STUDENT MANUAL

Public Safety Cardiopulmonary Resuscitation

CPR
2011

Published by:

EMS Program
CAL FIRE Academy
4501 State Highway 104
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CHAPTER 1: INTRODUCTION

Course Objectives

This manual in intended to train CAL FIRE emergency medical services (EMS) responders in the techniques of cardiopulmonary resuscitation (CPR); the training objectives are:

- ✓ List the major changes in the 2010 American Heart Associations (AHA) in CPR guidelines.
- ✓ Recognize scene safety issues.
- ✓ Describe and demonstrate adult, child, and infant CPR.
- ✓ Describe and demonstrate adult, child, and infant rescue breathing.
- ✓ Describe and demonstrate techniques for foreign body airway obstruction.
- ✓ Demonstrate Proper use of the AED.

Guidelines and Authority

Guidelines

This course follows the 2010 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care (ECC) for health care providers.

Authority

- ✓ CAL FIRE is a California Public Safety Department.
- ✓ California Health and Safety Code (HSC), Division 2.5, Section 1797.182
- ✓ California Code of Regulation (CCR), Title 22, Division 9, Chapter 1.5

Update to Chapter 1.5 Expected for 2012

The CPR and AED regulations were last updated in June of 2000. In March of 2011 a Task Force met to rewrite the regulations and bring them in line with industry standards. The updated regulations have stalled because of pending legislation, but are expected to go into effect in 2012. Until the new regulations go into effect, CAL FIRE must abide by the current regulations.

Medical Oversight

The CAL FIRE EMS Medical Director provides medical oversight and review of all CAL FIRE EMS training material. The Medical Director shall also:

- ✓ Work cooperatively with each of the LEMSA Medical Directors.
- ✓ Oversee the CPR Training Program and oxygen administration.
- ✓ Apply specialized medical knowledge to assure safety in the field of EMS operations; for making decisions, and providing expert consultation within the chain of command on a broad range of medical considerations.

INTRODUCTION 1

Training Delivery

Initial Training

The training for CPR/AED is approximately 10 hours in length, including presentation, applications and evaluation of student performances.

Retraining

Public Safety employees are required to receive CPR retraining every 2 years. The CAL FIRE retraining course is approximately 4 to six hours in length and includes a review of the topics with an emphasis of skills practice and competency verification (see course delivery matrix). The retraining course consists of the following:

1. A self-paced (hybrid delivery) or instructor review (classroom delivery).
2. Instructor review of CPR developments.
3. Skills practice and scenario session.
4. Skills competency verification.

Course Delivery Matrix

	TITLE	TIME	INITIAL	REFRESH CLASSROOM	REFRESH HYBRID
	Self-Study/Pre-Test (not included in class time)	2:00		2:00	2:00
Ch-1	Introduction	:30	:30	:30	:30
Ch-2	AHA 2010 Changes	:30	:30	:30	:30
S-1	Anatomy and Physiology	:30	:30		
S-2	Cardiovascular Disease and Stroke	:30	:30		
Ch-3	Ventilation Techniques	:15-:30	:30	:15	
Ch-4	Adult CPR	:15-:30	:30	:15	
Ch-5	Child CPR	:15-:30	:30	:15	
Ch-6	Infant CPR	:15-:30	:30	:15	
Ch-7	AED for Adults and Children	:15-:30	:30	:15	
Ch-8	AED for Infants and Children	:15-:30	:30	:15	
Ch-9	Relief of Choking Adult and Child	:15-:30	:30	:15	
Ch-10	Relief of Choking Infant	:15-:30	:30	:15	
S-3	Special CPR Situations	:30	:30		
	Skills Practice	:30-1:00	1:00	:30	:30
	CPR Scenarios	1:00	1:00	1:00	1:00
	Written Test	:30	:30	:30	:30
	Skills Test	1:00	1:00	1:00	1:00
	TOTAL CLASSROOM TIME		**10:00**	**6:00**	**4:00**

INTRODUCTION 1

CPR Student Requirements

The intent of the CAL FIRE CPR training program is to certify CAL FIRE public safety employees. CAL FIRE may certify volunteer firefighters, paid-call firefighters, explorer scouts, or cadets. There are no regulations limiting whom CAL FIRE may train, although, acceptance of the CAL FIRE CPR training program is optional for other emergency medical services (EMS) employers. CAL FIRE may train non-safety personnel ("lay persons").
Training eligibility:

- ✓ There are no training eligibility restrictions.

Administering a CPR Course

Lead Instructor Responsibilities

It is the responsibility of the instructor(s) to be familiar with all presentations, exercises, and activities and to arrange for the logistical requirements and needs of each course. CAL FIRE EMS Instructors must meet specific professional qualifications and have a resume on file:

- ✓ Lead Instructor must submit resume to the CAL FIRE EMS Program
- ✓ Assistant Instructors and Skills Proctors with the Unit EMS Coordinator or Unit Training Officer

For a more complete list of lead instructor lead instructor responsibilities consult the EMS Instructor policy in the 7200 Handbook.

Scheduling a Class

The Lead Instructor is responsible for all aspects of delivering a CPR course. A CAL FIRE CPR course may be approved for delivery providing the following requirements are met:

- ✓ Lead Instructor Resumes must be on file with the CAL FIRE EMS Program or attached to this form prior to the start of the course.
- ✓ All Lead Instructors must be approved by the CAL FIRE EMS Program prior to the start of any course.
- ✓ Assistant Instructor and Guest Speaker resumes must on file at the Unit prior to the start of course.

INTRODUCTION 1

Presentation Material

- ✓ Presentation files
- ✓ Computer with Microsoft PowerPoint
- ✓ LCD projector with screen to display PowerPoint presentation
- ✓ Student handouts
- ✓ Student manual

Equipment and Supplies

- ✓ Adult CPR manikins
- ✓ Bag valve masks
- ✓ Child CPR manikins
- ✓ Choking manikins, if available
- ✓ Infant CPR manikins
- ✓ AED or AED trainer
- ✓ Pocket mask with one way valve
- ✓ Sanitation supplies

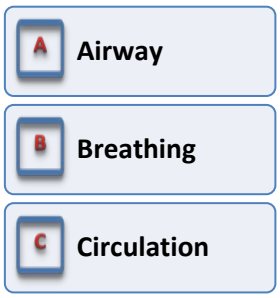
CHAPTER 2: AHA 2010 CHANGES FOR HEALTHCARE PROVIDERS

Changes in PATIENT ASSESSMENT

The Patient Assessment is Still "ABC"

"Look, listen and feel" removed because rescuers were taking too much time assessing victims. Refinements have been made for immediate recognition of victims. First tap the victim's shoulder; ask if they are OK then:

The A & B: Airway and Breathing
The EMS responder briefly checks for no breathing or no normal breathing (gasping) when checking for responsiveness. The responder then activates the emergency response system and sends for an AED.



The C: Circulation
The responder should spend no more than 10 seconds checking for a pulse, and if a pulse is not definitely felt within 10 seconds, CPR should be started. Use the AED as soon as it becomes available.

Change in the CPR SEQUENCE, from "ABC" to "CAB"

Compressions, Airway, Breathing

This change can be a bit confusing. The change is in the process of performing CPR, not patient assessment. In the past when we started CPR we would establish an airway, give 2 breaths, and then begin compressions, thus the ABC. The change to CAB puts more emphasis on chest compressions with a goal of increased survival rates. By changing the sequence, chest compressions will be initiated sooner and the delay in ventilation should be minimal.

Emphasis on High-Quality CPR

CPR Technique

- ✓ Complete chest recoil.
- ✓ Minimize interruptions.
- ✓ Avoid excessive ventilation.

Compression depth

- ✓ 2+ inches for adult.
- ✓ 1/3 the AP diameter of the chest for infants and children.

Compression rate

- ✓ At least 100/min.

Team Resuscitation

The steps in the BLS CPR have traditionally been presented as a sequence to help a single rescuer prioritize actions. There is increased focus on providing CPR as a team because resuscitations in the field typically involve teams of rescuers performing several actions simultaneously. For example one rescuer may begin chest compressions, while another is retrieving the bag-valve-mask; a third is setting up the defibrillator while another may be communicating with the base hospital or dispatch.

AED Now Includes Infants

For Infants under one year of age, a manual defibrillator is preferred. If a manual defibrillator is not available, pediatric setting/pads are desirable. If neither is available a standard AED may be used.

Age Classifications Have Remained the Same

AED Age Classification

When using the AED, healthcare providers will continue to use the cutoff of 8 years old for the use of child pads or child attenuator system (to reduce the AED delivered energy).

- ✓ Adult – Over 8 years of age
- ✓ Child – 1 to 8 years of age
- ✓ Infant – Under one year of age

CPR Age Classifications

When performing CPR, healthcare providers should consider victims aged 1 year to onset of puberty to be a child. Hypoxic arrest remains most common cause of cardiac arrest in children through adolescence ages. Healthcare providers should apply the “child” CPR guidelines and sequence (CPR first, and 15:2 compression to ventilation ratio for 2-rescuer CPR).

- ✓ Adult: Past puberty*
- ✓ Child: 1 year to the onset of puberty*
- ✓ Infant: Birth to one year

*Puberty is defined as having armpit hair or breast development.

AHA 2010 CHAIN OF SURVIVAL CHANGES

Adult Chain of Survival Changes

The Chain of Survival is a concept presented by the American Heart Association to summarize the best approach to the treatment of persons with sudden cardiac arrest. The changes in 2010 are not significant; they basically put more emphasis on CPR quality and added after-care.

2005 The four links of the adult Chain of Survival **WERE**:

2010 The five links of the adult Chain of Survival **ARE**:

Pediatric Chain of Survival Changes

Pediatric cardiac arrest is normally secondary to a respiratory emergency. The Pediatric Chain of Survival is based on a concept presented by the American Heart Association to summarize the best approach to reduce onset and to increase survival.

2005 The four links of the child Chain of Survival **WERE:**

2010 The five links of the child Chain of Survival **ARE**:

CHAPTER 3: VENTILATION TECHNIQUES AND RESCUE BREATHING

Opening the Airway

This section describes how to correctly open a victim's airway by use of the head tilt-chin lift and the Jaw-thrust techniques; and give the victim breaths.

Performing the Head Tilt-Chin Lift

STEP	ACTION
1	Place one hand on the victim's forehead and push with your palm to tilt the head back.
2	Place the fingers of the other hand under the bony part of the lower jaw near the chin.
3	Lift the jaw and bring the chin forward.

Performing the Jaw-Thrust

Used when trauma to the head or neck is suspected; the jaw is lifted without tilting the head.

STEP	ACTION
1	Place one hand on the victim's head, resting your elbows on the ground or a firm surface.
2	Grasp the angles of the victim's lower jaw, place thumbs on chin and lift with both hands.
3	Move the mandible forward.

VENTILATION 3

Ventilation Techniques

OSHA requires healthcare workers to use a barrier device during CPR. Mouth-to-barrier device breathing is performed using variety of devices, from personal compact faces shields and pocket masks to oxygen supplied bag-valve masks.

Mouth-to-Mouth and Nose

Professional rescuers should not be in a situation that would require mouth to mouth or mouth to nose breathing. A professional rescuer should have a barrier device or mask to provide ventilations.

Mouth to mouth tips for off duty use

Mouth-to-mouth breathing is performed by holding the victim's airway open, and pinching the nose closed with your thumb and index finger (using the hand on the forehead). Take a normal breath and seal your lips around the victim's mouth, creating an airtight seal; exhale into the victim's mouth. Each rescue breath should be given over one second and should cause the chest to rise. If the chest does not rise reopen the airway and attempt another breath. If unable to ventilate after 2 attempts, return to compressions.

