

## **SECTION 6: Basic Life Support for pregnant women and children (IMEESC 13.1 and 13.5)**

### **Introduction**

Basic Life Support is a technique that can be employed by a one or more rescuers to support respiratory and circulatory functions of a collapsed patient using no or minimum equipment.

### **Resuscitation from cardiac arrest in pregnant women and in children**

The international guidelines for resuscitation from cardiac arrest (European Resuscitation Council 2010) detail two approaches to Basic Life Support. One is for “adults” and the other for “children”. The “adult” programme is predicated on resuscitation from a sudden cardiac event (such as ventricular fibrillation from a coronary occlusion) in a patient who was ventilating before the event and therefore has oxygen in their blood.

In this group, chest compressions to move the oxygenated blood into the coronary and cerebral arteries is of prime importance and therefore the rescuer’s sequence of actions after assessment starts with chest compressions not rescue breaths.

In the “child” type resuscitation attempt, the sequence of actions is predicated on a hypoxic event (including any respiratory failure or obstruction, or hypoxia at a cellular level as seen in shock). In this type, prime importance goes to re-establishing oxygenation and only secondarily to moving the oxygenated blood to the coronary and cerebral arteries. Therefore the rescuer’s sequence of actions after assessment starts with rescue breaths and then moves on to chest compressions.

The “child” type cardiac arrest is seen in almost all children (excluding those rare arrhythmic events in children with congenital or acquired heart disease and those in whom sudden, unexpected collapse is preceded by apparent normal respiratory and circulatory function), and in adults who have a terminal acute illness involving respiratory or circulatory pathology. This includes patients who have had convulsions, trauma including drowning, poisoning, bleeding, sepsis etc.

In addition, international guidelines on resuscitation from cardiac arrest agree that where possible guidelines should be simplified as there is evidence that complex guidelines cause “provider paralysis” resulting in no or poor life-saving effort being made.

In view of the above, the ALSG/MCAI programme for poorly resourced countries teaches a programme of Basic Life Support for infants, children and pregnant women which reflects the known pathologies in these groups, that is, respiratory and circulatory causes of cardiac arrest and recognises that the clinicians providing resuscitation attend all ages of patient.

The sequence taught therefore includes five preliminary rescue breaths and a 15:2 subsequent ratio.

Children are classified into 2 groups because of minor differences in technique based on anatomical differences between the groups:

