



MEDIC 
First Aid 

AMERICAN SAFETY & 
HEALTH INSTITUTE 



ADULT FIRST AID | CPR AED



student book
Ver. 9.0, 2021

TABLE OF CONTENTS

Using This Student Book	3	Impaled Objects.....	50
Introduction	5	Eye Injuries.....	51
Universal Concepts	6	Amputation	52
Procedure for Adult First Aid CPR AED	7	Internal Bleeding.....	53
Legal Concepts.....	11	Open Chest Wound.....	54
First Aid Provider: Roles, Responsibilities, & Priorities	13	Open Abdominal Injury	55
Assessment	14	Head, Neck, or Spinal Injury	56
Adult CPR AED.....	19	Concussion.....	57
Adult – Sudden		Bone, Joint, & Muscle Injuries.....	58
Cardiac Arrest (SCA).....	21	Burns	61
Adult – Assessment & Chest Compressions	23	Altered Mental Status	64
Adult – Rescue Breathing & Using a CPR Mask	25	Poisoning	65
Adult – Automated External Defibrillation & Using an AED	27	Difficulty Breathing	68
Adult – One-Provider CPR AED	29	Asthma	69
Adult – Additional CPR AED Considerations.....	31	Severe Allergic Reaction	70
Adult – Suspected Opioid-Associated Emergency (OAE)	33	Heart Attack.....	72
Adult – Relief of Choking	35	Stroke	74
Adult First Aid.....	37	Seizure.....	75
Procedure for Adult First Aid	38	Diabetes & Hypoglycemia.....	76
Adult First Aid Assessment	39	Presyncope & Syncope	77
Severe, Life-Threatening External Bleeding	42	Heat Emergencies.....	80
Shock.....	46	Cold Emergencies.....	82
Minor Wounds.....	47	Bites & Stings	84
Tooth Injuries.....	48		
Bleeding from the Nose	49		

Child CPR AED	89
Child – Cardiac Arrest & Pediatric Chain of Survival	91
Child – Assessment & Chest Compressions	93
Child – Rescue Breathing & Using a CPR Mask	95
Child – Automated External Defibrillation & Using an AED	96
Child – One-Provider CPR AED	98
Child – Additional CPR AED Considerations.....	100
Child – Suspected Opioid-Associated Emergency (OAE)	101
Child – Relief of Choking.....	102
Infant CPR AED	105
Infant – Cardiac Arrest & Pediatric Chain of Survival	107
Infant – Assessment & Chest Compressions	109
Infant – Rescue Breathing & Using a CPR Mask.....	111
Infant – Automated External Defibrillation & Using an AED	113
Infant – One-Provider CPR AED.....	114
Infant – Additional CPR AED Considerations	116
Infant – Suspected Opioid-Associated Emergency (OAE)	117
Infant – Relief of Choking	118
Appendix	119
Procedure for Adult First Aid, CPR AED.....	120
Procedure for Adult CPR AED	121
Procedure for Pediatric CPR AED	122
Procedure for Adult First Aid.....	123

- SAMPLE - INTERNAL USE ONLY -

ADULT – ONE-PROVIDER CPR AED

If an unresponsive person is not breathing normally or only gasping, one CPR provider can provide high-quality adult CPR by putting together all the skills of assessment, compressions, airway, breathing, and AED use.



Perform an Assessment

- ▶ First, assess scene safety, taking Standard Precautions. If the scene is safe, assess the person's responsiveness. Tap the person and ask loudly, "Are you okay?"
- ▶ If the person is unresponsive, activate EMS and/or your EAP.
- ▶ After activating, and unless they are readily available to you, send someone to get the first aid kit and an AED.
- ▶ Assess the person's breathing for no more than 10 seconds. If the person is not breathing normally or only gasping, start high-quality CPR.



Perform High-Quality Chest Compressions

- ▶ Position the person on a firm, flat surface. Perform 30 high-quality chest compressions. Position two hands on the lower half of the breastbone. Use upper body weight to compress. Compress at least 2 inches (5 centimeters). Compress at a rate of 100–120 times per minute. Allow the chest to fully recoil at the top of each compression.



