (PAD) programs.[16] The Public Access Defibrillation Trial included 1900 volunteer responders from 993 community units in 24 North American regions, and demonstrated that training and equipping volunteers to provide early defibrillation in a structured response system can increase the number of survivors to hospital discharge after out-of-hospital cardiac arrest in public locations.[16] While PAD programs can improve survival for out-of-hospital cardiac arrest caused by ventricular fibrillation, the effectiveness does diminish over time, making the availability of the device and the time it takes to bring it to the side of the patient very important considerations when establishing PAD programs.[17]

### Why AEDs Are Needed

While EMS providers will bring a defibrillator to the scene of the emergency, they may not always be able to reach the patient quickly enough. The cardiac arrest victim's chances of survival decrease by 5 to 10% with every passing minute between the beginning of VF and arrival of EMS. In most communities, the time interval between placing the phone call to 911 and arrival of EMS at the side of the victim is 7 minutes or longer. If you do the math, you can easily see why so many victims die. Help simply did not arrive in time.

Because early defibrillation can be lifesaving, modern defibrillators have been designed specifically for use by the public. Anyone can successfully save lives with use of an AED simply by following the voice prompts from the machine. AEDs can be found in many locations in your community including grocery stores, airports, shopping malls, and public buildings. The devices are most useful if they are conspicuously placed in the open, much the same as fire extinguishers.



## It's Not Just About the Box

The challenge with public access defibrillation programs lies in ensuring that potential rescuers are aware of AED locations and understand their role in using the devices. Having an action plan is critically important to the successful use of AEDs. That action plan should be tailor made for the area it serves. For example, security guards at the entrance to a public building should know the location of the closest AED and respond with it when an emergency occurs within the premises. The designated responder at the location should be trained in CPR regularly and be familiar with the basics of the AED at that site. Without designated responders, the victim may not receive necessary aid in time.

A PAD program can be directed by any responsible party. Some programs are overseen by the local EMS Director. In others, the employee health or building security service take the lead. Often there are not enough AEDs in public places to ensure they are available quickly when needed. Optimally, AEDs must be distributed so that the AED can be retrieved and placed on the victim within the first three minutes following collapse. The AED Implementation Guide (available at [www.heartrescueproject.com](http://www.heartrescueproject.com)) for business and industry contains many helpful tips including how to estimate the number of AEDs needed, where to place AEDs, how to address legal and training activities and how to promote your program.

Local EMS can pinpoint good locations for AEDs in conjunction with health departments, schools, local governments, churches, and local businesses. Church groups can purchase AEDs for their congregations. Business owners should invest in the devices for their offices and stores. Each of these groups should have a PAD program with designated responders and should report the location of the AEDs to local EMS providers.

## Creating a PAD Program in Your Community

### Talking Points and Facts

To begin a PAD program, EMS leaders should inform the community about cardiac arrest survival rates and goals for improving survival. Advocates should stress the importance of bystander CPR and early defibrillation with an AED while awaiting the arrival of EMS. Time is of the essence as each minute of delay in treatment represents a major drop in the chance of survival. Promoters should teach citizens to find an AED and provide a shock while waiting for EMS to arrive.

In the U.S. and Canada, the public uses an AED for only about 2-5% of the arrests they witness. Since 20-25% of cardiac arrests happen in public places, widespread PAD programs will make a significant difference in overall survival rates.

The price of an AED ranges from about \$1,500 to \$2,000. Pads are about \$50.00 and last 2 years. Batteries are about \$100 and last 1 to 5 years. Wall mounts cost an additional \$200 to \$500. Many specialty businesses now exist to place and maintain AEDs for a fee.

### ***Successful PAD programs include:***

- EMS leadership
- Community support
- Designated responders
- Prominent placement
- Clear signage
- Registration with EMS
- Public education

## Tools

### *Letter of Support for participating in the Community PAD Program*

PAD programs are generally administered in cooperation with local EMS oversight. Community members can advocate for the implementation of an organized program in their communities. See the letter of support sample.

### *Brochure*

A generic brochure for use to encourage community buy-in and site participation is very useful and can be tailored to meet your community's needs. An example of a PAD program brochure developed for the community by the local woman's club can be found at [www.heartrescueproject.com](http://www.heartrescueproject.com).

### *Registration Postcard*

A postcard or website can be used to encourage lay persons to report the location of any community based AEDs. Location reporting can often assist local EMS systems in notifying a 911 caller of a nearby AED and can help in determining where to place additional AEDs in the community. It is believed that the locations of a majority of the AEDs in a community are unknown.[18] An e-mail or postcard can remind participants to replace batteries and pads before expiration and can request updated information on AED locations and any new AEDs that may have been added.

### *Community Training*

AEDs are easy to use by simply following the voice prompts. Citizens need to know how to recognize cardiac arrest, call 911, and to retrieve the device, turn it on, follow directions and place pads. AED training does not have to be formal or lengthy. Alternative methods to traditional classroom training are available.

#### **SAMPLE LETTER FOR COMMUNITY PARTNERSHIP IN PAD PROGRAM**

Dear \_\_\_\_\_,

**YOUR COMMUNITY NAME** has begun a campaign to increase public awareness about the importance of early defibrillation in the event of sudden cardiac arrest. Sudden cardiac arrest is a condition where the heart suddenly stops working and a person becomes unconscious. The heart can be restarted with a shock from an automated external defibrillator, also called an AED.

Our challenge is to deliver the shock as soon as possible. Unfortunately, in most instances, the shock comes too late. In most communities, survival is only 8% from cardiac arrest. Although survival in **YOUR COMMUNITY NAME** is better than average due to the excellent care by citizens and paramedics, there are still important opportunities to save more lives from cardiac arrest.

Because an early shock soon after collapse is so important, some businesses/exercise centers/casinos (be specific) in **YOUR COMMUNITY NAME** have equipped their location with an AED. We know that when an AED from the community is used to provide a shock, the shock can occur very early even before the paramedics are able to arrive. This can translate into even more survivors here in **YOUR COMMUNITY NAME**.

As a community partner, you can help achieve even higher survival rates here in **YOUR COMMUNITY NAME**. As part of this campaign, a representative from **YOUR PROGRAM** will be calling you in the next couple of weeks to ask you some brief questions regarding your access to an AED at your business or institution (**be specific**). Your participation in this 5 minute phone contact will be much appreciated.

To learn more about the Public Access Defibrillation program, please see the enclosed brochure. Should you have any questions regarding this notice, or if you have placed an AED at your business/institution, please contact \_\_\_\_\_, Program Coordinator, at (\_\_\_\_) \_\_\_\_-\_\_\_\_.

Sincerely,

#### **Public Access Defibrillator (PAD) Program**

A Special Bulletin from the Vice President of Student Affairs

November 17, 2010

Dear University Community,

Our University announces a Defibrillation Program with the installation of Automated External Defibrillators (AEDs) at key locations throughout the campus. Employees, students, and University visitors will have a better chance of surviving a cardiac arrest because of the newly installed AEDs.

Please click [here](#) to review the brochure and AED Campus Locator. If you have any questions or concerns, contact Student Health Services at xxx.xxx.xxxx.

Sincerely,

Vice President of Student Affairs

Your local EMS medical director will be able to help you locate appropriate training resources.

### *Registration of the AED devices*

Any AEDs placed in a community should be reported to the local EMS system, regardless of lack of a requirement to do so. By placing an AED in your community, you are partnering with your EMS agency. That agency can provide you with guidance, as needed. As 911 dispatch systems continue to evolve, technology will allow dispatchers to direct bystanders to a nearby AED while waiting for EMS to arrive. This approach only works if the 911 center knows where the AEDs are.

AEDs are sophisticated devices with built in safety measures to ensure that the device will not shock anyone unless they need it. The sophistication extends to the devices ability to capture and store event data, which may be useful to health care providers as well as the patient. Your local EMS providers may wish to capture information from the AED following its use.

### *Placement*

AEDs can be most effective when placed in an area with a large concentration of individuals. One guideline suggests an AED be present if more than 250 people spend at least 8 hours a day at the site. Some very common places include: airports, shopping malls, public sports stadiums or arenas, public transportation locations (train, bus station, ferry terminal), health clubs, gyms, community centers, golf courses, tennis courts, and large industrial sites. Effective placement of AEDs will allow the rescuer to retrieve the machine and deliver a shock to a victim within 3 minutes of collapse. When deciding where to place AEDs, use this 3 minute rule as a guideline to help you determine how many AEDs you need and where to place them.

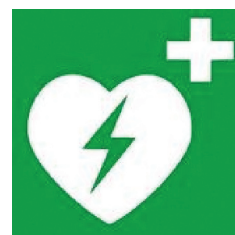
Companies should determine if there are places on-site where the incidence of sudden cardiac arrest may be higher, such as corporate health clubs, and identify locations that are hard to reach quickly. These may be good locations for AEDs. Areas where many people gather, such as cafeterias, often make sensible locations for the devices. It is imperative, when at all possible, to place AEDs within plain view in any unsecured location. Often used hallways and near elevators or building entrances are common locations.

### *The Neighborhood Watch Model*

Several communities around the country have established their own neighborhood PAD programs. Naperville, IL is one community that is exploring the installation of AEDs at the neighborhood level. City officials say they're working with the Naperville Area Homeowners Confederation to promote the installation of automated external defibrillators in residential neighborhoods throughout the city. Many neighborhoods have a central location well known to residents, such as a small park, which could make a sensible location for the placement of a neighborhood AED.

### *Signage*

While most of America is more familiar with the red AED sign, recently, the International Liaison Committee on Resuscitation (ILCOR) has approved a bright green universal sign indicating the presence of an automated external



defibrillator. There is also a red version of this newer logo designed for use in North America.

Both signs are intended to indicate the presence of an AED, the location of an AED in a room, a container with an AED for public use, or to indicate the direction to follow in order to reach the AED.

### *Incentives*

Committed community groups, citizens, or business owners can implement an AED matching program. When equipping their own locations, business owners could donate an extra defibrillator to a local group such as a church or small business. Community service clubs may wish to participate and/or partner in this type of program to improve SCA survival in the local community.

## Legislation and Liability

### *Good Samaritan laws*

Good Samaritan laws can protect those who use an AED to help a victim. These laws are intended to reduce a bystander's hesitation to act for fear of being prosecuted for unintentional injury. These laws vary by area, but there are three elements that make up the Good Samaritan doctrine: (1) the care given was performed as the result of the emergency, (2) the initial emergency was not caused by the person providing assistance, and (3) the care was not given in a grossly negligent or reckless manner.

Good Samaritan laws vary by jurisdiction, but all 50 states and the District of Columbia have enacted some form of the Good Samaritan law.

In addition to the Good Samaritan doctrine, states also have AED Laws which can serve to empower people to train and be prepared to use an automated external defibrillator to save lives. State legislation and mandates may exist for installing automated external defibrillators in public places like schools, sports stadiums, shopping malls, airports, and hotels.