- Infants (<1 year)
- Children between 1 year and puberty

## Basic Life Support for infants and children

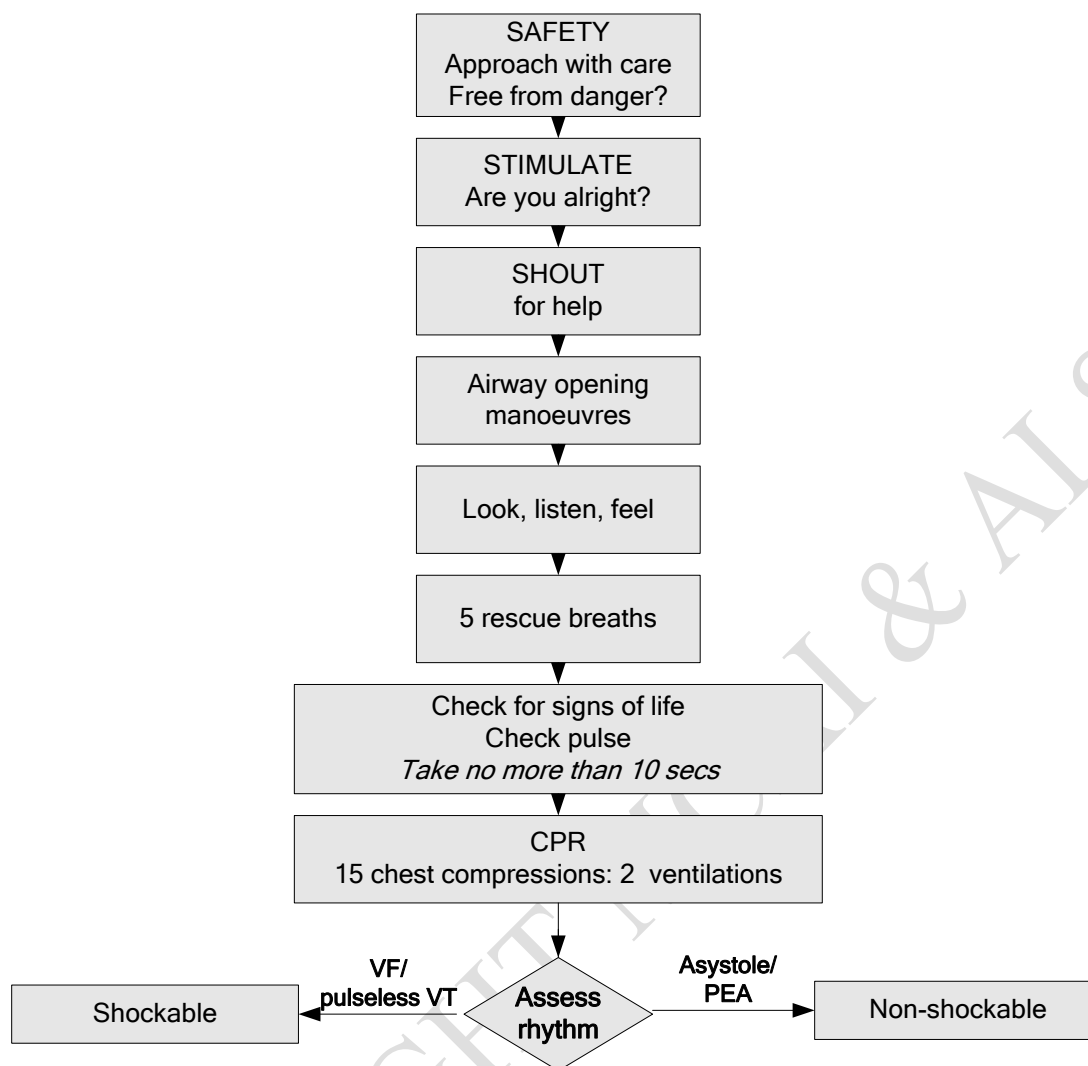


Figure Basic Life Support pathway of care for infant or child

## Basic life support in pregnancy

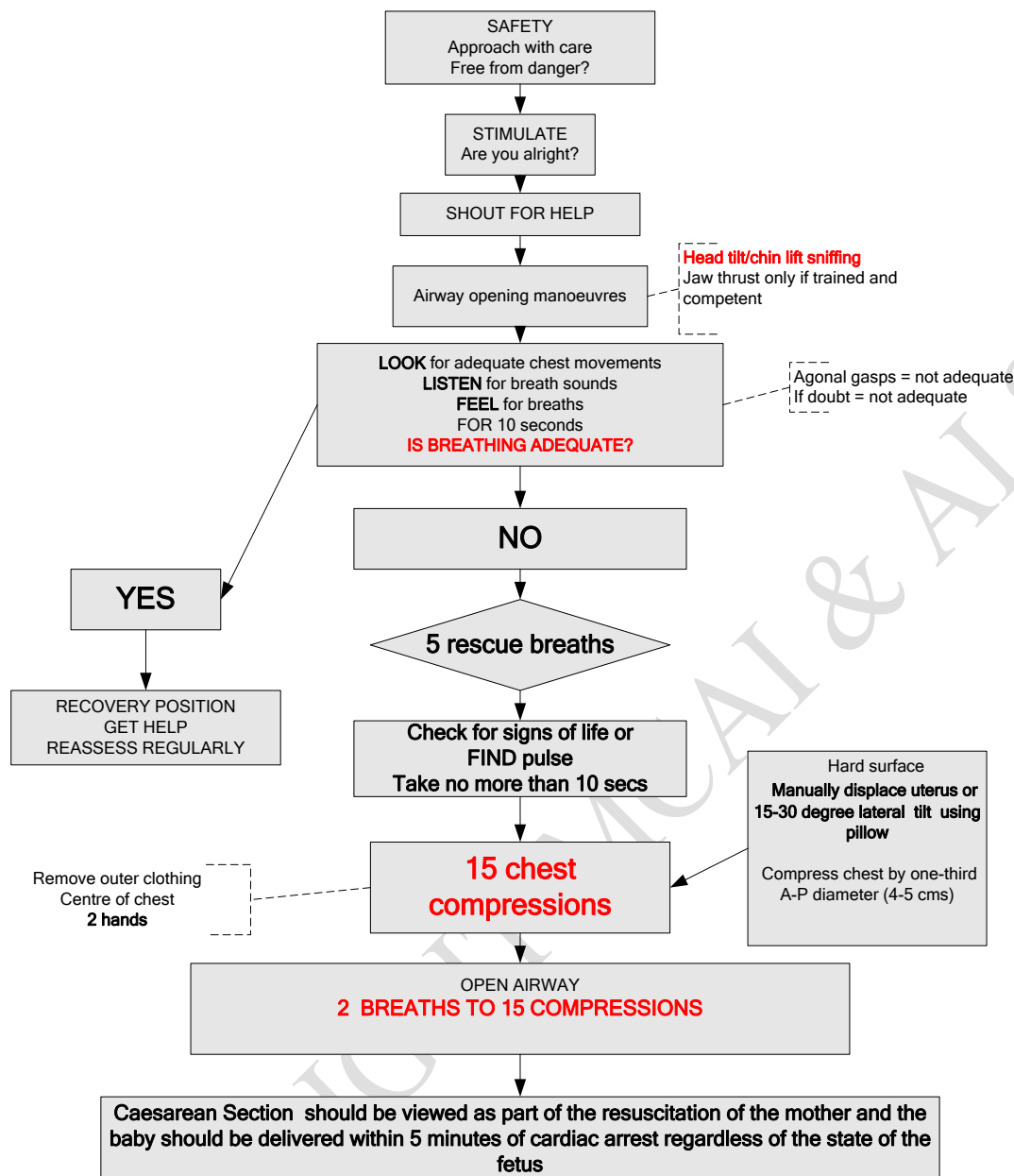


Figure Basic Life Support pathway in pregnancy

### The Initial Approach

**Safety:** it is essential the rescuer does not become the second victim and remove the patient from continuing danger if necessary

**Stimulate:** this is to establish state of consciousness

**Shout:** help will be needed

## The three S's

**SAFETY**  
*approach with care*  
*free from danger*  
**STIMULATE**  
*"are you alright?"*  
**SHOUT**  
*for help*

When more than one rescuer is present, one starts BLS. The second person activates the Emergency Medical Services (EMS) system then returns to assist in the BLS effort.

For infants and pre-pubertal children where there is only one rescuer, and no help has arrived, after opening the airway, delivering the five rescue breaths and giving one minute of CPR the rescuer must activate the EMS system themselves (if one is available). In the case of a baby or small child the rescuer will probably be able to carry the victim to a telephone whilst continuing CPR.

Similarly, in pregnancy, a single rescuer should activate the EMS system themselves, where one is available, if no help has arrived in response to the initial shout for help after opening the airway, delivering the five rescue breaths and giving one minute's CPR.

*Are you alright?*

An initial simple assessment of responsiveness consists of asking the patient: "ARE YOU ALRIGHT" and gently shaking him/her by the shoulder. Infants may make some noise or open their eyes.

In cases associated with trauma, or possible trauma, the cervical spine should be immobilised during this procedure by placing one hand firmly on the forehead while one of the patient's shoulders are shaken.

### Airway opening actions (A)

An obstructed airway may be the primary problem and correction of the obstruction can result in recovery without further intervention. . If unconscious but breathing, the recovery position or if pregnant, the left lateral position, must be adopted (*see later for recovery position*).

If the patient is not breathing, it may be because the airway is blocked by the tongue falling back obstructing the pharynx. Attempt to open the airway using **head tilt/chin lift manoeuvre**. The rescuer places his/her nearest hand on the patient's forehead, and applies pressure to tilt the head back gently. The correct positions are **neutral in the infant (0 – 1 year)** or **"sniffing" (nose up in the air)** in the child and pregnant woman or girl.

