5.1 Link 1: Prevention and Preparedness
SCA PREVENTION PROGRAMS
(listed by increasing complexity)

1. Work with local clinics to distribute pamphlets on differences between heart attack and SCA/ Know Your Ejection Fraction (EF) in waiting rooms of heart hospitals, and cardiology, family practice, ob-gyn clinics.

2. Get hospital permission to enclose SCAA and SCA pamphlets in ICD implantees’ materials when they leave the hospital.

3. Translate ICD, drug therapy, healthy heart, “EF”, heart screening, and other prevention materials into non-English languages as required to reach all citizens in your community. Use local college/university resources and/or native language people to keep costs down.

4. Collaborate with your local Electrophysiologists or talk to cardiologists and primary care physicians/nurses/assistants about the ACC/AHA primary prevention guidelines.

5. Exhibit at community fairs/health fairs to distribute ICD, drug therapy, healthy heart, “EF”, heart screening, and other prevention materials and host an SCAA chapter booth/table to enroll survivors, people living with devices, and others.

6. Sponsor a speaker at Patient Support Groups sponsored by the cardiology clinics about living with a device.

7. Develop a community health fair highlighting safe heart/preventative information, featuring Ejection Fraction (EF) and need for SCA risk assessment. Identify and sponsor a local electrophysiologist or other heart specialist to speak to community groups including Rotary Clubs, places of worship, medical societies, etc.

8. Become a patient ambassador to your local cardiology clinic to have pre-implanted patients referred to your SCAA local chapter members. Join with local Mended Hearts volunteers for peer-to-peer support.

9. Set up Patient Support Groups in your local hospital/cardiology clinic for survivors and patients. Talk to local hospitals about distributing patient support group kit.

10. Get a local talk radio program to dedicate a show to “living with an ICD” with a physician/expert and an implanted patient.
Ways that First Responders Can Expand SCA Awareness in Local Communities

Distribute SCAA materials. The SCAA Web site, www.suddencardiacarrest.org, maintains an exhaustive list of consumer-friendly educational materials, from Fact Sheets on various cardiovascular conditions to multi-media videos, public service announcements and community AED development tools. The next time you’re out in the community, consider sharing SCAA publications with others – whether at a community center, library, school, doctor’s office, grocery store or any other public venue. While consumers can quickly search the Internet or World Wide Web for any topic they desire, they still deserve to have access to accurate and credible information from sources with proven competency in this subject matter.

Translate AED materials into non-English languages. Does your agency already have educational materials on SCA or the importance of AEDs? Are there residents in your community, for whom English is not their native language? If so, consider translating those items into other languages. If you do not have a bilingual speaker on staff, reach out to local colleges/universities to see if a bilingual student would volunteer their time and talents. Remember, SCA afflicts all populations – regardless of the language they speak.

Attend community education/health fairs. First responders often go unnoticed by the public until tragedy strikes. By exhibiting at local fairs and education events, residents will see that you are an active part of the community and care about their personal health and safety. Or, look to partner with a hospital or local college to conduct a Healthy Heart Forum or provide CPR/AED instruction/training.

Submit an article to community newspapers. Reporters play a vital “watchdog” role in serving as the voice of the community and chronicling the need and performance of various public services/programs. If you see that AEDs are lacking within your community, detail the statistical and survival need for placing AEDs when reaching out to local media. Or if you find that certain barriers prevent the public from receiving adequate emergency response to SCA, share details of that void or resistance with editors and reporters.

Organize athletes screening events. SCA is the leading cause of death in young athletes and kills an estimated 5,000-7,000 children and young people each year. Media reports often cite “undetected” cardiovascular conditions as the cause of many SCA-related deaths in young athletes. Pre-participatory heart screenings can identify students at risk of SCA and alert families to potential problems before it’s too late.
late. In fact, community programs in cities like Chicago and Houston comprised of local cardiologists volunteering their time and experience, have yielded worthwhile results.