You can check on laws related to AED use in your state using either of the following sites:

The sudden cardiac arrest foundation  
<http://www.sca-aware.org/aed-#laws3>  
([www.sca-aware.org](http://www.sca-aware.org))

National Conference of State Legislatures  
(<http://www.ncsl.org/default.aspx?tabid=14506>)

### *FACTS*

In the U.S. and Canada it is estimated that the public uses AEDs for about 2-5% of the arrests they witness. Based on estimates from communities with data, it is believed that public access defibrillation, even used only 2-5% of the time, has saved about 474 lives per year in the U.S. and Canada.[5]





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## Notes

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# Strategies for Improving Survival from Sudden Cardiac Arrest: The Prehospital Level of Care

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# Out-of-Hospital Cardiac Arrest Survival

Organizing the emergency medical services (EMS) system to improve survival from out-of-hospital cardiac arrest (OHCA) is absolutely essential. EMS, unlike other aspects of care for victims of OHCA, may be both measured and controlled. While the treatment of out-of-hospital sudden cardiac arrest has remained relatively stable over the past few decades, new measurement technology has opened a window onto the details of resuscitation which was largely unavailable prior to 2000.

Technology has allowed measurement of the precise time intervals elapsing between different aspects of attempted resuscitations and fostered an enhanced attentiveness to the importance of continuous high quality chest compressions in addition to early defibrillation and appropriate drug therapy. Awareness that survival rates as high as 49% are possible for victims with witnessed VF has sparked an interest in improving OHCA survival across North America and around the world.[3] This renewed interest has led to the development of several new approaches to treatment as well as strategies for enhancing proven existing therapies.

Animal research emphasizing the benefits of continuous delivery of quality compressions,[3] as well as research showing that many health professionals provided poor quality CPR,[4-6] led to the 2005 changes in the recommended compression/ventilation ratio from 15:2 to 30:2.[7] Research studies quantified the detrimental effects of excessive assisted ventilation [8] and catalyzed efforts to control ventilations more precisely.[9] Several studies highlighted a lack of efficacy of several resuscitation drugs [7] and directed prehospital therapy toward a back to the basics approach. These recent updates to the care of the SCA victim have improved survival.

The 2010 American Heart Association Guidelines for CPR and Emergency Cardiovascular Care (ECC) updated recommendations for care for SCA victims.[10-12]

## **Recommendations for EMS systems include:**

- Improving the recognition of SCA by 911 call takers and urging 911 call takers to instruct callers to begin chest compressions while awaiting EMS arrival.
- Providing high quality CPR with minimal interruptions in chest compressions and with controlled ventilations. Beginning CPR with compressions rather than ventilations (C-A-B instead of A-B-C) to emphasize the primary importance of chest compressions and to decrease barriers to starting CPR.
- Establishing OHCA Systems of Care including linking with community AED programs, coordinating with receiving hospitals to optimize post-cardiac arrest care, and measuring survival to hospital discharge.
- Implementing quantitative waveform capnography for intubated patients to monitor endotracheal tube placement and the quality of the resuscitation.
- Working as a team during resuscitation with defined roles and clear communication

The American Heart Association Guidelines for CPR & ECC are available online at [static.heart.org/eccguidelines](http://static.heart.org/eccguidelines). A particularly useful document is the *Guidelines Highlights* document at [static.heart.org/eccguidelines/guidelines-highlights.html](http://static.heart.org/eccguidelines/guidelines-highlights.html), which summarizes the major changes for 2010.

# Using Cardiac Arrest Registry Data to Improve Survival for Victims of Out-of-Hospital Cardiac Arrest

EMS systems were originally designed to provide rapid medical care to the victims of sudden cardiac arrest and major injury.[13] This is the patient population with the most to gain from a high performing EMS system. How well the EMS system performs for these most challenging patients is an indication of how well the system performs for all patients, even those with minor illness and injury. Tracking survival to hospital discharge for SCA victims is essential to inform the quality improvement process. Careful monitoring of the processes of care such as: the time to first defibrillation; CPR fraction; and the effectiveness of dispatcher CPR instructions, is necessary to allow a critical appraisal of the system. Knowledge of how these and other important system components perform informs the quality improvement process and allows the implementation of strategies for improving underperforming components.

## Collecting Data for a Registry

The first step is to begin methodically collecting a minimum set of SCA data in a registry to measure survival rates and system characteristics related to SCA response. Tracking the performance of the EMS system and the victim's outcome requires the EMS agency to collaborate with receiving hospitals to obtain information about survival to hospital discharge for each case. When the information is used for quality improvement measures, hospitals should enthusiastically provide outcome information to the EMS system on an ongoing basis. Receiving hospitals may require a simple data sharing agreement with the EMS agency.

Every EMS system should measure, evaluate, and report its SCA survival rate to the community annually.

EMS systems, with the resources to do so, should maintain more comprehensive data registries to better inform their quality initiatives

Maintaining an ongoing, accurate, and complete registry for SCA QI requires a minimum of 1 FTE per 1,000,000 population dedicated to the task.[1]

## Sources of Data for the Registry

EMS systems often collect a multitude of patient level information. Determining which pieces of information to use may appear daunting at first. Early adopters of cardiac arrest registries developed a list of essential and optional data elements called the Utstein style, named for the historic abbey in Norway where these pioneers first met.[14] Data for an SCA registry can be obtained from:

1. EMS patient care records
  - a. Patient fields: demographic data, location of arrest, witnessed status, bystander CPR
  - b. Treatment fields: defibrillation, CPR, medications, IVs, ventilation methods, therapeutic hypothermia
  - c. Time fields: restoration of spontaneous circulation, arrival at hospital

2. 911 dispatch information
  - a. Treatment fields: dispatcher assisted CPR
  - b. Time fields: time of initial 911 call, time EMS/first responders dispatched, time EMS/first responders arrived at location
3. EMS equipment (heart monitor/defibrillators, AEDs, end tidal CO2 monitors)
  - a. Patient fields: complete ECG recording including initial rhythm
  - b. Treatment fields: time of first defibrillation, CPR quality metrics, ventilation rates, end-tidal CO2 values
4. Hospital medical records
  - a. Patient fields: therapeutic hypothermia, emergent diagnostic heart catheterization, emergent percutaneous coronary intervention, emergent coronary artery bypass grafting, implantable cardioverter defibrillator placement
  - b. Patient outcome: admit to hospital, discharge alive, cerebral performance category (CPC) score
  - c. Discharge disposition: died, discharge alive to home, discharge alive to rehabilitation, discharge alive to extended care facility (ECF)

Several of the fields noted above may be recorded in multiple locations. When this is so, the most accurate source of data should be used consistently to populate the registry. A complete list of suggested data fields is available online at [www.heartrescueproject.org](http://www.heartrescueproject.org) and in the Appendix section.

### ***Maintain a Consistent Case Definition***

The precise definition of a “case” included in the registry is very important. Included cases should follow a standard cardiac arrest case definition to allow benchmarking across systems. Selection criteria for cases that are included in the registry must remain the same over time to allow improvements in survival rates to be tracked accurately.

Historically, cases were excluded from the registry if thorough review of the available medical information revealed a primary cause of the event in a body system outside of the heart.[14] For example, cardiac arrest may be caused by drowning. Cases remaining were most likely due to a primary heart problem; they were of presumed cardiac etiology.

#### ***Case Definition for a Prehospital SCA Registry***

Cases meeting these criteria should be entered into the registry:

- Out-of-hospital non-traumatic cardiac arrest
- Victim assessed by organized EMS personnel
- Victim received either
  - External defibrillation by lay responders or emergency personnel, or
  - Chest compressions by EMS personnel

There is considerable variation in classification of the cause of OHCA depending upon the resources available to review hospital records and upon the training of the abstractors of the information. For example, with the need to elicit voluntary cooperation from receiving hospital

employees, EMS systems may not be able to request thorough hospital chart review to determine the most likely cause of the event. It may be simpler and more consistent to include all cases except those obviously caused by external injury.

## A Basic Data Collection Plan

Evaluation of OHCA survival can begin with tracking of just a few critical pieces of information. The most meaningful performance measurement is the rate of survival to hospital discharge for bystander-witnessed, out-of-hospital cardiac arrests that occurred prior to the arrival of EMS, and for which the first recorded cardiac rhythm is ventricular fibrillation. This group of patients serves as the benchmark. They generally have well documented times of collapse and hearts with an opportunity to respond to rapid defibrillation. They are most likely to survive if the system is working optimally.

### Minimum Data Elements Needed to Calculate Witnessed VF Survival Rates

- Cases of bystander-witnessed sudden cardiac arrest, prior to EMS arrival
- Cases with the first recorded rhythm ventricular fibrillation (VF)
- Hospital outcome data to indicate survival status at hospital discharge
- Patient care identifiers to allow linkage of prehospital data and hospital outcome: name, date of birth, EMS call identifier, date of incident, hospital name.

Run #	Date	Resuscitation Attempted?	Etiology	Witnessed Status	Initial Rhythm	Admitted to Hospital?	Discharged Alive?
2011	1/11/2011	Yes	Cardiac	Bystander	VF/VT	Yes	Yes
2012	1/12/2011	Yes	Cardiac	Bystander	VF/VT	Yes	No
2013	1/13/2011	Yes	Cardiac	Bystander	VF/VT	Yes	No
2014	1/14/2011	Yes	Cardiac	Bystander	VF/VT	Yes	No
2015	1/15/2011	Yes	Cardiac	Bystander	VF/VT	Yes	Yes
2016	1/16/2011	Yes	Cardiac	Bystander	VF/VT	Yes	No
2017	1/17/2011	Yes	Cardiac	Bystander	VF/VT	Yes	No
2018	1/18/2011	Yes	Cardiac	Bystander	VF/VT	Yes	No

Survival rate for bystander witnessed arrests for cardiac origin with resuscitation attempted and initial rhythm: 25.00%

If your EMS system serves a population of 50,000 or less, there are likely fewer than 25 cardiac arrests per year in your system and fewer than 10 bystander-witnessed VF events.

In this case, it may be feasible to enter basic registry items in a spreadsheet format. Go to [www.heartrescueproject.com](http://www.heartrescueproject.com) for a link to the VF spreadsheet you can download from the website.



## A Registry Plan for Larger Systems

Systems with resources available to assist in collection and evaluation of a moderate amount of data can include additional data elements in their registries. A more comprehensive data collection plan is suggested to enable evaluation of care and implementation of improvements to any system. The HeartRescue program has developed a list of data elements which is available online at [www.heartrescueproject.com](http://www.heartrescueproject.com) and in the Appendix.

### Hospital Information:

- Receiving hospitals should provide outcome information including survival to admission (yes or no), survival to hospital discharge (yes or no), and if discharged alive, an indication of neurologic status at discharge. The most commonly used scale for measuring neurologic outcome in this population is the cerebral performance category or CPC score (see box). It is widely used because it is relatively simple and can be calculated from information available in the medical record of the patient.
- Hospitals should also provide information about the process of caring for the patient. They should be asked if therapeutic hypothermia was used as well as if the patient received emergency heart catheterization and intervention. Obtaining these measures allows EMS to provide feedback to hospitals to ensure that they are providing optimal care for the patients they receive.

## Ensuring Data Accuracy

- One of the major challenges is ensuring that accurate and complete data are collected. There are opportunities to audit information to enhance the reliability of the measurements.
- **Case Ascertainment:** All cases must be accounted for when tracking SCA survival rates. Patients who may be defibrillated once and awaken quickly are sometimes missed in data collection systems. Often, identifying victims who die early is easier than tracking survivors. However, every effort should be used to ensure that there is an outcome (Alive/Dead at hospital discharge) for each individual in the database. Several resources available on the Internet allow such searches including the Social Security Death Index [www.deathindexes.com](http://www.deathindexes.com).

