



Government of Telangana



**EMRI GREEN
HEALTH SERVICES**

Life-Saving Techniques **CPR & AED**

Public Training Handout



National Emergency Medicine Learning Centre, EMRI GHS

COMMISSIONER, HEALTH AND FAMILY WELFARE

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MESSAGE

I am pleased to announce that the Telangana Government led by our Honourable Chief Minister, Shri K Chandrashekhar Rao is strengthening cardiac health care system with the launch of Cardiopulmonary Resuscitation (CPR) and Automatic External Defibrillator (AED) training programme. Emergency Medical Services (EMS) are a vital component of health care system and acknowledging that EMS needs further strengthening the training will equip every healthcare worker in the State with CPR & AED so that they can respond effectively during emergencies like Sudden Cardiac Arrest (SCA).

As a government, our primary objective is to ensure the well-being of all citizens. We understand that in the event of a Sudden Cardiac Arrest, every second counts, and prompt intervention can be the difference between life and death. Pre-hospital care is an essential part of the continuum of emergency care services where emergency medical service providers are the first to recognize the nature of an emergency and can immediately evaluate the situation and determine the need for appropriate medical resources. Pre-hospital care is the first avenue for the community to access the trained and skilled EMS providers.

However, the lack of skilled and trained EMS providers affects the development of a robust pre-hospital care system. Therefore, the need for development of well-structured curriculum and training to equip the EMS providers with the requisite skills and knowledge to manage emergencies.

With the introduction of CPR and AED training in our health system, we aim to enhance our emergency response capabilities and provide the best possible care to patients in need. We have taken all necessary measures to ensure their availability in all our health facilities to be highly effective in resuscitating patients who have experienced sudden cardiac arrest, thereby improving their chances of survival.

I strongly believe that this Training Manual will be useful in providing quality education and training thus, will ensure quality and accountability of Emergency Medical Services Providers.

A handwritten signature in blue ink, appearing to read "Harish Rao".

(T. HARISH RAO)

Introduction:

EMRI GHS in association with Govt. of Telangana started an initiative by introducing this comprehensive CPR and AED training that has been developed to equip healthcare providers with the necessary knowledge and skills to respond effectively in the event of a sudden cardiac arrest. Sudden cardiac arrest is a leading cause of death globally, and it can happen to anyone, anywhere, and at any time. It is therefore critical that we are all equipped with the knowledge and skills to respond effectively in such an emergency.

This training manual is designed to provide healthcare providers with a step-by-step guide on how to perform cardiopulmonary resuscitation (CPR) and use an automated external defibrillator (AED) to save the life of a person who has suffered sudden cardiac arrest. It covers the essential aspects of CPR and AED use, including recognizing the signs and symptoms of sudden cardiac arrest, initiating CPR, using an AED, and managing the patient until emergency medical services arrive.

The manual has been developed by a team of experienced and qualified instructors of EMRI GHS, who have drawn from their expertise and knowledge in this critical area. They have provided clear and concise instructions, supplemented with diagrams and illustrations, to guide them through the process of performing CPR and using an AED. The knowledge and skill gained through this manual can significantly save the life of someone in need. We are confident that this training manual will not only be beneficial to you but also to your family, friends, and colleagues.

EMRI GHS like to thank you for choosing to undergo this training, and we hope that this manual will serve as a valuable resource for healthcare providers as they prepare to respond to cardiac emergencies.

Sudden Cardiac Arrest (SCA)

Sudden cardiac arrest (SCA) is the sudden loss of all heart activity due to an irregular heart rhythm. Breathing stops. The person becomes unconscious. Without immediate Management, sudden cardiac arrest can lead to the death of a person.

Emergency management for sudden cardiac arrest includes cardiopulmonary resuscitation (CPR) and an automated external defibrillator (AED). Survival is possible with fast, appropriate medical care. CPR involves a series of chest compressions and rescue breaths that help to circulate oxygenated blood throughout the body until emergency medical services arrive. An AED is a portable device that delivers an electric shock to the heart to restore its normal rhythm.

The chances of survival from SCA increase significantly if CPR and AED are administered promptly. In fact, studies have shown that early initiation of CPR and defibrillation can improve the survival rate by up to 50%.

