PUBLIC ACCESS TO AUTOMATED EXTERNAL DEFIBRILLATORS (AEDs)

FACTS

- Cardiac refers to the heart. Arrest means stop. Sudden cardiac arrest is the sudden and unexpected loss of heart function.
- Signs of cardiac arrest include: no breathing or only gasping, no movement, and no pulse.
- Up to 40,000 cardiac arrests occur each year in Canada. That's one cardiac arrest every 12 minutes. Without rapid and appropriate treatment, most of these cardiac arrests will result in death. Thousands of lives could be saved through public access to automated external defibrillators.
- An automated external defibrillator (AED) is a small, portable device used to identify cardiac rhythms and deliver a shock to correct abnormal electrical activity in the heart. As a result of the sophisticated electronics in an AED the operator will only be advised to deliver a shock if the heart is in a rhythm which can be corrected by defibrillation. If a shockable rhythm is not detected, no shock can be given and the provider will be instructed to perform cardiopulmonary resuscitation (CPR) until emergency medical services arrive.
- When an AED and CPR are immediately available, the chance of survival from sudden cardiac arrest is substantially improved.[1] Combined with CPR, the use of an AED may increase the likelihood of survival by 75% or more.[2]
- AEDs have been used efficiently and effectively in community settings, such as casinos, airport terminals, airplanes, shopping malls, recreation facilities, office buildings and other public locations.[2-5]
- For every one minute delay in defibrillation, the survival rate of a cardiac arrest victim decreases by 7 to 10%. After more than 12 minutes of ventricular fibrillation, the survival rate is less than 5%.[6]
- AEDs combined with CPR and activating emergency medical services offer the best chance of saving a life in the event of a cardiac arrest.[1]

- A landmark study of the City of Chicago airports public access to AED program showed survival rates as high as 75%. This success is directly related to highly visible, readily accessible automated external defibrillators for public use and an integrated structured emergency response system.[7]
- Research shows that AEDs are most effectively used by trained individuals. However, AEDs are safe and easy to use by almost anyone. In fact, there are studies showing that laypersons can use AEDs safely and effectively.[8] There are also examples of cases where individuals with no training have successfully used an AED in an emergency situation as they are very straightforward to use and self-guiding.[7]
- Any location that has 1000 adults over the age of 35 present per day during the normal business hours (7.5 hours/day, 5 days per week, 250 days per year) can expect one incident of sudden cardiac arrest every 5 years.[6]
- Legislation in provinces across Canada protects individuals who use AEDs from liability when they are used in the context of saving a life. Information about individual provincial regulations can be obtained from the provincial Heart and Stroke Foundation offices.

HEART & STROKE™ FOUNDATION

PUBLIC ACCESS TO AUTOMATED EXTERNAL DEFIBRILLATORS (AEDs)

RECOMMENDATIONS

The Heart and Stroke Foundation (HSF) recommends that:

CANADIANS

1. Have widespread access to automated external defibrillators (AEDs), particularly in public locations where sudden cardiac arrest is likely.
2. Be trained and encouraged to apply cardiopulmonary resuscitation (CPR) and AED skills when needed.
3. Who are targeted responders be trained, equipped and directed to operate an AED if their responsibilities require them to respond to persons in cardiac arrest.
4. Who own and operate AEDs register the device with their local EMS or a device registry as appropriate and available, and ensure maintenance is performed according to manufacturer guidelines.

GOVERNMENTS

1. Establish provincial regulations or legislation to ensure immunity of individuals who provide AED program oversight, excluding gross negligence or wilful misconduct.
2. Establish provincial regulations or legislation to exempt responders (including bystanders, off-duty health care providers and business owners) from liability, excluding gross negligence or wilful misconduct.
3. Provide sustainable funding to support implementation and maintenance of public access to AED programs that include AED and CPR training.
4. Establish a national AED device registry to locate publicly accessible AEDs across the provinces and Canada.
5. Ensure AED programs are incorporated into comprehensive emergency response plans of government buildings such as conference and community centres, worksites and other public locations.
6. Incorporate CPR and AED training into high school curricula.

