Policy/Procedure/Guideline

Resuscitation Policy

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Policy Author: Bradley Woods

Policy Owner: CG&RB

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POLICY AWARENESS	
People who need to know this policy in detail	**All clinical staff**
People who need to have a broad understanding of this policy	**All staff**
People who need to know this policy exists	**All staff**

CHANGE CONTROL DETAILS			
Date DD/MM/YY	Version	Description	Reason for changes
11/04/2016	1.0	New Policy	New Policy

Policy location:
Main Policy folder in Control Room and Crew Room
On PTUK Server

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1.0 Introduction

Patient Transport UK will ensure that through agreed educational programs all staff engaged on operational clinical duties are educated in resuscitation. In addition it will ensure that selected non-operational staff will receive resuscitation training to ensure compliance with the Health and Safety (First Aid) Regulations 1981.

2.0 Purpose

This policy outlines the PTUK position with regard to skills and training on resuscitation according to the guidance in the JRCALC/European Resuscitation Council Guidelines.The key objective of this Policy is to ensure that: clinical staff have the ability to provide resuscitation whether it is basic life support (BLS) intermediate life support (ILS) or advanced life support (ALS) to a patient who has collapsed in cardiac or respiratory arrest. This is essential if the mortality and morbidity following such situations is to be reduced.

3.0 Duties

3.1 The **Medical Director** has overall responsibility for the content of this policy in accordance with the Resuscitation Council UK/European Resuscitation Council and the JRCALC guidance

3.2 **Clinical Lead** is responsible for ensuring that all clinical and where appropriate non-clinical staff can deliver care in accordance with this policy.

3.3 **All Clinical Staff** should ensure that they maintain their ability to deliver resuscitation (as appropriate) in line with their clinical staff grade. Resuscitation training is a key part of CPD.

3.4 The **Clinical, Governance and Risk Board** are responsible for ensuring this policy is updated every year.

3.5 **The Clinical Lead** and **Training Manager** are responsible for ensuring all staff are up to date with resuscitation training as appropriate to their staff grade and ensuring that an up to date record of all staff resuscitation training status is maintained.

4.0 Consultation and Communication with Stakeholders

4.1 This policy will be disseminated to operational staff as a clinical update and will be placed on the server for reference. A copy will be held in the crew room and in the control room.

5.0 Levels of Resuscitation Training for Operational Staff

5.1 Resuscitation training will be provided in line with current Resuscitation Council (UK) guidelines and JRCALC guidelines to the level of clinical responsibility for each staff grade as detailed below:

5.2 Patient Transport Service (PTS) Staff will receive basic life support training as part of their induction course. This training will include the use of an Automated External Defibrillator (AED).

5.3 Control and office based staff

- PTUK Staff who do not crew vehicles will receive basic life support training as part of their Induction Course. This training will include the use of an Automated External Defibrillator (AED).

5.4 IHCD technicians/Paramedics

More advanced practitioners as above will receive intermediate life support resuscitation training as part of their induction course. When there are any major changes to the international/national resuscitation guidelines, all staff will receive training and assessment in the new guidelines for resuscitation, in line with JRCALC/European Resuscitation Council and PTUK guidelines.

6.0 Update Training

Staff will undergo annual refresher training on resuscitation. Additionally, when there are any major changes to the international/national resuscitation guidelines, all staff will receive training and assessment in the new guidelines for resuscitation, in line with JRCALC /European Resuscitation Council Guidelines.

7.0 Equality Impact Assessment

This policy embraces Diversity, Dignity and inclusion in line with Human Rights guidance. PTUK staff recognise, acknowledge and value difference across all people. We will treat every person with respect, courtesy and with consideration for their individual backgrounds. We will ensure that everyone is treated fairly and that we convey equality of opportunity in service delivery and employment practice.

8.0 Process for Monitoring Compliance

The Clinical, Governance and Risk Board (C,RGB) will monitor Compliance with this policy, and note any incidents of non compliance. The training manager will report any instances of time lapsed training and non-updated staff to the C,GRB. The Clinical Lead will monitor patient clinical report forms for trends in non-compliance with Resuscitation Guidelines and report to the C,GRB accordingly.

9.0 References

European Resuscitation Council Guidelines for Resuscitation 2010

JRCALC Clinical Practice Guidelines 2013

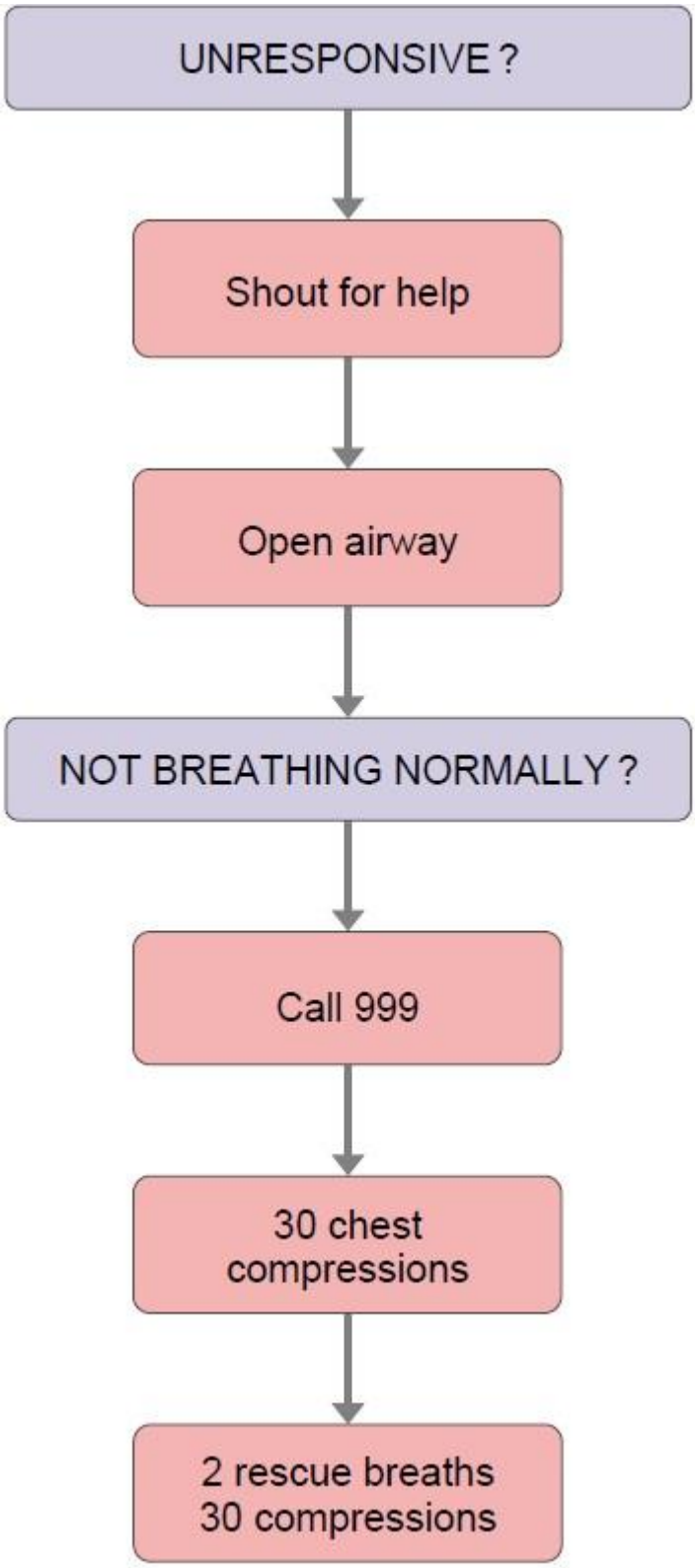
IHCD Ambulance Service Basic Training Manual, 3rd Edition, 2003

10.0 Appendices

Appendix A
Appendix B
Appendix C

Appendix A – Resuscitation Council (UK) Guidelines

Adult Basic Life Support/Choking



Adult basic life support sequence

Basic life support consists of the following sequence of actions:

1. Make sure the victim, any bystanders, and you are safe.

2. Check the victim for a response.

- Gently shake his shoulders and ask loudly, 'Are you all right?'

3A If he responds:

- Leave him in the position in which you find him provided there is no further danger.
- Try to find out what is wrong with him and get help if needed.
- Reassess him regularly.

3B. If he does not respond:

- Shout for help.
- Turn the victim onto his back and then open the airway using head tilt and chin lift:
  - Place your hand on his forehead and gently tilt his head back.
  - With your fingertips under the point of the victim's chin, lift the chin to open the airway.

4. Keeping the airway open, look, listen, and feel for normal breathing.

- Look for chest movement.
- Listen at the victim's mouth for breath sounds.
- Feel for air on your cheek.