Infant Mouth-to-Mouth/Nose

The process is similar to that of an adult, except an infant's face is smaller than an adult; therefore you must seal your lips around the infant's nose and mouth to give breaths. The breaths are much smaller and only enough to make the chest rise. The rescuer may have to attempt to open the airway several times to give breaths.

Mouth-to-Face Shield

Face Shields are clear plastic or silicone sheet with a one way valve and no exhalation valve, the face shield must be lifted to allow the victim's air escapes between the shield and the victim's face.

Mouth-to-Mask

Pocket Masks should have a 1-way valve to divert victim's exhaled air away from the rescuer; inflated outside margin provides a tight seal. Some have an oxygen inlet to permit administration of supplemental oxygen.

Techniques for use

1. **The lateral technique**, the rescuer is positioned at the victim's side and uses a head tilt-chin lift maneuver to open the airway (ideal for performing 1-rescuer CPR).
2. **The cephalic technique** requires the rescuer to be positioned above the victim's head and uses a jaw-thrust maneuver or head tilt-chin lift to open the airway. The cephalic technique should be used for 1-rescuer Rescue Breathing or for 2-rescuer CPR.

VENTILATION 3

Mouth-to-mask steps

STEP	ACTION
1	**Position** yourself at the victim's side.
2	**Place the mask** on the victim's face, using the bridge of the nose as a guide for correct position.
3	**Seal the mask** against the victim's face: • Using your hand that is closer to the top of the victim's head, place the index finger and thumb along the border of the mask. • Place the thumb of your other hand along the lower margin of the mask.
4	**Open the airway**. Place the remaining fingers of your hand closer to the victim's neck along the bony margin of the jaw and lift the jaw. Perform a head tilt-chin lift to open airway.
5	While you lift the jaw, press firmly and completely around the outside margin of the mask to seal the mask against the face.
6	Deliver air over 1 second to make the victim's chest rise.

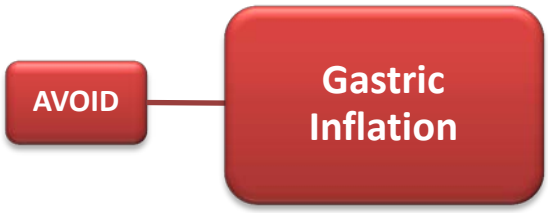
VENTILATION 3

Bag-Valve-Mask

A bag-valve mask (BVM) consists of a bag and a non-rebreathing valve attached to a face mask. The BVM is most effective when 2 trained rescuers work together; one sealing the mask to the face and the other squeezing the bag for one second and hard enough to allow the chest to rise.

BVM Steps

STEP	ACTION
1	**Position** yourself above the victim's head.
2	**Place the mask** on the victim's face, using the bridge of the nose as a guide for correct position.
3	**Seal the mask** against the victim's face using the E-C clamp technique to hold the mask in place while you lift the jaw to hold the air way open. • Perform head tilt. • Use thumb and index finger of one hand to make a "C" on the side of the mask, pressing the edge of the mask to the face. • Use the remaining fingers to lift the jaw (three fingers form the "E"), open the airway, and press the face to the mask.
4	Squeeze the mask to give breaths. • Deliver air over 1 second to make the victim's chest rise. • Use supplementary oxygen if available.



VENTILATION 3

Adult/Child/Infant Rescue Breathing

Rescue Breathing is a quick effective way to provide oxygen to a victim who is breathless but has a pulse. If rescue breathing is not provided the heart rate may slow and cardiac arrest may develop.

Adult	Child/Infant
• 10-12 breaths per minute. • 1 breath every 5-6 seconds.	• 12-20 breaths per minute. • 1 breath every 3-5 seconds.

Note on Infant and Child Rescue Breathing

If an infant or child's pulse is less than 60/min. with signs of poor perfusion, discontinue rescue breathing and start CPR.

VENTILATION 3

Advanced Airway Use for all Ages

Examples of an advanced airway are:

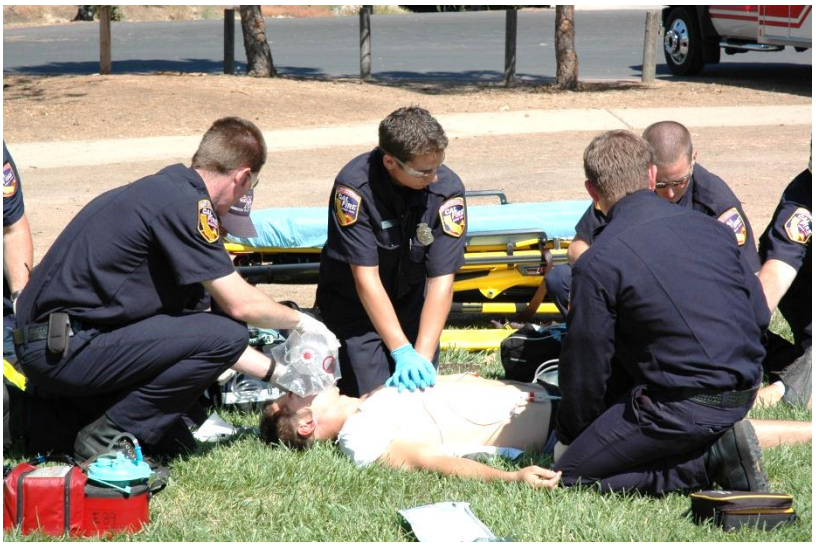
- ✓ Endotracheal intubation
- ✓ Laryngeal Mask Airway (King Airway, Combitube)

Before Advanced Airway

Rescuers must pause to provide ventilations.

After Advanced Airway Insertion

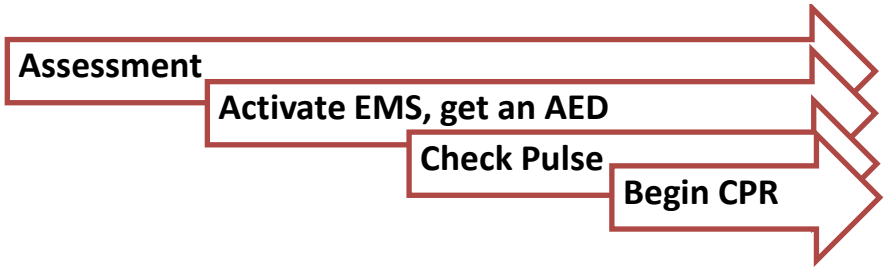
When an advanced airway is in use during 2-rescuer CPR for victims of all ages, give breaths at a rate of 1 breath every 6-8 seconds (8-10 breaths per minute). Do not pause or attempt to synchronize breaths between compressions. There should be no pause in compressions for delivery of breaths.



CHAPTER 4: ADULT CPR (puberty and older)

Upon prompt recognition of a victim in either cardiac arrest or respiratory arrest, it is important to begin CPR or rescue breathing immediately to provide the victim with the best chance of survival. CPR artificially oxygenates and circulates blood through a combination of chest compressions and ventilations.

Summary of BLS CPR



Assessment

Assessment is not just patient assessment, but overall assessment. The responder should check personal protective equipment and scene safety then assess the victim.

Personal Protective Equipment (PPE)

- ✓ Proper PPE must be worn as indicated by the nature of the emergency.
- ✓ PPE includes, but is not limited to: gloves (latex, nitrile or polyurethane), face shield or mask, eye protection, protective clothing / gown, protective footwear.

Scene Safety

- ✓ You must determine if the scene is safe, ask yourself, "Is it safe to approach the victim?"
- ✓ If the scene is unsafe, make it safe.
- ✓ If you cannot make the scene safe, do NOT enter.
- ✓ Call for specialized forces that can make the scene safe for you and your crew.

Victim Assessment

- ✓ Assess the victim for no breathing or no normal breathing (gasping).

Activate EMS and Get an AED

- ✓ If alone, activate EMS, get an AED, and return to the victim.

ADULT CPR 4

Check Pulse

STEP	ACTION
1	***Locate the trachea*** • Using 2 or 3 fingers.
2	***Position Fingers*** • Into groove between the trachea and the muscles at the side of neck • Feel for carotid pulse.
3	***Check pulse*** • For at least 5 seconds • No more than 10 seconds.
4	***Definite Pulse*** • If you do not definitely feel a pulse • Begin CPR
5	*Begin CPR* • Cycles of 30 compressions to 2 breaths.

Begin CPR

✓ Begin CPR starting with compressions.

✓ If alone, do 5 cycles of CPR (2 minutes) then attach the AED.

ADULT CPR 4

Chest Compressions

The 2010 AHA Guidelines emphasize the need for high quality compressions, chest compressions keep blood flowing to the heart, brain, and other vital organs.

Rate:

- ✓ Push hard, push fast: compress at a rate of at least 100 compressions per minute.

Recoil:

- ✓ Allow for full chest recoil after each compression.

Depth:

- ✓ Adult –At least 2 inches.

Interruptions:

- ✓ Minimize interruptions in compressions to less than 10 seconds.

Ratio:

- ✓ Adult, 30 compressions to 2 ventilations (written as **30:2**).

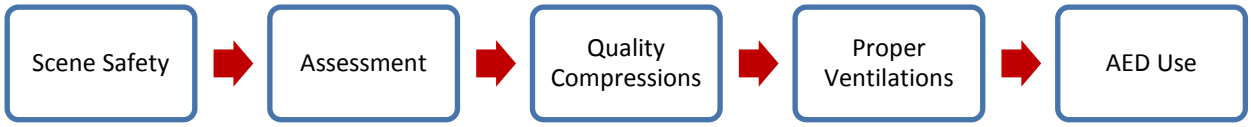
Chest Compression Technique

STEP	ACTION
1	Position yourself at victim's side.
2	Position victim face up on their back on a firm, flat surface. Take precautions if you suspect neck or spine injury.
3	Move clothing covering victim's chest.
4	Put the heel of one hand on the center of the victim's bare chest on the lower half of the breast bone.
5	Put the heel of your other hand on top of the first hand.
6	Straighten your arms and position your shoulders directly over your hands.
7	Push hard and fast. Press down at least 2 inches. Press straight down on victim's breast bone.
8	Allow chest to recoil completely Incomplete chest recoil will reduce the blood flow by compressions.
9	Deliver compressions smoothly at a rate of at least 100 per minute.

ADULT CPR 4

One-Rescuer CPR

Putting it all Together



1-Rescuer CPR Steps

STEP	ACTION
1	***Assess the victim for responsiveness.*** • No breathing. • No normal breathing. • No more than 5-10 seconds
2	***Activate EMS*** • Obtain AED.
3	***Check pulse*** • No more than 10 seconds.
4	*Begin CPR* • Cycles of 30 compressions to 2 breaths.
5	***Use defibrillator*** After first cycle or two minutes (if available). • Check rhythm with AED. • If shockable, give 1 shock and resume CPR immediately for 2 minutes.
6	***Resume CPR*** • If not shockable. Check rhythm every 2 minutes.
7	***Continue*** • Until ALS assumes responsibility, • Or the victim starts to move.

2 Rescuer CPR

When More Rescuers Arrive

When more rescuers arrive the first rescuer should stay with the victim and continue CPR if possible. The second rescuer activates the EMS system and retrieves an AED. After the second rescuer arrives the AED should be used as soon as possible. Compressors should switch roles every 5 cycles or approximately 2 minutes.

As additional rescuers arrive, they can help with the BVM ventilations, use of the AED, assist ALS, clear a path to the ambulance, and assist with the gurney.