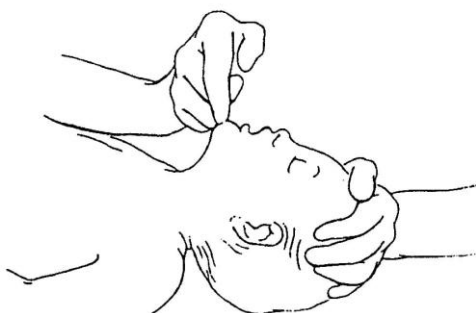


Figure Head tilt, chin lift in neutral position for infant

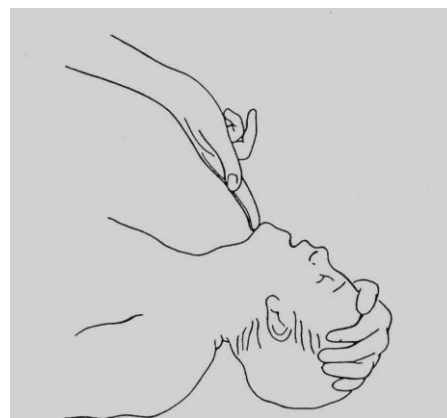


Figure Head tilt chin lift in "sniffing" position for child and pregnant woman or girl

The fingers of the other hand should then be placed under the chin and the chin of the supine patient should be lifted upwards. As this action may close the patient's mouth it may be necessary to use the thumb of the same hand to part the lips slightly.

As an alternative to the head tilt / chin lift the **jaw thrust** manoeuvre can be very effective but requires more training and experience.

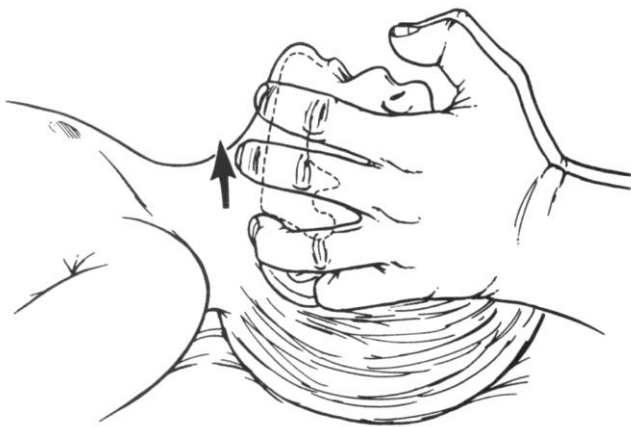


Figure  
Jaw thrust

Jaw thrust is achieved by placing two or three fingers under the angle of the mandible bilaterally, and lifting the jaw upward. This is potentially safer than head

tilt/chin lift when there is a history of major trauma as head tilt / chin lift may exacerbate a cervical spine injury.

**However, airway opening is always the most important action which must be achieved and should always take precedence over concerns regarding a possible cervical spine injury.**

Patency of the airway should then be assessed by:

**LOOKing** for adequate chest movements  
**LISTENing** for breath sounds  
**FEELing** for breaths

This is best achieved by the rescuer placing his/her face above the patient's, with the ear over the nose, the cheek over the mouth, and the eyes looking along the line of the chest. Take no longer than 10 seconds to assess breathing.

If there is anything obvious in the mouth and it is easy to reach, remove it.

**Do not perform a blind finger sweep in the mouth**

A blind finger sweep can damage the soft palate and foreign bodies may be forced further down the airway becoming lodged below the vocal cords.

**Breathing Actions in the infant, child or pregnant woman or girl (B)**

If airway opening techniques do not result in the resumption of adequate breathing within 10 seconds, and a self inflating bag/mask system is not available, then mouth to mouth or mouth to mouth and nose exhaled air resuscitation should be commenced.

### *Definition of adequate breathing*

A victim may have very slow or shallow breathing, or taking infrequent, noisy, agonal gasps. Do not confuse this with normal breathing.

### *Rescue breaths*

***If in doubt about the adequacy of breathing, 5 initial rescue breaths should be given.*** While the airway is held open, the rescuer breathes in and seals his/her mouth around the patient's mouth or mouth and nose (infant). If the mouth alone is used then the nose should be pinched using thumb and index finger of the hand maintaining head tilt. Slow exhalation, 1-2 seconds, by the rescuer should result in the patient's chest rising. The rescuer should take a further breath himself before the next rescue breath.



Figure mouth to mouth and nose rescue breaths in an infant



Figure Mouth to mouth with nose pinched in sniffing airway position (child and in pregnancy)

As children and pregnant women or girls vary in size, only general guidance can be given regarding the volume and pressure of inflation (*see the box*).

#### General guidance for exhaled air resuscitation:

- the chest should be seen to rise
- slow breaths at the lowest pressure reduce gastric distension
- firm gentle pressure on the cricoid cartilage may reduce gastric distension with air

If the chest does not rise, then the airway is not clear. The usual cause is failure correctly to apply the airway opening techniques previously discussed. The first step to try is to readjust head tilt / chin lift position and try again. If this is not successful, jaw thrust should be tried. If two rescuers are present, one should maintain the airway while the other breathes for the patient.

Failure of both head tilt / chin lift and jaw thrust should lead to suspicion that a foreign body is causing the obstruction (*see* choking guidance).

Whilst performing rescue breaths the presence of a gag reflex or coughing is a good sign as it indicates a signs of life (see below),

### **Circulation actions in the infant, child and pregnant woman or girl (C)**

Once the initial 5 breaths have been given circulation should be assessed and managed.

*Check signs of life and/or pulse (take no more than 10 seconds)*

Even experienced health professionals can find it difficult to be certain that the pulse is absent within 10 seconds, so the absence of “*signs of life*” are the best indication to start chest compressions. *Signs of life* include: movement, coughing or normal breathing (not agonal gasps - these are irregular, infrequent breaths). So the absence of evidence of normal breathing, coughing or gagging (may be noticed during rescue breaths) or any spontaneous movement is an indication for chest compressions.

Inadequacy of circulation is also indicated by the absence of a central pulse for up to 10 seconds but it can be difficult and therefore time wasting to be certain, hence the current emphasis on assessing the presence of “*signs of life*”.

In babies and young children a slow pulse (less than 60 beats/minute) is an indication for chest compressions. In children and pregnant women or girls, the carotid pulse in the neck can be palpated. Infants, however, generally have a short fat neck so the carotid pulse may be difficult to identify. The brachial artery in the medial aspect of the ante-cubital fossa or the femoral artery in the groin should be felt in infants. If there are no signs of life and/or a pulse is absent for up to 10 seconds **start chest compressions**. **Compressions should also be started** if in an infant or young child there is an inadequate heart rate (less than 60/minute) **but only if accompanied by signs of poor perfusion** which include pallor, lack of responsiveness and poor muscle tone.

Start chest compressions if:

- no signs of life or
- no pulse or
- slow pulse (less than 60 per minute in infant or young child with poor perfusion)

“Unnecessary” chest compressions are almost never damaging. It is important not to waste vital seconds before starting chest compressions after oxygenating the patient with the rescue breaths. If there are signs of life and the pulse is present (and has an adequate rate, with good perfusion) but apnoea persists, exhaled air resuscitation must be continued until spontaneous breathing resumes.

