



# **BLS & AED Student Handout**



## The Chain of Survival

For us to survive on a day to day basis two things need to happen, air needs to go in and out (Breathing) and blood needs to go round and round (Circulation). If either of these things stop then the brain begins to deteriorate. We can help slow this deterioration in a sudden cardiac arrest by carrying out the steps of the 'Chain of Survival' as quickly as possible.



### Early Recognition and Call for Help

The sooner we recognise that somebody is suffering from a potential heart problem the sooner we call the emergency services. Steps can then be taken to prevent the cardiac arrest from happening. Once arrest has occurred then time is of the essence.

### Early CPR

Chest compressions and rescue breaths keep oxygen circulating around the body, slowing the deterioration of the brain. Chance of survival is also greatly increased.

### Early Defibrillation

The sooner we defibrillate the heart the better the chance of survival. Every minute costs the casualty a 10% chance of surviving.

### Post Resuscitation Care

The emergency services will start this to stabilise the casualty and it will be continued in hospital. This will increase the chance of long term survival.

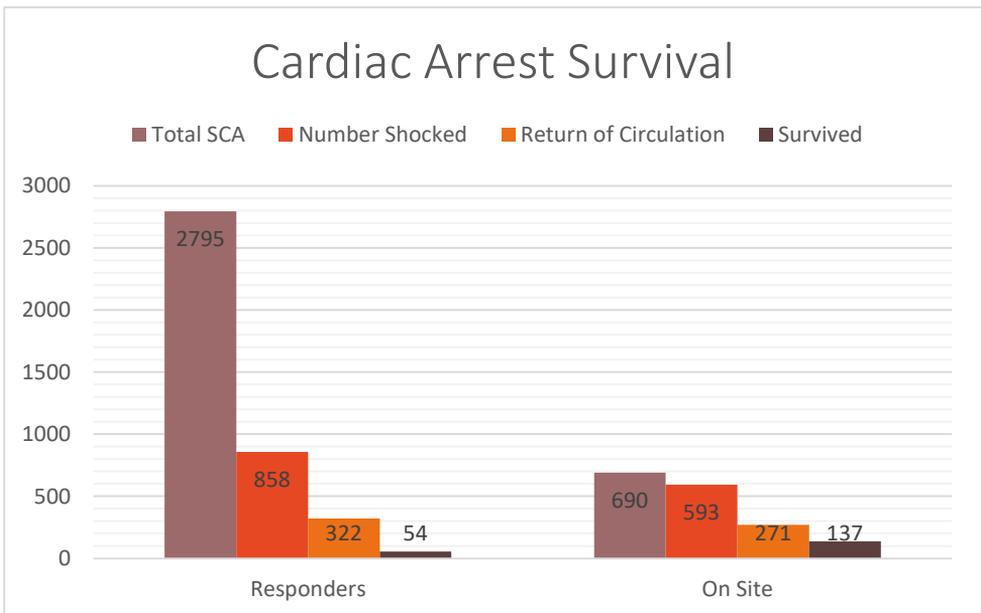
## Cardiac Arrest Survival

The UK Resuscitation Council carried out a study of the survival rates of individuals who were attended by a responder with an AED.

The study looked at the results of treatment where an AED was 'on site' versus cardiac arrests where it was necessary for somebody to respond to the event by travelling to the casualty.

There was a significant difference between the two scenarios, with 'on site' AED's greatly improving the chance of survival.

- Overall survival rate for a return of circulation for responders bringing an AED was 11.5%
- Overall survival rate for a return of circulation for 'on site' AEDs was 39%
- Of 690 Sudden Cardiac Arrests that happened where an AED was 'on site', 593 received a shock
- 271 of these people had a return of circulation and at least 137 survived and were discharged from hospital.



## What is an AED?

An Automated External Defibrillator (AED) is an electronic device that will analyse the heart rhythm of a casualty and decide if the heart would benefit from an electric shock to return the heart to an effective beating rhythm.

They are designed to be used by 'Lay' rescuers, that is people with no medical training. They are safe and very reliable and will give verbal instructions with voice prompts and many also have visual indications.



There are many AEDs in public places such as supermarkets, train stations and shopping centres.

Some public access AEDs may be in a locked box. The code for the box is normally available from the Ambulance Service when you call them.

Most AEDs will run self checks and give an indication as to their status. The only maintenance is replacement of pads and batteries when they expire.