**Change state laws.** The legal landscape of SCA is changing, though not soon enough. Over 20 states now have laws requiring AEDs at schools or athletic activities. State legislatures across the country are also revamping their Good Samaritan laws to expand civil immunity protection to persons, who acting in good faith, perform CPR and utilize an AED. And even local governments like San Diego, California, have developed ordinances mandating AEDs in certain public places. Review your state’s laws to see if they are outdated. Work with local representatives and your state’s Department of Health to change outdated laws to require AEDs in schools, health clubs or other public places and incentivize bystander involvement, a key element of the “chain of survival.”

**Hold fundraisers to purchase and deploy AEDs.** While speaking to a community group or sharing educational materials doesn’t necessarily involve raising money, other awareness tactics like donating AEDs or developing media campaigns require money. There are a variety of creative and highly-effective ways to raise money to support SCA awareness. Starting out small can make a huge difference, and events like bake-sales, raffles, auctions and walk-a-thons are responsible for the placement of countless AEDs across the country. For more specific ideas and details on fundraising, visit the “Raising Funds to Support SCA” section.

**Develop an SCAA public access defibrillation (PAD) program.** See “Educational Resources” section.

**Organize volunteers to create a local SCA chapter.** Check out the SCAA Web site to see where the nearest chapter is located. If there’s not one near you, create your own chapter by gathering people with common interests. Find other local champions interested in the cause and meet to identify local approaches to increasing awareness of SCA. Even if only a few people join, remember the collective effort can far-reaching.
Importance of Bystander Assistance

The national survival rate for SCA is a low five percent because most cardiac events are not witnessed by others, or sadly, bystanders who are at the scene do not intervene and provide lifesaving assistance. Often times, bystanders enter a stage of shock, or out of irrational fear of contracting a medical condition or legal ramifications; they choose not to attend to the victim. Others simply don’t know how to help. Either way, inactivity on the part of bystanders is deadly. And doing nothing, should no longer be an option.

For every additional minute that passes while the victim is unattended, his/her chance of survival decreases by 10 percent. This number is sobering, as is the fact that most out-of-hospital cardiac arrest victims who survive, are left with neurological deficits.

It’s estimated that as many as 30 to 50 percent of SCA victims would likely survive if CPR and AEDs were used within five minutes of collapse. These numbers are encouraging, as is the number of states across the country re-writing their Good Samaritan laws to now provide civil immunity protection to lay individuals who perform CPR or use an AED.

Being a bystander and providing help is not something reserved only for medical professionals or first responders. Anyone can make a difference – whether a housewife, plumber, crossing guard, radio personality or bank teller. You never know when you will be placed in a situation where you can provide assistance. Learning CPR and how to use an AED is simple and easy, as many local organizations offer FREE courses as active community service projects.
When to Call 9-1-1 & What to Expect When You Do

Dialing 9-1-1 is the first step we normally think of during a medical emergency, and rightfully so as it’s been engrained in our upbringing since early childhood. Consider this, it’s all the more beneficial to the emergency dispatcher on the other end of the phone if you can provide basic details about the medical emergency and victim. So, while in the process of dialing 9-1-1, here are some other extremely helpful and very important steps to take.

Tell the dispatcher the location. If you do not know street names, look around for street addresses on nearby buildings or other distinctive landmarks, and be as specific and detailed as possible.

Check the scene and safety around you. While we want to do the “right thing” and help a person in need, it’s equally important to assess your immediate surroundings and stay out of danger. Little assistance can be given to a victim when the bystander’s life is threatened.

Shake the victim and shout! It’s possible that the individual may have simply “passed out” rather than suffered a heart attack or cardiac arrest. Shaking the person and making loud noises can sometimes bring them to consciousness. If the person does not respond, this information is very valuable to the dispatcher, who can immediately provide you with effective next-steps.