### *Chest compressions*

For the best output, the patient must be placed on his/her back, on a hard surface. The chest should be compressed by a third of its depth. Children vary in size, and the exact nature of the compressions given should reflect this. In general, infants (less than 1 year) require a technique different from children up to puberty, in whom the method used in adults can be applied with appropriate modifications for their size.

Figure Chest compressions in an infant, showing both the two thumb and the two finger methods

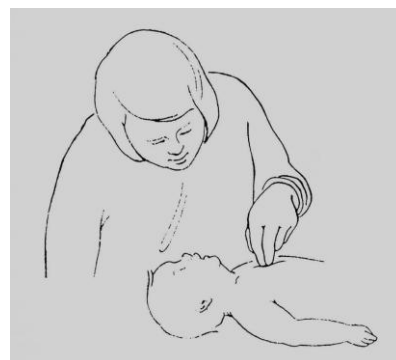


Figure Chest compressions one-handed technique

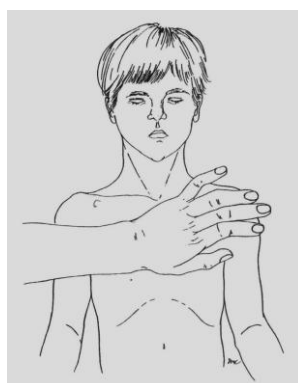


Figure Chest compressions two-handed technique



### *Position for chest compressions*

Chest compressions should compress

**Infant:** Infant chest compression can be more effectively achieved using the hand-encircling technique: the infant is held with both the rescuer's hands encircling or partially encircling the chest. The thumbs are placed over the lower half of the sternum and compression carried out, as shown in Figure X.x. This method is only possible when there are two rescuers, as the time needed to reposition the airway precludes its use by a single rescuer if the recommended rates of compression and ventilation are to be achieved. The single rescuer should use the two-finger method, employing the other hand to maintain the airway position as shown in the Figure X.x.

**Small children** Place the heel of one hand over the lower half of the sternum.. Lift the fingers to ensure that pressure is not applied over the child's ribs. Position yourself vertically above the child's chest and, with your arm straight, compress the sternum to depress it by approximately one third of the depth of the chest (Figure X.x).

For **larger children or** pregnant women or girls, or for small rescuers, compressions may be achieved most easily by using both hands with the fingers interlocked (Figure X.x). The rescuer may choose one or two hands to achieve the desired compression of one third of the depth of the chest.

Once the correct technique has been chosen and the area for compression identified:

**15 compressions should be given to 2 ventilations.**

#### *Technique of giving chest compressions in larger child or pregnant woman or girl*

- Kneel by the side of the victim who must be on a firm surface, having displaced the uterus (*see below*) if appropriate.
- Place the heel of one hand in the centre of the victim's chest.
- Place the heel of your other hand on top of the first hand.
- Interlock the fingers of your hands and ensure that pressure is not applied over the victim's ribs. Do not apply any pressure over the upper abdomen or the bottom end of the bony sternum (breastbone).
- Position yourself vertically above the victim's chest and, with your arms straight, press down on the sternum – 5 - 6 cm.
- After each compression, release all the pressure on the chest without losing contact between your hands and the sternum.
- Repeat at a rate of about 100-120 times a minute (a little less than 2 compressions a second).
- Compression and release should take an equal amount of time.

#### *Technique of giving breaths in larger child or pregnant woman or girl*

- After 15 compressions open the airway again using head tilt and chin lift (use jaw thrust if you are experienced and capable of doing it properly)
- Pinch the soft part of the victim's nose closed, using the index finger and thumb of your hand on her forehead.
- Allow the victim's mouth to open, but maintain chin lift.
- Take a normal breath and place your lips around the victim's mouth, making sure that you have a good seal. If you have a bag/valve/mask, this can be used instead of mouth to mouth BLS in all ages.
- Blow steadily into the victim's mouth whilst watching for his/her chest to rise; take about one second to make his/her chest rise as in normal breathing; this is an effective rescue breath.
- Maintaining head tilt and chin lift, take your mouth away from the victim and watch for his/her chest to fall as air comes out.
- Take another normal breath and blow into the victim's mouth once more to give a total of two effective rescue breaths. Then return your hands without delay to the correct position on the sternum and give a further 15 chest compressions.
- Continue with chest compressions and rescue breaths in a ratio of 15:2.
- Stop to recheck the victim only if he/she starts breathing **normally**; otherwise **do not interrupt resuscitation**.
- If your rescue breaths do not make the chest rise as in normal breathing, then before your next attempt:
  - Check the victim's mouth and remove any visible obstruction.
  - Recheck that there is adequate head tilt and chin lift.

- Try jaw thrust if you are able to do this effectively
- Do not attempt more than two breaths each time before returning to chest compressions.
- ***If there is more than one rescuer present, another should take over CPR about every 2 min to prevent fatigue. Ensure the minimum of delay during the changeover of rescuers.***



Figure Rescue breaths in the larger child or pregnant woman or girl

**Continuing cardiopulmonary resuscitation** The compression rate at all ages is 100-120 per minute. A ratio of 15 compressions to 2 ventilations is maintained whatever the number of rescuers. With pauses for ventilation there will be less than 100-120 compressions per minute although the *rate* is 100-120 per minute. Compressions can be recommenced at the end of inspiration and may augment exhalation.

If no help has arrived, the emergency services must be contacted after 1 minute of cardiopulmonary resuscitation *Apart from this interruption to summon help, basic life support must not be interrupted unless the patient moves or takes a breath.*

Effective chest compressions are tiring for the rescuer. Continually check that the compressions and the ventilations are satisfactory (they should be performed “Hard and Fast”) and, if possible, alternate the rescuers at this task.

Any time spent readjusting the airway or re-establishing the correct position for compressions will seriously decrease the number of cycles given per minute. This can be a real problem for the solo rescuer, and there is no easy solution. In the infant and small child, the free hand can maintain the head position. The correct position for compressions does not need to be measured after each set of ventilations.

The cardiopulmonary resuscitation manoeuvres recommended for infants and children are summarised in the Table.

