

Candidate Guide

2011 CPR Guidelines



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CANDIDATE GUIDE FOR THE 2011 CPR UPDATES

Published by the Lifesaving Society, BC & Yukon Branch
112 – 3989 Henning Drive
Burnaby, BC, Canada V5C 6N5
Phone 604.299.5450; Fax 604.299.5795
Email: info@lifesaving.bc.ca; Website: www.lifesaving.bc.ca
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The Lifesaving Society is Canada's lifeguarding experts. The Society is a national charitable organization working to prevent drowning and water-related injuries through lifeguard, lifesaving, and swimming training, competitive lifesaving, safety management standards and services, and Water Smart® public education.

The Society is an independent, charitable organization educating Canadian lifesavers since the first Lifesaving Society Bronze Medallion Award was earned in 1896.

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A NOTE TO CANDIDATES

In October 2010, the “2010 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiac Care Science with Treatment Recommendations” was published by the International Liaison Committee on Resuscitation (ILCOR).

The ILCOR Guidelines document in conjunction with the American Heart Association “2010 AHA Guidelines for CPR and ECC” presents the latest treatment recommendations for CPR, ECC and First Aid.

These recommendations and guidelines are based on a comprehensive, international evaluation of the best research available. In Canada and around the world, the ILCOR Guidelines are used by organizations such as the Lifesaving Society to review and revise the standards and techniques for resuscitation and first aid skills within our programs.

During late 2010 and early 2011, the Lifesaving Society worked with the Canadian Red Cross, St. John Ambulance Service and Canadian Ski Patrol to determine how the new guidelines would be implemented in Canada.

This Candidate Guide highlights these standards and is meant to supplement the Canadian First Aid Manual and Canadian CPR Manual until resource revisions are completed.

THE CHAIN OF SURVIVAL

Studies published before and since 2005 have demonstrated that:

1. The quality of chest compressions continues to require improvement.
2. There is considerable variation in survival from out-of-hospital cardiac arrest across emergency medical services (EMS) systems.
3. Most victims of sudden cardiac arrest do not receive any bystander CPR.

The changes recommended in the 2010 AHA Guidelines attempt to address these issues and make recommendations to improve patient outcomes from cardiac arrest. The Chain of Survival has been modified to reflect the changes from the 2010 AHA Guidelines.

Figure 1
AHA ECC Adult Chain of Survival

The links in the new AHA ECC Adult Chain of Survival are as follows:

1. Immediate recognition of cardiac arrest and activation of the emergency response system
2. Early CPR with an emphasis on chest compressions
3. Rapid defibrillation
4. Effective advanced life support
5. Integrated post-cardiac arrest care



2010 AHA Guidelines

HANDS-ONLY™ CPR

There has been a lot of media surrounding Hands-Only™ (compression-only) CPR. If a bystander is **not trained** in CPR, they should provide Hands-Only™ (compression-only) CPR for the adult victim who suddenly collapses.

- Discomfort with the application of rescue breaths was the primary reason cited for lay rescuers not providing resuscitation.
- When an untrained bystander calls EMS for a collapse; they will be coached by EMS dispatch on how to assess for breathing and provide Hands-Only™ CPR.



Trained rescuers will continue to provide rescue breaths along with compressions when performing CPR. Hands-Only™ CPR would be appropriate if they do not have access to a pocket mask and are uncomfortable with direct mouth to mouth contact.

COMPRESSION-AIRWAY-BREATHING

As with Hands-Only™ CPR, there has been a lot of press surrounding the new **C-A-B** (Compression-Airway-Breathing) algorithm in the treatment of a sudden cardiac arrest.

The Breathing Check

Rescuers will open the airway using a head-tilt/chin-lift and check for the presence of abnormal or absent breathing for **5 seconds** (maximum 10 seconds). This is a change from the 2005 guidelines where the rescuer would assess breathing for 10 seconds.

