



# Saving lives from cardiac arrest

Community AED program implementation guide

**PHILIPS**  
sense and simplicity

# Sudden cardiac arrest: what it is and how you can help your community save lives

Sudden cardiac arrest (SCA) strikes approximately 295,000 individuals each year, and is a leading cause of adult death in the United States<sup>1</sup>. More people die from SCA than from house fires, HIV, firearms, prostate and breast cancer, and traffic accidents, combined.<sup>1, 6, 7</sup>

Sudden cardiac arrest does not discriminate by age. SCA can often happen anywhere, to anyone, at any time – without warning or symptoms.

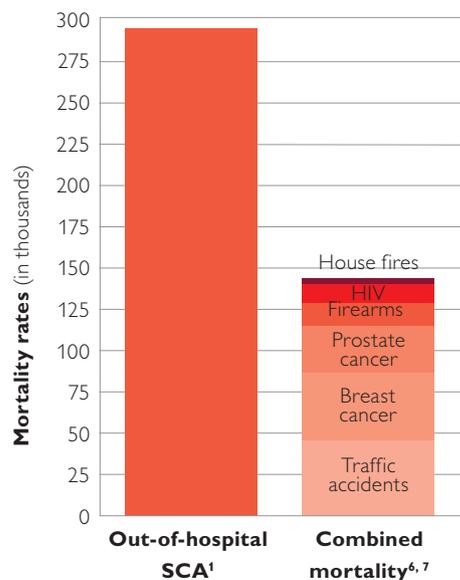
Sudden cardiac arrest can be caused by a variety of reasons, including coronary heart disease, blood vessel abnormalities, drug overdose, heart attack (myocardial infarction), electrical shock, trauma to the chest or some other outside trigger.<sup>2, 3</sup>

It is an electrical malfunction of the heart that causes it to quiver rather than pump in a normal rhythm. The victim stops breathing, and no pulse is present.

### Surviving sudden cardiac arrest

Defibrillation – the delivery of electrical current to the heart – is recognized as the definitive treatment for the most common cause of SCA: ventricular fibrillation (VF). VF is an abnormal heart rhythm that causes the heart to suddenly stop pumping blood.

Surviving SCA is largely dependent on how quickly the person is defibrillated. For each minute that defibrillation is delayed, the chance of survival decreases by seven to 10 percent.<sup>1</sup> Irreversible brain damage typically occurs within four to six minutes after cardiac arrest.<sup>4</sup> After 10 minutes, few victims of SCA survive.



Comparison of mortality figures for SCA vs. other leading causes of death.

### Response time matters

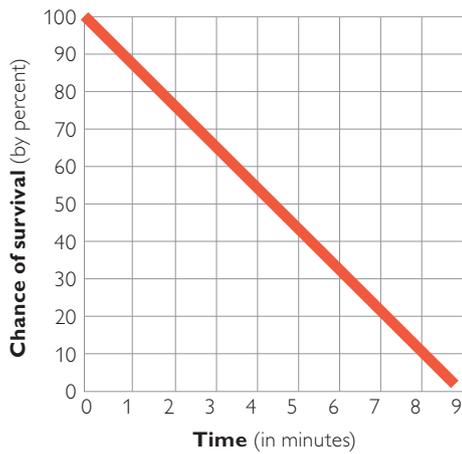
Traditionally, defibrillation has been delivered by emergency medical services (EMS) personnel summoned to the aid of a sudden cardiac arrest victim.