Give Rescue Breaths

- ▶ Use a CPR mask to give rescue breaths. Open the airway and give 2 rescue breaths. Ensure each breath is 1 second in length and creates visible rise of the chest.

Continue CPR

- ▶ Immediately resume high-quality chest compressions.
- ▶ Repeat CPR cycles of 30 compressions and 2 breaths for 2 minutes.



Operate the AED

- ▶ As soon as an AED is available, power on the AED. Bare the chest.
- ▶ Correctly apply the AED pads according to the pictures.
- ▶ Clear the person so the AED can analyze the heart rhythm. While the AED is analyzing, make sure no one is touching the person.
- ▶ If directed by the AED to deliver a shock, clear the person again and press the shock button.

Resume High-Quality CPR

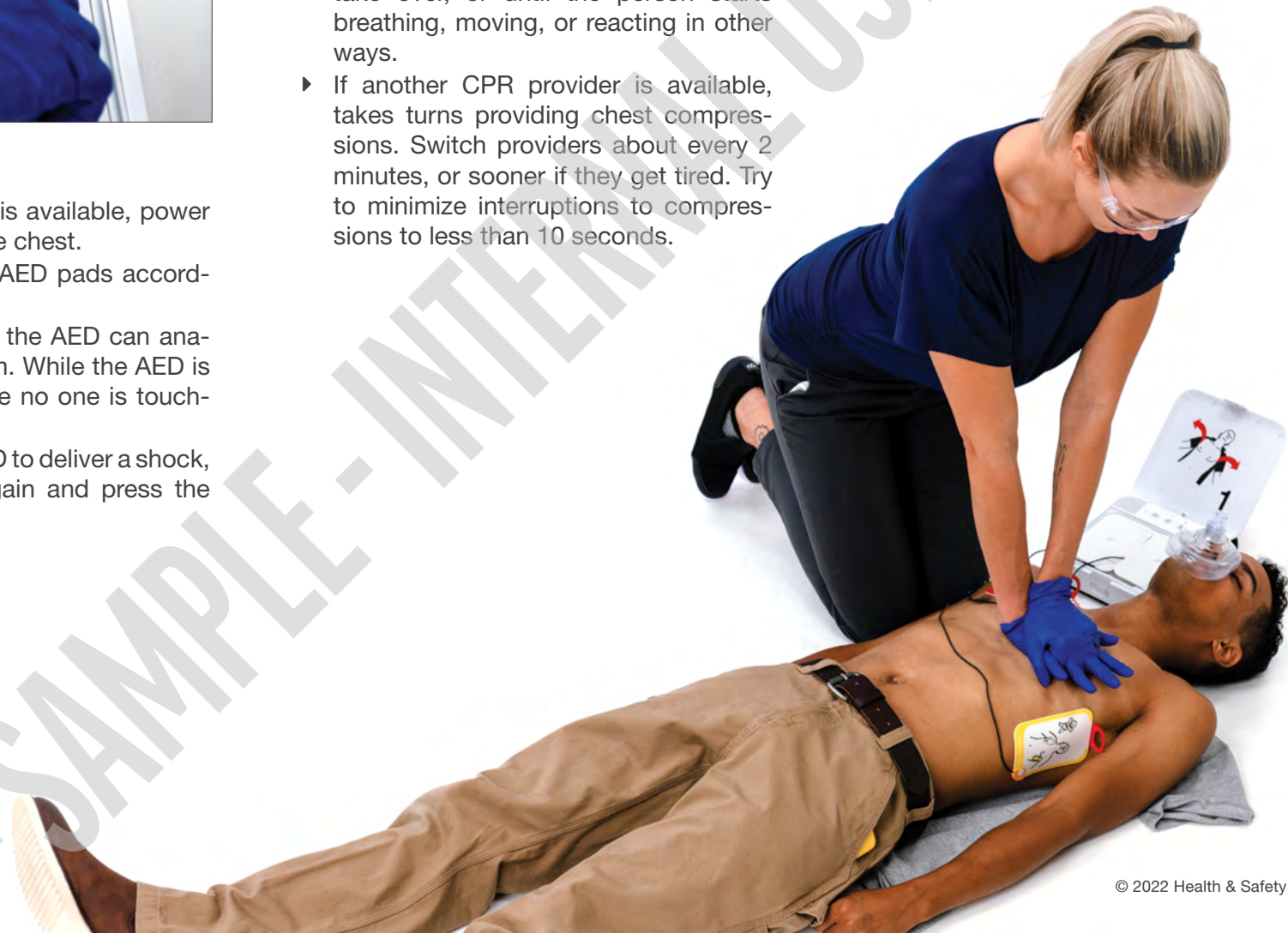
- ▶ Immediately resume high-quality CPR starting with chest compressions.
- ▶ Follow the voice prompts. After about 2 minutes of CPR, the AED will prompt you again to analyze the heart rhythm. Follow the voice prompts.

