CPR FOR ADULTS (AGES 9 AND OVER)

1. Check if conscious or unconscious.
   Gently shake shoulders and shout: "Are you OK?" Activate EMS by sending a bystander to call the local emergency telephone number. If positioning is necessary, support head and neck and roll victim onto back.

2. Open airway. Check for breathing.
   Place palm of one hand on forehead and apply firm pressure backward. Place fingers of other hand just under chin and gently lift. Do not close victim’s mouth completely. Put ear close to victim’s mouth and nose. LOOK for rise and fall of the chest. LISTEN and FEEL for breathing.

3. If not breathing –
   Give 2 full breaths (1 second each).
   Keeping airway open, pinch nose using thumb and index finger. Open your mouth wide and take a deep breath. Place your mouth over victim’s mouth making a tight seal. Give 2 full breaths (1 second each) with a pause between to take a breath.

   Place your hands in center of the chest between the nipples.

5. Chest compressions.
   Place shoulders and weight directly over hands, keeping elbows straight. Pushing straight down with smooth and even movements, compress chest cavity 1 1/2 - 2 inches at a rate of 100 compressions per minute. Give 30 fast compressions allowing the chest to recoil and count: "one, two, three and." Follow 30 compressions with 2 breaths and repeat until help arrives.

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If you do not have the money pay what you can and if you cannot pay anything please pay the cosmos back with good deeds to others.
Pass on the good karma by being good to others and helping them the way I am helping you.
<table>
<thead>
<tr>
<th>Skill</th>
<th>Adult</th>
<th>Child</th>
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<td>Adult</td>
<td>1 year to adolescent</td>
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<td>Adolescent and older (approx 12-13 years)</td>
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<tr>
<td>Check the scene</td>
<td>Do not enter an unsafe scene</td>
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<tr>
<td>Check the patient</td>
<td>Tap on the collar bones and shout</td>
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<td>Tap the shoulders or flick the feet and shout</td>
</tr>
<tr>
<td>Activate EMS</td>
<td>If completely alone: Activate EMS after unresponsiveness is found. Come back to provide care. If asphyxial arrest is likely, call after 2 minutes or 5 cycles of CPR.</td>
<td>If completely alone: Go activate EMS after 5 cycles or 2 minutes of CPR. For a sudden witnessed collapse, activate EMS after unresponsiveness is found. Come back to provide care.</td>
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<tr>
<td>Airway</td>
<td>Head tilt chin lift. Look in the mouth for any foreign objects. For suspected head, neck or back injuries use a jaw thrust</td>
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<tr>
<td>Breathing</td>
<td>Look, Listen, and Feel for about 5 seconds. If not breathing give 2 breaths lasting about 1 second each.</td>
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<tr>
<td>Unconscious Choking:</td>
<td>Reposition airway, tilt head back further and try again. If air still does not go in and make the chest rise, begin 30 chest compressions, open the airway and look in the mouth for a foreign object. If one is seen, sweep it out, attempt 2 breaths. If air does not go in, reposition airway, tilt head back further and try again. Continue cycles of 30 chest compressions, foreign body check, 2 breaths, reposition attempt 2 breaths again until air goes in and makes chest rise. After breaths go in, check ABC and provide appropriate care.</td>
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<tr>
<td>Circulation</td>
<td>Carotid Artery in the Neck Check for no more than 10 seconds.</td>
<td>Brachial artery in the upper arm: Check for no more than 10 seconds.</td>
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</tr>
<tr>
<td>Rescue Breathing:</td>
<td>1 breath every 5 seconds: recheck ABC every 1-2 minutes.</td>
<td>1 breath every 3 seconds: recheck ABC every 1-2 minutes.</td>
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<tr>
<td>CPR</td>
<td>1 or 2 rescuer: 30:2 at a rate of 100 per minute. Use 2 hands: Place the heel of 1 hand in the center of the chest, place other hand on top. Depth: 1 1/2—2 inches</td>
<td>1 rescuer: 30:2 2 rescuer: 15:2 at a rate of 100 per minute. Use 1 or 2 hands: Place the heel of 1 hand in the center of the chest, if needed place other hand on top. Depth: 1/3 to 1/2 the depth of the chest</td>
<td>1 rescuer: 30:2 2 rescuer: 15:2 at a rate of 100 per minute. Use 2 fingers on the breastbone just below the nipple line. Alternate or 2 rescuer: Use 2 thumbs encircling hands technique. Depth: 1/3 to 1/2 the depth of the chest</td>
</tr>
<tr>
<td>AED</td>
<td>If unwitnessed, provide 2 minutes of CPR before shock. If witnessed arrest, provide shock immediately. Provide sequence of 1 shock, 2 minutes or 5 cycles of CPR, 1 shock, 2 minutes of CPR, etc…</td>
<td>Child pad preferred for ages 1-8. If not available, use adult pads. Don’t let pads touch together.</td>
<td>Not recommended for infants &lt;1 year</td>
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</tbody>
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Course Objectives

- Overcome the 5 fears that prevent rescue efforts
- Identify basic anatomy of the heart and lung
- Know prudent heart living, controllable and uncontrollable risk factors
- Identify the signs and symptoms of a heart attack
- Action steps for suspected heart attack
- Rescue breathing
- Foreign body airway obstruction management
- CPR for Adult, Child and Infant
- Setup and use of an AED
- 2 rescuer CPR
- Use of a resuscitation mask
- Use of a Bag Valve Mask

The purpose of this booklet is to provide a source for review and assistance with the ProCPR curriculum. Participants desiring CPR certification need to use www.procpr.org to view the videos, receive instruction, and complete testing.

Basic Terms

- Good Samaritan Law – states that a person acting in good faith, rendering reasonable first aid, will not be held accountable for damages to that person unless gross willful misconduct is used. This person must not have a legal duty to respond or complete the first aid.
- Consent – a patient allowing you to give first aid
- Informed consent – you informing the patient of consequences, and then the patient giving permission for you to give first aid.
- Implied consent – when a patient is unconscious, it is given that if the person were conscious, they would request care.
- Abandonment – initiating care and then stopping without ensuring that the person has same level or higher care being rendered.
- Negligence – When you have a duty to respond and you fail to provide care or give inappropriate care, and your failure to provide care or inappropriate care causes injury or harm.
- Universal Precautions – Using gloves, masks, gowns, etc. for every patient every time when there is a possibility of coming in contact with any body fluids.
- Clinical Death — The moment breathing and heartbeat stop. Typically, a person has a high likelihood of being revived without much cellular damage when clinically dead for approximately 0-6 minutes. Within 6-10 minutes, brain cell damage is highly likely.
- Biological Death — Irreversible damage to brains cells and tissues. If a person has been clinically dead for 10 minutes or more, there will be irreversible cell damage. Resuscitation is unlikely but not impossible.
The Five Fears

• Fear of Disease
  Solution: Universal precautions. Whenever the possibility of coming in contact with bodily fluids exists, wear personal protective equipment for every patient, every time.

• Fear of Lawsuits
  Solution: Good Samaritan laws. States have laws that protect people from legal action who act in good faith to provide reasonable First Aid when the rescuer does not have a legal duty to respond.

• Fear of Uncertainty
  Solution: Emphasis is placed on the role of CPR not merely on the number sequences. Even if numbers are forgotten, remember to push hard and push fast. This emphasizes the simplicity of basic life support.

• Fear of Hurting a Patient
  Solution: Patients who are clinically dead can only be helped, not made worse with resuscitation efforts.

• Fear of Unsafe Scene
  Solution: Never enter an unsafe scene! Rescuers are no use to patients if they become patients themselves.
Heart
- Consists of four chambers, about the size of your fist, located under the breastbone.
- Function of the heart is to pump the blood to the brain, lungs and body. Your body has about 5.6 liters (6 quarts) of blood which circulates through the body three times every minute.
- The cardiovascular system comprises the heart, arteries, capillaries, and veins.

Lungs
- There are two lungs that function to take in oxygen and release carbon dioxide.
- Room air contains 21% oxygen. Our bodies use about 4-6 percent. When we breathe out we expire carbon dioxide and about 16% oxygen.

Brain
- Tells the rest of the body what to do and needs oxygen on a regular basis. Brain cells will begin to die in 4 to 6 minutes.
- The average human brain weighs three pounds and uses 20% of the body's oxygen.
- The medulla oblongata is the lower portion of the brainstem which controls several major body functions including respiration and circulation.

Cells
- All cells of the body require oxygen continuously to carry out normal functions. Carbon dioxide is produced as a waste product and must be eliminated from the body through the lungs.
- Red blood cells transport the oxygen to the tissues.
The ProCPR Method

**Protect yourself**
Safety first! Make sure the scene is safe. Do not enter an unsafe scene! If it is unsafe, stay at a safe distance and activate EMS (call 911). Prepare and apply appropriate personal protective equipment.

**Respond**
Is the scene safe or can the scene be made safe for the rescuer? Is there a true medical emergency?

**Observe signs and symptoms**
Shout to the patient first then tap and shout to determine the level of responsiveness. Ask what happened? Are there any life threatening conditions?

**Call**
If no response or a life threatening condition exists, activate EMS (call 911).

**Provide proper care**
Care for the patient based on present medical conditions.

**Relinquish** care to the provider of the next level of care.
Controllable risk factors:
- cigarette smoking
- high blood pressure
- obesity
- lack of exercise
- high blood cholesterol levels
- uncontrolled diabetes
- high fat diet
- high stress

Uncontrollable risk factors:
- race
- heredity
- sex
- Age

Centers for Disease Control and Prevention estimates that in the United States approximately 330,000 people die each year from sudden cardiac arrest due to coronary heart disease.

Heart Attack

Signs and Symptoms may include
- Chest discomfort-pressure, tightness, that lasts longer than 2 min.
- Nausea
- Sweating
- Shortness of breath
- Denial
- Feeling of weakness
- Women present more with shortness of breath, extreme fatigue, or flu-like symptoms About a third of women experience no chest pain.

Treatment:
- Recognize the signs and symptoms of a heart attack, activate EMS, have patient remain in a position of comfort, give nothing to drink or eat, and keep the patient calm and quiet.
Years ago I was excited to see some infomercials about alternative medicine treatments for diseases. The speaker talked a good show and sold me to buy his books. But there was absolutely no real advice in the books, only multilevel companies with more to buy. This made me angry and then I decided to write the best self-help books on natural medicine. Editing and collecting the best in real substantiated advice.

Desiré has written two incredible books and made movies to go with them. What to do for influenza and specifically what to do when the next major virus hits. A movie and a self-help book designed to really help you and your families understand what to do to protect yourself.

Also cancer is such a devastating disease, and there are ways to help yourself in the kitchen with cooking for cancer patients. Full advice from soup to nuts on exercise, mediation, cooking, and more. Coupled with a video for the science of how it works.

The health care debate is bringing a question of health and care. In this incredible new book Desiré has outlined a very thorough review of the real problems of Health Care. This book will tell you the truth the chemical companies do not want you to hear.

If you need more information on the SCIO and purchase details please get in touch with us

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The ProCPR Method

The Chain of Survival
The earlier these steps take place in an emergency, the better the chance of a patient’s survival.

- Early Activation of EMS
- Early CPR
- Early Defibrillation
- Early Advanced Care

Using personal Protective Equipment

Putting Gloves on:
Always use disposable gloves when providing first aid care. If you have a latex allergy use a latex alternative such as nitrile or vinyl. Before providing care, make sure the gloves are not ripped or damaged. You may need to remove rings or other jewelry that may rip the gloves.

Removing Gloves:
Remember to use skin to skin and glove to glove. Pinch the outside wrist of the other gloved hand. Pull the glove off turning the glove inside-out as you remove it. Hold it in the gloved hand. Use the bare hand to reach inside the other glove at the wrist to turn it inside out trapping the other glove inside. Dispose of gloves properly. If you did it correctly, the outside of either glove never touched your exposed skin.

Use a Rescue mask or Face Shield:
If you have to provide rescue ventilations, use a rescue mask or face shield that has a one way valve. To prevent exposure, avoid giving direct mouth to mouth ventilations.
Check the Scene

Key Questions to ask:

- Is it safe for me to help?
- What happened?
- How many patients are there?
- Am I going to need assistance from EMS?
- Do I have my personal protective equipment on and ready to use?

Check the patient if safe to help

- Tap and shout. Is there any response?
  
  **If no response, activate EMS.**

  **4 basic levels of responsiveness:**
  - Alert and responds appropriately
  - Responsive to **voice**
  - Responsive to painful stimuli only
  - Unresponsive

Activate EMS – Call 911

- **If alone—**
  - PHONE FIRST and get the AED and return to start CPR and use the AED for all ages of a sudden witnessed collapse.
  - CARE FIRST by providing about 5 cycles or 2 minutes of CPR before activating the emergency response number for unresponsive infants and children (except infants and children of a sudden, witnessed collapse) and for all patients of hypoxic (asphyxial) arrest (e.g., drowning, injury, drug overdose).

- **If not alone—**
  - Send someone to call. Give your location, the patient’s location, what happened, how many people are injured, what is being done, and make sure you hang up last, return to the rescuer and patient to provide help as needed.
Check and Correct ABC

Airway
- **Open Airway using head tilt chin lift**-
  Look in the mouth. If you see any foreign object, sweep it out right away.

Breathing
- **Check for signs of life. Look, Listen and feel for Breathing for 5-10 seconds**:
  Look at the patient’s chest to observe any chest rise, listen with your ear to hear any air movement, and your cheek should be close enough to the patient’s mouth to feel any air movement.
- **If no breathing, give 2 breaths** lasting 1 second each. Watch for chest rise.  
  **Note:** If not using a mask, make sure you make a seal around the mouth on an adult or child and pinch the nose closed each time you give a breath. On an infant, make sure to cover the mouth and nose with your mouth.

Circulation
- **Check the Circulation** for no more than 10 seconds
  **Adult and Child**– Check the carotid artery in the neck.
  **Infant**– Check the brachial artery on the inside of the upper arm.
Respiratory Arrest

- Unconscious
- No signs of life. Absent breathing but pulse is present.

Treatment:
- If there is a pulse but no breathing, start rescue breathing
  Adult – 1 breath every 5 seconds
  Child and Infant – 1 breath every 3 seconds
- Reassess Airway, Breathing, and Circulation every minute

Cardiac Arrest

- Unconscious
- No signs of life. Absent breathing and absent pulse

Treatment:
- If no pulse and no breathing – give 30 chest compressions and 2 breaths at a rate of about 100 compressions per minute. Continue cycles of 30 compressions to 2 breaths until an AED arrives, advanced medical personnel take over, the patient shows signs of life, or you are too exhausted to continue.
- Hand placement for compressions:
  Adult — Place heel of hand of the dominant hand on the center of the chest between the nipples. The second hand should be placed on top.
  Child — Place heel of one hand in the center of the chest between the nipples. Use the second hand if necessary.
  Infant — Place two thumbs or fingers on the center of the chest just below the nipples.
AED- Automated External Defibrillator

AED’s are designed to shock the heart, in order for the heart to restart under a normal rhythm. The AED analyzes the heart’s rhythm, advises whether a shock is advised and then powers up, the operator then pushes a button that will deliver the shock.

• Each minute that defibrillation is delayed the chance of survival is reduced by 10 percent. After 10 minutes few people are resuscitated.

• Early defibrillation increases survival rates to greater than 50%.
• For sudden witnessed collapse, use the AED as soon as it is available. For unwitnessed cardiac arrest use the AED after about 5 cycles (about 2 minutes) of CPR.
• If you are giving CPR to a child (older than 1 year) and the available AED does not have child pads or a way to deliver a smaller dose, go ahead and use a regular AED with adult pads.

AED Considerations:
• Remove a patient from standing water, such as in a puddle, before AED use. Rain, snow, or a wet surface is not a concern.
• Patient should be removed from a metal surface if possible.
• Slightly adjust pad placement so as not to directly cover the area if the patient has an obvious bump or scar for a pacemaker.
• Remove medication patches found on the patient’s chest with a gloved hand.
• Never remove the pads from the patient.
Treatment:

- Bare the chest. Dry it off if it is wet. If there is excessive hair you may need to shave it off.
- Turn the machine on.
- Place one pad on the patient's upper right chest just below the collarbone and above the nipple. Place the other pad on the patient's lower left ribs below the armpit. **Make sure to follow the directions shown on the pads for the AED pad placement. Manufactures will vary slightly.**
- Make sure pads are pressed down firmly. Do not try to lift up and adjust pads or they will not stick.
- Follow the directions the AED gives.
- Make sure to shout, “Stand Clear” before pushing the shock button.
- The normal cycle is 1 shock, 2 minutes of CPR, 1 shock, 2 minutes of CPR, etc...
- Be aware that many AED’s will not be programmed with the new 2005 ECC recommendations and may give up to 3 shocks and require 1 minute of CPR before giving another set of 3 shocks.
- The AED should be kept still while in operation. It is not designed for movement, such as in a vehicle.
Choking

Conscious Choking

- ask, “Are you choking?”
- If a person is unable to breath or speak, treat the patient.

Treatment:
- Activate EMS

**Adult and Child**

- Stand behind the victim with one foot in-between the victims feet and your other foot behind you.
- Place the flat side of your fist just above the patients belly button. Grab the back of your fist with your other hand.
- Administer abdominal thrusts until the object comes out or the patient becomes unconscious.

**Infant**

- Administer 5 back blows and 5 chest thrusts until the object comes out or the patient becomes unconscious.

**Special Circumstances:**
- If the patient is pregnant or too large to reach around, instead of placing your fist in the abdomen, place it in the middle of the chest to give chest thrusts.
Cell phones do affect the brain.

The shields can help a little but...

The SCIO can undo the damage by regulating and balancing the Body Electric's Regulatory Processes + increasing VARHOP.

If you need more information on the SCIO and purchase details please get in touch with us:

Maitreya Kft.

tel: +3613036043 | web: www.qxsubspace.com | e-mail: info@qxsubspace.com
Unconscious Choking

- Unconscious
- No signs of life. Absent breathing
- Attempted rescue breaths will not go in

**Treatment:**

- Check responsiveness
- Activate EMS
- Open **Airway** using head tilt chin lift
- Check for signs of life. Look, Listen and feel for **Breathing** for 5-10 seconds
- If no breathing, give 2 breaths lasting 1 second each. Watch for chest rise
- If first breath does not make the chest rise, reposition head and reattempt rescue breaths. If first breath still does not make the chest rise, assume there is a foreign body airway obstruction.

**Adult, Child, and Infant**-

- Give 30 chest compressions
- Check the mouth for a foreign body. If something is seen sweep it out with a finger.
- Attempt rescue breaths. If first breath does not make the chest rise, reposition head and reattempt rescue breaths. If first breath still does not make the chest rise, repeat cycles of compressions, foreign body check, and breathing attempts until breaths make the chest rise.
- After breaths make the chest rise, check the **Circulation** for no more than 10 seconds
- If pulse is present start rescue breathing. If no pulse, start CPR.
Two Rescuer Skills

Adult 2 rescuer CPR:
- First rescuer performs initial assessment and ventilations. Second rescuer performs 30 compressions at a rate of 100 compressions per minute.
- After every 5 cycles of 30:2, rescuers should switch positions. The switch should take less than 10 seconds.

Child and Infant 2 rescuer CPR:
- Rescuers should use a compression to ventilation ratio of 15:2.
- For infants, rescuers should use the 2 thumb encircling hands chest compression technique.
- After cycles rescuers should switch positions. The switch should take less than 10 seconds.
Bag valve mask

- If a bag-valve mask is available attach the bag-valve mask to a source of oxygen set at 12-15 L/min. If no O2 is available remove the residual bag reservoir at the end of the bag-valve mask and use room air.

- Using the "C-E" method for sealing the bag-valve mask to the patient's face, prepare to ventilate the patient. Please note that if for any reason the bag-valve ventilations are ineffective, revert to mouth-to-mask or face shield delivery method for rescue breaths.

- Ensure that thumb and forefinger are sealing the mask at the face of the patient. With middle, ring, and pinky fingers, grab the mandible (jaw) of the patient and pull the patient's face into the mask seal. If the mask is sealed well, there should be minimum to no air leakage on ventilation. Squeeze the bag fully so that the patient's chest rises. When the chest rises stop squeezing the bag so to avoid over-inflation which may force the air into the stomach.

- In some cases, the infant will benefit from turning the mask upside down so that the small point covers the patient's chin and the broad part of the mask is covering the mouth and nose.

- Ventilate at 1 breath every 5 seconds for an adult and 1 breath every 3 seconds for a child or infant, to perform rescue breathing. If an advanced airway is in place, perform 1 breath every 6-8 seconds. Take care not to hyper-ventilate the patient.
Control Severe Bleeding
- Inspect the wound. Look for the exact point where the bleeding is coming from. Apply gloves.
- Use direct pressure on the wound using an absorbent pad or gauze. Add more gauze or padding if necessary.
- You may consider using a pressure bandage by wrapping a roller gauze or elastic bandage around the wound to maintain bleeding control.

Manage Shock
- **Signs & Symptoms** restlessness, dizziness, confusion, cool moist skin, anxiety, delayed capillary refill time, and weakness.
- **Treatment:** Recognize, Activate EMS, keep calm, Nothing to eat or drink, maintain body heat, raise the legs if no spinal injury or fracture of the legs.

Perform Ongoing Assessments
- Check for and correct conditions which may not be immediately life threatening but may become so if not corrected.

**SAMPLE** (if time permits) ask patient about:
- Signs and symptoms
- Allergies
- Medications
- Past Medical History
- Last meal eaten
- Events leading up to need for help

**Look from head to toe for:**
- Deformities
- Contusions
- Abrasions
- Penetrations
- Burns
- Tenderness
- Lacerations
- Swelling
Desiré is the Professor Emeritus of IMUNE. IMUNE is an accredited and legally registered medical university in Europe.

Since 1995 IMUNE has been offering medical education in a variety of subjects to defend and perpetuate Natural Medicine. There are many small minded people being driven by the SINthetic chemical companies to destroy Natural Medicine as a viable choice in Medicine. IMUNE has offices in Switzerland, Mexico, Dubai, Budapest, England, and the British Virgin Islands. The small petty minded picayune minions of the chemical companies constantly attack with their anal retentive biased short sided views. We must fight for freedom of choice and especially freedom of choice on medicine.

The New Doctorate of Wellness program is accredited by Europe and international law. There are 100 hours of home study video on Wellness, new old biofeedback, electrophysiological medicine, anatomy, physiology, nutrition etc. You must have a mentor for home study, complete 50 contact hours of class time, write a treatise or a study, and have over 25 cases of practicum experience all validated. The cost is 2,000 euro. IMUNE has the experience and true education you and the World need.

