Summary of Resuscitation Techniques for Health Professionals LEVEL 4
CPR Guidelines – Main Points

**Basic Life Support**
- Follow the DRS-ABCD approach
- The need for CPR is determined by unresponsiveness and the absence of normal breathing
- The initial check for normal breathing should be no more than ten seconds

**Chest Compressions**
- Compression/ ventilation ratio for unintubated patients 30: 2 for adults and children in Basic Life Support, 15:2 for children/infants in Advanced Life Support
- Minimise all interruptions to chest compressions
- Hard and Fast and Fresh. Allow the chest to recoil fully
  - Hard (i.e. depress the chest by 1/3 of its anterior/ posterior diameter)
  - Fast (i.e. chest compressions are at 100 compressions per minute)
  - Fresh (i.e. Change compression person every 2 minutes)
- Once intubated, compressions are continuous and ventilations are 10 breaths per minute for adults and 15 breaths per minute for children and infants

**Rescue Breaths**
- These breaths are attempted. If unsuccessful, do not delay the resumption of chest compressions
- Each breath is given over one second, and with enough volume to produce chest rise
- In adults the focus is on early defibrillation – send for help first, and compressions as a priority over rescue breathing
- In children and infants 2 attempted initial breaths are given, enough to produce chest rise. In child/infant collapse – send for help fast (1 minute of CPR before going for help)

**Pulse Checks**
- The pulse is no longer checked during the initial assessment and then only if there are signs of life or it is noted that there is a rhythm present that could be associated with cardiac output

**Precordial Thump**
- The precordial thump has largely been omitted
- A single precordial thump is administered to the centre of the chest during a witnessed adult collapse, AND the patient is cardiac monitored, AND you see they are in Ventricular Tachycardia, AND there is no defibrillator immediately available

**Manual Defibrillation**
- All manual defibrillation shocks are given at maximum output of the defibrillator in adults and at 4 J/kg in children.
- Defibrillations are given as a single shock followed by two (2) minutes of CPR
- Reanalyse every 2 minutes
AEDs
- AEDs are pre-programmed to deliver a certain amount of energy.
- Turn the AED on and follow the voice prompts

Drug Management
- Adrenaline
  - Shockable
    - 1 mg is given after the second shock/defibrillation and then every second loop (shock : CPR 2 minutes = 1 loop)
  - Non-shockable
    - 1mg given as soon a possible
  - Children/Infants
    - 10mcg/kg (0.1ml/kg 1:10000)

- Amiodarone is given in persistent VF and pulseless VT after the third (3rd) shock/defibrillation. In adults amiodarone 300mg is given. In children and infants 5mg/kg amiodarone is given.
Basic Life Support

D
Dangers?

R
Responsive?

S
Send for help

A
Open Airway

B
Normal Breathing?

C
Start CPR
30 compressions : 2 breaths
if unwilling / unable to perform rescue breaths continue chest compressions

D
Attach Defibrillator (AED)
as soon as available and follow its prompts

Continue CPR until responsiveness or normal breathing return

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<tr>
<td><strong>D</strong></td>
<td><strong>DANGER</strong></td>
<td>Approach the victim while ensuring your own safety from electrocution, fire, poison, traffic or other physical hazards. If necessary, while bearing in mind the possibility of spinal injury, the victim should be moved in order to ensure the safety of both the victim and the rescuer.</td>
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<td><strong>R</strong></td>
<td><strong>RESPONSE</strong></td>
<td>Gently shake the victim and shout &quot;are you okay?&quot; but do not aggravate any injuries. Other ways to check for responsiveness include a tap on the clavicle, sternal rub or squeezing the trapezius muscle. In adult collapse, the most likely rhythm is VF or VT. It is therefore important that the medical emergency team/ambulance should be always be called to decrease the time from collapse to defibrillation and optimised further management</td>
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<td><strong>S</strong></td>
<td><strong>SEND FOR HELP</strong></td>
<td>In adult collapse, the most likely rhythm is VF or VT. It is therefore important that the medical emergency team/ambulance should be always be called to decrease the time from collapse to defibrillation and optimised further management. In the in-hospital setting activate the emergency call bell system and ask one of your colleagues to call the emergency number. This is a Code Blue. In the out of hospital setting ensure that a specific individual has the responsibility for calling 111 for an ambulance and ensure that they return and confirm that the ambulance is on its way. The rescuer should go for help if they are alone and help is not on the way. If it is going to take longer than 3 minutes to go for help or if it is a drowning victim or a child, CPR should be performed prior to going for help</td>
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<td><strong>A</strong></td>
<td><strong>OPEN AIRWAY</strong></td>
<td>Open the airway by applying the head tilt and chin lift manoeuvre. If the casualty shows signs, or the history is suggestive of injury, open the airway using a jaw thrust. Remove obvious causes of upper airway obstruction, such as vomit, with 2 fingers covered in cloth.</td>
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<td><strong>B</strong></td>
<td><strong>CHECK BREATHING</strong></td>
<td>Within 10 seconds, determine if the victim is breathing by placing your ear over the victim’s mouth and nose while maintaining an open airway. Look and feel for movement of the chest and listen and feel for air escaping during exhalation. Remember that slow gasping respirations (agonal breathing), may persist for several minutes after a cardiac arrest. These agonal breaths are generally ineffectual and rescue breaths are required. ** If breathing is present and there is airflow at the mouth, place the victim in the recovery position if they are unconscious.</td>
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| **C** | **CPR** | Chest compressions are delivered over the lower half of the sternum. Run the dominant hand to the top of the victim’s axilla and place this hand in the centre of the chest directly opposite the top of the axilla. Now place the second hand on top of the first. The fingers are lifted from the chest wall and only the heel of the hand should be in contact with the sternum. Keep the arms straight with the elbows locked in position. The shoulders should be positioned directly above the hands so that the thrust for each compression is straight down onto the sternum. 

