

MB2 Basic Airway Management and Resuscitation

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Learning Outcomes

The student at the end of the session should be able to:

- Demonstrate a safe approach and check victim's responsiveness
- Demonstrate checking for airway obstruction
- Demonstrate simultaneous airway opening, breathing and pulse check
- Demonstrate the location of the carotid pulse
- State the hospital emergency telephone number
- Demonstrate initiating and continuing chest compressions
- Demonstrate the use of simple airway adjuncts
- Demonstrate the use of bag-valve-mask ventilation on a manikin
- Demonstrate two-rescuer cardiopulmonary resuscitation
- Demonstrate the jaw thrust

Basic Airway Management

Patients with airway compromise need prompt recognition and correction using basic airway techniques. This section will cover:

- Clinically identifying patients with airway compromise
- Responding to these with simple airway manoeuvres
- Selecting and introducing airway adjuncts appropriately
- Recognising the need for ventilation and delivering this effectively

Look at Fig 1, a sagittal view of the adult airway from the mouth and nasal cavities to the trachea. Partial or complete obstruction can occur at any point. Any patient with a lowered conscious level is vulnerable to airway obstruction, purely through relaxation of smooth muscle occlusion of the nasopharynx by the soft palate, the oropharynx by the tongue and the laryngopharynx by the epiglottis.