“Look, Listen, and Feel” has been removed as a breathing assessment tool as:

- Oxygen levels in the blood remain adequate for the first several minutes after a sudden cardiac arrest.
- Passive chest recoil during the relaxation phase of chest compressions can also provide some air exchange.

Abnormal breathing can include gasping (agonal breathing) and severe respiratory distress.

- Agonal breathing is present in up to 40% of pre-hospital cardiac arrests and is mistaken as a sign of effective breathing leading to omission of bystander rescue breathing and/or CPR.
- With agonal breathing, the diaphragm is still receiving intermittent residual impulses from the brain resulting in sporadic gasping breaths.

By changing the sequence to C-A-B, chest compressions will be initiated sooner and ventilation only minimally delayed until completion of the first cycle of chest compressions (30 compressions should be accomplished in about 18 seconds).

The EMS Call

In the event of a sudden cardiac arrest, the trained rescuer will activate EMS after checking for breathing. This is a change from the 2005 guidelines where the EMS call came immediately after determining unresponsiveness.

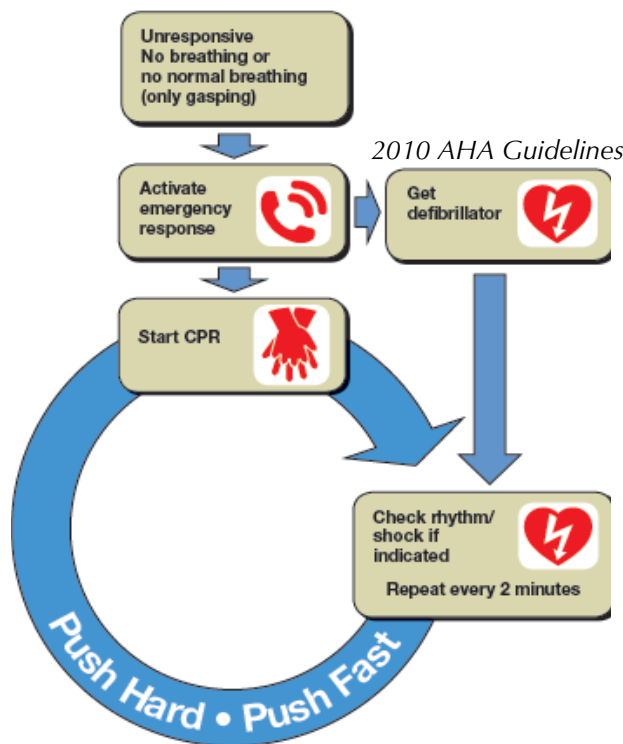
- The rescuer can use judgment in determining when an EMS call can be made.
- It is important that the call is made within the first 2 minutes of the primary survey so as not to delay transport to advanced care.

The **lone** rescuer will immediately **activate** EMS, retrieve an AED (if available) and then start CPR with a compression to ventilation ratio of 30:2.

The lone rescuer will perform 5 cycles (2 minutes of CPR) on a **child or infant** prior to calling 911 and retrieving the AED (if located close by). Respiratory arrest is the most common cause of cardiac arrest in children, thus 2 minutes of resuscitation should be attempted prior to activating EMS and retrieving an AED.

If **two or more rescuers** are present, one rescuer should start CPR and the second should call EMS and then initiate the AED protocol.

Simplified Adult Basic Life Support Algorithm



1. Check for danger.
2. Determine unresponsiveness or level of consciousness (pinch and shout).
3. Open the airway and check for absent or abnormal breathing for 5 seconds (max 10 seconds).
4. The **lone** rescuer will immediately **activate** EMS and retrieve an AED.
5. If an AED is not immediately available, the rescuer should proceed directly to **CPR** and then apply the AED as soon as it is available.
6. If an **AED** is immediately available, the rescuer will apply the AED.
7. If **two or more rescuers** are present, one rescuer should start CPR and the second should call EMS and then initiate the AED protocol.

