"The HCA Way" Basic Life Support

Created September 2009 Reviewed Dec 2016 (Version 9)



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Basic Life Support





"This Basic Life course is endorsed by ACN according to our Continuing Professional Development (CPD) Endorsed Course Standards. It has been allocated the following CPD hours according to the Nursing and Midwifery Board of Australia – Continuing Professional Development Standard."

Theoretical component: 0.5 CPD hours Practical session: 1.5 CPD hours Total (Practical and Theoretical): 2 CPD hours

On completion of the online package and assessment quiz you must attend a 1.5 hour practical session to demonstrate the knowledge and skills acquired.

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In January 2016, the Australian Resuscitation Council released the reviewed Basic Life Support guidelines based on evaluation of scientific evidence from the International Liaison Committee on Resuscitation (ILCOR). These guidelines are constantly updated and ratified by the Australian Resuscitation Council. The information in this learning program has been derived from the Australian Resuscitation Council (ARC) Guidelines 2016 with permission.

Objectives

On the successful completion of this learning package and a HCA practical Basic Life Support session, the participant will be able to correctly demonstrate the following effective resuscitation techniques on an adult, child and infant:

- Identify and remove self and victim from Danger;
- Check for **Response**;
- Send for Help;
- Clear/open Airway;
- Check to see if victim is Breathing;
- Ascertain correct hand placement to meet requirements of effective external Cardiopulmonary Resuscitation (CPR);
- Provide effective Compressions at the correct rate and depth;
- Use Automatic External Defibrillator (AED);
- Care for recovering patient;
- Record all measures taken.

For more information on effective resuscitation techniques and the Basic Life Support Guidelines, visit the Australian Resuscitation Council at <u>www.resus.org.au</u>.

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The Aim of BLS

Basic Life Support (BLS) is performed to support the patient's circulation and respiration through the use of cardiopulmonary resuscitation (CPR) until advanced life support arrives. Victims who have had early and correct BLS intervention will be better oxygenated and are more likely to respond to advanced techniques to revive them, thereby increasing their chance of survival.

BLS is only a temporary substitute for normal ventilation and circulation, as only approximately 20-30% of normal cardiac output can be achieved via the BLS technique.

Chain of Survival



The Chain of Survival refers to a series of actions that, when put into place, reduce the mortality rate associated with cardiac arrest.

Basic Life Support is the core of any resuscitation attempt. The key elements include:

- Prompt recognition of cardiac arrest;
- Call for urgent medical assistance;
- Early effective CPR with an emphasis on minimal disruptions to compressions;
- Early defibrillation;
- Early advanced life support;
- Integrated post-cardiac arrest care.

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BLS: Steps of Resuscitation (ARC 2010) **DRSABCD**

DANGER: Check for Danger

Response: Check for a Response

SEND FOR HELP

AIRWAY: Open the airway and ensure no blockages

BREATHING: Check the victim for normal breathing

COMPRESSIONS: 30:2 (compression to breath ratio) or compression-only CPR

DEFIBRILLATOR: Attach a defibrillator as soon as possible and follow the prompts

ANY ATTEMPT AT RESUSCITATION IS BETTER THAN NO ATTEMPT

(Australian Resuscitation Council)

Definition of a 'Child' and 'Infant'

According to the 2016 Australian Resuscitation Council Guidelines,

An 'infant' is classified as aged 0 - 1 year old a '*child*' is classified as aged 1 - 8 year and an '**adult**' 8- onward.

Any reference to a **child** or **infant** in this tutorial follows these age guidelines.

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D = Danger: Hazards, Risks & Safety

Always consider your safety first, followed by the safety of the patient/victim and then lastly the safety of any bystanders.

As a rescuer, you must be able to quickly assess the situation for any potential dangers or hazards to yourself or others in the immediate environment. Priority must lie with your own safety, followed by the safety of the patient/victim and then any bystanders.