Education...
...free from Borders  www.imune.net
Healthy membrane potential and adequate body voltage makes all of the functions of the cell work better.

Low Body Voltage leads to weak membrane potential, weak osmosis, trapped toxins, premature aging, and increased susceptibility to virus.

Charging the Human Battery

Factors that influence the body voltage and membrane potential are fatty acids in the cell membrane, minerals, especially salts, hydration water, oxygenation, stress, toxins and lifestyle.

The SCIO has been proven in tests to increase the electrical potential of the body. Increased cellular membrane potential makes osmosis increase, which increases detoxification, nutrient transfer and absorption, hydration, oxidation, and all cellular functions in general.

If you need more information on the SCIO and purchase details please get in touch with us

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VASO-VAGAL Reaction

Conventional biofeedback systems using skin resistance all use stimulation of electricity. The Indigo is no different.

Some patients have a vaso-vagal reaction when her system tried to shift from sympathetic nervous dominace to a more relaxing para-sympathetic dominance. If this happens too fast there can be a vaso-vagal episode. I have been lecturing about the dangers of the vaso-vagal shift for years but no one seems to be listening to the problem.
A vasovagal episode or vasovagal response or vasovagal attack (also called neurocardiogenic syncope) is a malaise mediated by the vagus nerve. When it leads to syncope or "fainting", it is called a vasovagal syncope, which is the most common type of fainting.

There are a number of different syncope syndromes which all fall under the umbrella of vasovagal syncope. The common element among these conditions is the central mechanism leading to loss of consciousness. The differences among them are in the factors that trigger this mechanism.

Typical triggers for vasovagal episodes include:

- Prolonged standing or upright sitting, particularly when standing with legs in a locked position for long periods of time—avoidance of long-term locking of one's legs in the standing position is taught in the military as well as in marching bands and drill teams.
- Standing up very quickly
- Stress
- Any painful or unpleasant stimuli, such as:
  - Venepuncture
  - Experiencing intense pain
  - Experiencing medical procedures with local anesthesia
  - Giving or receiving a needle immunization
  - Watching someone give blood
  - Watching someone experience pain
  - Watching or experiencing medical procedures
  - Sight of blood
  - Occasions of slight discomfort, such as dental and eye examinations
  - Hyperthermia, a prolonged exposure to heat
  - High temperature, either in the environment or due to exercise
  - High pressure on or around the chest area after heavy exercise
- Arousal or stimulants e.g. sex
- Sudden onset of extreme emotions
- Hunger
• Nausea or vomiting
• Dehydration
• Urination ('micturition syncope') or defecation, having a bowel movement ('defecation syncope')
• Abdominal straining or 'bearing down' trying to pass a large stool as in the Scrubs episode with JD
• Swallowing ('swallowing syncope') or coughing ('cough syncope')
• Random onsets due to nerve malfunctions
• Switching from sympathetic dominance (Adrenergic) to para-sympathetic (Cholinergic)
• Pressing upon certain places on the throat, sinuses, anus, anal perium and eyes, also known as vagal reflex stimulation when performed clinically
• Water colder than 10 Celsius (50° F), or ice that comes in contact with the face, that stimulates the mammalian diving reflex and can correct the episode
• High altitude
• Use of certain drugs that affect blood pressure, such as amphetamine
• Intense laughter

**Features**

In people with vasovagal episodes, the episodes are typically recurrent, usually happening when the person is exposed to a specific trigger. The initial episode often occurs when the person is a teenager, then recurs in clusters throughout his or her life. Prior to losing consciousness, the individual frequently experiences a prodrome of symptoms such as lightheadedness, nausea, sweating, ringing in the ears
(tinnitus), uncomfortable feeling in the heart, weakness and visual disturbances such as lights seeming too bright, fuzzy or tunnel vision. These last for at least a few seconds before consciousness is lost (if it is lost), which typically happens when the person is sitting up or standing. When sufferers pass out, they fall down (unless this is impeded); and when in this position, effective blood flow to the brain is immediately restored, allowing the person to wake up.

The autonomic nervous system's physiologic state (see below) leading to loss of consciousness may persist for several minutes, so:

1. If sufferers try to sit or stand when they wake up, they may pass out again;
2. The person may be nauseated, pale, and sweaty for several minutes.

Vasovagal syncope is rarely life-threatening in itself, but is mostly associated with injuries from falling while having an episode.
Treatment

Treatment for vasovagal syncope focuses on avoidance of triggers, restoring blood flow to the brain during an impending episode, and measures that interrupt or prevent the pathophysiologic mechanism described above.

- The cornerstone of treatment is avoidance of triggers known to cause syncope in that person. However, new development in psychological research has shown that patients show great reductions in vasovagal syncope through exposure-based exercises with therapists.\(^4\)
• Because vasovagal syncope causes a decrease in blood pressure, relaxing the entire body as a mode of avoidance isn't favorable. A patient can cross his/her legs and tighten leg muscles to keep blood pressure from dropping so drastically before an injection.
• Before known triggering events, the patient may increase consumption of salt and fluids to increase blood volume. Sports and energy drinks may be particularly helpful.
• Discontinuation of medications known to lower blood pressure may be helpful, but stopping antihypertensive drugs can also be dangerous. This process should be managed by an expert.
• Patients should be educated on how to respond to further episodes of syncope, especially if they experience prodromal warning signs: they should lie down and raise their legs; or at least lower their head to increase blood flow to the brain. If the individual has lost consciousness, he or she should be laid down with his or her head turned to the side. Tight clothing should be loosened. If the inciting factor is known, it should be removed if possible (for instance, the cause of pain).
• Wearing graded compression stockings may be helpful.
• There are certain orthostatic training exercises which have been proven to improve symptoms in people with recurrent vaso-vagal syncope.

For our devices therapist must be warned to not use maximum settings for too long and stay at the safe calibrated levels. This will prohibit a vaso-vagal episode. Always ask if there is a history of vaso-vagal episodes most often fainting or cold sweats with heart palpitations. If so always use low calibrated settings. Do not try to push therapy after therapy on patients with such history. Please always watch a patient who is getting a therapy on electrical stimulation. Be prepared to respond. Respond by cold water on the face gently. Gentle pressure over the eyes with a cold rag. Push on the acupuncture emergency spot above their upper lip in the cleft under their nose. Lie the patient down but watch out if they stand up too fast. Reduce stress and wait for ten minutes it will most likely pass. Do not let them leave till they are better. Call 911 if they pass out for more than a min. have pain or vomiting. Report fainting spell. I was working in a doctor’s office where a woman passed out in the waiting room. She did not respond to the emergency acupuncture spot. The head doctor said for her to sleep it off. I went thru her hand bag and found sleeping pills. She was trying to commit suicide, but she did it in an office where they might save her. Most suicides do it where someone could save them. Luckily I was there to save her and called 911. She lived to tell the story.
Acupuncture emergency spot, press for 10 - 15 sec in case of fainting
The QCC trivector device passes a changing low level field thru the item and generates a sophisticated picture of the electrical field of the item. It makes a 22X22X22 3D field that means over 10,000 separate frequencies to make one pattern. The shark senses these fields and they are amplified by the salt water. This study leads to the discovery of the electro-sense. Researchers have found that humans also have such a system but it is weak.

Every item has such a field. Living things have a changing reactive field, non-living things have a static field non-changing. We now know that the electro-sense in humans is the surface of the skin and most concentrated in the sense of smell.

So by measuring the Voltammetric electrical field of items and then amplifying the field 10 million times we get to really measure the patient’s reaction to items, really. So by applying a trivector Voltammetric pattern we can measure the response or evoked potential and see the patient’s reactivity.

So 5 million dollars were spent buying and procuring the items in the matrix and testing these items with a patented registered technology of modern science. This is why the SCIO device works so well, at each treatment from calibration, test etc these QCC signatures are at the heart. Real science, real technology, real legal compliance, real items, real results, real honesty and integrity.

In 5th grade we were taught we are made up of atoms made of electrons and protons and neutrons. The electrons in the outer level are so charged they never touch. We are made of electrical fields.

The QCC is a very advanced patented trademarked technology with a CE mark. It measures in a very sophisticated process the Voltammetric electrical field of any item. If you look up voltammetry in Google you see thousands of references for a world recognized very scientific chemical process also referred to as Polography.

You can see our patented process at http://www.voltametriqqc.ro/

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Shark Senses

Mary Ann Badavi & Stephanie Parker

- The bonnethead shark has an electrosense that is five million times greater than the electrosense of humans.
- Picture: Andy Murch/Elasmobranch.com

Electricity

- A shark’s ampullae of Lorenzini are able to feel electric currents at short ranges.
- All living things emit a small electrical current, a shark can feel it from 0-8 Hz.
- It is also thought that the Hammerhead shark evolved its head to increase surface area for electrical reception.
Adult Basic Life Support

Introduction

This section contains the guidelines for out-of-hospital, single rescuer, adult basic life support (BLS). Like the other guidelines in this publication, it is based on the document 2005 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science with Treatment Recommendations (CoSTR), which was published in November 2005. Basic life support implies that no equipment is employed other than a protective device.

Guideline changes

There are two main underlying themes in the BLS section of CoSTR: the need to increase the number of chest compressions given to a victim of cardiac arrest, and the importance of simplifying guidelines to aid acquisition and retention of BLS skills, particularly for laypersons.

It is well documented that interruptions in chest compression are common and are associated with a reduced chance of survival for the victim. The ‘perfect’ solution is to deliver continuous compressions whilst giving ventilations independently. This is possible when the victim has an advanced airway in place, and is discussed in the adult advanced life support (ALS) section. Chest-compression-only CPR is another way to increase the number of compressions given and will, by definition, eliminate pauses. It is effective for a limited period only (about 5 min) and is not recommended as standard management of out-of-hospital cardiac arrest.

The following changes in the BLS guidelines have been made to reflect the greater importance placed on chest compression, and to attempt to reduce the number and duration of pauses:

1) Make a diagnosis of cardiac arrest if a victim is unresponsive and not breathing normally.
2) Teach rescuers to place their hands in the centre of the chest, rather than to spend more time using the ‘rib margin’ method.
3) Give each rescue breath over 1 sec rather than 2 sec.
4) Use a ratio of compressions to ventilations of 30:2 for all adult victims of sudden cardiac arrest. Use this same ratio for children when attended by a lay rescuer.
5) For an adult victim, omit the initial 2 rescue breaths and give 30 compressions immediately after cardiac arrest is established.
Adult Basic Life Support

1. UNRESPONSIVE?
   - Shout for help
   - Open airway

2. NOT BREATHING NORMALLY?
   - Call 999
   - 30 chest compressions
   - 2 rescue breaths
   - 30 compressions
To aid teaching and learning, the sequence of actions has been simplified. In some cases, simplification has been based on recently published evidence; in others there was no evidence that the previous, more complicated, sequence had any beneficial effect on survival.

There are other changes in the guidelines. In particular, allowance has been made for the rescuer who is unable or unwilling to perform rescue breathing. It is well recorded that reluctance to perform mouth-to-mouth ventilation, in spite of the lack of evidence of risk, inhibits many would-be rescuers from attempting any form of resuscitation. These guidelines encourage chest compression alone in such circumstances.

Guidelines 2000 introduced the concept of checking for ‘signs of a circulation’. This change was made because of the evidence that relying on a check of the carotid pulse to diagnose cardiac arrest is unreliable and time-consuming, mainly, but not exclusively, when attempted by non-healthcare professionals. Subsequent studies have shown that checking for breathing is also prone to error, particularly as agonal gasps are frequently misdiagnosed as normal breathing. In Guidelines 2005 the absence of breathing, in a non-responsive victim, continues to be the main sign of cardiac arrest. Also highlighted is the need to identify agonal gasps as another, positive, indication to start CPR.

Finally, there is recognition that delivering chest compressions is tiring. It is now recommended that, where more than one rescuer is present, another should take over the compressions (with a minimum of delay) about every 2 min to prevent fatigue and maintain the quality of performance.

**Adult BLS sequence**

Basic life support consists of the following sequence of actions:

1. **Make sure the victim, any bystanders, and you are safe.**

2. **Check the victim for a response.**
   - Gently shake his shoulders and ask loudly, ‘Are you all right?’

3. **If he responds:**
   - Leave him in the position in which you find him provided there is no further danger.
   - Try to find out what is wrong with him and get help if needed.
   - Reassess him regularly.
3 B If he does not respond:
- Shout for help.
- Turn the victim onto his back and then open the airway using head tilt and chin lift:
  - Place your hand on his forehead and gently tilt his head back.
  - With your fingertips under the point of the victim’s chin, lift the chin to open the airway.

4 Keeping the airway open, look, listen, and feel for normal breathing.
- Look for chest movement.
- Listen at the victim's mouth for breath sounds.
- Feel for air on your cheek.

In the first few minutes after cardiac arrest, a victim may be barely breathing, or taking infrequent, noisy, gasps. Do not confuse this with normal breathing.

Look, listen, and feel for no more than 10 sec to determine if the victim is breathing normally. If you have any doubt whether breathing is normal, act as if it is not normal.

5 A If he is breathing normally:
- Turn him into the recovery position (see below).
- Send or go for help, or call for an ambulance.
- Check for continued breathing.

5 B If he is not breathing normally:
- Ask someone to call for an ambulance or, if you are on your own, do this yourself; you may need to leave the victim. Start chest compression as follows:
  - Kneel by the side of the victim.
  - Place the heel of one hand in the centre of the victim’s chest.
  - Place the heel of your other hand on top of the first hand.
  - Interlock the fingers of your hands and ensure that pressure is not applied over the victim's ribs. Do not apply any pressure over the upper abdomen or the bottom end of the bony sternum (breastbone).
  - Position yourself vertically above the victim's chest and, with your arms straight, press down on the sternum 4 - 5 cm.
  - After each compression, release all the pressure on the chest without losing contact between your hands and the sternum. Repeat at a rate of about 100 times a minute (a little less than 2 compressions a second).
  - Compression and release should take an equal amount of time.
6 A Combine chest compression with rescue breaths.
- After 30 compressions open the airway again using head tilt and chin lift.
- Pinch the soft part of the victim’s nose closed, using the index finger and thumb of your hand on his forehead.
- Allow his mouth to open, but maintain chin lift.
- Take a normal breath and place your lips around his mouth, making sure that you have a good seal.
- Blow steadily into his mouth whilst watching for his chest to rise; take about one second to make his chest rise as in normal breathing; this is an effective rescue breath.
- Maintaining head tilt and chin lift, take your mouth away from the victim and watch for his chest to fall as air comes out.
- Take another normal breath and blow into the victim's mouth once more to give a total of two effective rescue breaths. Then return your hands without delay to the correct position on the sternum and give a further 30 chest compressions.
- Continue with chest compressions and rescue breaths in a ratio of 30:2.
- Stop to recheck the victim only if he starts breathing normally; otherwise do not interrupt resuscitation.

If your rescue breaths do not make the chest rise as in normal breathing, then before your next attempt:
- Check the victim's mouth and remove any visible obstruction.
- Recheck that there is adequate head tilt and chin lift.
- Do not attempt more than two breaths each time before returning to chest compressions.

If there is more than one rescuer present, another should take over CPR about every 2 min to prevent fatigue. Ensure the minimum of delay during the changeover of rescuers.

6 B Chest-compression-only CPR.
- If you are not able, or are unwilling, to give rescue breaths, give chest compressions only.
- If chest compressions only are given, these should be continuous at a rate of 100 a minute.
- Stop to recheck the victim only if he starts breathing normally; otherwise do not interrupt resuscitation.

7 Continue resuscitation until:
- qualified help arrives and takes over,
- the victim starts breathing normally, or
- you become exhausted.
Explanatory notes

Risk to the rescuer

The safety of both the rescuer and victim are paramount during a resuscitation attempt. There have been few incidents of rescuers suffering adverse effects from undertaking CPR, with only isolated reports of infections such as tuberculosis (TB) and severe acute respiratory distress syndrome (SARS). Transmission of HIV during CPR has never been reported. There have been no human studies to address the effectiveness of barrier devices during CPR; however, laboratory studies have shown that certain filters, or barrier devices with one-way valves, prevent oral bacteria transmission from the victim to the rescuer during mouth-to-mouth ventilation. Rescuers should take appropriate safety precautions where feasible, especially if the victim is known to have a serious infection, such as TB.

Initial rescue breaths

During the first few minutes after non-asphyxial cardiac arrest the blood oxygen content remains high. Ventilation is, therefore, less important than chest compression at this time.

It is well recognised that skill acquisition and retention are aided by simplification of the BLS sequence of actions. It is also recognised that rescuers are frequently unwilling to carry out mouth-to-mouth ventilation for a variety of reasons, including fear of infection and distaste for the procedure. For these reasons, and to emphasise the priority of chest compressions, it is recommended that, in most adults, CPR should start with chest compressions rather than initial ventilations.

Jaw thrust

The jaw thrust technique is not recommended for lay rescuers because it is difficult to learn and perform. Therefore, the lay rescuer should open the airway using a head-tilt-chin-lift manoeuvre.

Agonal gasps

Agonal gasps are present in up to 40% of cardiac arrest victims. Laypeople should, therefore, be taught to begin CPR if the victim is unconscious (unresponsive) and not breathing normally. It should be emphasised during training that agonal gasps occur commonly in the first few minutes after sudden cardiac arrest. They are an indication for starting CPR immediately and should not be confused with normal breathing.

Mouth-to-nose ventilation

Mouth-to-nose ventilation is an effective alternative to mouth-to-mouth ventilation. It may be considered if the victim’s mouth is seriously injured or cannot be opened, the rescuer is assisting a victim in the water, or a mouth-to-mouth seal is difficult to achieve.
Mouth-to-tracheostomy ventilation

Mouth-to-tracheostomy ventilation may be used for a victim with a tracheostomy tube or tracheal stoma who requires rescue breathing.

Bag-mask ventilation

Considerable practice and skill are required to use a bag and mask for ventilation. The lone rescuer has to be able to open the airway with a jaw thrust whilst simultaneously holding the mask to the victim's face. It is a technique that is appropriate only for lay rescuers who work in highly specialised areas, such as where there is a risk of cyanide poisoning or exposure to other toxic agents. There are other specific circumstances in which non-healthcare providers receive extended training in first aid which could include training, and retraining, in the use of bag-mask ventilation. The same strict training that applies to healthcare professionals should be followed and the two-person technique is preferable.

Chest compression

In most circumstances it will be possible to identify the correct hand position for chest compression without removing the victim’s clothes. If in any doubt, remove outer clothing.

In Guidelines 2000 a method was recommended for finding the correct hand position by placing one finger on the lower end of the sternum and sliding the other hand down to it. It has been shown that the same hand position can be found more quickly if rescuers are taught to ‘place the heel of your hand in the centre of the chest with the other hand on top’, provided the teaching includes a demonstration of placing the hands in the middle of the lower half of the sternum.6

Whilst performing chest compression:

a) Each time compressions are resumed, the rescuer should place his hands without delay ‘in the centre of the chest’.

b) Compress the chest at a rate of about 100 a minute.

c) Pay attention to achieving the full compression depth of 4-5 cm (for an adult).

d) Allow the chest to recoil completely after each compression.

e) Take approximately the same amount of time for compression and relaxation.

f) Minimise interruptions in chest compression.

g) Do not rely on a palpable carotid or femoral pulse as a gauge of effective arterial flow.

h) ‘Compression rate’ refers to the speed at which compressions are given, not the total number delivered in each minute. The number delivered is determined not only by the rate, but also by the number of interruptions to open the airway, deliver rescue breaths, and allow AED analysis.
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Compression-only CPR

Studies have shown that chest-compression-only CPR may be as effective as combined ventilation and compression in the first few minutes after non-asphyxial arrest. Laypeople should, therefore, be encouraged to do compression-only CPR if they are unable or unwilling to provide rescue breaths, although combined chest compression and ventilation is the better method of CPR.

Over-the-head CPR

Over-the-head CPR for a single rescuer and straddle CPR for two rescuers may be considered for resuscitation in confined spaces.

Recovery position

There are several variations of the recovery position, each with its own advantages. No single position is perfect for all victims. The position should be stable, near a true lateral position with the head dependent, and with no pressure on the chest to impair breathing.

The Resuscitation Council (UK) recommends this sequence of actions to place a victim in the recovery position:

- Remove the victim’s spectacles.
- Kneel beside the victim and make sure that both his legs are straight.
- Place the arm nearest to you out at right angles to his body, elbow bent with the hand palm uppermost.
- Bring the far arm across the chest, and hold the back of the hand against the victim’s cheek nearest to you.
- With your other hand, grasp the far leg just above the knee and pull it up, keeping the foot on the ground.
- Keeping his hand pressed against his cheek, pull on the far leg to roll the victim towards you onto his side.
- Adjust the upper leg so that both the hip and knee are bent at right angles.
- Tilt the head back to make sure the airway remains open.
- Adjust the hand under the cheek, if necessary, to keep the head tilted.
- Check breathing regularly.

If the victim has to be kept in the recovery position for more than 30 min turn him to the opposite side to relieve the pressure on the lower arm.
**Choking**

**Recognition**

Because recognition of choking (airway obstruction by a foreign body) is the key to successful outcome, it is important not to confuse this emergency with fainting, heart attack, seizure, or other conditions that may cause sudden respiratory distress, cyanosis, or loss of consciousness.

Foreign bodies may cause either mild or severe airway obstruction. The signs and symptoms enabling differentiation between mild and severe airway obstruction are summarised in the table below. It is important to ask the conscious victim ‘Are you choking?’

<table>
<thead>
<tr>
<th>General signs of choking</th>
<th>Signs of mild airway obstruction</th>
<th>Signs of severe airway obstruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attack occurs while eating</td>
<td><strong>Response to question ‘Are you choking?’</strong></td>
<td><strong>Response to question ‘Are you choking?’</strong></td>
</tr>
<tr>
<td>Victim may clutch his neck</td>
<td>• Victim speaks and answers yes</td>
<td>• Victim unable to speak</td>
</tr>
<tr>
<td></td>
<td><strong>Other signs</strong></td>
<td>• Victim may respond by nodding</td>
</tr>
<tr>
<td></td>
<td>• Victim is able to speak, cough, and breathe</td>
<td><strong>Other signs</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Victim unable to breathe</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Breathing sounds wheezy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Attempts at coughing are silent</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Victim may be unconscious</td>
</tr>
</tbody>
</table>

**Adult choking sequence**

(This sequence is also suitable for use in children over the age of 1 year)

1. **If the victim shows signs of mild airway obstruction:**
   - Encourage him to continue coughing, but do nothing else.