It is important to note that the **A-B-C** (Airway-**B**reathing-**C**irculation) algorithm will still be used in the assessment of a patient and that **C-A-B** is a treatment sequence for a person who is not breathing or breathing normally.

EFFECTIVE CPR

Studies published before and since 2005 have demonstrated that the quality of chest compressions continues to require improvement. Effective chest compressions are essential for providing blood flow during CPR and can significantly increase survival rates. The following changes have been recommended to ensure high quality, effective CPR:

- A compression rate of at least 100/min for adults, children and infants.
- A compression depth of at least 5cm (2 inches) in adults.
- A compression depth of at least one third of the anterior-posterior diameter of the chest in children (about 5cm or 2 inches).
- A compression depth of at least one third of the anterior-posterior diameter of the chest in infants (about 4cm or 1.5 inches).
- Landmarking should occur on the centre of the chest; rescuers are landmarking too low and are compressing the xiphoid process (reference Figure 2).
- The rescuer must allow for full chest recoil (often the faster a rescuer compresses the chest, the shallower the compression depth or they do not allow the chest to fully rise).
- The maximum time a rescuer should be off the chest is 10 seconds.

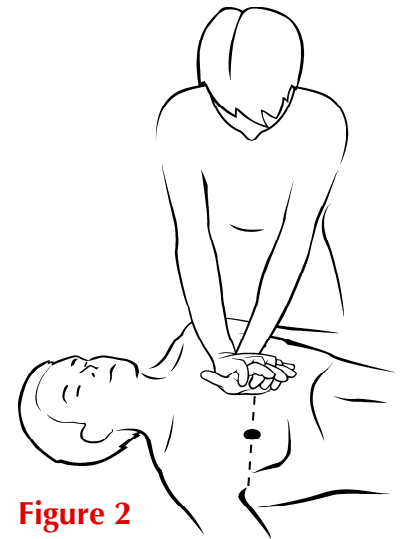
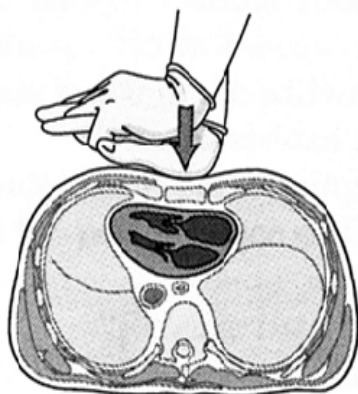
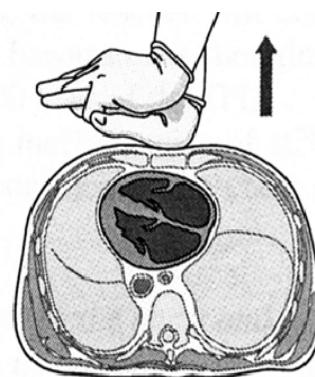


Figure 2



Compressing the chest forces oxygen rich blood out of the heart to the brain.



Full chest recoil allows the heart to completely fill with blood.

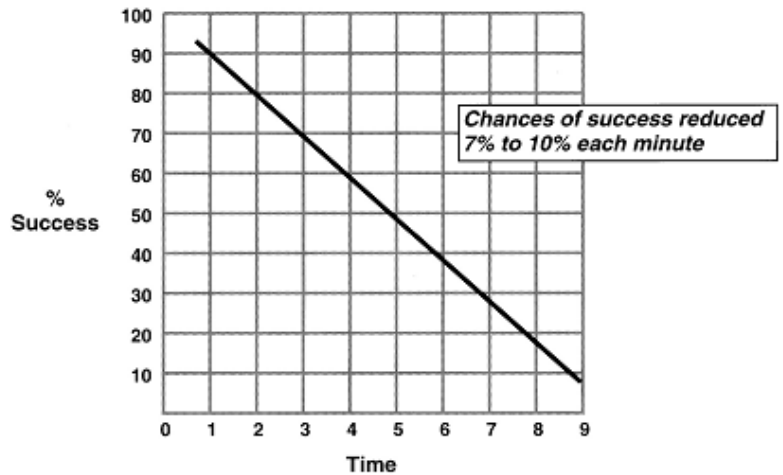
IMPLEMENTATION OF AED TRAINING

In 2005, the Lifesaving Society only required rescuers to have a bystander try to obtain an AED and AED trained operator. Any practical AED training was offered through separate AED courses and provided as needed throughout the various Branches.