In the first few minutes after cardiac arrest, a victim may be barely breathing, or taking infrequent, noisy, gasps. This is often termed agonal breathing and must not be confused with normal breathing. Look, listen, and feel for **no more** than **10 s** to determine if the victim is breathing normally. If you have any doubt whether breathing is normal, act as if it is **not** normal.

5A. If he is breathing normally:

- Turn him into the recovery position (**see below**).
- Summon help from the ambulance service by mobile phone. If this is not possible, send a bystander. Leave the victim only if no other way of obtaining help is possible.

- Continue to assess that breathing remains normal. If there is any doubt about the presence of normal breathing, start CPR (5B).

5B. If he is not breathing normally:

- Ask someone to call for an ambulance and bring an AED if available. If you are on your own, use your mobile phone to call for an ambulance. Leave the victim only when no other option exists for getting help.
- Start chest compression as follows:
  - Kneel by the side of the victim.
  - Place the heel of one hand in the centre of the victim's chest (which is the lower half of the victim's sternum (breastbone).
  - 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 sternum.
  - 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 100 - 120 min-1.
  - Compression and release should take an equal amount of time.

6A. Combine chest compression with rescue breaths:

- After 30 compressions open the airway again using head tilt and chin lift.
- Pinch the soft part of the victim's nose closed, using the index finger and thumb of your hand on his forehead.
- Allow his mouth to open, but maintain chin lift.
- Take a normal breath and place your lips around his mouth, making sure that you have a good seal.
- Blow steadily into his mouth whilst watching for his chest to rise; take about one second to make his 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 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. The two breaths should not take more than 5 seconds. Then return your hands without delay to the correct position on the sternum and give a further 30 chest compressions.
- Continue with chest compressions and rescue breaths in a ratio of 30:2.
- Stop to recheck the victim only if he starts to show signs of regaining consciousness, such as coughing, opening his eyes, speaking, or moving

purposefully AND starts to breathe normally; otherwise **do not interrupt resuscitation.**

If the initial rescue breath of each sequence does 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.
- 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 1-2 min to prevent fatigue. Ensure the minimum of delay during the changeover of rescuers, and do not interrupt chest compressions.

6B. Compression-only CPR

- If you are not trained to, or are unwilling to give rescue breaths, give chest compressions only.
- If chest compressions only are given, these should be continuous at a rate of 100 - 120 min-1.

Stop to recheck the victim only if he starts to show signs of regaining consciousness, such as coughing, opening his eyes, speaking, or moving purposefully AND starts to breathe normally; otherwise **do not interrupt resuscitation.**

7. Continue resuscitation until:

- qualified help arrives and takes over,
- the victim starts to show signs of regaining consciousness, such as coughing, opening his eyes, speaking, or moving purposefully AND starts to breathe normally, OR
- you become exhausted.

Further points related to basic life support

Risks to the rescuer and victim

The safety of both the rescuer and victim are paramount during a resuscitation attempt.

There have been few incidents of rescuers suffering adverse effects from undertaking CPR, with only isolated reports of infections such as tuberculosis (TB) and severe acute respiratory distress syndrome (SARS). Transmission of HIV during CPR has never been reported.

There have been no human studies to address the effectiveness of barrier devices during CPR; however, laboratory studies have shown that certain filters, or barrier devices with one-way valves, prevent transmission of oral bacteria from the victim to the rescuer during mouth-to-mouth ventilation. Rescuers should take appropriate safety precautions

where feasible, especially if the victim is known to have a serious infection such as TB or SARS. During an outbreak of a highly infectious condition (such as SARS), full protective precautions for the rescuer are essential.

Initial rescue breaths

During the first few minutes after non-asphyxial cardiac arrest the blood oxygen content remains high. Therefore, ventilation is less important than chest compression at this time.

It is well recognised that skill acquisition and retention are aided by simplification of the BLS sequence of actions. It is also recognised that rescuers are frequently unwilling to carry out mouth-to-mouth ventilation for a variety of reasons, including fear of infection and distaste for the procedure. For these reasons, and to emphasise the priority of chest compressions, it is recommended that, in adults, CPR should start with chest compressions rather than initial ventilations.

Jaw thrust

The jaw thrust technique is not recommended for lay rescuers because it is difficult to learn and perform. Therefore, the lay rescuer should open the airway using a head-tiltchin-lift manoeuvre for both injured and non-injured victims.

Agonal gasps

Agonal gasps are present in up to 40% of cardiac arrest victims. Therefore laypeople should be taught to begin CPR if the victim is unconscious (unresponsive) and not breathing normally. It should be emphasised during training that agonal gasps occur commonly in the first few minutes after sudden cardiac arrest; they are an indication for starting CPR immediately and should not be confused with normal breathing.

Use of oxygen during basic life support

There is no evidence that oxygen administration is of benefit during basic life support in the majority of cases of cardiac arrest before healthcare professionals are available with equipment to secure the airway. Its use may lead to interruption in chest compressions, and is not recommended, except in cases of drowning (see below).

Mouth-to-nose ventilation

Mouth-to-nose ventilation is an effective alternative to mouth-to-mouth ventilation. It may be considered if the victim's mouth is seriously injured or cannot be opened, if the rescuer is assisting a victim in the water, or if a mouth-to-mouth seal is difficult to achieve.

Mouth-to-tracheostomy ventilation

Mouth-to-tracheostomy ventilation may be used for a victim with a tracheostomy tube or tracheal stoma who requires rescue breathing.

Bag-mask ventilation

Considerable practice and skill are required to use a bag and mask for ventilation. The lone rescuer has to be able to open the airway with a jaw thrust whilst simultaneously holding the mask to the victim's face. It is a technique that is appropriate only for lay

rescuers who work in highly specialised areas, such as where there is a risk of cyanide poisoning or exposure to other toxic agents. There are other specific circumstances in which non-healthcare providers receive extended training in first aid, which could include training, and retraining, in the use of bag-mask ventilation. The same strict training that applies to healthcare professionals should be followed and the two-person technique is preferable.

Chest compression

In most circumstances it will be possible to identify the correct hand position for chest compression without removing the victim's clothes. If in any doubt, remove outer clothing.

Each time compressions are resumed on an adult, the rescuer should place his hands on the lower half of the sternum. It is recommended that this location be taught in a simple way, such as 'place the heel of your hand in the centre of the chest with the other hand on top.' This teaching should be accompanied by a demonstration of placing the hands on the lower half of the sternum. Use of the internipple line as a landmark for hand placement is not reliable.

Performing chest compression:

a. Compress the chest at a rate of 100-120 min-1.

b. Each time compressions are resumed, place your hands without delay 'in the centre of the chest' (see above).

c. Pay attention to achieving the full compression depth of 5-6 cm (for an adult).

d. Allow the chest to recoil completely after each compression.

e. Take approximately the same amount of time for compression and relaxation.

f. Minimise interruptions in chest compression.

g. Do not rely on a palpable carotid or femoral pulse as a gauge of effective arterial flow.

h. 'Compression rate' refers to the speed at which compressions are given, not the total number delivered in each minute. The number delivered is determined not only by the rate, but also by the number of interruptions to open the airway, deliver rescue breaths, and allow AED analysis.

Compression-only CPR

Studies have shown that compression-only CPR may be as effective as combined ventilation and compression in the first few minutes after non-asphyxial arrest. However, chest compression combined with rescue breaths is the method of choice for CPR by trained lay rescuers and professionals and should be the basis for lay-rescuer education. Lay rescuers who are unable or unwilling to provide rescue breaths, should be encouraged to give chest compressions alone. When advising untrained laypeople by telephone, ambulance dispatchers should give instruction on compression-only CPR.

Regurgitation during CPR

Regurgitation of stomach contents is common during CPR, particularly in victims of drowning. If regurgitation occurs:

- Turn the victim away from you.
- Keep him on his side and prevent him from toppling on to his front.
- Ensure that his head is turned towards the floor and his mouth is open and at the lowest point, thus allowing vomit to drain away.
- Clear any residual debris from his mouth with your fingers; and immediately turn him on to his back, re-establish an airway, and continue rescue breathing and chest compressions at the recommended rate.

Teaching CPR

Compression-only CPR has potential advantages over chest compression and ventilation, particularly when the rescuer is an untrained or partially-trained layperson. However, there are situations where combining chest compressions with ventilation is better, for example in children, asphyxial arrests, and prolonged arrests. Therefore, CPR should remain standard care for healthcare professionals and the preferred target for laypeople, the emphasis always being on minimal interruption in compressions.

A simple, education-based approach is recommended:

- Ideally, full CPR skills should be taught to all citizens.
- Initial or limited-time training should always include chest compression.
- Subsequent training (which may follow immediately or at a later date) should include ventilation as well as chest compression.

CPR training for citizens should be promoted, but untrained lay people should be encouraged to give chest compressions only, when possible and appropriate with telephone advice from an ambulance dispatcher. Those laypeople with a duty of care, such as first aid workers, lifeguards, and child minders, should be taught chest compression and ventilation.