Continue CPR AED

- ▶ Continue CPR AED until another CPR provider, someone with more advanced training, or EMS providers arrive and take over, or until the person starts breathing, moving, or reacting in other ways.
- ▶ If another CPR provider is available, takes turns providing chest compressions. Switch providers about every 2 minutes, or sooner if they get tired. Try to minimize interruptions to compressions to less than 10 seconds.

Safety & Health Tip

If you find yourself unexpectedly encountering a person in cardiac arrest, you have limited or no PPE, and you are unwilling to provide rescue breathing out of fear the person may have an infectious disease, you can still help the person by providing compression-only CPR.



ADULT – ADDITIONAL CPR AED CONSIDERATIONS

A CPR provider may face some circumstances that require additional considerations or tasks for effective care. Act quickly if anything affects AED use to keep this link in the chain strong.



Chest Hair

Thick chest hair may prevent the AED pads from adhering to the skin. If chest hair is preventing pad-to-skin contact, use the razor that is typically included with a CPR AED response kit to quickly shave the spots where the pads will be placed. If you do not have a razor, but a second pair of pads is available, use the first set of pads to remove the hair from the skin. Apply the first set of pads firmly over the chest hair, then pull the pads off quickly. Then apply the second set of pads.



In Water

Do not use an AED if the person is immersed in water. The person must be removed from water before using an AED.



Wet Setting

If the person is in a wet setting, such as lying on snow or ice, in rain, on a wet floor or deck, or in a small puddle, it is safe to use the AED. If the person's chest is wet, quickly dry the chest before applying pads.



On Metal

AEDs can be used safely on metal surfaces, such as gratings or stairwells. Make sure the pads do not directly touch any metal surface when the AED is powered on.



Implanted Devices

Persons at high risk for cardiac arrest may have a surgically implanted defibrillator or pacemaker. Most often, a noticeable lump is visible in the left upper chest, though sometimes the implant is in the upper right chest or abdomen. Avoid placing the AED pad directly over the implant, as the device may interfere with shock delivery.



Medication Patches

Do not place AED electrode pads directly on top of a medication patch. A patch could block delivery of the shock from the electrode pad to the heart and cause small burns to the skin. If it doesn't delay shock delivery, peel off the patch with a gloved hand and quickly wipe the area before attaching the electrode pad.



Metal Jewelry

If the AED pads are not in contact with metal jewelry, the jewelry does not have to be removed.