The “10 Minute Window”

To give the victim the best chance of survival, activation of EMS, provision of CPR and operation of an AED must occur within the first moments of a cardiac arrest.

For every minute that passes between collapse and defibrillation, survival rates decrease by 7% to 10%. Even minimal training has been shown to improve survival rates, thus, practical training opportunities should be made available and promoted for the lay rescuer.



Components of an AED Unit

Although there are many AED models on the market, they all have the same basic operating components to include:

- A **POWER** button
- A **SHOCK** button
- A set of **ELECTRODE** pads
- **PROMPTS** (verbal or visual)



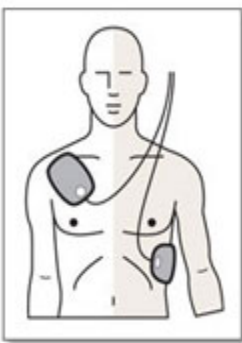
AED Operation Principles

As mentioned above, there are many AED models on the market, regardless of the AED model encountered; there are some basic operation principles that apply to all units:

- The first thing a rescuer should do is turn on the **POWER** button.
 - The unit will prompt the rescuer on how to use that particular model of AED, so listen carefully to the instructions.
- The electrode pads must be properly applied. The rescuer can only apply the pads once, so it is important to put them on correct the first time.
 - All clothing on the upper body must be removed for visual land marking and pad application.
 - Shave chest so pads stick to the skin not the hair.
 - Wipe off water or sweat before putting on the pads.
- Unless the patient shows signs of life, the rescuer will always perform 2 minutes of CPR after a “shock” or “no shock” sequence.
- Water and/or wet environment
 - Remove the victim from freestanding or still water and move to a dry area.
 - If removing a victim from a swimming pool, clear the victim from the water completely (do not leave the victims feet in the water) and lay victim over a floor drain to ensure that they are not placed in freestanding or still water.
 - Quickly towel dry the deck in the immediate area that you will be working on the victim.
 - Ensure that the victim’s chest is dry and that your hands are dry.

Electrode Pad Placement

Adult Pad Placement

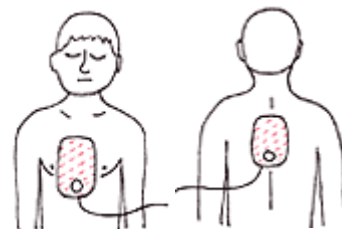


The pad that attaches to the upper right hand side of the chest should not go over top of the sternum, clavicle or nipple.

The pad that attaches to the lower left hand side of the chest should wrap around the rib cage (do not place on the abdomen). This pad often has a heart symbol on it to help you identify the left side pad.

Child Pad Placement

The right side pad attaches to the anterior chest and the left side pad attaches to the back or posterior chest.



OBSTRUCTED AIRWAY PROCEDURES

In 2005, the Heart & Stroke Foundation of Canada recommended abdominal thrusts as the preferred method to clear the airway of a responsive patient with a severe airway obstruction. The primary reason that abdominal thrusts were selected over other methods of clearing the airway was for ease of teaching.

The 2010 AHA Guidelines indicate that if abdominal thrusts are not effective, the rescuer may consider other methods to clear the airway. Studies have shown that abdominal thrusts, back blows, and chest thrusts are acceptable methods of clearing the airway for responsive adults and children suffering from a severe airway obstruction.

The implementation of two procedures for adults and children should not pose a significant teaching issue as two procedures are already being used in responsive infant airway obstruction procedures.