TRAINING AGENCIES

1. Promote AED programs that meet or exceed guidelines for AED and CPR training established by the Heart and Stroke Foundation of Canada.
2. Encourage public facilities with a high likelihood of cardiac arrest to incorporate AED programs into more comprehensive emergency response plans.
3. Support the operation of AED programs using internationally recognized best practices including:
   a. integration of basic life support and/or advanced cardiac life support training with AED training, as appropriate;
   b. integration of AEDs within the health care system, including linkages with the emergency medical service (EMS) system to ensure seamless response;
   c. consideration of the response time of the local EMS system when acquiring and placing AEDs in a community and/or workplace;
   d. oversight of the program by a designated individual (e.g. coordinator, first responder, or medical director);
   e. quality assurance (e.g. routine inspection and maintenance of the AED, data collection, evaluation, and the review of clinical events when an AED is used);
   f. placing the AED in a location that is easily accessible and clearly marked; and
   g. ongoing training from an accepted and recognized training agency.

PRE-HOSPITAL PLANNERS AND PROVIDERS

1. Advocate for strengthening the Chain of Survival™ and ensure access to AEDs by responders in all Canadian communities.
2. Plan for early defibrillation initiatives to be implemented within the community Chain of Survival™.
3. Include AED programs as part of organized comprehensive emergency response plans that are linked with the EMS system, and implemented within systems which provide transfer of care protocol, coordination or oversight, training, continual readiness, quality assurance and improvement, data collection, and evaluation.
4. Follow provincial guidelines for AED programs where such guidelines have been established.

HOSPITALS

Examine policies and procedures for cardiac arrest and resuscitation to ensure that the time to defibrillation using AEDs within the hospital setting is as short as possible. In settings where professionals trained in advanced cardiac life support are not immediately available (less than three minutes from arrest to defibrillation), AED deployment and training should be provided as a basic skill for healthcare providers.

HEART & STROKE™ FOUNDATION

PUBLIC ACCESS TO AUTOMATED EXTERNAL DEFIBRILLATORS (AEDs)

BACKGROUND

Arrhythmias (abnormal heart rhythms) such as ventricular fibrillation cause most sudden cardiac arrests. Early defibrillation is the intervention that is most likely to increase survival rates following cardiac arrest. The time between the onset of cardiac arrest and the use of an automated external defibrillator (AED) is the major determinant for success of the resuscitation attempt. While cardiopulmonary resuscitation (CPR) helps to maintain oxygen and blood flow in a victim of cardiac arrest for a short period of time, it is unlikely to convert an abnormal heart rhythm to a normal heart rhythm. Restoring a normal heart rhythm requires defibrillation to be provided within the first few minutes of the arrest. The use of an AED combined with CPR and calling for advanced Paramedic help is a critical combination to improve the odds of survival. Combined with CPR, the use of an AED may increase the likelihood of survival by 75 per cent or more.[2]

DEFIBRILLATION AND THE CHAIN OF SURVIVAL™

Defibrillation is the most effective link in the Chain of Survival™. The Chain of Survival™ consists of a series of seven links that give the victim of a medical emergency the best chance of living. The seven links are:

- Making healthy choices to prevent heart disease and stroke;
- Early recognition of cardiac arrest, heart attack and stroke;
- Early access to emergency care;
- Early CPR;
- Early defibrillation;
- Early advanced cardiac care; and
- Early rehabilitation to reduce complications, improve survival and prevent recurrence.

All links in the Chain of Survival™ are important to reduce death and disability from heart disease and stroke. The Chain of Survival™ is only as strong as its weakest link. The success of each link depends on the link immediately before and after. Recognizing the warning signs of cardiac arrest and reacting by rapid notification of the emergency medical services (EMS) system (by calling 9-1-1 or other emergency response number), helps to get the AED to the victim quickly and reduce delay to defibrillation.

EARLY DEFIBRILLATION

If an AED is immediately applied to a victim of cardiac arrest due to ventricular fibrillation, particularly within the first 5 to 10 minutes, the likelihood of survival is high. Survival rates in cardiac rehabilitation programs that provide defibrillation within the first few minutes after a cardiac arrest are higher than 85 per cent.[9] With each passing minute from the time of the arrest, the probability of survival declines about 7 to 10 per cent.[6] Studies show that few patients survive if the time from collapse to defibrillation is greater than 12 minutes.[10,11] If CPR is performed from the time of collapse to the time the defibrillator arrives, survival may be possible after a longer time interval.

