Hong Kong College of Cardiology

Automated External Defibrillator (AED) Project and Guideline

Schools and Education
YOUR GUIDE TO PUTTING A HEART SAFE AED PROGRAM IN PLACE

Sudden death at any age is a tragedy. When the victim is a child, the tragedy is compounded, with many years of life lost and dreams unfulfilled.

It doesn’t have to be this way. Equipping schools with Automated External Defibrillator (AED) and teaching school nurses, athletic trainers and others to use them can give anyone struck down by SCA another chance at life. VF is the most common cause of sudden cardiac arrest. AED deliver a pulse of electricity, the single most effective way to restore the normal rhythm of a heart quivering in ventricular fibrillation. Not everyone can be saved from sudden cardiac arrest, but studies show early defibrillation can dramatically improve survival rate.

We’ve all seen the heartbreaking headlines:

- A ball strikes a 14-year-old lacrosse player, Louis, in the chest, sending his heart into a deadly irregular rhythm. Although he receives Cardiopulmonary Resuscitation (CPR) and a hospital is less than a mile away, it takes 12 minutes for the boy to receive defibrillation. He dies.
- A 14-year-old student athlete, Sean, nicknamed “iron man,” is running in gym class when he suffers sudden cardiac arrest. More than 10 minutes pass before the first defibrillation shock. He survives with severe brain injury.

The story had a different ending in the following cases, where the school was equipped with an AED that was used to deliver a lifesaving shock:

- A 15-year-old girl collapses during basketball practice. The high school trainer uses an AED kept near the court to resuscitate her.
- A school janitor suffers cardiac arrest and is shocked back to life with an AED installed near the gym.
- A man suffers cardiac arrest while watching his granddaughter play basketball. The principal retrieves and applies the school AED, saving his life.

As you can see, it could be a matter of life and death to have AED within easy reach of coaches, school nurses, school administrators, custodial staff and students who are trained to use them. Every minute counts. Typically, only about five percent of people struck down by SCA survive. But if people in VF receive CPR and the lifesaving AED shock within three minutes of collapse, the survival rate can increase up to 74 percent.

Therefore, the Jockey Club ‘Heart-safe School’ Project has been organized by Hong Kong College of Cardiology to install Automated External Defibrillator (AED) in over 1000 Primary, Secondary and Special schools in Hong Kong.

This Guideline helps you to tailor an AED Project (Project) that works for your situation.
To help ensure success, put someone in charge of coordinating your efforts. Be sure to cover these bases:

**Get Ready:**

- Assign a project coordinator
- Champion the idea and raise awareness of AED
- Coordinate with local emergency medical services

**Get Set:**

- Arrange for medical direction
- Identify your response team
- Choose your equipment and vendor
- Design policies and procedures
- Assess how many AEDs you'll need and where they’ll do the most good
- Estimate costs for equipment, training and PR (public relations)
- Fund your budget
- Train your responders and plan for refresher training

**Go:**

- Acquire and deploy AEDs and other supplies
- Promote your Project to raise support
- Build Quality assurance into your operation
PROMOTE THE IDEA AND RAISE AWARENESS

To implement a successful early defibrillation program, you'll need support throughout your school community, including school personnel, parent-teacher association and school board members to help the program move forward. Resistance may come from people who don't realize how easy and essentially foolproof AED is. If their understanding is limited to TV shows where doctors manually defibrillate patients with “paddles”, it will help to show an automatic external defibrillator. An AED talks the user through the simple steps of defibrillation, and is designed to analyze the heart’s rhythm and advise whether a shock is needed.

People may find it hard to believe that healthy youngsters can fall victim to sudden cardiac arrest (SCA). While rare, SCA does strike children and teenagers. Unfortunately, sudden death may be the first symptom of a heart defect or other condition that increases a youngster’s risk of SCA.

For your convenience, presentation materials are available to help you spread the word about AED and how it can help save lives throughout our communities.