### *Glasgow-Pittsburgh Cerebral Performance Categories*

#### **1. Good Cerebral Performance**

Conscious: Alert, able to work and lead a normal life. May have minor psychological or neurological deficits.

#### **2. Moderate Cerebral Disability**

Conscious. Sufficient cerebral function for part-time work in sheltered environment or independent activities of daily life.

#### **3. Severe Cerebral Disability**

Conscious. Dependent on others for daily support because of impaired brain function (in an institution or at home with exceptional family effort).

#### **4. Coma, Vegetative State**

Not conscious. Unaware of surroundings, no cognition. No verbal or psychological interactions with environment.

#### **5. Death**

Certified brain dead or dead by traditional criteria.[2]

- **Effect of Missing Data**

- If survivors are missed, the calculated survival rate will be falsely low.
- If there are many cases missing outcome, an accurate survival rate cannot be calculated.

## Evaluating Survival Data

The Utstein Guidelines provide useful templates for measurement of key aspects of resuscitation care and outcome.[14] The appendix contains 3 templates in the Utstein style for the reporting of annual SCA statistics, which can be completed on an annual basis to calculate a baseline survival rate and which can then be used to compare survival rates for subsequent years.

In addition to using the Utstein template to help determine survival rates, systems can perform the calculations described in **Calculating Annual System Statistics** to obtain additional information pertinent to the care of SCA victims.

## Quality Improvement

The quality improvement process relies on valid measurements of resuscitation performance and patient outcome. Examples of core performance measures that can be evaluated in a SCA quality improvement plan include:

- **Response times:** The time required from receipt of the 911 call until the arrival to the patient.
  - This is a measure that can be improved within the agency. Decreasing the time it takes to dispatch a crew to the scene can directly improve survival rates. *All components of the response time should be reviewed.* A plan to decrease delays should be developed and tested.
- **Rate of bystander CPR**
  - Bystander CPR rates can be improved by implementing effective dispatcher CPR instruction programs, and by addressing community awareness and expectations regarding SCA and CPR through media campaigns or educational activities and training.
- **Time from the 911 call to first defibrillation**
  - Once dispatch issues have been addressed as previously described, team configuration and skills training designed to emphasize the importance of early defibrillation can be implemented.
- **Interruptions to chest compression during CPR**
  - The CPR fraction is the percentage of time that compressions are being delivered during the resuscitation. This parameter should reach into the 90% range. Team skills training designed to minimize interruptions to compressions can be implemented using SCA scenarios. Airway and IV placement should be accomplished without major delays in compressions. The CPR fraction can be measured using downloads from the monitor/defibrillator as well as data from skills training sessions using manikins that document these parameters.

- **CPR quality and ventilation rate**

- If these parameters are not collected in the field, skills manikins and/or defibrillator/monitors with CPR accelerometers are available to allow evaluation and improvement in the practice of high quality CPR.

- **Airway management**

- Success of airway management procedures should be documented and reviewed. Confirmation of airway placement should be confirmed at intubation, upon transport and upon arrival to the emergency department. Skills training using SCA scenarios can be used to address airway management issues.

- **Documentation**

- Complete documentation of events that occur during the resuscitation should be monitored.

- **Survival to hospital discharge**

- Hospital discharge is the significant outcome measure and should be evaluated and reported on an annual basis.

***Calculating Annual System Statistics from Registry Data***

- 1. Total Out-of-Hospital Cardiac Arrest (OHCA) Incidence (#/100,000)**
  - a. (cases per 100,000 population)
- 2. Population of the area served by the EMS system (#)**
  - a. (To enable incidence calculation)
- 3. Total (all cases) OHCA Survival to Hospital Discharge (%)**
- 4. Presumed OHCA etiology (%)**
  - a. (% cardiac, % trauma, % respiratory, % drowning, % electrocution, % other)
- 5. VF Incidence (#/100,000)**
  - a. (VF cases per 100,000 population)
- 6. VF Survival-to-Hospital Discharge (%)**
  - a. (# VF survivors/# cases presenting in VF)
- 7. CPR response (%)**
  - a. (Bystander, family member, fire/police, EMS, medical provider, other)
- 8. AED used (%)**
  - a. (Yes, No, Present, but not used, AED malfunctioned) (%)
- 9. ROSC in the pre-hospital setting (time, %)**
  - a. (Time ROSC began or No ROSC) ROSC upon hospital arrival (%)
- 10. EMS Induced Hypothermia (Yes, No) (%)**
  - a. (Number of patients eligible for the prehospital therapeutic hypothermia (TH) therapy divided by the number of patients who received pre-hospital TH).
  - b. Definition: Prehospital TH eligible patients are those who have achieved sustained ROSC but who remain unconscious in the prehospital setting.
- 11. Hospital induced hypothermia (Yes, No) (%)**
  - a. (Number of patients eligible for in-hospital TH therapy divided by number receiving in-hospital TH) In-hospital eligible patients = those remaining unconscious but who have achieved ROSC and do not have contraindications to TH therapy).
- 12. Overall Cerebral Performance Category score of 1-2 (%)**

## Using Electronically Captured Data to Provide Feedback to Rescuers

Newer monitor/defibrillators may allow documentation of real time CPR quality indicators including compression rate and depth (when used with an accelerometer), ventilation rate, end-tidal CO<sub>2</sub> values, and hands-off time throughout the resuscitation (CPR fraction), including pauses for defibrillation. Some systems are able to use voice recordings in combination with electronic data recordings which allows precise documentation of all activities as they occur during the resuscitation.

Data downloaded from monitor/defibrillators can be viewed and analyzed using programs available from the monitor vendor. These programs allow capture, review, and analysis of electronic ECG recordings after they are downloaded from the monitor/defibrillator following a cardiac arrest. Once the ECG file is uploaded into the program, key components of the arrest such as number and timing of defibrillations, pauses in care, CPR fraction, and ventilation ratios can be visualized and quantified. Some programs allow additional data entry in a registry style and will incorporate the ECG file and the CPR metrics as well as provide summary reports of the case.

**Examples of some of these programs can be found at the following web sites:**

- CodeStat Review Software with Advanced CPR Analytics: [www.physio-control.com](http://www.physio-control.com)
- RescueNet ePCR: [www.zolldata.com/resucenet-epcr/](http://www.zolldata.com/resucenet-epcr/)
- Q-CPR Measurement and Feedback Tool: [www.healthcare.philips.com](http://www.healthcare.philips.com)

Use of these technologies allows a timely review of CPR metrics with the rescuers. They are useful to quantify interruptions in chest compressions which are frequently encountered while waiting for the defibrillator to charge, and after a shock, when changing rescuers, or when providing other interventions such as intubation or IV placement. Addressing all sources of pauses during a complete review of the case using these available tools can highlight areas for improvement.

While new technologies help us to understand the overall quality of the resuscitation, there are few, if any, controlled studies to inform the precise value of each component. In the near future, as the literature in this field grows, it will be evaluated and translated into informed guidelines to help in decision making regarding technology investments for individual systems.

Among the American Heart Association's 2010 Guidelines for CPR and ECC, there is a new recommendation which states *"Resuscitation systems should establish ongoing systems of care assessment and improvement."* The rationale from the AHA on this topic focuses around the lack of understanding about the causes of such extremely divergent regional variation in both the incidence and outcome for SCA. A plea is made for both EMS systems and hospitals to systematically monitor cardiac arrests and outcome and to employ quality improvement measures including feedback, and benchmarking in order to improve performance.

### Benchmarking

Benchmarking of SCA survival should be performed internally, using comparisons to prior performance on an annual basis, and externally comparing the system's survival rates to those of similar systems. Ensure that your measurements are made using the standard case definition, and that the other systems, to which you will be compared, use the same standard case definition. Benchmarking results should be shared with all stakeholders in your community.

Because so many factors influence survival outcomes in an EMS system, it is challenging to determine precisely how each effects the resuscitation care process and how they may influence survival in your community. If your system is just beginning to systematically improve SCA survival, take care NOT to benchmark your system immediately against systems like Seattle and Rochester that have reached their excellent survival rates by making incremental improvements steadily for decades. Although these organized and dedicated systems have pushed their survival for witnessed VF cases near to 50%,<sup>[15]</sup> resuscitation experts agree that improving survival is an iterative process. Any improvements over your systems baseline survival rates will result in additional survivors each year, and will serve as a stepping stone to the next improvement.

## Existing Cardiac Arrest Survival Data

Much work has been done to standardize cardiac arrest outcome measures in an effort to facilitate comparisons across EMS systems, states, and regions.<sup>[14, 16]</sup> Although an SCA registry can be built using proprietary database programs such as Microsoft Access, this requires time and some degree of database development skill. A number of existing EMS data collection systems are in use throughout the U.S. and Canada designed for similar purposes, also adhere to these definitions. Among the most well known are: NEMSIS, ARIZONA SHARE, CARES, and ROC EPISTRY.

The majority of the registries mentioned here have been developed for a specific geographic area or for research. As such, they may not be accepting data. NEMSIS is in use in various degrees of functionality for data collection in most states.

### *Snapshot of Cardiac Arrest Registries*

**NEMSIS:** National EMS Information System, est. 2001

**GOAL:** A standardized data submission process useful for improving patient outcomes

**NEMSIS DATA:** Contains over 400 standardized data elements

**WEBSITE:** [www.nemsis.org](http://www.nemsis.org)

**SHARE:** Save Hearts in Arizona Registry and Education, est. 2005

**GOAL:** A statewide quality improvement registry

**SHARE DATA:** Prehospital and outcome data elements

**WEBSITE:** [www.azshare.gov](http://www.azshare.gov)

**CARES:** Cardiac Arrest Registry to Enhance Survival, est. 2004

**GOAL:** Essential data elements for prehospital cardiac arrest

**CARES DATA:** Documents about 30 data elements and allows reporting and benchmarking

**WEBSITE:** <http://mycares.net>

**ROC EPISTRY:** Resuscitation Outcomes Consortium Epidemiologic Data Registry, est. 2005

**GOAL:** Data infrastructure for design & implementation of ROC trials

**EPISTRY DATA:** 17,500 prehospital cardiac arrest cases each year including outcome data

**WEBSITE:** <https://roc.uwctc.org>

Some EMS systems have anticipated the importance of the SCA registry and have either designed their own database or use a proprietary system. Whichever method is used, it is important that data be collected using standardized methods. There must also be documented, precise definitions for all elements included in the data dictionary. See Appendix for the HeartRescue Partners data dictionary.

## Public Reporting of Survival Rates to the Community

When an annual survival rate is calculated, it is important to take the crucial step of reporting the results publicly to the community. This provides an excellent opportunity to enlist community members in joining the initiative to improve survival. The method by which communities choose to report their survival data varies, but could include one or more of the following methods: a press release; a written report to the community; publication of survival rates by year in the EMS system's annual report to the city; or by informing the city government leaders.

## High Quality CPR

Training and dedication to quality improvement goals regarding the provision of excellent BLS care are essential for establishing a baseline from which survival can continue to be improved. When excellent basic care is provided by all systems, the wide variations in survival that now exist may be reduced. This will allow a clearer baseline from which the survival impact of additional therapies can be evaluated in the future. Ensuring that high quality CPR is provided in an EMS system can be approached in a number of ways.

Ongoing evaluation of CPR metrics from SCA cases can provide a quality check on interruptions to compressions, pause times around defibrillation, and other CPR metrics. Implementation of regular training scenarios using manikins that provide feedback on the rate and depth of compressions can be used to improve skills and reduce pause times. Each system should establish a method for ensuring that high quality CPR is provided as a basic requisite. The Appendix contains a sample review form for CPR Metrics.