2 Rescuer Steps

STEP	ACTION
1	***Enter Second Rescuer.***
2	***Activate EMS,*** • Obtain AED if not done.
3	***Turn on AED***
4	***Attach proper pads***
5	***Clear victim to analyze*** • Must be a verbal and visible check.
6	***Second Rescuer switches*** • Second rescuer prepares to resume compressions.
7	***Give 1 shock*** • If shockable (first rescuer). • Immediately resume CPR.
6	***Resume CPR*** • Second rescuer resumes CPR. • Switch compressors every 2 minutes.
7	***Continue*** • Until ALS assumes responsibility. • Or the victim starts to move.

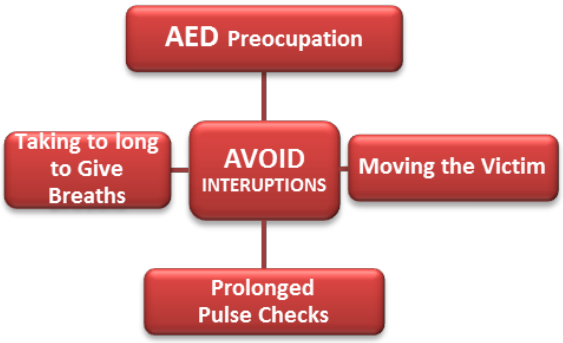
Avoid Interruptions

5- 10 second switch

To prevent fatigue, if two or more rescuers are available, switch compressor role every 5 cycles (2 minutes). Compressions should be stopped for no more than 5 to 10 seconds during the switch.

Duties of the Rescuers

1	***Role of the Compressor:*** • Rate, <18 for 30 compressions. • Pause for breaths. • Correct compression technique.
2	***Role of the Ventilator*** • Proper ventilations. • Coach/motivate compressor. • Call for switch after 5 cycles.



Complications from CPR for all Ages

Gastric Inflation

Gastric inflation, air entering the stomach is usually caused by poor CPR technique, such as improper or inadequate opening of the airway, over-inflation or ventilations too rapid, and lack of an airtight seal of the mouth and nose. To prevention gastric inflation, properly position the airway, maintain an airtight seal when ventilating, and inflate only to the point of chest rise. If your victim has gastric inflation, be prepared to turn victim on side to expel vomitus.

Chest Injuries

Injuries are common from both properly and improperly performed chest compressions.
Types of injuries that can be seen are: separation of the ribs from the sternum, rib or sternum fracture, pneumothorax, and hemothorax. To minimize injuries ensure proper hand position during chest compressions and proper depth of chest compressions. Concerns for injuries should not impede prompt and energetic application of CPR; the only alternative to effective CPR for the victim is death.

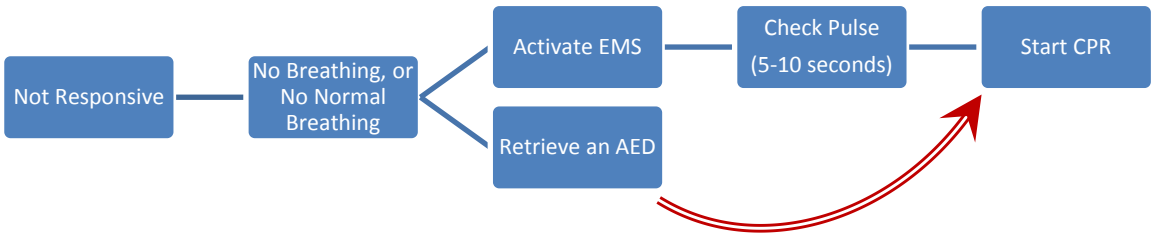
Withholding CPR in victims who are breathless and pulseless

Refer to your local EMS authority for protocols; traditionally, a victim with a valid, dated and signed (by physician) DNR (do not resuscitate) order may have CPR withheld.

ADULT CPR 4

You may terminate CPR if you are relieved by someone equally or higher trained than yourself, a pulse returns (Rescue Breathing may still be necessary), you become physically exhausted and cannot continue or the Coroner or a Physician arrives on the scene and declares the victim.

CPR Algorithm



CHAPTER 5: CHILD CPR (1 year to puberty)

Overview

The actions taken during the first few minutes of an emergency are critical to survival of the child with a cardio respiratory emergency. Understanding pediatric initial assessment with prompt recognition and quick action may prevent respiratory and circulatory arrest.

Differences in Child and Adult CPR

The main differences between child and adult CPR are:

- ✓ The 2 rescuer CPR ratio is 15:2.
- ✓ The depth of compressions is approximately 2 inches or 1/3 the depth or the chest.
- ✓ May use one hand for compressions for small children.
- ✓ Amount of air for breaths – provide only enough air to make chest rise.
- ✓ Activating emergency response system and getting an AED, see note below.

NOTE: If the rescuer did not witness the arrest, the rescuer should give 5 cycles of CPR before leaving the child victim to activate the emergency response system. If a child collapses suddenly (witnessed) activate the emergency response system and retrieve an AED (if available).

Child Assessment

Determine the victim's level of responsiveness:

- ✓ Leave the child in the position found. Gently stimulate the child (flick the toes, or rub the back) and ask loudly "are you okay?"
- ✓ Quickly assess the presence or extent of injury and determine whether the child is responsive.
- ✓ Scan the body for bleeding; if the victim is losing blood, control the bleeding quickly in order to maintain good circulation.
- ✓ Move the victim only if it is necessary to ensure their safety or to provide CPR.

Child Pulse Check

To palpate a pulse on a child the rescuer may use the femoral or the carotid pulse.

Femoral Pulse

- Place 2 fingers in the inner thigh, midway between the hipbone and the pubic bone, just below the crease where the leg meets the abdomen.

Opening the Airway

The tongue is the most common cause of airway obstruction in the unresponsive pediatric victim. Place the head in a neutral alignment. To provide support under the back, place a folded blanket or towel under the shoulders to fill the void. Because the tongue is attached to the lower jaw, moving the lower jaw forward will lift the tongue away from the back of the throat.

Notice towel under shoulders

Child Compression Techniques

One Handed Compressions

For small children you may use either 1 or 2 hands for chest compressions.

- ✓ Place palm of one hand at the nipple line.
- ✓ Press straight down on the chest.
- ✓ Compression depth
  - o approximately 2 inches, or
  - o 1/3 the anterior-posterior (AP) diameter of the chest
  - o The AP diameter of the chest is the chest depth

CHILD CPR 5

1 Rescuer Child CPR

STEP	ACTION
1	***Assess the child for responsiveness.*** • No breathing. • Gasping or no normal breathing. • Shout for help, if alone.
2	***Response to shout?*** • If someone responds, send for help and AED. • If you are alone and the child collapsed suddenly, leave to activate EMS and obtain AED.
3	***Check carotid/femoral pulse*** • No more than 10 seconds. • If no pulse or pulse<60 with signs of poor perfusion.
4	*Begin CPR* • Begin with compressions. • Cycles of 30 compressions to 2 breaths.
5	***After 5 cycles*** • Activate EMS and obtain AED if not already done.
6	***Continue*** • Until ALS arrives, • Or the victim starts to move.

2 Rescuer Child CPR (no AED)

STEP	ACTION
1	***Assess the child for responsiveness.*** • No breathing. • Gasping or no normal breathing.
2	***Check carotid/femoral pulse*** • No more than 10 seconds. • If no pulse or pulse<60 with signs of poor perfusion.
3	***Begin CPR*** *if no pulse is definitely felt.* • Begin with compressions. • Cycles of 15 compressions to 2 breaths.
4	***Continue*** • Until ALS arrives, • Or the victim starts to move.

CHAPTER 6: INFANT CPR (under 1 year of age)

Overview

Respiratory failure is the most common cause of cardiopulmonary deterioration and arrest during infancy. The most common causes of cardiac arrest in infants are sudden infant death syndrome (SIDS), respiratory disease, airway obstruction, submersion, sepsis, and neurological disease.

The following terminology is recommended when defining pediatric age classifications:

- ✓ Newly born – first few minutes to hours after birth.
- ✓ Neonate – first 28 days of life.
- ✓ Infant – birth to age 1.

Differences in Infant and Adult CPR

The main differences between child and adult CPR are:

- ✓ The location of the **pulse check**, brachial artery.
- ✓ **Compression techniques**:
  - 2 fingers, single rescuer.
  - 2 thumb-encircling hands, 2 rescuer.
- ✓ **CPR ratio** is 15:2 for 2 rescuer.
- ✓ The **depth of compressions** is approximately 1 ½ inches or 1/3 the depth or the chest.
- ✓ Activating emergency response system and getting an AED.

NOTE: If the rescuer did not witness the arrest, the rescuer should give 5 cycles of CPR before leaving the infant victim to activate the emergency response system. If an infant suddenly becomes unresponsive (witnessed) activate the emergency response system and retrieve an AED (if available).

Infant Assessment

Determine the victim's level of responsiveness:

- ✓ Leave the victim in the position found. Gently stimulate the infant (flick the toes, or rub the back) and ask loudly "are you okay?"
- ✓ Quickly assess the presence or extent of injury and determine whether the infant is responsive.

- ✓ Scan the body for bleeding; if the victim is losing blood, control the bleeding quickly in order to maintain good circulation.
- ✓ Move the victim only if it is necessary to ensure their safety or to provide CPR.

Opening the Airway

The tongue is the most common cause of airway obstruction in the unresponsive pediatric victim. Place the head in a neutral alignment. To provide support under the back, place a folded blanket or towel under the shoulders to fill the void. Because the tongue is attached to the lower jaw, moving the lower jaw forward will lift the tongue away from the back of the throat.

The Infant Pulse Check

To perform a pulse check on an infant can be extremely difficult, even for those trained in pediatric care. The following are techniques for palpating the brachial artery in an infant:

- ✓ Place 2 or 3 fingers on the inside of the upper arm, between the infant's elbow and shoulder.
- ✓ Press gently on the inside of the upper are for at least 5 seconds, but no more than 10 seconds.

1 Rescuer Infant CPR

Two Finger Compression Technique

- ✓ Place infant on flat surface.
- ✓ Use 2 fingers in the center of the infant's chest just below the nipple line.
- ✓ Push hard and fast at a rate of at least 100/minute.
- ✓ Allow full chest recoil between compressions.

INFANT CPR 6

Steps for 1 Rescuer Infant CPR

STEP	ACTION
1	***Assess the infant for responsiveness.*** • No breathing. • Gasping or no normal breathing. • Shout for help, if alone.
2	***Response to shout?*** • If someone responds, send for help and AED.
3	***Check brachial pulse*** • No more than 10 seconds. • If no pulse or pulse<60 with signs of poor perfusion.
4	*Begin CPR* • Begin with compressions. • Cycles of 30 compressions to 2 breaths.
5	***After 5 cycles*** ✓ Activate EMS and obtain AED if not already done.
6	***Continue*** • Until ALS arrives, • Or the victim starts to move.

INFANT CPR 6

2 Rescuer Infant CPR

2 Thumb-Encircling Hands Technique

This technique is preferred for 2 rescuer chest compressions if the rescuer can fit their hands around the infant's chest.

- ✓ Place both thumbs side by side over the lower half of the infant's sternum.
- ✓ Encircle the infant's chest and support the back with the fingers of both hands.
- ✓ Use both thumbs to depress the sternum approximately 1 ½ inch.
- ✓ Allow full chest recoil.

Steps 2 Rescuer Infant CPR

STEP	ACTION
1	***Assess the infant for responsiveness.*** • No breathing. • Gasping or no normal breathing.
2	***Shout for help, if alone*** • If response to shout. • Send for help and AED.
3	***Check brachial pulse*** • No more than 10 seconds. • If no pulse or pulse<60 with signs of poor perfusion.
4	***Begin 2 rescuer CPR*** • Begin with compressions. • Cycles of 15 compressions to 2 breaths.
5	***After 5 cycles*** • Activate EMS and obtain AED, if not already done.
6	***Continue*** • Until ALS arrives, • Or the victim starts to move.