Most EMS organizations are challenged to respond within 10 minutes due to many factors, such as traffic congestion, multi-story buildings, secured access, and other delays.<sup>8</sup> As a result, the SCA survival rate in the U.S. is currently **less than seven percent.**<sup>1</sup>

There is consensus among health and safety organizations that rapid response (generally three to five minutes) with a defibrillator following cardiac arrest is critical. The U.S. Department of Labor's Occupational Health and Safety Administration (OHSA) has a four minute response requirement for early defibrillation programs.<sup>9</sup> The American Heart Association recommends defibrillation response times from three to five minutes depending on the environment.<sup>10</sup> The Department of Health and Human Services and the General Services Administration identify three minutes or less as the "optimal response time" for an early defibrillation program.<sup>11</sup>

### Chain of Survival

The American Heart Association's Chain of Survival protocol addresses the fact that most SCA events occur outside of a hospital, with death occurring within minutes of onset.<sup>12</sup>



**Chance of survival decreases 7-10% each minute.**

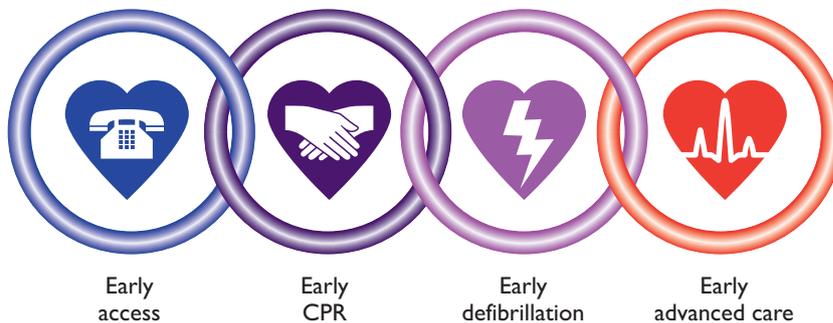
For the Chain to be effective, quick execution of each and every link is critical. With each minute that passes, the likelihood of survival decreases seven to ten percent.

There are four links in the "Chain of Survival":

1. Early access to on-site and EMS responders through quick activation of the emergency system, such as 911
2. Early initiation of CPR until a defibrillator arrives
3. Early defibrillation
4. Early advanced cardiac life support (paramedics)

For more information on the Chain of Survival, see [www.chainofsurvival.com](http://www.chainofsurvival.com).

### Chain of Survival





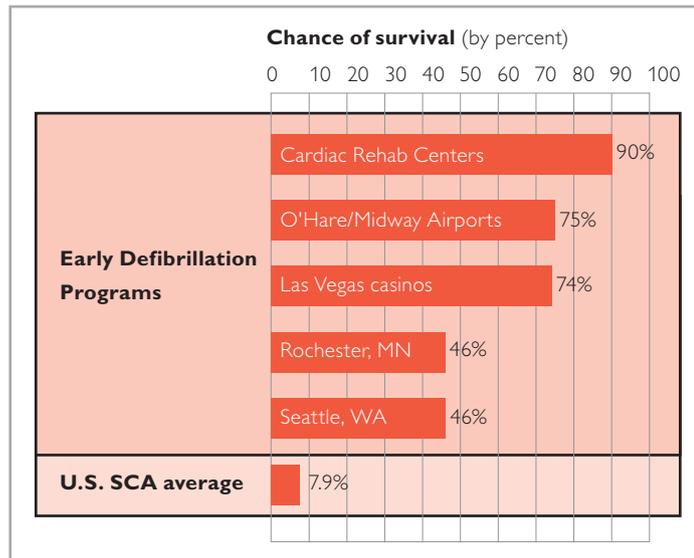
### Early defibrillation saves lives

Placing automated external defibrillators (AEDs) in the hands of citizen responders who can defibrillate an SCA victim within three to four minutes of collapse, while EMS is in route, greatly increases the victim's chance of survival. There are growing numbers of successful community early defibrillation programs using Philips HeartStart defibrillators, including programs in Austin, Texas; Sunnyvale, California; Whitewater, Wisconsin; and Polk County, Florida. All have instituted community early defibrillation programs that provide an estimated call-to-delivery of the first shock in four to seven minutes. These four communities alone saved more than 98 victims of SCA in the first few years of their programs.