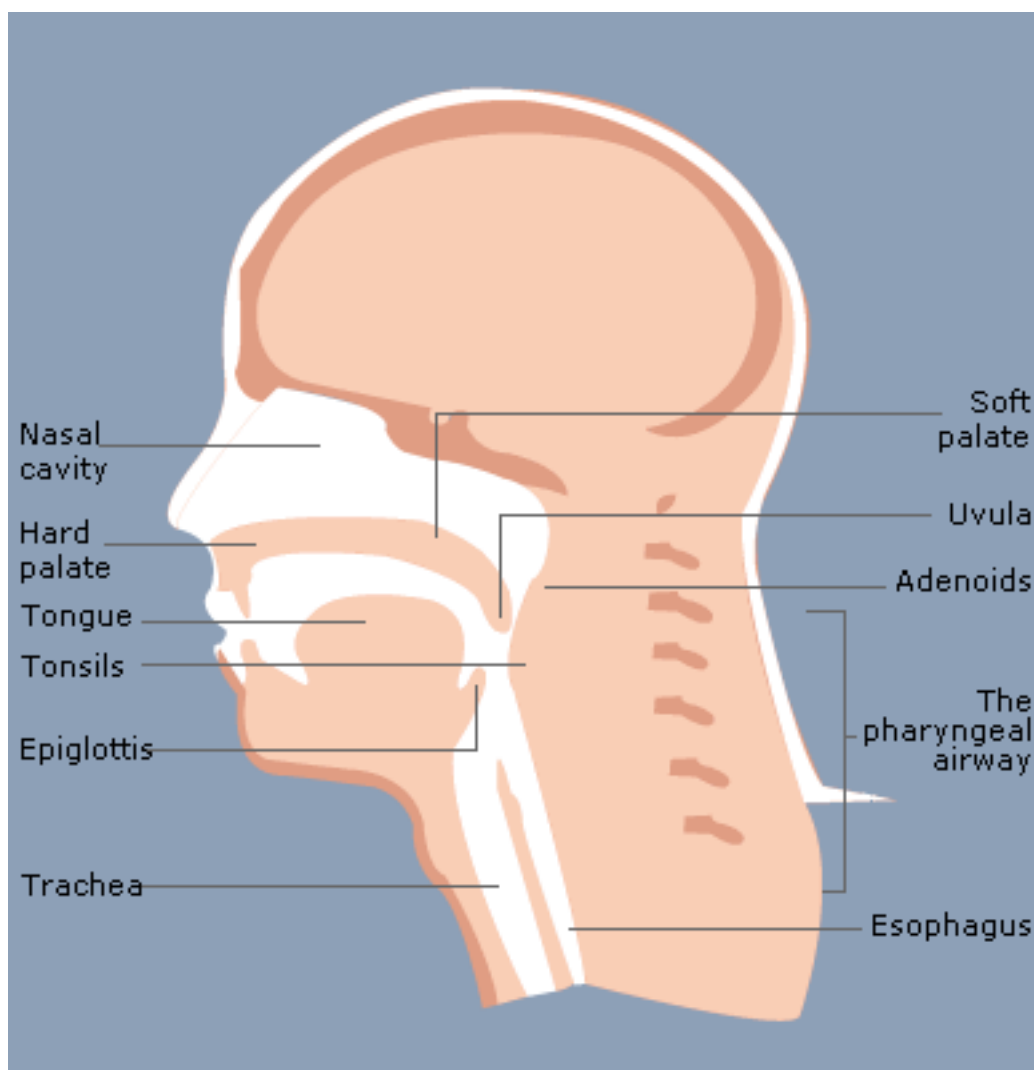


Fig 1: Pharyngeal airway

Conscious patients with airway compromise typically sit upright intuitively.

In unconscious patients, look for abnormal chest and abdominal wall movement, suggesting airway obstruction and the lack of fogging of the oxygen mask. Listen for the snoring noise of partial airway obstruction.



Fig 2: Lack of fogging of the oxygen face mask during normal inspiration



Fig 3: Fogging of the oxygen face mask due to normal expiration

Simple Airway Manoeuvres

Unconscious patients are vulnerable to aspiration from:

- Vomit
- Blood
- Secretions

Suction

Use gentle suction under direct vision to remove these with a wide bore rigid sucker.

When faced with an actively vomiting or regurgitating patient, or where there is a significant amount of blood in the airway, turn the patient on their side and tip the trolley head down.

Taking the sucker off the end of the suction tube may help clear thick undigested food, otherwise the sucker becomes blocked.

Turning the unconscious patient on their side and tipping the trolley head down may be the best way of avoiding aspiration.

The chin-lift manoeuvre

Unconscious patients lying supine on a trolley are vulnerable to airway obstruction.

Their oral axis (OA), pharyngeal axis (PA) and laryngeal axis (LA) are malaligned (**Fig 4**).

Placement of a pillow or folded blanket beneath their head, together with a chin-lift manoeuvre should improve the alignment of the axes, i.e. open up the angle depicted in blue, between the OA and LA.