CHAPTER 7: AED FOR ADULTS AND CHILDREN
8 YEARS OF AGE AND OLDER

An automated external defibrillator (AED) has a microprocessor that interprets the electrocardiographic (ECG) rhythm and determines whether or not it is appropriate to deliver a shock. The fully automated AED operates without the need for any action by the operator except to turn on the power and attach the defibrillation pads to the victim. Prompt use of an AED by rescuers that know how and when to use an AED and perform CPR will provide a better chance for victim survival.

Overview

The interval from collapse to defibrillation is one of the key factors of survival from cardiac arrest. Early defibrillation is critical for victims of sudden cardiac arrest and ventricular fibrillation (VF) in general. When VF is present, the heart quivers and does not pump blood. The most effective treatment for VF is electrical defibrillation. The probability of successful defibrillation decreases quickly over time. VF deteriorates to asystole if not treated.

When to Use an AED

The AED may be used **ONLY** when the victims have all three of the following clinical findings:

- ✓ Unresponsive
- ✓ Not breathing or no good breathing
- ✓ No pulse, or no definite pulse

Arrival of the AED

The AED should be TURNED ON and placed at the side of the victim, next to the rescuer that will operate it. If more than one rescuer shall be performing CPR, the AED should be placed opposite the rescuer performing CPR.

- ✓ **NOTE**: Some manufacturer allow professional rescuers to attach pads then power on AED, this may avoid distracting voice prompts.

Compressions should not be interrupted unnecessarily to attach the AED. The rescuer attaching the pads should work around the compressor to limit interruptions.

ADULT & CHILD AED 7

Electrode Pad

Turn on AED prior to placing pads. Ensure that the electrode pads do not touch. If there is a risk that pads may touch use anterior/posterior pad placement regardless of victim's age.

Typical Placement

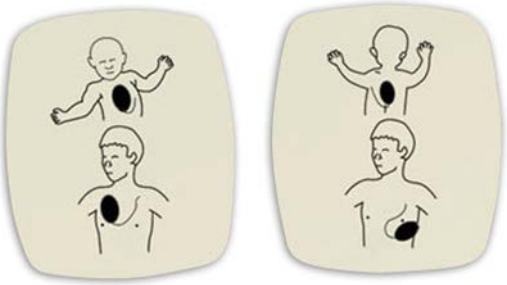
- ✓ One electrode pad is placed on the upper right side of the bare chest to the right of the breastbone, directly below the collarbone.
- ✓ Place the other pad to the left lower side of the chest, left of the nipple, a few inches below the left arm pit.

AP Placement

- ✓ Place pads at heart level.
- ✓ One electrode pad is placed in the center of the bare chest.
- ✓ The second is placed in the center of the bare back.

Choosing the Correct Pads

Child Pads/Child System



- ✓ NEVER use child pads or child system on an adult, treatment may be ineffective.
- ✓ Children are classified as being less than 8 years of age.

Adult Pads/Adult System

- ✓ Victims 8 years of age or older:
- ✓ Use typical pad placement unless pads touch, then use A/P placement.

Pad Attachment Issues

Peel the backing away from the electrode pads and attach the to the victim's bare chest.

Wet Chest

- ✓ Wipe the victim's chest if overly wet or sweaty.

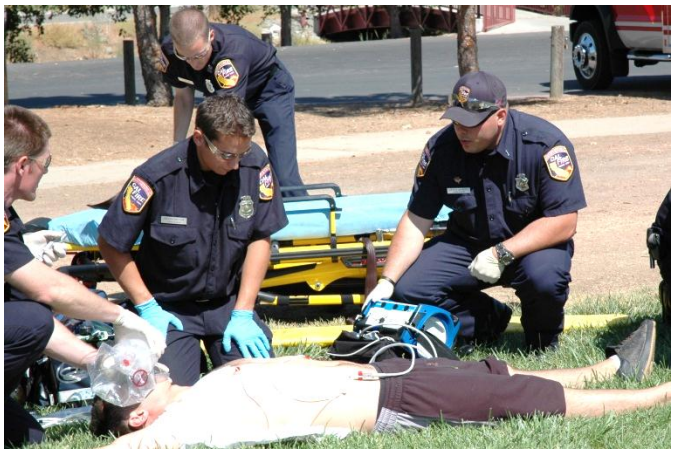
Hairy Chest

- ✓ See special AED use situations in next section.

ADULT & CHILD AED 7

AED Steps

STEP	ACTION
1	***Turn on the AED.***
2	***Attach the pads.*** • To the victim's bare chest.
3	***Clear victim to analyze*** • Verbal and visible clear the victim. • The AED will take 5-15 seconds to analyze.
4	***If the AED advises shock,*** • Verbally and visibly clear the victim. • Push the button to shock.
5	***If no shock is needed, and after shock delivery,*** • Immediately resume CPR.
6	***Resume CPR*** • Start with compressions.
7	***AED will advise to re-analyze*** • After 5 cycles or 2 minutes. • After shock or if no shock is advised, continue CPR.
8	***Continue*** • Until ALS assumes responsibility. • Or the victim starts to move.



ADULT & CHILD AED 7

Outcomes and actions after shock delivery

After shock delivery the AED may provide display or voice prompt messages, leave the pads on the victim and immediately resume CPR beginning with chest compressions. Do NOT delay CPR to recheck the pulse even if the displayed rhythm looks "normal." After 5 cycles (about 2 minutes) of CPR allow the AED to analyze the victim, following AED voice prompts. Continue care until advanced care providers take over or the victim starts to move. Advanced care providers will indicate when a pulse check or other therapies are appropriate.

Special AED use situations

Water

Water is a good conductor of electricity; you should remove the victim from contact with water to reduce the shock risk to rescuers. Dry the victim's chest before attaching the AED. A wet chest may conduct electricity across the skin surface, preventing adequate shock dose to the heart.

Metal

It is not necessary to remove the victim from contact with a metal surface, follow normal safety protocols.

Transdermal patches

Do NOT place pads over a medication patch, it may block delivery of shocks or cause small burns to the skin. Use gloves to remove the patch and wipe the area clean before attaching the AED.

Pacemakers

Large scars on the chest of your victim may indicate an implanted pacemaker or defibrillator. You should **NOT** place an AED electrode pad directly over an implanted device. Place an AED electrode pad at least 1 inch to the side of any implanted device. Placement of AED electrode pad on an implanted device may block the delivery of shock to the heart.

Hairy chest

If your victim has a hairy chest the area should be shaved with the razor that should be carried with the AED. The pads may stick to hair not chest. If the AED gives a "check electrode" or "check pads" message try pressing down firmly on pad to establish contact. If the AED "check electrode" or "check pad" message continues, quickly pull off pads. This will remove a lot of hair. If a lot of hair still remains where you will place the pads, NOW shave the area with the razor carried with the AED if you have not done so. Put on a new set of pads. Follow voice prompts.

Moving a Victim

Rescuers should leave an AED attached while transporting victim on a stretcher or in an ambulance. You should NEVER push the ANALYZE button while moving victim. Movement can interfere with analysis. The stretcher or ambulance must come to a complete stop to analyze or reanalyze the victim.

AED maintenance and troubleshooting

Maintenance

AED units are to be inspected and maintained per manufacturer's recommendations on a periodic basis. Most AEDs perform daily self-checks, rescuers need simply to ensure the AED is operational and that all AED inventory is intact and ready for use.

Troubleshooting

Learn the error messages used with your AED and the typical solutions. Common AED errors messages are:

- ✓ Problem with pads – push down firmly or apply new pads, do not turn off the AED.
- ✓ Motion detected or analysis interrupted – ensure victim is not moved.
- ✓ Low battery – install back-up battery.

ADULT & CHILD AED 7

Legal aspects of AED use

Good Samaritan laws give immunity to lay rescuers who try to help victim of sudden cardiac arrest (SCA) with an AED. Meaningful immunity laws typically protect non-negligent conduct and misconduct amounting only to negligence. California, for example, immunizes all but "acts of gross negligence or willful or wanton misconduct."

Medical Directors provide medical oversight for an AED program as required by state law. A Medical Director must be a physician and surgeon, currently licensed in California. CAL FIRE's Medical Director ensures that the department' AED service providers meet the training requirements of law and review each incident that involved the use of an AED and ensure that quality improvements are taken, if indicated.

Documentation

CAL FIRE-700, Quality Assurance/Quality Improvement (QA/QI) Form

- ✓ Used to evaluate the AED use when a need for quality improvement is observed.
- ✓ Filled out by the Unit EMS Coordinator.
- ✓ Forwarded to the Department EMS Coordinator at the Academy for review, by the Department Medical Director.
- ✓ Any quality improvement outcomes made by the Department Medical Director will be forwarded to the Unit EMS Coordinator or designee, for implementation.

The Unit AED Coordinator or designee will use the CAL FIRE QA/QI Form, to evaluate the AED use. Responders should forward all CAL FIRE-701 (AED Use Forms) along with a copy of the PCR to the Unit EMS Coordinator so the Unit EMS Coordinator will have sufficient information to fill out the form.

CAL FIRE-701, AED Use Form

In all instances in which an AED is applied to a victim, the CAL FIRE AED Use Form is utilized. The form shall be reviewed by the Unit AED Coordinator or their designee to accurately assess and assure department policy has been met and to identify any quality improvement needs.

CAL FIRE-702, Daily AED Inspection Report

Daily inspections will be documented on the front of the CAL FIRE 702 and monthly inspections shall be documented on the reverse side.

ADULT & CHILD AED 7

LEMSA AED Use Reporting

The Unit EMS Coordinator or the Unit Training Officer must collect and report to the Local EMS Agency (LEMSA) where the defibrillation occurred, as required by the LEMSA but no less than annually, data that includes, but is not limited to:

- ✓ The number of patients with sudden cardiac arrest receiving CPR prior to arrival of emergency medical care.
- ✓ The total number of patients on whom defibrillatory shocks were administered, witnessed (seen or heard) and not witnessed; and
- ✓ The number of these persons who suffered a witnessed cardiac arrest whose initial monitored rhythm was ventricular tachycardia or ventricular fibrillation.

CHAPTER 8: AED FOR INFANTS AND CHILDREN FROM 1 TO 8 YEARS OF AGE

Overview

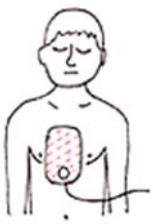
There are a few special considerations when using an AED on an infant or child from 1 to 8 years of age. Some AEDs have been modified to deliver a different shock doses for children. If you use a pediatric-capable AED you should be familiar with the features and procedures for use of:

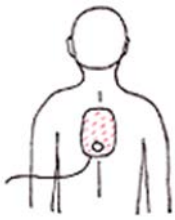
- ✓ Use of Child pads
- ✓ Use of Child system/key

Steps

The steps for child and infant AED use are the same as for the adult AED use except for a few key points:

- ✓ Use of child pads/system, if available.
- ✓ May require AP pad placement, so the pads do not touch.
- ✓ As in adults, use the AED as soon as available.





Using an AED on an Infant

Should you use an AED on infants (< 1 year of age)?

The new 2010 American Heart Association (AHA) guidelines now recommend the use of defibrillators for infants.

- ✓ For Infants under one year of age, a manual defibrillator is preferred.
- ✓ If a manual defibrillator is not available, pediatric setting/pads are desirable.
- ✓ If neither is available a standard AED may be used.