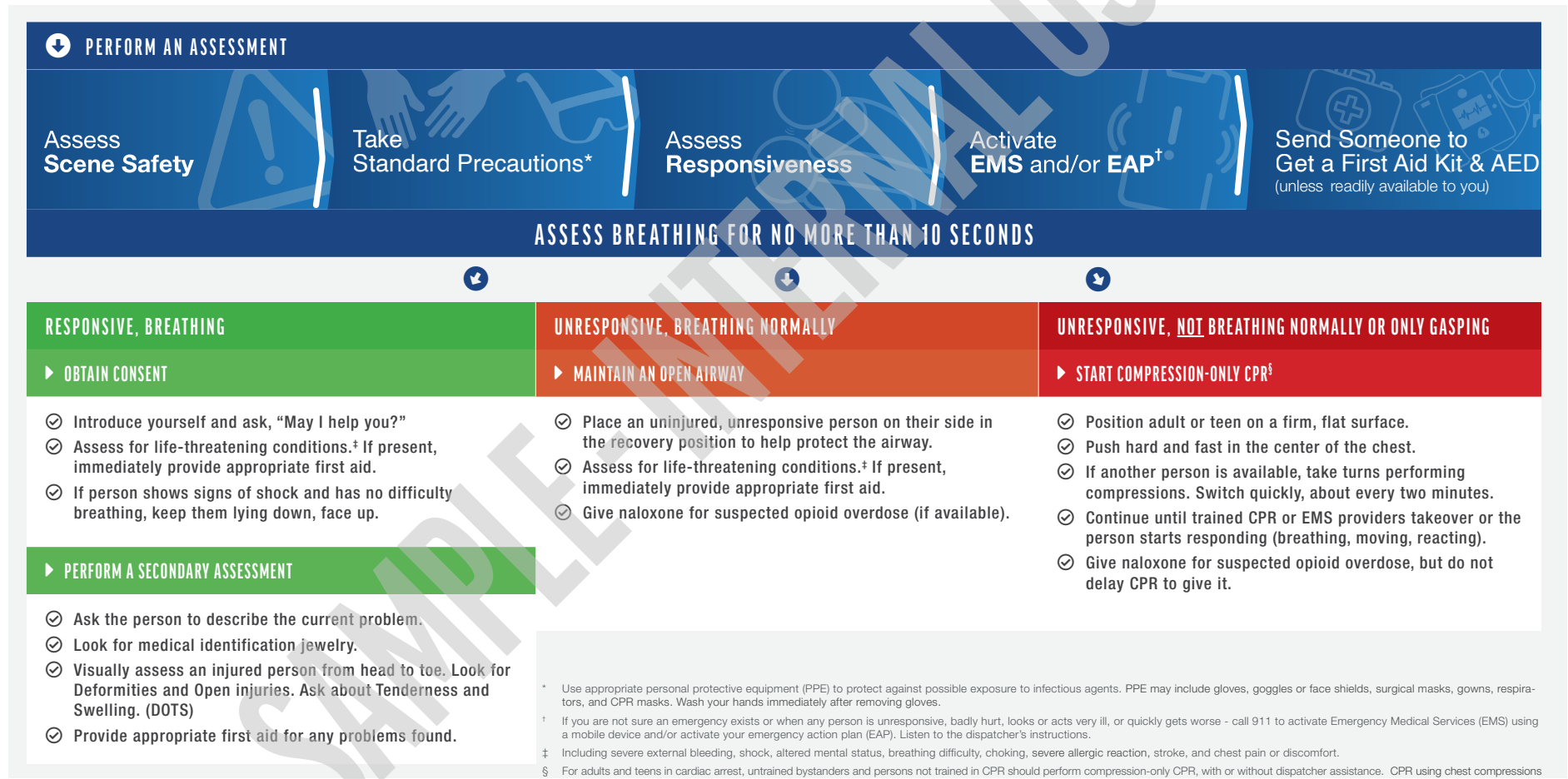
Pregnant Person in Cardiac Arrest

Do not delay chest compressions or defibrillation for a pregnant person. Follow the normal steps for operating the AED. The shock from the AED will not harm the baby. If the person starts breathing, moving, or reacting in other ways, place the person on their left side to improve blood flow.

PROCEDURE FOR ADULT FIRST AID

A procedure is “a particular way of accomplishing something or of acting.”²⁸ The *Procedure for Adult First Aid* is a step-by-step diagram with instructions that provide guidance for assessing, prioritizing, and performing first aid and compression-only CPR. The *Procedure for Adult First Aid* is modeled after “decision tree” type medical algorithms and is based on scientific evidence, national guidelines, and the consensus of experts.

There are different procedures for first aid and CPR AED depending on whether the person affected is an adult, child, or infant. The action you take also depends on your training as a first aid provider, a CPR AED provider, or both. Follow the procedure that aligns with your training. When an emergency occurs, it may not always be clear at first what kind of care the person needs. If you are a trained first aid, CPR AED provider, you will follow that procedure. If you are only trained in first aid, you will follow that procedure.