Over-the-head CPR

Over-the-head CPR for a single rescuer and straddle CPR for two rescuers may be considered for resuscitation in confined spaces.

Recovery position

There are several variations of the recovery position, each with its own advantages. No single position is perfect for all victims. The position should be stable, near a true lateral position with the head dependent, and with no pressure on the chest to impair breathing.

The RC (UK) recommends the following sequence of actions to place a victim in the recovery position:

- Remove the victim's glasses, if present.

- Kneel beside the victim and make sure that both his legs are straight.
- Place the arm nearest to you out at right angles to his body, elbow bent with the hand palm-up.
- 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 his hand pressed against his cheek, pull on the far leg to roll the victim towards you on to his side.
- Adjust the upper leg so that both the hip and knee are bent at right angles.
- Tilt the head back to make sure that the airway remains open.
- If necessary, adjust the hand under the cheek to keep the head tilted and facing downwards to allow liquid material to drain from the mouth.
- Check breathing regularly.

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

Choking

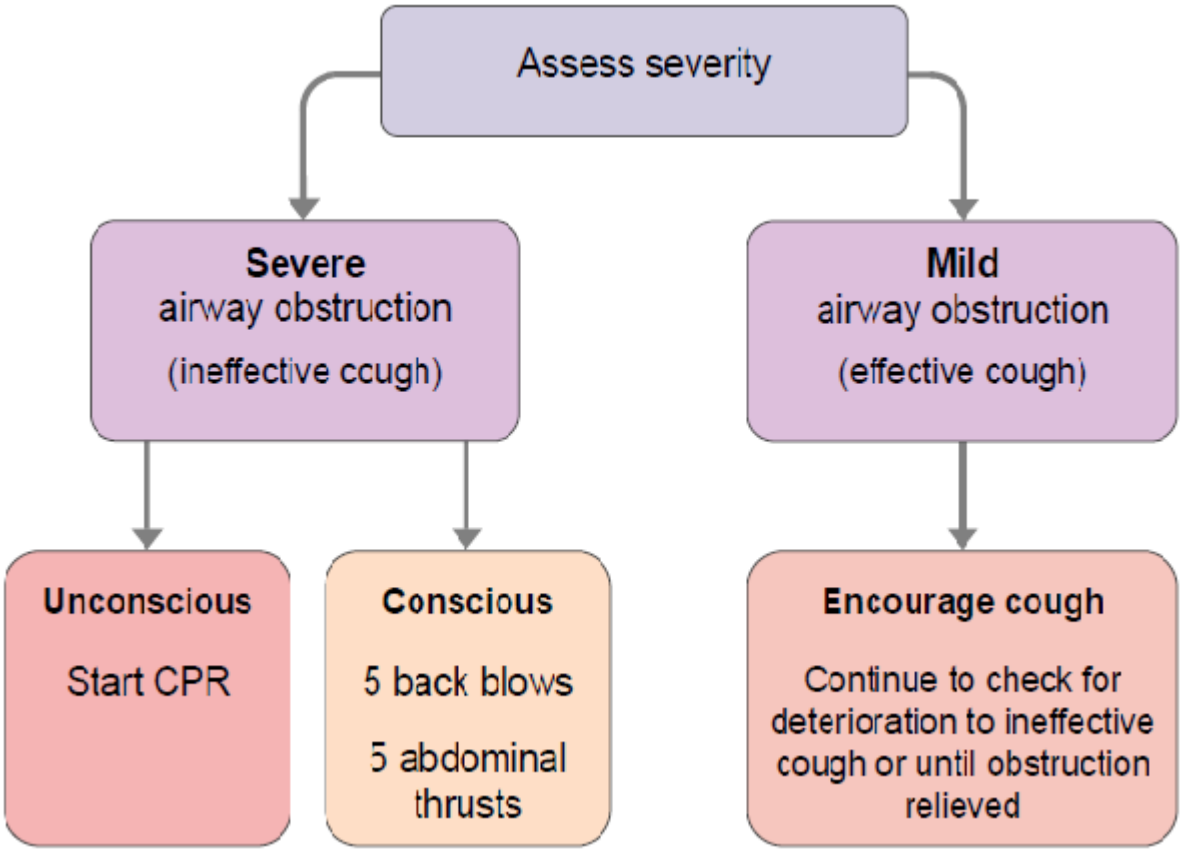
Recognition

Because recognition of choking (airway obstruction by a foreign body) is the key to successful outcome, it is important not to confuse this emergency with fainting, heart attack, seizure, or other conditions that may cause sudden respiratory distress, cyanosis, or loss of consciousness.

Foreign bodies may cause either mild or severe airway obstruction. The signs and symptoms enabling differentiation between mild and severe airway obstruction are summarised in the table below. It is important to ask the conscious victim 'Are you choking?'

General signs of choking	
• **Attack occurs while eating** • **Victim may clutch his neck**	
Signs of Airway obstruction	**Signs of mild airway obstruction**
Response to question 'Are you choking?' • Victim unable to speak • Victim may respond by nodding *Other signs* • Victim unable to breathe	*Response to question 'Are you choking?'* • Victim speaks and answers yes *Other signs* • Victim is able to speak, cough, and

• Breathing sounds wheezy • Attempts at coughing are silent • Victim may be unconscious	breathe



Sequence for the treatment of adult choking

(This sequence is also suitable for use in children over the age of 1 year)

1. If the victim shows signs of mild airway obstruction:

- Encourage him to continue coughing, but do nothing else.

2. If the victim shows signs of severe airway obstruction and is conscious:

- Give up to five back blows.
  - Stand to the side and slightly behind the victim.
  - Support the chest with one hand and lean the victim well forwards so that when the obstructing object is dislodged it comes out of the mouth rather than goes further down the airway.
  - Give **up to** five sharp blows between the shoulder blades with the heel of your other hand.

- Check to see if each back blow has relieved the airway obstruction. The aim is to relieve the obstruction with each blow rather than necessarily to give all five.
- If five back blows fail to relieve the airway obstruction give up to five abdominal thrusts.
  - Stand behind the victim and put both arms round the upper part of his abdomen.

- Lean the victim forwards.
- Clench your fist and place it between the umbilicus (navel) and the bottom end of the sternum (breastbone).
- Grasp this hand with your other hand and pull sharply inwards and upwards.
- Repeat up to five times.

- If the obstruction is still not relieved, continue alternating five back blows with five abdominal thrusts.

3. If the victim becomes unconscious:

- Support the victim carefully to the ground.
- Call an ambulance immediately.
- Begin CPR (from 5B of the adult BLS sequence). Healthcare providers, trained and experienced in feeling for a carotid pulse, should initiate chest compressions even if a pulse is present in the unconscious choking victim.

Following successful treatment for choking, foreign material may nevertheless remain in the upper or lower respiratory tract and cause complications later. Victims with a persistent cough, difficulty swallowing, or with the sensation of an object being still stuck in the throat should therefore be referred for an immediate medical opinion.

Resuscitation of children and victims of drowning

Both ventilation and compression are important for victims of cardiac arrest when the oxygen stores become depleted: about 2 - 4 min after collapse from ventricular fibrillation (VF), and immediately after collapse for victims of asphyxial arrest.

Previous guidelines tried to take into account the difference in causation, and recommended that victims of identifiable asphyxia (drowning; trauma; intoxication) and children should receive 1 min of CPR before the lone rescuer left the victim to get help. But most cases of sudden cardiac arrest out of hospital occur in adults and are of cardiac origin due to VF (even though many of these will have changed to a non-shockable rhythm by the time of the first rhythm analysis). These additional recommendations, therefore, added to the complexity of the guidelines whilst applying to only a minority of victims. Many children do not receive resuscitation because potential rescuers fear causing harm. This fear is unfounded; it is far better to use the adult BLS sequence for resuscitation of a child than to do nothing. For ease of teaching and retention, laypeople should be taught to use the adult sequence for children who are not responsive and not breathing normally, with the single modification that the chest should be compressed by one third of its depth. However, the following minor modifications to the adult sequence will make it even more suitable for use in children:

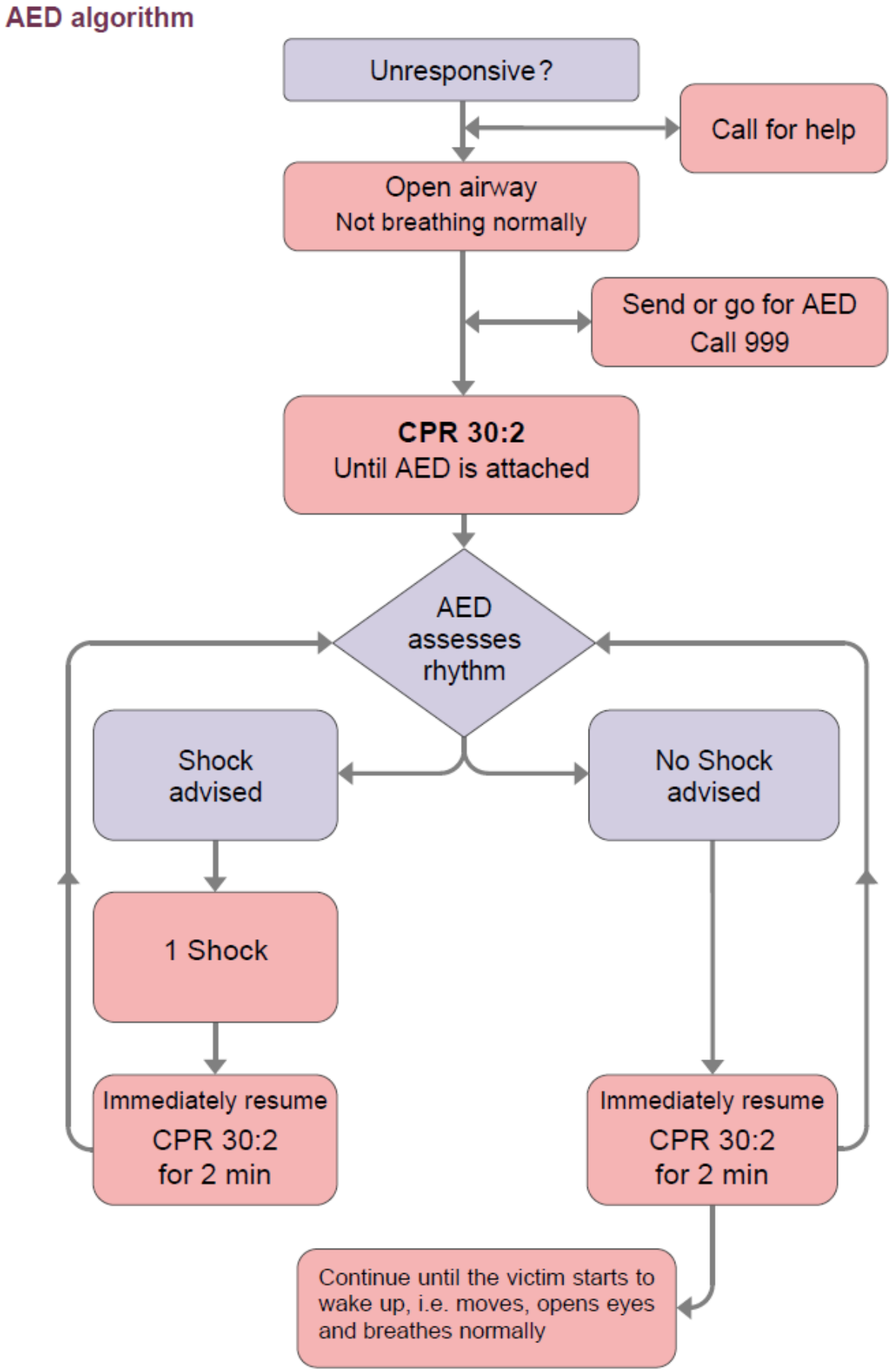
- Give 5 initial rescue breaths before starting chest compressions (adult BLS sequence of actions 5B).
- If you are on your own, perform CPR for 1 min before going for help.

- Compress the chest by one third of its depth. Use two fingers for an infant under 1 year; use one or two hands for a child over 1 year as needed to achieve an adequate depth of compression.

The same modifications of five initial breaths, and 1 min of CPR by the lone rescuer before getting help, may improve outcome for victims of drowning. This modification should be taught only to those who have a specific duty of care to potential drowning victims (e.g. lifeguards). If supplemental oxygen is available, and can be brought to the victim and used without interruption in CPR (e.g., by attaching to a resuscitation face mask), it may be of benefit.

Drowning is easily identified. It can be difficult, on the other hand, for a layperson to recognise when trauma or intoxication has caused cardiorespiratory arrest. If either cause is suspected the victim should be managed according to the standard BLS protocol.

9.2 Use of Autometed Electronic Defibrillators (AEDs).



Sequence of actions when using an automated external defibrillator

The following sequence applies to the use of both semi-automatic and automatic AEDs in a victim who is found to be unconscious and not breathing normally.

1. **Follow the adult BLS sequence as described in the basic life support chapter. Do not delay starting CPR unless the AED is available immediately.**
2. **As soon as the AED arrives:**
   - If more than one rescuer is present, continue CPR while the AED is switched on. If you are alone, stop CPR and switch on the AED.
   - Follow the voice / visual prompts.
   - Attach the electrode pads to the patient's bare chest.
   - Ensure that nobody touches the victim while the AED is analysing the rhythm.

3A. If a shock is indicated:

- Ensure that nobody touches the victim.
- Push the shock button as directed (fully-automatic AEDs will deliver the shock automatically).
- Continue as directed by the voice / visual prompts.
- Minimise, as far as possible, interruptions in chest compression.

3B. If no shock is indicated:

- Resume CPR immediately using a ratio of 30 compressions to 2 rescue breaths.
- Continue as directed by the voice / visual prompts.

4. **Continue to follow the AED prompts until:**
   - qualified help arrives and takes over OR
   - the victim starts to show signs of regaining consciousness, such as coughing, opening his eyes, speaking, or moving purposefully AND starts to breathe normally OR
   - you become exhausted.

Placement of AED pads

Place one AED pad to the right of the sternum (breast bone), below the clavicle (collar bone). Place the other pad in the left mid-axillary line, approximately over the position of the V6 ECG electrode. It is important that this pad is placed sufficiently laterally and that it is clear of any breast tissue.

Although most AED pads are labelled left and right, or carry a picture of their correct placement, it does not matter if their positions are reversed. It is important to teach that if this happens 'in error', the pads should not be removed and replaced because this wastes time and they may not adhere adequately when re-attached.

The victim's chest must be sufficiently exposed to enable correct pad placement. Chest hair will prevent the pads adhering to the skin and will interfere with electrical contact. Shave the chest only if the hair is excessive, and even then spend as little time as possible on this. Do not delay defibrillation if a razor is not immediately available.

Defibrillation if the victim is wet

As long as there is no direct contact between the user and the victim when the shock is delivered, there is no direct pathway that the electricity can take that would cause the user to experience a shock. Dry the victim's chest so that the adhesive AED pads will stick and take particular care to ensure that no one is touching the victim when a shock is delivered.

Defibrillation in the presence of supplemental oxygen

There are no reports of fires caused by sparking where defibrillation was delivered using adhesive pads. If supplemental oxygen is being delivered by a face mask, remove the face mask and place it at least one metre away before delivering a shock. Do not allow this to delay shock delivery.

Minimise interruptions in CPR

The importance of early, uninterrupted chest compressions is emphasised throughout these guidelines. Interrupt CPR only when it is necessary to analyse the rhythm and deliver a shock. When two rescuers are present, the rescuer operating the AED applies the electrodes while the other continues CPR. The AED operator delivers a shock as soon as the shock is advised, ensuring that no one is in contact with the victim.

CPR before defibrillation

Provide good quality CPR while the AED is brought to the scene. Continue CPR whilst the AED is turned on, then follow the voice and visual prompts. Giving a specified period of CPR, as a routine before rhythm analysis and shock delivery, is not recommended.

Voice prompts

The sequence of actions and voice prompts provided by an AED are usually programmable and it is recommended that they be set as follows:

- deliver a single shock when a suitable rhythm is detected;
- no rhythm analysis immediately after the shock;
- a voice prompt for resumption of CPR immediately after the shock;
- a period of 2 min of CPR before further rhythm analysis.

AED use by healthcare professionals

All healthcare professionals should consider the use of an AED to be an integral component of BLS. Early defibrillation should be available throughout all hospitals, outpatient medical facilities and clinics. Sufficient staff should be trained to enable a first shock to be provided within 3 min of collapse anywhere in the hospital. Hospitals should monitor collapse-to-first-shock intervals and monitor resuscitation outcomes.

The RC(UK) advises that untrained employees working in healthcare establishments not be prevented from using an AED if they are confronted with a patient in cardiac arrest. The administration of a defibrillatory shock should not be delayed while waiting for more highly trained personnel to arrive. The same principle should apply to individuals whose certified period of qualification has expired.

Further information on AED use by healthcare professionals is provided in the in-hospital cardiac arrest chapter of these guidelines.

Storage and use of AEDs

AEDs should be stored in locations that are immediately accessible to rescuers; they should not be stored in locked cabinets as this may delay deployment. Use of the UK standardised AED sign is encouraged, to highlight the location of an AED. People with no previous training have used AEDs safely and effectively. While it is highly desirable that those who may be called upon to use an AED should be trained in their use, and keep their skills up to date, circumstances can dictate that no trained operator (or a trained operator whose certificate of training has expired) is present at the site of an emergency. Under these circumstances no inhibitions should be placed on any person willing to use an AED.