2. **If the victim shows signs of severe airway obstruction and is conscious:**
   - Give up to five back blows.
     - Stand to the side and slightly behind the victim.
     - Support the chest with one hand and lean the victim well forwards so that when the obstructing object is dislodged it comes out of the mouth rather than goes further down the airway.
     - Give up to five sharp blows between the shoulder blades with the heel of your other hand.
Adult choking treatment

Assess severity

Severe airway obstruction (Ineffective cough)
- Unconscious
  - Start CPR
- Conscious
  - 5 back blows
  - 5 abdominal thrusts

Mild airway obstruction (Effective cough)
- Encourage cough
  - Continue to check for deterioration to ineffective cough or relief of obstruction
• Check to see if each back blow has relieved the airway obstruction. The aim is to relieve the obstruction with each blow rather than necessarily to give all five.
• If five back blows fail to relieve the airway obstruction give up to five abdominal thrusts.
  o Stand behind the victim and put both arms round the upper part of his abdomen.
  o Lean the victim forwards.
  o Clench your fist and place it between the umbilicus (navel) and the bottom end of the sternum (breastbone).
  o Grasp this hand with your other hand and pull sharply inwards and upwards.
  o Repeat up to five times.
• If the obstruction is still not relieved, continue alternating five back blows with five abdominal thrusts.

3 If the victim becomes unconscious:
• Support the victim carefully to the ground.
• Immediately call an ambulance.
• Begin CPR (from 5B of the Adult BLS Sequence). Healthcare providers, trained and experienced in feeling for a carotid pulse, should initiate chest compressions even if a pulse is present in the unconscious choking victim.

Explanatory notes
Following successful treatment for choking, foreign material may nevertheless remain in the upper or lower respiratory tract and cause complications later. Victims with a persistent cough, difficulty swallowing, or with the sensation of an object being still stuck in the throat should therefore be referred for a medical opinion.

Abdominal thrusts can cause serious internal injuries and all victims receiving abdominal thrusts should be examined for injury by a doctor.

Resuscitation of children and victims of drowning
Both ventilation and compression are important for victims of cardiac arrest when the oxygen stores become depleted – about 4-6 min after collapse from ventricular fibrillation (VF), and immediately after collapse for victims of asphyxial arrest. Previous guidelines tried to take into account the difference in causation, and recommended that victims of identifiable asphyxia (drowning; trauma; intoxication) and children should receive 1 min of CPR before the lone rescuer left the victim to get help. The majority of cases of sudden cardiac arrest out of hospital, however, occur in adults and are of cardiac origin due to VF. These additional recommendations, therefore, added to the complexity of the guidelines whilst affecting only a minority of victims.
Also important is that many children do not receive resuscitation because potential rescuers fear causing harm. This fear is unfounded; it is far better to use the adult BLS sequence for resuscitation of a child than to do nothing.

For ease of teaching and retention, therefore, laypeople should be taught that the adult sequence may also be used for children who are not responsive and not breathing.

The following minor modifications to the adult sequence will, however, make it even more suitable for use in children:

- Give five initial rescue breaths before starting chest compressions (adult sequence of actions 5B).
- If you are on your own perform CPR for approximately 1 min before going for help.
- Compress the chest by approximately one-third of its depth. Use two fingers for an infant under 1 year; use one or two hands for a child over 1 year as needed to achieve an adequate depth of compression.

The same modifications of five initial breaths, and 1 min of CPR by the lone rescuer before getting help, may improve outcome for victims of drowning. This modification should be taught only to those who have a specific duty of care to potential drowning victims (e.g. lifeguards).

Drowning is easily identified. It can be difficult, on the other hand, for a layperson to determine whether cardiorespiratory arrest has been caused by trauma or intoxication. These victims should, therefore, be managed according to the standard protocol.

References


Highlights of the 2005 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care

This special issue of *Currents* summarizes the changes contained in the 2005 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care, published in the Dec 13, 2005, issue of the AHA journal *Circulation*. This edition of *Currents* does not replace the 2005 AHA Guidelines for CPR and ECC. It highlights major changes and provides background information and detailed explanations. It will be helpful to instructors and students in courses offered before new training materials are available. The complete 2005 guidelines document offers instructors and clinicians additional details about the recommendations for CPR and ECC.

This issue of *Currents* contains 3 major sections relevant to the AHA ECC courses:

1. Major Changes Affecting All Rescuers
2. Changes in Lay Rescuer CPR
3. Changes in Healthcare Provider Basic and Advanced Life Support

The Major Changes section highlights the most important new recommendations that affect all courses (except newborn resuscitation) and all rescuers. The Lay Rescuer CPR section highlights changes for instructors and participants in lay rescuer CPR courses, including first aid. It does not include extensive science background. The Healthcare Provider section includes information about the evidence evaluation process on which the new guidelines are based. It highlights the major changes for basic life support (BLS) for healthcare providers (HCP), defibrillation, advanced cardiovascular life support (ACLS), acute coronary syndromes (ACS), stroke, pediatric advanced life support (PALS), and neonatal resuscitation. The HCP section includes more detailed science support for new recommendations than in the lay rescuer section.

This issue of *Currents* does not contain references to the studies used in evidence evaluation for the guidelines recommendations. For detailed references see the 2005 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care (*Circulation*. 2005; 112:IV-1–IV-211).

Algorithms and drug information from the 2005 guidelines are also included in the 2006 Handbook of Emergency Cardiovascular Care (ECC Handbook).

The Challenge: Simplify Resuscitation Training and Improve Effectiveness

Coronary heart disease is responsible for an estimated 330 000 out-of-hospital and emergency department (ED) deaths in the United States each year. Most people accept that statistic as an estimate of the frequency of out-of-hospital and ED sudden cardiac arrest (SCA). This estimate, however, is incomplete. At present SCA is not reported as a distinct event to the Centers for Disease Control and Prevention (CDC) National Center for Vital Statistics. When the CDC begins to record reports of SCA, we will have a better understanding of the incidence of this leading cause of death and the impact of interventions.

(Continued on next page)
Many victims of SCA demonstrate ventricular fibrillation (VF) at some point in their arrest. Treatment of VF SCA requires early CPR and shock delivery with a defibrillator. High-quality bystander CPR can double or triple survival rates from cardiac arrest. Unfortunately fewer than one third of victims of SCA receive bystander CPR, and even fewer receive high-quality CPR. A major purpose of the 2005 AHA Guidelines for CPR and ECC and all the changes in the AHA training materials is to improve survival from cardiac arrest by increasing the number of victims of cardiac arrest who receive early, high-quality CPR.

Survival for out-of-hospital cardiac arrest averages 6.4% or less in most reports from the United States and Canada. Multiple factors contribute to this low rate of survival, and each of these factors can be difficult to control in clinical studies in the out-of-hospital setting. As a result, many studies use short-term outcomes such as return to hospital admission, rather than long-term outcomes such as neurologically intact hospital admission, rather than long-term survival to hospital discharge. These mixed outcomes make it difficult to judge if the results of a study are applicable to all patients or victims in all emergency response systems. Despite these challenges, resuscitation research must strive to identify treatments that increase the number of SCA victims who leave the hospital alive with normal brain function.

Some community lay rescuer programs have reported high survival rates from SCA because they provide early CPR and early defibrillation using computerized automated external defibrillators (AEDs) that can be operated by trained lay rescuers. These lay rescuer AED programs can serve as models for improving responses to cardiac arrest in other communities. The North American Public Access Defibrillation trial showed that organized community lay rescuer CPR and AED programs improved survival to hospital discharge for victims with witnessed VF SCA. In addition, lay rescuer and first responder CPR and AED programs in airports and casinos and with police officers have reported survival rates from witnessed VF SCA as high as 49% to 74%. These programs teach us the importance of a planned and practiced response and rescuer training.
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The 5 major changes in the 2005 guidelines are these:

- Emphasis on, and recommendations to improve, delivery of effective chest compressions
- A single compression-to-ventilation ratio for all single rescuers for all victims (except newborns)
- Recommendation that each rescue breath be given over 1 second and should produce visible chest rise
- A new recommendation that single shocks, followed by immediate CPR, be used to attempt defibrillation for VF cardiac arrest. Rhythm checks should be performed every 2 minutes.
- Endorsement of the 2003 ILCOR recommendation for use of AEDs in children 1 to 8 years old (and older); use a child dose-reduction system if available.

This section presents an overview of these major changes. The changes are also discussed in the sections for lay rescuers and healthcare providers.

**Emphasis on Effective Chest Compressions**

**2005 (New):** Effective chest compressions produce blood flow during CPR (Class I). The guidelines note the following about chest compressions during CPR:

- To give effective chest compressions, all rescuers should “push hard and push fast.” Compress the chest at a rate of about 100 compressions per minute for all victims (except newborns).
- Allow the chest to recoil (return to normal position) completely after each compression, and use approximately equal compression and relaxation times.
- Try to limit interruptions in chest compressions. Every time you stop chest compressions, blood flow stops.

**2000 (Old):** Importance of quality and rate of chest compressions, importance of complete chest wall recoil, and need to minimize interruption of chest compressions were not emphasized.

**Why:** When cardiac arrest is present, there is no blood flow. Chest compressions create a small amount of blood flow to the vital organs, such as the brain and heart. The better the chest compressions performed (ie, with adequate rate and depth and allowing complete chest recoil), the more blood flow they produce. Chest compressions that are too shallow or too slow do not deliver as much blood flow as possible to vital organs. When chest compressions are interrupted, blood flow stops. Every time chest compressions begin again, the first few compressions are not as effective as the later compressions. The more interruptions in chest compressions, the worse the victim’s chance of survival from cardiac arrest.

Studies of actual resuscitation events have shown that half of chest compressions given by professional rescuers are too shallow, and chest compressions are interrupted too often during CPR. The new recommendations remind rescuers to give chest compressions that are fast enough and deep enough. They also remind rescuers to minimize interruptions in chest compressions.

Rescuers are told to let the chest come back to normal position after each compression because during chest wall recoil blood refills the heart. If the rescuer does not allow the chest to recoil or reexpand after each compression, blood flow during the next compression will be reduced because the heart has not filled with adequate blood before the compression. More information about chest compressions in adults, children, and infants is in the basic life support section, below.

**One Universal Compression-to-Ventilation Ratio for All Lone Rescuers**

**2005 (New):** The AHA recommends a compression-to-ventilation ratio of 30:2 for all lone (single) rescuers to use for all victims from infants (excluding newborns) through adults. This recommendation applies to all lay rescuers and to all healthcare providers who perform 1-rescuer CPR.

Information about 2-rescuer CPR, a technique not typically taught to lay rescuers, is in the third section, “Healthcare Provider Basic and Advanced Life Support.”

**2000 (Old):** For adult CPR, a 15:2 compression-to-ventilation ratio was recommended. For infant and child CPR, a 5:1 compression-to-ventilation ratio was recommended.

**Why:** The science experts wanted to simplify CPR information so that more rescuers would learn, remember, and perform better CPR. They also wanted to ensure that all rescuers would deliver longer series of uninterrupted chest compressions. Although research has not identified an ideal compression-to-ventilation ratio, the higher the compression-to-ventilation ratio, the more chest compressions are given in a series during CPR. This change should increase blood flow to the heart, brain, and other vital organs.

During the first minutes of VF SCA, ventilation (ie, rescue breaths) is probably not as important as compressions. Ventilation, however, is important for victims of hypoxic arrest and after the first minutes of any arrest. Most infants and children and most victims of drowning, drug overdose, and trauma who develop cardiac arrest are hypoxic. These victims have the best chance of survival if they receive both chest compressions and ventilations. Therefore, chest-compression–only CPR was not recommended as the preferred CPR technique for lay rescuers. The experts concluded that the combination of compressions and ventilations will be most likely to give the best outcome for all victims of cardiac arrest.

For further information see “Lay Rescuer CPR” and “BLS for Healthcare Providers,” below.

**Recommendations for 1-Second Breaths During All CPR**

**2005 (New):** Each rescue breath should be given over 1 second (Class IIa). This recommendation applies to all rescuers. Each rescue breath should make the chest rise (rescuers should be able to see the chest rise). All rescuers should give the recommended number of rescue breaths. All rescuers should avoid delivering too many breaths (more than the number recommended) or breaths that are too large or too forceful.

**2000 (Old):** Many different tidal volumes were recommended for rescue breaths with
and without oxygen. Breaths were to be delivered in 1 second or over 1 to 2 seconds.

**Why:** During CPR, blood flow to the lungs is much less than normal, so the victim needs less ventilation than normal. Rescue breaths can safely be given in 1 second. In fact, during cycles of CPR, it is important to limit the time used to deliver rescue breaths to reduce interruptions in chest compressions. Rescue breaths given during CPR increase pressure in the chest. This compression reduces the amount of blood that refills the heart and in turn reduces the blood flow generated by the next group of chest compressions. For all of these reasons, hyperventilation (too many breaths or too large a volume) is not necessary, and may be harmful because it can actually reduce the blood flow generated by chest compressions. In addition, delivery of large and forceful breaths may cause gastric inflation and its complications.

### Attempted Defibrillation: 1 Shock, Then Immediate CPR

**2005 (New):** When attempting defibrillation, all rescuers should deliver 1 shock followed by immediate CPR, beginning with chest compressions. All rescuers should check the victim’s rhythm after giving about 5 cycles (about 2 minutes) of CPR. Once AEDs are reprogrammed by the manufacturers, they should prompt rescuers to allow a rhythm check every 2 minutes.

**2000 (Old):** For treatment of cardiac arrest with a “shockable” rhythm, rescuers delivered up to 3 shocks without any CPR between the shocks. Rescuers checked the rhythm before and after delivering shocks.

**Why:** The rationale for this new protocol is based on 3 findings:

1. The rhythm analysis by current AEDs after each shock typically results in delays of 37 seconds or even longer before the delivery of the first post-shock compression. Such long interruptions in compressions can be harmful (see information above and Figure 1).

2. With most defibrillators now available, the first shock eliminates VF more than 85% of the time. In cases where the first shock fails, resumption of CPR is likely to confer a greater value than another shock.

3. Even when a shock eliminates VF, it takes several minutes for a normal heart rhythm to return and more time for the heart to create blood flow. A brief period of chest compressions can deliver oxygen and sources of energy to the heart, increasing the likelihood that the heart will be able to effectively pump blood after the shock. There is no evidence that chest compressions immediately after defibrillation will provoke recurrent VF.

We anticipate that AED manufacturers will reprogram AEDs to support this recommendation. The AHA encourages AED manufacturers to develop devices that can analyze the victim’s heart rhythm without interrupting chest compressions.

### Reaffirmation of 2003 ILCOR Statement: AEDs Recommended for Children Aged 1 Year and Older

**2005 (New):** AEDs are recommended for use in children 1 year of age and older. The evidence is insufficient to recommend for or against the use of AEDs in infants under 1 year of age (Class Indeterminate).

For sudden witnessed collapse in a child, use the AED as soon as it is available. For unwitnessed cardiac arrest in the out-of-hospital setting, use the AED after about 5 cycles (about 2 minutes) of CPR. Ideally the AED should be proven (via published studies) to accurately and reliably recognize pediatric shockable rhythms and be capable of delivering a “child” energy dose. Many AEDs are now equipped to deliver smaller doses through the use of smaller child pads or a key or other means to reduce the energy dose. If you are giving CPR to a child (older than 1 year) and the available AED does not have child pads or a way to deliver a smaller dose, use a regular AED with adult pads. DO NOT use child pads or a child dose for adult victims of cardiac arrest.

**2000 (Old):** Since 2003 AEDs have been recommended for children in cardiac arrest 1 to 8 years old.

**Why:** Some AEDs have been shown to be very accurate in recognizing pediatric shockable rhythms, and some are equipped to deliver energy doses suitable for children. Rescuers should NOT use child pads or a child dose for adults in cardiac arrest, however, because the smaller dose is unlikely to defibrillate the adult.

**Lay Rescuer CPR**

The major changes in the 2005 guidelines recommendations for lay rescuer CPR are the following:

1. If alone with an unresponsive infant or child, give about 5 cycles of compressions and ventilations (about 2 minutes) before leaving the child to phone 911.

2. Do not try to open the airway using a jaw thrust for injured victims—use the head tilt–chin lift for all victims.

3. Take 5 to 10 seconds (no more than 10 seconds) to check for normal breathing in an unresponsive adult or for presence or absence of breathing in the unresponsive infant or child.

4. Take a normal (not a deep) breath before giving a rescue breath to a victim.

5. Give each breath over 1 second. Each breath should make the chest rise.

6. If the victim’s chest does not rise when the first rescue breath is delivered, perform the head tilt–chin lift again before giving the second breath.

7. Do not check for signs of circulation. After delivery of 2 rescue breaths, immediately begin chest compressions (and cycles of compressions and rescue breaths).

8. No teaching of rescue breathing without chest compressions (exception: rescue breathing is taught in the Heartsaver Pediatric First Aid Course).

9. Use the same 30:2 compression-to-ventilation ratio for all victims.

10. For children, use 1 or 2 hands to perform chest compressions and compress at the nipple line; for infants, compress with 2 fingers on the breastbone just below the nipple line.

11. When you use an AED, you will give 1 shock followed by immediate CPR, beginning with chest compressions. Rhythm checks will be performed every 2 minutes.

12. Actions for relief of choking (severe airway obstruction) have been simplified.

13. New first aid recommendations have been developed with more information included about stabilization of the head and neck in injured victims.
Figure 1-A
The first segments were recorded when the AED was turned on and attached (time is 22:37:22). The rhythm is labeled as “coarse VF.

Figure 1-B
In this second series, a shock is advised and is delivered (at 22:37:44), 22 seconds after the pads were attached. The shock eliminates the VF; the initial post-shock rhythm is asystole. The AED then analyzes the rhythm after the first shock.

Figure 1-C
This third ECG segment depicts the post-shock rhythm through the next 21 seconds. Asystole is present, and the AED is analyzing the rhythm so no CPR is provided and there is no blood flow.

Figure 1-D
This fourth segment depicts refibrillation (at 22:38:09), 25 seconds after the first shock successfully eliminated VF. Note that no CPR was performed during the 25 seconds. The AED then analyzes the rhythm and recommends a shock. A shock is delivered (at 22:38:43), asystole follows, and the AED then analyzes those rhythms. CPR is finally recommended and begins at 22:39:01, a total of 1 minute, 17 seconds after the first shock. The victim survived.

Figure 1
ECG series shows the negative effect of delaying chest compressions after shock delivery. This continuous series was downloaded from an AED used for resuscitation of a victim of sudden cardiac arrest on a golf course. The ECG begins at 22:37:22 when the AED is attached and continues through 22:39:01 when CPR is resumed. The victim survived the SCA.
These changes are designed to simplify lay rescuer training and to increase the number of uninterrupted chest compressions delivered to the victim of cardiac arrest. More information about these changes appears below. The major changes summarized earlier are highlighted in this section for completeness.

What did NOT change for lay rescuers:
- Checking for response
- Location for hand placement for chest compressions in adults
- Compression rate
- Compression depth for adults, infants, or children (although compression depth for infants and children is no longer listed in inches; it is described only as 1/2 to 1/2 the depth of the chest)
- Ages used for infant, child, and adult CPR recommendations
- Key steps for relief of foreign-body airway obstruction (FBAO; choking) for infants, children, or adults
- First aid recommendations (minor rewording about stabilization of the head and neck for injured victims)

Lone Rescuers of Infants and Children

Lay Rescuers Give 5 Cycles (About 2 Minutes) of CPR for Infant or Child Before Call

2005 (New): For unresponsive infants and children, the lone rescuer should perform 5 cycles (about 2 minutes) of CPR before phoning 911 and, for the child, retrieving the AED (Table 1).

2000 (Old): The lone rescuer alone with an unresponsive infant or child was taught to give about 1 minute of CPR before leaving the child to phone 911.

Why: In infants and children, hypoxic cardiac arrest is the most common type of arrest. The 5 cycles of (30:2) compressions and ventilations or about 2 minutes of CPR will deliver some oxygen to the victim’s heart, brain, and other vital organs. Some infants and children may respond to that in this initial CPR. After the 5 cycles (about 2 minutes) the lone lay rescuer should leave the child to telephone the emergency response number (911).

Airway and Breathing

Lay Rescuers Do Not Perform Jaw Thrust

2005 (New): The lay rescuer should use the head tilt–chin lift to open the airway in all unresponsive victims even if the victim is injured.

2000 (Old): Lay rescuers were taught to use a jaw thrust to open the airway of injured victims.

Why: It is very difficult to open the airway with a jaw thrust. In addition, all methods of opening the airway can produce movement of an injured spine, so the jaw thrust may not be any safer than the head tilt–chin lift. The lay rescuer must be able to open the airway for the victim who does not respond. To simplify instruction and ensure that the lay rescuer can open the airway, only the head tilt–chin lift will be taught to lay rescuers.

Check for Breathing in Adults, Children, and Infants

2005 (New): If the lay rescuer finds an unresponsive adult victim, the lay rescuer should open the airway and take 5 to 10 seconds (but no more than 10 seconds) to check for normal breathing. If no normal breathing is present, the rescuer should give 2 rescue breaths.

Lay rescuers of unresponsive infants and children should take 5 to 10 seconds (but no more than 10 seconds) to check for presence or absence of breathing before giving 2 rescue breaths.

2000 (Old): Lay rescuers checked for presence or absence of normal breathing for all victims.

Why: As noted in 2000, adult victims of SCA may gasp for the first minutes after collapse, and lay rescuers may believe that the gasping victim is breathing. Rescuers should treat gasping as no breathing. Unresponsive victims who are gasping are probably in cardiac arrest and need CPR. EMS dispatchers report that when they tell bystanders to look for absence of “normal” breathing, the word “normal” helps bystanders better identify adult victims who need CPR.

For example, when EMS dispatchers ask bystanders if the victim is breathing, the bystanders often say yes even when a victim is only gasping. If the dispatcher asks if the same victim is breathing “normally,” bystanders will say no and will be able to recognize that the victim needs CPR. It is important that lay rescuers recognize when CPR is needed.