**Push**  
**Hard** (depress the chest by 1/3 of its anterior/ posterior diameter) and **Fast** (compress at a rate of 100 compressions per minute) and **Fresh** (Change the compression person every 2 minutes) |
| **D** | **Defibrillate** | ATTACH AN EXTERNAL DEFIBRILLATOR AS SOON AS POSSIBLE. The goal is to defibrillate the victim as soon as possible after cardiac arrest |
Airway

Airway Occlusion

During unconsciousness the greatest cause of airway occlusion is the tongue. As unconsciousness deepens the loss of muscle tone causes the tongue to fall to the back of the pharynx thus occluding the airway. Any noises such as snoring, grunting, wheezing, stridor or gurgling indicate that some form of airway management is required.

Outlined below are some common basic moves to open the airway

**Head Tilt Chin Lift**

[Image of Head Tilt Chin Lift]

**Jaw Thrust**

This method of opening the airway is for those patients with suspected neck injuries.

[Image of Jaw Thrust]

Breathing

After establishing that the airway is clear and open, the next step is to establish the presence (or absence) of breathing.

The ‘look, listen, feel’ technique quickly confirms whether or not breathing is present.

**Look, listen feel:**
- **LOOK** for the rising or falling of the chest
- **LISTEN** for breathing by placing your ear close to the patients’ mouth.
- **FEEL** for chest movement by placing your hand on the patient’s chest.

If normal or adequate breathing that moves air is absent, proceed with 30 chest compressions and 2 breaths/ventilations for the adult patient.

Breathing is done by pinching the patient’s nose while maintaining head tilt and chin lift. The rescuer takes a deep breath and makes a tight seal around the patient’s mouth. The rescuer then blows sufficient air into the patient’s mouth to make the chest rise. The rescuer then turns their head and looks down the patient’s chest to watch it fall before giving the next breath. Each breath should be given over 1 second. Quick breaths can cause gastric inflation that increases the risk of regurgitation.

If using a bag mask resuscitator never simply push the mask onto the patient’s face. Position it over the mouth and nose and hold it in place by the thumb and index finger placed around the collar of the face mask. The other three fingers grasp the lower jaw, and lift it into the mask to obtain an airtight seal with the face.

**Bag Valve Mask**

The bag valve mask (BVM) is used to ventilate the patient. In conjunction with high flow oxygen and an oxygen reservoir it delivers approximately 90% oxygen. Each ventilation is delivered over one second. The **10/10 rule** is useful to bear in mind when ventilating the patient.

10 – Run O2 at **10 litres per min** plus or alternatively until the reservoir bag fills.

10 – For the pt in respiratory arrest with a pulse, ventilate them **10 x per min**.
   For the pt that is intubated and in cardiac arrest, ventilation rate is **10 x per min**.
Excessive ventilation in terms of rate or volume leads to:

- Risk of aspiration.
- Gas trapping & decreased tidal volume.
- Increasing intrathoracic pressure $\rightarrow \downarrow$ coronary perfusion.

If you have problems achieving a seal with the BVM, use two hands to hold the mask, and have another person squeeze the bag.

Further information can be found by following this link

Compressions

The need for resuscitation is identified by unresponsiveness and the absence of normal breathing.

Hands should be placed on the lower third of the sternum

Use either a one or two hand technique for children

In babies, use the two finger or the two thumb technique

Compression rate for all ages is 100/min

Compression depth should be approximately 1/3 of the depth of the chest


Defibrillation

The combination of early CPR, early defibrillation and early Advanced Cardiac Life Support has been termed the ‘Chain of Survival’ The table below reprinted from the AHA Textbook of ACLS
clearly represents how early access to all of the steps of the chain of survival reflects better patient outcomes.