28 “Procedure,” Merriam-Webster.com Dictionary, <https://www.merriam-webster.com/dictionary/procedure> [Retrieved 8/2/2021].

BONE, JOINT, & MUSCLE INJURIES

Bones, muscles, and joints give the body shape, allow movement, and protect vital internal organs.

There are four different types of injuries affecting bones, muscles, and joints.

- Strains are stretching or tearing injuries to muscles or tendons.
- Sprains are tearing injuries to ligaments that hold joints together.
- Dislocations are the separation of bone ends at a joint.
- Fractures are breaks in bones.

Use the DOTS mnemonic as a guide. Strains, sprains, dislocations, and isolated fractures can be extremely painful but are not usually life-threatening. However, fractures of the pelvic or thigh bones may result in serious internal blood loss and shock.

Follow the Adult First Aid Procedure

Assess scene safety and take Standard Precautions. Assess responsiveness. If you are not sure an emergency exists, or if the person looks badly hurt or quickly gets worse, call 911 to activate EMS using a mobile device and/or activate your EAP. After activating, and unless they are readily available to you, send someone to get the first aid kit and an AED. Assess breathing for no more than 10 seconds. If the person is breathing and appears responsive, obtain consent.

Encourage the person to not move or use the injured limb. Check to see if there is an open wound. With consent, gently cut or tear away clothing to expose the injury site. Control any bleeding using a clean dressing and firm, continuous, direct manual pressure on the bleeding site. Do not push a bone back under the skin. Cover it with a sterile dressing.

Use padding in the gaps around it to provide a stable and

D	Deformities
O	Open Injuries
T	Tenderness
S	Swelling



comfortable spot for the limb to rest. If needed, place your hands above and below the injured area to help keep the limb still. It is best to not straighten an injured limb that is unnaturally angled. Leave it in the position found.

Cold application decreases bleeding, swelling, pain, and disability. Cooling is best accomplished with a plastic bag filled with a mixture of ice and water, which is better than ice alone. To prevent cold injury, limit each application of cold to no more than 20 minutes. Place a barrier, such as a thin towel, between the plastic bag and the skin. If a limb becomes blue or extremely pale, circulation may be cut off. If this occurs and you have not yet done so, activate EMS and/or your EAP.

Splinting

Splinting an injured limb can reduce pain and prevent further injury, especially when moving an injured person. In general, it is best to rely on EMS providers to splint, as they have more training, experience, and equipment.

Malleable Splints

In more populated, complex, or high-risk workplaces, first aid kits are required to include a malleable splint. This splint is a compact, lightweight, highly versatile device designed for immobilizing bone and soft tissue injuries in emergency settings.



When needed it can easily be molded and shaped to create a rigid and stable splint.

- ▶ Shape the splint to match the contours of the limb by using the opposite, uninjured limb.
- ▶ Once rigid and shaped, the splint can be held in place with tape, self-adhesive roller or elastic bandages, or plastic cling film.
- ▶ If the hand is involved, place a roller gauze or elastic bandage in their injured hand to allow the fingers to curl around it. This keeps the hand in a natural position of function and is more comfortable.

Caution should be use with elastic bandages and cling film because it is easy to apply them too tightly.

After splinting, check frequently for discoloration, coolness, or numbness in the hand or foot. If necessary, loosen the splint to improve blood flow.



MEDICAL EMERGENCIES

ALTERED MENTAL STATUS

An alteration in mental status refers to a change in awareness, such as confusion, loss of alertness, disorientation, or bizarre, inappropriate, or combative behavior, without a loss of consciousness.

An altered mental status is caused by a wide range of diseases, illnesses, and injuries, including traumatic brain injury, intoxication, infection, stroke, seizures, low oxygen levels, and diabetes.

An altered mental status is an important warning sign of a potentially life-threatening condition.

Follow the Adult First Aid Procedure

Assess scene safety and take Standard Precautions. Assess responsiveness. If you are not sure an emergency exists, or if the person looks badly hurt or quickly gets worse, call 911 to activate EMS using a mobile device and/or activate your EAP. After activating, and unless they are readily available to you, send someone to get the first aid kit and an AED. Assess breathing for no more than 10 seconds. If the person is breathing and appears responsive, obtain consent.