There are three categories of dangers that the rescuer must be aware of:

- Manual Handling: Abide by the general principals of WH&S (Manual Handling) where possible. Do not attempt to move a collapsed person without first obtaining assistance unless it is a life-threatening emergency situation;
- Infection Control: Take safety precautions where possible using universal or standard precautions. In a health care environment, Personal Protective Equipment is a requirement; and
- Environment: Fire, electricity, traffic and so on are environmental hazards that you will need to consider when performing BLS. Also consider the presence of oxygen and flammable items if a defibrillator is being used as they may pose a risk e.g. always turn off oxygen in the workplace if in use.

Personal Protective Equipment (PPE) in BLS

It is reasonable for a rescuer to use personal protective equipment (PPE) which may include gloves or a barrier device for rescue breaths; however CPR should never be withheld if PPE is not available unless there is a clear risk to the rescuer. The risk of transmission of rescue breaths delivered without the use of a barrier device is very low.

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The rescuer should avoid moving the victim where at all possible. A victim should only be moved if:

- The safety of the rescuer or the victim is compromised;
- The victim requires protection from extreme weather conditions;
- Required in order to evacuate the victim from difficult terrain;
- Care of the airway or breathing is required (e.g. rolling an unconscious victim to the side to clear the airway or rolling them onto their back to commence CPR); and,
- Required to control severe bleeding.

If you do need to move a victim, where possible, have a third person assist to support the victim's head and neck and prevent any twisting or bending from occurring. Lone rescuers are recommended to use an ankle or arm-shoulder drag to move a victim in danger.

Traffic Accidents:

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Resuscitation at a traffic accident can also pose a unique scenario to the rescuer. To ensure the safety of self, the victim and others at the accident scene:

- Turn off the ignition and apply the park brake;
- Turn on hazard lights and if there are bystanders present, ask them to warn oncoming traffic;
- Do not attempt to rescue someone or touch a vehicle which is within 10 metres of a fallen power line until the area is declared safe by the electrical authorities;
- Warn bystanders not to smoke; and
- Clear immediate environment of hazards to reduce danger of trips/falls.

An unconscious but breathing victim can be managed within the car, provided there is no danger to the victim. However an unconscious, non-breathing victim must be removed from the vehicle to commence chest compressions.

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R = **Response** ('Touch and Talk')

Assess the collapsed victim's response to verbal and tactile stimuli ('talk and touch') ensuring that this does not cause or aggravate any injury. Tap/shake the victims **FOOT** to elicit a response. Give a simple command such as "open your eyes, can you hear me?"

If the patient does <u>not</u> respond or only shows a minor response, e.g. groaning without opening their eyes, they should be treated as UNCONCIOUS.

S = Send for Help

It is your professional responsibility to know the phone numbers and method for calling emergency codes in your clinical/community settings. You should know where the emergency buzzers and alarms are and where the resuscitation trolley and emergency equipment are kept. You also need to know the procedures to be implemented within the facility in which you are working and in the community.

Send for Help can be implemented after the first 2 minutes of CPR if the rescuer is in a situation where they are alone with no immediate helper.





The Australian Ambulance Service emergency number is:



Dialling 112 on a digital mobile phone will put you directly through to many countries' emergency services. (If you have no signal, this number will get you through to 000 in Australia).

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A = Airway

A clear, unobstructed/open airway is required for effective breathing. Absence of a clear airway will be recognised by absent or noisy breathing and/or failing to respond to 'touch and talk'.

The airway must be cleared and open



In a normal, unobstructed airway, the air can flow freely through the nose or mouth to the lungs.



Air flow can be restricted at different locations including the nose and soft palate with the uvula and the **tongue base**.

The narrowing or blockage of the airways can be fatal.