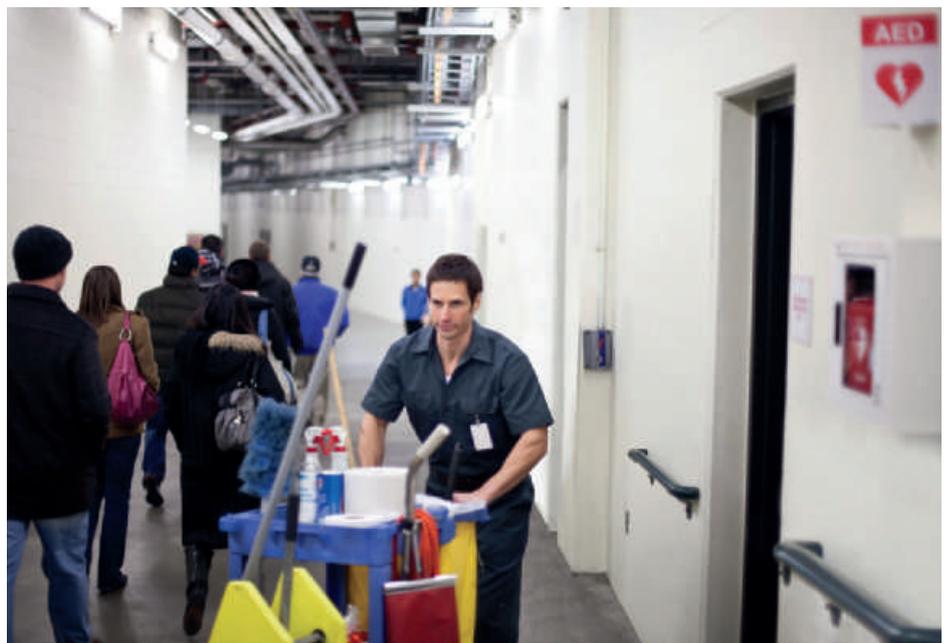
In addition, several public areas where people gather (for example, airports and casinos) have already seen survival rates as high as 75 percent by having defibrillators readily available for use by non-EMS personnel.<sup>13, 15</sup>

According to the American Heart Association, if bystander CPR was initiated more consistently, if AEDs were more widely available, and if every community could achieve a 20 percent cardiac arrest survival rate, an estimated 40,000 more lives could be saved each year.<sup>14</sup>

The quick response to deliver a shock may make the difference. An early defibrillation program in your community may save the life of a neighbor, a coworker, or even a family member.



Early defibrillation programs improved survival rates<sup>1,13,15,16,17,18</sup>



# Assess your community early defibrillation needs

Many communities are teaming up with their local EMS systems to implement early defibrillation programs to help save lives from sudden cardiac arrest.

A number of studies have shown that there is a higher incidence of sudden cardiac arrest (SCA) at certain sites. These sites are:

- Airports<sup>19</sup>
- Community and senior citizen centers<sup>19</sup>
- Dialysis centers<sup>19, 20, 21</sup>
- Ferries and train terminals<sup>19</sup>
- Golf courses<sup>19</sup>
- Health centers and gyms<sup>19</sup>
- Cardiology, internal and family medicine practices, and urgent care centers<sup>20</sup>
- Jails<sup>19</sup>
- Large industrial sites<sup>19</sup>
- Large shopping malls<sup>19</sup>
- Nursing homes<sup>21, 22</sup>
- Private businesses<sup>23</sup>
- Sports and events complexes<sup>19, 21</sup>

Consider implementing on-site AED programs in locations such as these in your community.

## Questions to consider for AED placement

The Sudden Cardiac Arrest Association (SCAA) has published the following questions to provide additional guidance when placing defibrillators for maximum effectiveness.<sup>24</sup>

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

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

## Delays in EMS response may impact AED placement

Consideration should also be given to sites where emergency medical services may be delayed due to obstacles or barriers, such as:

- Multi-story buildings
- Congested metropolitan locations
- Facilities with security gates

After reviewing this information, you should now have an idea of the best sites to locate AEDs within the community.

## Conducting a community site survey

Once you have determined the sites for your AED program, the next step is to determine the number of AEDs needed at each site. This can be done by conducting a comprehensive site survey of all identified locations within the community, and accurately assessing EMS response times to those locations. The survey could include:

- Evaluations of each site, including indoor and outdoor locations, open spaces, the number of buildings at each site and the number of floors in each building.
- Assessments of local community-based EMS response times and capabilities for these locations.
- Assessments of local private EMS response times and capabilities for the same locations.