AEDs should come with an accessory kit. This normally contains items such as:

- Scissors
- Razor
- Resuscitation face shield or pocket mask
- Protective Gloves
- Some AEDs may have spare AED pads or Paediatric Pads



## The Primary Survey

The primary survey involves making initial checks for life threatening conditions and the actions to improve these conditions. We remember what to do in the primary survey by remembering the letters

# DRABC

## D is for Danger

Ensure that it is safe to approach the casualty and that there is no danger to the first aider, the casualty or bystanders.

## R is for Response

We must assess the level of response of the casualty. This allows us to monitor and detect any changes in the level of consciousness that the casualty may be experiencing. There are 4 levels of consciousness used in first aid. They are:

### A for Alert

This means that the casualty is able to speak to us and understands what is happening.

### V for Voice

Does the casualty respond when we talk to them? Give them a shake and talk loudly to them. Do they make sense, are they confused? Can they carry out a simple task such as open their eyes or to wiggle their fingers?

### P for Pain

If the casualty does not respond to our voice then we can inflict a *small* amount of pain, such as pinching the lobe of the ear. Look at the casualties face to see if there is any response to this.

### U for Unresponsive

If the casualty does not respond to any of the stimulus that we have applied, then they are considered to be unresponsive.

If we use the **AVPU** scale, then we are able to see if there is any improvement or deterioration in the response level of the casualty while they are in our care.

## A is for Airway

When a casualty is lying flat on their back it is highly probable that the tongue will fall to the back of the throat and block off the casualties' airway.

We should open the airway by placing one hand on the casualties' forehead and using the fingers of the other hand, hold underneath the chin. We then tilt the head and neck back and lift the chin.

This manoeuvre is known as the **head tilt/chin lift**.



## B is for Breathing

Once we have opened the casualties' airway we need to check that they are actually breathing.

We do this by placing our cheek and ear very close to the casualties' mouth whilst maintaining the head tilt/chin lift and looking down the length of the body.

We are then able to:

**Listen** for breathing

**Feel** any breath on our cheek

**See** the chest rise and fall

We need to check for normal breathing for at least 10 seconds before we decide that it is absent.



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## BLS & AED

In the case of cardiac arrest there may be attempts by the casualty to breathe. These are short, infrequent attempts that are not effective breaths. These are known as **agonal breathing** and should not be confused with normal breathing.

If a casualty is **NOT** breathing, then we need to begin CPR immediately.

If we find that the casualty is breathing, then we can move on to C.

## C is for Circulation

After we have confirmed that a casualty is breathing we need to check for any life threatening conditions that could be affecting the circulation of the casualty.

We can make a quick check for any obvious signs that the casualty is suffering from

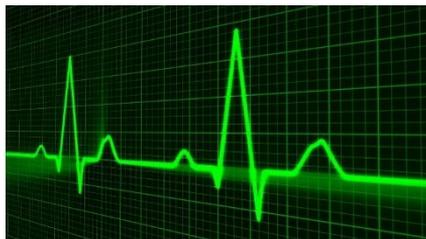
- Major bleeds
- Serious heart condition such as a heart attack
- Signs of a stroke
- Anaphylactic shock
- Shock

We can check the casualties' circulation by carrying out a capillary refill test.

Press down firmly on the casualties' finger nail or forehead and see how long it takes for the blood to return. It should be less than 2 seconds.

If the blood does not return it is a sign that the heart is not beating and we should carry out CPR.

If the refill is much slower than 2 seconds, then it could be a sign of one of the conditions above.



## Action on Vomiting

You need to be aware that the casualty may vomit at any time. If this happens whilst the casualty is on their back, then the vomit will most likely go down the airway making it very difficult to breathe or may completely block the airway and choke the casualty.



The casualty should be turned onto their side to allow any vomit to drain out of their mouth. Turn the casualty away from you (so you don't get covered!) and support them with your knees.

## Recovery Position

After we have completed our primary survey we need to move the casualty into a better position to protect the airway.

We begin by ensuring the casualties' legs are out straight.



If they are wearing glasses then remove them and put them somewhere safe, not the floor.

We then move the arm nearest to us outwards, with the elbow bent and the palm upmost. If the arm will not lie naturally on the floor do not force it down.



Bring the far arm across the chest and hold the back of that hand against the cheek, your palm to their palm.

We are going to support the head with this hand.

With your other hand, grasp the knee of the far leg and pull this upwards, keeping the foot flat on the ground.

Use the knee to pull them towards you, rolling them on to their side.

Keep your other hand under their head, supporting it as they roll.

Tilt the head back to keep the airway open and re-check the casualties' breathing.

Keep the casualties' hand under their head as support and move the upper leg so that the hip and knee are bent.