Table Summary of basic life support techniques in infants and children

	Infant (<1 yr)	Child (1 yr to puberty) and pregnant woman or girl
<b>Airway</b>		
Head-tilt position	Neutral	Sniffing
<b>Breathing</b>		
Initial slow breaths	Five	Five
<b>Circulation</b>		
Pulse check	Brachial or femoral	Carotid
Landmark	Lower half of sternum	Lower half of sternum
Technique	Two fingers or two thumbs	One or two hands
CPR ratio	15:2	15:2

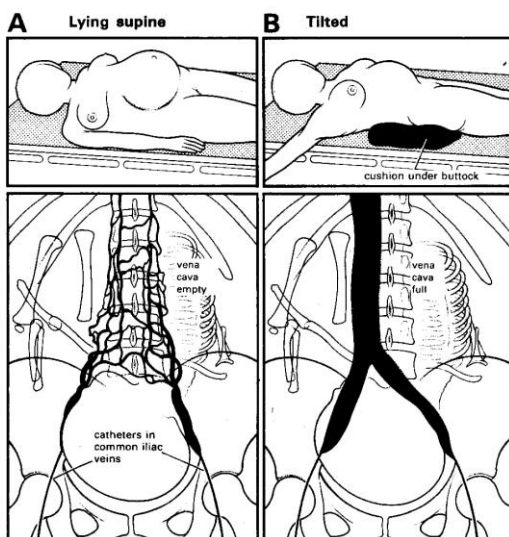
*Call emergency services (if they exist)*

If no help has arrived, the emergency services must be contacted after a minute of resuscitation has been delivered. An infant or small child may be carried to a telephone or to get help and attempts continued. Apart from this interruption to summon help, basic life support must not be interrupted unless the patient moves or takes a breath or you are exhausted.

If recovery occurs and signs of life return, place in the recovery position and continue to re-assess and ensure specialist help arrives.

**Special Circulation Actions in the pregnant woman or girl**

Place the patient on hard surface in the left lateral tilt position to overcome vena caval compression. This can be achieved with a wedge placed under the right hip to displace the gravid uterus to the left or improvise with a pillow or coat. If an assistant is available, they can displace the uterus to the left side off the vena cavae. Effective chest compressions can be accomplished at a 15-30 degree tilt to the left but the displacement of the uterus method is the more effective.

**THE SUPINE HYPOTENSIVE SYNDROME**

**THE SUPINE HYPOTENSIVE SYNDROME.** These are both venograms. A, the mother is lying on her back, her uterus is occluding her vena cava, and all the blood from the lower part of her body is flowing through her paravertebral veins. B, a pillow has now been put under her right buttock tilting her to the left. Blood is now flowing normally in her vena cava. *Kindly contributed by Murray Carmichael.*

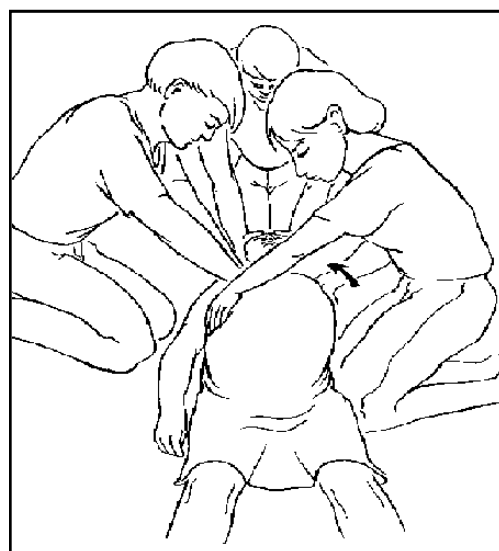


Figure Manual displacement of the uterus

### **Chest-compression-only CPR.**

- If you are not able, or are unwilling, to give rescue breaths, give chest compressions only. This is particularly relevant in countries where there is a high prevalence of HIV or hepatitis or TB (see below).
- If chest compressions only are given, these should be continuous at a rate of 100 a minute. Stop to recheck the victim only if she starts breathing **normally**; otherwise do not interrupt resuscitation.

### **Continue resuscitation until:**

- qualified help arrives and takes over
- the victim starts breathing normally
- you become exhausted.

### **Basic Life Support and infection risk**

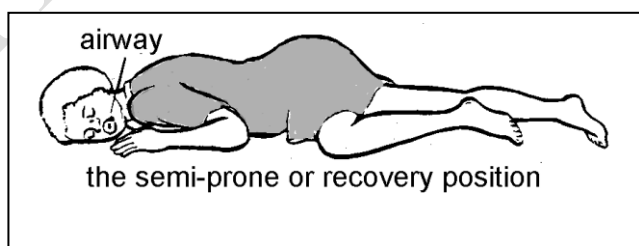
Few cases have been reported. The most serious concerns are meningococcus and TB. In the case of meningococcus, rescuers involved in the resuscitation of the airway in such patients should take standard prophylactic antibiotics.

There have been no reported cases of transmission of either hepatitis B or human immunodeficiency virus (HIV) through mouth-to-mouth ventilation. Blood-to-blood contact is the single most important route of transmission of these viruses, and in non-trauma resuscitations the risks are negligible. Sputum, saliva, sweat, tears, urine and vomit are low-risk fluids. Precautions should be taken, if possible, in cases where there might be contact with blood, semen, vaginal secretions, cerebrospinal fluid, pleural and peritoneal fluids and amniotic fluid. Precautions are also recommended if any bodily secretion contains visible blood. Devices that prevent direct contact between the rescuer and the victim (such as resuscitation masks) can be used to lower risk; gauze swabs or any other porous material placed over the victim's mouth is of no benefit in this regard.

Infection rates vary from country to country and rescuers must be aware of the local risk. In countries where HIV/AIDS is more prevalent the risk to the rescuer will be greater.

**If available, bag valve mask ventilation is preferable to mouth to mouth ventilation.**

Figure Recovery position



The patient should be placed in a stable, lateral position that ensures maintenance of an open airway with free drainage of fluid from the mouth, ability to monitor and gain access to the patient, security of the cervical spine and attention to pressure points. The Resuscitation Council (UK) recommends this sequence of actions to place a victim in the recovery position:

- Remove the victim's spectacles-if present.
- Kneel beside the victim and make sure that both her legs are straight.
- Place the arm nearest to you out at right angles to her body, elbow bent with the hand palm uppermost.