Remember, the goal of your community early defibrillation program is to maximize the potential of your local EMS system, in order to strengthen the “Chain of Survival” in your community. Therefore, it is strongly recommended that the local EMS agency tasked with providing emergency responses be heavily involved in the development of any public access defibrillation program.



### Identifying strategic locations for defibrillator placement at a site

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

To help identify locations where defibrillators need to be placed in order to achieve the optimal defibrillation response time, you could use the information gathered from your community site survey along with maps, blueprints, floor plans, or sketches. Objects in the environment not shown on maps – such as steep terrain, embankments, large garden planting areas, groups of trees, or decorative sculptures – may necessitate relocation of a defibrillator. Also, be sure to consider secure areas with locked doors when judging response times. Often, secured areas should be viewed as totally separate facilities for the purpose of AED placement.

AEDs should be placed in easily accessible, well-marked locations, ideally near the telephones so EMS can be called when an SCA event occurs. For example, they can be mounted on the wall in the front lobby (if applicable), by exits, and near elevators or fire extinguishers. In settings with mobile units (for example, golf carts), placement on the mobile units should be considered. Philips can help assess the unique needs of each community.

### Testing defibrillator placement locations

Once initial defibrillator locations have been determined, it is important to test your planned locations. Set up an SCA response test for each planned defibrillator location. Physically go through a collapse-to-pads-on scenario using a stopwatch to determine if the locations are logical and appropriate to meet the goal of three to four minutes. This will tell you whether the defibrillator location should be adjusted to help ensure you meet your program goal.

### Identifying each AED location

Once you have determined the locations for the defibrillators, a method for bringing attention to each defibrillator should be implemented. Signage should be installed that readily identifies the location of each defibrillator.

As with evacuation plans and maps indicating the locations of exits, fire extinguishers, and first aid equipment, the locations of defibrillators should be placed on all maps of each facility, including online maps and information directories on facility or company intranets as available.

# Early defibrillation program considerations

In addition to the AEDs you will need as part of your community early defibrillation program, you may want to consider the following:

- AED supplies
- Emergency response plan
- Medical direction
- Training for citizen responders
- Program management
- Data management
- State and local AED requirements
- Liability and risk management
- Insurance

## AED supplies

In addition to devices and cases, you should also purchase defibrillation supplies, such as spare sets of pads, spare batteries and, depending on the location of your AEDs, pediatric defibrillation capabilities so that children may be treated if needed. A spare set of pads and battery, and pediatric supplies if needed, can be stored in the carry case along with other first aid equipment you may need, such as pocket masks, scissors, gloves, and razors.

You may need to purchase specially designed cabinets or wall brackets, with appropriate signage, to store the AEDs.

## Emergency response plan

An emergency response plan is an integral part of your early defibrillation program. The emergency response plan will identify your community defibrillator needs and required locations. The plan also outlines details of responding to an incident of sudden cardiac arrest, including:

- How an emergency response is initiated
- How EMS is notified
- Defibrillation response protocol
- Transfer of patient care from citizen responders to EMS
- Post-event and debriefing procedures
- Data management
- Responder training and retraining

Most importantly, the emergency response plan identifies the community emergency response team members – including those volunteers who will be trained to use the defibrillators in the event of sudden cardiac arrest – and their responsibilities, qualifications, and training.

The community emergency response team is the driving force behind your early defibrillation program. The team may include a medical director, a program coordinator, community site coordinators, and citizen responders. Each member takes an active role in leading the efforts to bring potentially lifesaving equipment to the community.

## Medical direction

Most states require medical direction – or physician oversight – for an early defibrillation program. There also may be a requirement for a prescription to be provided in order to purchase some models of defibrillators. Consider finding a medical director at the outset of your community early defibrillation program planning to help determine the medical requirements for your program.