CHAPTER 9: RELIEF OF CHOKING Adults and Children (to age 1)

Early recognition is instrumental to successful treatment. Complete airway obstruction is an emergency that will result in death within minutes if not treated. The most common cause of a blocked airway in the unconscious victim is the tongue. However, if the victim is conscious, the most common cause of a blocked airway is food. Early recognition and prompt treatment will give the victim the best chance for survival.

Recognizing Choking

Signs of mild airway obstruction:

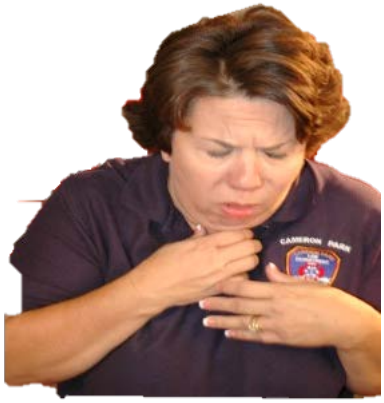
- ✓ Good air exchange.
- ✓ Responsive and can cough forcefully.
- ✓ May wheeze between cough.

Do not interfere with the victim's attempts to expel the obstruction. The victim should be encouraged to cough forcefully.

Signs of severe airway obstruction:

- ✓ Poor or no air exchange.
- ✓ Weak, ineffective cough or no cough at all.
- ✓ High-pitched noise while inhaling or no noise at all.
- ✓ Increased respiratory difficulty.
- ✓ Possible cyanosis (turning blue) unable to speak.
- ✓ Clutching the neck with the thumb and fingers, making the universal choking sign.
- ✓ Unable to move air.

Ask the victim if they are choking and request permission to help. The victim may not be able to talk, but can visibly agree to treatment.



RELIEF OF CHOKING 9

Responsive Victim

Abdominal thrusts

Abdominal thrusts should be used for conscious adults or children suffering severe airway obstruction. Each new thrust should be a separate, distinct movement given with the intent of relieving the obstruction. If the victim is small, the rescuer may need to kneel behind the victim.

Steps for Abdominal Thrusts

STEP	ACTION
1	***Position yourself behind the victim.***
2	***Wrap arms around the victim's waist.*** • By sliding your arms under the victim's armpits.
3	***Place hands for abdominal thrusts*** • Make a fist and place the thumb side against the middle of the abdomen, • Just above the navel and well below the tip of the xiphoid process.
4	***Perform Abdominal Thrusts*** • Grasp your fist with your other hand and • Apply pressure in an INWARD AND UPWARD thrust.
5	***Repeat*** • Repeat thrusts until the object is expelled from the airway or the victim becomes unresponsive

RELIEF OF CHOKING 9

Steps for Chest Thrusts

The rescuer will need to perform chest thrusts instead of abdominal thrusts for pregnant women, markedly obese, or victims with abdominal injury.

STEP	ACTION
1	***Position yourself behind the victim.***
2	***Wrap arms around the victim's CHEST.*** • By sliding your arms under the victim's armpits.
3	***Place hands for chest thrusts*** • Make a fist and place the thumb side against the middle of the chest, at the nipple line.
4	***Perform Chest Thrusts*** • Grasp your fist with your other hand and apply pressure as a **DOWNWARD** thrust.
5	***Repeat*** • Repeat thrusts until the object is expelled from the airway or the victim becomes unresponsive.

Prone Chest Thrusts

If the victim is lying down or you cannot reach around the victim, kneel beside the victim's chest, or straddle victim's thighs. Place the heel of one hand on the midline of the breastbone in the center of the chest and other hand on top (similar to chest compressions). Lean forward until your shoulders are directly over the midline of the victim's chest. Deliver distinct thrusts in a DOWNWARD direction. Apply enough force to compress the chest cavity. Continue until the object is expelled or the victim loses consciousness.

RELIEF OF CHOKING 9

Unresponsive Victim

Begin CPR

If a victim loses consciousness or is unconscious:

- ✓ Activate the emergency response system.
- ✓ Open the airway; remove an object if you see it.
- ✓ Begin CPR with compressions.
- ✓ Each time you open the airway to give breaths look for the object.
- ✓ If you see an object, remove it with your fingers.
- ✓ If you do not see an object, keep doing CPR.

After Choking Relief

After the airway obstruction is removed, treat the victim as you would any responsive/unresponsive patient.

- ✓ Reassess victim.
- ✓ Provide CPR or rescue breathing if needed.
- ✓ If the victim is responsive, recommend that the victim be transported to the hospital to rule out any medical complications from abdominal thrusts.

CHAPTER 10: RELIEF OF CHOKING INFANT

Early recognition is instrumental to successful treatment. Complete airway obstruction is an emergency that will result in death within minutes if not treated. The trained observer can often detect early signs of choking.

Recognizing Choking

Signs of mild airway obstruction:

- ✓ Signs are the same as the Adult and Child.

Do not interfere with the victim's attempts to expel the obstruction. The victim should be encouraged to cough forcefully. If mild obstruction continues activate the EMS system.

Signs of severe airway obstruction:

- ✓ Signs are the same as the Adult and Child, except
- ✓ The infant will be unable to cry.

If the infant is unable to make any sounds or breathe, the rescuer must attempt to relieve the obstruction by administering back slaps and chest thrusts.

INFANT RELIEF OF CHOKING 10

Responsive Infant:

Steps to Relieve Infant Choking

7	ACTION
1	***Kneel or sit with the infant in your lap***
2	***Bare infant's chest***
3	***Position the infant for back slaps*** • Support the infant's head and jaw as you place the infant face down on your forearm. • Avoid compressing throat. • Rest forearm on lap or thigh. • Keep infant's head lower than trunk.
4	***Deliver back slaps*** • Up to 5 back slaps. • Forcefully between shoulder blades. • Attempt to dislodge obstruction.
5	***Position infant for chest thrusts*** • Turn the infant as a unit. • Support the head and neck. • Keep infant's head lower than trunk.
6	***Deliver chest thrusts*** • Up to 5 chest thrusts. • Quick downward thrusts. • One per second. • Attempt to dislodge obstruction.
7	***Continue*** ✓ Until object is removed or until infant becomes unresponsive.

INFANT RELIEF OF CHOKING 10

Unresponsive Infant:

Blind Finger Sweeps

The rescuer should **NOT** perform blind finger sweeps in infants and children. Sweeps may push the obstruction further into the airway causing more harm.

Steps for Unresponsive Infant Choking

Stop giving backslaps and begin CPR.

- ✓ Activate EMS system, if not already.
- ✓ Place the infant on a firm, flat surface.
- ✓ Begin CPR with 1 extra step: each time you open the airway, look for the If you see an object, remove it.
- ✓ After approximately 5 cycles (about 2 minutes) of CPR, activate EMS.
- ✓ Continue CPR.

After Choking Relief

After the airway obstruction is removed, treat the infant as you would any responsive/unresponsive infant.

- ✓ Reassess victim.
- ✓ Provide CPR or rescue breathing if needed.
- ✓ If the victim is responsive, recommend that the victim be transported to the hospital to rule out any medical complications from abdominal thrusts.

INITIAL COURSE EXTENDED SECTIONS

INITIAL COURSE EXTENDED SECTIONS

This section has been added to account for the additional hours required for an initial CPR course.
See Chapter 1 section on training delivery.

S-1 ANATOMY AND PHYSIOLOGY

Objectives

- ✓ Understand the differences between clinical death and biological death.
- ✓ Understand the basic function of the heart, respiratory system, and the nervous system and how they inter-relate.

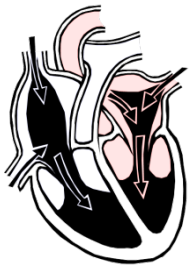
Death

Clinical death occurs in the first 4 to 6 minutes after breathing and heartbeat stop. It is reversible with CPR. Permanent brain damage will normally begin in 6-10 minutes without oxygen.

Biological death (brain death) occurs approximately 10 minutes after breathing and heartbeat stop due to lack of oxygen. Biological death is non-reversible. An exception to this rule is cold water near-drowning (see Special Conditions).

Sudden death occurs when the heart abruptly stops. Causes of sudden death are: heart attack, sudden cardiac arrest, respiratory arrest, drowning, electrocution, allergic reaction, and other trauma.

Cardiovascular System



The heart is a double pump. The right side of the heart, the upper chamber (atrium) and lower chamber (ventricle) receive de-oxygenated blood from the body. The right ventricle pumps the blood into the pulmonary artery for delivery to the lungs to be oxygenated. The left side of the heart, the upper chamber (atrium) and lower chamber (ventricle) receive oxygenated blood from the lungs. The left ventricle pumps the oxygenated blood into the aorta, supplying the body with oxygen.

The function of the heart is to pump blood to both the lungs and the body. The heart is a hollow organ whose chambers are lined by thin, strong endocardium. The tough, muscular wall of the heart is called the myocardium. The heart is surrounded by a sac called the pericardium.

The heart lies in the center of the chest, behind the breastbone (sternum), in front of the backbone (thoracic spine), and above the diaphragm. The heart is surrounded by lung except the area against the spine and a small area down the front center of the heart.

ANATOMY & PHYSIOLOGY S-1

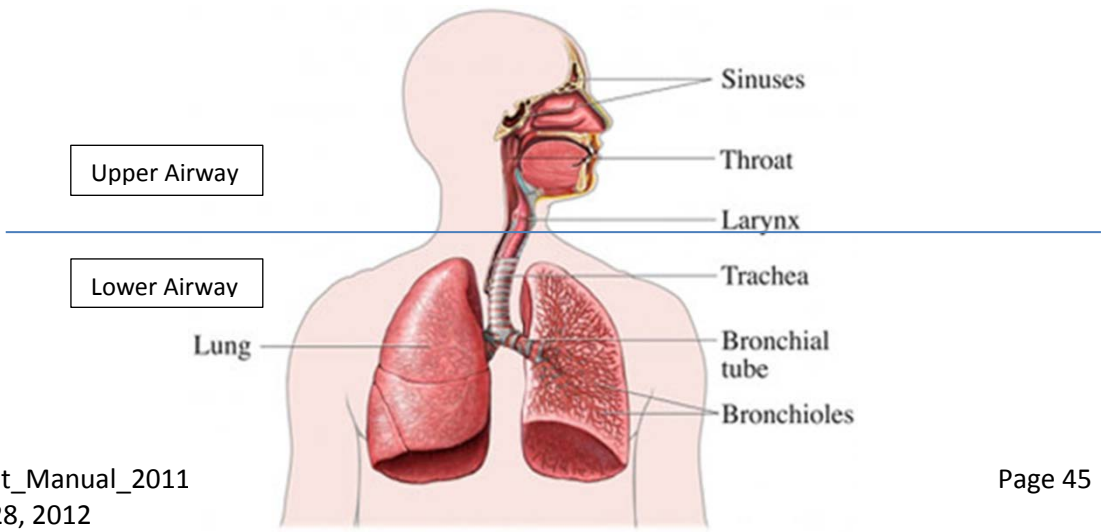
The three main vessels of the body are arteries, capillaries and veins. From the heart, arteries carry blood away from the heart to all extremities and organs. The arteries eventually branch down to capillaries, which are micro size (1 cell thick) and allow the exchange of oxygen and nutrients into the cells and waste products into the blood stream for disposal. The veins carry de-oxygenated blood back to the heart for oxygenation.

Blood delivers oxygen to body tissue and removes carbon dioxide and other waste products from the body. The average-sized adult man has approximately 5 to 6 liters of blood circulating in the body. Blood plays an important role in clotting and in the body's defense against infection.