### Rationale for Early Defibrillation
- The most frequent initial rhythm in sudden cardiac arrest is VF.
- The only effective treatment for VF is electrical defibrillation.
- The probability of successful defibrillation diminishes rapidly over time.
- VF tends to convert to asystole within a few minutes

### Safety when defibrillating
- Use with care around water – dry the patient’s chest.
- Always ensure that charged paddles remain in contact with the patient.
- There are two places for defibrillator paddles, on the patient or in the machine. DO NOT wander around with the paddles.
- Always shout for people to stand clear when you are about to defibrillate.
- Visually check nobody is touching the patient before you discharge the shock.
- Use a contact medium to prevent burning the patient (e.g. 3M™ Gel Pads).
- Never touch the patient who is receiving the DC shock.
- Do not use in the presence of flammable gases. If using a BVM & 02 remove the mask prior to defibrillation. If your patient is intubated and you therefore have closed circuit from which the 02 cannot escape, nothing different needs to be done.
- Do not defibrillate over GTN patches
- If a permanent pacemaker is placed under the right clavicle the pad/paddle should be placed at least 8 cm away, or the antero-lateral configuration should be adopted (NZRC


Paddle and electrode placement

1. Keep away from jewellery.
2. If patient’s chest is so hairy electrodes do not contact the skin then the use of a razor is indicated.

ECG Rhythm Recognition

For assistance in ECG interpretation and recognition, the following website may be of assistance:
http://www.skillstat.com/learn.htm - click on ECG Simulator
Automated External Defibrillators

**WHAT IS AN AED?**
The Automated External Defibrillator (AED) is a small compact device that
Interprets heart rhythms
Delivers an electrical shock to treat sudden cardiac arrest

**WHAT ARE THE INDICATIONS FOR USING AN AED?**
Unconsciousness
Abnormal breathing

**VOICE PROMPTS FROM AED**
1. Each AED manufacturer has different instructions
2. Turn the AED on, listen and follow the instructions
3. **DO NOT** stop CPR until the AED advises you too

**BEFORE YOU PRESS THE SHOCK BUTTON**
Check that no one is touching the patient/victim – including yourself
State clearly – “stand back”
Push the shock button

Follow machine prompts which will tell you when to analyse again
- Note – Portable self contained units count down automatically – hospital combination manual and AED machines need the “Pause” button pressed to start an automatic count down
- Note: CPR should continue until the AED begins analysis and immediately after the delivery of the defibrillation shock

**AED BATTERY**
- Will last a minimum of 300 shocks or 12 ‘on’ hours
- Has a shelf life of 5 years, even if it is not used
- Must not be turned on to practice
  1. **Daily Check** – Check the status indictor window should display an hour glass and not a cross
  2. **Monthly Check** – Check the AED pads for expiry dates and signs of damage

**Note**
- AED pads ALSO plug into the manual defibrillator pads connector
  Once pads are on, there is **NO** reason to remove and change to paddles

How are children different

- An infant is less than 1 year of age
- A young child is 1 – 8 years of age
- An older child in 9 – 14 years of age
- Older children may be treated as per adult protocols
- VF may be the cause of approximately 10% of paediatric arrests
- It is rare for a child to have a primary cardiac arrest. Most cardiac arrests are secondary to hypoxia
- Therefore the paediatric arrest algorithm places rescue breaths not compressions as first priority - **2 attempted breaths** may be given first in Advanced Life Support
- Other causes of cardiac arrest include trauma, dehydration and sepsis
- **Cardiac compressions are 100 compressions per minute**
- Once intubated, give breaths at a rate of 15 min for an infant or child during uninterrupted chest compressions
- If a manual defibrillator is not available infants ≤ 1 year and children 1-8 yrs may be treated with an AED if it has a dose attenuator. If neither is available, use the preset AED energy levels
- Manual defibrillation is given at 4 Joules/kg

**Adrenaline:** 10mcg/kg (0.1ml/kg of 1:10,000) intravenous or intra-osseous dose

- Give 1st dose after second shock for patients with a VT/VF arrest
- Give 1st dose as soon as possible for patients in PEA or asystolic arrest
- Adrenaline is given immediately post defibrillation and followed with 2 minutes of CPR
- Give every alternate loop or every 4 minutes thereafter

**Amiodarone:** 5mg/kg in 10mls of 5% Dextrose

- Give Amiodarone for VT/VF arrests after the 3rd defibrillation
# Choking

## Recognition

Because recognition is the key to successful outcome, it is important to ask the conscious victim “Are you choking?” This at least gives the victim who is unable to speak the opportunity to respond by nodding!