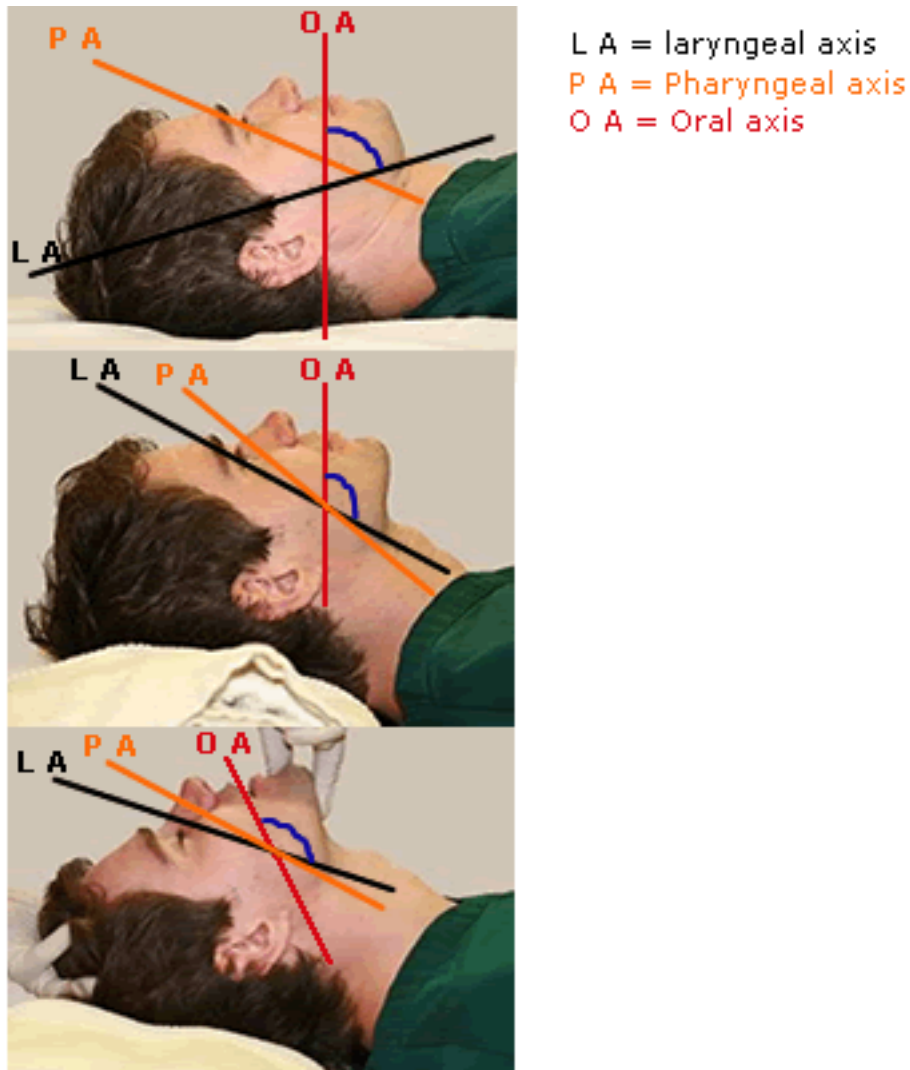


Fig 4: Malalignment of the oral, pharyngeal and laryngeal axes in a patient in the supine position, and altered alignment of the axes following placement of a pillow or folded blanket beneath the head, and following a chin-lift manoeuvre

The pillow effectively flexes the neck in relation to the torso; the chin-lift manoeuvre extends the head in relation to the neck. The so called sniffing position is achieved.

Beware application of a chin-lift manoeuvre without raising the occiput. This may lead to hyperextension of the neck, further compromising the airway.

Gentle movement is advised in patients with fixed neck deformities.

You can achieve the sniffing position in most patients with a pillow and chin-lift.

The jaw thrust

The jaw thrust (Fig 7) effectively lifts the mandible forwards, lifting the tongue off the posterior pharynx at the same time.

The key is to hook the left little finger underneath the angle of the jaw. Use the ring and middle fingers to secure further grip under the mandible and the index finger and thumb to help secure a tight seal between mask and face. Holding this position may become tiring. The same result (forward displacement of the tongue) may be achieved by the use of the oropharyngeal airway.



Fig 7: The jaw thrust

The chin-lift is suitable for those patients who, with an open airway, are breathing adequately. A high flow oxygen mask can be applied.

A jaw thrust is more suitable for patients who require bag-mask ventilation, since it is difficult to apply a mask and a chin-lift simultaneously.

Since movement of the head and neck is contraindicated in the context of suspected significant cervical spine injury, use a jaw thrust, not the chin-lift manoeuvre (or indeed a pillow).

Simple Airway Adjuncts

Introduction

The oropharyngeal and nasopharyngeal airways are designed to address airway obstruction. In most patients, the oropharyngeal airway (in particular) produces the same result as a jaw thrust. In such circumstances oxygen can be applied via an oxygen mask.

Oropharyngeal airway

The correct size oropharyngeal airway should reach from the patients incisors, to the angle of the jaw (Figs 8 and 9).



Fig 8: The oropharyngeal airway should reach from the patients incisors to the angle of the jaw



Fig 9: The flanged front end of the oropharyngeal airway should sit just in front of the teeth

Method:

1. Insert curved side uppermost, twisting it through 180 once inserted halfway
2. The flanged front end should sit just in front of the teeth
3. Confirm an improvement in ventilation has been achieved

Note: An oropharyngeal airway may precipitate vomiting or rarely, laryngospasm. In both situations, remove it promptly.

Nasopharyngeal airway

The key advantage over the oropharyngeal airway is the ability of the nasopharyngeal airway to relieve airway obstruction in those patients whose mouths are difficult to open, typically patients undergoing a seizure. Unless it is too long, it is unlikely to stimulate the oropharynx and is better tolerated in lighter patients.

The disadvantage of a nasopharyngeal airway is occasional nasal haemorrhage as a complication.

Method:

1. Lubricate the tube with gel and insert into the right nostril aiming gently towards the occiput, curved side down, with a little twisting motion if necessary
2. Change to a smaller airway if there is firm resistance
3. Check for bleeding in the oropharynx
4. Check for improvement in airway patency



Fig 10: Nasopharyngeal airways

Having secured a patent airway, ask yourself whether the patient needs:

- Ventilation
- An oxygen mask

You can subjectively gauge the adequacy of the patients spontaneous ventilation by the depth and rate of chest wall movement.