CAUSES OF SCA IN YOUTHS

Undetected heart conditions
- Hypertrophic cardiomyopathy, abnormalities in muscle fibers that make the heart muscle thicken, usually caused by an inherited disorder
- Arrhythmogenic right ventricular dysplasia (ARVD), damaged muscle in the lower right chamber of the heart, which makes the heart more susceptible to abnormal heart rhythms
- Congenital coronary artery defects, defects of the heart’s own blood vessels
- Long QT syndrome, an inherited disorder affecting the heart’s electrical system, which can lead to life-threatening changes in heart rhythm
- Wolff-Parkinson-White syndrome, an electrical malfunction of the heart in which the electrical signal reaches the heart's lower chambers (ventricles) too soon, disturbing the healthy beating of the heart
- Primary ventricular tachycardia, an extremely fast abnormal heart rhythm that affects pumping function of the heart
- Primary pulmonary hypertension, increased resistance to blood flow through the lungs, leading to abnormally high blood pressure in the arteries that supply blood to the lungs

Previously diagnosed heart conditions
- Dilated cardiomyopathy, abnormal heart muscle, causing the walls of the heart to stretch under pressure, weakening the heart's pumping capacity
- Marfan syndrome, an inherited disorder of the connective tissue, often resulting in abnormalities in the heart or aorta, the main blood vessel leading away from the heart

Accidents and risky behaviors
- Commotio cordis, caused by a blunt blow to the chest at a critical time in the cardiac cycle, which can cause a deadly irregular heartbeat
- Cocaine or other stimulant abuse
- Electrolyte imbalances caused by eating disorders, rapid weight loss or dehydration
COORDINATE WITH LOCAL EMERGENCY MEDICAL SERVICES

Work closely with Hong Kong College of Cardiology and the local Emergency Medical Services to assure your school’s AED is integrated into the public. Hong Kong College of Cardiology can provide guidance on equipment choice and placement, training and medical direction.

To help ensure the best care for a cardiac arrest victim, it’s essential to have clear procedures for smooth hand-off to emergency medical services when the ambulance arrives.

Chain of Survival

1. Call 999
2. Immediate CPR
3. Appropriate defibrillation
4. Immediate dispatch to hospital
5. Effective advanced life support
IDENTIFY YOUR RESPONSE TEAM

The size and layout of your school and its operating hours will determine how many people you’ll want to train to use an AED. Consider training staff members who already provide medical services, such as school nurses or health aides, and those present when students are exercising, such as coaches, trainers, lifeguards and physical education teachers. Also take into account people who can respond immediately (unlike teachers, who may not be able to leave a classroom right away). Be sure to account for staff turnover—lack of a stable rescuer pool can weaken your program.

You’ll want some rescuers who will be present even after school hours, such as administrators, custodial, office or security staff, coaches, choir directors and drama teachers who are on site during games, practices, meetings, concerts and plays. Don’t overlook high school students as part of your rescuer pool. Students and others who are trained to use the AED will take this lifesaving skill with them into the community, thus strengthening the “Chain of Survival.”

Your rescuer pool will affect procedures such as how to notify trained responders, where to place AED and how to bring it to a victim.

CHOOSE YOUR EQUIPMENT AND VENDOR

Seek the advice of Emergency Medical Services, because of their experience and knowledge can be very valuable in advising you about the type of AED to buy. Additionally, make sure you ask about the reputation of the vendor for reliability, durability and ongoing support. Selecting a single brand of AED will greatly simplify training and maintenance. By choosing a vendor early in the process, you can tap the company’s expertise about training, site assessment, policies and procedures.

Professional advice about the selection of AED is provided by Hong Kong College of Cardiology under the Jockey Club ‘Heart-safe School’ Project.

Important considerations include:

- Reputation of the AED manufacturer for product quality, reliability and customer service
- Compatibility with the equipment of local EMS
- Very easy operation, with clear voice prompts
- Fully-automatic models
- Biphasic technology, with energy escalating to 360 Joules, that enables the AED to adjust shocks and energy levels to match the victim’s needs
- Defibrillation electrodes that are pre-connected to the AED to save precious seconds
- Maintenance-free batteries
- Direct field service team for on-site download of AED data
- Validated computer-based refresher training
- Availability of Infant/Child Reduced Energy Defibrillation Electrodes if your school serves children younger than age eight
- Vendor can provide a complete implementation solution
DESIGN POLICIES AND PROCEDURES

If you already have a written plan for responding to medical emergencies, update it to include AED. If not, now is the time to put it in writing.