Keep monitoring the casualty, checking breathing and pulse, on a regular basis.

## Cardio Pulmonary Resuscitation (CPR)

CPR is carried out in the case of a sudden cardiac arrest.

We always begin with the Primary Survey with every casualty. On reaching the 'B' of the D. R. A. B. C. we will discover that the casualty is not breathing. This is when time is of the essence and we must start CPR immediately.



## Cardiac Compressions

The most likely cause of an adult to collapse and have no breathing or heart beat is sudden cardiac arrest. The heart stops working first, quickly followed by the breathing. For this reason, we start adult CPR with Cardiac Compressions.



You should begin by exposing the chest area.

Place the heel of one hand in the centre of the chest, approximately mid-way up the breast bone.

Place your other hand over the first and interlink your fingers.

Use the top hand to pull the lower fingers off the chest, leaving only the heel of the hand in contact.

Lean right over the casualty so that your shoulders are above your hands.

Bend your body in the middle, pushing down through your locked arms, and compress the casualties' chest by 5-6cm.

Carry out a total of 30 compressions.

Try and maintain a rate of at least 100 to 120 compressions a minute.

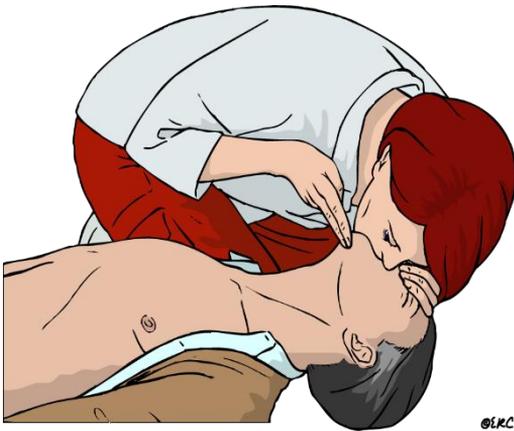
The relaxation and compression should be of a similar length.

After completing one set of 30 compressions you should move onto carrying out rescue breaths.

### Rescue Breaths

Tilt the head back and lift the chin, the same as when clearing the airway.

Take a normal breath



Seal your mouth over the casualty's mouth and pinch the nose.

Blow into the mouth until the chest rises.

Allow the chest to fall and then repeat.

Continue with 30 compressions and 2 rescue breaths until further medical help arrives or you are no longer capable of continuing.

If possible you should change CPR

operator every 2 minutes.

### Chest Compression Only Resuscitation

If there is a risk to your safety by doing rescue breaths, or you are unwilling to carry out rescue breaths, then you should carry out chest compression only resuscitation.

- Maintain 100 – 120 beats a minute
- Only pause to change rescuers every 1 to 2 minutes
- Only stop if it is obvious the casualty has recovered
- It may be possible to use a resuscitation device to protect you when carrying out rescue breaths. Restart rescue breaths if one of these becomes available.

## Cardio Pulmonary Resuscitation (CPR) with an AED

Only try to use an AED if there is a person to assist you. One person to carry out CPR and the other to operate the AED.

When using an AED try to maintain CPR as much as possible, only stopping when the AED prompts you to do so.

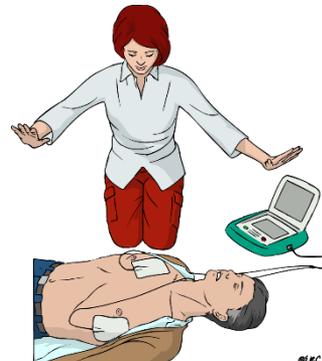
1. Switch on the AED and follow the instructions.
2. Expose the casualties' chest if not already done so.
3. It may be necessary to remove any excess chest hair using a razor from the AED accessory pack.
4. It may also be necessary to dry the chest, particularly if the casualty has been in contact with water.
5. Open the packet containing the electrode pads.

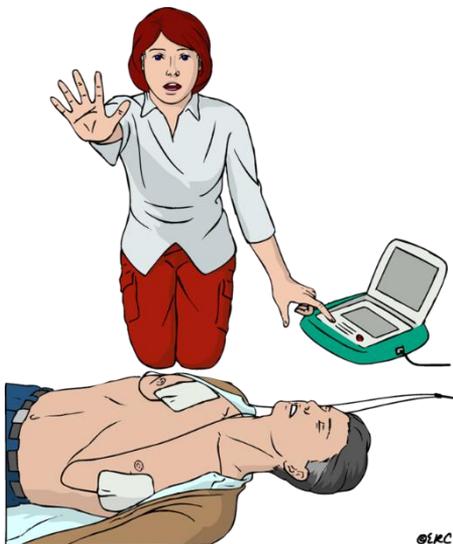


6. Place the first pad on the upper right of the chest below the collar bone.
7. Place the second pad on the left side of the chest, on the lower ribs below the armpit.
8. If the electrodes have been placed in the opposite positions to those shown on the pads do not change them, as long as they are on the upper right and lower left of the chest then they will work.