The medical director's role in your community will depend on the size and characteristics of the population served by your AED program. Most often, the medical director's role is to provide hands-on medical consultation and expertise; to be involved in day-to-day decisions; to provide oversight in protocol and training; to review SCA incident data; and to work as a liaison between the community's AED program and the local EMS agencies.

You may want to consult with the medical director of your program when developing your defibrillator response protocol. The protocol includes assessing the victim and actual use of the defibrillator. The medical director can also review your protocol once complete.

The most appropriate person to act as medical director for your community may be an emergency physician or someone trained in emergency medicine, a family physician, an internist, a cardiologist, or a physician specializing in occupational health medicine. The local EMS agency that responds to 911 calls will already have a medical director with existing oversight responsibilities. These physicians will often have the expertise necessary to perform this additional role.



### **Training for citizen responders**

Typically, citizen responders are volunteers within the community who are trained in CPR and the use of a defibrillator. They become first responders in the event of a sudden cardiac arrest.

Certified training in defibrillator operation may be required of those people in your community who volunteer to be citizen responders. Many nationwide and local training organizations now provide CPR and defibrillation training programs. The classes typically take about three to four hours. The term “certified training” may have legal

connotations in your area. You will want to verify with your training organization that they offer a training certificate upon completion of their CPR and defibrillation training class.

Additionally, since most responders will go for long periods of time without being called upon to use a defibrillator, a periodic retraining program is vital to keep responders sharp and their confidence high.

### **Program management**

Your community early defibrillation program will require coordination and management. Personnel and expertise may be found among your local EMS providers or emergency preparedness coordinators. Often these types of programs are logical extensions of their existing responsibilities.

Part of good program management is identifying a person who can be the program coordinator. This person would be responsible for managing the day-to-day aspects of the early defibrillation program, including funding, budget management, equipment and accessories maintenance, compliance, training, and promotion. The program coordinator would also communicate with all members of the program, including the medical director, EMS agencies, and citizen responders. He or she would also be responsible for overseeing coordinators at sites where AEDs have been installed. These site coordinators would manage equipment and accessory installation, maintenance and usage of devices, and training and retraining of site responders.

Once implemented, your program coordinator will be responsible for informing residents and visitors that there is a program in place to respond to sudden cardiac arrest.

### **Data management**

Your emergency response plan should also take into consideration the need for a system to collect and manage SCA incident data. Reviewing SCA incident data is critical to the evaluation of response times and performance. By reviewing data recorded on the defibrillator, you will be able to access information regarding if CPR was performed, if the defibrillator was applied and used appropriately, when the first shock occurred, shock intervals, ECG readings, and other valuable information.

In addition, data reporting and review will:

- Provide a medical record for the patient.
- Allow for the potential of future research and development.
- Help the medical director set and, if necessary, alter defibrillation protocols.
- Allow for more detailed analysis of an incident or trending of multiple incidents.
- Serve to validate the program.

The data management system should be sufficiently flexible to allow the creation of easy-to-read reports and graphic illustrations of various aspects of your program.

Some aspects of data retrieval and reporting you may want to address in your emergency response plan include responsibility for data retrieval from the defibrillators, communication of data when appropriate, computer download procedures, and the scope and content of reports to be generated and reviewed.

An effective method to limit liability and risk is to develop a well-planned, effectively implemented, and consistently managed program based on your community's needs.

### State and local AED requirements

State and local requirements for AED programs play an important role in setting program constraints. Most states specify what type of responder training is expected, how to work with state and local EMS agencies, and how to maintain or renew the AED program. Be aware of these key requirements as you start implementation.

State laws may require:

- A licensed physician to act as a medical supervisor of the program.
- Notification to EMS agencies of AED programs, or registration of AED programs with EMS agencies.
- Responders to complete a nationally recognized training CPR and AED course for lay responders.

In 2000, the federal government enacted the Cardiac Arrest Survival Act (CASA), which affords limited protection from liability for citizen responders trained to use AEDs throughout the United States and encourages the implementation of public access programs in federal buildings. In addition, all 50 states now have Good Samaritan laws that offer limited liability protection for citizen lay responders trained to use automated external defibrillators. Some states also require or support AED placement in schools.