Some causes of an obstructed airway could include:

- Tongue (unconscious patient);
- Semi-solid material (vomit, seaweed);
- Solid material at the entrance to or within upper airway;
- Laryngeal spasm;
- Swelling (asthma, allergies); or,
- Injury involving airway (smoke, toxic fumes)

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Management of the Airway: Adults & Children

- Inspect the airway observing for any foreign body or obstruction from mucous;
- Clear the airway either using the victim's fingers ('finger sweep') or a suction apparatus (if available) if the rescuer is proficient in its use. Be careful not to push the material in further causing an obstruction. Remove any loose fitting dentures if required;
- Do not routinely roll the victims to their side unless the airway is obstructed by liquid (blood or vomit) or the victim has suffered a submersion injury. Instead turn the mouth slightly downwards and sideways to allow secretion drainage by gravity;
- Open the airway by using a backward HEAD TILT together with CHIN LIFT. Opening of the airway by JAW THRUST manoeuvre can be used by health professionals who are knowledgeable and practised in this methodology. If a cervical spine injury is suspected, then JAW THRUST becomes the preferred methodology for healthcare providers;
- Please note that in an unconscious victim, care of the airway takes precedence over any injury, including the possibility of spinal injury. If you suspect spinal injury, use gentle JAW THRUST.



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Management of the Airway: Infants

A head tilt **MUST NOT** be used on infants.

Due to the soft and pliable nature of the infant's narrow nasal and trachea passages, using a head tilt/chin lift on an infant may cause excessive distortion of the airway. When managing the airway of an infant, the head should be kept in a neutral position to minimise distortion of the airway.

If airway patency needs to be acquired in infants a **JAW THRUST** is used.



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Management of Choking

(This technique is the same for Adults, Children & Infants)

Airway obstruction may be present in the conscious or unconscious victim and may be partial or complete. It may be gradual or sudden in onset and the signs and symptoms of obstruction will depend on the severity of the condition. At this stage most victims can still hear you, so let them know what you are doing and why. Reassure and encourage the victims to clear obstructions themselves.

Choking victims are managed with five (5) back blows and, if unsuccessful, five (5) chest thrusts. After each back blow/chest thrust, a visual/verbal check is made to see if the obstruction has been dislodged. The aim is to free the obstruction rather than give all five (5) back blows and all five (5) chest thrusts.

Obstructed Airway Management

One of the first signs of an obstructed airway (partial or complete) may be that the victim may become agitated and begins to panic. Whilst dealing with a conscious victim, remember to always tell them what you are doing and why and encourage them to cough. The assessment of the airway must be completed quickly as the victim may soon be unconscious.

PARTIAL OBSTRUCTION: Breathing will NOT be normal but escape of air may be felt.

- Check the airway (if possible remove any loose foreign bodies);
- Encourage victim to cough
- Initiate five (5) back blows, followed by five (5) chest thrusts; and
- If the patient deteriorates, call 000.

COMPLETE OBSTRUCTION: No breathing present, person still conscious.

Send for Help – call 000;
 Check the airway (if possible remove any loose foreign body If the victim becomes unconscious, follow the DRSABCD steps to resuscitate.

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Back Blow Delivery Method

Back blows generate an increase in pressure in the blocked airway that might result in either partial or total dislodgment of inhaled foreign material, or may loosen the foreign body and initiate a cough.

Use the heel of one hand to deliver a sharp blow in the middle of the back between the shoulder blades. Deliver up to **five (5) back blows**, checking after each to see whether the previous blow has relieved the obstruction and if possible encourage the victim to cough.



Above: Back blow technique

Below: Back blow technique for infants



Positioning:

- Adults should remain standing unless already seated;
- Children should remain standing unless already seated and may be supported by placing an arm around their front;
- Infants should be picked up and tucked under the arm or across the arm depending on their size.

Remember: Children and Infants require less force when performing back blows than adults.

If the back blows are UNSUCCESSFUL proceed to chest thrusts and call for help

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Chest Thrust Delivery Method

Using the heel of one hand, apply a short, sharp upward thrust to the centre of the chest. The thrust should be performed at a slower rate than a CPR compression. Deliver up to **five (5) chest thrusts**, checking after each to see whether the thrust has relieved the obstruction.

Positioning:

- Adults or children may either sit or stand against a firm support (e.g. a wall or chair back);
- Infants should be placed so that they are facing upwards (supine position) along a rescuer's thigh or held in a cradle position against the upper torso, with their head supported.



Photos (from top to bottom): Chest thrust technique on and adult and child; chest thrust technique for infants.