Children

Standard AED pads are suitable for use in children older than 8 years. Special paediatric pads, that attenuate the current delivered during defibrillation, should be used in children aged between 1 and 8 years if they are available; if not, standard adult-sized pads should be used. The use of an AED is not recommended in children aged less than 1 year. However, if an AED is the only defibrillator available its use should be considered (preferably with the paediatric pads described above).

CPR versus defibrillation first

Several studies have examined whether a period of CPR before defibrillation is beneficial, particularly in patients with an un-witnessed arrest or prolonged collapse without resuscitation. A review of evidence for the 2005 guidelines resulted in the recommendation that it was reasonable for EMS personnel to give a period of about 2 min of CPR (i.e. about five cycles at 30:2) before defibrillation in patients with prolonged collapse (> 5 min).

This recommendation was based on clinical studies in which response times exceeded 4-5 min and in which a period of 1.5 to 3 min of CPR by paramedics or EMS physicians before shock delivery improved return of spontaneous circulation (ROSC), survival to hospital discharge and one-year survival for adults with out-of-hospital VF/VT compared with immediate defibrillation.

In contrast, in two randomised controlled trials, a period of 1.5 to 3 min of CPR by EMS personnel before defibrillation did not improve ROSC or survival to hospital discharge in patients with out-of-hospital VF/VT, regardless of EMS response interval. Four other studies have also failed to demonstrate significant improvements in overall ROSC or survival to hospital discharge with an initial period of CPR although one did show a higher rate of favourable neurological outcome The duration of collapse is frequently difficult to estimate accurately and there is evidence that performing chest compressions while fetching and charging a defibrillator improves the probability of survival.[43] For these reasons, in any cardiac arrest that they have not witnessed, EMS personnel should provide good-quality CPR while a defibrillator is fetched, applied and charged, but routine delivery of a specified period of CPR (e.g. 2 or 3 min) before rhythm analysis and shock delivery is no longer recommended.

Pre-hospital airway management

There is insufficient evidence to support or refute the use of any specific technique to maintain an airway and provide ventilation in adults with pre-hospital or in-hospital cardiac arrest. Tracheal intubation has been perceived as the optimal method of providing and maintaining a clear and secure airway during cardiac arrest but data are accumulating on the problems associated with pre-hospital intubation. It is now strongly recommended that tracheal intubation should be used only when trained personnel are available to carry out the procedure with a high level of skill and confidence. In the absence of experienced personnel the use of supraglottic airway devices (SADs) during CPR is probably more rational. However, there are only poor-quality data on the pre-hospital use of these devices during cardiac arrest. The use of SADs is discussed in more detail in the advanced life support (ALS) chapter.

Tracheal intubation

The perceived advantages of tracheal intubation over bag-mask ventilation include:

enabling ventilation without interrupting chest compressions,[44] enabling effective ventilation (particularly when lung and/or chest compliance is poor), minimising gastric inflation and therefore the risk of regurgitation, protection against pulmonary aspiration of gastric contents, and the potential to free a rescuer's hands for other tasks.

Use of the bag-mask is more likely to cause gastric distension, which, theoretically, is more likely to cause regurgitation and aspiration. However, there are no reliable data to indicate that the incidence of aspiration is any higher in cardiac arrest patients ventilated using a bag-mask compared with those ventilated via a tracheal tube.

The disadvantages of tracheal intubation over bag-valve-mask ventilation include:

- The risk of an unrecognised misplaced tracheal tube – in patients with out of-hospital cardiac arrest, the documented incidence ranges from 0.5% to 17%

- A prolonged period without chest compressions while intubation is attempted: in a study of pre-hospital intubation by paramedics during 100 cardiac arrests, the total duration of the interruptions in CPR associated with tracheal intubation attempts was 110 and in 25% the interruptions were for more than 3 min

- A comparatively high failure rate: intubation success rates correlate with the experience of the intubator. Healthcare personnel who undertake pre-hospital intubation should do so only within a structured, monitored programme, which should include comprehensive competency based training and regular opportunities to refresh skills. Rescuers must weigh the risks and benefits of intubation against the need to provide effective chest compressions. The intubation attempt may require some interruption of chest compressions but, once an advanced airway is in place, ventilation will not require interruption of chest compressions. Personnel skilled in advanced airway management should be able to undertake laryngoscopy without stopping chest compressions; a brief pause in chest compressions will be required only as the tube is passed through the vocal cords.

Alternatively, to avoid any interruptions in chest compressions, the intubation attempt may be deferred until return of spontaneous circulation. No intubation attempt should interrupt chest compressions for more than 10 s; if intubation is not achievable within these constraints, recommence bag-mask ventilation. After intubation, confirm correct tube placement and secure the tube adequately.

Confirmation of the correct placement of the tracheal tube

Waveform capnography is the most sensitive and specific way to confirm and monitor continuously the position of a tracheal tube in victims of cardiac arrest and should supplement clinical assessment (auscultation and visualisation of the tube passing between the vocal cords). Waveform capnography will not discriminate between tracheal and bronchial placement of the tube – careful auscultation is essential. Existing portable monitors make capnographic initial confirmation and continuous monitoring of tracheal tube position feasible in almost all settings where intubation is performed, including out of hospital.

Rules for stopping resuscitation

Following out-of-hospital cardiac arrest, failure of ALS-trained EMS personnel to achieve ROSC at the scene is associated with an extremely low probability of survival. The rare exception, where the transfer to hospital of a patient with ongoing CPR results in long-term good quality survival, is usually associated with special circumstances, such as pre-existing hypothermia or drug overdose. For this reason, attempts have been made to formulate and validate rules for stopping resuscitation that allow EMS personnel to stop the resuscitation attempt and pronounce life extinct without transporting the victim to hospital. One such rule recommends stopping CPR when there is no return of spontaneous circulation, no shocks are administered, and the arrest is not witnessed by EMS personnel.[56] However, this rule was validated with defibrillation-only emergency medical technicians in Canada and may not apply to an EMS system staffed by paramedics. In the UK, guidelines from the

Joint Royal Colleges Ambulance Service Liaison Committee (2006), advise that ambulance clinicians may stop resuscitation if **all** of the following criteria are met:

- 15 min or more has passed since the onset of collapse.
- No bystander CPR was given before arrival of the ambulance.
- There is no suspicion of drowning, hypothermia, poisoning/overdose, or pregnancy.
- Asystole is present for more than 30 s on the ECG monitor screen. Pre-hospital resuscitation attempts are also generally discontinued if the rhythm remains asystole despite 20 min of advanced life support (ALS) except in cases of drowning and hypothermia.

Paediatric Basic Life Support

Introduction

Changes in paediatric life support guidelines have been partly in response to new scientific evidence, and partly to simplify them in order to assist teaching and retention. As in the past, there remains a paucity of good quality evidence specifically on paediatric resuscitation, and some conclusions have had to be drawn from experimental work or extrapolated from adult data. Cardiorespiratory arrest is much less common in children than in adults and providers who are not specialists in paediatric practice will manage most cases initially. These considerations have emphasised the importance of providing simple, practical guidance, as well as rigorous assessment and incorporation of the best available scientific data.

There remains a strong focus on simplification where possible, based on the knowledge that many children receive no resuscitation at all because rescuers fear doing harm as they have not been taught paediatric resuscitation. Bystander resuscitation significantly improves outcome in children[21] and there is evidence from experimental models that doing either chest compression or expired air ventilation alone may result in a better outcome than doing nothing. It follows that outcomes could be improved if by-standers who would otherwise do nothing, were encouraged to begin resuscitation, even if they do not follow an algorithm targeted specifically at children. However, there are distinct differences between the arrest of cardiac origin, seen predominantly in adults, and the asphyxial arrest, which occurs commonly in children. Therefore, a separate paediatric algorithm is justified for healthcare professionals who have a duty to respond to paediatric emergencies and who are in a position to receive enhanced training.

Guideline changes

Recognition of cardiorespiratory arrest – healthcare provider and lay person

Pulse palpation for 10 s cannot give a reliable measurement of the presence or absence of an effective circulation. This means that palpation of the pulse cannot be the sole determinant of the need for chest compressions. Healthcare providers therefore need to determine the presence or absence of ‘signs of life’, such as response to stimuli, normal breathing (rather than abnormal gasps) or spontaneous movement. They may also perform pulse palpation but, if there are no other ‘signs of life’, they should only withhold CPR if they are certain that there is a definite pulse. The decision to start CPR should take less than 10 s from the time of beginning the initial assessment of the child’s circulatory status and if there is still doubt after that time, CPR should be initiated.

If the layperson considers that there are no ‘signs of life’, CPR should be started immediately.

Compression:Ventilation ratios – healthcare provider and lay person

Although ventilation remains a very important component of CPR in asphyxial arrest, rescuers who are unable or unwilling to provide this should be encouraged to perform at least compression-only CPR. A child is far more likely to be harmed if bystanders do nothing at all.