Be sure to cover these points in your procedures for responding to a possible sudden cardiac arrest:

- Actions by those who witness a possible cardiac emergency should take, such as one person starting CPR while others dash for the AED, notify the main office, and call 999
- How to notify internal trained responders (using walkie-talkies, cell phones, radios or the building public address system, for example)
- Who is responsible for bringing the AED to a victim
- Who will alert the main office to call 999
- How paramedics will be directed to the exact location within the school (perhaps having someone meet paramedics at the front door and escort them to the victim)
- Standing orders stating when the AED should be used
- Procedures to follow if an AED is moved from the building to a playing field, such as notifying the main office or school nurse about its location, and how to contact the person who has it (via cell phone or radio, for example)
- How to handle data the AED records during use (patient’s heart rhythm, AED analysis and any shock delivered)
- What to do after an event, such as downloading and transferring data from the AED, notifying the medical director, reviewing the event to determine how procedures might be improved, replenishing supplies, returning the AED to service, and stress debriefing to help responders handle their emotions after a rescue effort

Policies and procedures also should include:

- Locations of AED and related rescue equipment
- A process, schedule and checklist for inspecting and maintaining equipment
- Records that must be kept each time an AED is used to satisfy any district or state reporting requirements
- Training and refresher training requirements
- Who manages the AED program at the district and school level
- Who provides medical direction (Can be provided by Hong Kong College of Cardiology)
- A process to periodically review and update the policies and procedures

Remarks: as with other policies and procedures, those relating to AED will require periodic updating regularly.
ASSESS HOW MANY AEDs YOU’LL NEED AND WHERE THEY’LL DO THE MOST GOOD

To achieve a good response time, you’ll want enough AED in the right places. Every additional minute of delay lowers the rate of successful resuscitation by seven to 10 percent.

Ideally, you want AEDs placed within a brisk one-minute walk of any location in the school. Give first priority to areas of higher risk, such as:

- Where children or adults exercise, including gymnasiums, sports fields and pools
- Where many people gather, such as auditoriums, cafeterias or large meeting rooms

Having an AED does no good unless people know where it is, can retrieve it easily, and quickly summon trained responders. Locating AED near a phone makes it easier to quickly activate your internal response team and local paramedics.

Place an AED where people can retrieve them after normal school hours. If vandalism is a concern, consider using wall cabinets equipped with lights that flash or alarms that sound when opened. Post signs alerting visitors to the locations of AED. To cover athletic events, some schools carry an AED to practices and games along with the first aid kit.

Apart from a free set of qualified AED will be provided under the Jockey Club ‘Heart-safe School’ Project which organized by Hong Kong College of Cardiology, the use of AED and CPR training will also be offered. Before the AED installation, we will make a site visit to the school for the best location to place the AED in the school.

There is no one simple formula that applies to all schools. The vendor may be able to help you determine the number of AED and where to place it. Walking the building, carrying a stopwatch and floor plans, is often the best way to determine the number of AED needed and specific locations. Ideally, you want a ‘drop to shock’ time no longer than three to five minutes. Walking at a brisk pace, you can cover about 300 feet per minute.

Don’t let lack of funding to place an AED in all schools at once deter you. A phased approach can be very successful, first placing an AED in schools with large enrollments, many athletic events or activities that draw large crowds, such as concerts, plays and meetings. Lower risk locations can be equipped with AED in later phases.
ESTIMATE COSTS FOR EQUIPMENT, TRAINING AND PR

After selecting a vendor, estimate your project budget. You’ll need to calculate both start-up costs and ongoing expenses, such as refresher training and maintenance.

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<th>ITEM</th>
<th>NUMBER NEEDED</th>
<th>COST</th>
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<td>AED</td>
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<td>Extra defibrillation electrodes</td>
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<tr>
<td>Infant/Child Reduced Energy Electrodes for children less than eight years old</td>
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<td>Alarmed wall cabinets or carrying cases</td>
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<tr>
<td>Supplies such as non-latex gloves, pocket mask, scissors, razor (to shave chest hair if necessary) and towel (to dry chest area)</td>
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<td>Medical direction, such as Health Educational Talks</td>
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<td>Initial staff/student training</td>
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<td>Training supplies</td>
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<td>Data management system, which may include a computer, modem and software</td>
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<td>Refresher drills and recertification training</td>
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<td>Replacement of electrodes and batteries as needed</td>
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<td>Device maintenance or service agreement</td>
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<td>Amortized fund to pay for future units and replacement AED</td>
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TRAIN YOUR RESPONSE TEAM AND PLAN FOR REFRESHER TRAINING

Strengthening the “Chain of Survival” requires more than training people to use an AED. They should know how to quickly recognize signs of sudden cardiac arrest, start CPR right away, locate and use the defibrillator, and care for a victim until the paramedics arrive. Training should cover how to activate the building’s emergency response plan and notify external paramedics without delay.

Training shows that AED is easy to use, and in fact difficult to misuse, especially if devices have few steps to operate and simple voice prompts to guide rescuers. It may reassure people concerned about liability to learn that AED is intended for use on people who will almost certainly die if untreated. It is designed to analyze a patient’s heart rhythm and deliver a shock only if needed.