Gasing does not occur as often in infants and children in cardiac arrest as it does in adults. Children may demonstrate breathing patterns such as rapid breathing or grunting that are not normal but are adequate. For

### TABLE 1. Summary of Lay Rescuer CPR for Adults, Children, and Infants

<table>
<thead>
<tr>
<th>Step/Action</th>
<th>Adult: 8 years and older</th>
<th>Child: 1 to 8 years</th>
<th>Infant: Under 1 year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airway</td>
<td>Head tilt–chin lift</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breaths</td>
<td>2 breaths at 1 second/breath</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreign-body airway obstruction</td>
<td>Abdominal thrust</td>
<td>Back slaps and chest thrusts</td>
<td></td>
</tr>
<tr>
<td>Compressions</td>
<td>In the center of the chest, between nipples</td>
<td>Just below nipple line</td>
<td></td>
</tr>
<tr>
<td>Compression landmarks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compression method</td>
<td>Push hard and fast</td>
<td>Allow complete recoil</td>
<td></td>
</tr>
<tr>
<td>2 Hands: 1 hand, second hand on top</td>
<td>2 Hands: Heel of 1 hand with second on top or 1 Hand: Heel of 1 hand only</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Hands: Heel of 1 hand with second on top or 1 Hand: Heel of 1 hand only</td>
<td>2 fingers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compression depth</td>
<td>1½ to 2 inches</td>
<td>About ¼ to ½ the depth of the chest</td>
<td></td>
</tr>
<tr>
<td>Compression rate</td>
<td>About 100/min</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compression-ventilation ratio</td>
<td>30:2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Defibrillation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AED</td>
<td>Use adult pads. Do not use child pads/child system.</td>
<td>Use after 5 cycles of CPR. Use child pads/system for child 1 to 8 years if available. If not, use adult AED and pads.</td>
<td>No recommendation for infants &lt;1 year of age</td>
</tr>
</tbody>
</table>
this reason, lay rescuers of infants and children are not taught to look for normal or abnormal breathing; they should look for presence or absence of breathing. They should be able to determine within 10 seconds if the infant or child is breathing or not.

**Rescuers Should Take a Normal Breath Before Giving a Rescue Breath**

**2005 (New):** All rescuers should take a normal breath (not a deep breath) before giving mouth-to-mouth or mouth-to-barrier device rescue breaths.

**2000 (Old):** Rescuers were instructed to take a deep breath before giving a mouth-to-mouth or mouth-to-mask rescue breath.

**Why:** Taking a deep breath before giving a rescue breath is unnecessary. The rescuer should be able to give a breath that makes the victim’s chest rise without taking a deep breath.

**Give Each Rescue Breath Over 1 Second**

**2005 (New):** All rescuers should deliver each rescue breath (with or without a barrier device) over 1 second.

**2000 (Old):** Rescuers were told to deliver some breaths over 1 to 2 seconds.

**Why:** Rescue breaths can be given in 1 second. The shorter the time needed to deliver breaths, the faster rescuers can resume chest compressions. Longer breaths can reduce blood return to the heart so it reduces refilling of the heart with blood; this will decrease the blood flow produced by the next set of chest compressions.

**Reopening of Airway If First Breath Does Not Make Chest Rise**

**2005 (New):** When lay rescuers give 2 rescue breaths, each rescue breath should make the chest rise (ie, the rescuer should be able to see the chest rise). If the first breath does not make the chest rise, the rescuer should perform another head tilt–chin lift before attempting to deliver the second rescue breath.

**2000 (Old):** Although rescuers were told that each breath should make the chest rise, lay rescuers were given no instructions about what to do if the rescue breath did not make the chest rise.

**Why:** The purpose of this change is to give clear instructions for lay rescuers who note that the victim’s chest does not rise when the first rescue breath is given. Rescue breaths are very important for the nonbreathing infant or child because infants and children usually do not breathe well even before cardiac arrest develops. The rescuer should give 2 effective breaths (ie, breaths that make the chest rise). If the chest does not rise after the first breath, performing the head tilt–chin lift again may open the airway. The lay rescuer should not try more than 2 times to give a rescue breath that makes the chest rise because it is important to give chest compressions.

**Simplifying Lay Rescuer CPR**

**No Lay Rescuer Check for Signs of Circulation**

**2005 (New):** After delivering the first 2 rescue breaths, the lay rescuer should immediately begin cycles of 30 chest compressions and 2 rescue breaths. The lay rescuer should continue compressions and rescue breaths until an AED arrives, the victim begins to move, or professional responders take over.

**2000 (Old):** After delivering 2 rescue breaths the lay rescuer checked for signs of circulation (breathing, coughing, or movement). If there were no signs of circulation, the rescuer was taught to begin chest compressions. Lay rescuers were advised to recheck for signs of circulation every few minutes.

**Why:** In 2000 the AHA stopped recommending that lay rescuers check for a pulse because data showed that lay rescuers could not do so reliably within 10 seconds. Lay rescuers were instructed to look for signs of circulation. There is no evidence that lay rescuers can accurately assess signs of circulation, however, and this step delays chest compressions. Lay rescuers should not check for signs of circulation and should not interrupt chest compressions to recheck for signs of circulation.

**30:2 Compression-to-Ventilation Ratio for All Victims**

**2005 (New):** The AHA recommends a compression-to-ventilation ratio of 30:2 for all lay rescuers to use for all victims from infants (excluding newborns) through adults.

**2000 (Old):** For adult CPR a 15:2 compression-to-ventilation ratio was recommended. For infant and child CPR a 5:1 compression-to-ventilation ratio was recommended.

**Why:** The science experts wanted to simplify CPR information so that more rescuers would learn, remember, and perform CPR. In addition, they wanted to ensure that all rescuers would deliver longer series of chest compressions. This change should increase blood flow to the heart, brain, and other vital organs.

**Simplified Instructions for Compressions of Child and Infant**

**2005 (New):** Rescuers may use 1 or 2 hands to give chest compressions for children. Rescuers should press on the breastbone at about the nipple line. For compressions for infants, rescuers should press on the breastbone just below the nipple line.

**2000 (Old):** One-hand chest compressions were recommended over the lower half of the child’s sternum and 1 finger-breadth below the nipple line of the infant.

**Why:** Rescuers and children come in all sizes. For the child, the rescuer should use 1 or 2 hands as needed to compress the chest about one third to one half its depth. If 2 hands are used, the hand placement...
is the same as the hand placement used for chest compressions for adult victims (the difference is in the depth of chest compression). This change was made to simplify instruction.

For the infant, the rescuer should use 2 fingers to press on the breastbone just below the nipple line. This change was made because rescuers and infants come in many sizes, and the use of 1 rescuer finger width resulted in compressions at different places. This change was made to simplify instruction.

**Giving Shocks With AEDs: Give 1 Shock Then CPR**

2005 (New): When using an AED, all rescuers should deliver 1 shock followed by immediate CPR. The CPR should begin with chest compressions. All rescuers should allow the AED to check the victim’s rhythm again after about 5 cycles (about 2 minutes) of CPR.

2000 (Old): For treatment of cardiac arrest with a “shockable” rhythm, rescuers delivered up to 3 shocks without any CPR between the shocks. After 3 shocks rescuers would give about 1 minute of CPR and then check the rhythm.

**Why:** When AEDs recheck the rhythm after a shock, this delays chest compressions. Most new defibrillators eliminate VF with 1 shock, so VF probably won’t be present immediately after a shock is delivered. Thus it is difficult to justify interruption of chest compressions to search for VF when it is not likely to be present. In addition, after a shock eliminates VF, most hearts do not pump blood effectively for a few minutes after the shock. Chest compressions are needed during this time to provide blood flow to the heart, brain, and other organs. If VF does remain after a shock, chest compressions will deliver oxygen to the heart. This will make the VF more likely to be eliminated by the next shock.

**Simplified Instructions for Relief of Foreign-Body Airway Obstruction**

2005 (New): Terminology used to separate choking victims who require intervention (eg, abdominal thrusts) from those who do not has been simplified to refer only to signs of mild versus severe airway obstruction. Rescuers should act if they see signs of severe obstruction: poor air exchange and increased breathing difficulty, a silent cough, cyanosis, or inability to speak or breathe. Rescuers should ask 1 question: “Are you choking?” If the victim nods yes, help is needed. Other lay rescuer treatment of choking has not changed.

2000 (Old): Rescuers were taught to recognize partial airway obstruction with good air exchange, partial airway obstruction with poor air exchange, and complete airway obstruction. Rescuers were taught to ask the victim 2 questions: “Are you choking?” and “Can you speak?”

**Why:** The goal of these revisions is simplification. The goal of using “mild” versus “severe” airway obstruction is to help the rescuer know when to act. The elimination of 1 question simplifies lay rescuer action.

**First Aid**

These are the second evidence-based guidelines for first aid and the first guidelines cosponsored by the American Heart Association and the American Red Cross. First aid guidelines describe recommendations for assessments and interventions intended for use by bystanders or victims who have no medical equipment. The topics reviewed in these first aid guidelines are:

- Use of oxygen (new in 2005)
- Use of inhalers (new in 2005)
- Use of epinephrine auto-injectors (new in 2005)
- Seizures (reviewed in 2000 and 2005)
- Bleeding (reviewed in 2000 and 2005)
- Wounds and abrasions (new in 2005)
- Burns—thermal and electrical (reviewed in 2000 and 2005)
- Musculoskeletal trauma (reviewed in 2000 and 2005)
- Dental injuries (new in 2005)
- Snakebite (new in 2005)
- Cold emergencies—hypothermia and frostbite (reviewed in 2005)
- Poisoning—chemical and ingested (reviewed in 2000 and 2005)

In general the recommendations made in 2000 were confirmed in 2005. The one exception was the modification of wording used for spine stabilization for injured victims and the recovery position recommended for victims with possible spine injury. The recommendations summarized here highlight the new recommendations and do not include those that confirm the 2000 guidelines.

**Not Enough Evidence to Recommend First Aid Use of Oxygen**

2005 (New): Evidence is insufficient to recommend for or against the use of oxygen for first aid.

**Why:** The only published studies about oxygen use involved healthcare providers. There was no evidence about the first aid use of oxygen.

**Recommended: Use of Asthma Inhaler and Epinephrine Auto-injector**

2005 (New): First aid providers may help victims with asthma use an inhaler prescribed by a physician. First aid providers may help victims with a bad allergic (anaphylactic) reaction use a prescribed epinephrine auto-injector. The first aid provider may administer the epinephrine if the provider is trained to do so, the state law allows it, and the victim is unable to administer it.

**Why:** Deaths from asthma are increasing, and drugs in inhalers can reduce breathing difficulties from asthma. Epinephrine given by auto-injector can lessen signs and symptoms of a bad allergic reaction. Asthma inhalers and the epinephrine auto-injector are unlikely to cause harm in someone with breathing difficulties from asthma or an allergic reaction, and they may prevent life-threatening complications.

**Treatment of Wounds and Abrasions**

2005 (New): First aid providers should wash wounds and abrasions with clean running water for 5 minutes or longer. They should wash the wounds or abrasions until the wound shows no sign of foreign matter. If running water is not available, the rescuer can use any source of clean water. If the wound is an abrasion or is superficial, the first aid provider can apply an antibiotic ointment or cream.

**Why:** Clean running water can work well to clean wounds and prevent infection and help healing. Small superficial wounds appear to heal best if treated with an antibiotic cream or lotion.
Spine Stabilization for Injured Victims

2005 (New): First aid providers should use manual spine stabilization (ie, stabilization with hands rather than devices) and should avoid using immobilizing devices. Rescuers should use the head tilt–chin lift to open the airway (see information above).

If you suspect a spine injury, it is best not to move the victim. If you are alone and must leave the unresponsive victim to get help, extend one of the victim’s arms above the head. Then roll the victim’s body to that side so that the victim’s head rests on the extended arm. Bend the legs to stabilize the victim (Class Ib).

2000 (Old): If the first aid provider suspected that the victim had a spinal cord injury, the provider was instructed to immobilize the victim’s head, neck, and trunk, and use the jaw thrust to open the airway.

Why: Immobilization devices can interfere with opening the airway, and there is no evidence that first aid providers can use devices correctly. Even the jaw thrust can move the injured spine, so it is no longer recommended for the first aid rescuer.

The recovery position described above may support the head and neck so you should use it when you must leave the victim with a suspected spine injury.

Treatment of an Avulsed Tooth

2005 (New): If a tooth is avulsed, first aid providers should clean the tooth socket and use pressure to stop the bleeding. Providers should handle the tooth by the crown (not the root that was in the gum) and should place the tooth in milk and consult the victim’s dentist.

Why: Placing the tooth in milk may help preserve the tooth until a dentist can reimplant it. The first aid provider should not try to reinsert the tooth because it can injure the victim or harm the tooth.

Treatment of Snakebites

2005 (New): If a victim’s arm or leg is bitten by an elapid (coral) snake, the first aid provider should wrap the entire extremity with an elastic bandage. The bandage should immobilize the extremity. It should be wrapped snugly enough to allow 1 finger to slip between the bandage and the skin. Insufficient evidence exists to recommend this bandage for a non-elapid snakebite. The first aid provider should not try to put any suction on a snakebite.

Why: A snug bandage wrapped around the entire extremity has been shown to reduce venom uptake from an elapid (coral) snakebite. No evidence has shown that a pressure bandage reduces venom uptake after non-elapid snakebites. Applying suction to a snakebite has no benefit and may cause harm.

Treatment of Cold Emergencies

2005 (New): First aid for hypothermia includes moving the victim into a warm environment, removing wet clothing, and wrapping the victim’s exposed body surfaces with blankets or clothing. Active rewarming should be used only when the victim is far from a medical facility. A frostbitten area should not be actively warmed if there is any chance of refreezing or if the victim is close to a medical facility.

Why: Little scientific evidence guides first aid recommendations for hypothermia and frostbite. The recommendations are based on extrapolation from in-hospital studies, clinical experience, and concern for possible complications of rapid rewarming.

Treatment of Poisoning

2005 (New): When poisoning occurs, first aid providers should call the Poison Control Center (800-222-1222). Victims should not drink anything (including milk or water) after ingesting a poison. Providers should not give the victim activated charcoal or syrup of ipecac unless told to do so by the Poison Control Center. Rescuers should brush chemical poisons off the skin and then wash the skin with large amounts of water.

Why: No human studies have shown a benefit to administration of water or milk after poisoning, and they may increase the risk of vomiting. Not enough evidence exists to recommend use of activated charcoal or ipecac unless advised by the Poison Control Center.
Spinal injury and pain

Using MTENS and TVEP the SCIO can treat the spinal area for injury and pain. Sending in an auto-focused sophisticated pulse different for each patient based on their personal electrical needs.

If you need more information on the SCIO and purchase details please get in touch with us Maitreya Kft.
tel: +3613036043 | web: www.qxsubspace.com | e-mail: info@qxsubspace.com
Changes include simplifying and emphasizing the role of basic life support as fundamental to improving survival from cardiac arrest. All rescuers must deliver high-quality CPR: they must provide compressions of adequate depth and number, allow adequate chest recoil after each compression, and minimize interruptions in chest compressions. The most important message in the 2005 guidelines is that high-quality (ie, properly performed) CPR will save lives, and all victims of cardiac arrest should receive high-quality CPR.

References


Classes of Recommendation

Classes of Recommendations are listed in the guidelines to indicate the strength of recommendations. These classes represent the integration of the strength of the scientific evidence with application factors such as the magnitude of benefit, usefulness or efficacy, cost, educational and training challenges, and difficulties in implementation.

For Class I recommendations, high-level prospective studies support the action or therapy, and the benefit of the action or therapy substantially outweighs the potential for harm. For Class IIa recommendations, the weight of evidence supports the action or therapy, and the therapy is considered acceptable and useful. Recommendations are generally labeled Class IIb when the evidence documented only short-term benefits from the therapy (eg, amiodarone for pulseless VF cardiac arrest) or when positive results were documented with lower levels of evidence.

Class IIb recommendations fall into 2 categories: (1) optional and (2) recommended by the experts despite the absence of high-level supporting evidence. Optional interventions are identified by terms such as “can be considered” or “may be useful.” Interventions that the experts believe should be carried out are identified with terms such as “is recommended.”

Recommendaions for EMS Dispatchers

EMS Dispatcher CPR Instruction

2005 (New): Dispatchers should receive appropriate training to provide CPR instructions to callers by telephone (Class IIa). Dispatchers should help bystanders to recognize that victims with occasional gasps are likely victims of cardiac arrest, to increase the likelihood that victims of cardiac arrest will receive bystander CPR (Class IIb). When callers describe a victim of likely VF SCA, telephone instruction in chest compressions alone may be preferable (Class IIb). Dispatchers who provide telephone CPR instructions to bystanders treating infants and children and adult victims with a high likelihood of a hypoxic (asphyxial) cause of arrest (eg, drowning victims) should give directions for rescue breaths and chest compressions.

2000 (Old): The previous guidelines recommended formal dispatcher training and use of dispatch protocols to provide pre-arrival instructions. For simplicity, dispatcher instructions for chest-compression-only CPR were recommended (Class IIa), with request for further evaluation.

Why: Dispatcher CPR instructions increase the likelihood of bystander CPR. Although chest compressions alone may be effective for victims of VF SCA, instructions in chest compressions and rescue breaths will likely be needed for victims of hypoxic (asphyxial) arrest. When dispatchers question the bystander to determine if cardiac arrest is present, dispatchers must help the bystander distinguish between effective breathing and gasps. If an unresponsive victim is gasping, that victim should be treated as though cardiac arrest is present, and the rescuer should be instructed to give CPR (see below).

Dispatchers to Recommend Aspirin for Acute Coronary Syndromes

2005 (New): Dispatchers and EMS providers should be trained to recognize symptoms of ACS. Dispatchers should advise patients with no history of aspirin allergy or signs of active or recent gastrointestinal bleeding to chew an aspirin (160 mg to 325 mg) while awaiting the arrival of EMS providers (Class IIa).

2000 (Old): EMS providers (but not dispatchers) were instructed to give aspirin as soon as possible to all patients with suspected ACS (unless the patient had an ASA allergy).

Why: Early administration of aspirin has been associated with decreased mortality rates in several clinical trials. Many studies have demonstrated the safety of aspirin administration.

Recommendations for EMS Systems

Improvement in Response Intervals When Feasible

2005 (New): EMS systems should evaluate their protocols for cardiac arrest patients and try to shorten response time when feasible (Class I). Each EMS system should measure the rate of survival to hospital discharge for victims of cardiac arrest and use these measurements to document the impact of changes in procedures (Class IIa).

2000 (Old): The guidelines recommended goals for response intervals and programs of quality improvement.

Why: All EMS systems should develop a process of ongoing quality improvement. This process should identify delays in system response and reduce them when feasible.

EMS Medical Directors May Recommend CPR Before Shock

2005 (New): EMS system medical directors may consider implementing a protocol that would allow EMS responders to provide about 5 cycles (about 2 minutes) of CPR before attempted defibrillation when the EMS system call-to-response interval is >4 to 5 minutes.

2000 (Old): EMS providers attempted defibrillation as soon as cardiac arrest was identified.
Why: In 2 of 3 studies, when the EMS call-to-response interval was 4 to 5 minutes or longer, a period of 1½ to 3 minutes of CPR before defibrillation was associated with improved survival. For further information see Defibrillation, below.

Basic Life Support for Healthcare Providers

Many of the changes in BLS recommended in 2005 are designed to simplify CPR recommendations (including eliminating differences in technique for different ages when possible), increase the number and quality of chest compressions delivered, and increase the number of uninterrupted chest compressions.

A universal compression-to-ventilation ratio of 30 to 2 is recommended for lone rescuers for victims of all ages (except newborns). This 30:2 compression-to-ventilation ratio also applies to healthcare providers performing 2-rescuer CPR for adult victims until an advanced airway (eg, endotracheal tube, esophageal-tracheal combitube [Combitube], or laryngeal mask airway [LMA]) is in place. Once an advanced airway is in place, 2 rescuers should no longer provide cycles of CPR with pauses in compressions to give rescue breaths (see below).

Before an advanced airway is in place, rescuers should perform about 5 cycles of CPR after shock delivery and before the next rhythm check. Once an advanced airway is in place, rescuers should perform about 2 minutes of CPR after shock delivery and before the next rhythm check.

For 2-rescuer infant and child CPR for healthcare providers (and in any courses such as lifeguard CPR where 2-rescuer CPR for infants and children is taught), rescuers should use a 15:2 compression-to-ventilation ratio (see below).

Major changes in BLS for HCP include the following:

- Healthcare provider “child” CPR guidelines now apply to victims 1 year to the onset of puberty.
- Lone healthcare providers should tailor their sequence of actions for the most likely cause of arrest in victims of all ages.
- “Phone first” and get the AED and return to start CPR and use the AED for all adults and any children with out-of-hospital sudden collapse.

✦“CPR first” (provide about 5 cycles or 2 minutes of CPR before activating the emergency response number) for unresponsive infants and children (except infants and children with sudden, witnessed collapse) and for all victims of likely hypoxic (asphyxial) arrest (eg, drowning, injury, drug overdose).
- Opening the airway remains a priority for an unresponsive trauma victim with suspected cervical spine injury; if a jaw thrust without head extension does not open the airway, healthcare providers should use the head tilt–chin lift maneuver.
- Basic healthcare providers check for “adequate” breathing in adults and presence or absence of breathing in infants and children before giving rescue breaths. Advanced providers will look for “adequate” breathing in victims of all ages and be prepared to support oxygenation and ventilation.
- Healthcare providers may need to try “a couple of times” to reopen the airway and deliver effective breaths (ie, breaths that produce visible chest rise) for infant and child victims.
- Excessive ventilation (too many breaths per minute or breaths that are too large or too forceful) may be harmful and should not be performed.
- Chest compressions are recommended if the infant or child heart rate is less than 60 per minute with signs of poor perfusion despite adequate oxygenation and ventilation. This recommendation was part of the 2000 guidelines but was not emphasized in courses. It will now be emphasized in the courses.
- Rescuers must provide compressions of adequate rate and depth and allow adequate chest recoil with minimal interruptions in chest compressions.
- Use 1 or 2 hands to give chest compressions for a child; press on the sternum at the nipple line. For the infant, press on the sternum just below the nipple line.
- During 2-rescuer infant CPR, the 2 thumb–encircling hands technique should include a thoracic squeeze.
- Healthcare providers should use a 30:2 compression-to-ventilation ratio for 1-rescuer CPR for victims of all ages and for 2-rescuer CPR for adults. Healthcare providers should use a 15:2 compression-to-ventilation ratio for 2-rescuer CPR for infants and children.
- During 2-rescuer CPR with an advanced airway in place, rescuers no longer provide cycles of compressions with pauses for ventilation. The compressor provides continuous compressions and the rescuer providing rescue breaths gives 8 to 10 breaths per minute (1 breath about every 6 to 8 seconds).
- When 2 or more healthcare providers are present during CPR, rescuers should rotate the compressor role every 2 minutes.
- Actions for FBAO relief were simplified.