Respiratory System

The respiratory system brings oxygen into the lungs from the outside air via breathing. Respiration helps to eliminate carbon dioxide from the body. All body cells require oxygen to function and survive. Breathing is the body's mechanism of taking in and using oxygen. The body cannot store oxygen; therefore a continuous breathing pattern is necessary to supply the body cells with required oxygen.

The airways are often divided into upper and lower sections. The upper airway is that portion of the respiratory tract beginning at the mouth and nose and ending at the larynx (voice box). Parts of the upper airway consist of the nose, mouth, nasopharynx, oropharynx, epiglottis and the larynx (voice box). Lower airway is the portion of the respiratory tract that extends from below the epiglottis through the terminal of the bronchioles. Parts of the lower airway consist of the trachea (windpipe), bronchi (1 bronchus to the right lung and 1 bronchus to the left lung), bronchioles (branches of the bronchi which terminate in the alveoli) and alveoli (small air sacs in the lungs where gas exchange occurs, surrounded by capillaries).



ANATOMY & PHYSIOLOGY S-1

Cerebrovascular System – Central Nervous System

Respiratory center in the brain; creates the stimulus to breathe. The brain requires a constant flow of oxygenated blood. Lack of blood supply to brain tissue in a specific area can result in distinct and limited loss of the specific function controlled by that area of the brain. Lack of blood supply to the brain stem can result in respiratory arrest or cardiovascular collapse.

Brain

The cerebrum: largest portion of the brain, it is responsible for higher mental function and regulates all sensory and motor activities. The cerebrum is divided into right and left hemispheres. The right side controls the left side of the body and the left side controls the right side of the body. This is can be an observable sign in brain injury such as stroke. The brain requires a constant flow of oxygenated blood, lack of blood flow to specific areas can cause distinct lack of function.

Spinal Cord

The brain Stem is the lower part of the brain. It is made of bundles of nerves which travel down to the spinal cord and contain distinct control centers which monitor and control respiratory and circulatory function. Arteries in the back of neck supply blood to brain stem, lack of blood supply can result in respiratory arrest or cardiovascular collapse.

Summary

Having a basic understanding of anatomy and physiology as it relates to body function will help you better access your patient and communicate your findings with other EMS personnel.

S-2 CARDIOVASCULAR DISEASE AND STROKE

Risk Factors for Heart Disease and Stroke

Certain risk factors for heart disease and stroke cannot be changed, such as:

- ✓ Age,
- ✓ Heredity,
- ✓ Gender, and
- ✓ Race.

There are some risk factors which can be controlled or modified, such as: cigarette smoking, diet, diabetes, obesity, high cholesterol, high blood pressure, exercise, excessive stress and prudent heart and brain living.

Coronary Artery Disease (CAD)

Coronary artery disease is the leading cause of death in the United States. Two conditions of heart disease, arteriosclerosis and atherosclerosis cause the narrowing or blockage of arteries. Firefighters are not immune to this problem.

Arteriosclerosis is the hardening and thickening of the walls of the arteries. Arteriosclerosis can occur because of fatty deposits on the inner lining of arteries (atherosclerosis), calcification of the wall of the arteries, or thickening of the muscular wall of the arteries from chronically elevated blood pressure. Commonly called “hardening of the arteries”, include a variety of conditions that cause the artery walls to thicken and lose elasticity.

Atherosclerosis is a form of arteriosclerosis. Decreases the arteries ability to dilate when needed to supply more blood to the heart is one of the most frequent causes of angina pectoris.

Angina pectoris is a symptom of CAD and displays as a transient pain, pressure or discomfort frequently located in the center of the chest; it results from a temporary lack of adequate blood supply to the heart muscle and commonly lasts from 2 to 15 minutes. Angina pectoris pain is often described as crushing, pressing, constricting, oppressive, or heavy. The pain may spread to one (more often the left) or both shoulders or arms or to the neck, jaw, back, or upper mid portion of the abdomen. Pain is usually relieved by rest or nitroglycerin (3 over 10 to 15 minutes). Phone 911 if pain is not relieved by rest or nitroglycerin.

CARDIOVASCULAR DISEASE & STROKE S-2

Acute Myocardial Infarction (AMI)

AMI, commonly called a heart attack is the damaging or death of an area of the heart muscle resulting from a reduction in the blood supply to that area.

Signs and symptoms of AMI are chest discomfort similar to angina episodes that lasts longer than 15 to 20 minutes. The pain is not relieved or only partially relieved by rest or nitroglycerin. The victim will display sweating, nausea, vomiting, or shortness of breath. Early diagnosis and treatment reduces mortality, decreases the size of the heart attack, improves heart function, and decreases incidence of heart failure.

During sudden cardiac arrest, SCA, the heart stops beating and breathing ceases abruptly or unexpectedly. This may occur as the initial and only symptom of CAD (coronary artery disease), before any other symptoms develop. Most commonly occurs within the first hour after the onset of symptoms of a heart attack. Direct cause is usually VF (ventricular fibrillation), an abnormal, chaotic, uncoordinated quivering of the heart muscle.

The patient reaction and association symptoms are denial, breathing difficulty, nausea and/or vomiting. The skin signs are a color of pale to ashen gray, skin temperature is cool and there will be profuse sweating. The victim will be anxious and irritable and may have a feeling of impending doom.

Early Recognition

Early diagnosis and treatment:

- ✓ Reduces mortality,
- ✓ Decreases the size of the heart attack,
- ✓ Improves heart function, and
- ✓ Decreases incidence of heart failure.

Treatment

Have patient stop their activity and sit or lie down. Obtain a full patient assessment/history, carefully track vital signs, administer oxygen, and arrange for transport.

CARDIOVASCULAR DISEASE & STROKE S-2

Sudden cardiac arrest (SCA)

SCA is a stoppage of the heart muscle. The heart stops beating and breathing ceases abruptly or unexpectedly. This may occur as the initial and only symptom of CAD, before any other symptoms develop and will most commonly occur within the first hour after the onset of symptoms of a heart attack. Direct cause is usually ventricular fibrillation (VF), an abnormal, chaotic, uncoordinated quivering of the heart muscle.

Prevention

Quality patient care may help prevent escalation to sudden cardiac arrest.

Stroke

Stroke is 3rd leading cause of death in the U.S. and is the leading cause of brain injury in adults. Acute stroke victims will display a significant change in responsiveness resulting in confusion, stupor, or coma. Signs and symptoms will include a sudden weakness or numbness of the face, arm, or leg on one side of the body, slurred or incoherent speech, unexplained dizziness, unsteadiness, sudden falls and dimness or loss of vision (particularly in one eye).

The causes of stroke are:

- ✓ Hemorrhagic (Rupture)
- ✓ Ischemic (Blockage)

Hemorrhagic stroke is caused by bleeding into the brain, most frequently caused by longstanding high blood pressure (hypertension) or an aneurysm (the rupture of a cerebral artery).

Ischemic stroke is a complete occlusion of a cerebral artery caused by either a cerebral thrombosis (blood clot) or an embolism (blockage of a vessel by a clot that has traveled from another location).

Transient Ischemic Attack: A TIA is a reversible episode of focal neurological dysfunction that typically lasts a few minutes to a few hours. It is impossible to distinguish between a TIA and a stroke at the time of onset. TIA symptoms completely resolve within 24 hours (most last less than 60 minutes). TIAs are a significant indicator of a stroke risk.

Treatment

- ✓ High flow oxygen and transport to a stroke center.

S-3 SPECIAL CPR SITUATIONS

Overview

Knowing the steps of basic life support is not always enough. A special situation may present itself during an emergency. The recognition of the unique situation and being prepared will provide the victim with the best possible chance of survival.

Changing Locations during CPR

The two main reasons for moving a victim during CPR are:

1. Remove rescuers and/or victim from an unsafe scene.
2. For transport.

Continue CPR when transferring victim to a gurney. Rescuer can stand alongside the victim, maintaining the locked-arm position for compressions. Attempt to limit all compression interruptions to 5-10 seconds.

Stairways

Stairways always present a challenge. If a CPR victim must be transported down stairs, the rescuer should perform CPR at the head or foot of the stairs. Then, at a predetermined signal, interrupt CPR to move quickly to the next floor level – move as quickly as possible.

Cardiopulmonary Arrest Associated With Trauma

Mechanism of Injury

When performing CPR on a trauma victim consider the mechanism of injury:

- ✓ Diving accident.
- ✓ Fall from a height.
- ✓ Automobile accident.

SPECIAL CPR SITUATIONS S-3

Cervical Spine Injury

Signs and symptoms of possible cervical spine injury are:

- ✓ Injury above the clavicle.
- ✓ Head injury with unconsciousness.

To provide care of the victim, limit their movement, and open the airway with jaw-thrust maneuver. If the rescuer cannot open the airway using the jaw-thrust maneuver, the head-tilt chin lift maneuver may be used. For direct and severe injury to vital structures, such as the heart, aorta, or pulmonary arteries, bleeding must be controlled as soon as possible to maintain adequate blood volume and oxygen-carrying capacity.

Submersion or Near-Drowning Accident

Rescue from the Water:

Reach, throw, row, tow, and go:

Get to the victim as quickly as possible. Utilize a boat, raft, surfboard, or flotation device. Be aware of your own personal safety and the safety of your crew. Assume spinal cord injury; immobilize the cervical and thoracic spine.

Rescue Breathing:

Begin rescue breathing as soon as possible (in shallow water, in a boat, or on shore). Open the airway by using the jaw-thrust maneuver whenever possible. Remember, that c-spine precaution is essential victim care, but establishing an airway is the primary concern, without it, the victim will not survive. Use mouth-to-mouth or mouth-to-nose breathing; use barrier device if available.

Chest Compressions:

Do not attempt compressions while still in the water unless the victim is on a board. Begin when victim is on a hard, flat surface and has been found to be not breathing with pulseless.

Diving reflex

All victims of submersion or near drowning who require resuscitative efforts should be transported to the hospital for evaluation and monitoring of pulmonary complications, head, or spinal cord injuries. The diving reflex occurs when the victim's face is submerged in cold water (68˚F or below). Breathing is inhibited, the heart slows, and blood vessels constrict. This can often delay death, especially in the very young; even after prolonged submersion.

SPECIAL CPR SITUATIONS S-3

Hypothermia

Hypothermia is the reduction of body temperature below normal, which can be deadly in its extreme.

The five stages of hypothermia are:

1. Shivering
2. Apathy and decreased muscle function
3. Decreased level of responsiveness
4. Decreased vital signs
5. Death

Rick Factors specific to Hypothermia

Victims with injuries, chronic illness, or certain other conditions will show the effects of cold much sooner than health people. Those under the influence of alcohol or drugs also tend to be affected more rapidly than others. The age of the victim is also a determining factor; infants and young children are at risk because of their anatomy and the elderly are at risk due to impaired judgment, medications, limited mobility, or limited income.

Victim Care

Comfort, calm, and reassure the victim. Remove all wet clothing from the victim and protect against heat loss and wind chill with blankets. Cover victim's head; utilize heat packs and hot water bottles if available. Maintain the victim in a horizontal position and avoid rough movement and excessive activity. Allow additional time to assess breathing; assess signs of circulation. If breathing is absent or ineffective, provide rescue breathing with bag-valve mask. Administer warm, humidified oxygen (42˚ C to 46˚ C [108˚ F to 115˚ F]) if available.

Electric Shock

There are approximately 500 to 1000 deaths annually in the United States from electric shock. Rescuer must be certain the rescue efforts will not put anyone in further danger.

Victim Care

Begin rescue breathing as soon as possible, using jaw-thrust maneuver to open the airway. Maintain spinal protection and immobilization during extrication and treatment. Carefully move the victim from non-accessible location, such as a utility pole. Resume rescue breathing and begin chest compressions as soon as victim is on a hard, flat surface. Remove smoldering clothing, shoes, and belts to prevent further thermal damage. Treat burns the same as for other burn victims.