If ventilation is required you will need:

- The correct size facemask, which is one that fits snugly from the bridge of the nose to just above the chin (Fig 11)
- A self-inflating bag (Fig 12)



Fig 11: Facemask fitting snugly from the bridge of the nose to just above the chin

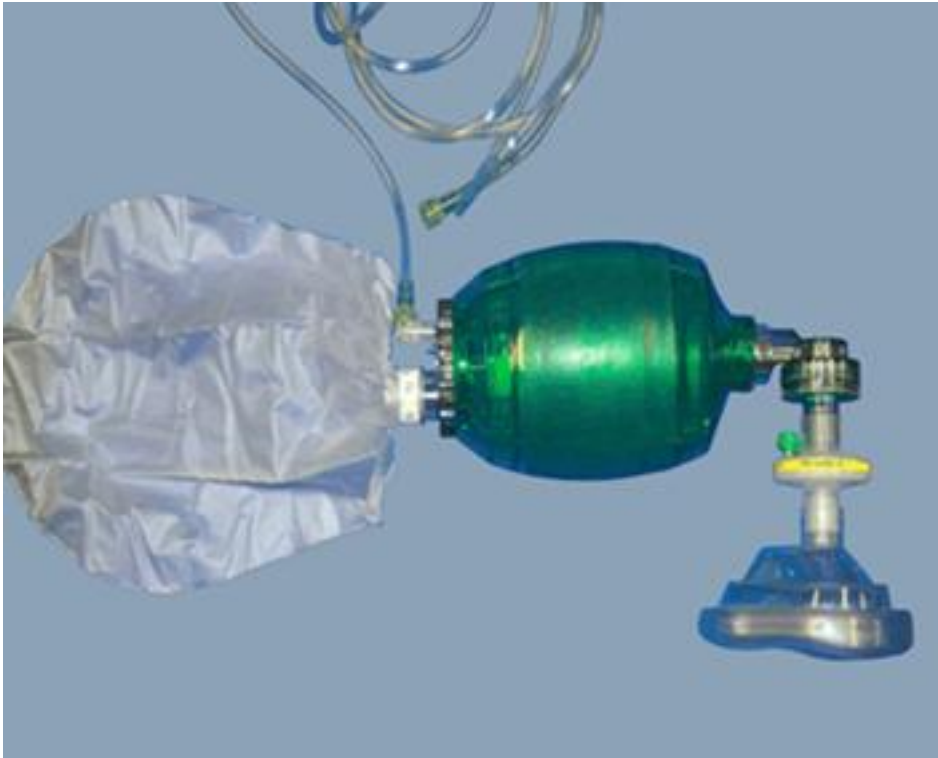


Fig 12: Self-inflating bag

Method

Check the airway does not need suctioning first, then:

1. Apply the mask firmly to the patients face using the index finger and thumb in a capital C shape (Fig 13)
2. Hook the little finger under the angle of the mandible and grip more mandible with the ring and middle fingers
3. Raise the spread fingers to effect the jaw thrust
4. Squeeze the bag firmly with the right hand, release, pause and repeat at a rate of 10 breaths per minute (Fig 14)



Fig 13: Single operator hand position



Fig 14: Single operator hand position

Adequate ventilation can be confirmed by looking for chest wall rise and fall, and improvement in oxygen saturation. More resistance in the bag than you might anticipate suggests a problem.

Single operator bag-mask ventilation is not an easy skill. Recognise your limitations as a single-handed airway practitioner. If you sense a problem ask someone to squeeze the bag as per your instructions, whilst you attempt to provide better airway patency and mask seal using your right hand opposite your left (**Fig 15**).



Fig 15: Two person bag-mask ventilation

Key Points

- The sniffing position can be achieved in most patients with a pillow and chin-lift
- Turning the unconscious patient on their side and tipping the trolley head down may be the best way of avoiding aspiration
- In trauma patients, apply the jaw-thrust not the chin-lift manoeuvre
- Toleration of an oropharyngeal airway is one of the best indicators of an unprotected airway
- Use the nasopharyngeal airway in patients with airway compromise whose mouths are difficult to open
- Single operator bag-mask ventilation is not an easy skill. Practice on a manikin

Sequence for a collapsed patient in hospital

An algorithm for the initial management of in-hospital cardiac arrest is shown in Figure 16. This session will concentrate on the shaded area:

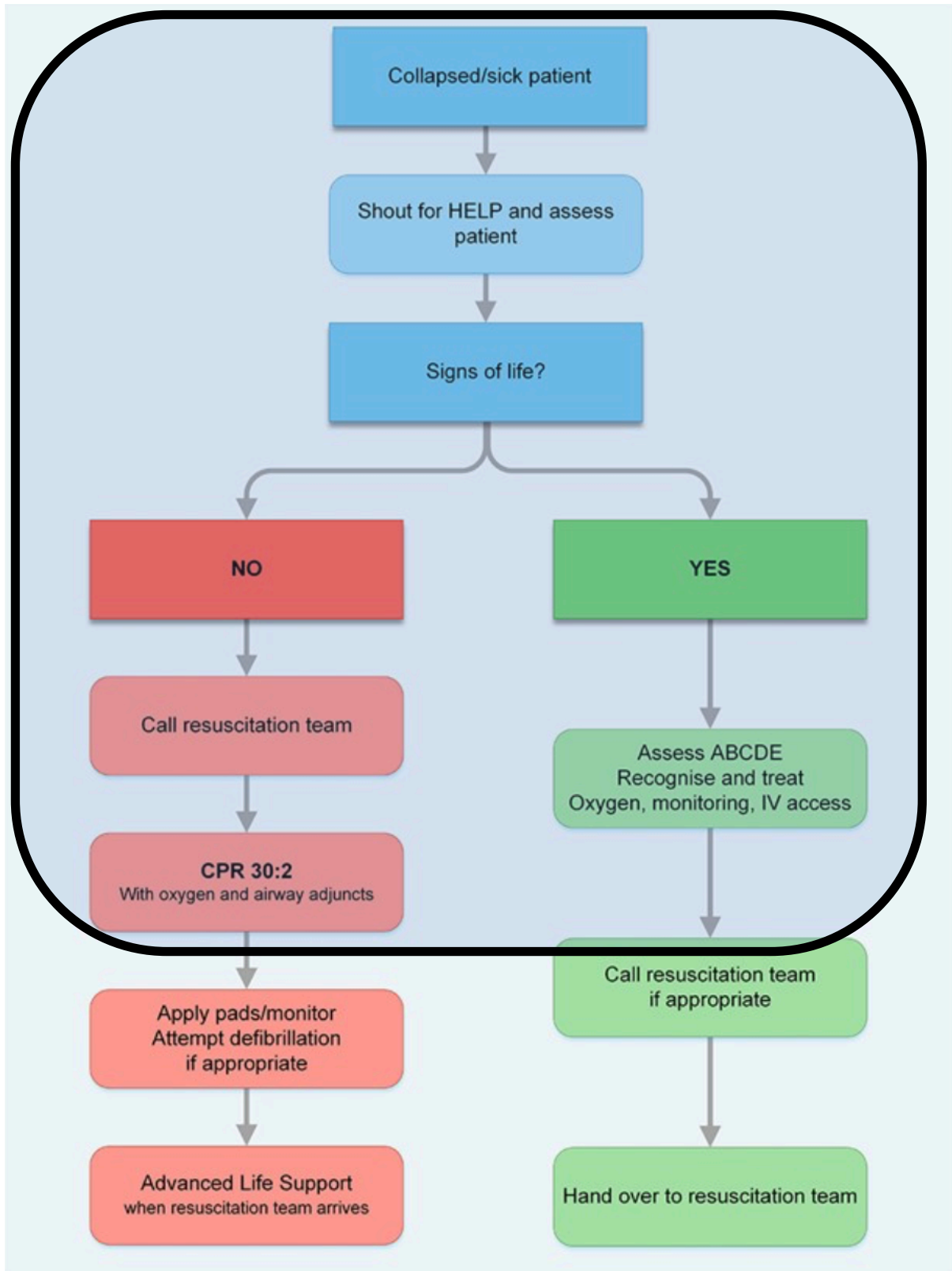


Figure 16

Ensure personal safety

- There are very few reports of harm to rescuers during resuscitation.
- Your personal safety and that of resuscitation team members is the first priority during any resuscitation attempt.
- Check that the patient's surroundings are safe.
- Put on gloves as soon as possible. Other personal protective equipment (PPE) (eye protection, face masks, aprons, gowns) may be necessary especially when the patient has a serious infection such as tuberculosis. Follow local infection control measures to minimise risks.
- Be careful with sharps; a sharps box must be available. Use safe handling techniques for moving victims during resuscitation. The Resuscitation Council (UK) has produced [Guidance for safer handling during cardiopulmonary resuscitation in healthcare settings](#).