What did NOT change:

- Checking for response
- Pulse check
- Rescue breathing without chest compressions
- Location of hands or fingers for adult chest compressions
- Compression rate
- Compression depth for adults, infants, or children (note that for infants and children the depth of compression is listed as one third to one half the depth of the chest and is no longer listed in inches)
- Ages for use of infant BLS recommendations

For Healthcare Providers “Child” BLS Guidelines Apply to Onset of Puberty

2005 (New): Child CPR guidelines for healthcare providers apply to victims from about 1 year of age to the onset of adolescence or puberty (about 12 to 14 years old), as defined by the presence of secondary sex characteristics (eg, breast development in girls, armpit hair in boys). Hospitals (particularly children’s hospitals) or pediatric intensive care units may choose to extend the use of PALS guidelines to pediatric patients of all ages (generally up to about 16 to 18 years old) rather than use puberty as the cutoff for application of PALS versus ACLS guidelines.

Emergency: CPR and AED Use

For victims of all ages (except newborns) and child CPR guidelines for healthcare providers apply.

Caution: Why Does CPR Work?

Chest compressions increase coronary perfusion pressure and cerebral perfusion pressure in the absence of spontaneous cardiac function. This increases cerebral blood flow and oxygenation and improves survival. A universal compression-to-ventilation ratio of 30:2 in adults and 15:2 in infants and children increases the number of uninterrupted chest compressions, improves coronary perfusion, improves cerebral perfusion, and increases survival.
Healthcare providers often will assist lay rescuers in the community. Healthcare providers should be aware that child CPR guidelines for the lay rescuer apply to children about 1 to 8 years old (up to about 25 kg or 55 pounds in weight or up to about 127 cm or about 50 inches in height/length). Adult guidelines for the lay rescuer apply to victims about 8 years of age and older.

2000 (Old): Child CPR guidelines applied to victims 1 to 8 years old.

Why: There is no single anatomic or physiologic characteristic that distinguishes a “child” victim from an “adult” victim and no scientific evidence that identifies a precise age to begin adult rather than child CPR techniques. The lay rescuer age delineations remain unchanged from those recommended in 2000 for ease of teaching CPR and use of an AED with child pads or a child dose-attenuator system (for victims 1 to 8 years of age).

Healthcare providers will continue to use the cutoff of 8 years old for use of AED child pads or child attenuator system (to reduce the AED dose). However, because hypoxic (asphyxial) arrest remains the most common cause of cardiac arrest in children through adolescence, healthcare providers should apply the “child” CPR guidelines and sequence (eg, CPR first, and 15:2 compression-to-ventilation ratio for 2-rescuer CPR) for victims aged 1 year to the onset of puberty.

Lone Healthcare Provider Should Tailor Sequence for Out-of-Hospital Arrest

2005 (New): In general, the lone healthcare provider will “phone first” (and get an AED if available and then provide CPR and use the AED) for an unresponsive adult. In general, the lone healthcare provider will provide “CPR first” (and will activate the emergency response system after about 5 cycles or 2 minutes of CPR) for an unresponsive infant or child. The sequence of rescue actions, however, should be tailored to the most likely cause of arrest. If a victim of any age has a sudden witnessed collapse, the collapse is likely to be cardiac in origin, and the healthcare provider should activate the emergency response system, get an AED (when available), and return to the victim to provide CPR and use the AED when appropriate (see Defibrillation, below). The AED should be used as soon as it is available for victims of sudden collapse/SCA (see Box).

If a victim of any age has a likely hypoxic (asphyxial) arrest, such as a drowning, the lone healthcare provider should give 5 cycles (about 2 minutes) of CPR before leaving the victim to activate the emergency response system and retrieve the AED.

2000 (Old): Tailoring of provider response to the likely cause of arrest was mentioned in the 2000 Guidelines but was not emphasized in training.

Why: Sudden collapse in a victim of any age is likely to be cardiac in origin, and early defibrillation is needed in addition to early CPR. Victims of hypoxic (asphyxial) arrest need immediate CPR, including ventilations and chest compressions, before the lone healthcare provider leaves the victim to phone for help and get the AED.

Opening the Airway and Stabilizing the Spine in a Trauma Victim

2005 (New): The healthcare provider should use the head tilt–chin lift technique to open the airway of a trauma victim unless cervical spine injury is suspected. If a cervical spine injury is suspected, the healthcare provider should open the airway using a jaw thrust without head extension (Class IIb). If this maneuver does not open the airway, the healthcare provider should use a head tilt–chin lift technique because opening the airway is a priority for the unresponsive trauma victim (Class I).

Healthcare providers should manually stabilize the head and neck rather than use immobilization devices during CPR for victims with suspected spinal injury (Class IIIb).

2000 (Old): The jaw thrust without head tilt was taught to both lay rescuers and healthcare providers.

Why: The jaw thrust is a difficult maneuver to learn and to perform; in fact, on many manikins it is impossible to perform. The jaw thrust may not effectively open the airway and it may cause spinal movement. Opening the airway is a priority when a trauma victim is unresponsive. Healthcare providers treating a victim with suspected cervical spine injury should attempt to open the airway with the jaw thrust, but if the healthcare provider cannot open the airway with the jaw thrust, the provider should use the head tilt–chin lift.

Manual stabilization is preferred to application of immobilization devices during CPR for the victim with head and neck trauma because immobilization devices may interfere with effective CPR. If a second rescuer is present, that rescuer should manually stabilize the head and neck during CPR.

Check for “Adequate” Breathing in Adults and Presence or Absence of Breathing in Infant and Child

2005 (New): The BLS healthcare provider checks for adequate breathing (lay rescuers check for “normal” breathing) in adult victims. If adequate breathing is not present, the rescuer should give 2 rescue breaths. The BLS healthcare provider checks for presence or absence of breathing in the infant or child and gives 2 breaths if the infant or child is not breathing.

Advanced healthcare providers (with ACLS and PALS training) will assess for adequate breathing in victims of all ages (including infants and children) and should be prepared to support oxygenation and ventilation.

2000 (Old): The healthcare provider checked for adequate breathing for victims of all ages.
Why: In general, BLS healthcare providers should be prepared to administer rescue breaths if the victim is not breathing adequately. Healthcare providers should not wait to give rescue breaths until adult respiratory arrest occurs. Children may demonstrate breathing patterns, such as rapid breathing or grunting, which are adequate but not normal. The pediatric science experts feel that assessment of "adequate" breathing in an infant or child is a challenging skill that is more consistent with advanced provider skills (ie, PALS).

Attempt to Give 2 Effective Breaths for Infant, Child

2005 (New): Healthcare providers should try “a couple of times” to deliver 2 effective breaths (breaths that cause visible chest rise) to the infant or child.

2000 (Old): Healthcare providers were told to move the child’s head through a variety of positions to obtain optimal airway opening and effective rescue breaths.

Why: The most common mechanism of cardiac arrest in infants and children is asphyxial, so the infant or child in cardiac arrest is likely to be hypoxic and hypercarbic. Rescuers must be able to provide effective rescue breaths (ie, breaths that cause visible chest rise). The healthcare provider is not expected to try indefinitely but should try “a couple of times” if needed to deliver effective breaths.

Rescue Breathing Without Chest Compressions

2005 (New): If the unresponsive victim is not breathing but has a pulse, the healthcare provider will give rescue breathing without chest compressions. The provider will deliver 10 to 12 breaths per minute for an adult (approximately 1 breath every 5 or 6 seconds) and 12 to 20 breaths per minute for an infant or child (approximately 1 breath every 3 to 5 seconds).

2000 (Old): Healthcare providers delivered 10 to 12 breaths per minute for the adult and 20 breaths per minute for the infant or child.

Why: The wider range of acceptable breaths for the infant and child will allow the provider to tailor support to the patient.

Healthcare providers may assist lay rescuers in providing CPR in the community. Healthcare providers should be aware that lay rescuers are not taught to check for signs of circulation or a pulse. Consequently lay rescuers are not taught to deliver rescue breathing without chest compressions.

Rescue Breaths With Chest Compressions

2005 (New): All rescuers should deliver each rescue breath during CPR (via mouth to mouth, mouth to shield, mouth to mask, or bag mask, or via advanced airway, with or without supplementary oxygen) over 1 second (Class IIa). The volume of each rescue breath should be sufficient to produce visible chest rise (Class IIa). Rescuers should avoid delivering more breaths than are recommended or breaths that are too large or too forceful.

It is impossible to estimate the tidal volume delivered during rescue breaths, although an adult ventilating bag (volume of 1 to 2 L) is required to deliver sufficient volume to produce visible chest rise in an adult. The rescuer will need to compress a 1-L bag about halfway and a 2-L bag by about one third when delivering rescue breaths to an adult victim, but the volume delivered should produce visible chest rise. The 2005 guidelines recommend that manikins be configured so that visible chest rise occurs at a tidal volume of about 500 to 600 mL.

2000 (Old): Various tidal volumes were recommended and rescuers were taught to deliver them over 1 to 2 seconds. The recommended tidal volume for rescue breaths for adults was approximately 700 to 1000 mL.

Why: Less ventilation than normal is needed during CPR. The 2005 AHA guidelines note the following regarding delivery of rescue breaths:

- Oxygen delivery is the product of oxygen content in arterial blood and cardiac output (blood flow). During the first minutes of CPR for VF SCA, the oxygen content in the blood initially remains adequate; oxygen delivery to vital organs is limited by reduced blood flow (cardiac output). Therefore, immediately after VF SCA, rescue breaths (that can help increase oxygen content in the blood) are not as important as effective chest compressions that create blood flow. The rescuer must provide effective chest compressions to optimize blood flow and, as a result, oxygen delivery to vital organs including the brain and heart.

- The relationship between ventilation (volume of breaths × rate) and the blood flow to the lungs is called the ventilation-perfusion ratio (V/Q). For the best oxygenation of the blood and elimination of carbon dioxide, ventilation should closely match perfusion. During CPR, blood flow to the lungs is only about 25% to 33% of normal, so less ventilation (fewer breaths and smaller volume) is needed to provide oxygen and eliminate carbon dioxide during cardiac arrest than when the victim has a perfusing rhythm with normal or near-normal cardiac output and normal blood flow to the lungs.

- Hyperventilation (too many breaths or too large a volume) during CPR is not necessary and can be harmful for several reasons. The positive pressure in the chest that is created by rescue breaths will decrease venous return to the heart. This limits the refilling of the heart, so it will reduce cardiac output created by subsequent chest compressions. Large tidal volumes and forceful breaths in the unprotected airway are also likely to cause gastric inflation and its complications.

When providing rescue breaths, rescuers should deliver breaths over 1 second, with a volume sufficient to produce visible chest rise. For additional information, see “CPR With an Advanced Airway,” below.

Chest Compressions Recommended for Symptomatic Bradycardia in Infant or Child

2005 (New): If despite adequate oxygenation and ventilation (or delivery of the 2 rescue breaths to the unresponsive victim) the heart rate of the infant or child is <60 bpm with signs of poor systemic perfusion, the healthcare provider should begin chest compressions.

2000 (Old): This same recommendation was contained in the 2000 guidelines; however, it was not incorporated into BLS training.

Why: Bradycardia is a common terminal rhythm observed in infants and children. The healthcare provider should not wait for the development of pulseless arrest to begin chest compressions for the infant or child with poor perfusion who does not improve with support of oxygenation and ventilation.
Emphasis on Chest Compression Depth and Rate, Chest Wall Recoil, and Minimal Interruptions

2005 (New): Effective chest compressions are essential to provide blood flow during CPR (Class I). The 2005 guidelines emphasize that the rescuer should “push hard, push fast, and allow the chest to recoil after each compression.”

The most effective chest compressions are produced if rescuers push hard, push fast at a rate of 100 per minute (Class IIa), allow full chest recoil after each compression (Class IIb), and minimize interruptions of compressions.

Healthcare providers should interrupt chest compressions as infrequently as possible and should limit interruptions to no more than 10 seconds at a time except for specific interventions such as insertion of an advanced airway or use of a defibrillator (Class IIa). Interruptions for rescue breaths or pulse checks should take less than 10 seconds.

2000 (Old): The recommendations for depth and rate of chest compressions were the same. Less emphasis was given to the need for adequate depth of compression, complete recoil of the chest, and minimizing interruptions in chest compressions.

Why: To be effective, chest compressions must provide adequate blood flow to the heart (coronary artery blood flow) and the brain (cerebral blood flow). Effective blood flow is related to the rate and depth of compressions. Yet studies of CPR performed by healthcare providers showed that half of the chest compressions provided were too shallow, and no compressions were provided during 24% to 49% of CPR time.

Allowing complete chest recoil after each compression allows blood to return to the heart to refill the heart. If the chest is not allowed to recoil/reexpand, there will be less venous return to the heart, and filling of the heart is reduced. As a result, cardiac output produced by subsequent chest compressions will be reduced.

When chest compressions are interrupted, blood flow stops and coronary artery perfusion pressure quickly falls. The lower the coronary artery perfusion pressure, the lower the victim’s chance of survival. When rescuers are giving cycles of compressions and rescue breaths, they should deliver the

Rescuers Should Change Compressors Every 2 Minutes

2005 (New): When more than 1 rescuer is present, rescuers should change “compressor” roles about every 2 minutes or 5 cycles of CPR (1 cycle of CPR = 30 compressions and 2 rescue breaths). Rescuers should try to complete the switch in 5 seconds or less (Class IIb). For information about 2-rescuer CPR when an advanced airway is in place, see “CPR With an Advanced Airway,” below.

2000 (Old): When the first rescuer performing chest compressions becomes fatigued, the rescuer should change positions with minimal interruptions in chest compressions.

Why: In manikin studies, rescuer fatigue, as demonstrated by inadequate chest compression rate or depth and inadequate chest recoil, developed in as little as 1 to 2 minutes. However, rescuers did not report feeling fatigued for 5 minutes or longer. In studies of actual resuscitations by professional rescuers, 50% of chest compressions were not deep enough. Given the importance of effective chest compressions, it will be helpful for rescuers to alternate compressor responsibilities.

Rescuers Can Use 1 or 2 Hands for Chest Compressions at Nipple Line for Child

2005 (New): For chest compressions on children, rescuers should use the heel of 1 hand to compress the lower half of the sternum to a depth of one third to one half the chest diameter. If 2 hands are used, hand placement is the same as that used for compression of adult victims (the depth of compression will be different). Rescuers should compress at about the nipple line.

2000 (Old): In children (>approximately 1 year), compress the chest with the heel of 1 hand.

Why: Children as well as rescuers come in all sizes. Rescuers should use the technique that will enable them to give effective chest compressions. One child manikin study showed that some rescuers performed better chest compressions using the “adult” technique of 2-hand placement and compressions.

Refinement of Instructions for Chest Compressions in Infants During 2-Rescuer CPR

2005 (New): Healthcare providers should use the 2 thumb–encircling hands technique for 2-rescuer CPR for infants. With this technique the healthcare provider forcefully compresses the sternum with the thumbs while using the fingers to squeeze the thorax (Class IIa).

2000 (Old): The 2 thumbnail encircling hands technique was the preferred technique for 2-rescuer healthcare provider CPR for infants. Simultaneous compression of the chest wall with the fingers was not described.

Why: There is additional evidence that the 2 thumbnail encircling hands technique produces higher coronary artery perfusion pressure. It also more consistently results in appropriate depth or force of compression, and it may generate higher systolic and diastolic blood pressures. As with adult chest compression, allow the chest to fully reexpand after each compression to allow adequate venous return to the heart and adequate refilling of the heart.

Compression-to-Ventilation Ratios for Infants and Children

2005 (New): Lone healthcare providers should use a compression-to-ventilation ratio of 30:2 for infants, children, and adults (Class Indeterminate for infants and children, Class IIa for adults). Rescuers performing 2-rescuer CPR (eg, all healthcare providers and those completing a healthcare provider course, such as lifeguards) should use a 15:2 ratio for infants and for children (aged 1 year until the onset of puberty). For information about CPR with an advanced airway in place, see below.

2000 (Old): A compression-to-ventilation ratio of 15:2 for adults and a compression-to-ventilation ratio of 5:1 for infants and children were recommended.

Why: This change was made to simplify lay rescuer training and to reduce interruptions in chest compressions by all rescuers. Healthcare providers should be able to recall and use a different compression-to-ventilation ratio for 1-rescuer and 2-rescuer CPR for infants and children. The 15:2 compression-to-ventilation ratio for 2-rescuer CPR for infants and children will provide the additional ventilations they are
likely to need. Healthcare providers should minimize interruption of chest compressions to deliver rescue breaths.

**2-Rescuer CPR With an Advanced Airway**

**2005 (New):** Healthcare providers should deliver cycles of compressions and ventilations during CPR when there is no advanced airway (eg, endotracheal tube, LMA, or Combitube) in place. Once an advanced airway is in place for infant, child, or adult victims, 2 rescuers no longer deliver cycles of compressions interrupted with pauses for ventilation. Instead, the compressing rescuer should deliver 100 compressions per minute continuously, without pauses for ventilation. The rescuer delivering the rescue breaths (ventilations) should give 8 to 10 breaths per minute for infant, child, or adult victims and should be careful to avoid delivering an excessive number of ventilations. A ventilation rate of about 8 to 10 breaths per minute will be the equivalent of giving 1 breath about every 6 to 8 seconds.

**2000 (Old):** Former guidelines recommended “asynchronous” compressions and ventilations (compressions and ventilations not timed with one another) during CPR when an advanced airway is in place. A ventilation rate of 12 to 15 per minute was recommended for adults during CPR with an advanced airway. Rescuers were taught to recheck for signs of circulation “every few minutes.” The recommendations to avoid overventilation focused on prevention of gastric inflation.

**Why:** Once an advanced airway is in place, ventilation can be accomplished during compressions, so rescuers no longer need to pause chest compressions to allow delivery of ventilation. This allows the compressing rescuer to provide uninterrupted chest compressions.

Once an advanced airway is in place, rescuers should be particularly careful to avoid delivery of an excessive number of breaths. Several studies of actual CPR by healthcare providers showed that many victims receive too many breaths, breaths with too large a volume, or both. Rescuers should practice delivering the correct number of breaths during CPR.

During CPR a lower than normal respiratory rate will maintain adequate oxygenation and carbon dioxide elimination because blood flow to the lungs is much lower than normal. Rescuers should avoid overventilation because it increases intrathoracic pressure, interferes with venous return of blood to the heart (so it prevents adequate refilling of the heart), and therefore decreases the cardiac output generated by subsequent chest compressions.

**Streamlining Actions for Relief of Foreign-Body Airway Obstruction**

**2005 (New):** Terms used to distinguish choking victims who require intervention (eg, abdominal thrusts or back slaps and chest thrusts) from those who do not have severe airway obstruction. Rescuers should act if they observe signs of severe airway obstruction: poor air exchange and increased breathing difficulty, a silent cough,

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**TABLE 2. Summary of BLS ABCD Maneuvers for Infants, Children, and Adults**

(Newborn/Neonatal Information Not Included) *Note:* Maneuvers used only by healthcare providers are indicated by “HCP.”

<table>
<thead>
<tr>
<th>MANEUVER</th>
<th>ADULT Lay rescuer: ≥8 years</th>
<th>CHILD Lay rescuers: 1 to 8 years</th>
<th>INFANT Under 1 year of age</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACTIVATE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergency Response Number (lone rescuer)</td>
<td>Activate when victim found unresponsive HCP: if asphyxial arrest likely, call after 5 cycles (2 minutes) of CPR</td>
<td>Activate after performing 5 cycles of CPR For sudden, witnessed collapse, activate after verifying that victim unresponsive</td>
<td></td>
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<tr>
<td>AIRWAY</td>
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<tr>
<td>Head lift–chin lift (HCP: suspected trauma, use jaw thrust)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>BREATHS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial</td>
<td>2 breaths at 1 second/breath</td>
<td>2 effective breaths at 1 second/breath</td>
<td></td>
</tr>
<tr>
<td>HCP: Rescue breathing without chest compressions</td>
<td>10 to 12 breaths/min (approximately 1 breath every 5 to 6 seconds)</td>
<td>12 to 20 breaths/min (approximately 1 breath every 3 to 5 seconds)</td>
<td></td>
</tr>
<tr>
<td>HCP: Rescue breaths for CPR with advanced airway</td>
<td>8 to 10 breaths/min (approximately 1 breath every 6 to 8 seconds)</td>
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<td></td>
</tr>
<tr>
<td>Foreign-body airway obstruction</td>
<td>Abdominal thrusts</td>
<td>Back slaps and chest thrusts</td>
<td></td>
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<tr>
<td>CIRCULATION</td>
<td></td>
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</tr>
<tr>
<td>Pulse check (&lt;10 sec) HCP: Carotid (HCP can use femoral in child)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Compression landmarks Center of chest, between nipples Just below nipple line</td>
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<tr>
<td>Compression depth 1½ to 2 inches Approximately ⅔ to ⅓ the depth of the chest</td>
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<tr>
<td>Compression rate Approximately 100/min</td>
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<tr>
<td>Compression-ventilation ratio 30:2 (1 or 2 rescuers) 30:2 (single rescuer) 15:2 (2 rescuers)</td>
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<td></td>
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<tr>
<td>DEFIBRILLATION</td>
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<tr>
<td>AED</td>
<td>Use adult pads. Do not use child pads/child system. HCP: For out-of-hospital response may provide 5 cycles/2 minutes of CPR before shock if response &gt; 4 to 5 minutes and arrest not witnessed. Use adult AED as soon as available for sudden collapse and in-hospital. All: After 5 cycles of CPR (out-of-hospital), use child pads/child system for child 1 to 8 years if available. If child pads/system not available, use adult AED and pads.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HCP</td>
<td>No recommendation for infants &lt; 1 year of age</td>
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cyanosis, or inability to speak or breathe. Rescuers should ask 1 question: “Are you choking?” If the victim nods yes, help is needed. If the victim becomes unresponsive, all rescuers are instructed to activate the emergency response number at the appropriate time and provide CPR. There is one change from 2000: every time the rescuer opens the airway (with a head tilt–chin lift) to deliver rescue breaths, the rescuer should look in the mouth and remove an object if one is seen. The tongue-jaw lift is no longer taught, and blind finger sweeps should not be performed.