SPECIAL CPR SITUATIONS S-3

Anaphylactic Shock

Causes

Anaphylactic shock can have many causes:

- ✓ Insect sting,
- ✓ Food,
- ✓ Medicine,
- ✓ Pollen,
- ✓ Inhaled, ingested, or injected substance.

Victim Care

Immediate treatment is required to prevent death. If the time between exposure and the appearance of signs and symptoms is rapid, there is a greater risk of a fatal reaction. Prolonged CPR provides oxygen delivery until the effects of the reaction may become resolved. Treat the severe asthmatic crisis aggressively, before deterioration to full arrest occurs.

Pregnancy

Cardiac Arrest Causes

There are a few causes of cardiac arrest associated with delivery:

- ✓ Amniotic fluid embolism - debris enter the maternal circulation, causing cardio-respiratory collapse.
- ✓ Eclampsia – a serious complication characterized by convulsions.

Victim Care

The victim should be transported in the left lateral recumbent position, supported by pillows or blankets. If spinal injury is suspected, c-spine victim first then tip board as a unit to the left, this will reduce pressure on the vena cava, and the abdominal organs, thus reducing hypotension and a reduction in cardiac output.

Performing CPR on a Pregnant Woman

Provide standard measures and procedures for CPR, but perform chest compressions slightly higher on the sternum as the uterus has pushed the diaphragm up higher than the normal position. Chest compressions can be performed while she is positioned on her left side; prop a hard surface behind her back and continue.

There are many opportunities for a special circumstance to present itself at an emergency scene. Review the different situations and be prepared to do what is necessary for the victim's survival under the unique circumstances.

SUMMARY of 2010 CPR RECOMMENDATIONS

Component	Recommendations		
	Adults	**Children**	**Infant**
Recognition	Unresponsive (for all ages)		
	No breathing or no normal breathing (only gasping)		
	No pulse palpated within 10 seconds		
Pulse Check Site	Carotid	Carotid or femoral	Brachial
CPR Sequence	CAB		
Compression Rate	At least 100/minute		
Compression Landmarks	Lower half of breastbone		Just below the nipple line
Compression Depth	At least 2 inches	At least ⅓ chest depth About 2 inches	At least ⅓ chest depth About 1 ½ inches
Chest Wall Recoil	Allow complete recoil between compressions Rotate compressors every 2 minutes		
Compression Interruptions	Minimize interruptions in chest compressions Attempt to limit interruptions to <10 seconds		
Airway	Head tilt-chin lift or for suspected trauma: jaw-thrust		
Compression-to-Ventilation (without advanced airway)	**30:2** 1 or 2 rescuers	**30:2** for Single rescuers **15:2** for 2 rescuers	
Rescue Breathing	1 breath every 5-6 seconds	1 breath every 3-5 seconds	
Ventilations with Advanced Airway	1 breath every 6-8 seconds (8-10 breaths/min) Asynchronous with chest compressions About 1 second per breath Visible chest rise		
Defibrillation	Attach and use AED as soon as available. Minimize interruptions in chest compressions before and after shock; Resume CPR beginning with compressions immediately after each shock		

MAJOR CHANGES FOR PROFESSIONAL BLS:

1) "Look, Listen, and Feel" has been removed, if pulse is not detected within 10 seconds, begin CPR.
2) CPR sequence is "CAB", compressions, airway, breathing.
3) Compression depth has increased for all ages.
4) Compression rate has changed to "at least" 100/minute instead of "approximately" 100.
5) Quality compressions: push hard & fast, no delays, full recoil & avoid excessive ventilation.
6) Minimize compression interruptions.
7) Use of AED on an infant (manual is preferred, Pedi-dose desirable, regular allowed).

TESTS

WRITTEN TESTS

Final Exam

There are separate final exams for the Initial Course and the Refresher Course. The Lead Instructor will oversee the final exam prior to skills testing. Students must pass the final exam with an 80%.

Remedial

A Remedial exam will be available for students failing to pass the final exam with an 80% score. The exam shall be offered to students failing the final exam within 72 hours. Students should be offered instructor assistance and should be encouraged to review the student manual prior to taking the remedial exam. Students failing to pass the remedial exam must retake the entire course.

Practice Test

See practice test on following pages.

10 QUESTION CPR PRACTICE TEST

1. Why was the CPR sequence changed from "ABC" to "CAB" in the 2010 guidelines?
   A) So pulse checks would not take over 10 seconds
   B) To allow prompt AED use
   C) To ensure the scene is safe
   D) So chest compressions would be initiated sooner
   PAGE 3
2. Finger sweeps on infants should be performed
   A) after back slaps
   B) never
   C) if pulse is absent
   D) after chest thrusts
   PAGE 40

3. Which of the following options lists the correct compression and ventilation rates for 2-rescuer CPR in the presence of an advanced airway?
   A) Compress at a rate of at least 60 per minute, 1 breath every 6 to 8 seconds
   B) Compress at a rate of at least 100 per minute, 2 breaths every 5 to 10 seconds
   C) Compress at a rate of at least 100 per minute, 1 breath every 6 to 8 seconds
   D) Compress at a rate of at least 60 per minute, 1 breath every 5 to 10 seconds
   PAGE 11

4. The first step in assessing a collapsed victim is to
   A) perform abdominal thrusts
   B) check for a pulse
   C) determine unresponsiveness
   D) examine the mouth for foreign body obstruction
   PAGE 15

5. One of the following conditions may pose a hazard when using an AED. Select the one situation that poses the greatest hazard.
   A) the patient is lying on a soft surface
   B) the patient is lying on the living room carpet
   C) the patient has an implanted insulin pump in his abdomen
   D) the patient's chest is covered with water or the victim is lying in water
   PAGE 29

6. When administering breaths by using a bag-mask device for a child who is not breathing but does have a pulse, the rescuer should
    A) avoid performing a head tilt
    B) Give breaths at the rate of 1 breath every 3 to 5 seconds
    C) squeeze the bag as often as possible
    D) position the child on his or her stomach
    PAGE 10

7. The correct position for chest compressions on an infant is to place two fingers on the sternum
    A) just below the nipple line
    B) at the rib margin
    C) 1 finger width above the xiphoid
    D) 1 finger width above the nipple line
    PAGE 23

8. When performing CPR, a victim should be treated as an infant if they are
    A) under 40 pounds
    B) under 1 year of age
    C) 1 to 8 years of age
    D) 1 to 3 years of age
    PAGE 4

9. What is the best action to relieve severe choking in a responsive infant?
    A) give 2 breaths, repositioning the airway after each breath
    B) kneel behind the infant and perform abdominal thrusts
    C) begin cycles of 5 back slaps, followed by 5 chest thrusts
    D) start CPR immediately
    PAGE 39

10. If a victim is coughing forcefully with a partial airway obstruction you should
    A) do 5 back slaps
    B) give 5 abdominal thrusts
    C) perform the Heimlich maneuver
    D) not interfere
    PAGE 34

CPR SKILLS TESTS

See stand-alone CPR skills tests sheets on the following pages. Test sheets are also available on the CAL FIRE intra-net.

1 and 2 Rescuer Adult CPR with AED Skill Sheet

Student's Name: _____ Date: _____

*Students must complete this skill twice, in the First arriving Rescuer role and then again in the Second arriving Rescuer role.

	Circle Skill(s) if Remediation is Needed ➔	CPR Skills	AED Skills	
Skill Step	**CRITICAL STEPS**		✓if done correctly	
First Rescuer: Evaluate for ability to initiate BLS and deliver quality CPR for 5 cycles.				
1	Assess for response and no breathing or no normal breathing.			
2	Send some to activate EMS or contact radio dispatch, if needed.			
3	Check for pulse (no more than 10 seconds).			
4	Give high quality CPR.			
	• Correct hand placement.		Cycle 1:	
	• Adequate rate (at least 100/min or 30 in 18 seconds).		Cycle 2:	
	• Adequate depth: (at least 2 in. deep, 23 out of 30 times).		Cycle 3:	
	• Complete recoil: (at least 20 out of 30 times).		Cycle 4:	
	• Minimize Interruptions: (give 2 breaths with **pocket mask** <10 seconds).		Cycle 5:	
Second Rescuer: Evaluate for ability to use the AED and to switch roles.				
5	During 5th cycle of compressions Second Rescuer arrives with AED and BVM.			
	• Turn on AED and apply pads.			
6	First Rescuer continues compressions while the Second Rescuer sets up AED.			
7	Second Rescuer clears victim to allow AED to analyze – Rescuers switch.			
8	If AED indicates a shockable rhythm, second rescuer clears victim and delivers the shock.			
First Rescuer: Evaluate ability to give breaths with a BVM.				
9	Both rescuers resume quality CPR.		Cycle 1	Cycle 2
	Second Rescuer gives 30 compressions immediately after shock for 2 cycles.			
	First Rescuer delivers 2 breaths with a BVM for 2 cycles.			
AFTER 2 CYCLES, STOP THE EVALUATION				
• If the student completes all steps successfully, the student passes the evaluation. • If the student does not pass all steps successfully, allow the student to practice and re-evaluate.				
Print Instructor Name:	Instructor Signature:	Date:		

BASED ON AHA GUIDELINES

Instructions for 1 and 2 Rescuer Adult CPR with AED

1. **Assess victim (Steps 1 and 2, must be completed within 10 seconds of arrival at scene).**
    - Check for unresponsiveness (must be completed prior to compressions).
    - Check for no breathing or normal breathing (gasping).
2. **Send someone to activate EMS or contact dispatch by radio (Steps 1 and 2, must be completed within 10 seconds of arrival at scene).**
    - Shout for help or direct someone to call for help and get an AED.
3. **Check for pulse:**
    - Check carotid pulse.
    - This should take no more than 10 seconds. (identify cardiac arrest)
4. **Deliver high-quality 1 Rescuer CPR (initiates CPR within 10 seconds of identifying cardiac arrest).**
    - Correct placement of hands in center of chest.
        - Adult: Lower half of breastbone.
        - Adult: 2-handed (second hand on top of the first or grasping the wrist of the first hand).
    - Compression rate of at least 100/minute.
        - 30 compressions in 18 seconds or less.
    - Adequate depth for victim age.
        - Adult: At least 2 inches.
    - Complete chest recoil after each compression.
        - Appropriate ratio: 30:2.
    - Minimizes interruptions in compressions.
        - Less than 10 seconds of interruption for delivery of breaths and return to compressions.
        - Compressions not interrupted until AED analyzing rhythm.
        - Compressions resumed immediately after shock/no shock.

5-8.Integrates prompt and proper use of AED with CPR:

- Turns AED on.
- Places proper sized pads for victim's age in correct location.
- Clears rescuers from victim for AED to analyze rhythm (pushes ANALYZE button if required).
- Clears victim and delivers shock.
- Resumes chest compressions immediately after shock delivery.
- Does not turn off the AED during CPR.
- Provides safe environment for rescuers during AED shock delivery.
    - Communicates clearly.
    - Delivers shock to victim after all rescuers are clear of victim.
- Switches during analysis phase of AED.

9. **Provides effective breaths with BVM during 1 rescuer CPR.**
    - Opens airway adequately.
    - Provides effective breaths.
    - Delivers each breath over 1 second.
    - Delivers breaths that produce visible chest rise.
    - Avoids excessive ventilation.