For more details on 9-1-1 and immediate first aid for cardiac emergencies, refer to the following Fact Sheet on CPR.
FACT SHEET: Cardiopulmonary Resuscitation (CPR)

Cardiopulmonary resuscitation, or CPR, is a method of providing oxygen and blood circulation through rescue breathing and chest compressions. During cardiac arrest, the normal rhythm of the heart is interrupted and the heart muscle loses its ability to pump blood (and distribute oxygen through the blood).

The potential loss of oxygen impacts the entire circulatory system, affecting the brain and other vital organs. Delivery of CPR is LIFE-SAVING first aid, and can increase a person’s chances of survival if started within minutes of a sudden cardiac arrest event by helping to maintain vital blood flow to the heart and brain. Without oxygen-rich blood, permanent brain damage or death can occur in less than 8 minutes. Moreover, CPR has been shown to increase the amount of time that an electric shock from a defibrillator can be effective. In fact, the American Heart Association estimates that effective bystander CPR, provided immediately after sudden cardiac arrest, can double or triple a person’s chance of survival.

CPR should be performed when a person is not showing signs of life. Victims will be unconscious, unresponsive, not breathing normally, and not moving. Taking immediate action can help save a life when a potential rescuer follows this emergency sequence:

- **PHONE FIRST**: Dial 9-1-1 immediately, or send someone to make the call if a phone is not immediately available. Tell the dispatcher the specific location and what action is being taken. DO NOT HANG UP!

- **SCENE SAFETY**: Make sure that you are not in immediate danger as well.

- **UNIVERSAL PRECAUTIONS**: If gloves and mouth barrier are available, prepare yourself to use them accordingly.

- **SHAKE AND SHOUT**: Determine unresponsiveness of the victim. “Hey, are you OK?!”

- **CLEAR AIRWAY**: Tilt the head and lift the chin to open the airway.

- **COMPRESSIONS**: Place the heel of one hand over the other, position yourself with shoulders directly over the victim and deliver compressions to the center of the chest (along the line of the nipples). The most effective rate is 100 compressions per minute. Push hard, push fast, and allow for full chest recoil between compressions.
In April 2008, the American Heart Association revised its recommendations and encouraged lay bystanders to use compression-only CPR as an alternative to the combined rescue breathing and chest compression method. Research had shown that many people were reluctant to provide CPR support because of their personal discomfort in providing mouth-to-mouth breathing to a stranger. The compression-only method provides vital blood flow and oxygen support while waiting for emergency responders or the shock of a defibrillator to be administered, and overcomes an important hurdle in getting everyone to act when someone suffers sudden cardiac arrest. New technology has been also developed to assess the efficacy of CPR technique. This new line of devices can help rescuers provide proper pace and depth of compressions, while giving automated voice prompts for breaths.
Toolkit: Participating in a Health Fair

Participating in community health fairs is a highly effective tactic to increasing awareness of SCA and your profession, and obviously let local residents know you are there for them. This kit provides suggestions and tips on making the most out of health fairs.

First, contact the organization who is putting on the health fair. Introduce yourself and explain what your organization is trying to do (raise awareness of SCA). Provide him/her with the SCAA Web site so they can easily obtain more information on our groups. that way they can check us out.

- Have two or three SCAA volunteers staff the table/booth. It is always nice to have an SCA survivor present.
- Keep the table simple: perhaps a red table cloth, at least two AED trainers, “flat matt” to help with the AED trainer/CPR and informational sheets on SCA.
- Consider using table-top filing display stands for various educational material to save space. Often, the less crowded a display is, the more people will be drawn to it. Extra boxes of educational material can be stored under the table, within easy reach to give people looking for more information.
- Promote other upcoming events your group is involved with.
- Take business cards to all health fairs even if you cannot be there in person. The cards can be given out to anyone interested in further engaging with the cause.
- When someone comes up to our table, here is a possible approach:
  - Ask if they know what an AED is?
  - Ask if they know about a SCA is or if they know someone who has had one?
  - Explain both the AED and the SCAA.
  - Demonstrate or allow THEM to operate run the AED trainer.
At this particular Health Fair, don’t you love that the AED is right behind us! Prime location.
FACT SHEET: Diagnostic Testing for Patients at Risk for SCA