Assess for any other life-threatening conditions. If a person with an altered mental status becomes unresponsive, place them on their side in the recovery position to help protect the airway. If they stop breathing or are only gasping, start CPR.





HEART ATTACK

Acute coronary syndrome is a medical term used to cover a broad range of conditions where the blood and oxygen supply to the heart muscle is suddenly blocked. One such condition is a myocardial infarction, commonly known as a heart attack. The myocardium refers to the muscular tissue of the heart. The word “infarction” comes from Latin and means “to plug up or cram.” This cramming is typically caused by arteriosclerosis, a chronic disease that causes plaque (cholesterol and other substances found in the blood) to thicken, harden, and narrow the coronary arteries.

When the preexisting coronary artery plaque breaks, a blood clot forms and lodges in the blood vessel, blocking the flow of blood and oxygen to the heart muscle, causing a heart attack. Less commonly, a severe spasm, or sudden contraction, of a coronary artery can stop blood flow to the heart muscle. The more time that passes without treatment to restore blood flow, the greater the damage to the heart muscle.

The symptoms of a heart attack vary from person to person. Heart attacks can start slowly and cause only mild pain or discomfort. Symptoms can be mild, or more intense and sudden. Symptoms also may come and go over several hours. The most common symptom

is chest pain or discomfort. Other symptoms include upper body discomfort, such as pain or discomfort in the left arm, both arms, the upper back, neck, jaw, or stomach. Shortness of breath, feeling weak, lightheaded, or faint, and cold, clammy, sweaty skin can occur with heart attack, as well as nausea and vomiting. Women are somewhat more likely to have shortness of breath, nausea and vomiting, unusual tiredness (sometimes for days) and pain in the back, shoulders, and jaw.⁵⁷

Sudden cardiac arrest (SCA) occurs when the normal electrical impulses in the heart cause it to beat too quickly, inefficiently, or in an unsynchronized manner. SCA results from a problem with the heart’s electrical system. With SCA, the heart suddenly and unexpectedly stops beating. Blood flow to the body, along with the oxygen it carries, abruptly stops. Cardiac arrest happens suddenly, and often without any warning signs. A victim of SCA will be unconscious, unresponsive, and not breathing normally or only gasping.

With a heart attack, the heart generally continues to beat, despite the blockage, and the person remains conscious and responsive. A person who is having a heart attack may deny it. But delays to medical care can jeopardize the person’s life.

⁵⁷ Heart Attack. National Heart, Lung, and Blood Institute. Available: <https://www.nhlbi.nih.gov/health-topics/heart-attack> [Retrieved 3/4/2021]

CHILD – AUTOMATED EXTERNAL DEFIBRILLATION & USING AN AED

An automated external defibrillator (AED) is a portable computerized device that is simple to operate. It can identify the abnormal heart rhythms associated with sudden cardiac arrest – pulseless ventricular tachycardia and ventricular fibrillation – and deliver an electrical shock to restore the heart’s normal contractions. If the electrical shock is effective, there will be a return of spontaneous circulation. The heart will be able to pump blood. The child may also start breathing, moving, or reacting in other ways.