### Liability and risk management

Even with government support of Good Samaritan legislation, some communities may still be concerned about risk and liability for responders. The most effective method to limit liability and risk is to develop a well-planned, effectively implemented, and consistently managed program based on careful analysis and rational criteria, including:

- A collapse-to-shock or call-to-shock response goal.
- Formal physician oversight (medical direction).
- Defibrillator deployment criteria and implementation phases.
- A formal emergency response plan.
- Data tracking plans to capture and review incidents, response times, and outcomes.
- Long-term maintenance and retraining plans.

Philips Healthcare recommends that, before you plan your community early defibrillation program, you consult your legal counsel regarding the extent of legal protection that may apply to your community.

### Insurance

Many insurance companies offer coverage for defibrillation responders, frequently with no increase in premiums for many policyholders. Many insurance plans support the acquisition, placement, and use of defibrillators in appropriate circumstances, provided that:

- Their use is permitted by state law.
- The individual using the defibrillator has been suitably trained.
- The defibrillators are maintained according to the manufacturer's requirements.
- Appropriate CPR and EMS resources are available and used.

# Assessing costs and funding your program

Before you seek funding sources, you must first assess the cost of your early defibrillation program. These can include:

- Equipment costs (initial and replacement), including defibrillators, pads, batteries, data cards, personal protective equipment, cabinets and installation, and recommended identification signage.
- Medical Director compensation.
- Defibrillation Program Coordinator compensation.
- Training costs (initial and ongoing), including instructor fees, training books, handouts and supplies (pocket masks, one-way valves), certification fees, facility rental, participant refreshments.
- Public awareness: any advertising, direct mail, public relations, local websites, and social networking opportunities you use to promote the program to your community.
- Additional costs: program management, SCA incident documentation, quality assurance, insurance, and deductibles.

## Create a program plan

Prior to approaching funding sources, develop a well-organized plan for your community program. Having a detailed plan that presents a strong case to persuade potential funding sources is essential for a successful community program. Elements of this plan should include:

- Your community early defibrillation program name.
- Your program mission statement and goals.
- Your program “Statement of Need.”
- Details on how you plan to implement your program, based on your community assessment.
- Your program budget.

## Draft a “master grant proposal” template

The next step is to format your plan into a grant proposal, which can be used to request funding from organizations. Your proposal should be clearly written, succinct, and well organized. Some funding organizations require a specific format or application form. Others will accept a generally recognized “standard” format.

Using a template will help you organize your material and information easily and effectively. A generic community grant application that can serve as a template is available online from the University of Kansas Community Toolbox Web site: Writing a Grant Application for Funding Page [http://ctb.ku.edu/en/dothework/tools\\_tk\\_14.htm](http://ctb.ku.edu/en/dothework/tools_tk_14.htm)

## Identify funding options

The next step is to identify funding options. Communities across the country have found funding solutions through municipal budgets, local-level organizations, corporate donations, and the establishment of nonprofit foundations.

Reaching out to local government, private businesses, healthcare providers, and other early defibrillation programs may help you to uncover ways to fund your program.

Additionally, many communities have initiated their own fundraising campaigns which enable local organizations and individual community members to become involved in, and to contribute to, the program.

Some funding organizations and donors require recipients to have nonprofit status with the IRS. Nonprofit status is also advantageous when advertising your program, because it entitles you to receive donated or discounted space. If you find you need to have a nonprofit 501(c)3 organization in place to administer the program and apply for funds, you might want to identify existing nonprofits in your community within which to run your program. For information on how to form your own nonprofit organization, visit BoardSource (formerly the National Center for Nonprofit Boards) at <http://www.boardsource.org>.