- Bring the far arm across the chest, and hold the back of the hand against the victim's cheek nearest to you.
- With your other hand, grasp the far leg just above the knee and pull it up, keeping the foot on the ground.
- Keeping her hand pressed against her cheek, pull on the far leg to roll the victim towards you onto her side.
- Adjust the upper leg so that both the hip and knee are bent at right angles.
- Tilt the head back to make sure the airway remains open.
- Adjust the hand under the cheek, if necessary, to keep the head tilted.
- Check breathing regularly.

If the victim has to be kept in the recovery position for **more than 30 minutes** turn to the opposite side to relieve the pressure on the lower arm.

### Automatic external defibrillators (AEDs)

The use of the AED is now included in basic life support teaching for adults because early defibrillation is the most effective intervention for the large majority of unpredicted cardiac arrests in adults. As has been stated, in children and young people and in pregnant and puerperal women, circulatory or respiratory causes of cardiac arrest predominate. However, in certain circumstances children and pregnant women may suffer a primary cardiac cause for cardiac arrest, and the use of an AED may be life saving.

The standard AED can be used in adults and in children over the age of eight years. For children from one to eight years, an AED can be used but must have paediatric paddles. An AED can not currently be used for infants under one year old as the devices are not accurate enough in this age group.

These devices are becoming much more widely available and are relatively inexpensive. They are life saving where there is a shockable rhythm and are included in the training for Basic rather than Advanced Life Support as they were designed for community use. If defibrillation is to be successful it must be performed within 15 minutes of the onset of fibrillation (and the earlier, the more chance of success) so for collapses that might produce fibrillation in the community, waiting for arrival at hospital would be too late.

However, they are also now used widely in hospital cardiac arrests by first responders and are therefore included here.

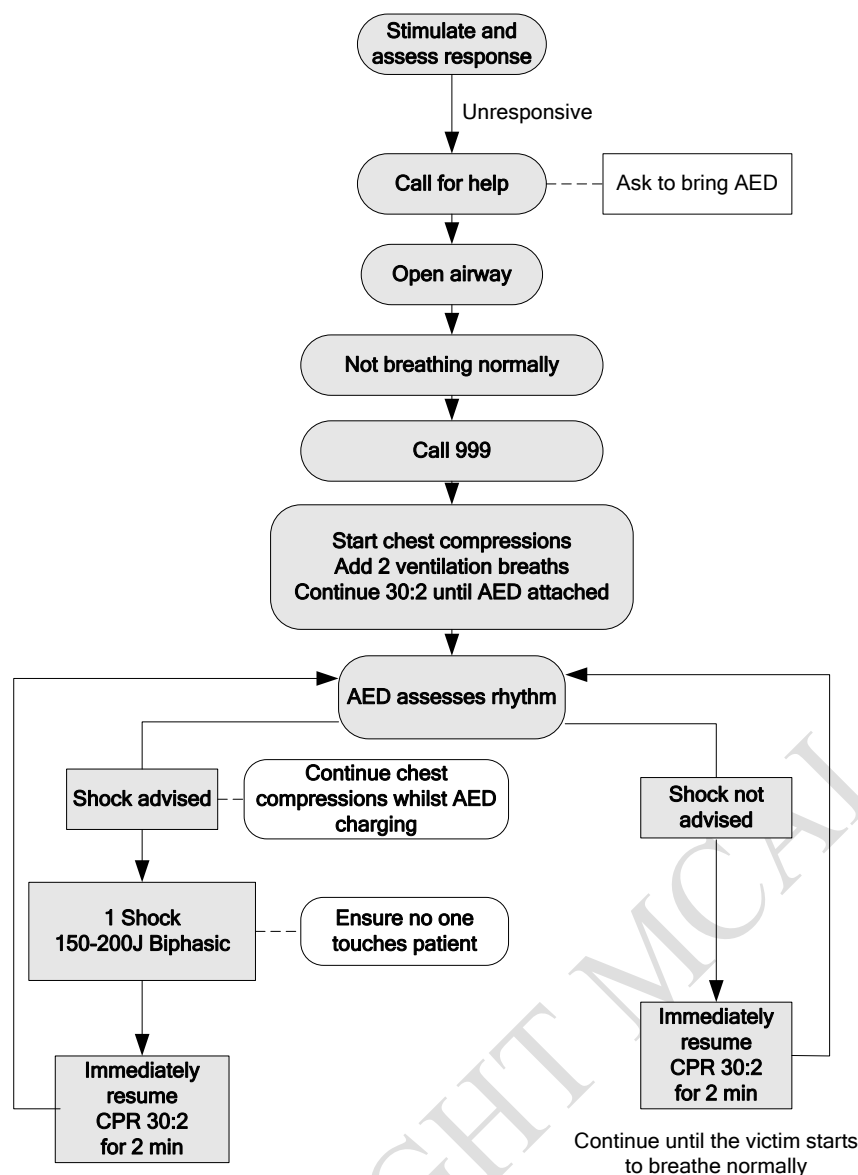


Figure Algorithm for the use of AED

### Attach AED pads

Expose the chest and place one adhesive defibrillator pad on the patient's chest to the right of the sternum below the right clavicle, and one in the mid-axillary line, taking care to avoid breast tissue. Keep the axillary electrode vertical to maximise efficiency.

If a shock is indicated most AED devices will do this automatically but some will ask the operator to deliver the shock by pressing a button. Immediately after the shock, resume compressions for two minutes after which there will be a further prompt for a rhythm analysis.

If defibrillation is *not* indicated CPR should be continued for two minutes, at which stage the AED will prompt further analysis of rhythm.

### Perimortem Caesarean Section

The UK Resuscitation Council considers that prompt caesarean delivery should be seen as part of resuscitation in cardiac arrest in advanced pregnancy. Delivery of the fetus will obviate the effects of aortocaval compression and significantly improve the chance of successful resuscitation. This

will reduce maternal oxygen consumption, increase venous return, make ventilation easier and allow CPR in the supine position.

### **When to do it**

All the evidence suggests that a caesarean delivery should begin within four minutes of cardiac arrest and be accomplished by five minutes. In practice this means preparations for surgical evacuation of the uterus should begin almost at the same time as CPR following cardiac arrest. Pregnant women develop anoxia faster than non-pregnant women and can suffer irreversible brain damage within four to six minutes of cardiac arrest. CPR should be continued throughout the caesarean section and afterwards, as this increases the chances of a successful neonatal and maternal outcome.

### **Where to do it**

The woman should *not* be transferred to an operating theatre as it will merely waste time. She should be delivered at the site of collapse unless physically impossible. Diathermy will not be needed, as blood loss is minimal with no cardiac output. If the pregnant woman or girl is successfully resuscitated, she can be moved to theatre to be anaesthetized and to complete the operation.