A doctor, generally a cardiologist or electrophysiologist, may conduct a series of tests to diagnose patients and determine risk level, treatment options, and indications for implantable cardioverter device (ICD) therapy. These include:

- Electrocardiogram
- Echocardiogram
- Holter Monitor
- Event Recorder
- Electrophysiology Study (EPS)
- Cardiac catheterization
- T-wave alternans (TWA) Test

An Electrocardiogram, often called an EKG, is a painless and common test that records the electrical activity of the heart. It produces lines called "waveforms" that a clinician may view on a monitor or print on paper. When divided into time segments, these waveforms are used to measure the rate of movement of the heart's electrical impulses.

An Echocardiogram is a non-invasive, safe and effective test to study the anatomy of the heart. It uses sound waves (ultrasound) to form images of the structures of the heart. An "echo" is used to evaluate the size of the different chambers of the heart, the quality of the valves, measure the heart's pumping ability and identify other problems of the heart that may increase a person's risk for dangerous arrhythmias.

Holter Monitor is a portable heart monitor that is worn by patients to monitor heart rhythms over a period of time. Patients wear a small recording box attached to their chest by five adhesive electrode patches for 24-48 hours.

An Event Recorder is a portable heart monitor that is worn by patients to monitor heart rhythms over a period of time. When patients experience symptoms, they activate the event record to take a snapshot of their heart's activity as they are symptomatic. This is useful for patients with relatively infrequent and brief symptoms.

During an Electrophysiology Study, an electrophysiologist specifically provokes arrhythmia events in the patient in a controlled clinical environment. During the study, data about the flow of electricity during actual events is collected. As a result, EP studies can help locate the specific areas heart tissue that give rise to the abnormal electrical impulses that cause arrhythmias. This detailed electrical flow information provides valuable diagnostic and, therefore, treatment information.

A T-wave alternans (TWA) test is used to detect a subtle electrical abnormality in the EKG that is linked to increased risk of dangerous arrhythmias. It is a non-invasive test that requires the patient to wear electrodes on the torso while walking for 5-7 minutes on a treadmill to elevate the heart rate.
Successful Screening Programs Across the Country

**Chicago, Illinois.** Under the guidance of Dr. Joseph Marek, clinical cardiologist with Midwest Heart Specialists, the Midwest Heart Foundation is working to increase awareness of sudden cardiac death in young adults. The Young Hearts for Life® Cardiac Screening Program brings qualified medical volunteers to high schools to provide free electrocardiograms (ECGs) to identify high school students at risk for sudden cardiac death. Since 2006, Midwest Heart Foundation in collaboration with high schools, community hospitals and volunteers has provided free ECG screenings to over 62,000 high school students. Marek's research team gave ECGs to 50,665 teens, 14 to 18 years old, including athletes and non-athletes. The screening was done in 32 schools in suburban Chicago during the regular school day. Screening identified 1,096 teens with abnormal ECGs, indicating a heart irregularity that could result in sudden cardiac death. Of those teens, 150 were found to have left ventricular hypertrophy, which can lead to hypertrophic cardiomyopathy, the most common cause of sudden cardiac death. Another 145 had a condition called prolonged QTc, which could indicate long QT syndrome, also linked to sudden cardiac death.

**Seattle, Washington.** Free advanced heart screenings for high school students and student athletes are being offered throughout the greater Seattle area. Approximately one high school undergoes screening every two months with nearly 400 students at each screening session. The University of Washington cardiology and sports medicine departments, as well as Seattle Children’s Hospital, members of the Nick of Time foundation, local EMS/fire and other physicians have been working together in this broad-based collaborative effort.