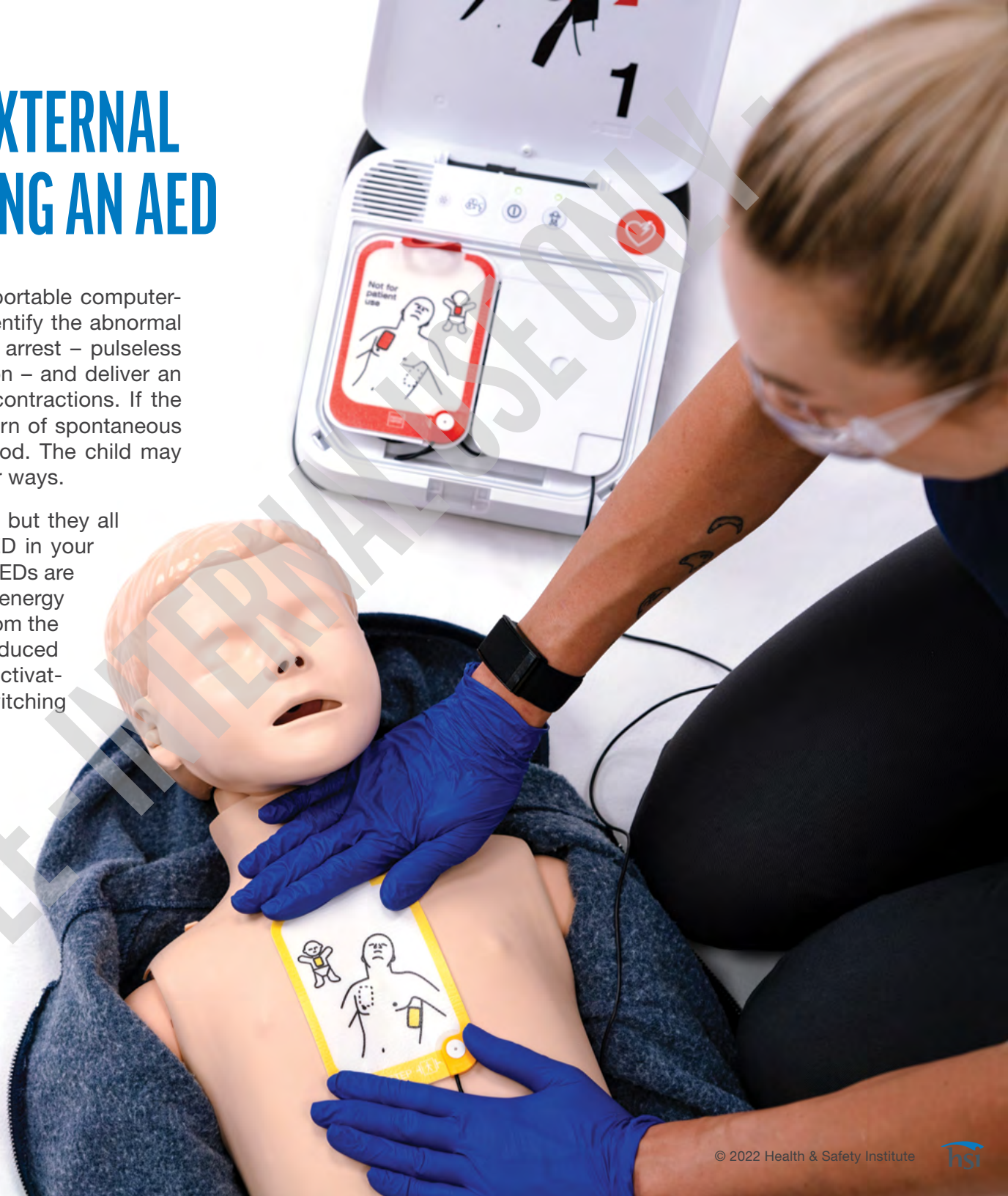
AED design varies by model and manufacturer, but they all operate in a similar manner. If you have an AED in your workplace, be familiar with its operation. Most AEDs are designed for both adult and pediatric use. The energy level of the shock for pediatric use is reduced from the standard adult energy setting. The shock is reduced by an electronic device built into the AED and activated using a button, “key,” or another type of switching mechanism.

Choosing the AED Pads

Pediatric pads are recommended for children under 8 years of age. If the child pads are not available, use the adult pads. The standard adult shock will be higher, but a higher energy shock is better than no shock at all.

Children 8 Years of Age and Older

Do not apply pediatric pads to children 8 years of age and older because the energy level of the shock will be too low.



Power on the AED

- ▶ Power on the AED and bare the child's chest. If there is a button, "key," or another type of mechanism for switching to child use, activate it.