Consider the diagnosis of choking particularly if:

- Episode occurs whilst eating, and onset was very sudden.
- Adult victim - may clutch his or her neck, or points to throat.
- Child victim - there may be clues, e.g. seen eating or playing with small items just before onset of symptoms.

## Assess severity

- **Effective Cough (Mild Airway Obstruction):**
  - The patient is able to breathe, cough effectively and speak.
  - Children are fully responsive, crying or verbally respond to questions, may have loud cough (and able to take a breath before coughing).

- **Ineffective Cough (Severe Airway Obstruction):**
  - Victim unable to breathe or speak/vocalise.
  - Attempts at coughing are quiet or silent.
  - Cyanosis and diminishing conscious level (particularly in children).
  - Victim unconscious.

## Management

### Adults

- With an effective cough, encourage the patient to continue coughing, but do nothing else except monitor for deterioration. If the obstruction is not relieved – call 111
- Ineffective cough in a conscious patient:
  - Stand to the side and slightly behind the victim, support the chest with one hand and lean the victim well forwards (so that the obstructing object comes out of the mouth rather than going further down the airway).
  - Give up to five sharp back blows between the shoulder blades with the heel of your other hand (checking after each if the obstruction has been relieved).
  - If unsuccessful, give up to five chest thrusts. Stand behind the victim put both arms around the chest, identify the same compression point as for chest compressions, clench one fist, grasp it with the other hand and pull sharply inwards.
  - Continue alternating five back blows and five chest thrusts until successful or the patient becomes unconscious.
In an unconscious patient:

- Lower the patient to the floor.
- Call an ambulance immediately.
- Begin CPR.

**Children**

- If coughing effectively, just encourage the child to cough, and monitor continuously.
- If coughing is, or is becoming, ineffective, shout for help and assess the child’s conscious level.
- If the child is conscious, give up to five back blows, followed by five chest thrusts in infants and children (repeat the sequence until the obstruction is relieved or the patient becomes unconscious).
  - For infants (<1 year old): back blows and chest thrusts:
    - In a seated position, support the infant in a head-downwards, prone position to let gravity aid removal of the foreign body.
    - Support the 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 jaw, as this will aggravate the airway obstruction.
    - Deliver up to five sharp blows with the heel of your hand to the middle of the back (between the shoulder blades).
    - After each blow, assess to see if the foreign body has been dislodged and, if not; repeat the manoeuvre up to five times.
    - After five unsuccessful back blows, use chest thrusts: turn the infant into a head-downwards supine position 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. This is the lower sternum. Deliver five chest thrusts. These are similar to chest compressions for CPR, but sharper in nature and delivered at a slower rate.
  - For children (1 year old to puberty): treatment is the same as in Adults:
    - Blows to the back are more effective if the child is positioned head down. A small child can be placed across the lap as with an infant. If this is not possible, support the child in a forward-leaning position.
    - Deliver up to five sharp back blows with the heel of one hand in the middle of the back between the shoulder blades.
    - After five unsuccessful back blows, chest thrusts are used
      - Repeat chest thrusts up to 5 times.
- If the child becomes unconscious, place him or her on a flat, firm surface, shouting for help if none has arrived. Open the mouth and look for any obvious object. If one is seen, make an attempt to remove it with a single finger sweep (don’t do blind finger sweeps).
- If unsuccessful, begin CPR as for paediatric basic life support.
Adult Anaphylaxis

Anaphylaxis suspected?

Stop administration / Remove trigger
Call for help - Position supine
High flow oxygen - Attach monitoring

Cardiac Arrest
Start CPR
IV/IO access
Intravenous adrenaline 1mg every 3-5mins
2L saline rapidly
Consider increased doses/frequency of IV adrenaline if still in cardiac arrest > 5mins

Diagnosis:
Look for acute onset of illness
Life-threatening airway and/or breathing and/or circulation problems
And usually skin changes

Shock / Bronchospasm
Intramuscular adrenaline
0.3-0.5mg

Attempt IV cannulation
Intravenous fluids

If hypotension, bronchospasm or airway swelling persists 5-10mins after first dose of IM adrenaline
Administer second dose of IM adrenaline

*Life-threatening problems
Airway (swelling, hoarseness, stridor)
Breathing (rapid breathing, wheeze, fatigue, cyanosis, SpO2<92%)
Circulation (pale, clammy, low blood pressure, tautness)

*Intramuscular adrenaline
Use 1:1,000 adrenaline / 0.3-0.5mg (0.3-0.5mL). Preferred injection site: upper outer thigh
Check route and dose before administration (to ensure adrenaline is given IM)

*Intravenous fluids
0.9% Sodium Chloride: 1000mL. Rapid infusion then titrate according to requirements

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