1 and 2 Rescuer Infant CPR without AED Skill Sheet

Student's Name: _____ Date: _____

	Circle Skill(s) if Remediation is Needed ➔	1 Rescuer CPR Skills	2 Rescuer CPR Skills	BVM Skills	2 Thumbs Encircling Hands	
SKILL STEP	**CRITICAL STEPS**				**✓ IF DONE CORRECTLY**	
One Rescuer Infant CPR: **FIRST RESCUER**: Evaluate for ability to initiate BLS and deliver quality CPR for 5 cycles.						
1	Assess for response and no breathing or no normal breathing.					
2	Send some to activate EMS or contact radio dispatch, if needed.					
3	Check for pulse (no more than 10 seconds).					
4	Gives high quality CPR.					
	• Correct finger placement.				Cycle 1:	
	• Adequate rate (at least 100/min or 30 in 18 seconds).				Cycle 2:	Time:
	• Adequate depth: (approximately 1 ½ in. deep, 23 out of 30 times).				Cycle 3:	
	• Complete recoil: (at least 20 out of 30 times).				Cycle 4:	
	• Minimizes Interruptions: (give 2 breaths with **pocket mask** <10 seconds).				Cycle 5:	
Two Rescuer CPR and Switch: Evaluate the **FIRST RESCUER** for ability to use the BVM and give compressions using the two thumbs encircling hands technique. Evaluate **BOTH RESCUERS** for the ability to switch roles.						
5	During 5th cycle of compressions Second Rescuer arrives with BVM.					
6	Both rescuers resume quality two rescuer CPR.				Cycle 1	Cycle 2
	• SECOND RESCUER gives 15 compressions for 2 cycles in 9 seconds using 2 thumb encircling hands technique.				X	X
	• FIRST RESCUER delivers 2 breaths with a BVM for 2 cycles.					
AFTER 2 CYCLES, Prompt rescuers switch roles.						
7	Both rescuers resume quality CPR.				Cycle 1	Cycle 2
	• SECOND RESCUER gives 15 compressions for 2 cycles in 9 seconds using 2 thumb encircling hands technique.				Time:	Time:
	• FIRST RESCUER delivers 2 breaths with a BVM for 2 cycles.				X	X
AFTER 2 CYCLES, STOP THE EVALUATION						
• If the student completes all steps successfully, the student passes the evaluation. • If the student does not pass all steps successfully, allow the student to practice and reevaluate.						

Print Instructor Name:	Instructor Signature:	Date:

BASED ON AHA GUIDELINES

Instructions for 1 and 2 Rescuer Infant CPR without AED

1. **Assess victim (Steps 1 and 2, must be completed within 10 seconds of arrival at scene).**
    - Check for unresponsiveness (must be completed prior to compressions).
    - Check for no breathing or no normal breathing.
2. **Send someone to activate EMS or contact dispatch by radio (Steps 1 and 2, must be completed within 10 seconds of arrival at scene).**
    - Shout for help or direct someone to call for help and get an AED.
    - If alone remain with the infant to provide 2 minutes of CPR before activating EMS.
3. **Check for pulse:**
    - Check brachial pulse.
    - This should take no more than 10 seconds.
4. **Deliver high-quality 1 Rescuer CPR (initiates CPR within 10 seconds of identifying cardiac arrest.**
    - Correct placement of hands: 1 Rescuer: 2 fingers just below nipple line.
    - Compression rate of at least 100/minute: 30 compressions in 18 seconds or less.
    - Adequate depth for victim age.
        - Infant: At least one third of the depth of the chest (approximately 1 ½ inch).
    - Complete chest recoil after each compression.
    - Appropriate ratio for age and number of rescuers: 1 rescuer: 30:2.
    - Minimize interruptions in compressions.
        - Less than 10 seconds between compression cycles.

Evaluate the FIRST RESCUER for ability to use the BVM and give compressions using the two thumbs encircling hands technique. Evaluate BOTH RESCUERS for the ability to switch roles.

5. **Switch at appropriate intervals as prompted by instructor.**
6. **Provides effective breaths with BVM during 1 rescuer CPR.**
    - Provides effective breaths.
        - Opens airway adequately.
        - Delivers each breath over 1 second.
        - Delivers breaths that produce visible chest rise.
        - Avoids excessive ventilation.
7. **Provides high-quality compressions during 2 rescuer CPR.**
    - Correct placement of hands/fingers in center of chest.
        - 2 rescuers: 2 thumb-encircling hands just below the nipple line.
    - Compression rate of at least 100 per minute: 15 compressions in 9 seconds or less.
    - Adequate depth for age.
        - Infant: At least one third of the depth of the chest (approximately 1 ½ inch).
    - Complete chest recoil after each compression.
    - Appropriate ratio for age and number of rescuers: 2 rescuer: 15:2
    - Minimizes interruptions in compressions.
    - Less than 10 seconds of interruption for delivery of breaths and return to compressions.

Foreign Body Airway Obstruction, Adult and Child Skill Sheet

Student's Name: _____ Date: _____

	Circle Skill(s) if Remediation is Needed ➔	Responsive Victim	Unresponsive Victim
Skill Step	**CRITICAL STEPS**		✓if done correctly
Rescuer: Evaluate for ability to assess for choking and perform abdominal thrusts.			
1	Ask the victim "are you choking, can you cough, speak or breathe"?		
Evaluator states "victim has a severe airway obstruction".			
2	Let the victim know you can help.		
3	Stand behind the victim *(kneel if small child.).*		
4	Perform abdominal thrusts until object is dislodged or victim loses conscious.		
Evaluator states "victim has lost consciousness".			
5	Send some to activate EMS or contact radio dispatch, if needed.		
6	Gently lower victim to the ground.		
7	Begin CPR, (*look into mouth for object before giving each breath).*		
8	Complete at least two cycles of CPR.		
Evaluator states "you see and remove an object, and the victim is breathing and has a pulse".			
STOP THE EVALUATION			
• If the student completes all steps successfully, the student passes the evaluation. • If the student does not pass all steps successfully, allow the student to practice and reevaluate.			
Print Instructor Name:	Instructor Signature:	Date:	

BASED ON AHA GUIDELINES

Instructions for Foreign Body Airway Obstruction, Adult and Child

1. **Assess victim (Steps 1 and 2, must be completed within 10 seconds of arrival at scene).**
    - Check for severe airway obstruction.
2. **Let the victim know you can help (Steps 1 and 2, must be completed within 10 seconds of arrival at scene).**
    - Ask, "are you choking, can you cough, speak, or breathe" (must be completed prior to assisting victim).
3. **Stand behind the victim**
    - Kneel behind small victims.
4. **Perform abdominal thrusts**
    - Make a fist with one hand.
    - Place the thumb side of your fist against the victim's abdomen, in the midline, slightly above the navel and well below the breastbone.
    - Grasp your fist with your other hand and press your fist into the victim's abdomen with a quick forceful upward thrust.
    - Give each new thrust with a separate, distinct movement to relieve the obstruction.
    - Repeat until object is expelled, or victim becomes unresponsive.

    Evaluator states that victim has become unresponsive
5. **Send someone to activate EMS or contact dispatch by radio.**
6. **Gently lower victim to the ground.**
    - Ensure that victim's head does not hit the ground.
    - Place victim on their back.
7. **Begin CPR.**
    - Look into victim's mouth before giving each breath for object.
8. **Complete at least 2 cycles of CPR.**

Evaluator states "you see and remove an object, and the victim is breathing and has a pulse".

Foreign Body Airway Obstruction, Infant Skill Sheet

Student's Name: _____ Date: _____

	Circle Skill(s) if Remediation is Needed ➔	Responsive Infant	Unresponsive Infant
Skill Step	**CRITICAL STEPS**		✓if done correctly
Rescuer: Evaluate for ability to assess for choking and perform abdominal thrusts.			
1	Confirm infant is responsive and has a severe airway obstruction.		
Evaluator states "victim has a complete airway obstruction".			
2	If easy, remove clothes from infant's chest.		
3	Sit or kneel, then rest infant on forearm with head slightly lower *(facedown).*		
4	Perform 5 back slaps.		
5	Turn infant over as a unit, carefully supporting head and neck.		
6	Perform five chest thrusts *(quick downward thrusts just below the nipple line).*		
7	Continue back slaps and chest thrusts until object is removed or the infant becomes unconscious.		
Evaluator states "Infant has lost consciousness".			
8	Activate EMS, if needed.		
9	Gently lower victim to the ground or firm surface.		
10	Begin CPR, (*look into mouth for object before giving each breath).*		
11	Complete at least two cycles of CPR.		
Evaluator states "you see and remove an object, and the victim is breathing and has a pulse".			
STOP THE EVALUATION			
• If the student completes all steps successfully, the student passes the evaluation. • If the student does not pass all steps successfully, allow the student to practice and reevaluate.			
Print Instructor Name:	Instructor Signature:	Date:	

BASED ON AHA GUIDELINES

Instructions for Foreign Body Airway Obstruction, Infant

1. **Assess victim (Step 1 must be completed within 10 seconds of arrival at scene).**
   - Confirm infant is responsive.
   - Check for severe airway obstruction. *Victim has complete airway obstruction.*
2. **Remove victim's clothing from chest.**
   - If quick and easy.
3. **Position infant.**
   - Sit or kneel.
   - Rest infant on forearm with head slightly lower (facedown).
4. **Perform 5 back slaps.**
   - Forcefully between the infant's shoulder blades.
   - Using the heel of your hand.
   - Deliver each slap with the intent to dislodge the object.
5. **Turn infant over.**
   - As a unit, carefully supporting head and neck.
6. **Perform five chest thrusts.**
   - Quick downward thrusts.
   - Just below the nipple line.
7. **Continue back slaps and chest thrusts until object is removed or the infant becomes unconscious.**

   Evaluator states "Infant has lost consciousness"
8. **Send someone to activate EMS or contact dispatch by radio.**
9. **Gently lower victim to the ground.**
   - Ensure that victim's head does not hit the ground.
10. **Begin CPR.**
    - Look into victim's mouth before giving each breath for object.
11. **Complete at least 2 cycles of CPR.**

    Evaluator states "you see and remove an object, and the victim is breathing and has a pulse".

CPR SCENARIOS

CPR SCENARIOS

The focus of CPR training has changed from the individual rescuer to the team approach of CPR. The following are suggestions for CPR scenarios to help instructors and students make the transition:

Team CPR Scenario:

There is increased focus on providing CPR as a team because resuscitations in the field typically involve teams of rescuers performing several actions simultaneously. For example one rescuer may begin chest compressions, while another is retrieving the bag-valve-mask; a third is setting up the defibrillator while another may be communicating with the base hospital or dispatch. Other tasks that should be considered are clearing a path to the ambulance, creating more room to operate, retrieving the gurney, talking to family members.

Situation:

- ✓ Start with bystander CPR with a pocket mask.
- ✓ Send in a 2 person company with oxygen and a BVM.
- ✓ Send in a 2 person company with an AED.
- ✓ Send in a 2 person ALS company if available.

Other Considerations:

Other tasks that should be considered are clearing a path to the ambulance, creating more room to operate, retrieving the gurney, and talking to family members. Are you spending too much time at scene? Remember post-cardiac care is one of the components of the AHA's chain of survival.

15 Minute Challenge

Break class up into groups of 3 or 4. Utilize adult, child, and infant mannequins. Have teams perform basic CPR with a BVM (no AED) for 15 minutes straight, switching roles every five cycles or approximately 2 minutes. The individuals in the group not performing CPR at the moment should be coaching CPR by ensuring quality compressions and limiting interruption time to 5-10 seconds.

Create your Own Scenarios

Be imaginative.

REFERENCES

REFERENCES

2010 American Heart Association Guidelines for CPR and ECC

BLS for Healthcare Providers, American Heart Association, 2011

Brady/Prentice Hall First Responder, 6th Edition