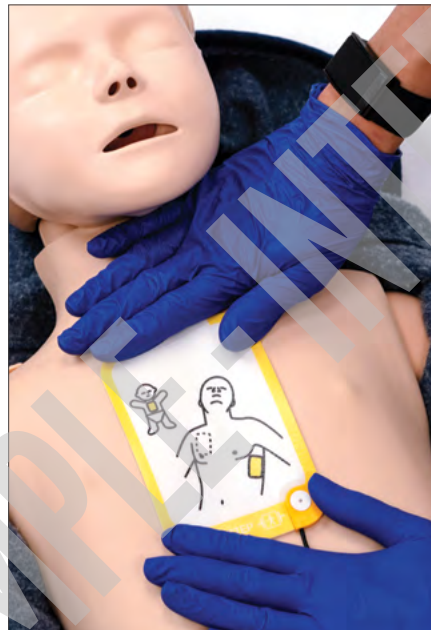
Bare the Chest

- ▶ Proper AED operation requires direct contact between the pads and the child's skin. Any clothing in the way must be removed. If necessary, cut through clothing with the shears that are typically included with a CPR AED response kit.



Apply the AED Pads

- ▶ Peel the pads from the backing sheet one at a time and place each according to the pictures. Some pads require a front-and-back position. Others require a left-right position. Press the pads firmly in place. Pads must not touch or overlap each other. Avoid placing the pads over medication patches or implanted devices. Try to apply the pads within 30 seconds after the AED arrives. If possible, compressions should continue while the pads are being placed.



Allow AED Analysis

- When the AED voice prompts you, clear the child and allow the AED to analyze the heart rhythm. Be certain that no one is touching the person.

Clear the Person and Deliver a Shock

- ▶ If the AED advises a shock, it will prompt you to clear the person again. Loudly say, "Everybody clear," or something similar.
- ▶ For most AEDs, delivering a shock is done by pressing the shock button. Deliver a shock.
- ▶ Once a shock has been delivered, immediately resume CPR starting with chest compressions.

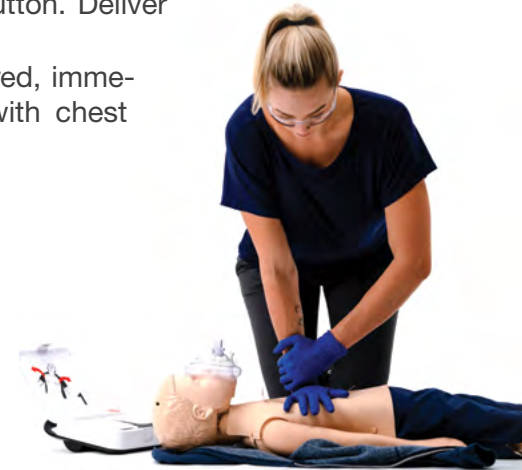


Follow the Voice Prompts

- ▶ After about 2 minutes of CPR, the AED will prompt you again to analyze the heart rhythm. Follow the voice prompts.

Continue CPR AED

- ▶ Continue CPR AED until another CPR provider, someone with more advanced training, or EMS providers arrive and take over, or until the child starts breathing, moving, or reacting in other ways.



Reassess Regularly

- ▶ If the child begins responding, regularly reassess their responsiveness, airway, and breathing.

INFANT – ADDITIONAL CPR AED CONSIDERATIONS

A CPR provider may face some circumstances that require additional considerations or tasks for effective care. Act quickly if anything affects AED use to keep this link in the chain strong.



In Water

Do not use an AED if the infant is immersed in water. The infant must be removed from water before using an AED.



Wet Setting

If the infant is in a wet setting, such as lying on snow or ice, in rain, on a wet floor or deck, or in a small puddle, it is safe to use the AED. If the chest is wet, quickly dry it before applying pads.



On Metal

AEDs can be used safely on metal surfaces, such as gratings or stairwells. Make sure the pads do not directly touch any metal surface when the AED is powered on.



Jewelry

If the AED pads are not in contact with metal jewelry, the jewelry does not have to be removed.

SAMPLE-INTERNAL USE ONLY.

Health & Safety Institute

1450 Westec Drive
Eugene, OR 97402 USA
800-447-3177

hsi.com/brands

isbn: 978-1-945991-40-0

MEDIC
First Aid

AMERICAN SAFETY &
HEALTH INSTITUTE

EMS
SAFETY

hsi Health & Safety
Institute™