The CV ratio for resuscitation at birth remains 3:1 but there is uncertainty about the best ratio for use in neonates outside of the delivery room. The 2010 International Consensus on CPR Science[270] suggests that the ratio should depend on aetiology but a literal application of this would be complex and confusing to apply in practice. The best approach is for individual units to decide on the CPR teaching that they provide for dealing with neonates based on the likely pathology that they encounter and the type of resuscitation that they perform most commonly.

Chest compression quality

Anthropomorphic and radiographic measurements in children have demonstrated that compression of the chest by one-third the AP diameter is feasible and safe. Data in adults and older children suggest that chest compressions are frequently too shallow, so there has been a subtle, but important, change in the instruction on chest compressions from “approximately one-third” to “at least one-third” of the AP diameter of the chest. A post-mortem review found that physical damage following CPR in children was very rare. It is reasonable to advise, “don’t be afraid to push too hard”.

Training and feedback devices are being developed for adults but require absolute, rather than relative, dimensions. In order to facilitate the same for children, the measurement data above indicate that the mean dimensions for one-third compression depths for infants and children are 4 and 5 cm respectively.

In order to be consistent with the adult BLS guidelines the advice on compression rate has been amended to ‘at least 100 but not greater than 120 min^{-1}.

Automated external defibrillators (AEDs) in infants

Although there are only few data, evidence from case reports now favours the use of an AED (preferably with an attenuator) in infants with shockable rhythms, if no manually adjustable machine is available. Shockable rhythms are unusual in children under 1 year of age and the main focus of resuscitation should be on good-quality CPR.

Infant and child BLS sequence

Rescuers who have been taught adult BLS, and have no specific knowledge of paediatric resuscitation, should use the adult sequence. The following modifications to the adult sequence will, however, make it more suitable for use in children:

- Give 5 initial rescue breaths before starting chest compression (adult sequence step 5B).
- If you are on your own, perform CPR for 1 min before going for help.
- Compress the chest by at least one-third of its depth. Use two fingers for an infant under 1 year; use one or two hands for a child over 1 year as needed to achieve an adequate depth of compression.

(See adult BLS chapter)

The following is the sequence that should be followed by those with a duty to respond to paediatric emergencies (usually healthcare professional teams):

1. Ensure the safety of rescuer and child.

2. Check the child’s responsiveness:

- Gently stimulate the child and ask loudly, ‘Are you all right?’
- Do not shake infants, or children with suspected cervical spine injuries.

3A. If the child responds by answering or moving:

- Leave the child in the position in which you find him (provided he is not in further danger).
- Check his condition and get help if needed.
- Reassess him regularly.

3B. If the child does not respond:

Shout for help.

Turn the child onto his back and open the airway using head tilt and chin lift:

- Place your hand on his forehead and gently tilt his head back.
- With your fingertip(s) under the point of the child's chin, lift the chin. Do not push on the soft tissues under the chin as this may block the airway.
- If you still have difficulty in opening the airway, try the jaw thrust method: place the first two fingers of each hand behind each side of the child's mandible (jaw bone) and push the jaw forward.

Have a low threshold for suspecting injury to the neck. If you suspect this, try to open the airway using chin lift or jaw thrust alone. If this is unsuccessful, add head tilt a small amount at a time until the airway is open. Establishing an open airway takes priority over concerns about the cervical spine.

4. Keeping the airway open, look, listen, and feel for normal breathing by putting your face close to the child's face and looking along the chest:

- **Look** for chest movements.
- **Listen** at the child's nose and mouth for breath sounds.
- **Feel** for air movement on your cheek.

In the first few minutes after cardiac arrest a child may be taking infrequent, noisy gasps. Do not confuse this with normal breathing. Look, listen, and feel for **no more** than **10 s** before deciding – if you have any doubts whether breathing is normal, act as if it is **not** normal.

5A. If the child is breathing normally:

- Turn the child onto his side into the recovery position (see below).
- Send or go for help – call the relevant emergency number. Only leave the child if no other way of obtaining help is possible.
- Check for continued normal breathing.

5B. If the breathing is not normal or absent:

- Carefully remove any obvious airway obstruction.
- Give 5 initial rescue breaths.
- While performing the rescue breaths note any gag or cough response to your action. These responses, or their absence, will form part of your assessment of 'signs of life', described below.

Rescue breaths for a child over 1 year:

- Ensure head tilt and chin lift.
- Pinch the soft part of his nose closed with the index finger and thumb of yourhand on his forehead.

- Open his mouth a little, but maintain the chin lift.
- Take a breath and place your lips around his mouth, making sure that you have a good seal.
- Blow steadily into his mouth over about 1-1.5 s sufficient to make the chest rise visibly.
- Maintaining head tilt and chin lift, take your mouth away and watch for his chest to fall as air comes out.
- Take another breath and repeat this sequence four more times. Identify effectiveness by seeing that the child's chest has risen and fallen in a similar fashion to the movement produced by a normal breath.

Rescue breaths for an infant:

- Ensure a neutral position of the head (as an infant's head is usually flexed when supine, this may require some extension) and apply chin lift.
- Take a breath and cover the mouth and nasal apertures of the infant with your mouth, making sure you have a good seal. If the nose and mouth cannot both be covered in the older infant, the rescuer may attempt to seal only the infant's nose or mouth with his mouth (if the nose is used, close the lips to prevent air escape).
- Blow steadily into the infant's mouth and nose over 1-1.5 s sufficient to make the chest rise visibly. Maintain head position and chin lift, take your mouth away, and watch for his chest to fall as air comes out.
- Take another breath and repeat this sequence four more times. For both infants and children, if you have difficulty achieving an effective breath, the airway may be obstructed:
- Open the child's mouth and remove any visible obstruction. Do not perform a blind finger sweep.
- Ensure that there is adequate head tilt and chin lift but also that the neck is not over extended.
- If head tilt and chin lift has not opened the airway, try the jaw thrust method.
- Make up to 5 attempts to achieve effective breaths. If still unsuccessful, move on to chest compression.

6. Assess the child's circulation (signs of life):

Take no more than 10 s to:

- Look for signs of life. These include any movement, coughing, or normal breathing (not abnormal gasps or infrequent, irregular breaths).
- If you check the pulse **take no more than 10 s:**
  - In **a child aged over 1 year** – feel for the carotid pulse in the neck.
  - In **an infant** – feel for the brachial pulse on the inner aspect of the upper arm.
  - For both infants and children the femoral pulse in the groin (mid way between the anterior superior iliac spine and the symphysis pubis) can also be used.

7A. If you are confident that you can detect signs of a circulation within 10 s:

- Continue rescue breathing, if necessary, until the child starts breathing effectively on his own.

- Turn the child onto his side (into the recovery position) if he starts breathing effectively but remains unconscious.
- Re-assess the child frequently.

7B. If there are no signs of life, unless you are CERTAIN that you can feel a definite pulse of greater than 60 min^{-1} within 10 s

- Start chest compression.
- Combine rescue breathing and chest compression.

For all children, compress the lower half of the sternum:

- To avoid compressing the upper abdomen, locate the xiphisternum by finding the angle where the lowest ribs join in the middle. Compress the sternum one finger's breadth above this.
- Compression should be sufficient to depress the sternum by at least one third of the depth of the chest.
- Don't be afraid to push too hard. Push "hard and fast".
- Release the pressure completely, then repeat at a rate of 100 - 120 min^{-1}
- After 15 compressions, tilt the head, lift the chin, and give two effective breaths.
- Continue compressions and breaths in a ratio of 15:2.
- The best method for compression varies slightly between infants and children.
- **Chest compression in infants:**
- The lone rescuer should compress the sternum with the tips of two fingers.
- If there are two or more rescuers, use the encircling technique:
  - Place both thumbs flat, side by side, on the lower half of the sternum (as above), with the tips pointing towards the infant's head.
  - Spread the rest of both hands, with the fingers together, to
  - encircle the lower part of the infant's rib cage with the tips of the
  - fingers supporting the infant's back.
  - Press down on the lower sternum with your two thumbs to
  - depress it at least one-third of the depth of the infant's chest.

Chest compression in children aged over 1 year:

- Place the heel of one hand over the lower half of the sternum (as above).
- Lift the fingers to ensure that pressure is not applied over the child's ribs.
- Position yourself vertically above the victim's chest and, with your arm straight, compress the sternum to depress it by at least one-third of the depth of the chest.
- In larger children, or for small rescuers, this may be achieved most easily by using both hands with the fingers interlocked.

8. Continue resuscitation until:

- The child shows signs of life (normal breathing, cough, movement or definite pulse of greater than 60 min^{-1}).
- Further qualified help arrives.

- You become exhausted.