**Houston, Texas.** The Houston Early-Age Risk Testing and Screening (HEARTS) program will provide cardiovascular screening to 1,500 sixth-grade students at HISD’s Luther Burbank, Lamar Fleming, James Hogg, Francis Scott Key, and Jane Long Middle Schools. Trained and licensed healthcare workers from the University of Texas Medical School at Houston Division of Cardiology and the Memorial Hermann Sports Medicine Institute will administer a cardiac physical examination, an electrocardiogram (EKG), and an echocardiogram (2-D echo). Students receive a free physical examination and specialized cardiac examinations and any follow-up that’s needed at no cost to students and families.

Also in Houston, the Houston Independent School District and the Center for Coronary Artery Anomalies at the Texas Heart Institute are partnering to provide voluntary screenings for students at various middle schools. With parental permission, each student is screened using both the MRI and ECG equipment in a non-invasive process that typically lasts 15 minutes and is at no cost to parents. The project is being underwritten by a $5 million donation by the local Kinder Foundation.
Sudden Cardiac Arrest in Athletes: Debunking the Myth from Media Hype

Christine Lawless, MD, MBA, FACC, FACSM, CAQSM is president of Sports Cardiology Consultants in Chicago, Illinois. A highly regarded expert on SCA and athletics, she also serves as team physician for US Figure Skating, consulting cardiologist to Major League Soccer and co-chair of the American College of Cardiology Council on Sports and Exercise Cardiology. After numerous media documentations of recent SCA incidents in student athletes, SCAA sat down with Dr. Lawless (a member of the SCAA Medical Advisory Board) to find out the truth behind this topic and dispel any misleading information. Here’s what we learned:

Athletes represent fitness and vitality. Thus, when sudden cardiac arrest (SCA) occurs in an athlete, it may be shocking and counterintuitive to what we believe about athletes. Repeated media reports of each individual death makes us think that these episodes occur more frequently than they actually do.

The true frequency of SCA in athletes is not known, as there is no mandatory scientific registry of such events. Some research indicates that the risk of an event in the USA is about 1/200,000 athletes per year; whereas other reports suggest this may be 4-5 times higher, about 1/40,000 athletes/year. Athletes who appear to be at particular risk are football and basketball athletes in the USA, soccer players in Europe, and endurance athletes such as triathletes.

Because of differing causes of underlying heart disease, athletes are generally divided into those under the age of 35-40 years old, and those over the age of 35-40 years. SCA episodes in athletes under the age of 35-40 years are likely to be due to inherited heart muscle disease (hypertrophic cardiomyopathy), a direct blow to the chest (commotio cordis), abnormal position of the coronary arteries (anomalous coronary artery), dilated aorta with valvular disease (Marfans syndrome), or primary disorders of cardiac rhythm (channelopathies like long QT). Although the majority of the SCA episodes in athletes are due to underlying cardiac disease, there are other causes of sudden death in athletes, such as sickle cell disease, and heat illness. In athletes over the age of 35-40 years, SCA episodes are far more likely to be due to blockage in the arteries to the heart (coronary artery disease).

Strategies to prevent SCA episodes in athletes are aimed at two levels. The first is to detect underlying heart disease during pre-participation screening examinations; the second is to treat episodes of SCA as quickly as possible on the athletic field, or in athletic venues.

A variety of primary care healthcare providers perform initial pre-participation screening for heart disease during pre-participation examinations (PPE). If a cardiac issue is identified, the athlete is referred to a cardiologist for a participation recommendation. The American College of Cardiology (ACC) and the American Heart Association (AHA) have published a set of expert recommendations called the 36th
Bethesda Guidelines. These guidelines provide a framework for cardiologists to make wise participation and return-to-play decisions in athletes.

In Europe, it is routine to include the 12 lead electrocardiogram (ECG) in pre-participation examinations. Data generated in Italy suggests that the ECG may enhance the ability to detect underlying heart disease, and ultimately lower the SCA and sudden death rates. However, data from Israel suggests that the addition of the ECG does not reduce the incidence of SCA episodes and sudden death rate. At present, the AHA does NOT recommend inclusion of the ECG in pre-participation examinations for athletes in this country. No doubt, this issue will continue to be researched over the next few years to determine if enhanced cardiac screening would be useful in the U.S. to prevent SCA and sudden death episodes.