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Foreign Body Airway Obstruction (Choking)



B = Check for Breathing

- LOOK for movement of the upper abdomen or lower chest;
- LISTEN for the escape of air from nose and mouth;
- FEEL for movement of chest and upper abdomen.

Assess for signs of breathing normally: If breathing sounds are absent, breathing is erratic or ineffective or normal breathing is not present, after the airway has been cleared and opened, the rescuer should commence chest compressions.

C = Compressions

Chest compressions should be commenced when a victim/patient is unresponsive and not breathing normally. Early compressions can improve outcomes by keeping the brain and heart perfused with the oxygenated blood in the circulatory system prior to collapse.

Rules for achieving effective chest compressions:

- 100 120 compressions per minute (for all ages);
- Push down firmly on the sternum to 1/3 of the depth of the chest;
- Push in a regular rhythm, for example counting '1, 2, 3'
- Compression/relaxation ratio should be 50:50 with complete recoil of chest between each compression;
- Frequent rotation of personnel should be taken after approximately 200 compressions or approximately every two (2) minutes;
- Avoid compression below lower limits of sternum as may cause regurgitation and/or damage to liver/spleen/stomach;
- Interruptions to chest compressions should be minimised;
- Avoid compressions applied too high as ineffective depth is achieved; and,
- After each 30 compressions there is an interruption in chest compressions for two
 (2) rescue breaths (optional).

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Location Point for Compressions

The ARC recommends chest compressions are performed on the lower half of the sternum or centre of the chest as the compression point for **all age groups**. Direct visualization may be used to locate the compression point, generally the 'centre of the chest' equates with the lower half of the sternum.

Compression Technique for Adults and Children

- Chest compressions should be performed with the victim on their back on a firm surface with the rescuer kneeling besides the victim's chest;
- For compressions on an adult or child, the rescuer should position themselves
 vertically above the victim's lower sternum and position their hands, one on top of
 the other with their arms straight (one-handed compressions can also be used on
 small adults or children provided the correct depth of the compression is still
 achieved); and,
- Compressions should depress 1/3 of the depth of the chest (approximately 5 -7cm for adults and 5cm for a child).



Below: Correct posture for compressions

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Compression Techniques for Infants

- The infant should be held with head in neutral position either resting on forearm or leg (as pictured) for the two finger method, or on a flat firm surface for the two thumb method,
- Either the **two finger** or **two thumb** compression method can be used on an infant; and,
- Compressions should be at 1/3 of the depth of the infant's chest (approx. 4cm).



Above: The two-finger compression method

Rescue Breathing Techniques (Optional)

During the first few minutes after cardiac arrest the blood oxygen content remains high. The average adult inhales 500-600 mls of oxygen in a single breath. Oxygen levels are in the blood remain high for up to 7 minutes following cardiac arrest. Ventilation is therefore initially less important than chest compressions and rescuers can choose whether or not to deliver rescue breaths. (Compression-only CPR can be used when the rescuer is untrained or unwilling to provide mouth-to-mouth rescue breathing).

Always deliver chest compressions before commencing rescue breathing.

The universal compression-ventilation ratio is 30:2 (30 compressions: 2 rescue breaths) This ratio is recommended for all ages - adults, children & infants.

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Bag-Valve-Mask

In health care settings, where the equipment permits and oxygen is available and the staff are trained and certified in the use of the mouth-mask & bag-valve-mask techniques, it is a requirement that breaths be given.

- The operator's role is to maintain the airway with the head tilt/chin lift or jaw thrust;
- Ensure a seal exists with mask around the nose and mouth;
- Administer breaths by squeezing the Bag-valve mask (Ambu-Bag);
- Inflation should be slow and gentle to reduce gastric inflation;
- Administer regular breaths of 2 in a cycle of 30:2.

Please note that bag-valve-mask equipment, oropharyngeal airways, oxygen powered equipment should only be used by those who are proficient in their use.