The treatment of a responsive patient with a severe airway obstruction will include:

- Alternating 5 abdominal thrusts and 5 back blows for adults and children
- Alternating 5 chest thrusts and 5 back blows for obese or pregnant patients
- Alternating 5 chest thrusts and 5 back blows for infants

Application of Back Blows

When performing back blows it is important that the patient's airway is parallel to the ground.

This can be achieved by the rescuer wrapping one arm diagonally across the patient's chest and having them bend forward (figure 3) or having the patient bend over and support themselves on a table or counter top (figure 4).



Figure 3



Figure 4

The rescuer will then deliver 5 firm back blows with the heel of their hand between the shoulder blades of the patient. It is important the patient have a **good level of consciousness** prior to attempting this procedure.

2010 AHA GUIDELINES & DROWNING

Annually over half a million Canadians participate in our swimming, lifesaving, lifeguard and leadership programs. Over 25,000 Canadians earn our Bronze Medallion award each year and as Canada's lifeguarding experts; we set the standard for lifeguard training across the country.

With this in mind, we need to consider how the new C-A-B algorithm will affect aquatic rescue in light of the drowning research supporting the traditional Airway-Breathing-Circulation (A-B-C) approach to rescue of a drowning patient.

2010 AHA Guidelines & Drowning

According to the 2010 AHA Guidelines for CPR and ECC, the most important and detrimental consequence of submersion is hypoxia; therefore, oxygenation, ventilation, and perfusion should be restored as rapidly as possible. CPR for drowning victims should use the traditional A-B-C approach in view of the hypoxic nature of the arrest.

Research has shown that it would not be unrealistic to provide rescue breaths not exceeding 20 seconds prior to starting CPR as victims with only respiratory arrest usually respond after a few artificial breaths are given.

European Resuscitation Council (ERC) & Drowning

Most drowning victims will have sustained cardiac arrest secondary to hypoxia. In these patients, compression-only CPR is likely to be less effective and should be avoided. The first and most important treatment for the drowning victim is alleviation of hypoxia...give five initial ventilations or rescue breaths as soon as possible.

International Lifesaving Federation (ILS) & Drowning

It will be noted that the AHA and ERC each recommend a different number of initial breaths in the resuscitation of drowning victims. Our recommendation is that there be at least two initial breaths but would suggest that individuals follow their national guidelines if uncertain about how many to give.