2000 (Old): Rescuers were taught to recognize partial airway obstruction with good air exchange, partial airway obstruction with poor air exchange, and complete airway obstruction. Rescuers were taught to ask the victim 2 questions: “Are you choking?” (the victim who needs help must nod yes) and “Can you speak?” (the victim with obstructed airway must shake his or her head no).

Why: The goal of these revisions is simplification. Experts could find no evidence that a complicated series of maneuvers is any more effective than simple CPR. Some studies showed that chest compressions performed during CPR increased intrathoracic pressure as high as or higher than abdominal thrusts. Blind finger sweeps may result in injury to the victim’s mouth and throat or to the rescuer’s finger with no evidence of effectiveness.

Defibrillation

The changes recommended in the 2005 guidelines are designed to minimize interruptions in chest compressions. In addition, they acknowledge the high first-shock success of biphasic waveforms in eliminating VF or rapid ventricular tachycardia (VT).

Major changes in defibrillation:

- Immediate defibrillation is appropriate for all rescuers responding to sudden witnessed collapse with an AED on site (for victims ≥1 year of age). Compression before defibrillation may be considered when EMS arrival at the scene of sudden collapse is >4 to 5 minutes after the call.
- One shock followed by immediate CPR, beginning with chest compressions, is used for attempted defibrillation. The rhythm is checked after 5 cycles of CPR or 2 minutes.
- For attempted defibrillation of an adult, the dose using a monophasic manual defibrillator is 360 J.
- The ideal defibrillation dose using a biphasic defibrillator is the dose at which the device waveform has been shown to be effective in terminating VF. The initial selected dose for attempted defibrillation using a biphasic manual defibrillator is 150 J to 200 J for a biphasic truncated exponential waveform or 120 J for a rectilinear biphasic waveform. The second dose should be the same or higher. If the rescuer does not know the type of biphasic waveform in use, a default dose of 200 J is acceptable.
- Reaffirmation of 2003 ILCOR statement that AEDs may be used in children 1 to 8 years of age (and older). For children 1 to 8 years of age, rescuers should use an AED with a pediatric dose-attenuator system if one is available.
- Elements of successful community lay rescuer AED programs were revised.
- Instructions for shocking VT were clarified.

What did NOT change:

- The initial dose for attempted defibrillation for infants and children using a monophasic or biphasic manual defibrillator. First dose 2 J/kg; second and subsequent doses 4 J/kg.
- The dose for synchronized cardioversion for infants and children
- The dose for synchronized cardioversion for supraventricular arrhythmias and for stable, monomorphic VT in adults

Compressions First Versus Shock First for VF Sudden Cardiac Arrest

2005 (New): When any rescuer witnesses an adult cardiac arrest and an AED is immediately available on site, the rescuer should use the AED as soon as possible. This recommendation applies to lay rescuers as well as to healthcare providers who are working in hospitals or other facilities with AEDs on site. When more than 1 rescuer is available, 1 rescuer should provide CPR until the AED arrives. Ideally 1 rescuer should continue CPR until another rescuer turns the AED on and attaches the AED electrode pads and the device is ready to analyze the victim’s heart rhythm.

When any healthcare provider witnesses a child collapse suddenly, the provider should phone (or send someone to phone) the emergency response number and should begin CPR and should attach an AED and use it as soon as possible. When using an AED for an unresponsive child who did not have witnessed collapse, a rescuer should give 5 cycles or about 2 minutes of CPR before using an AED.

When EMS personnel arrive at the scene of an out-of-hospital cardiac arrest that they have not witnessed, it is reasonable for them to give about 5 cycles (about 2 minutes) of CPR before checking the ECG rhythm and attempting defibrillation (Class IIb). In systems with a typical EMS call-to-response interval >4 to 5 minutes, EMS physician directors may consider implementing a protocol that would allow EMS responders to provide about 5 cycles or 2 minutes of CPR before attempted defibrillation for victims with a history of sudden collapse (Class IIb).

2000 (Old): The AHA recommended the use of an AED as soon as it was available for all adult victims of SCA. When use of AEDs for children 1 to 8 years was recommended in 2003, the AHA recommended the use of an AED after 1 minute of CPR.

Why: Two of three studies showed that 1½ to 3 minutes of EMS CPR before attempted defibrillation improved survival for victims of VF SCA if the EMS providers arrived at the scene 4 to 5 minutes or longer after the EMS call. There was no difference in survival (CPR first or shock first) for victims when the EMS responders arrived at the victim’s side in less than 4 to 5 minutes from call. Note that one randomized study did not show any difference in outcome whether CPR was provided before attempted defibrillation or not.

When VF cardiac arrest is present for several minutes, the heart has probably used up most of the available oxygen and substrate needed to contract (pump) effectively. At this point the amplitude (size) of the VF waveform is typically low, and shock delivery may not eliminate VF. Even if a shock does eliminate VF, when the heart has been without oxygen
MCES
for Autism

It is a scientific fact that when a low voltage and micro-current pulse is applied to the body, osmosis, enzyme activity, and healing are increased. This current, applied to the patient's body electric autoregulation a harmonic pulse to the cranium has been shown to help autism, attention deficit and hyperactive children. It has been shown helpful for anxiety, addictions, emotional disturbances, and insomnia.
for several minutes before shock delivery, it is unlikely to pump blood effectively for the first several seconds or minutes after defibrillation. A period of CPR before shock delivery will provide some blood flow to the heart, delivering some oxygen and substrate to the heart muscle. This will make a shock more likely to eliminate VF and will make the heart more likely to resume an effective rhythm and effective pumping function after shock delivery.

1 Shock Plus Immediate CPR for Attempted Defibrillation

2005 (New): To treat cardiac arrest associated with VF or pulseless VT, the 2005 guidelines recommend delivery of single shocks followed immediately by a period of CPR, beginning with chest compressions (Class IIa). Rescuers should not interrupt chest compressions to check circulation (e.g., evaluate rhythm or pulse) until about 5 cycles or approximately 2 minutes of CPR have been provided after the shock. These recommendations may be modified for the in-hospital setting, particularly where continuous electrocardiographic or hemodynamic monitoring may be in place.

2000 (Old): The use of a “stacked” sequence of up to 3 shocks was recommended, without interposed chest compressions, for the treatment of VF/pulseless VT.

Why: The 3-shock recommendations were based on the use of monophasic defibrillator waveforms. Repeated shocks were necessary with monophasic waveforms because the first shock was often unsuccessful, and several shocks were typically needed to eliminate VF. Three shocks in rapid succession were more likely to be effective than single shocks because transthoracic impedance decreased and current delivery to the heart increased with each shock delivered.

Modern biphasic defibrillators have a much higher (85% to 94%) first-shock success rate than monophasic defibrillators, so VF is likely to be eliminated with 1 biphasic waveform shock. In 2005 the rhythm analysis for a 3-shock sequence performed by commercially available AEDs resulted in delays of 19 to 37 seconds or longer between delivery of the first shock and delivery of the first post-shock compression. This long hands-off time cannot be justified when VF is unlikely to be present and victims are likely to need CPR.

If 1 shock fails to eliminate VF, the VF may be of low amplitude (indicative of a myocardium depleted of oxygen and substrates). In such patients immediate CPR, particularly with effective chest compressions, is likely to provide blood flow to the myocardium and improve the likely success of a shock. In fact, even when shock delivery is successful in eliminating VF, most victims demonstrate a nonperfusing rhythm (pulsless electrical activity [PEA] or asystole) for the first minutes after defibrillation. These victims need immediate CPR, especially chest compressions. No evidence indicates that chest compressions immediately after defibrillation will provoke recurrent VF.

Monophasic Waveform Defibrillation Dose for Adults

2005 (New): The recommended dose for initial and subsequent shocks using monophasic waveform for treatment of VF/pulseless VT in adults is 360 J. For manual defibrillation doses in infants and children, see “Pediatric Advanced Life Support,” below.

2000 (Old): The recommended dose for an initial shock using a monophasic waveform for treatment of VF/pulseless VT in adults was 200 J. The second recommended dose was 200 to 300 J, and the recommended dose for the third and subsequent shocks was 360 J. The biphasic dose recommended was one shown to be equivalent to monophasic waveforms.

Why: The goal of this recommendation is to simplify attempted defibrillation and to support the use of device-specific doses of proven effectiveness. Rescuers should note that with the rectilinear biphasic waveform, energies selected by the operator will typically differ from delivered energies. Data is insufficient to support superiority of either escalating energy or nonescalating energy dosing. Providers should be familiar with the defibrillators they use clinically.

Use of AEDs in Children

2005 (New): As noted above in the Major Changes section, since 2003 the use of AEDs is recommended for children in cardiac arrest 1 year of age and older. For sudden, witnessed arrest in the child or adult in the out-of-hospital setting, the lone healthcare provider should phone the emergency response number, retrieve the AED, and return to the victim to perform CPR and use the AED. AEDs should be used as soon as they are available for in-hospital resuscitation.

Lay rescuers and healthcare providers responding to an unwitnessed or nonsudden cardiac arrest in the child in the out-of-hospital setting should use the AED after giving 5 cycles or about 2 minutes of CPR. Evidence is insufficient to recommend for or against use of AEDs in infants less than 1 year of age (Class Indeterminate).
2000 (Old): Use of AEDs in children 8 years of age and older was recommended (Class IIb). Evidence was insufficient to recommend for or against AED use in children under 8 years old (Class Indeterminate). AEDs could be used to identify the rhythm of children 1 to 8 years of age (Class IIb). In 2003 AHA and ILCOR published a statement noting that AEDs could be used in children 1 to 8 years old.

Why: Evidence published since 2000 has established the safety of biphasic waveforms and the ability of most AEDs to recognize shockable rhythms in infants and children. If an AED system is available that reduces (attenuates) the delivered energy dose through use of a special pad/cable system or other method, that system should be used for children 1 to 8 years old but not for children 8 years of age or older or for adults.

Community Lay Rescuer AED Programs

2005 (New): CPR and AED use by public safety first responders are recommended to increase survival rates for SCA (Class I). AED programs in public locations where there is a relatively high likelihood of witnessed cardiac arrest (eg, airports, casinos, sports facilities) are recommended (Class I). Common elements of successful community lay rescuer AED programs are:

- A planned and practiced response, typically requiring oversight by a healthcare provider
- Training and equipping of rescuers in CPR and use of the AED
- A link with the local EMS system
- A program of device maintenance and ongoing quality improvement

There is insufficient evidence to recommend for or against the deployment of AEDs in homes (Class Indeterminate).

2000 (Old): The key elements of successful AED programs included physician prescription and oversight, training of likely rescuers, link with the local EMS system, and a process of continuous quality improvement.

Why: High survival rates from out-of-hospital SCA have been reported in some settings, particularly in community programs that provide early recognition, early CPR, and early defibrillation. The North American Public Access Defibrillation trial showed that organized community lay rescuer CPR and AED programs improved survival to hospital discharge for victims with witnessed VF SCA. In addition, survival rates from witnessed VF SCA as high as 49% to 74% have been reported by lay rescuer CPR and AED programs in airports and casinos and with police officers. The North American trial results reinforced the importance of a planned and practiced response. Even at sites with AEDs in place the AEDs were deployed for fewer than half of the cardiac arrests at those sites, indicating the need for frequent CPR. Some AEDs do not require a prescription, so healthcare provider oversight is not mandatory for lay rescuer AED programs.

Clarification for Shock Delivery for Ventricular Tachycardia

2005 (New): If a patient has polymorphic VT, the patient is likely to be unstable, and rescuers should treat the rhythm as VF. They should deliver high-energy unsynchronized shocks (ie, defibrillation doses). If there is any doubt whether monomorphic or polymorphic VT is present in the unstable patient, do not delay shock delivery to perform detailed rhythm analysis—provide high-energy unsynchronized shocks (ie, defibrillation doses). Rescuers should use the ACLS Pulseless Arrest Algorithm.

2000 (Old): Synchronized cardioversion was recommended for stable polymorphic VT.

Why: Although synchronized cardioversion is preferred for treatment of an organized ventricular rhythm, for some irregular rhythms, such as polymorphic VT, synchronization is not possible. Lower energy levels should not be used for these unsynchronized shocks because low-energy shocks have a high likelihood of provoking VF when given in an unsynchronized mode.

Advanced Cardiovascular Life Support (ACLS)

Effective ACLS begins with high-quality BLS, particularly high-quality CPR. Changes in the ACLS treatment of cardiac arrest have been designed to minimize interruptions in chest compressions for rhythm check, pulse check, and ACLS therapies. To minimize interruptions in chest compressions, the resuscitation team leader should plan interventions such as rhythm checks, insertion of an airway, and even drug administration around uninterrupted periods of CPR.

The potential effects of any drugs or ACLS therapy on outcome from VF SCA arrest are dwarfed by the potential effects of immediate, high-quality CPR and early defibrillation. There is much less emphasis on drug therapy during cardiac arrest and much more emphasis on CPR with minimal interruptions in chest compressions.

Major changes in ACLS include

- Emphasis on high-quality CPR. See information in the BLS for Healthcare Providers section, particularly rescue breaths with chest compressions and emphasis on chest compression depth and rate, chest wall recoil, and minimal interruptions.
- Increased information about use of LMA and esophageal-tracheal combitube (Combitube). Use of endotracheal intubation is limited to providers with adequate training and opportunities to practice or perform intubations.
- Confirmation of endotracheal tube placement requires both clinical assessment and use of a device (eg, exhaled CO2 detector, esophageal detector device). Use of a device is part of (primary) confirmation and is not considered secondary confirmation.
- The algorithm for treatment of pulseless arrest was reorganized to include VF/ pulseless VT, asystole, and PEA.
  - The priority skills and interventions during cardiac arrest are BLS skills, including effective chest compressions with minimal interruptions.
  - Insertion of an advanced airway may not be a high priority.
  - If an advanced airway is inserted, rescuers should no longer deliver cycles of CPR. Chest compressions should be delivered continuously (100 per minute) and rescue breaths delivered at a rate of 8 to 10 breaths per minute (1 breath every 6 to 8 seconds).
  - Providers must organize care to minimize interruptions in chest compressions for rhythm check, shock delivery, advanced airway insertion, or vascular access.
• Intravenous or intraosseous (IO) drug administration is preferred to endotracheal administration.

• Treatment of VF/pulseless VT:
  - To attempt defibrillation, 1 shock is delivered (see “Defibrillation” for defibrillation doses using monophasic or biphasic waveforms) followed immediately by CPR (beginning with chest compressions).
  - Rescuers should minimize interruptions in chest compressions and particularly minimize the time between compression and shock delivery, and shock delivery and resumption of compressions.
  - Compressions should ideally be interrupted only for rhythm checks and shock delivery. Rescuers should provide compressions (if possible) after the rhythm check, while the defibrillator is charging. Then compressions should be briefly interrupted when it is necessary to “clear” the patient and deliver the shock, but the chest compressions should resume immediately after the shock delivery.
  - Providers do not attempt to palpate a pulse or check the rhythm after shock delivery. If an organized rhythm is apparent during rhythm check after 5 cycles (about 2 minutes) of CPR, the provider checks a pulse.
  - Drugs should be delivered during CPR, as soon as possible after rhythm checks.
    — If a third rescuer is available, that rescuer should prepare drug doses before they are needed.
    — If a rhythm check shows persistent VF/VT, the appropriate vasopressor or antiarrhythmic should be administered as soon as possible after the rhythm check. It can be administered during the CPR that precedes (until the defibrillator is charged) or follows the shock delivery.
    — The timing of drug delivery is less important than is the need to minimize interruptions in chest compressions.
  - Vasopressors are administered when an IV/IO line is in place, typically if VF or pulseless VT persists after the first or second shock. Epinephrine may be given every 3 to 5 minutes. A single dose of vasopressin may be given to replace either the first or second dose of epinephrine.
    - Antiarrhythmics may be considered after the first dose of vasopressors (typically if VF or pulseless VT persists after the second or third shock). Amiodarone is preferred to lidocaine, but either is acceptable.
  - Treatment of asystole/pulseless electrical activity: epinephrine may be administered every 3 to 5 minutes. One dose of vasopressin may replace either the first or the second dose of epinephrine.
  - Treatment of symptomatic bradycardia: the recommended atropine dose is now 0.5 mg IV, may repeat to a total of 3 mg. Epinephrine or dopamine may be administered while awaiting a pacemaker.
  - Treatment of symptomatic tachycardia: a single simplified algorithm includes some but not all drugs that may be administered. The algorithm indicates therapies intended for use in the in-hospital setting with expert consultation available.
  - Postresuscitation stabilization requires support of vital organs, with the anticipation of postresuscitation myocardial dysfunction. Some reliable prognostic indicators have been reported.
  - Avoid hyperthermia for all patients after resuscitation. Consider inducing hypothermia if the patient is unresponsive but with an adequate blood pressure following resuscitation.

Things that did NOT change in ACLS include the following:

- Most drug doses are the same as those recommended in 2000 (one exception noted above—atropine for bradycardia).
- The need to search for and treat reversible causes of cardiac arrest and failure to respond to resuscitation attempts. These contributing factors are referred to as the H’s (hypovolemia, hypoxia, hydrogen ion, hypo-/hyperkalemia, hypoglycemia, hypothermia) and T’s (toxins, tamponade, tension pneumothorax, thrombosis [includes coronary or pulmonary], trauma [hypovolemia]). These are listed in the ACLS and PALS algorithms.

Use of Advanced Airways

2005 (New): Rescuers must be aware of the risks and benefits of insertion of an advanced airway during a resuscitation attempt. Because insertion of an advanced airway may require interruption of chest compressions for many seconds, the rescuer should weigh the need for compressions against the need for insertion of an advanced airway. Airway insertion may be deferred until several minutes into the attempted resuscitation.

The optimal method of managing the airway during cardiac arrest will vary on the basis of provider experience, EMS or healthcare system characteristics, and patient condition. All healthcare systems must establish processes of continuous quality improvement to monitor and optimize methods of establishing and maintaining an airway.

Studies suggest that the LMA and Combitube can be inserted safely and can provide ventilation that is as effective as bag-mask ventilation (Class IIa).

2000 (Old): The endotracheal tube was considered the ventilation adjunct of choice.

Why: Experience with advanced airways shows clearly that endotracheal intubation by inexperienced providers may be associated with a high complication rate because the tubes may be misplaced or displaced. If advanced airways are used, the providers must evaluate placement and detect misplacement, and the healthcare system must monitor results.

Verify Correct Tube Placement With Clinical Exam and Device

2005 (New): To reduce the risk of unrecognized tube misplacement or displacement, providers should use clinical assessment plus a device such as an exhaled CO2 detector or an esophageal detector device to evaluate tube location (Class IIa). Providers should confirm the placement of any advanced airway immediately after insertion, in the transport vehicle, and whenever the patient is moved.

Most published studies regarding the use of devices to confirm advanced airway placement have confirmed endotracheal tube placement so there is insufficient evidence to comment on the accuracy of the devices in confirming LMA or Combitube placement.
physician. If PEA or asystole develops after a shock (and CPR), rescuers should follow the Asystole/PEA branch of the algorithm.

Continuous monitoring (eg, electrocardiographic, hemodynamic) while CPR is interrupted only for rhythm check and shock delivery. If possible, rescuers should perform chest compressions while the defibrillator is charging. Rescuers should resume chest compressions immediately after a shock is delivered. In in-hospital settings with continuous monitoring, this sequence may be modified by the physician. If PEA or asystole develops after a shock (and CPR), rescuers should follow the Asystole/PEA branch of the ACLS or PALS Pulseless Arrest Algorithms.

Figure 2: Ventricular Fibrillation and Pulseless VT: Treatment Sequence for ACLS and PALS. This illustrates suggested timing of CPR, rhythm checks, attempted defibrillation (shock delivery), and drug delivery for persistent VF/pulseless VT. Drug doses should be prepared prior to rhythm check. Drugs should be administered during CPR, as soon after a rhythm check as possible. Ideally CPR (particularly chest compressions) is interrupted only for rhythm check and shock delivery. If possible, rescuers should perform chest compressions while the defibrillator is charging. Rescuers should resume chest compressions immediately after a shock is delivered. In in-hospital settings with continuous monitoring, this sequence may be modified by the physician. If PEA or asystole develops after a shock (and CPR), rescuers should follow the Asystole/PEA branch of the ACLS or PALS Pulseless Arrest Algorithms.

Figure 3: Asystole and Pulseless Electrical Activity: Treatment Sequence for ACLS and PALS. This illustrates the suggested timing of CPR, rhythm checks, and drug delivery for pulseless electrical activity (PEA) or asystole. Drug doses should be prepared prior to rhythm check. Drugs should be administered during CPR, as soon as possible. Ideally CPR (particularly chest compressions) is interrupted only for rhythm check and shock delivery. If possible, rescuers should perform chest compressions while the defibrillator is charging. Rescuers should resume chest compressions immediately after a shock is delivered, without checking the rhythm. In in-hospital settings with continuous monitoring, this sequence may be modified by the physician. If VF/pulseless VT develops, rescuers should follow the VF/Pulseless VT branch of the ACLS or PALS Pulseless Arrest Algorithms.

2000 (Old): Resuscitation for VF/pulseless VT was organized around 1-minute intervals of CPR. As a result, chest compressions were frequently interrupted.

Why: Clinical studies of actual CPR by healthcare providers showed that chest compressions were not performed during 24% to 49% of CPR time. In addition, the high first-shock success rate of biphasic defibrillators means that a single shock is likely to eliminate VF. Most victims, however, have asystole or PEA immediately after shock delivery and require immediate CPR. A major revision in approach is designed to reduce the frequency and length of interruptions in chest compressions. Rather than waste time looking for a “shockable” rhythm or palpating a pulse immediately after shock delivery (neither is likely to be present), rescuers should immediately resume CPR (beginning with chest compressions) and check the rhythm after 5 cycles or 2 minutes of CPR.

Vascular (IV or IO) Preferred to Endotracheal Drug Administration

2005 (New): Although many drugs (including lidocaine, epinephrine, atropine, naloxone, and vasopressin) can be absorbed via the trachea, the IV or IO route of administration is preferred. For this reason, the endotracheal doses of resuscitation medications are not listed in the ACLS Pulseless Arrest Algorithm, although they may be used if no IV/IO access is available.

The optimal endotracheal dose of most drugs is unknown but is typically 2 to 2½ times the recommended IV dose. Providers should dilute the recommended dose in 5 to 10 mL of water or normal saline and inject the drug directly into the endotracheal tube. Studies of epinephrine and lidocaine suggest that dilution in water rather than normal saline may achieve better drug absorption, but there is insufficient evidence to recommend water dilution over normal saline.