Recent data suggests that the ECG can improve the sensitivity of the pre-participation examination from 35 or 40 percent to as high as 85-90 percent in detecting underlying heart disease, especially hypertrophic cardiomypathy.

Critics of ECG screening are opposed for several reasons. Because the incidence of SCA is so low in athletes, addition of ECGs may not have any impact on the incidence of SCA or sudden death when studied in a carefully performed randomized trial. The U.S. has an already low incidence of SCA in athletes, perhaps as low as what Italian researchers ended with after over 20 years of ECG-based screening. Thus, it may not be possible to improve upon this figure. Athletic adaptation can cause changes on the ECG that are difficult to distinguish from pathology, so there is a substantial chance of physicians misinterpreting the ECG. This can result in athletes being disqualified who actually have no underlying disease (false positives). This false positive rate should not be underestimated, as studies have shown it can be as high as 40 percent. The additional resources required to “work up” false positive ECGs may be cost prohibitive, and may result in undue risk to the athlete.

Despite well-meaning screening attempts, no pre-participation strategy is fail-safe, and there is always the possibility of an SCA episode in athletic individuals. If an SCA episode occurs, one must be prepared to treat it quickly with an AED. These machines should be available at all athletic venues to assure that episodes of SCA can be dealt with promptly, thus allowing the opportunity for maximal survival from an event. Although we have limited data in athletes, the success rate of defibrillation with AEDs ranges somewhere between 25-75%, depending on age of athlete, athletic venue, and group studied.

Although the frequency of SCA episodes in athletes is probably quite low, diligent pre-participation screening for underlying cardiac disease, prompt attention to cardiac symptoms, evaluation by cardiologists, and rapid recognition and treatment of an SCA episode with an AED can reduce the likelihood of athlete mortality from such events.
CPR & AED Training in Schools Program

Through our collaborative efforts, SCAA and its chapters have reached thousands of students, teachers, parents, coaches and athletic directors to raise awareness of SCA, the importance of giving CPR and using AEDs to save lives. Our goal is to change the paradigm of unnecessary deaths from SCA by educating and empowering bystanders to act during an emergency situation.

In 2010, SCAA launched its CPR and AED Training Program “Keep it Beating” for high school students. The program is 90 minutes long and consists of two 45-minute classes. Part I teaches the difference between SCA and a heart attack, what an AED is and the importance of a heart-healthy lifestyle. Part II teaches adult/child CPR, use of an AED and adult/child choking rescue.
Emergency Action Plan (EAP)

Schools are an important gathering place for students, staff and visitors within the community. Providing a safe environment for all who congregate on a school campus is a priority! Part of promoting a safe environment is having an effective Emergency Action Plan in place. The goal is to give victims of SCA or other life-threatening emergencies a chance to survive by immediately implementing a consistent response protocol that includes:

- Early activation of the EMS by calling 9-1-1
- Early CPR
- Early defibrillation
- Early transition to EMS

Many schools have an athletic trainer who is able to provide medical assistance during after-school events. However, the availability of the trainer is limited because several sports occur simultaneously. Just one trainer cannot be in several places at one time, and therefore emergency response training is critical for coaches, students, event staff, nurses and other administrators.

Follow these steps to create an EAP:

- Conduct an AED Site Assessment
- Develop a Communication/Crisis Plan
- Create specific entries for Fall sports, Winter sports and Spring sports, and do not forget to cover Fine Arts events, as well.

For coaches and advisors:

- Develop a response protocol worksheet and include a site map for each member of team
- Discuss this plan with the team and identify student responders who can also be of assistance
- Seek input from other staff while developing the document, and always keep an original copy of the plan/document on file in the office
- Take the plan to each practice/game/event