9. Once the pads are in position the AED will instruct you to stop CPR while the heart rhythm is analysed. Do not touch the casualty at this point as you may affect the analysis of the heart.



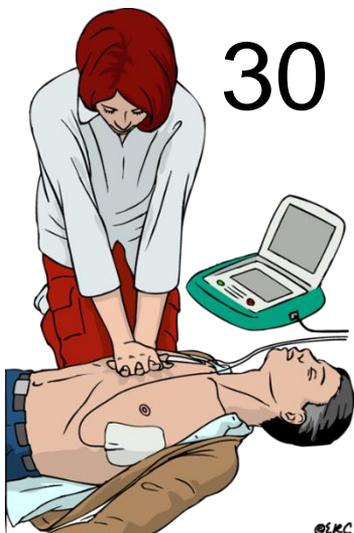


## Shock Advised

- Ensure nobody is touching the casualty, shout 'STAND CLEAR'.
- Push the button if the AED is Semi-Automatic, a Fully-Automatic AED will just deliver the shock.
- Restart CPR as soon as the shock has been delivered.
- Try to keep the pauses for shocks and breaths as short as possible. Maintain the chest compressions as much as you can.

## No Shock Advised

- Continue CPR at a ratio of 30 compressions to 2 breaths.
- Continue CPR until the AED gives the next set of instructions.



Continue providing CPR and following the AED instructions until your casualty recovers or the Emergency Services take over.

Do not remove the pads, allow the Emergency Services to remove these when they arrive.

## Caution with an AED

There are a number of precautions that we must take when using an AED. The actual risk of significant harm is minimal but a few simple precautions will ensure that we don't do any unintentional harm.

**Electric Shock:** It is unlikely that you would receive an electric shock when defibrillating a casualty. It is still best practice to ensure that nobody is touching the casualty, just in case!



**Medication Patches:** Some casualties may have a medication patch on their chest. These patches can explode if electricity is passed through them so must be removed.



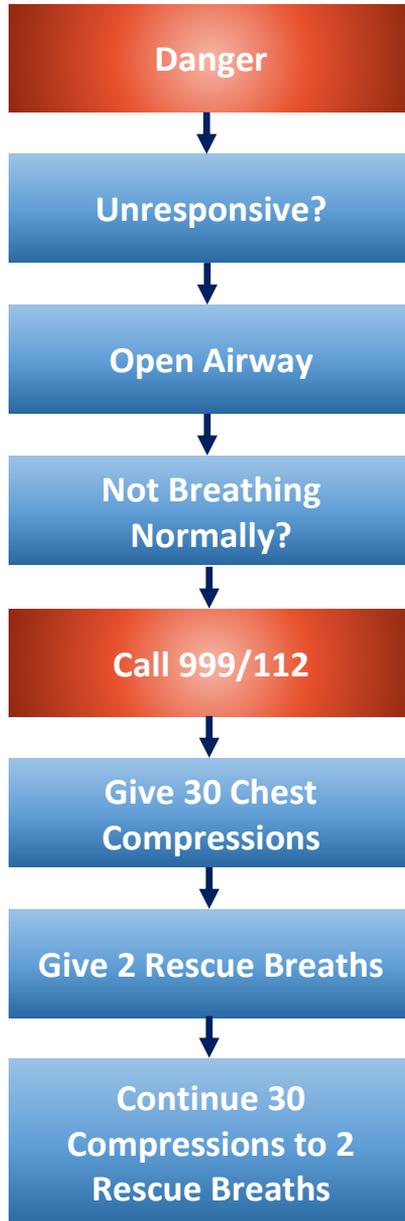
**Jewellery:** We need to ensure that there are no metal objects, such as jewellery and piercings, under the pads as this could cause burns.



**Implanted Devices:** Some people with heart problems could have a device, such as a pacemaker or defibrillator, implanted in their chest. These are often visible on the top left of the chest below the collar bone. Avoid placing the pads over the top of these devices.

**Explosive Atmosphere:** There is a risk that when we deliver a shock a spark could cause an explosion in a highly flammable atmosphere. For this reason, we should not use an AED in these circumstances.

**CPR Flowchart**



### CPR & AED Flowchart