2000 (Old): Administration of doses 2 to 2½ times the recommended IV dose was recommended. To administer the drug...
by endotracheal route, providers were instructed to pass a catheter beyond the tip of the tracheal tube, stop compressions, inject the drug, follow with several quick insufflations, and resume CPR.

**Why:** Administration of drugs into the trachea results in lower blood concentration than the same dose given by IV route. Recent animal studies suggest that the lower epinephrine concentrations achieved when the drug is delivered by the endotracheal route may produce transient β-adrenergic effects. These effects can be detrimental, causing hypotension, lower coronary artery perfusion pressure and flow, and reduced potential for return of spontaneous circulation (ROSC). Thus, although endotracheal administration of some resuscitation drugs is possible, IV or IO drug administration is preferred because it provides more predictable drug delivery and pharmacologic effect.

**Timing of Drug Administration During Pulseless Arrest**

**2005 (New):** When drug administration is indicated, the drugs should be administered during CPR, as soon as possible after the rhythm is checked. A drug may be administered during the CPR that is performed while the defibrillator is charging, or during the CPR performed immediately after the shock is delivered. Drug delivery should not interrupt CPR. Rescuers should prepare the next drug dose before it is time for the next rhythm check so that the drug can be administered as soon as possible after the rhythm check (Figures 2 and 3). This requires organization and planning.

**2000 (Old):** Drugs were administered immediately after a post-shock rhythm check, in a “Drug—CPR—shock” (repeat as needed) cycle. CPR was provided for about a minute after drug administration to circulate the drug prior to the next rhythm check. Rhythm checks were performed about every minute during attempted resuscitation, resulting in frequent interruptions in chest compressions.

**Why:** These revisions were proposed to minimize interruptions in chest compressions during attempted resuscitation. The recommendation to provide immediate CPR for 5 cycles or 2 minutes after an attempted shock required a change in the timing of drug administration.

The consensus recommendation is to administer the drugs as soon as possible after the rhythm check. The guidelines note that the timing of drug delivery is less important than the need to minimize interruptions in chest compressions.

As an alternative, physicians may order drug administration during the CPR interval, but the patient’s rhythm at the time of drug administration will be unknown. The benefit of administering the drugs as soon as possible after the rhythm check is that the drug is then given to treat the rhythm seen at the rhythm check. For example, if VF is present at the first rhythm check after epinephrine was administered, an antiarrhythmic would be the likely drug to administer.

**Vasopressors During Cardiac Arrest**

**2005 (New):** Vasopressors are administered when an IV/IO line is in place, typically after the first or second shock. Epinephrine may be given every 3 to 5 minutes. One dose of vasopressin may be given instead of either the first or second dose of epinephrine.

**2000 (Old):** Epinephrine (Class Indeterminate) or vasopressin (Class IIb) could be given for VF/pulseless VT arrest. For asystole/PEA, epinephrine was recommended, and evidence was insufficient to recommend for or against vasopressin.

**Why:** Although vasopressin showed promising results, it has not improved rates of intact survival to hospital discharge. As a result a single dose of vasopressin may be used as an alternative to either the first or second dose of epinephrine.

**Antiarrhythmics During VF/VT Cardiac Arrest**

**2005 (New):** When VF or pulseless VT persists after 2 to 3 shocks plus CPR and administration of a vasopressor, consider administering an antiarrhythmic such as amiodarone. If amiodarone is unavailable, lidocaine may be considered.

**2000 (Old):** Consider antiarrhythmics if VF/VT persists after shock delivery and administration of a vasopressor: amiodarone (Class IIb) or lidocaine (Class Indeterminate).

**Why:** More experience documents the effectiveness of amiodarone and no new evidence has been published documenting the effectiveness of lidocaine.

**Treatment of Asystole and Pulseless Electrical Activity**

**2005 (New):** Although epinephrine (1 mg IV/IO) is still recommended and can be given every 3 to 5 minutes for the treatment of asystole or PEA, one dose of vasopressin (40 U IV/IO) may be substituted for either the first or second dose of epinephrine. Atropine (1 mg IV/IO) may still be considered for asystole or slow PEA, up to 3 doses (Figure 4).

**2000 (Old):** For asystole or PEA, epinephrine was recommended (1 mg every 3 to 5 minutes). Atropine (1 mg IV) could be considered for asystole or slow PEA every 3 to 5 minutes as needed, to a total dose of 0.04 mg/kg.

**Why:** No placebo-controlled study has demonstrated that vasopressors improve survival from cardiac arrest. Because vasopressors can improve aortic blood pressure and coronary artery perfusion pressure, they continue to be recommended. In general, vasopressin has not been shown to improve survival from cardiac arrest. In one large study, vasopressin (compared with epinephrine) improved survival for a subgroup of patients with asystole, but the patients did not survive neurologically intact. Because the effects of vasopressin have not been shown to differ substantially from those of epinephrine in the treatment of cardiac arrest, both are included in the algorithm. Only 1 dose of vasopressin is administered, replacing either the first or second epinephrine dose.

**Treatment of Symptomatic Bradycardia**

**2005 (New):** Prepare for transcutaneous pacing without delay for high-degree block. Consider atropine 0.5 mg IV while awaiting a pacemaker. The atropine may be repeated to a total dose of 3 mg. If the atropine is ineffective, begin pacing. Consider epinephrine infusion (2 to 10 μg/min) or dopamine infusion (2 to 10 μg/kg per minute) while awaiting a pacer or if pacing is ineffective. Prepare for transvenous pacing. Treat contributing causes.

**2000 (Old):** The range of atropine dose for symptomatic bradycardia was 0.5 to 1 mg IV. Consider dopamine (5 to 20 μg/kg per minute), epinephrine (2 to 10 μg/min), or isoproterenol (2 to 10 μg/min).
Why: Studies showed that the effective dose of atropine for symptomatic bradycardia is 0.5 mg IV (repeated as needed to a total dose of 3 mg). Isoproterenol was eliminated from the algorithm because no evidence that was reviewed documented its efficacy.

**Treatment of Tachycardia**

**2005 (New):** Treatment of tachycardia is summarized in a single algorithm. Immediate synchronized cardioversion is still recommended for the unstable patient. If the patient is stable, a 12-lead ECG (or a rhythm strip) enables classification of the tachycardia as narrow-complex or wide-complex. These two classifications can be further subdivided into those with regular or irregular rhythms. The algorithm boxes with screened type are designed for in-hospital use or with expert consultation available (others can be used by ACLS providers as appropriate).

**2000 (Old):** Several tachycardia algorithms divided treatments into those appropriate for patients with adequate ventricular function and those with poor ventricular ejection fraction.

**Why:** The goal was to simplify therapy and distill the information in the algorithm to the essence of care required for initial stabilization and evaluation in the first hours of therapy. The algorithm is based on the most obvious characteristics of the ECG (QRS width and regularity). It can be used without knowledge of the victim’s underlying myocardial function. The use of boxes with screened type signals those areas of the algorithm intended for in-hospital use or with expert consultation.

**Postresuscitation Stabilization**

**2005 (New):** Postresuscitation care includes support of myocardial function with anticipation that myocardial “stunning” may be present, requiring vasoactive support. For information about induced hypothermia, see below. It is reasonable for providers to maintain strict glucose control, but additional studies are needed to determine the precise blood glucose concentration that requires insulin therapy and the target range of blood glucose concentration. Clinical signs that correlate strongly with death or poor neurologic outcome include the following:

- Bilateral absence of cortical response to median nerve somatosensory-evoked potentials measured 72 hours (in the normothermic patient) after hypoxic-ischemic (asphyxial) insult
- Absent corneal reflex at 24 hours
- Absent pupillary response at 24 hours
- Absent withdrawal response to pain at 24 hours
- No motor response at 24 hours
- No motor response at 72 hours

**2000 (Old):** No specific neurologic signs were noted to be prognostic.

**Why:** A meta-analysis demonstrated that bilateral absence of cortical response to median nerve somatosensory-evoked potentials predicted poor outcome with 100% specificity when used in normothermic patients who were comatose for at least 72 hours after hypoxic-ischemic (asphyxial) insult. A recent meta-analysis of 11 studies involving 1914 patients documented the 5 clinical signs that strongly predicted death or poor neurologic outcome.

**Hypothermia**

**2005 (New):** Unconscious adult patients with ROSC after out-of-hospital cardiac arrest should be cooled to 32°C to 34°C for 12 to 24 hours when the initial rhythm was VF (Class Ia). Similar therapy may be beneficial for patients with non-VF arrest out of hospital or for in-hospital arrest (Class IIb). Further research is needed.

**2000 (Old):** Mild hypothermia may be beneficial to neurologic outcome and is likely to be well tolerated (Class IIb). But hypothermia should not be induced actively after resuscitation from cardiac arrest (Class Indeterminate). In 2003 an interim ILCOR statement supported induced hypothermia.

**Why:** In 2 randomized clinical trials, induced hypothermia (cooling within minutes to hours after ROSC) resulted in improved survival and neurologic outcome in adults who remained comatose after initial resuscitation from out-of-hospital VF cardiac arrest. Patients in the study were cooled to 33°C or to the range of 32°C to 34°C for 12 to 24 hours. One study, the Hypothermia After Cardiac Arrest (HACA) study, included a small subset of patients with in-hospital cardiac arrest.

**Acute Coronary Syndromes**

The guidelines for acute coronary syndrome have been updated in light of the 2003-2005 ILCOR evidence evaluation and the recent ACC/AHA Guidelines for Management of ST-elevation Myocardial Infarction (STEMI) and Guidelines for Management of Unstable Angina and Non–ST-Elevation Myocardial Infarction (UA/NSTEMI). See the ACS section of the 2005 AHA Guidelines for CPR and ECC for more details.

The changes in the ACS guidelines largely comprise refinements and modifications to existing recommendations, including:

- EMS dispatcher may instruct patients with ACS to chew an aspirin (see EMS section).
- The algorithm is streamlined but still focuses on risk stratification using the 12-lead ECG.
- There is more information about identification of high-risk patients with UA/NSTEMI.
- Contraindications to fibrinolytics have been refined to match most recent criteria published by ACC/AHA.

**Things that did NOT change:**

- Rapid evaluation and risk stratification with the ECG remains time-sensitive.
- Patients with STEMI require rapid reperfusion (with fibrinolytics or percutaneous coronary intervention [PCI]).
- Patients with UA/NSTEMI require risk stratification and may require revascularization by PCI or coronary artery bypass grafting (CABG).
- Adjunctive therapies (aspirin, heparin, cilopidogrel, glycoprotein IIb/IIIa inhibitors) are important to improve outcome.

**Stroke**

The 2005 guidelines reaffirm administration of tissue plasminogen activator (tPA) for carefully selected patients with acute ischemic stroke but caution that tPA must be administered in the setting of a clearly defined protocol and institutional commitment. Stroke units have documented improved outcomes and they are recommended.
Refer to the 2005 guidelines for additional information about stroke care, including a modified table listing contraindications for fibrinolytics and a modified table about management of hypertension. Both are consistent with the most recent management recommended by the American Stroke Association. In addition, the 2005 guidelines recommend lowering of blood glucose in patients with acute ischemic stroke when the serum glucose level is >10 mmol/L (>about 200 mg/dL). This is consistent with studies published from ICU settings.

The two topics with the most new evidence include tPA administration for ischemic stroke and the use of stroke units. These two topics are summarized here.

**tPA Improves Outcome When Administered With Strict Criteria**

**2005 (New):** Administration of IV tPA to patients with acute ischemic stroke who meet the National Institute of Neurologic Disorders and Stroke (NINDS) eligibility criteria is recommended if tPA is administered by physicians in the setting of a clearly defined protocol, a knowledgeable team, and institutional commitment (Class I). Note that the superior outcomes reported in both community and tertiary-care hospitals in the NINDS trials have been difficult to replicate in hospitals with less experience in, and institutional commitment to, acute stroke care.

**2000 (Old):** Intravenous administration of tPA is recommended for carefully selected patients with acute ischemic stroke if they have no contraindications to fibrinolytic therapy and if the drug can be administered within 3 hours of the onset of stroke symptoms (Class I).

**Why:** The NINDS results have been supported by subsequent 1-year follow-up, reanalysis of the NINDS data, and a meta-analysis. Additional prospective randomized trials, including one just completed in Canada, supported the NINDS results. A recent pair of articles from a hospital consortium documented higher complications of hemorrhage following tPA administration in the first study, when the hospitals did not require strict protocol adherence. The follow-up study (after the hospitals instituted strict protocols) documented a hemorrhage rate lower than that reported in the NINDS trials. Evidence from prospective randomized studies in adults also documented a greater likelihood of benefit the earlier treatment with tPA is begun.

Many physicians have emphasized the flaws in the NINDS trials. But additional analyses of the original NINDS data by an independent group of investigators confirmed the validity of the results. They verified that improved outcomes in the tPA treatment arm persist even when imbalances in the baseline stroke severity among treatment groups are corrected.

**Stroke Units**

**2005 (New):** Multiple randomized clinical trials and meta-analyses in adults document consistent improvement in 1-year survival rate, functional outcomes, and quality of life when patients hospitalized with acute stroke are cared for in a dedicated stroke unit by a multidisciplinary team experienced in managing stroke. When such a facility is available within a reasonable transport interval, stroke patients who require hospitalization should be admitted there (Class I).

**2000 (Old):** Stroke units were not discussed in the 2000 guidelines.

**Why:** Although the studies reported were conducted outside the United States in in-hospital units that provided both acute care and rehabilitation, the improved outcomes achieved by stroke units were apparent very early in the stroke care. These results should be relevant to the outcome of dedicated stroke units staffed with experienced multidisciplinary teams in the United States.

**Pediatric Advanced Life Support**

**Emphasis on Effective CPR**

The information provided in previous sections about the need for effective CPR applies to the PALS provider. Effective PALS support begins with high-quality PBLS. Rescuers must provide chest compressions of sufficient depth and rate, allowing adequate chest wall recoil, with minimal interruptions in chest compressions. For further information see the BLS for Healthcare Providers section, particularly rescue breaths and emphasis on chest compression rate and depth, complete chest recoil, and minimal interruptions.

The following are the major PALS changes in the 2005 guidelines:

- There is further caution about the use of endotracheal tubes. LMAs are acceptable when used by experienced providers (Class Ib).
- Cuffed endotracheal tubes may be used in infants (except newborns) and children in in-hospital settings provided that cuff inflation pressure is kept <20 cm H2O.
- Confirmation of tube placement requires clinical assessment and assessment of exhaled carbon dioxide (CO2); esophageal detector devices may be considered for use in children weighing >20 kg who have a perfusing rhythm (Class Ib). Correct placement must be verified when the tube is inserted, during transport, and whenever the patient is moved.
- During CPR with an advanced airway in place, rescuers will no longer perform “cycles” of CPR. Instead the rescuer performing chest compressions will perform them continuously at a rate of 100/minute without pauses for ventilation. The rescuer providing ventilation will deliver 8 to 10 breaths per minute (1 breath approximately every 6 to 8 seconds). For further information, see the Basic Life Support for Healthcare Providers section.
- More evidence has accumulated to reinforce that vascular access (IV/IO) is preferred to endotracheal drug administration.
- Timing of 1 shock, CPR, and drug administration during pulseless arrest has changed and now is identical to that for ACLS. See ACLS section for details.
- Routine use of high-dose epinephrine is not recommended (Class III).
- Lidocaine is deemphasized, but it can be used for treatment of VF/pulseless VT if amiodarone is not available.
- Induced hypothermia (32°C to 34°C for 12 to 24 hours) may be considered if the child remains comatose after resuscitation (Class Ib).
- Indications for the use of inotropes are mentioned in the postresuscitation section.
- Termination of resuscitative efforts is discussed. It is noted that intact survival has been reported following prolonged
Volts and Oscillations (EMG, EEG)
Amps and Oscillations (ECG)
Resistance (GSR)
Hydration
Oxidation (Redox potential)
Ph acid vs alkalinity
Reactivity evoked potential to voltammetric fields of substances (TVEP) over 228,000 measures a second of these energetic factors

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resuscitation and absence of spontaneous circulation despite 2 doses of epinephrine.

Things that have NOT changed in PALS:
- Shock doses for VF/VT (note that the second dose was 2 to 4 J/kg and is now 4 J/kg)
- Shock doses for cardioversion
- Major steps in bradycardia and unstable tachycardia algorithm
- Most drug doses
- Appreciation that most cardiac arrests in infants and children result from a progression of shock or respiratory failure
- Most recommendations for treatments of poisonings and drug overdose

Use of Advanced Airways

2005 (New): Insufficient evidence exists to recommend for or against the routine use of an LMA during cardiac arrest (Class Indeterminate). When endotracheal intubation is not possible, the LMA is an acceptable adjunct for experienced providers (Class IIb), but it is associated with a higher incidence of complications in young children.

Endotracheal intubation in infants and children requires special training because the pediatric airway anatomy differs from the adult airway anatomy. Success and a low complication rate are related to the length of training, supervised experience in the operating room and in the field, adequate ongoing experience, and the use of rapid sequence intubation (RSI).

2000 (Old): The endotracheal tube was considered the ventilation adjunct of choice if used by properly trained providers in a system with monitoring of results and complications. Insufficient evidence was found to recommend for or against use of LMAs in children.

Why: As experience with advanced airways has accumulated, endotracheal intubation by inexperienced providers appears to be associated with a high incidence of misplaced and displaced tubes. In addition, tubes may become displaced when the patient is moved. Providers should be experienced in bag-mask ventilation. If advanced airways are used, providers must evaluate placement and detect misplacement, and the healthcare system must monitor results.

Use of Cuffed Endotracheal Tubes

2005 (New): In the in-hospital setting, a cuffed endotracheal tube is as safe as an uncuffed tube for infants (except the newborn) and children. In certain circumstances (eg, poor lung compliance, high airway resistance, or a large glottic air leak) a cuffed tube may be preferable, provided that attention is paid to endotracheal tube size, position, and cuff inflation pressure (Class Ila). Keep cuff inflation pressure <20 cm H2O.

The formula used to estimate the internal diameter of a cuffed tube differs from that used for an uncuffed tube and is as follows:

\[
\text{Cuffed endotracheal tube size (mm ID)} = \frac{\text{age in years}}{4} + 3
\]

2000 (Old): Uncuffed tubes are typically used for children <8 years old. Cuffed tracheal tubes sized for younger children are available and may be appropriate in some circumstances.

Why: Evidence has accumulated that cuffed tubes can be used safely in children.

Verify Correct Tube Placement With Clinical Exam and Device

2005 (New): In infants and children with a perfusing rhythm, use a colorimetric detector or capnography to detect exhaled CO2 to confirm endotracheal tube position in the prehospital and in-hospital settings (Class Ia) and during intrahospital and interhospital transport (Class IIb). The self-inflating bulb (esophageal detector device) may be considered to confirm endotracheal tube placement in children weighing >20 kg with a perfusing rhythm (Class IIIb). Insufficient data exists to make a recommendation for or against its use in children during cardiac arrest (Class Indeterminate).

Why: The new emphasis is on the need to verify correct tube placement immediately after the tube is inserted, during transport, and especially when the patient is moved. The new wording also does not describe the use of devices as “secondary” confirmation but as “additional” confirmation with clinical assessment (ie, part of the “primary” assessment).

Vascular (IV or IO) Preferred to Endotracheal Drug Administration

2005 (New): Any vascular access, IO or IV, is preferable, but if you cannot establish vascular access, you can give lipid-soluble drugs such as lidocaine, epinephrine, atropine, and naloxone (“LEAN”) via the endotracheal tube, although optimal endotracheal doses are unknown.

2000 (Old): If vascular access is not achieved rapidly in cardiac arrest and the airway is secured, lipid-soluble resuscitation drugs may be administered by the endotracheal route. Whenever a vascular route is available, however, it is preferable to endotracheal drug administration.

Why: There is now a better appreciation that administration of drugs into the trachea results in lower blood concentration than the same dose given by IV route. Recent animal studies suggest that the lower epinephrine concentrations achieved when the drug is delivered by the endotracheal route may produce transient β-adrenergic effects. These effects can be detrimental, causing hypotension, lower coronary artery perfusion pressure and flow, and reduced potential for ROSC. Thus, although endotracheal administration of some resuscitation drugs is possible, IV or IO drug administration is preferred because it will provide more predictable drug delivery and pharmacologic effect.

Timing of Drug Administration During Pulseless Arrest

2005 (New): When drug administration is indicated, the drugs should be administered during CPR, as soon as possible after the rhythm is checked. A drug may be administered during the CPR that is performed while the defibrillator is charging, or during the CPR performed immediately after the shock is delivered. Drug delivery should not interrupt CPR. Rescuers should prepare the next drug dose before it is time...
after the rhythm check. The guidelines are to administer the drugs as soon as possible administration. The consensus recommendation shock required a change in the timing of drug recommendation to provide immediate CPR during attempted resuscitation. The

Why: These revisions were proposed to minimize interruptions in chest compressions during attempted resuscitation. The recommendation to provide immediate CPR for 5 cycles or 2 minutes after an attempted shock required a change in the timing of drug administration. The consensus recommendation is to administer the drugs as soon as possible after the rhythm check. The guidelines note that the timing of drug delivery is less important than the need to minimize interruptions in chest compressions.

Routine Use of High-Dose Epinephrine Not Recommended

2005 (New): Use a standard dose (0.01 mg/kg IV/IO) of epinephrine for the first and for subsequent doses (Class IIa). There is no survival benefit from routine use of high-dose (0.1 mg/kg IV/IO) epinephrine, and it may be harmful particularly in asphyxia (Class III). High-dose epinephrine may be considered in exceptional circumstances such as β-blocker overdose (Class IIb). If epinephrine is administered by endotracheal route, use a dose of 0.1 mg/kg.

2000 (Old): The initial dose of epinephrine for cardiac arrest is 0.01 mg/kg given by the IV or IO route or 0.1 mg/kg by the endotracheal route. Higher doses (0.1 to 0.2 mg/kg) by any intravascular route may be considered (Class IIb).

Why: A prospective randomized controlled trial documented that routine use of high-dose epinephrine failed to improve outcome from cardiac arrest in children and actually was associated with worse outcome. In some special situations, such as drug overdose, high-dose epinephrine may be considered.

Rhythm Disturbances and Defibrillation

2005 (New): The only change in treating arrhythmias is to deemphasize the value of lidocaine compared with amiodarone in treating VT and preventing VF. Both are still listed in the algorithm. The text says “give amiodarone (Class IIb) or lidocaine if you do not have amiodarone.”