While drugs and devices have a place in resuscitation, there is no substitute for excellent basic care. [17] High quality CPR and early defibrillation are the best tools EMS owns, and the important role of the first responder in delivering this important treatment must also be recognized.

## EMS Use of CPR Devices

The American Heart Association has published *Highlights of the 2010 AHA Guidelines for CPR and Emergency Cardiovascular Care*, which includes statements addressing the use of CPR devices. The statements can be read in their entirety in the highlights document available at [static.heart.org/eccguidelines/guidelines-highlights.html](http://static.heart.org/eccguidelines/guidelines-highlights.html). Regarding the use of CPR devices, the summary statement from the AHA 2010 Guidelines Part 7. CPR Techniques and Devices states "To date, no adjunct has consistently been shown to be superior to standard conventional (manual) CPR for out-of-hospital basic life support, and no device other than a defibrillator has consistently

improved long-term survival from out-of-hospital cardiac arrest. A variety of CPR techniques and devices may improve hemodynamics or short-term survival when used by well-trained providers in selected patients. All of these techniques and devices have the potential to delay chest compressions and defibrillation. In order to prevent delays and maximize efficiency, initial training, ongoing monitoring, and retraining programs should be offered to providers on a frequent and ongoing basis".

## Dispatcher Assisted CPR Instructions

EMS systems that have carefully reviewed their survival data in relation to the time it takes to reach the patient have rediscovered the important influence of starting CPR early. Implementing system changes that shave seconds from the dispatch process in order to get EMS to the patient faster and which result in a shorter time to defibrillation, can improve survival from cardiac arrest.

When 911 call takers are trained to provide assertive compression-only CPR telephone instructions, victims benefit from improved survival in large part due to this bystander CPR. A well monitored program of dispatcher-assisted CPR can significantly raise bystander CPR rates in your community. [18-19] These changes are easily measured and monitored, and can be implemented by any system with few resources. An example of a quality improvement review that can be used to evaluate and improve dispatcher assisted CPR effectiveness is provided in the Appendix.

## Therapeutic Hypothermia

The use of mild therapeutic hypothermia for victims of SCA who have been resuscitated but who remain unresponsive has been recommended since 2002.[20-22] Mild therapeutic hypothermia (TH) is defined as cooling the body to 32-34 degrees C for 12-24 hours after resuscitation from SCA. Mild TH has been shown to confer a survival benefit for patients who first presented in VF when provided up to six hours after the arrest.[21]. In addition, there is now a small amount of evidence that SCA victims with other presenting rhythms may also benefit.[7]

Existing knowledge of reanimation [23] demonstrated higher survival and better neurologic outcome.[21] This result along with studies demonstrating the feasibility of providing TH in the prehospital setting [20, 24] prompted TH use by a few EMS systems. Recent clinical studies show that pre-hospital cooling using ice-cold saline can lower core temperatures by 0.8 to 1.0 degree C on emergency department arrival, but these studies did not find any survival benefit from initiation of TH in the field.[24-25] Initiating TH prior to ED arrival has served as an impetus for hospitals to develop TH protocols, and as a reminder to hospital personnel to consider continuing the therapy.

While it would seem logical that providing hypothermia therapy as early as possible following ROSC would improve neurological outcome, available data suggest that there is not a large clinical effect from instituting cooling in the prehospital setting following restoration of circulation.[26] Additional clinical studies may improve current strategies for delivering hypothermia and better define the optimal rate of cooling induction, duration of cooling, determination of appropriate target temperatures, and perhaps, individual patient variables.[24-25, 27]

## Cooling Methods

In the prehospital setting, core temperatures can be reduced by 0.8 to 1.0 degree C with the rapid infusion of cold saline following ROSC.[25] Using either interosseous infusion or a large bore IV, a large amount of fluid, 30-40 ml/kg, can be infused in a short time. Saline can be kept cold in the ambulance using low tech methods such as storage in a cooler packed with ice. An inexpensive "plug in" cooler can also be used to ensure that the saline is always cold.

Prehospital protocols sometimes recommend the use of a paralytic during infusion. Paralytic agents are considered during the provision of in-hospital TH if the patient is counteracting the cooling process by excessive shivering during the induction phase. Due to the usually short transport times to the hospital, and the added complexity of managing and monitoring a paralyzed patient, it is not necessary to use a paralytic for the induction of prehospital therapeutic hypothermia.

There may be other methods of cooling currently used in the prehospital setting. Cooling blankets and ice packs have been used, however, these are slow to produce a change in body temperature and, therefore, not very useful in the prehospital setting. More complex devices such as body cooling bags may be available, however, they are not widely used. Rapid infusion with cold saline provides a quick, safe, and simple method of decreasing core temperature in the prehospital setting.

It is essential that the EMS system providing TH has predetermined that the destination hospital has adequate resources to continue the hypothermia therapy begun in the field as well as the other supportive care needed during the post-resuscitation phase.[7]

While still considered controversial, there are EMS systems that provide intra-arrest cooling for all cardiac arrest resuscitations. This simplifies decision-making about who is eligible and increases the chance that an eligible subject will receive the treatment. To do this simply, some systems have opted to use cold saline as their primary resuscitation fluid.

## Therapeutic Hypothermia Resources

The University of Pennsylvania has maintained a resource packed website with regard to many aspects of both in-hospital and out-of-hospital hypothermia therapy. Multiple examples of prehospital protocols and references are available at <http://www.med.upenn.edu/resuscitation/hypothermia/>. The University of Pennsylvania resuscitation experts have been offering workshops at various locations around the country to help both EMS and hospital personnel to establish therapeutic hypothermia programs.

Order sets and algorithms for Minnesota Heart Institute partner hospital are available on the website maintained by the Abbott Northwest Hospital Minneapolis Heart Institute and can be found at <http://www.mplsheart.com/Professionals/EmergencyProtocols/TherapeuticHypoCardiacArrest.aspx>



# EMS Support and Direction for Community Initiatives

## CPR and AED programs and training

Most EMS systems serve as a point of contact for members of the public who request CPR training. EMS systems with systems in place to offer this training have the opportunity to step up their offerings to the community by providing more frequent training sessions, and by incorporating compression-only CPR and AED training.

### *Automated External Defibrillators*

The 2010 AHA Guidelines for CPR and ECC recommend the establishment of AED programs in public locations where there is a relatively high likelihood of witnessed cardiac arrest (airports, casinos, sports facilities). To maximize the effectiveness of these programs, it is important that programs include a high degree of organizing, planning, and training as well as establishment of a link with the EMS system.

The local EMS Medical Director is often the primary resource consulted about the feasibility and implementation details of community AED programs. As the medical director, there are several things that you can do to facilitate community programs. Many useful resources can be found at <http://www.physio-control.com/learning/pad/how-to.aspx?id=2260&terms=AED%20program%20implementation>

- Provide information to community members about what an AED plan should entail.
- Encourage the reporting of AED placements and their use to EMS, and put a system in place for management of this information.
- Provide information about how to purchase and how to place an AED for public use.
- Incorporate AED location documentation in Fire Department building inspections.
- Celebrate survival successes annually and encourage support groups, EMS Week celebrations or on Valentine's Day. Go Red for Women Day [goredforwomen.org](http://goredforwomen.org) and Heart Month are all good times for getting the message out about SCA awareness, AED placement, and CPR training.
- Collaborate with other agencies in your community (police departments, shopping mall security, schools and universities) to serve as a resource and ensure that a consistent public access defibrillation plan is followed by all in the community.

# APPENDIX

## HeartRescue Partners Program Evaluation Case Definition and Data Elements

This list is not exclusive. States participating in the HeartRescue Project Partners program are encouraged to collect additional information with the goal of improving cardiac arrest survival. Some of these additional data elements are included as optional items on this list.

### Case Inclusion Criteria

- Out-of-hospital **non-traumatic** cardiac arrest
- Patient assessed by organized EMS personnel
- Patient received either:
  - External defibrillation by lay responders or emergency personnel
  - Chest compressions by EMS personnel (includes all levels of EMS: Basic EMT, Fire, ALS, and Police that are asked by the 911 center to respond to the cardiac arrest)

### Case Data Elements

#### *Table of system level data elements*

Item	Element	Status
1	Population of the area served by the EMS systems participating in the Medtronic Flagship Program (2010 census most likely source).	<b>Required</b>

#### *Table of case level data elements*

Item	Element	Status
2	Unique case identifier	<b>Required</b>
3	Census tract ID	<b>Optional</b>
4	Date and Time of initial 911 dispatch (dd/mm/yyyy hh:mm)	<b>Optional</b>

<b>Item</b>	<b>Element</b>	<b>Status</b>
5	Presumed arrest etiology	<b>Optional</b>
	Cardiac	
	Drowning	
	Electrocution	
	Respiratory	
	Trauma	
	Other	
6	Age in Years	<b>Required</b>
7	Year of Arrest Event	<b>Required</b>
8	Incident State	<b>Required</b>
	AZ	
	CA	
	MN	
	NC	
	PA	
	SD	
	WA	
9	Incident County	<b>Required</b>
10	Witnessed Arrest	<b>Required</b>
	Yes	
	No	
	Unknown	
11	Arrest after 911 arrival	<b>Required</b>
	Yes	
	No	
	Unknown	
12	Resuscitation attempted by 911 responder and/or shock delivered by an AED before 911 responder arrival	<b>Required</b>
	Yes	
	No	
	Unknown	
13	Bystander CPR provided	<b>Required</b>
	Yes	
	No	
	Unknown	

Item	Element	Status
14	Dispatcher CPR instructions provided	Optional
	Yes	
	No	
	Unknown	
15	Who initiated CPR	Optional
	EMS	
	Family member	
	First responder (Fire/Police)	
	Lay medical provider	
	Other	
	Unkown	
16	Date and Time of first CPR (dd/mm/yyyy hh:mm)	Optional
17	Bystander CPR type	Optional
	Compressions and ventilations	
	Compressions-only	
	Ventilations only	
	Unknown	
18	AED or manual defibrillator applied prior to EMS arrival	Required, either 18 (preferred) or 19
	Yes, with defibrillation	
	Yes, without defibrillation	
	No	
	Unknown	
19	AED used at any time	Required, either 18 (preferred) or 19
	Yes	
	No	
	Present, but not used	
	AED malfunctioned	
	Unknown	
20	Who first defibrillated the patient?	Required
	Bystander, not family member	
	EMS	
	Family member	
	First responder (Fire/Police)	
	Lay medical provider	
	Not applicable	
	Unknown	

<b>Item</b>	<b>Element</b>	<b>Status</b>
21	If first responder defibrillated the patient, was that responder a police officer?	<b>Optional</b>
	Yes	
	No	
	Unknown	
22	Date and Time of first EMS personnel arrival at scene (dd/mm/yyyy hh:mm)	<b>Optional</b>
23	Date and Time of ALS arrival at scene (dd/mm/yyyy hh:mm)	<b>Optional</b>
24	Date and Time of first 911 responder shock (dd/mm/yyyy hh:mm)	<b>Optional</b>
25	Initial arrest rhythm of patient	<b>Required</b>
	Ventricular fibrillation	
	Ventricular tachycardia without pulse	
	Pulseless electrical activity (PEA)	
	Asystole	
	Unknown shockable	
	Unknown not shockable	
	Missing	
26	Type of EMS resuscitation protocol used	<b>Optional</b>
	2005 AHA Guidelines	
	2010 AHA Guidelines	
	Cardiocerebral resuscitation	
	Other	
	Unknown	
27	Any prehospital ROSC for at least 30 seconds	<b>Optional</b>
	Yes	
	No	
	Unknown	
28	Return of Spontaneous Circulation (ROSC) upon ED Arrival	<b>Required</b>
	Yes	
	No	
	Unknown	
29	EMS induced Hypothermia	<b>Optional</b>
	Yes	
	No	
	Unknown	