### **How to do it**

A minimum amount of equipment is required in this situation. Sterile preparation and drapes are unlikely to improve survival. A surgical knife is sufficient.

No one surgical approach is particularly recommended and should be based on operator preference. The classical midline abdominal approach is aided by the natural diastasis of recti abdomini that occurs in late pregnancy and the relatively bloodless field in this situation. However many obstetricians are more familiar with a lower transverse abdominal incision and can deliver a baby in less than a minute.

Open cardiac massage during surgery is a possibility when the abdomen is already open and the heart can be reached relatively easily through the diaphragm ( if a midline approach has been used)

An anaesthetist should attend at the earliest opportunity to provide a protected airway, ensure continuity of effective chest compressions and adequate ventilation breaths as well as helping to determine and treat any underlying cause (4 H's and 4 T's)

Should resuscitation be successful and the pregnant woman or girl regain a cardiac output, appropriate anaesthesia and pain relief will be required and the woman should be moved to a theatre to complete the operation.

### **Fetal outcome**

It is emphasised that caesarean section is part of resuscitation and done to improve maternal survival, and it worthwhile once the uterus has reached the level of the umbilicus (i.e. about 20 weeks gestation). If done promptly, it can also improve fetal survival, although gestational age at the time of delivery also clearly influences outcome. In the UK, the 2006-8 national audit report on maternal mortality ("Saving Mothers' Lives": Eighth report of the Confidential Enquiries into Maternal Deaths in the UK) there were no survivors amongst those delivered at less than 28 weeks. 47% of those delivered at >36 weeks did survive: all but one in this group involved CPR

begun in hospital illustrating the advantage of early evacuation of the uterus for the neonate as well as the pregnant woman or girl.

Although uterine evacuation is a well validated step in maternal resuscitation, there is still reluctance among some obstetricians to perform peri-arrest caesarean sections due to concerns about neonatal neurological damage. However in a comprehensive review of postmortem caesarean deliveries between 1900 and 1985 by Katz *et al.*, 70% (42/61) of infants delivered within five minutes survived and all developed normally. Only 13% (8/61) of those delivered at 10 minutes and 12% (7/61) delivered at 15 minutes survived. One infant in each of the groups of later survivors had neurological damage. Later series confirm the advantage of early delivery for intact fetal survival, although there are a few case reports of intact infant survival more than 20 minutes after maternal cardiac arrest.

Evidence suggests that if the fetus survives the neonatal period then the chances of normal development are good.

### **Make decision to abandon CPR if unsuccessful**

CPR should be continued if the rhythm continues as VF/VT. A decision to abandon CPR should only be made after discussion with the consultant obstetrician and senior clinicians.

### **Medico-legal issues**

No doctor has been found liable for performing a postmortem caesarean section in the UK jurisdiction.

#### **SECTION 6 QUIZ 1**

1. In the pathways of care for basic life support the following statements are true
  - a. the "SSS approach" and "Are you alright" precede airway opening
  - b. after airway opening and where there is no obvious breathing you give 5 rescue breaths
  - c. the landmarks for chest compressions in an infant, child or mother are 1 fingerbreadth above the xiphisternum
  - d. in the mother the rate of compressions to inflations is 3 to 1
2. In basic life support the following statements are true
  - a. the correct position for airway opening in a child older than 1 year is the neutral position
  - b. The 3 SSS approach stands for Safety, Stimulate and Shout for help
  - c. if pregnant the left lateral tilt position is needed

#### **ANSWERS:**

1. abc 2. b,c

#### **SECTION 6 QUIZ 2**

- 3) When giving basic life support in pregnancy the following statements are true
  - a) a hard surface is essential for chest compressions
  - b) a 15-30° left lateral tilt is essential
  - c) compress the chest by two thirds of it's A - P diameter
  - d) the baby must be delivered as part of the resuscitation of the pregnant woman or girl
- 4) When giving basic life support in an infant the following statements are true
  - e) the head should be in the neutral position
  - f) both the nose and mouth should be inflated by the rescuer's mouth
  - g) jaw thrust is never used

#### **ANSWERS:**

3. abd 4. ab

## CHOKING IN THE CHILD

### Introduction

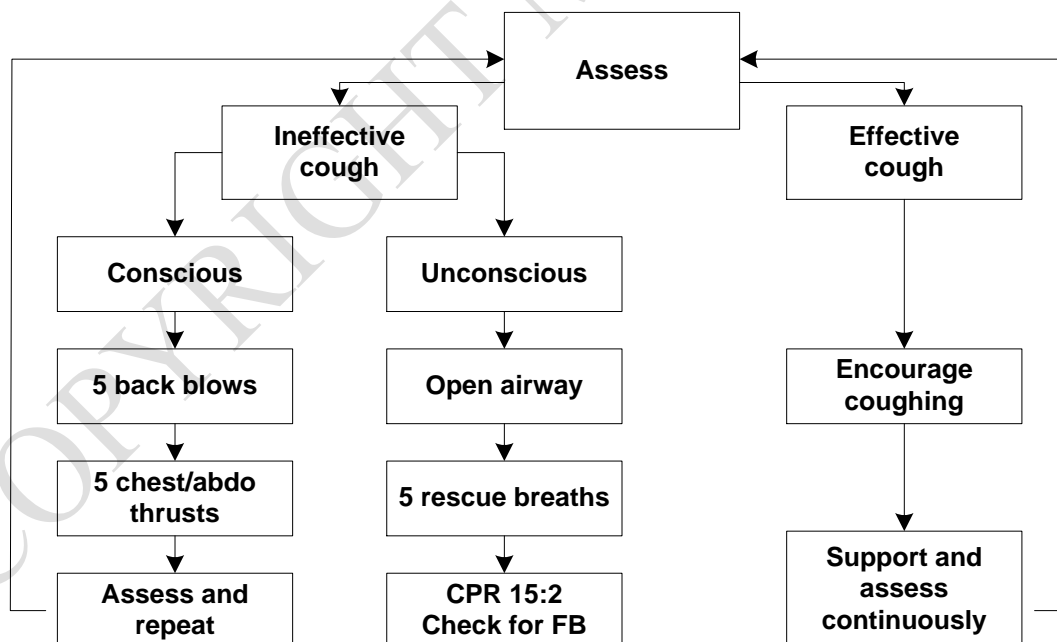
The vast majority of deaths from foreign body airway obstruction (FBAO) occur in pre-school children. Virtually anything may be inhaled, foodstuffs predominating. The diagnosis may not be clear-cut, but should be suspected if the onset of respiratory compromise is sudden and associated with coughing, gagging and stridor.