Sudden cardiac arrest isn't the same as a heart attack. A heart attack happens when blood flow to a part of the heart is blocked. Sudden cardiac arrest is not due to a blockage. However, a heart attack can cause a change in the heart's electrical activity that leads to sudden cardiac arrest.

Why CPR is important?

cardiopulmonary resuscitation is a critical component of the response to sudden cardiac arrest (SCA). SCA occurs when the heart suddenly stops beating, and blood flow to the brain and other vital organs is interrupted. Without immediate intervention, brain damage or death can occur within minutes.

CPR is a life-saving technique that can help maintain blood flow to vital organs until emergency medical services (EMS) arrive. The goal of CPR is to manually circulate oxygenated blood throughout the body by compressing the chest and providing rescue breaths. This helps to deliver oxygen to the brain and other organs, reducing the risk of damage and improving the chances of survival.

During SCA, the heart may enter a state of ventricular fibrillation (VF), where the heart muscle quivers erratically rather than pumping blood. An AED (automated external defibrillator) can be used to deliver a shock to the heart to restore its normal rhythm. However, even if an AED is available, the immediate initiation of CPR can help increase the likelihood a successful defibrillation by providing a more optimal environment for the heart to receive the electrical shock. It also increases the chances of successful defibrillation by providing an optimal environment for the heart to receive the electrical shock. The ability to perform CPR can make the difference between life and death in a medical emergency.

Achieving ROSC after CPR:

The percentage of ROSC (return of spontaneous circulation) after CPR can vary depending on a number of factors, such as the cause of the cardiac arrest, the duration of CPR, the age and health status of the person, and the quality and timeliness of the CPR and other interventions.

Studies have reported ROSC rates ranging from around **20% to 60%** for in-hospital cardiac arrests, and around **10% to 30%** for out-of-hospital cardiac arrests. However, it is important to note that achieving ROSC is only the first step in a complex process of managing and treating a person who has suffered cardiac arrest, and survival to hospital discharge or recovery of neurological function may depend on additional interventions and treatments beyond ROSC alone.

Cardio Pulmonary Resuscitation (CPR)

Definition

- Cardiopulmonary Resuscitation (CPR) is the act of giving artificial breaths and compressing the chest so that the heart can pump blood to the rest of the body. It can help to keep a person alive after his/her heart and lungs have stopped functioning.
- CPR is done on people who show no signs of life (they have stopped breathing, coughing, and moving). For CPR to be effective, the victim must be placed on a hard surface.
- If you do CPR on a victim who is not showing signs of life, you could be able to save his/her life. Once you have determined there are no signs of life, **remember your CAB's**.
- **Circulation** – the first step is to Ensure adequate blood circulation to the body from the heart by giving chest compressions
- **Airway** – the second step is to open the airway by the head-tilt-chin-lift maneuver.
- **Breathing** – Check for breathing and give artificial breaths if necessary.
- CPR is different for adults, children aged 1-8 years, and infants.
- In children and infants, 1 rescuer CPR is performed with 30 chest compressions and 2 ventilations, whereas in 2 rescuer CPR it is performed with 15 chest compressions and 2 ventilations.

Adult CPR

Step 1: Check for responsiveness. Tap the shoulders and in a loud, clear voice ask the victim if he/she is okay. If he/she is not responding, call 108 or instruct somebody to call 108, immediately remove the shirt to expose the chest, and go to next step.



Step-2: Check the person's breathing for 5-10 seconds.
For breathing- see for the chest rise.



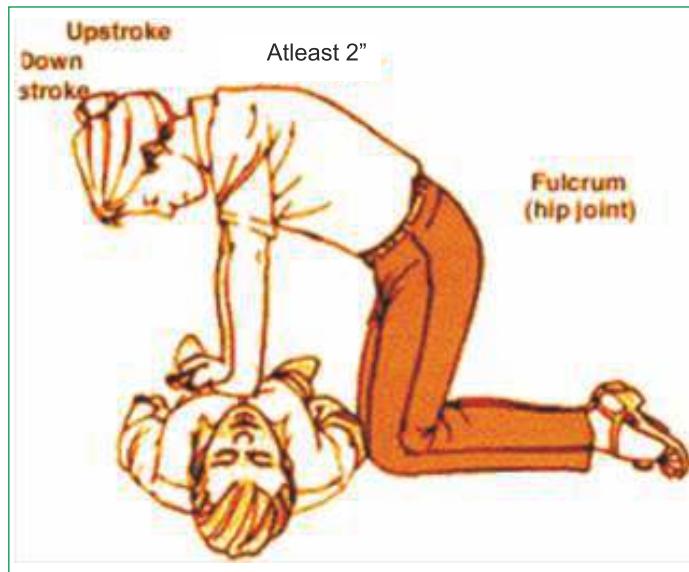
Step 3: If breathing is absent or gasping, Start chest compressions immediately by locating the point on the breastbone just between the nipples (approximately the center of the breastbone). This is the point where you will be compressing the chest.