<b>Item</b>	<b>Element</b>	<b>Status</b>
30	Prehospital 12-lead ECG acquired	<b>Optional</b>
	Yes	
	No	
	Unknown	
31	Prehospital 12-lead ECG has STEMI	<b>Optional</b>
	Yes	
	No	
	Unknown	
32	ITD used	<b>Optional</b>
	Yes	
	No	
	Unknown	
	If yes, select how:	
	Face mask	
	Endotracheal tube	
33	Mechanical CPR device used	<b>Optional</b>
	Yes	
	No	
	If yes, please specify:	
	a. Active Compression Decompression (LUCAS)	
	b. Load-Distributing Band (AutoPulse)	
	c. Mechanical Piston (Thumper)	
	d. Other	
34	Out-of-hospital disposition	<b>Required</b>
	911 did not attempt resuscitation	
	Resuscitation terminated at scene	
	Transported to hospital	
35	Date and Time of ED arrival (dd/mm/yyyy hh:mm)	<b>Optional</b>
36	Hospital 12-lead ECG has STEMI or STEMI equivalent	<b>Optional</b>
	Yes	
	No	
	Unknown	
37	Did the patient undergo coronary angiography?	<b>Required</b>
	Yes	
	No	
	Unknown	

<b>Item</b>	<b>Element</b>	<b>Status</b>
38	Date and Time of angiography (dd/mm/yyyy hh:mm)	<b>Optional</b>
39	Admitted to hospital	<b>Required</b>
	Yes	
	No	
	Unknown	
40	Was hypothermia care initiated or continued in the hospital?	<b>Required</b>
	Yes	
	No	
	Unknown	
41	Percutaneous coronary intervention (PCI) performed?	<b>Required</b>
	Yes	
	No	
	Unknown	
42	Coronary artery bypass graft surgery (CABG) performed?	<b>Required</b>
	Yes	
	No	
	Unknown	
43	ICD placement	<b>Required</b>
	Yes, implanted during initial hospitalization	
	Not yet, but documented plan for ICD placement after initial hospital discharge	
	No	
	Unknown	
44	Was a DNR order initiated for the patient?	<b>Optional</b>
	Yes	
	No	
	Unknown	
45	Date and Time of first DNR order (dd/mm/yyyy hh:mm)	<b>Optional</b>
46	Final hospital diagnosis of acute myocardial infarction	<b>Optional</b>
	Yes	
	No	
	Unknown	
47	Survival to Hospital Discharge	<b>Required</b>
	Yes	
	No	
	Unknown	

Item	Element	Status
48	Overall Cerebral Performance Category score at hospital discharge	Optional
	1	
	2	
	3	
	4	
	5	
	Unknown	

### SCA Registry Documentation

The purpose of these forms is to track progress of data entry into the registry, and to provide both a summary and a mechanism for checking case ascertainment and progress of QI review.

### SCA Volume by Month (Useful for ensuring all cases are included)

Report the number of cases included in the registry each month.

Month / Year	# Total Cases	# VF Cases	# Cases w Complete Data	# Cases reviewed by QI personnel
/				
/				
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# Processes of Care Report

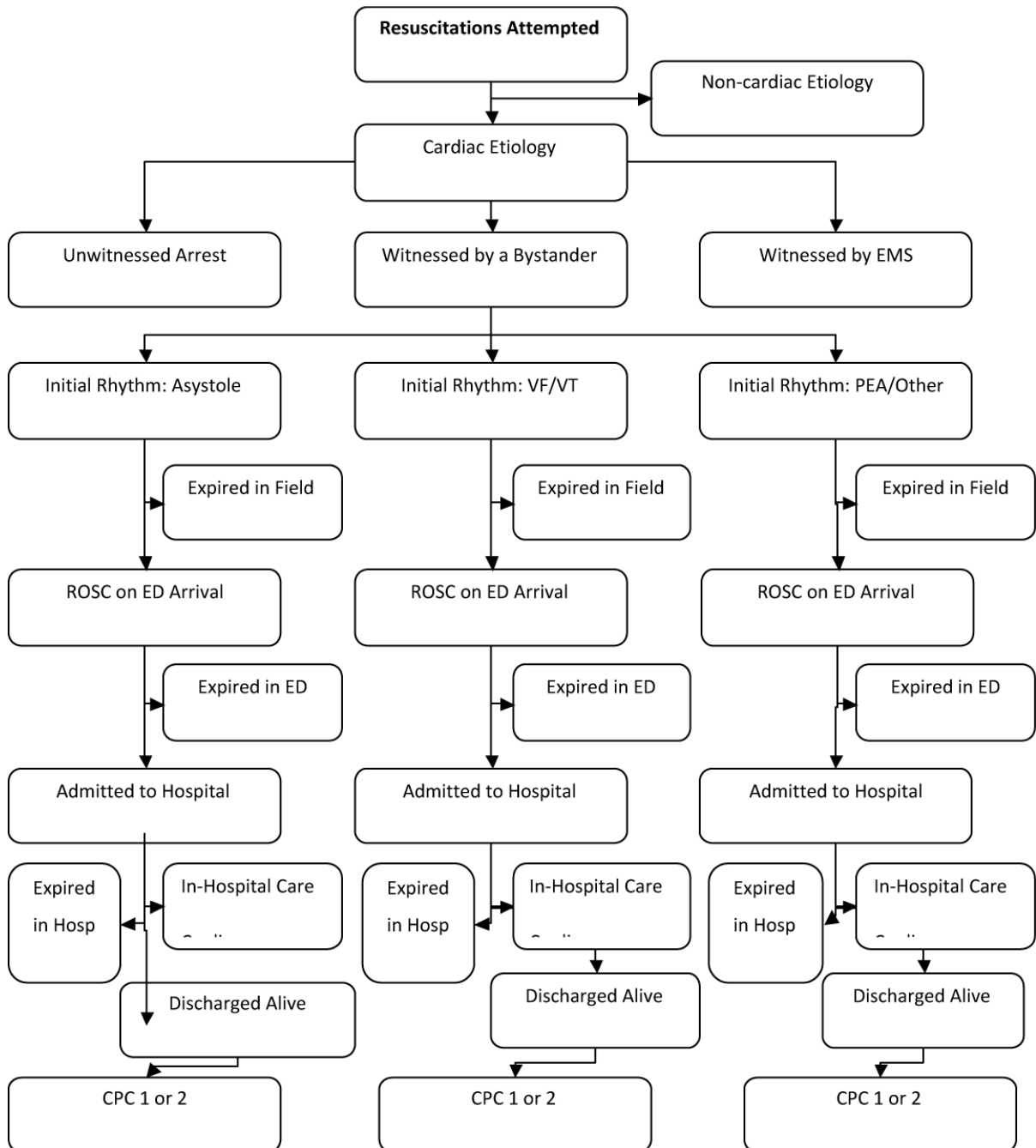
Report Start Date \_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_ Report End Date \_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_

<b>Presumed Arrest Etiology</b>	<b>Count of Cases</b>	<b>Time interval from 911 to Arrival (m:ss)</b>	<b>First Responder (N)</b>	<b>ALS Responder (N)</b>
Cardiac		0:00 – 1:59		
Drowning		2:00 – 2:59		
Electrocution		3:00 – 3:59		
Respiratory		4:00 – 4:59		
Trauma		5:00 – 5:59		
Other		6:00 – 6:59		
Unknown		7:00 – 7:59		
		8:00 – 8:59		
		9:00 – 9:59		
<b>Age (years)</b>		10:00 – 10:59		
< 20		11:00 – 11:59		
20-29		12:00 +		
30-39				
40-49				
50-59				
60-69				
70-79				
80+				
Unknown				
			<b>Bystander CPR provided</b>	<b>Count of Cases</b>
			Yes	
			No	
			Unknown	
			Dispatch CPR instructions provided	
			Yes	
			No	
			Unknown	
<b>AED or manual defib applied prior to EMS arrival</b>				
Yes, with defibrillation				
Yes, without defibrillation				
No				
Unknown				
			<b>Bystander CPR type</b>	
			Compressions + breaths	
			Compress only	
			Ventilation only	
			Unknown	

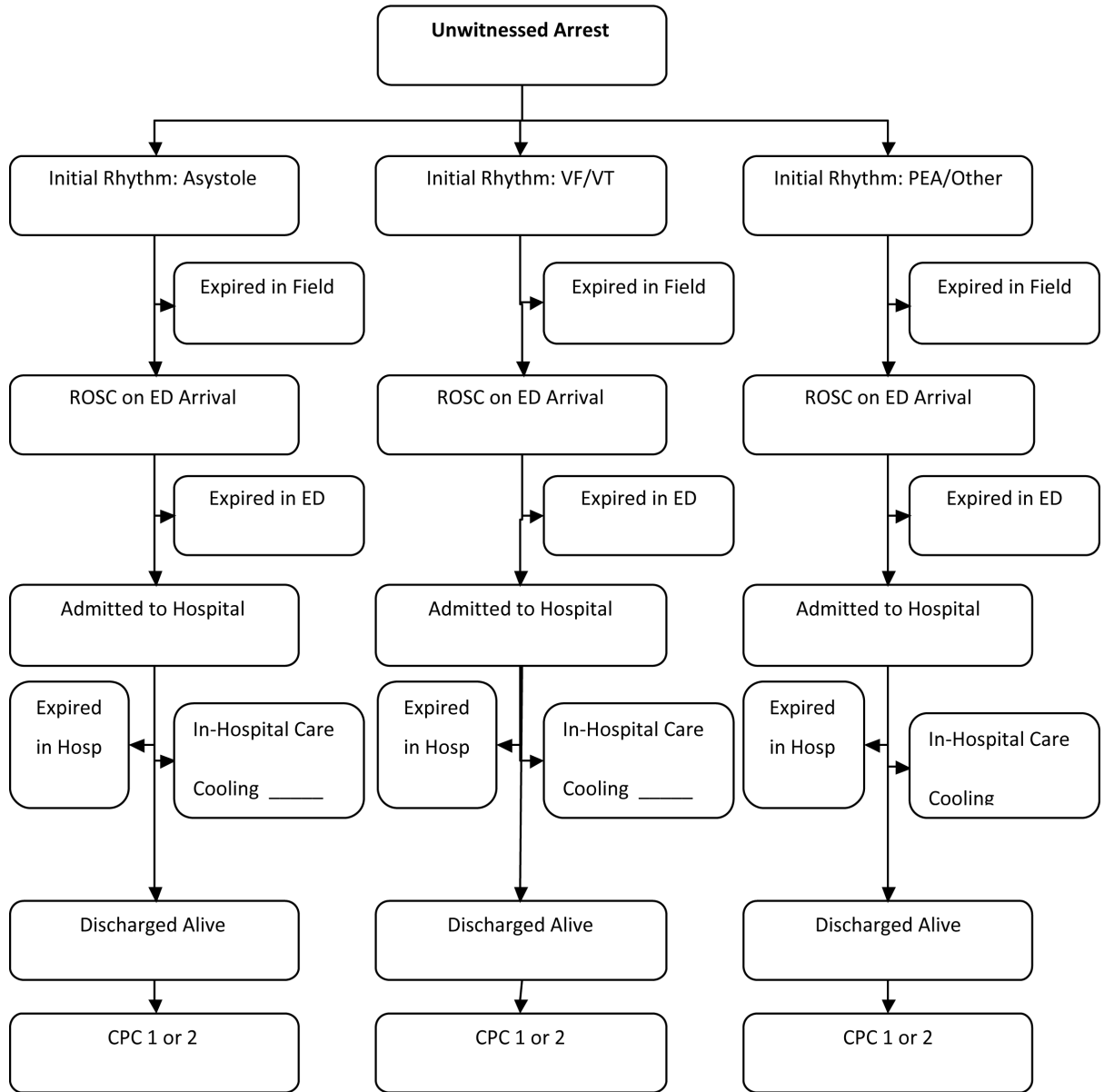
## SCA Outcome Reports in the Utstein Style