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Mouth-to-Mask Technique

In one action, the operator places the mask with the pointed end up over the nose; A firm pressure is applied to create a seal around the mouth and nose; At the same time the Head Tilt/Chin Lift is implemented where possible and regular breaths are given; Assess for correct technique by looking for the rise and fall of the chest.

If you are in a health care environment and can apply oxygen ensure that it is at a high concentration (100%). Oxygen should be used on all patients as soon as it is available,

Mouth-to-Mouth (Children and Infants)

The rescuer's mouth should cover the nose and mouth of the child or infant (as pictured).

Giving rescue breaths this way is optional and up to the individual. If rescue breathing is being delivered, the provider should deliver regular, consistent gentle puffs breaths, taking no longer than one second per breath.

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D = **D**efibrillation



If available, attach an Automated External Defibrillator (AED) as soon as possible and follow the prompts. The use of an Automated External Defibrillator (AED) is now part of the BLS algorithm as prescribed by the A.R.C. AEDs have the ability to identify the underlying cardiac rhythm as being either a 'shockable' or 'non shockable' rhythm. The AED will prompt the user to defibrillate i.e. 'shock advised' or 'shock not advised'.

A defibrillation shock is indicated for treating shockable rhythms:

- Ventricular Fibrillation (VF)
- Ventricular Tachycardia (VT) pulseless

The AED delivers **200 joule** shocks and the WH&S safety criteria associated with the 'Stand Clear' procedure must be implemented. It is recommended that an AED be attached if available during commencement of CPR.

It is universally recognised that early defibrillation significantly improves survival rates. Survival can be significantly improved even 6-10 minutes after arrest, as long as effective CPR has been started early in the arrest. It is thought that good CPR may even increase the likelihood of defibrillation success.

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Automated External Defibrillator (AED)

With AEDs, the operator attaches two adhesive electrodes (pads) to the victim's chest. This serves the dual function of cardiac monitoring and defibrillation through these electrodes. The tasks of rhythm recognition, energy selection and charging are automated.

Instructions are given via a screen and/or a synthesized voice to reinforce the instructions. The machine will recognise shockable rhythms, decide if defibrillation is indicated, charge itself to a predetermined level and direct the operator when/if to administer the shock.

An AED should only be used if the victim is found to be **unresponsive and not breathing**. **CPR should be in progress while awaiting the arrival of an AED**.

The order of priority after arrival of the AED is to:

- Open the AED;
- Turn the AED on (with some AEDs, opening the case will turn the machine on automatically);
- Follow prompts i.e. 'apply pads to patients bare chest', 'plug in connector to flashing light', 'analysing heart rhythm', 'charging', 'push button now';
- The operator cannot pre-empt the AED it will not respond;
- The operator must only follow the instructions given and at the pace that they are given.

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Pad Placement & Application

The ideal electrode (pad) placement is one that allows maximum current flow through the myocardium from the base to the apex of the heart.



The pads are firstly removed from an adhesive backing and then applied by pressing firmly to the victim's chest, making sure that the edges are also adhering closely to the skin. **Ensure good contact** and remove wrinkles, creases and bulges if necessary. The cable that comes attached to the pads should then be connected to the machine.

All pads will have a diagram on them showing the location where they need to be positioned on the body. Take time to check for this as placement of pads can vary slightly with each make of AED.



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Safety Aspects of Application of AED Pads

Ensure the victim has been removed from any body fluids and liquids that they may have been lying in.

- Place pads on clear, dry chest;
- DO NOT place pads over anything except clear, dry skin: avoid clothing, wet skin, ECG electrodes, cardiac monitors (external pacing wires internal defibrillators and/or pacemakers), medication patches and external parts of intravenous lines, subcutaneous ports, recent wounds and drain tubes;
- DO NOT place pads over pacemaker generators; Devices such as permanent pacemakers/internal defibrillators provide a direct electrical connection to the heart. To minimise the risk of myocardial damage, placement of pads with a safety margin of least 2-10 cm away from the pacemaker is recommended depending upon defibrillator manufacturer's recommendation;
- If for any reason you cannot place the right hand pad at the base position of the heart on the chest due to excessive hair, bleeding, and I.V. lines, the right hand pad can be moved up on the clavicle or over the shoulder.
- If in the health care setting and oxygen is in use, **TEMPORARILY** remove the source.