Evidence from clinical studies clearly shows that bystander CPR can help to improve survival rates from cardiac arrest. Bystander CPR is the best treatment that a cardiac arrest patient can receive until a defibrillator and advanced medical care arrive.[8] CPR training teaches Canadians how to recognize the signs of a heart attack and cardiac arrest, how to react (shortening the time to defibrillation), and how to provide CPR until emergency medical services arrive, shortening the time to defibrillation.

AEDs AND TARGETED RESPONDERS IN THE COMMUNITY

The Heart and Stroke Foundation (HSF) recommends that targeted responders be trained, equipped, and directed to operate an AED safely and effectively. A targeted responder is any person who, as a part of their job description as a professional primary health care provider or a professional first responder, has the duty to respond to a medical emergency. Targeted responders may include any healthcare provider, or any first responder whose occupation or volunteer activities demand proficiency in the knowledge and skills of basic life support (BLS).

AEDs AND LAY RESPONDERS

Lay responders can be effective for improving survival from cardiac arrest. The Public Access Defibrillation (PAD) trial demonstrated a doubling of survival rates (from 17 to 34 per cent) in public places where defibrillators are placed and lay volunteers are trained to use the defibrillators.[7] Studies of lay rescuer AED programs in settings such as airports and casinos have shown survival rates of 41 to 74 per cent.[1] AEDs are most effective when used by trained individuals, but are safe and easy to use by trained and untrained individuals.[8] In fact, there are cases where individuals with no training have successfully used an AED in an emergency situation.[7]

AEDs AND HOSPITAL SETTINGS

The goal of early defibrillation in-hospital is a collapse-to-shock interval of less than 3 minutes in all areas of the hospital and ambulatory care facilities.[9] Current guidelines recommend that patients in cardiac arrest caused by ventricular fibrillation or ventricular tachycardia (the types of abnormal heart rhythms that can be corrected with an AED) be defibrillated within 2 minutes of a witnessed cardiac arrest. A 2008 study revealed that in nearly a third of sudden cardiac arrests in hospitals,

staff took too long to respond, increasing the risk of brain damage and death. Delays in defibrillation (of longer than 2 minutes) led to 22.2 per cent of patients surviving to discharge compared to 39.3 per cent when early shock was provided.[12] AED technology poses unique opportunities for in-hospital resuscitation. Hospitals are encouraged to examine their policies and procedures for cardiac arrest and resuscitation to determine if use of AEDs within the hospital setting can reduce time to defibrillation. In settings where professionals trained in advanced cardiac life support are not immediately available, AED training should be provided as a basic skill for healthcare providers. AEDs should be made readily available in strategic areas throughout hospitals to help reduce the time from collapse to defibrillation. In addition, collapse-to-first shock intervals and resuscitation outcomes should be monitored.

PUBLIC ACCESS TO DEFIBRILLATION

Research shows that AEDs are an effective intervention for sudden cardiac arrest in settings where there is a high likelihood of cardiac arrest such as airports, casinos, commercial aircraft cabins, places of recreation, sports facilities, public buildings and in other settings where large numbers of high-risk adults may be located.[1-7] These locations also have a reasonable likelihood of witnessed cardiac arrest.[6]

The Resuscitation Outcomes Consortium (ROC) evaluation of nearly 13,000 cardiac arrests found that a high percentage of cardiac arrests in public locations (60%) were classified as ventricular tachycardia (VT) or ventricular fibrillation (VF), the types of abnormal heart rhythms that can be corrected using an AED.[13]

Reducing the time to CPR and defibrillation by having defibrillators accessible in public locations can help provide the best chance of survival following cardiac arrest. The City of Chicago airports public access to AED program showed survival rates as high as 75 per cent. This success is directly related to highly visible, readily accessible automated external defibrillators for public use and an integrated structured emergency response system.[7] Provincial legislation, such as Good Samaritan, Medical Aid or Defibrillation Acts protect anyone using an AED in an emergency situation from liability. Each province has its own legislation.

The window of opportunity for using an AED is small and defibrillation is most successful if performed shortly after cardiac arrest. Urban and rural communities need to determine the degree to which they are capable of getting an AED to a victim of cardiac arrest in time for resuscitation efforts to be effective, and consider placement of AEDs where the chance of ambulance response is low, for example on ferries or airplanes.

HSF strongly supports the development of AED programs in communities across Canada to ensure widespread access to AEDs and to provide the greatest chance of survival from cardiac arrest.

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