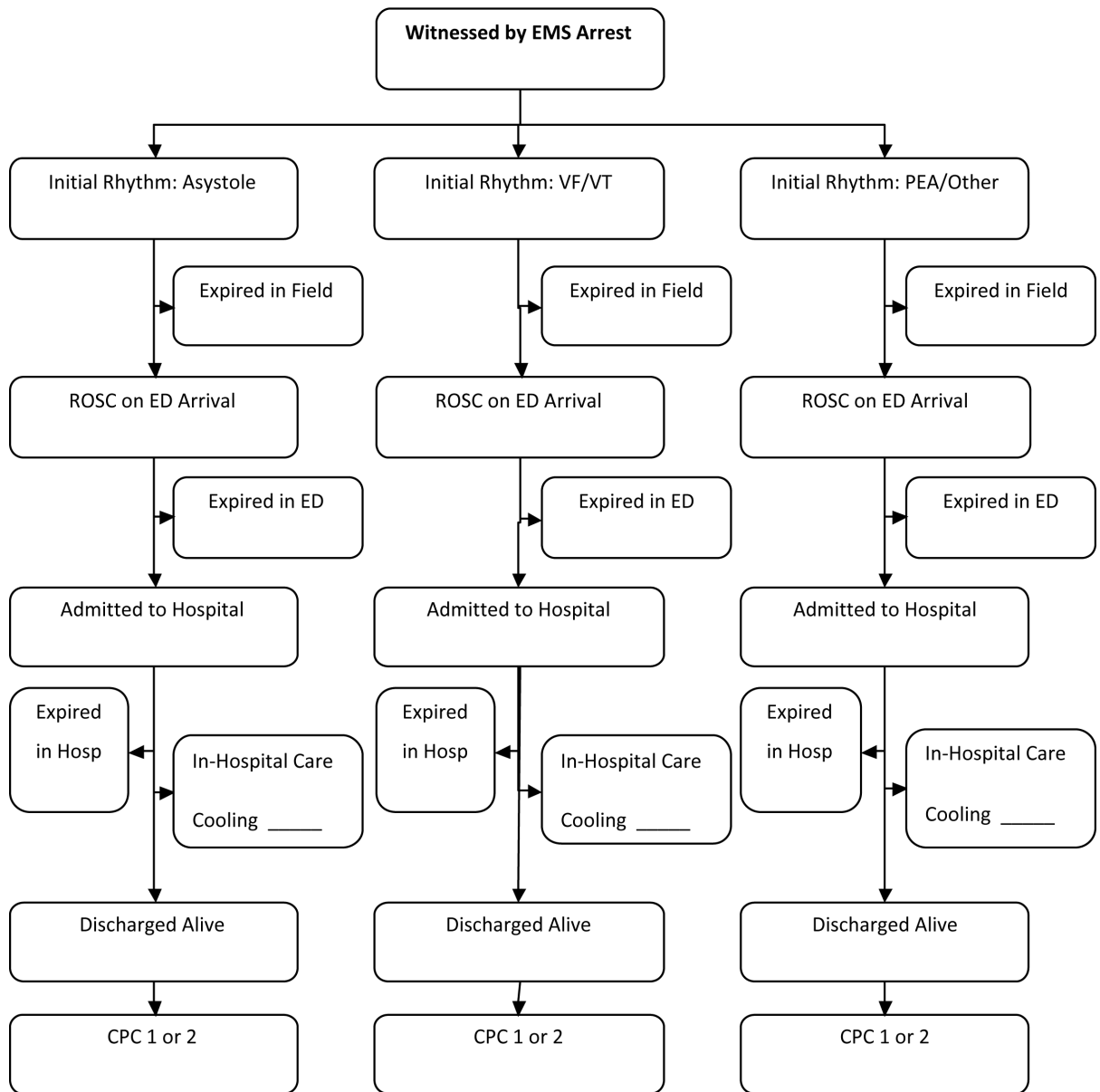
Data reported in the following forms should be limited to cases with a resuscitation attempt by 911 responder and/or a shock delivered by an AED before 911 responder arrival and include only cases with a cardiac etiology.

Report Start Date \_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_ Report End Date \_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_



Report Start Date \_\_\_\_/\_\_\_\_/\_\_\_\_ Report End Date \_\_\_\_/\_\_\_\_/\_\_\_\_





## Prehospital SCA Quality Improvement Review

**TO:** EMS Supervisor (name) \_\_\_\_\_ EMS \_\_\_\_/Unit \_\_\_\_

**FROM:** Medical Director \_\_\_\_\_

**RE:** EMS Run # \_\_\_\_\_, Medic XX / Engine XX / Unit X  
 Date of Incident: \_\_\_\_\_ Incident Address: \_\_\_\_\_  
 Date of Review: \_\_\_\_\_ Reviewer: \_\_\_\_\_

We are providing feedback on your recent resuscitation efforts to improve outcome for patients with cardiac arrest. We encourage your comments or response below.

Documented Initial Rhythm \_\_\_\_\_ Analyzed Initial Rhythm \_\_\_\_\_

- Y N N/A Unk Turned on monitor immediately upon arrival at patient.
- Y N N/A Unk If in VF, initial 120 (90-150) seconds of CPR performed.
- Y N N/A Unk Compression pause < 10 seconds prior to each defibrillation.
- Y N N/A Unk Documented presence or absence of bystander CPR.

### Benchmark

PARAMETER	THIS EVENT	SYSTEM AVERAGE
% time chest compressions ongoing during arrest	%	%
# pauses in chest compressions > 10 seconds		
Average ventilation rate	per min	per min
Average chest compression: ventilation ratio		

Comments From Case Reviewer:

\_\_\_\_\_

Comments From Medic/Engine Crew: *(Use back of page, if more space required)*

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Comments From EMS Supervisor:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

I have reviewed this report with the medics involved

No further action required

Action taken

EMS Supervisor Signature: \_\_\_\_\_ Date: \_\_\_\_\_

*Return this document to CFD QA Officer*

*This document is privileged, confidential, exempt from disclosure, and protected under ORC Secs. 2305.24, 2305.25, 2305.251, & 2305.252. Do not redisclose.*

## Example 1: Bystander CPR Pre-Arrival Instructions Call Review Sheet

**(ALL TIMES IN MILITARY FORMAT using hh:mm:ss)**

**Date of Call:** \_\_\_\_/\_\_\_\_/\_\_\_\_

**Run Number:** \_\_\_\_\_

**Time of E911:** \_\_\_\_:\_\_\_\_:\_\_\_\_

**Time Call Received:** \_\_\_\_:\_\_\_\_:\_\_\_\_

**Time first responders dispatched:** \_\_\_\_:\_\_\_\_:\_\_\_\_

**Initial call type:** \_\_\_\_\_

**Did the call type change during the incident:** Yes No

**If yes, what was the final call type:** \_\_\_\_\_

**Patient's age:** \_\_\_\_\_ Years

**Patient's gender:** Male Female

**Patient location:**

Home/Residence	Public Building	Street/Hwy
Nursing Home	Residence/Institution	Physician Office/Clinic
Educational Institution	Unknown	Hospital
Recreation/Sport	Industrial Place	Jail
Airport	Other _____	

**Caller's gender:** Male Female

**Caller's relationship to patient:**

spouse/companion	sibling	son/daughter
parent	friend/acquaintance	other family
medical provider	other non-family	unknown

**Did the caller state victim appeared dead?** Yes No

**Did the caller state victim appeared blue?** Yes No

**Did the caller state victim felt cold?** Yes No

**Did the caller state CPR was already initiated?** Yes No

**Did the dispatcher ask if the victim was responsive?** Yes No N/A (*already stated by caller*)

**Did the dispatcher ask if the victim was breathing?** Yes No N/A (*already stated by caller*)

**If the victim was breathing, did the dispatcher ask if the victim's breathing was normal?**  
 Yes No N/A (*victim not breathing*)

**How did the caller describe the victim's breathing?** \_\_\_\_\_

**Did caller describe snoring (agonal) breathing?** Yes No

**Was the caller alone with the patient?** Yes No N/A (*unknown*)

**Caller states bystander has training in CPR (e.g. medical professional, EMT):** Yes No

**Was the patient determined to have obvious death?** Yes No

**If the patient was determined to be dead, did the dispatcher instruct the caller to stop all resuscitation procedures?** Yes No N/A

**Did the dispatcher state "I am going to help you do CPR until help arrives. Listen carefully. I'll tell you exactly what to do."?**

Yes No **If no, what did dispatcher say:** \_\_\_\_\_

**Did the dispatcher ask if there was an AED at the location?** Yes No

**If yes, did the dispatcher instruct the caller to apply the AED?** Yes No N/A

**Did the caller state that an AED was already in use?** Yes No

<b>Assign emotional content of caller:</b>	<b>Beginning of call</b>	<b>End of call</b>
Uncontrollable, hysterical	_____	_____
Yelling, not listening, uncooperative	_____	_____
Moderately upset, but cooperative	_____	_____
Anxious, but cooperative	_____	_____
Normal conversational speech	_____	_____

**What was the presumed cause of the cardiac arrest? (pick one)**

Cardiac    
  Trauma    
  Respiratory    
  Drowning    
  Electrocutation    
 Other \_\_\_\_\_

**Record the time for each task, as directed by the dispatcher**

Task	Time (minutes into the call)
___ 1 Check for breathing	____:____
___ 2 Move patient to hard surface	____:____
___ 3 CPR landmarks	____:____
___ 4 Perform compressions	____:____
___ 5 Arrival of first responder	____:____

**Were there any delays in following the pre-arrival instructions?**     Yes     No

**If yes, describe:** \_\_\_ Caller refused to perform actions

\_\_\_ Chronic physical limitations of caller (e.g., cannot walk)

\_\_\_ Acute physical limitation of the caller (e.g., vomiting)

\_\_\_ Emotional state of caller

\_\_\_ Disagreeable patient characteristics (e.g., vomit or odor)

\_\_\_ Presence of agonal breathing

\_\_\_ Medical legal concern

\_\_\_ Other: \_\_\_\_\_

**Did the rescuer perform chest compressions (complete direction 10)?**     Yes     No

**If yes, time chest compressions began** \_\_\_\_:\_\_\_\_

**Did rescuer continue to follow the instructions until EMS arrived in the house (e.g., did they continue compressions even when they heard the siren)?**