When to call for assistance

It is vital for rescuers to get help as quickly as possible when a child collapses:

- When more than one rescuer is available, one (or more) starts resuscitation while another goes for assistance.
- If only one rescuer is present; undertake resuscitation for about **1 min** before going for assistance. To minimise interruptions in CPR, it may be possible to carry an infant or small child whilst summoning help.
- The only exception to performing 1 min of CPR before going for help is in the case of a child with a **witnessed, sudden** collapse when the rescuer is alone. In this situation, a shockable rhythm is likely and the child may need defibrillation. Seek help immediately if there is no one to go for you**.**

Recovery position

An unconscious child whose airway is clear and who is breathing normally should be turned onto his side into the recovery position. There are several recovery positions; each has its advocates. The important principles to be followed are:

- The child should be placed in as near a true lateral position as possible with his mouth dependant to enable free drainage of fluid.
- The position should be stable. In an infant, this may require the support of a small pillow or a rolled-up blanket placed behind his back to maintain the position.
- There should be no pressure on the chest that impairs breathing.
- It should be possible to turn the child onto his side and to return him back easily and safely, taking into consideration the possibility of cervical spine injury.
- The airway should be accessible and easily observed.
- The adult recovery position is suitable for use in children.

Explanatory notes

Definitions

A **newborn** is a child just after birth.

A **neonate** is a child in the first 28 days of life.

An **infant** is a child under 1 year.

A **child** is between 1 year and puberty.

The differences between adult and paediatric resuscitation are largely based on differing aetiology, with primary cardiac arrest being more common in adults whereas children usually suffer from secondary cardiac arrest. The onset of puberty, which is the physiological end of childhood, is the most logical landmark for the upper age limit for use of paediatric guidelines. This has the advantage of being simple to determine in contrast to an age limit, as age may be unknown at the start of resuscitation. Clearly, it is inappropriate and unnecessary to establish the onset of puberty formally; if the rescuer believes the victim to be a child then he should use the paediatric guidelines. If a mis-judgment is made, and the victim turns out to be a young adult, little harm will accrue as studies of aetiology have shown that the paediatric pattern of arrest continues into early adulthood.

It is necessary to differentiate between infants and older children, as there are some important differences between these two groups.

Compression:ventilation ratios

The 2010 International Liaison Committee on Resuscitation (ILCOR) Consensus on Science with Treatment Recommendations (CoSTR), continues with the 2005 recommendation that the CV ratio should be based on whether one or more rescuers are present. The 2010 CoSTR recommends that lay rescuers, who usually learn only single-rescuer techniques, should be taught to use a ratio of 30 compressions to 2 ventilations. This is the same ratio as recommended for adults and enables anyone trained in BLS techniques to resuscitate children with minimal additional information. Two or more rescuers with a duty to respond should learn a ratio with more rescue breaths (15:2), as this has been validated by experimental and mathematical studies.[273, 274] This latter group, who would normally be healthcare professionals, should receive enhanced training targeted specifically at the resuscitation of children.

Although the 2010 CoSTR recommendation is based on the number of rescuers present, it would certainly negate the main benefit of simplicity if lay rescuers were taught a different ratio for use if there were two of them. Similarly, those with a duty to respond, who would normally be taught to use a ratio of 15:2, do not have to use the 30:2 ratio if they are alone, unless they are not achieving an adequate number of compressions because of difficulty in the transition between ventilation and compression.

Chest compression technique

The 2010 guidelines prioritise chest compressions. Subtle changes in wording (*at least* one-third depth, *at least* 100 min^{-1}) encourage harder and faster compressions. The evidence suggests that rescuers are too gentle and slow and that harm is unlikely, either through the use of excessive force or through performing chest compressions in a victim who has a spontaneous circulation. Interruptions are minimised by not stopping compressions during defibrillator charging, immediate resumption after shock delivery and continuing without a pause for breaths, once the trachea is intubated.

Automated external defibrillators

Since the publication of Guidelines 2005 there have been continuing reports of safe and successful use of AEDs in children less than 8 years and further studies demonstrating that AEDs are capable of identifying arrhythmias accurately in children and are extremely unlikely to advise a shock inappropriately. **Nevertheless, if there is any possibility that an AED may need to be used in children, the purchaser should check that the performance of the particular model has been tested in paediatric arrhythmias.**

Many manufacturers now supply purpose-made paediatric pads or programmes, which typically attenuate the output of the machine to 50-75 J.[275] These devices are recommended for children between 1 and 8 years. If no such system or manually adjustable machine is available, an unmodified adult AED may be used.

Although shockable rhythms are extremely unusual in infants, there are rare case reports of the successful use of AEDs in this age group. For an infant in a shockable rhythm, the risk:benefit ratio favours the use of an AED (ideally with an attenuator) if a manually adjustable model is not available.

Choking

Recognition of choking

No new evidence on this subject was presented during the 2010 Consensus Conference. Back blows, chest thrusts and abdominal thrusts all increase intra-thoracic pressure and can expel foreign bodies from the airway. In half of the episodes more than one technique is needed to relieve the obstruction. There are no data to indicate which measure should be used first or in which order they should be applied. If one is unsuccessful, try the others in rotation until the object is cleared.

When a foreign body enters the airway the child reacts immediately by coughing in an attempt to expel it. A spontaneous cough is likely to be more effective and safer than any manoeuvre a rescuer might perform. However, if coughing is absent or ineffective, and the object completely obstructs the airway,

the child will become asphyxiated rapidly. Active interventions to relieve choking are therefore required only when coughing becomes ineffective, but they then must be commenced rapidly and confidently.

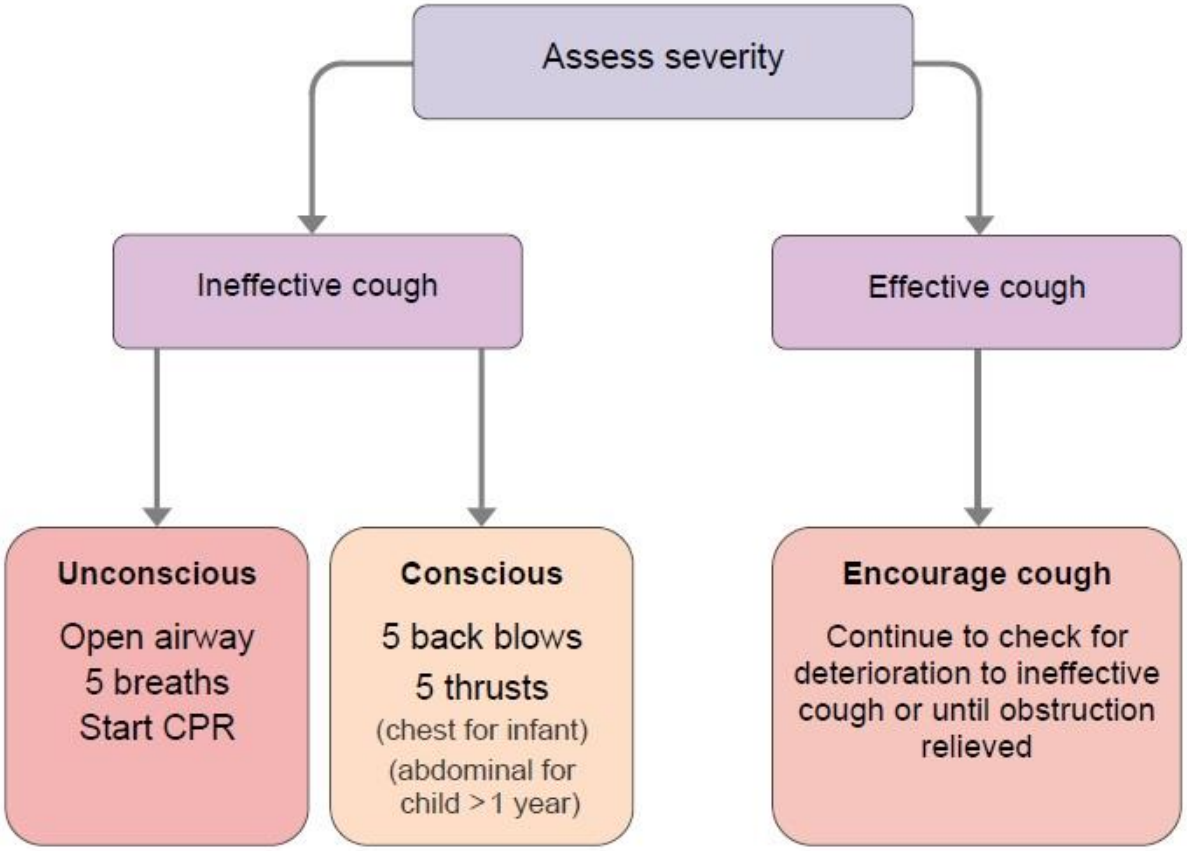
The majority of choking events in children occur during play or whilst eating, when a carer is usually present. Events are therefore frequently witnessed, and interventions are usually initiated when the child is conscious.