Step 4: Place the heel of one hand onto the compression point on the breastbone & Place the other hand on top of the first hand.

Step 5: Interlace the fingers of both hands.

Step 6: Make sure that the shoulders are positioned over the breastbone and the arms are straight.



Step 7: Give chest compressions at the rate of 100 to 120 compressions/minute. The chest should compress at least 2 to 2.4 inches on each push. (or 5-6 cms)



Step 8: If the child begins breathing on his/her own but is not conscious, place him/her in the recovery position. See section on recovery position.

Do's and Don'ts

- DO NOT put pressure on the ribs. Keep your weight only on the breastbone.
- DO NOT compress the abdomen,

- **What will happen if I damage the bones in the chest?**

There is a possibility that the bones in the chest may break, but this should not stop you from doing CPR. Save the victim's life. Treatment for broken bones can occur later.

- **What should I do if I become too tired to continue CPR?**

If you are too tired, ask for help or relief if it is available. If you are too fatigued to continue, it is better to stop than to become a victim yourself. Resume only if you feel you can continue.

- **What if the victim has some known infection such as HIV or tuberculosis?**

Just give compressions until advanced help arrives.

Child CPR

Step 1: Check for responsiveness. Tap the shoulders and in a loud, clear voice ask the child if he/she is okay. If he/she is not responding, call 108 or instruct somebody to call 108. Immediately remove the shirt to expose the chest, and go to step 2.



Step-2: Check the person's breathing for 5-10 seconds.

For breathing- see for the chest rise.

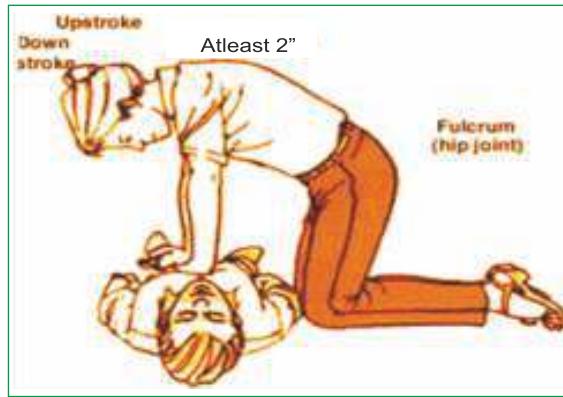
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Step 4: Place the heel of one hand onto the compression point on the breastbone. Place the other hand on top of the first hand.

Step 5: Interlace the fingers of both hands.

Step 6: Make sure that the shoulders are positioned over the breastbone and the arms are straight.



Step 7: Give chest compressions at the rate of 100 to 120 compressions/minute. The chest should compress at least 2 to 2.4 inches on each push. (or 5-6 cms)

Step 8: If the child begins breathing on his/her own but is not conscious, place him/her in the recovery position. See section on recovery position.

Step:9 30 compressions in 15 - 18 seconds.

Step:10 Open the airway by doing the head-tilt-chin-lift maneuver. Tilt the head back with one hand and lift the chin up with the other hand. To lift the chin, use two fingers to pull up the bony portion of the chin.

This will help to open the airway by moving the tongue away from windpipe. Do NOT press on the soft tissue below the chin, as it can block air from entering the windpipe. If you see anything in the mouth and can take it out, remove it now

Step:11 Give two breaths

Step:12 If the child begins breathing on his/her own but is not conscious, place him/her in the recovery position. See section on recovery position.

Do's and Don'ts

- DO NOT put pressure on the ribs. Keep your weight only on the breastbone.
- DO NOT compress the abdomen

If not comfortable in giving breaths, give continuous compressions till help arrives.