2011 United States Lifeguard Standards & Drowning

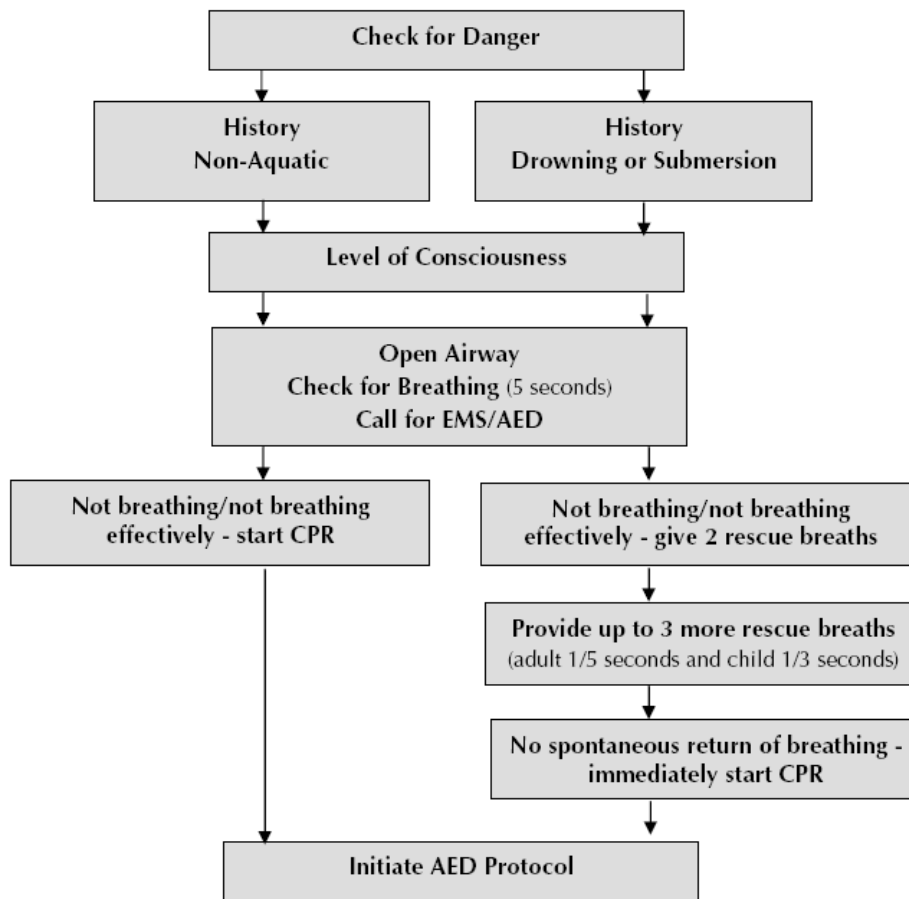
In all drownings, early rescue breathing is the highest priority. Early rescue breathing, including in-water resuscitation, is recommended under the following appropriate circumstances: shallow water, a trained rescuer with a flotation aid in deep calm water, or two or more trained rescuers.

Conclusion

Drowning has been identified as a special circumstance where application of the A-B-C algorithm is appropriate.

The drowning victim receive 2 initial rescue breaths followed up by 3 additional rescue breaths (1 breath every 5 seconds for an adult and 1 breath every 3 seconds for a child/infant). If spontaneous breathing does not return, immediately start CPR.

Simplified Basic Life Support Algorithm – Non-Aquatic versus Aquatic



Summary

The application of the 2 initial and 3 additional rescue breaths must occur within the first 20 seconds to be effective and beneficial for a victim suffering from a hypoxic event.

- ▶ If the rescuer is in deep water (chest deep or greater) or can not effectively deal with complications (vomiting, etc.), they will:
 - Immediately remove the victim from the water
 - Provide the 2 initial followed up by the 3 additional rescue breaths
 - Immediately start CPR if no return of spontaneous breathing
- ▶ If the rescuer is in shallow water and can effectively deal with complications, they will:
 - Provide the 2 initial followed up by the 3 additional rescue breaths
 - Remove the victim from the water
 - Immediately start CPR if no return of spontaneous breathing
- ▶ If the rescuer is in shallow water and the victim vomits, they will:
 - Clear the airway and immediately remove the victim
 - Check for breathing, if not breathing, provide 2 rescue breaths and start CPR

FIRST AID UPDATES

In addition to the resuscitation recommendations, the 2010 AHA Guidelines have published treatment recommendations as released by ILCOR and the International First Aid Science Advisory Board on First Aid.

Patient Positioning

A prone patient (face down) should be left in the position found unless normal breathing can not be assessed. If normal breathing can not be assessed, then the patient should be rolled into the supine position (on the back).

Whenever a patient is being left unattended or is breathing on their own, they should be placed in the recovery position (where a spinal injury is not suspected). This position is designed to maintain a patent airway and reduce the risk of airway obstruction and aspiration.



Treatment of Severe Bleeding

Bleeding is best controlled by applying firm pressure maintained for a long period of time. Elevation can reduce the amount of pressure applied and can aggravate other injuries (such as fractures). Use of pressure points and elevation to control severe bleeding is no longer recommended.

Hypothermia

If a hypothermic patient does not have effective breathing in the initial 5-10 second assessment, CPR should be initiated immediately.