Yes    
  No    
 N/A    
 Unknown

**Time call ended**     \_\_\_\_:\_\_\_\_

**Survival Data can be abstracted from EMS records, if available.**



## Example 2 : Dispatcher Assisted CPR Tape Review & Evaluation

This document is for Quality Review purposes only. Not for general distribution. Exempt from discovery.  
(RCW 43.70.510)

Dispatch center \_\_\_\_\_  
Dispatcher \_\_\_\_\_  
Instructions Offered \_\_\_\_\_  
Instructions Accepted \_\_\_\_\_

### Basic Information

Pt. ID# \_\_\_\_\_  
Incident Date \_\_\_\_\_  
Time of Call \_\_\_\_\_  
Incident Number \_\_\_\_\_  
Chief Complaint \_\_\_\_\_  
LEP indicated on CAD \_\_\_\_\_  
If no, should it have been? \_\_\_\_\_  
If yes, was Language line used? \_\_\_\_\_

### Need for CPR

Was the need for CPR determined early? YES \_\_\_\_ NO \_\_\_\_ UNKNOWN \_\_\_\_  
CR proceeded with instructions without delay? YES \_\_\_\_ NO \_\_\_\_ UNKNOWN \_\_\_\_  
Were DACPR instructions given appropriately? YES \_\_\_\_ NO \_\_\_\_ UNKNOWN \_\_\_\_  
Was the pace of CPR adequate? If no, was it corrected? \_\_\_\_\_  
Were agonals present? YES \_\_\_\_ NO \_\_\_\_ UNKNOWN \_\_\_\_  
Described by RP YES \_\_\_\_ NO \_\_\_\_ UNKNOWN \_\_\_\_  
Recognized by dispatcher YES \_\_\_\_ NO \_\_\_\_ UNKNOWN \_\_\_\_  
Heard on tape YES \_\_\_\_ NO \_\_\_\_ UNKNOWN \_\_\_\_

### Comments:

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# Notes

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# Post-Cardiac Arrest Care

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# Background

In the past few years, new evidence has highlighted the important contribution of the medical care provided during the immediate post-cardiac arrest period.[1-9] While optimal prehospital care is critical to restore a heartbeat and preserve brain function, the best chance of a favorable outcome is significantly enhanced by systematic delivery of advanced post-cardiac arrest care in the hospital setting.[11]

## The Contribution of Hospital Care

Due to its importance, post-cardiac arrest care has been elevated to the status of the fifth link in the metaphor used to describe the interconnectedness of processes involved in the care of the sudden cardiac arrest (SCA) Victim. The American Heart Association's 2010 Guidelines for Cardiopulmonary Resuscitation (CPR) and Emergency Cardiovascular Care (ECC) now includes a chapter dedicated to post-cardiac arrest period. [12]

### ***Steps for Survival***

Recognition of cardiac arrest and call for help  
Early CPR emphasizing chest compressions  
Rapid defibrillation  
Advanced life support  
Advanced post-cardiac arrest hospital care

## Post-Cardiac Arrest Syndrome

Many patients who achieve restoration of spontaneous circulation (ROSC) following out-of-hospital SCA experience *Post-Cardiac Arrest Syndrome*. This combination of complex pathophysiologic processes develops during the human body's recovery from prolonged whole body ischemia.[13] This severe injury progresses because of interactions between an injured brain, heart, and other organs which can ultimately result in multisystem organ failure and death. Post-cardiac arrest syndrome may be worsened by the precipitating cause of the cardiac arrest.

Many of the components of post-cardiac arrest syndrome can be successfully treated. All SCA patients who survive to hospital admission should have the opportunity to benefit from state-of-the-art care to treat possible post-cardiac arrest syndrome. If necessary, patients should be transferred to a critical care unit in an institution that is committed to provide the best possible care addressing all aspects of post-cardiac arrest syndrome.

### ***Objectives of Post-Cardiac Arrest Care***

1. Optimize cardiopulmonary function and vital organ perfusion after ROSC
2. Transport/transfer to an appropriate hospital or critical care unit with a comprehensive post-cardiac arrest treatment system of care
3. Identify and treat ACS and other reversible causes
4. Control temperature to optimize neurologic recovery
5. Anticipate, treat, and prevent multiple organ dysfunction. This includes avoiding excessive ventilation and hyperoxia

*(Highlights of the 2010 American Heart Association Guidelines for CPR and ECC. [static.heart.org/eccguidelines/guidelines-highlights.html](http://static.heart.org/eccguidelines/guidelines-highlights.html))*

There are many gaps in both the knowledge and delivery of post-cardiac arrest care. Optimal care for these patients has not been standardized. While regional systems of care have been proposed, they are not yet widely available. Many physicians who currently care for these SCA survivors may be unfamiliar with post-cardiac arrest syndrome and do not have access to evidence-based treatment protocols.[14]

## Post-Cardiac Arrest Care Guidelines

While the best treatment for the constellation of abnormalities associated with the restoration of spontaneous circulation is still evolving, ongoing efforts have identified care strategies to improve outcomes. The 2010 American Heart Association (AHA) Guidelines for CPR and ECC contains a useful post-cardiac arrest care algorithm as well as a table documenting a multi-system approach to care, and clear explanations for current recommendations.[12] The guideline states: "A comprehensive, structured, multidisciplinary system of care should be implemented in a consistent manner for the treatment of post-cardiac arrest patients." [12]

Survivors of out-of-hospital sudden cardiac arrest should have access to a program that includes structured interventions which have been shown to improve survival, including:

- Therapeutic hypothermia
- Hemodynamic stabilization
- Immediate coronary reperfusion when indicated
- Glycemic control
- Neurologic diagnosis, management and prognostication

EMS systems should learn whether the facility to which they transport their patients has the capability to offer these therapies, and whether or not they are implemented when indicated. If a hospital does not, EMS must act in the patient's best interest to facilitate transport to a facility that does offer the patient the needed system of care. For example, if the post-cardiac arrest 12-lead ECG shows ST-segment elevation myocardial infarction (STEMI), EMS can request air transport to ensure rapid access to a cardiac catheterization facility.

## Therapeutic Hypothermia

EMS can facilitate initiation of therapeutic hypothermia for eligible post-cardiac arrest patients. Studies have shown that brain injury due to cardiac arrest can be mitigated with therapeutic hypothermia.[1, 2, 9] While this is a relatively simple and inexpensive therapy to implement in the hospital setting, there is no scientific evidence that prehospital initiation of therapeutic hypothermia changes outcome. However, much like delivery of aspirin to patients with chest pain, prehospital initiation of therapeutic hypothermia offers a redundant system to help ensure that appropriate patients are treated.

Examples of hospital TH protocols, references, and other materials are available from the University of Pennsylvania's Center for Resuscitation Science [www.med.upenn.edu/resuscitation/hypothermia](http://www.med.upenn.edu/resuscitation/hypothermia). See also the section of this document on prehospital therapeutic hypothermia.

## Emergent Cardiac Catheterization

EMS must also learn if the institution to which they transport post-cardiac arrest patients will take those who have STEMI or a high suspicion of acute MI expediently to the cardiac catheterization lab.[15] Waiting for the patient to “wake up” before treating STEMI will increase loss of heart muscle.[16, 5] Patients can be cooled while on the way to and during heart catheterization.[17] Additionally, appropriate survivors should be evaluated for ICD placement prior to hospital discharge.[18]

## Multidisciplinary Team Care

The comprehensive care required to manage the constellation of problems possible in the post-arrest period requires that the patient be cared for by a multidisciplinary team of critical care as well as cardiology and neurology specialists who have a plan of care available which will allow them to anticipate and treat problems as they arise.

## Avoidance of Early Termination

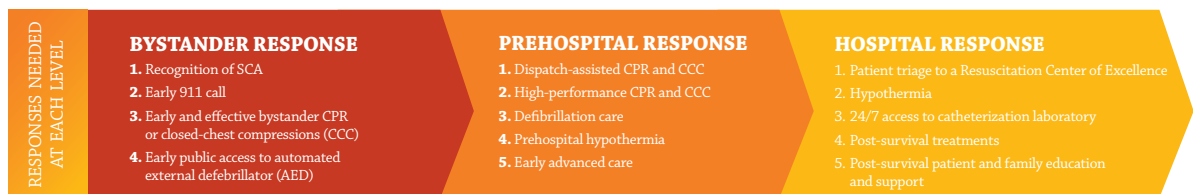
The goal of management is to return patients to their pre-arrest level of functioning. Currently there is no way to predict an individual patient’s outcome based on pre-arrest or intra-arrest parameters. In the hospital setting, it is not possible to predict poor outcome during the first 24 hours, and possibly not until 72 hours after ROSC. It is recommended that patients who have received therapeutic hypothermia be observed for more than 72 hours after ROSC before predicting poor outcome.[12, 19]

## Organ Donation

Victims of sudden cardiac arrest who progress to brain death from cardiac arrest should be considered for organ donation. These patients are an underrecognized source of organ donors whose cause of death does not prohibit them from consideration as a donor.[20]

# Regional Systems of Care

Currently there is no national process in place to establish, categorize, verify, or designate regional cardiac arrest systems of care. However, in some areas of the country, EMS medical directors have been able to organize coordinated approaches to hospital care by ensuring that appropriate patients are transported to institutions that have the most coordinated approach to post-cardiac arrest care.[14]





## Appendix

Emergency Department Post-Cardiac Arrest Checklist			
	<b>Hypothermia Therapy Indicated?</b>		
	GSC Motor score < 6 (i.e. not following commands)	Yes	No
	Cardiac arrest most likely cause of coma	Yes	No
	If both are "Yes", then follow your hypothermia therapy protocol.		
	<b>Emergent Cardiac Intervention Indicated?</b>		
	STEMI on 12-lead ECG	Yes	No
	High clinical suspicion for acute MI	Yes	No
	Hemodynamic instability	Yes	No
	If any "Yes", then begin your STEMI protocol.		
	<b>Is oxygen saturation between 94 and 99%?[10]</b>		
	<b>Is mean arterial pressure at least 65 mm Hg (systolic BP &gt; 90)?</b>		
	<b>Labs for lactate, troponin, potassium, glucose, and creatinine drawn?</b>		
	<b>Is bedside glucose measurement between 80 and 180?</b>		
	<b>Is chest x-ray taken?</b>		
	<b>If comatose, is core temperature monitored?</b>		
	<b>Is there an indication for a head CT scan?</b>		
	<b>Is there an indication for echocardiography (e.g., detect global stunning, wall-motion abnormalities, structural problems or cardiomyopathy)?</b>		
	<b>Is invasive monitoring indicated (e.g., low mean arterial pressure, hypothermia therapy, shock)?</b>		

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# Patient and Family Support Following Sudden Cardiac Arrest

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# Patient Support and Reintegration

## Impact of SCA

When a loved one experiences sudden cardiac arrest, family members are devastated and shocked by the swiftness and cruelty of the event, much the same as families of other victims of tragedies such as motor vehicle collisions. The ability to understand an SCA event is quite different from other tragedies, however, because few people understand what SCA is, or how their loved one came to be a victim. Whether or not their loved one has survived, all families need to leave the hospital with an informed understanding of sudden cardiac arrest and the ability to access resources they may need as they take back their lives.