Infant (Less than 1 year) CPR

Step 1: Check for responsiveness. Tap the feet and call to the infant. If he/she is not responding, call 108 or instruct somebody to call 108, immediately remove the clothing to expose the chest.

Check infant breathing for 5- 10 seconds

For breathing- see for the chest rise

Step 2: Draw an imaginary line between the nipples. Locate the midpoint on the breastbone between the nipples and place your finger just below the imaginary line. This is the point where you will be compressing the chest.

Step 3: Use the index and middle fingers of one hand to compress the chest and place another hand on the forehead to maintain head tilt.



Step 4: Give chest compressions at the rate of 100 to 120 compressions/minute. The chest should compress at least 1 – 1.5 inches on each push. (4 cms)



Step 5 infant begins breathing on his/her own but is not conscious, place him/her in the recovery position. See section on recovery position.

Do's and Don'ts

- DO NOT put pressure on the ribs. Keep your weight only on the breastbone.
- DO NOT compress the abdomen

If not comfortable in giving breaths, give continuous compressions till help arrives.

FAQ's

- **How can I maintain a head tilt while I am doing CPR on an infant?**

Keep one hand on the infant's forehead to maintain a head tilt while doing compressions with the other hand. This will help to keep the airway open during compressions.

- **Can I give CPR with the infant positioned in my lap?**

No. The infant needs to be on a hard surface for compression to be successful.

* Guidelines taken from 2020 AHA CPR guidelines for lay rescuers.

Automated External Defibrillation (AED)

Defibrillation is the primary intervention that makes the greatest difference in survival of cardiac arrest patients in ventricular fibrillation.



When to use AED

- Attach AED to only unresponsive, pulseless, non-breathing patients to avoid delivering inappropriate shocks
- AED advises shocks for ventricular tachycardia when the rate exceeds a certain value (for example, above 180 beats/min)

Steps to operate an AED

- Expose the patient's chest



AED Maintenance

The outside of the AED, including the defibrillator pads connector socket, can be cleaned with a soft cloth dampened in one of several appropriate cleaning agents (see list below). The following guidelines include some important reminders:

- Do not immerse the AED in fluids.
- Make sure a battery and a data card tray are installed when cleaning the AED, to keep fluids out of the device.
- Do not use abrasive materials, cleaners, strong solvents such as acetone or acetone-based cleaners, or enzymatic cleaners.
- Clean the AED and the connector socket with a soft cloth dampened with one of the cleaning agents listed below. — Isopropyl alcohol (70% solution) — Soapy water — Chlorine bleach (30 ml/l water) — Ammonia-based cleaners — Glutaraldehyde-based cleaners — Hydrogen peroxide

SPECIAL CONSIDERATIONS

1. Excessive chest hair

If the victim has a hairy chest you will need to remove the hair prior to placing the AED pads on the victim's chest. Leaving hair in place may cause the AED pads not make contact with the patient's chest and cause the shock to be ineffective.

2. Medication Patches

If the victim has a medication patch on their skin in the area the AED pads are to be placed you must remove them prior to attaching the AED pads. Use gloved hands to remove the medication patch. Medications patches may divert the shock or represent a burn hazard if not removed.