Prevent Arcing

Arcing is the leaping of current from one paddle to the other when the defibrillator is discharged. This short circuits the current away from the heart, resulting in chest burns, ineffective defibrillation and poses an electrical hazard to staff. This can be prevented by:

- Checking for danger ensure provider is not standing in fluids electric cables etc.;
- Turning off any oxygen supply devices as oxygen is a high risk combustion factor;
- Remove wet clothing and dry the chest area;
- Remove any medication patches to ensure correct pad placement.

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Delivering Shock

When prompted to press shock button, firstly ensure:

- 1. Victim, rescuer and others are not in contact with metal objects;
- 2. Oxygen is moved away from victim;
- 3. That no one is touching the victim whilst the shock is being delivered;
- 4. A loud, clear message such as '**Stand Clear**' or '**All Clear**' is given; in addition to performing a 360° degree visual safety check just prior to pushing 'shock' button;
- 5. A shock will not be delivered until the 'Shock' Button is pressed.

If a shock is not advised, the machine will direct the operator to recommence CPR.

After 2 minutes of continued CPR, the AED will prompt rescuers to move away from victim so that the victims underlying rhythm can be re-analysed. The AED will continue to advise shockable or non- shockable rhythm and give prompts for rescuers to follow. It is essential that the victim is completely still whilst the rhythm is being analysed, as movement caused by CPR, transport, etc. may interfere with rhythm analysis by the automated machine.

Recovery Checks during CPR

Interruptions to CPR are associated with poorer outcomes. Therefore, CPR should NOT be interrupted if possible, except for AED defibrillation. If the resuscitation is successful, the victim will have return of spontaneous circulation (ROSC), become responsive and start breathing independently indicating a stop of CPR. Always leave the AED pads on the victim, as people who have had a cardiac arrest and are revived can very quickly go back into another arrest status. Continue to:

- Monitor the patient closely;
- Place in recovery position (Left Lateral Position);
- Wait for help to arrive (ambulance paramedics/qualified health professionals)

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If resuscitation is unsuccessful continue with CPR unless:

- You find yourself in an isolated situation with no-one else to help and It is impossible to continue (e.g. exhaustion);
- If after a prolonged resuscitation attempt with no other help and no response from the victim the operator stops and declares the victim deceased; or,
- A healthcare professional directs that CPR be ceased and the victim is pronounced deceased.

Resuscitation in Late Pregnancy

In the obviously pregnant woman, the standard resuscitation technique requires modification. Due to anatomical and physiological changes, BLS is difficult. The enlarged uterus restricts chest expansion making delivery of rescue breaths more difficult and there is an increased risk of aspiration of stomach contents.

The pregnant uterus causes pressure on the major abdominal blood vessels when the woman lies on her back or on her right side, reducing venous return to the heart and hence cardiac output. The situation may be corrected by positioning the woman in the **left lateral tilt position** i.e. an obvious pelvic <u>tilt</u> to the left. **This can be achieved by placing something under the right buttock i.e. jacket, handbag, jersey, pillow etc.**



Left Lateral <u>Tilt</u> Position: The pregnant woman is positioned on her back with shoulders flat on a hard surface and enough padding under the right buttock to displace the uterus giving an obvious tilt to the left. This position must be maintained while Rescue Breathing/ Cardiac Compressions are given. Once the pregnant woman is in the correct position the chest compressions/rescue breaths should be performed the same as on any other adult.

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CONGRATULATIONS!



You have now completed the reading for this part of the course. You should now complete the multiple-choice assessment quiz to successfully complete the **Basic Life Support Program** online (Part One).

After completing the assessment quiz please arrange attendance at a Basic Life Support Practical Session (Part Two) to be assessed in practice.

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Advisory Panel (Dec 2016)

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References:

The Australia Resuscitation Council Guidelines 2016 <u>http://resus.org.au/guidelines/</u>viewed 30/11/16

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