Non-Traumatic Chest Pain (Heart Attack/Angina)

Although ASA will not make the pain go away, it can help to stop clotting in the arteries, thus reducing damage to the heart. If the patient has their own ASA (acetylsalicylic acid/Aspirin), assist them in taking it provided:



- They are not **Allergic** to ASA or ibuprofen
- They do not have a history of **Asthma**
- Their doctor has not **Advised Against** taking ASA
- They do not have an **Active GI bleed** (stomach/ulcer) or a recent traumatic head injury

Have the victim **chew** (1) adult ASA tablet or (2) children's or "daily low dose" ASA tablets. **DO NOT** substitute acetaminophen (Tylenol) or ibuprofen (Advil/Motrin) as they block the blood-thinning affect of ASA.

If prescribed nitroglycerine, a patient can take up to 3 doses at intervals of 3-5 minutes provided that their level of consciousness remains good.

Anaphylaxis

It is important that rescuers continue to be taught the signs and symptoms of anaphylaxis and how to assist in the administration of epinephrine if a patient is unable to do so.

Signs & Symptoms

- Generalized itching
- Blotchy, raised, red bumps on the skin (hives)
- Wheezing; difficulty breathing
- Swelling – including throat, tongue, and face
- Dizziness, light headedness
- Stomach cramps, vomiting, diarrhea
- Decreased LOC or unconsciousness



Normal Appearance



Allergic Reaction

Treatment

Before administering an EpiPen epinephrine auto-injector, you must ensure that:

- The Primary Survey has been completed (ABCs) and that **EMS** has been activated.
- Only the patient's EpiPen is used. **DO NOT** administer another person's pen.
- The auto-injector can **NOT** be used regardless of the expiry date if the epinephrine solution is discoloured and/or has a precipitate.
- Ice should **NOT** be placed on the injection site after the use of an auto-injector as this can inhibit the dispersal of epinephrine into the blood stream.
 - Remove the blue safety cap from the EpiPen®.
 - Press the tip of the pen into **outer thigh** of the patient until there is a "click".
 - Hold the pen in place for 10 seconds
 - Massage injection site for quick dispersal of medication.
 - Dispose of the needle in the carry case or sharps container.



Protective cap covering exposed needle

Heat Related Injury

For alert victims of suspected heat stroke, immersion in cold water is the initial recommended treatment. If the patient has a decreased level of consciousness, the application of wet towels, dousing with water, sponging, etc. would be appropriate. Electrolyte drinks (sport drinks) can be used in the treatment of heat exhaustion.

Jelly Fish Stings

Jelly fish stings should be liberally washed with vinegar as soon as possible for at least 30 seconds. After the nematocysts are removed or deactivated, immerse in hot water (as tolerated) for about 20 minutes.

HEALTH CARE PROVIDER UPDATE

All resuscitation recommendations as outlined above are to be applied to the Health Care Provider (HCP) level. The most significant change from 2005 to 2010 is a shift in focus to a teamwork approach. HCP training should focus on building the team as each member arrives or delegating roles if multiple rescuers are present. This better reflects real life applications in ambulance or hospital settings.

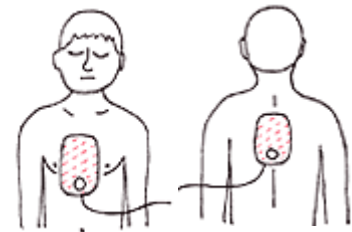
In addition, it is recommended that Health Care Providers:

- Be able to customize treatments to a specific mechanism of injury where appropriate (such as A-B-C for the drowning patient).
- Be trained to apply the AED on infants as they have a higher likelihood of encountering an infant in cardiac arrest and having access to an AED with pediatric pads.

Infant Pad Placement

The right side pad attaches to the anterior chest and the left side pad attaches to the back or posterior chest.

The use of a pediatric dose attenuator is preferred, but not required.