3. Water and/or sweat

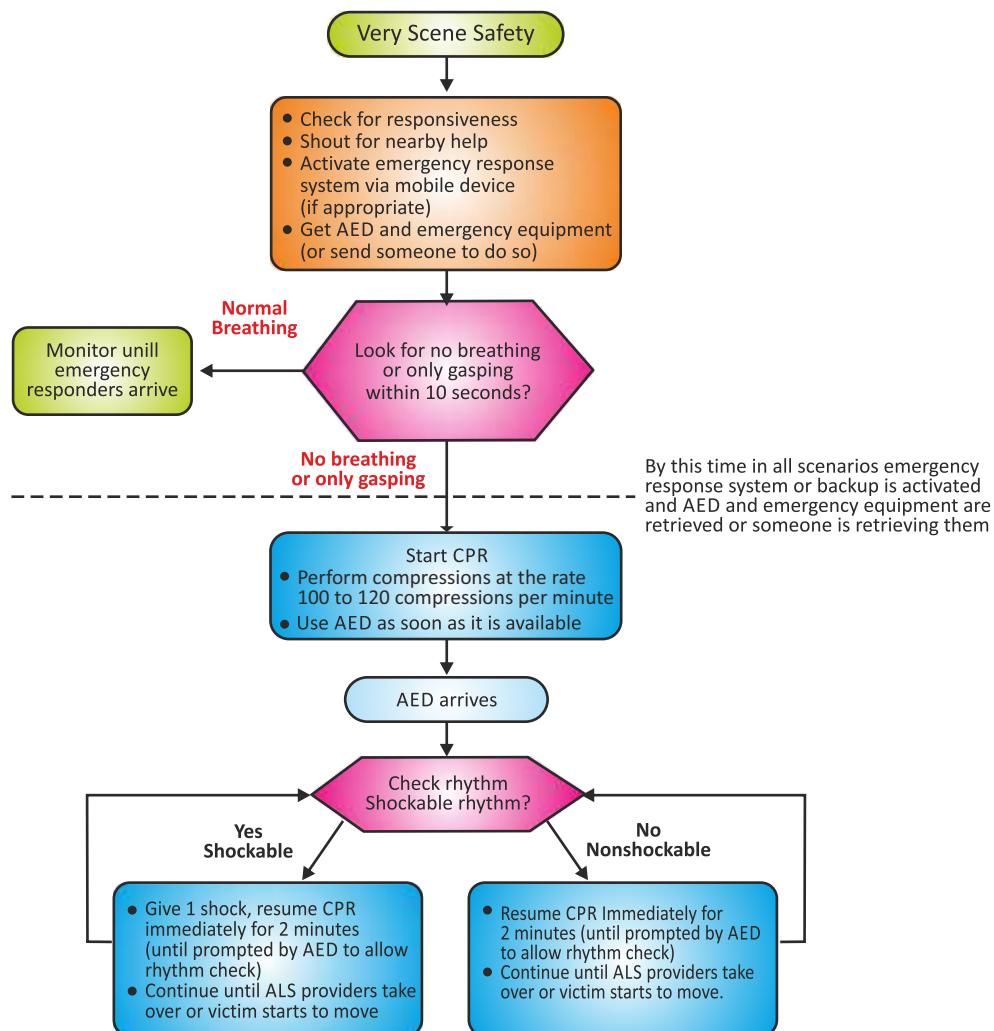
If the victim is covered in water or sweat attempt to dry the chest prior to applying the AED pads. Moisture may divert the shock from the heart.

4. Pacemakers

If the victim has an implanted pacemaker, continue to use an AED as otherwise indicated for other patients. Ensure the AED pads are at least an inch away from the victim's device prior to delivering a shock. An implanted pacemaker or defibrillator will look like a small lump underneath the skin usually on the upper left side of the chest near the heart.

Simplified Adult BLS

Algorithm for Public Hands on CPR

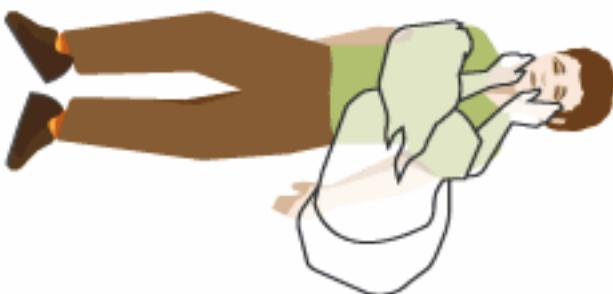


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If the Victim is moving, coughing, or vocalizing? Place Victim in **Lateral position**



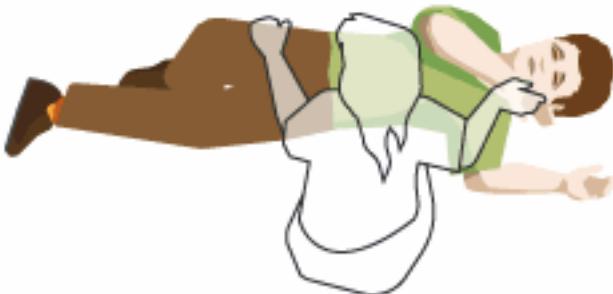
How to place Victim in recovery position:



- 1** Tilt head backwards,
ensure clear airway and
straighten head and neck



- 2** Place arm at side and
other arm across chest
with hand against cheek



- 3** Bring far knee up to a
 90° angle



- 4** Roll person over towards
you with knee at angle and
ensure head is supported

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