Airway obstruction also occurs with infections such as acute epiglottitis and croup. In these cases attempts to relieve the obstruction using the methods described below are dangerous. Children with known or suspected infectious causes of obstruction, and those who are still breathing and in whom the cause of obstruction is unclear should be taken to hospital urgently. The treatment of these children is dealt with in Section 13.

If a foreign body is easily visible and accessible in the mouth then remove it but while attempting this, take great care not to push it further into the airway. Do not perform blind finger sweeps of the mouth or upper airway as these may further impact a foreign body and damage tissues without removing the object.

The physical methods of clearing the airway, described below, should therefore only be performed if:

1. The diagnosis of FBAO is clear-cut (witnessed or strongly suspected) and ineffective coughing and increasing dyspnoea, loss of consciousness or apnoea have occurred.
2. Head tilt/chin lift and jaw thrust have failed to open the airway of an apnoeic child.



**Figure** The sequence of actions in a choking infant/ child and infant/child

If the child is coughing she/he should be encouraged. A spontaneous cough is more effective at relieving an obstruction than any externally imposed maneuver. An effective cough is recognised by the victim's ability to speak or cry and to take a breath between coughs. The child should be

continually assessed and not left alone at this stage. No intervention should be made unless the cough becomes ineffective, that is quieter or silent, and the victim cannot cry, speak or take a breath, or if he becomes cyanosed or starts to lose consciousness. Then call for help and start the intervention.

These manoeuvres are then alternated with each other, and with examination of the mouth and attempted breaths as shown in the above figure.

## Infants

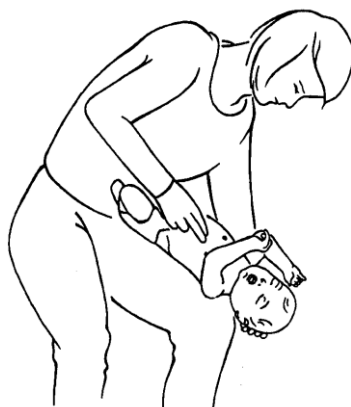
Abdominal thrusts may cause intra-abdominal injury in infants. Therefore a combination of back blows and chest thrusts is recommended for the relief of foreign body obstruction in this age group.

The baby is placed along one of the rescuer's arms in a head-down position, with the rescuer's hand supporting the infant's jaw in such a way as to keep it open, in the neutral position. The rescuer then rests his or her arm along the thigh, and delivers 5 back blows with the heel of the free hand.

If the obstruction is not relieved the baby is turned over and lay along the rescuer's thigh, still in a head-down position. Five chest thrusts are given using the same landmarks as for cardiac compression but at a rate of one per second. If an infant is too large to allow use of the single-arm technique described above, then the same manoeuvres can be performed by laying the baby across the rescuer's lap.



**Figure** Back blows in infant



**Figure** Chest thrusts in an infant

## Children

Back blows can be used as in infants or in the case of a larger child, with child supported in a forward leaning position. In the child the abdominal thrust (Heimlich manoeuvre) can also be used. This can be performed with the victim either standing or lying but the former is usually more appropriate.

If this is to be attempted with the child standing, the rescuer moves behind the victim and passes his or her arms around the victim's body. Owing to the short height of children, it may be necessary for an adult to raise the child or kneel behind them to carry out the standing manoeuvre effectively. One hand is formed into a fist and placed against the child's abdomen above the umbilicus and below the xiphisternum. The other hand is placed over the fist, and both hands are thrust sharply upwards into the abdomen. This is repeated 5 times unless the object causing the obstruction is expelled before then.

To carry out the Heimlich maneuver in a supine child, the rescuer kneels at his or her feet. If the child is large it may be necessary to kneel astride him or her. The heel of one hand is placed against the child's abdomen above the umbilicus and below the xiphisternum. The other hand is placed on top of the first, and both hands are thrust sharply upwards into the abdomen, with care being taken to direct the thrust in the midline. This is repeated 5 times unless the object causing the obstruction is expelled before that.



**Figure** Back blows in a small child

Following successful relief of the obstructed airway assess the child clinically. There may be still some part of the foreign material in the respiratory tract. If abdominal thrusts have been performed the child should be assessed for possible abdominal injuries.

Each time breaths are attempted look in the mouth for the foreign body and remove it if visible. Take care not to push the object further down and avoid damaging the tissues. If the obstruction is relieved the victim may still require either continued ventilations if not breathing, and chest compressions if there are no signs of a circulation. Advanced life support may also be needed.



**Figure** Heimlich maneuver in a standing child

If the child breathes effectively then place him in the recovery position and continue to monitor him.

### Unconscious infant or child with foreign body airway obstruction

- Call for help.
- Place the child supine on a flat surface.
- Open the mouth and attempt to remove any visible object.
- Open the airway and attempt 5 rescue breaths, repositioning the airway with each breath if the chest does not rise.
- Start chest compressions even if the rescue breaths were ineffective.
- Continue the sequence for single rescuer CPR for about a minute then summon help again if none is forthcoming.
- Each time breaths are attempted, look in the mouth for the foreign body and remove it if visible. Take care not to push the object further down and avoid damaging the tissues.
- If the obstruction is relieved the victim may still require either continued ventilations if not breathing but is moving or gagging or both ventilations and chest compressions if there are no signs of a circulation. Advanced life support may also be needed.
- If the child breathes effectively then place her/him in the recovery position and continue to reassess.

#### **SECTION 6 QUIZ 3**

**2) When treating the choking child the following statements are true**

- a) The diagnosis of foreign body airway obstruction is clear-cut (witnessed or strongly suspected) if ineffective coughing and increasing dyspnoea, loss of consciousness or apnoea are present.
- b) a blind finger sweep of the mouth should first be undertaken
- c) head tilt/chin lift and jaw thrust must be the first actions to open the airway in the apnoeic patient

**3) When treating the choking child the following statements are true**

- a) First assess whether there is effective coughing
- b) 5 back blows with the head down is the most important manoeuvre if coughing is effective
- c) in an infant under 1 year abdominal thrusts may also be used
- d) the Heimlich manoeuvre (abdominal thrusts) may help in the child

#### **ANSWERS:**

**1. ac 2. a, d (abdominal thrusts may damage an infant)**