Choking is characterised by the sudden onset of respiratory distress associated with coughing, gagging, or stridor. Similar signs and symptoms may also be associated with other causes of airway obstruction, such as laryngitis or epiglottitis, which require different management. Suspect choking caused by a foreign body if:

- the onset was very sudden;
- there are no other signs of illness;
- there are clues to alert the rescuer, for example a history of eating or playing with small items immediately prior to the onset of symptoms.

General signs of choking	
• **Witnessed episode** • **Coughing or choking** • **Sudden onset** • **Recent history of playing with or eating small objects.**	
Ineffective coughing	**Effective cough**
• Unable to vocalise • Quiet or silent cough • Unable to breathe • Cyanosis • Decreasing level of consciousness	• Crying or verbal response to questions • Loud Cough • Able to take a breath before coughing • Fully responsive

Paediatric Choking Treatment Algorithm



Relief of choking

Safety and summoning assistance

Safety is paramount. Rescuers should avoid placing themselves in danger and consider the safest action to manage the choking child:

- If the child is coughing effectively, then no external manoeuvre is necessary.
- Encourage the child to cough, and monitor continuously.
- If the child's coughing is, or is becoming, ineffective, **shout for help** immediately and determine the child's conscious level.

Conscious child with choking

- If the child is still conscious but has absent or ineffective coughing, give back blows.
- If back blows do not relieve choking, give chest thrusts to infants or abdominal thrusts to children. These manoeuvres create an 'artificial cough' to increase intrathoracic pressure and dislodge the foreign body.

Back blows

►In an infant:

- Support the infant in a head-downwards, prone position, to enable gravity to assist removal of the foreign body.
- A seated or kneeling rescuer should be able to support the infant safely across his lap.

- Support the infant's head by placing the thumb of one hand at the angle of the lower jaw, and one or two fingers from the same hand at the same point on the other side of the jaw.
- Do not compress the soft tissues under the infant's jaw, as this will exacerbate the airway obstruction.
- Deliver up to 5 sharp back blows with the heel of one hand in the middle of the back between the shoulder blades.
- The aim is to relieve the obstruction with each blow rather than to give all 5.

►In a child over 1 year:

- Back blows are more effective if the child is positioned head down.
- A small child may be placed across the rescuer's lap as with an infant.
- If this is not possible, support the child in a forward-leaning position and deliver the back blows from behind.

If back blows fail to dislodge the object, and the child is still conscious, use chest thrusts for infants or abdominal thrusts for children. **Do not use abdominal thrusts (Heimlich manoeuvre) for infants.**

Chest thrusts for infants:

- Turn the infant into a head-downwards supine position. This is achieved safely by placing your free arm along the infant's back and encircling the occiput with your hand.
- Support the infant down your arm, which is placed down (or across) your thigh.
- Identify the landmark for chest compression (lower sternum approximately a finger's breadth above the xiphisternum).
- Deliver up to 5 chest thrusts. These are similar to chest compressions, but sharper in nature and delivered at a slower rate.
- The aim is to relieve the obstruction with each thrust rather than to give all 5.

Abdominal thrusts for children over 1 year:

- Stand or kneel behind the child. Place your arms under the child's arms and encircle his torso.
- Clench your fist and place it between the umbilicus and xiphisternum.
- Grasp this hand with your other hand and pull sharply inwards and upwards.
- Repeat up to 4 more times.
- Ensure that pressure is not applied to the xiphoid process or the lower rib cage as this may cause abdominal trauma.
- The aim is to relieve the obstruction with each thrust rather than to give all 5.

Following chest or abdominal thrusts, reassess the child:

- If the object has not been expelled and the victim is still conscious, continue the sequence of back blows and chest (for infant) or abdominal (for children) thrusts.
- Call out, or send, for help if it is still not available.
- Do not leave the child at this stage.
- If the object is expelled successfully, assess the child's clinical condition. It is possible
- that part of the object may remain in the respiratory tract and cause complications. If

- there is any doubt, seek medical assistance.

Unconscious child with choking

- If the choking child is, or becomes, unconscious place him on a firm, flat surface.
- Call out, or send, for help if it is still not available.
- Do not leave the child at this stage.

Airway opening:

- Open the mouth and look for any obvious object.
- If one is seen, make an attempt to remove it with a single finger sweep.

Do not attempt blind or repeated finger sweeps – these can impact the object more deeply into the pharynx and cause injury.

Rescue breaths:

- Open the airway and attempt 5 rescue breaths.
- Assess the effectiveness of each breath: if a breath does not make the chest rise, reposition the head before making the next attempt.

Chest compression and CPR:

- Attempt 5 rescue breaths and if there is no response, proceed immediately to chest compression regardless of whether the breaths are successful.
- Follow the sequence for single rescuer CPR (step 7B above) for approximately 1 min before summoning the EMS (if this has not already been done by someone else).
- When the airway is opened for attempted delivery of rescue breaths, look to see if the foreign body can be seen in the mouth.
- If an object is seen, attempt to remove it with a single finger sweep.
- If it appears that the obstruction has been relieved, open and check the airway as above. Deliver rescue breaths if the child is not breathing and then assess for signs of life. If there are none, commence chest compressions and perform CPR (step 7B above).

Appendix B - Equality Impact Assessment Tool

To be completed and attached to any procedural document when submitted to the appropriate committee for consideration and approval.

		Yes/No	Comments
1.	**Does the policy/guidance affect one group less or more favourably than another on the basis of:**		
	• Race	No	
	• Ethnic origins (including gypsies and travellers)	No	
	• Nationality	No	
	• Gender	No	
	• Culture	No	
	• Religion or belief	No	
	• Sexual orientation including lesbian, gay and bisexual people	No	
	• Age	No	
	• Disability - learning disabilities, physical disability, sensory impairment and mental health problems	No	
2.	**Is there any evidence that some groups are affected differently?**	No	
3.	**If you have identified potential discrimination, are any exceptions valid, legal and/or justifiable?**	No	
4.	**Is the impact of the policy/guidance likely to be negative?**	No	
5.	**If so can the impact be avoided?**	n/a	
6.	**What alternatives are there to achieving the policy/guidance without the impact?**	n/a	
7.	**Can we reduce the impact by taking different action?**	n/a	

If you have identified a potential discriminatory impact of this procedural document, please refer it to Human Resources, together with any suggestions as to the action required to avoid/reduce this impact.

Appendix C - Checklist for the Review and Approval of Procedural Documents

To be completed and attached to any document which guides practice when submitted to the appropriate committee for consideration and approval.

	Title of document being reviewed:	Yes/No/ Unsure	Comments
1.	**Title**		
	Is the title clear and unambiguous?	Yes	
	Is it clear whether the document is a guideline, policy, protocol or standard?	Yes	
2.	**Rationale**		
	Are reasons for development of the document stated?	Yes	
3.	**Development Process**		
	Is the method described in brief?	Yes	
	Are people involved in the development identified?	Yes	
	Do you feel a reasonable attempt has been made to ensure relevant expertise has been used?	Yes	
	Is there evidence of consultation with stakeholders and users?	Yes	
4.	**Content**		
	Is the objective of the document clear?	Yes	
	Is the target population clear and unambiguous?	Yes	
	Are the intended outcomes described?	Yes	
	Are the statements clear and unambiguous?	Yes	
5.	**Evidence Base**		
	Is the type of evidence to support the document identified explicitly?	Yes	
	Are key references cited?	Yes	
	Are the references cited in full?	Yes	
	Are supporting documents referenced?	Yes	
6.	**Approval**		

	Title of document being reviewed:	Yes/No/ Unsure	Comments
	Does the document identify which committee/group will approve it?	Yes	
	If appropriate have the joint Human Resources/staff side committee (or equivalent) approved the document?	Yes	
7.	**Dissemination and Implementation**		
	Is there an outline/plan to identify how this will be done?	Yes	
	Does the plan include the necessary training/support to ensure compliance?	Yes	
8.	**Document Control**		
	Does the document identify where it will be held?	Yes	
	Have archiving arrangements for superseded documents been addressed?	Yes	
9.	**Process to Monitor Compliance and Effectiveness**		
	Are there measurable standards or KPIs to support the monitoring of compliance with and effectiveness of the document?	Yes	
	Is there a plan to review or audit compliance with the document?	Yes	
10.	**Review Date**		
	Is the review date identified?	Yes	
	Is the frequency of review identified? If so is it acceptable?	Yes	
11.	**Overall Responsibility for the Document**		
	Is it clear who will be responsible for co-ordinating the dissemination, implementation and review of the document?	Yes	

Individual Approval			
If you are happy to approve this document, please sign and date it and forward to the chair of the committee/group where it will receive final approval.			
Name		Date	11/04/2020
Signature			
Committee Approval			
If the committee is happy to approve this document, please sign and date it and forward copies to the person with responsibility for disseminating and implementing the document and the person who is responsible for maintaining the organisation's database of approved documents.			
Name		Date	11/04/2020
Signature			