For survivors and their families, leaving the hospital after experiencing a sudden cardiac arrest can be a terrifying experience. Many survivors have received an implantable cardioverter defibrillator (ICD) to prevent future fatal arrhythmias and may have multiple concerns related to the device.[1-5]

Up to 40% of survivors may experience mild to moderate cognitive impairments following arrest. The most common cognitive issue is thought to be memory loss or delayed recall.[6] The cause, prognosis, and methods for coping with these deficits must be addressed. If deficits such as forgetfulness, reduced attention to stimuli, comprehension, and problem-solving ability are not identified and managed, they can lead to high levels of depression, anxiety, anger, and stress as well as social isolation and behavior changes.[7] Survivors should have access to intervention programs to aid their adjustment, family coping, and reintegration into society.[8-9] As they prepare for hospital discharge, patients should have the opportunity to meet with their healthcare providers to ask questions relevant to managing their concerns. Ideally, every institution should have a discharge policy which includes this opportunity.

## Basic Needs upon Hospital Discharge

- At discharge, survivors and families should receive referrals to resources for any additional physical rehabilitation programs to help them cope with existing brain injury.
- Honest and specific answers to questions are highly appreciated by survivors and families.
- Survivors welcome resources they can access for accurate information about their condition. Resources given at hospital discharge are most helpful if they have been screened for accuracy and relevance to the patient's specific diagnosis. For example, information about SCA caused by an inherited disorder may not be relevant for someone who experienced arrest due to a myocardial infarction. (Sources of patient information are included in the Appendix.)
- Knowledge of what to expect and how to react when symptoms are experienced after hospital discharge can be very helpful to the patient. For example, what types of symptoms should prompt a call to 911; when is it appropriate to call my doctor?
- Although the implantation of an internal cardioverter defibrillator (ICD) can provide some reassurance that sudden death will not occur again, individuals cannot help but worry and wonder each time there is a twinge of pain or feeling of discomfort. Up to 35% of patients develop anxiety disorders following ICD placement[10] and need to learn coping skills as well as what to do if they receive a shock from a new ICD.

- Information should be available that both advocates the use of counseling and support groups, and gives appropriate referrals to individuals and groups experienced with survivor concerns. Often survivors have very real and potentially paralyzing concerns about how to resume their lives. Do I plan for the future or not? Referral to counselors who are experienced with these issues, specifically for this population, can help survivors begin to deal with and resolve their concerns.

### ***An Understanding Boss***

“At the office, my husband’s boss and co-workers let him concentrate fully on me and my recovery. There was no one counting sick-time hours or danger of a reduced paycheck. He was told to take the time he needed. What’s more, the boss even told him that he couldn’t return full-time until the three of us had lunch together”.

“He was true to his word and my husband was able to do what needed to be done at home for his wife and two young children without being concerned about the impact on his work life.”

## **Support Groups**

Within a support group, members provide each other with various types of help. Generally support groups provide peer-to-peer or patient-to-patient support for a particular shared, and generally burdensome, characteristic. Help may take the form of providing and evaluating relevant information, relating personal experiences, listening to and accepting others' experiences, providing sympathetic understanding, and establishing social networks. A support group may also work to inform the public or engage in advocacy.

### **What makes a good support group?**

Although the needs and potential benefits may be different for each person, there are some basic components that make a particular support group effective for an individual. These include:

- Provision of current and reliable information
- The ability to respond in a timely manner to individuals and their questions
- Regularly scheduled meetings and or correspondence such as newsletters
- Access to appropriate professional support, if needed
- Strong leadership and a clear confidentiality policy

### ***Insights from a Survivor***

“Planning for your own imminent death when you have just survived SCA may sound like a contradiction, but is very real”.

“I was 33 years old when I experienced a sudden cardiac arrest. I had been saving for retirement, but had always wanted to travel more. Trying to balance the need to plan for a future with the likelihood of there not being one made it very difficult for me to continue to save money for things in the distant future.”

“During my first post-arrest follow up appointment with my cardiologist, I asked if I should continue saving for retirement or if I should spend the money on a trip around the world. He told me to keep saving. This was very good advice. However, I really did want to know if I was going to die quickly so that I could do some very cool stuff with the money I wouldn’t be using in retirement!”

- Content relative to the members specific needs: common interests and experiences and other members that can relate to what is happening to you.

## Starting a Support Group

Establishing a new support group is time consuming and requires dedication. Often help can be enlisted from a local hospital or religious organization to get the group started. Studying existing support groups can be helpful as it may provide information about a group structure that works well, or can help identify educational materials that have already been developed. Once a group is started, it may be of benefit to make sure local organizations or hospitals are aware of its existence so that they can offer support and refer individuals to the group.

## SCA Survivor Groups and Advocacy

Survivor groups can provide a focal point for members to inform the public about sudden cardiac arrest. There are a number of advocacy activities that can help to improve survival from SCA within a community.

Some activities that survivor groups can support include:

- Sharing survivor stories. This can have powerful influence on the public and be leveraged to challenge the public to learn CPR and place AEDs in their neighborhoods.
- Increasing awareness of SCA using media campaigns and fund raisers such as sports competitions. Funds raised can be used to purchase AEDs for local businesses or churches.
- Taking an active role in providing CPR training and in encouraging citizens to provide bystander CPR.

# Appendix

## Resources for Survivors

There are many organizations that offer support and advocacy opportunities for survivors of SCA, for families who have lost loved ones, and for healthcare professionals. The list below includes patient organizations as well as physician and professional organizations that offer useful resources which can be helpful to survivors on a multitude of topics.

### **Patient Oriented Organizations**

#### **Sudden Cardiac Arrest Association (SCAA) [www.suddencardiacarrest.org](http://www.suddencardiacarrest.org)**

The Sudden Cardiac Arrest Association (SCAA) identifies and unites survivors and those at risk of sudden cardiac arrest as well as others who are interested in being advocates on SCAA issues in their communities and beyond. SCAA promotes solutions to prevent sudden cardiac death including increased awareness, immediate bystander action, public access to defibrillation (PAD), cardiovascular disease prevention, and access to preventative therapies. The website contains multiple resources on the topics of understanding and surviving SCA, AED program implementation, and living with ICDs.



### **Sudden Cardiac Arrest Foundation (SCAF) [www.sca-aware.org](http://www.sca-aware.org)**

The sudden Cardiac Arrest Foundation supports the patients and families who have been affected by SCA, promotes collaboration between organizations, and provides information, resources, and guidance while facilitating peer-to-peer communication.

### **The Mended Hearts, Inc. [www.mendedhearts.org](http://www.mendedhearts.org)**

Recognized for its role in facilitating a positive patient-care experience, Mended Hearts partners with 460 hospitals and rehabilitation clinics, and offers services to heart patients through visiting programs, support group meetings, and educational forums. The Mended Hearts mission is to “inspire hope in heart disease patients and their families.”

Because Mended Hearts is made up of the very kinds of people it serves—heart patients, their families, and others impacted by heart disease, its members draw on personal experience as they help others. Mended Hearts support groups help people understand that there can be a rich, rewarding life after heart disease. Members listen, share their experiences, learn from healthcare professionals, and volunteer to talk to other heart patients about what they may face, including lifestyle changes, depression, recovery, and treatment. Annually, Mended Hearts volunteers make visits to patients, family members and caregivers in hospitals, online, and by phone.

**Mended Little Hearts** provides hope and support to children, families, and caregivers impacted by congenital heart defects in order to extend and improve quality of life.

### **WomenHeart [www.womenheart.org](http://www.womenheart.org)**

The National Coalition for Women with Heart Disease is known as WomenHeart. WomenHeart is a national organization promoting women’s heart health through advocacy, education, and support. WomenHeart advocates for equal access to quality care and provides information and resources to help women take charge of their health. In addition to advocacy information, the WomenHeart site offers resources that include facts, research, news, links and publications.

### **Adult Congenital Heart Association (ACHA) [www.achaheart.org](http://www.achaheart.org)**

The Adult Congenital Heart Association provides information and resources for adults with congenital heart defects and their families as well as the medical community. The organization provides a resource center and is active in outreach as well as advocacy and the promotion of adult congenital heart defect research. The website offers information for patients and families along with services through health-professional members.

### **Parent Heart Watch (PHW) [www.parentheartwatch.org](http://www.parentheartwatch.org)**

Parent Heart Watch is a state-by-state network of parents and partners solely dedicated to reducing the often disastrous effects of Sudden Cardiac Arrest in youth. This national network serves to inform, educate, advocate, and implement nationwide programs that help achieve the mission and vision of the organization.

### **Sudden Arrhythmia Death Syndromes Foundation (SADS) [www.sads.org](http://www.sads.org)**

The mission of the Sudden Arrhythmia Death Syndromes Foundation (SADS) is to save the lives and support the families of children and young adults who are genetically predisposed to sudden death due to heart rhythm abnormalities. The SADS website contains extensive patient and family

support materials and resources as well as sections providing information regarding awareness, research and advocacy, including multiple resources.

**Hypertrophic Cardiomyopathy Association (HCMA) [www.4hcm.org](http://www.4hcm.org)**

The HCMA Foundation's mission is to provide support, advocacy, and education to patients and their family members, the medical community, and the public about hypertrophic cardiomyopathy. Their vision is to serve as the major organization improving the lives of those with Hypertrophic Cardiomyopathy, preventing untimely deaths, and advancing global understanding. This organization provides multiple patient resources, including material on how to cope with loss, screening, and prevention of SCA in athletes along with information to assist in AED program development.

**The Children's Cardiomyopathy Foundation (CCF) [www.childrenscardiomyopathy.org](http://www.childrenscardiomyopathy.org)**

CCF is a national, non-profit organization focused on pediatric cardiomyopathy, a chronic and potentially life-threatening disease of the heart muscle. Cardiomyopathy affects approximately 30,000 children in the United States. Considered one of the most severe pediatric heart diseases to treat, it is the leading cause of sudden deaths and heart transplants in children.

*Healthcare-Patient-Professional organizations:*

**American Heart Association (AHA) [www.heart.org/HEARTORG](http://www.heart.org/HEARTORG)**

The American Heart Association website allows the identification of its local branches and provides information on local cardiovascular and stroke initiatives and programs. The mission of the AHA includes promoting healthier communities through advocacy, improving the quality of healthcare for heart and stroke patients, educating high risk populations through multiple initiatives and online tools, and support of research into heart and stroke care.

**Heart Rhythm Society (HRS) [www.hrsonline.org](http://www.hrsonline.org)**

The Heart Rhythm Society provides education and advocacy for cardiac arrhythmia professionals and patients, and serves as a primary information resource on heart rhythm disorders. Its mission is to improve the care of patients by promoting research, education, and optimal health care policies and standards. The Heart Rhythm Society website offers patient information about common heart rhythm disorders.

**The Pediatric and Congenital Electrophysiology Society (PACES) [www.pediatricpsociety.org](http://www.pediatricpsociety.org)**

This nonprofit organization is comprised of an international group of physicians and allied professionals dedicated to improving the care of children and young adults with cardiac rhythm disturbances. The group's primary mission is to foster high-quality collaborative research and exchange of ideas on arrhythmia topics that are relevant to infants and children or patients of any age with congenital heart disease. The web site allows identification of pediatric electrophysiologists by city.

## Recommended Reading

Sotile, W.M. and R. Cantor-Cooke, *Thriving with heart disease : a unique program for you and your family : live happier, healthier, longer*. 2003, New York: Free Press. xiv, 303 p.[11]

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