Consider the following local-level organizations that may offer funding for programs:

- Nonprofit organizations with cardiac-related missions.
- Local hospitals, which may support a nonprofit foundation that funds community health projects.
- Local or regional branches of national service organizations who may be chartered to strengthen the local community. Some of these include:
  - AARP
  - American Legion
  - Boy Scouts
  - Elks
  - Girl Scouts
  - Junior League
  - Kiwanis
  - Knights of Columbus
  - Lions
  - NAACP
  - Rotary
  - VFW
  - YMCA
  - YWCA
- Locally based corporations and businesses, which may have existing corporate grant programs often focusing exclusively on the geographic area of their operation.
- Private foundations based in your community, often founded by families or individuals.
- Traditional local fundraising events, such as auctions, raffles, or walkathons.

These groups may welcome a presentation about SCA and early defibrillation.

To find possible private foundations based in your community, refer to the following foundation directories available at your local library:

- The Foundation Directory
- National Guide to Funding in Health
- Guide to U.S. Foundations
- National Directory of Corporate Giving

You may also look online through the Foundation Center (<http://www.foundationcenter.org>). This resource allows you to search for funding organizations by key areas of interest, types of support given, geographic areas covered, the amount of grant awards available, and past recipients.

Identify a “short list” of top funding organizations to approach, based on the best fit of goals, guidelines, and availability of funds that match the needs and timeline of your community program. Funding experts agree that this approach increases your chance of receiving funding.

With your “short list,” begin to research the specific requirements and guidelines for each potential funding source. Some sources may require a simple letter, others, a detailed set of forms. Simply adjust your “master grant proposal” to fit the specific guidelines.



# Promote your program to the community

Developing a communications plan will help generate public awareness and can serve to create ongoing support for your program. There are many different ways to educate your community, including presentations and speaking engagements, your community website, public relations, advertising, and direct mail. The messages you communicate to the community may come from your mission statement, your goals and objectives, and your Statement of Need.

## **Establish a communications plan and budget**

Your communications plan should evolve from determining the best ways to reach as much as your community population as possible. You may decide to use a mix of communications tools in your plan. Be sure to include a timeline in the plan, identifying target dates for each component and a corresponding budget.

## **Promote through local resources**

As a starting point, you may want to promote your program through your community's website and through a grass roots effort by planning public presentations and speaking engagements throughout the community. If some members of the task force have experience with any of these methods of communication, enlist them to lead the effort in that area.

## **Presentations and speaking engagements**

Members of the task force should identify community organizations that might provide a platform for presentations and speaking engagements. These are both highly effective ways to generate potential funding and to educate the public about SCA and your early defibrillation program. Keynote speakers – including SCA survivors; EMS, fire, and police personnel; political leaders; city office holders; school superintendents and teachers – can be recruited to make these presentations.

## **Public relations**

Public relations may be a cost-effective way to have your message communicated through local media. After the first phase of defibrillator installation and responder training is complete, consider holding a press conference. Demonstrate the community's early defibrillation program to the local media. An ongoing relationship with members of the press may prove helpful to your program. Press releases announcing new placements, saves, rescuer awards, and other milestones may help generate support from the community for the program.

## **Advertising**

If you have established your program as a nonprofit entity, you may be entitled to receive a public service advertising discount. Media companies may donate or discount air time and outdoor space to nonprofit organizations, so your advertising costs would primarily be for graphic design and production.

## **Direct mail**

Direct mail offers an effective way to educate the entire community about sudden cardiac arrest and the need for early defibrillation. In a mailing campaign you might consider soliciting financial support, inviting citizens to attend presentations, or asking for volunteers to become responders. Consulting with a direct mail expert for advice on this communications method might streamline the process.



### **Talk to Philips**

As the world leader in AEDs, we have the tools and experience to help you every step of the way, starting with assessing your early defibrillation needs and conducting site surveys, all the way through funding and promoting your community early defibrillation program. We are also a leader in providing management tools and resources designed to help you establish and maintain a successful AED program. These services can help you ensure equipment readiness, monitor overall program management, comply with regulatory statutes, and access medical expertise. While the key elements of every AED program are the same, we know every situation is different. Whatever your needs, we are here to help.

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Printed in The Netherlands.  
4522 962 62381 \* DEC 2010