- No longer be trained in the use of cricoid pressure due to the inability of being able to properly teach it in a classroom setting and as such the improper application in the field.
- To facilitate delivery of ventilations with a BVM, oral airways can be used in unconscious patients with no cough or gag reflex. Oral airways should only be inserted by persons trained in their use.

As per the 2005 Guidelines, it is recommended that:

- If a pulse is present, but normal breathing is not detected, the rescuer will initiate rescue breathing. The rescue breath ratio will be 1 breath every 5-6 seconds (every 5 seconds recommended) for an adult and 1 breath every 3-5 seconds (every 3 seconds recommended) for a child/infant.
- The lone rescuer should not use a BVM, the 2 person BVM technique is preferred.

Two Rescuer Technique

- 1st rescuer opens airway with head tilt and jaw lift while sealing the mask.
- 2nd rescuer provides effective 1 second ventilations causing chest to rise (squeeze bag).



Two Rescuer BVM Technique

NOTES:

CONTACT US

Publications of the Lifesaving Society are available from any Branch office. Inquiries from outside Canada should be directed to the National Office.

Alberta & Northwest Territories Branch

11759 Groat Road
Edmonton, Alberta T5M 3K6
Telephone: (780) 415-1755
Fax: (780) 427-9334
E-mail: experts@lifesaving.org
Website: www.lifesaving.org

British Columbia & Yukon Branch

112 - 3989 Henning Drive
Burnaby, British Columbia V5C 6N5
Telephone: (604) 299-5450
Fax: (604) 299-5795
E-mail: info@lifesaving.bc.ca
Website: www.lifesaving.bc.ca

Manitoba Branch

504-138 Portage Avenue East
Winnipeg, Manitoba R3C 0A1
Telephone: (204) 956-2124
Fax: (204) 944-8546
E-mail: aquatics@lifesaving.mb.ca
Website: www.lifesaving.mb.ca

National Office

287 McArthur Avenue
Ottawa, Ontario K1L 6P3
Telephone: (613) 746-5694
Fax: (613) 746-9929
E-mail: experts@lifesaving.ca
Website: www.lifesaving.ca

New Brunswick Branch

55 Whiting Road, Unit 34
Fredericton, New Brunswick E3B 5Y5
Telephone: (506) 455-5762
Fax: (506) 450-7946
E-mail: lifesave@nb.aibn.com
Website: www.lifesavingnb.ca

Newfoundland & Labrador Branch

P.O. Box 8065, Station "A"
St. John's, Newfoundland A1B 3M9
Telephone: (709) 576-1953
Fax: (709) 738-1475
E-mail: lifeguard@nl.rogers.com
Website: www.lifesavingnl.ca

Nova Scotia Branch

5516 Spring Garden Road, 4th Floor
Halifax, Nova Scotia B3J 1G6
Telephone: (902) 425-5450
Fax: (902) 425-5606
E-mail: experts@lifesavingsociety.ns.ca
Website: www.lifesavingsociety.ns.ca

Ontario Branch

400 Consumers Road
Toronto, Ontario M2J 1P8
Telephone: (416) 490-8844
Fax: (416) 490-8766
E-mail: experts@lifeguarding.com
Website: www.lifesavingsociety.com

Prince Edward Island Branch

P.O. Box 2411
Charlottetown, Prince Edward Island C1A 8C1
Telephone: (902) 368-7757
Fax: (902) 368-1593
E-mail: pei.lifesaving@islandtelecom.com

Quebec Branch

4545 Pierre de Coubertin Avenue
P.O. Box 1000, Station "M"
Montreal, Quebec H1V 3R2
Telephone: (514) 252-3100 or 1-800-265-3093
Fax: (514) 254-6232
E-mail: alerte@sauvetage.qc.ca
Website: www.lifesaving.qc.ca

Saskatchewan Branch

2224 Smith Street
Regina, Saskatchewan S4P 2P4
Telephone: (306) 780-9255
Fax: (306) 780-9498
E-mail: lifesaving@sasktel.net
Website: www.lifesavingsociety.sk.ca



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