Check the patient for a response

- If you see a patient collapse or find a patient apparently unconscious assess if he is responsive (shake and shout). Gently shake his shoulders and ask loudly: "Are you all right?"
- If other members of staff are nearby it will be possible to undertake several actions simultaneously.

If the patient responds

- Urgent medical assessment is required. Call for help according to local protocols. This may include calling a resuscitation team (e.g. medical emergency team (MET)).
- Give the patient oxygen. Use a pulse oximeter to guide oxygen therapy.
- Attach monitoring: a minimum of pulse oximetry, ECG and blood pressure.
- Prepare for handover using SBAR (Situation, Background, Assessment, Recommendation) or RSVP (Reason, Story, Vital signs, Plan).⁶

If the patient does not respond

- Shout for help (if not done already).
- Turn the patient on to his back.
- Open the airway using head tilt and chin lift.
- Keeping the airway open, look, listen, and feel to determine if the victim is breathing normally. This is a rapid check and should take less than 10 seconds:
 - Look for chest movement (breathing or coughing)
 - Look for any other movement or signs of life
 - Listen at the victim's mouth for breath sounds

- Feel for air on your cheek
- If trained and experienced in the assessment of sick patients, check for breathing and assess the carotid pulse at the same time. The assessment should take less than 10 seconds whether you do a pulse check or not.

If there are signs of life or a pulse

- Urgent medical assessment is required. Depending on the local protocols, this may take the form of a resuscitation team.
- Follow the steps in 3A above whilst waiting for the team.
- The patient is at high risk of further deterioration and cardiac arrest and needs continued observation until help arrives.

If there are no signs of life and no pulse

- Start CPR and get a colleague to call the resuscitation team
- If alone, leave the patient to get help and equipment.
- Chest compressions in a patient whose heart is still beating are unlikely to cause harm. However, delays in diagnosing cardiac arrest and starting CPR will adversely affect chances of survival and must be avoided, so if there is any doubt proceed as if there are no signs of life and no pulse.
- Give 30 chest compressions followed by 2 ventilations.
- The correct hand position for chest compression is the middle of the lower half of the sternum.
- This hand position can be found quickly if you have been taught to 'place the heel of one hand in the centre of the chest with the other hand on top' and your teaching included a demonstration of placing hands in the middle of the lower half of the sternum.
- Ensure high quality chest compressions:
 - Depth of 5–6 cm
 - Rate of 100–120 compressions min⁻¹
 - Allow the chest to recoil completely after each compression
 - Take approximately the same amount of time for compression and relaxation
 - Minimise any interruptions to chest compression (hands-off time)
- Do not rely on palpating carotid or femoral pulses to assess the effectiveness of chest compressions.
- Resume compressions without any delay; place your hands back on the centre of the patient's chest.
- If there are enough team members, the person doing chest compressions should change about every 2 min or sooner if they are unable to maintain high quality chest compressions. This change should be done with minimal

interruption to compressions. This should be done during planned pauses in chest compression such as during rhythm assessment.

- Use whatever equipment is available immediately for airway and ventilation (e.g. a self-inflating bag-mask).
- Use an inspiratory time of about 1 second and give enough volume to produce a visible rise of the chest wall. Avoid rapid or forceful breaths.
- Add supplemental oxygen as soon as possible.
- There are usually good clinical reasons to avoid mouth-to-mouth ventilation in clinical settings, and it is therefore not commonly used, but there will be situations where giving mouth-to-mouth breaths could be life-saving (e.g. in non-clinical settings). If there are clinical reasons to avoid mouth-to-mouth contact, or you are unable to do this, do chest compressions until help or airway equipment arrives. A pocket mask or bag-mask should be immediately available in all clinical areas.

If the patient is not breathing and has a pulse (respiratory arrest)

- Ventilate the patient's lungs (as described above) and check for a pulse every 10 breaths (about every minute).
- This diagnosis can be made only if you are confident in assessing breathing and pulse or the patient has other signs of life (e.g. warm and well-perfused, normal capillary refill).
- If there are any doubts about the presence of a pulse, start chest compressions and continue ventilations until more experienced help arrives. All patients in respiratory arrest will develop cardiac arrest if the respiratory arrest is not treated rapidly and effectively.