Training options include having courses taught on-site by an independent training company, or at a convenient location in the community through the EMS, fire department, local hospital or community college. Many schools adopt a “train the trainer” approach, which lets them become self-sufficient in training responders. If your school already teaches first aid or CPR to students or staff, add AED training to help instill the culture of bystander response throughout your community.
Training classes should meet the guidelines of a nationally recognized program. Training classes give people both the skills and confidence to intervene in a cardiac emergency. Review your school’s emergency response plan during the training class, and include scenarios likely to happen at school in your training. Be sure your training complies with state and local regulations.

Keep good records of the people trained, and when they need refresher courses. You can add AED practice to school drills for fire, typhoon or other emergencies. Role play in drills simulating emergencies so your school responders can practice each step of the emergency response plan.

Retraining should occur at least every two years—sooner if your equipment, policies or procedures change.

Each participating school may nominate 10 school personnel to receive training on CPR and the operation of AED for free under the Jockey Club ‘Heart-safe School’ Project organized by Hong Kong College of Cardiology.

**ACQUIRE AND DEPLOY THE AED AND OTHER SUPPLIES**

A free set of AED will be provided by the Jockey Club ‘Heart-safe School’ Project.

Upon delivery, inspect and install your AED according to the operating instructions from the manufacturer. To help ensure AED is ready when you need it, check the readiness indicator routinely and follow the maintenance guidelines provided in the operating instructions. This includes keeping records of the expiration dates of consumables such as the battery and electrodes, and replacing them as needed.

Because many visitors frequent school buildings, which can be leased for after-hours activities, post signs to mark the AED locations. Some schools post an AED symbol and map so the devices are easy to find in an emergency.
PROMOTE YOUR PROGRAM TO RAISE SUPPORT

Publicizing AED to the larger community helps promote your school’s commitment to the safety of students, staff and visitors. A communications campaign within the school should highlight the location of AED and inform students and staff how to alert trained responders in the event of a cardiac emergency.

Ways to publicize your project include:

- News media coverage when AED is put into service
- Media coverage when a life is saved with an AED
- Announcements at meetings of faculty, staff, Parent-Teacher Association, student council and school board
- Posters and brochures
- Decals on doors of facilities
- Articles in Parent-Teacher Association, school, employee and union newsletters
- Notice on your intranet and public Web site

Such publicity strengthens the “Chain of Survival.” The larger community will be reminded of the need to immediately call for help in a cardiac emergency, and may be encouraged to take CPR and AED training themselves.

BUILD QUALITY ASSURANCE INTO YOUR OPERATION

Once you’re up and running, follow the policies and procedures developed to keep the equipment, supplies and trained responders at the ready to handle a cardiac emergency. A school nurse or other trained responder should be identified as responsible for maintaining the equipment, particularly replacing electrodes and other supplies that have expiration dates.

On schedule, the AED coordinator should go through the checklist for devices and supplies, order new supplies as needed, and determine that responders receive refresher training on schedule. This enables them to refresh skills, renew certifications, and learn about changes in equipment, policies and procedures.

Record keeping is a vital part of the education system, and AED use is no exception. Data collection and case review enables you to document how rescuers handle cases, track the number of people helped, justify money spent on early defibrillation, and provide data for analysis—to determine trends and identify how to modify procedures to help improve survival rates. Revise your policies and procedures as you learn from any experience using the AED, or with updates in best medical practices or equipment.
THERE’S NO TIME TO LOSE!

As you can see, schools equipped with an AED and staffed with trained responders can mean the difference between life and death for students, employees and the larger school community. Although there are many steps involved in setting up and managing a successful AED program, the rewards are great. Get started now on saving more lives.

The Jockey Club ‘Heart-safe School’ Project aims to develop schools into heart-safe premises through raising schools’ awareness of sudden cardiac arrest and strengthening relevant precautionary measures.

USE THIS CHECKLIST TO HELP LAUNCH YOUR PROGRAM

- Assign a project coordinator
- Champion the idea and raise awareness
- Coordinate with local Emergency Medical Services (Fire Services Department)
- Arrange for medical direction (e.g. Hong Kong College of Cardiology)
- Identify your response team
- Choose your equipment and vendor
- Design policies and procedures
- Assess how many AEDs you’ll need and where they’ll do the most good
- Estimate costs for equipment, training and PR
- Fund your budget
- Train responders and plan for refresher training
- Acquire and deploy AED and other supplies
- Promote your program to raise awareness and support
- Build quality assurance into your operation
Please feel free to contact us for more information:

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