The changes in the timing of drug administration in treating pulseless arrest, the use of 1 shock followed immediately by CPR (beginning with compressions), and the need to lessen interruptions in chest compressions are the same as those presented for ACLS.

The algorithm for treatment of tachycardia with adequate perfusion is not included in the 2005 guidelines because tachycardia with adequate perfusion does not require resuscitation. The algorithm is included in the ECC Handbook and training materials.

The superiority and greater safety of biphasic over monophasic shocks for defibrillation are emphasized. With manual biphasic or monophasic defibrillation, the initial dose remains 2 J/kg. Subsequent shock doses are 4 J/kg (this represents a slight modification of the second shock dose).

2000 (Old): Amiodarone may be used for VF/pulseless VT (Class Indeterminate). The defibrillation doses were 2 J/kg, then 2 to 4 J/kg, then 4 J/kg.

Why: Accumulating evidence (although largely in children with perfusing rhythms) shows that lidocaine is less effective than amiodarone. The defibrillation dose remains largely unchanged because there is no human data on effective biphasic defibrillation doses in children.

Postresuscitation Care

2005 (New): The 2005 guidelines emphasize the importance of avoiding hyperthermia and the possible benefits of induced hypothermia (32˚C to 34˚C) for 12 to 24 hours for patients who remain comatose after resuscitation from cardiac arrest (Class IIb). Providers should monitor temperature and treat fever aggressively (Class IIb).

The 2005 guidelines also indicate the probable beneficial effects of vasoactive medications, including inotropes, to treat postresuscitation myocardial depression. The adverse effects on the cerebral circulation of hyperventilation are noted. Intact survival has been reported following prolonged resuscitation and absence of spontaneous circulation despite 2 doses of epinephrine.

2000 (Old): Data was insufficient to recommend routine application of hypothermia, although the guidelines acknowledged that postarrest or posts ischemic hypothermia could have beneficial effects on neurologic function. Active cooling to treat hyperthermia was recommended (Class IIa). If a child fails to respond to at least 2 doses of epinephrine with ROSC, the child is unlikely to survive.

Why: Two positive randomized controlled trials in adults and trials of head and body cooling in neonates suggest the beneficial effects of cooling following an ischemic injury. More data is needed in children. Myocardial dysfunction will be present following resuscitation, and providers must be prepared to treat it. More data is available on the detrimental effects of hyperventilation, so it is no longer recommended for routine care. The intact survival of some children following prolonged resuscitation indicates our need to identify better prognostic indicators than the length of the resuscitative effort.

Neonatal Resuscitation

Care of the newborn, particularly in the first hours after birth, requires rapid and careful assessment and then focus on initial stabilization, ventilation, and (if needed) chest compressions and administration of epinephrine or volume expansion. The major priority for newborn resuscitation is establishment of effective ventilation and oxygenation. For the 2005 guidelines, additional evidence was available about the use of oxygen versus room air for resuscitation, the need for clearing the airway of meconium, methods of assisting ventilation, techniques for confirming endotracheal tube placement, and use of the LMA.

Use of Oxygen During Resuscitation

2005 (New): Supplementary oxygen is recommended whenever positive-pressure ventilation is indicated for resuscitation; free-flow oxygen should be administered to babies who are breathing but have central cyanosis (Class Indeterminate). Although the standard approach to resuscitation is to use 100% oxygen, it is reasonable to begin resuscitation with an oxygen concentration for the next rhythm check so that the drug can be administered as soon as possible after the rhythm check (Figures 2 and 3).
of less than 100% or to start with no supplementary oxygen (ie, start with room air). If the clinician begins resuscitation with room air, it is recommended that supplementary oxygen be available to use if there is no appreciable improvement within 90 seconds after birth. In situations where supplementary oxygen is not readily available, positive-pressure ventilation should be administered with room air (Class Indeterminate).

2000 (Old): If cyanosis, bradycardia, or other signs of distress were noted in a breathing newborn during stabilization, administration of 100% oxygen was indicated while determining the need for additional intervention.

Why: Scientists are concerned about the potential adverse effects of 100% oxygen on respiratory physiology and cerebral circulation and the potential tissue damage from oxygen free radicals. Conversely they are also concerned about tissue damage from oxygen deprivation during and after asphyxia. Clinical studies about use of room air or oxygen have yielded contradictory results, and some studies had methodologic limitations.

Clearing the Airway of Meconium

2005 (New): Current recommendations no longer advise routine intrapartum oropharyngeal and nasopharyngeal suctioning for infants born to mothers with meconium staining of amniotic fluid (Class I). Randomized controlled trials have shown that this practice offers no benefit if the infant is vigorous (Class I). Endotracheal suctioning for infants who are not vigorous should be performed immediately after birth (Class Indeterminate).

2000 (Old): If the amniotic fluid contains meconium and the infant has absent or depressed respirations, decreased muscle tone, or heart rate <100 bpm, perform direct laryngoscopy immediately after birth for suctioning of residual meconium from the hypopharynx and intubation/suction of the trachea. Evidence shows that tracheal suctioning of the vigorous infant with meconium-stained fluid does not improve outcome and may cause complications (Class I).

Why: A 2004 multicenter randomized trial gave further weight to the recommendations.

Devices for Assisting Ventilation

2005 (New): A self-inflating bag, a flow-inflating bag, or a T-piece (a valved mechanical device designed to regulate pressure and limit flow) can be used to ventilate a newborn (Class IIb).

Case reports suggest that the LMA can be a reasonable alternative to intubation in special cases, particularly when providers are experienced with the use of the device in preterm infants. Insufficient evidence exists to support the routine use of the LMA as the primary airway device during neonatal resuscitation, in the setting of meconium-stained amniotic fluid, when chest compressions are required, in very-low-birth-weight babies, or for delivery of emergency intratracheal medications (Class Indeterminate).

2000 (Old): T-pieces were not discussed in the 2000 guidelines. Evidence was insufficient to recommend for or against the LMA (Class Indeterminate).

Why: T-piece resuscitators are now recognized as acceptable devices for administering positive pressure during resuscitation of the newborn, but personnel should also be familiar with bag-mask equipment and technique.

Indication of Adequate Ventilation and Confirmation of Endotracheal Tube Placement

2005 (New): An increase in heart rate is the primary sign of improved ventilation during resuscitation. Exhaled CO₂ detection is the recommended primary technique to confirm correct endotracheal tube placement when a prompt increase in heart rate does not occur after intubation (Class IIa). Evidence is insufficient to recommend for or against the use of esophageal detector devices.

2000 (Old): The use of exhaled CO₂ detection was thought to be useful in the secondary confirmation of tracheal intubation in the newly born, particularly when clinical assessment was equivocal (Class Indeterminate).

Why: More evidence is available about the reliability of exhaled CO₂ detection to confirm correct placement of endotracheal tubes. The PALS section notes that there is insufficient evidence about the use of esophageal detector devices in patients aged <1 year (weight <20 kg) to recommend their use.

Drug Therapy

2005 (New): The recommended IV epinephrine dose is 0.01 to 0.03 mg/kg per dose. Higher IV doses are not recommended (Class III), and IV administration is the preferred route (Class IIa). While access is being obtained, administration of a higher dose (up to 0.1 mg/kg) through the endotracheal tube may be considered (Class Indeterminate).

Naloxone administration is not recommended during the primary steps of resuscitation, and endotracheal naloxone is not recommended (Class Indeterminate). Naloxone should be avoided in babies whose mothers are suspected of having had long-term exposure to opioids (Class Indeterminate).

2000 (Old): The same IV dose of epinephrine was recommended in 2000. Evidence was inadequate to support the routine use of higher doses of epinephrine (Class Indeterminate). Naloxone administration was recommended intravenously, endotracheally, or—if perfusion was adequate—intramuscularly or subcutaneously. In 2000 the tracheal route was the most rapidly accessible.

Why: The prospective randomized trial in pediatrics and the absence of data on effectiveness of high-dose IV epinephrine led to the recommendation that it should not be used in neonates. Because naloxone can be given by many routes and its absorption by the endotracheal route may be unpredictable, this drug should be given by other than endotracheal route.

Temperature Control

2005 (New): Although there is new data (including a second study published in October 2005), the data is insufficient to recommend routine use of modest systemic or selective cerebral hypothermia after resuscitation of infants with suspected asphyxia (Class Indeterminate). Further clinical trials are needed to determine which infants benefit most and which method of cooling is most effective. Avoidance of hyperthermia (elevated body temperature) is particularly important in babies who may have had a hypoxic-ischemic event.
Polyethylene bags may help maintain body temperature during resuscitation of very-low-birth-weight babies.

**2000 (Old):** In 2000 induced hypothermia was acknowledged as a promising area of research, but evidence was insufficient to recommend routine implementation (Class Indeterminate). The polyethylene bags were not mentioned for temperature control.

**Why:** In a multicenter trial involving newborns with suspected asphyxia (indicated by need for resuscitation at birth, metabolic acidosis, and early encephalopathy), selective head cooling (34°C to 35°C) was associated with a nonsignificant reduction in the overall number of survivors with severe disability at 18 months. The trial showed a significant benefit in the subgroup with moderate encephalopathy. Infants with severe electrographic suppression and seizures did not benefit from treatment with modest hypothermia. A second small controlled pilot study in asphyxiated infants with early induced systemic hypothermia found fewer deaths and disability at 12 months. In October 2005 a third positive study of hypothermia in asphyxiated infants with hypothermia was published. Further data is needed about the technique of induction of hypothermia and support required during the hypothermia.

Polyethylene bags have been effective in helping the newborn maintain body temperature.

**Withholding or Withdrawing Therapy**

**2005 (New):** It is possible to identify conditions associated with high mortality and poor outcome in which withholding resuscitative efforts may be considered reasonable, particularly when there has been the opportunity for parental agreement. The following guidelines must be interpreted according to current regional outcomes:

- When gestation, birth weight, or congenital anomalies are associated with almost certain early death and when unacceptably high morbidity is likely among the rare survivors, resuscitation is not indicated (Class IIa). Examples are provided in the guidelines.

- In conditions associated with a high rate of survival and acceptable morbidity, resuscitation is nearly always indicated (Class IIa).

- In conditions associated with uncertain prognosis in which survival is borderline, the morbidity rate is relatively high, and the anticipated burden to the child is high, parental desires concerning initiation of resuscitation should be supported (Class Indeterminate).

Infants without signs of life (no heartbeat and no respiratory effort) after 10 minutes of resuscitation show either a high mortality rate or severe neurodevelopmental disability. After 10 minutes of continuous and adequate resuscitative efforts, discontinuation of resuscitation may be justified if there are no signs of life (Class IIIb).

**2000 (Old):** Noninitiation or discontinuation of resuscitation in the delivery room may be appropriate in some circumstances. National and local protocols should dictate the procedures to be followed. Examples were provided in the guidelines of such potential circumstances.

**TABLE 3. Applying Classification of Recommendations and Level of Evidence**

<table>
<thead>
<tr>
<th>Class I</th>
<th>Class IIa</th>
<th>Class IIb</th>
<th>Class III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benefit &gt; Risk</td>
<td>Benefit &gt; Risk</td>
<td>Benefit &gt; Risk</td>
<td>Risk &gt; Benefit</td>
</tr>
<tr>
<td>Procedure/treatment or diagnostic test/assessment should be performed/administered.</td>
<td>It is reasonable to perform procedure/administer treatment or perform diagnostic test/assessment.</td>
<td>Procedure/treatment or diagnostic test/assessment may be considered.</td>
<td>Procedure/treatment or diagnostic test/assessment should not be performed/administered. It is not helpful and may be harmful</td>
</tr>
</tbody>
</table>

**Class Indeterminate**
- Research just getting started
- Continuing area of research
- No recommendations until further research (ie, cannot recommend for or against)

**Why:** More evidence has accumulated to identify conditions associated with high mortality and poor outcome. Under those conditions withholding resuscitative efforts may be considered reasonable, particularly when there has been the opportunity for parental agreement.

**SUMMARY**

This issue of *Currents* highlights many of the major changes in the 2005 AHA Guidelines for CPR and ECC. This document provides only a quick review and does not include the scientific background or details contained in the guidelines publication. Resuscitation clinicians and researchers should also read the complete guidelines document, published in the Dec 13, 2005, issue of the AHA journal *Circulation*. Also recommended is the 2005 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care With Treatment Recommendations (summary of the international review of the science), published in the Nov 29, 2005, issue of *Circulation*. Both publications are available free of charge at [http://www.circulationaha.org](http://www.circulationaha.org).
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National Center
7272 Greenville Ave.
Dallas, TX 75231-4596
http://www.americanheart.org/cpr
Cardiopulmonary Resuscitation

When you perform cardiopulmonary resuscitation (CPR), you are using mouth-to-mouth resuscitation to help the person breath and chest compressions to help the person's heart pump blood. The brief review of CPR on the following pages can help you in an emergency; however, this information should not take the place of a certified course in CPR.

**Immediate care** Assess the situation. Call out for someone to get help, or call 911 yourself if the person does not seem to need immediate assistance. You can determine this by gently shaking the person and asking in a loud voice "Are you OK?" If there is no response, begin CPR and continue until help arrives.
CPR on an Infant

Basic CPR on an infant is five chest compressions and one breath.

1. To find a pulse, locate the brachial artery in the upper arm. It is located on the underside of the arm between muscle and bone. Use two fingers to feel for the pulse.

2. If the baby is not breathing, tilt the head back slightly to open the airway.
The SCIO Universal Electrophysiological Biofeedback System can safely measure over the skin (transcutaneous) skin electro-potential down to the micro-volt range. Virtual and mathematical calculations of the attained data can provide CNS (Central Nervous System) biofeedback data, so as to include (simple EEG [electroencephalography], 3-pole ECG [simple stress electrocardiography], global transcutaneous EMG [electromyography]).

The system can measure the transcutaneous skin resistance by application of a medical safe micro-current voltammetric pulse, so as to measure GSR [galvanic skin response] and TVEP [transcutaneous voltammetric evoked potential].

The system is designed for the detection of stress and reduction of stress through CNS biofeedback data or stress lifestyle questionnaires. The stress and lifestyle questionnaires provide educational feedback through library referenced functions. And the device can be used for the treatment of muscular re-education from injury, muscle weakness, sport muscular enhancement or various dystonia. The applied voltammetric pulse can be used to detect and affect in established modalities such as pain (TENS [transcutaneous electro nerve stimulation]), trauma/wound healing, charge stability imbalance, redox potential and electrophysiological reactivity.

The device after 20 years of use is quality tested, clinically evaluated and scientifically validated as safe and effective.

If you need more information on the SCIO and purchase details please get in touch with us

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Put a washcloth or thin pad of clothing under the baby's shoulders. This keeps the head from assuming its naturally forward position. Form a seal with your mouth over the baby's mouth and nose. Blow one breath (a smaller breath than you would give to an adult), so that the baby's chest rises.

3 If the baby has no pulse, use two fingers to perform chest compressions. Place your fingers one finger width below an imaginary line connecting the infant's nipples. Push down 1 inch with each compression. Count out loud: "1 and 2 and 3 and 4 and 5." You may have to repeat the five compressions and one breath multiple times. You will push adult down on the chest 120 times per minute. Continue, alternating five compressions and one breath, until help arrives.
CPR on a Child Age 8 or Older or on an Adult

1 Lay the person on a hard, flat surface. Look into
the mouth and throat to ensure that the airway is clear. If an object is present, try to sweep it out with your fingers. Use disposable surgical gloves if they are available. If vomiting occurs, turn the person on his or her side and sweep out the mouth with two fingers. Do not place fingers in the mouth if there is rigidity or if the person is having a seizure.

2 Tilt the head back slightly to open the airway. Put upward pressure on the jaw to pull it forward.

3 Look for the person's chest to rise and fall. Listen for the sounds of breathing. Feel for the
4 If the person is at all responsive (if he or she is moaning, breathing, blinking, or moving any part of the body), his or her heart is beating; do not perform steps 6 or 7.

If the person is not breathing, perform mouth-to-mouth resuscitation, even if the heart is beating. If the person is breathing, cover with a blanket or clothing as for
shock. If the person is not responsive, feel for a pulse on the carotid artery. The artery is in the groove of the neck off to the side of the Adam's apple. If you do not feel a pulse, go to step 5 immediately.

5 If the person is not breathing, pinch the nostrils closed with your thumb and index finger. Place your mouth tightly over the person's mouth (use a mouthpiece if one is available). Blow two quick breaths and watch for the person's chest to rise. Release the nostrils.
6 If the heart is not beating, kneel at the person's right side. With the fingers of your right hand, find the bottom of the breastbone (in the center where the ribs meet). Place your index and middle fingers side by side, just above the bottom of the breastbone. Place the heel of your left hand just above your fingers, on the breastbone. Move your right hand and place it on top of the left, and interlock the fingers of the two hands
7 With your elbows straight, push down briskly (about 2 inches) with the heel of your hand 15 times over about 10 seconds. Let the chest rise after each compression. CPR for an adult includes 15 chest compressions and two breaths. You may have to repeat the 15 chest compressions and two breaths multiple times. Push down on the chest 80 to 100 times per minute. Continue until breathing begins or help arrives. Count out loud: 1 and 2 and 3 and 4 and 5," until you reach 15. Release your hands. Repeat step 5 and watch for the person's chest to fall. Feel for air being exhaled. Repeat, starting at step 5.
IT IS A SCIENTIFIC FACT THAT A LOW LEVEL VOLTAMMETRIC PULSE CAN INHIBIT PAIN SIGNALS.

THE SCIO WILL LET THE PATIENT’S BODY ELECTRIC AUTOFOCUS A HARMONIC PULSE TO MAXIMIZE THIS EFFECT. THIS IS CALLED

MICRO-CURRENT TRANSCUTANEOUS ELECTRO-NERVAL STIMULATION

AND CAN HELP YOU TO REDUCE PAIN WHILE HELPING YOU FIND THE CAUSE...

If you need more information on the SCIO and purchase details please get in touch with us

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Choking

A person who is choking will instinctively grab at the throat. The person also may panic, gasp for the breath, turn blue, or be unconscious. If the person can cough he or she is getting air. Nothing should be done.

**Immediate care** If the person cannot cough or speak, begin the Heimlich maneuver immediately to dislodge the object blocking the windpipe. The Heimlich maneuver creates an artificial cough by forcing the diaphragm up toward the lungs.

*If you are choking and alone* You can perform the Heimlich maneuver on yourself by giving yourself abdominal thrusts. Or position yourself over the back
of a chair or against a railing or counter and press forcefully enough into it so that the thrust dislodges the object.

**Heimlich Maneuver on an adult**

If the person is sitting or standing, stand behind him or her. Form a fist with one hand and place your fist, thumb side in, just below the person's rib cage in the front. Grab your fist with your other hand.

![Heimlich Maneuver on an adult](image)

Keeping your arms off the person's rib cage, give four quick inward and upward thrusts. You may have to repeat this several times until the obstructing object is coughed out.

If the person is lying down or unconscious, straddle him or her and place the heel of your hand just above the waistline. Place your other hand on top of this hand. Keeping your elbows straight, give four quick upward thrusts. You may have to repeat this procedure several times until the obstructing object is coughed out.
Helmlich Maneuver on a Child

Stand behind the child. With your arms around his or her waist, form a fist with one hand and place it, thumb side in, between the ribs and waistline. Grab your fist with your other hand. Keeping your arms off the child's rib cage, give four quick inward and upward thrusts. You may have to repeat this several times until the obstructing object is coughed out.
Heimlich Maneuver on an Infant

1. Place the infant facedown across your forearm (resting your forearm one on your leg) and support...
the infant's head with your hand. Give four forceful blows to the back with the heel of your hand. You may have to repeat this several times until the obstructing object is coughed out.

2 If this does not work, turn the baby over. With two fingers one finger width below an imaginary line connecting the nipples, give forceful thrusts to the chest to a depth of 1 inch. You may have to repeat this several times until the obstructing object is coughed out.
Is Online CPR Valid or Accepted?

December 20th, 2009

I have been searching all over the internet for information on this and have heard many different opinions on the subject. Many people believe that online CPR should be accepted, while others do not. The question really depends on what people are looking for.

The facts are that it is as valid as you, your employer or regulatory agency want it to be. Fact is that there is no primary US regulatory mechanism for the administration of CPR programs in general. So the same could be said for any CPR program — whether it is done in person or not is immaterial… Many people feel that the American Heart Association (AHA) or American Red Cross (ARC) approve programs and are accrediting bodies for CPR. This is not the case. The AHA is, however, a member of the International Liaison Committee on Resuscitation (ILCOR) which helps to establish regulatory guidelines for CPR, but the committee is also composed of many other agencies such as the European and Australian Resuscitation Councils.

Opinions on the subject vary. I think it depends on what works for you, your business/industry and/or regulatory agency(ies).

Online programs are generally NOT a scam, but I would say that any program which allows you to gain certification in anything without a written test is not as valid as one that does. What you get out of the class is VERY important. Do you think you could perform CPR after completing the program? What do others that have taken the course have to say about the program offering training? I would use these measures as well as reputation, credentials of those offering the program, and customer service to determine if a program will work. This is the same for both online and in-person CPR certification.
The SCIO device can use the Trivector and Cybernetic Loop to rectify aberrant and disharmonious energy patterns in the body. This has profound effects on all body functions but affects the corpus callosum most intensely.

This means that the ability of the conscious verbal mind to relate to the subconscious is increased with the rectification process. The patient will probably not feel the effect. There will always be a positive effect. If there is a negative effect, it is because there is shielded or covert feelings or memories in the subconscious. These will cause disease if left untreated. A simple release may solve the problem.

The changes include:

1. Activate the innate intelligence to balance the body energies. This is the basic principle of chiropractic, acupuncture, and osteopathy medicine.
2. There is an easier exchange of energy and information from right brain to left brain via the corpus callosum. The corpus callosum is the largest energy form in the body and the rectification process has profound effects on stabilizing it, so it dramatically reduces switching phenomena.
3. The SCIO thereby increases the ability of the conscious to interface with the unconscious. This allows greater knowledge of self and of the higher self.
4. There is a greater memory access, a more true access of memory without emotional clouding.
5. There is a greater flexibility of connective tissue, allowing for more resilience.
6. There is a greater oxygenation and hydration ability of the body.
7. There is a smoother muscle control.
8. There is a general increase in well being that the conscious mind is so often unable to perceive. And thus there are thousands of subtle improvements to be found.
ARTIFICIAL RESPIRATION

CLEARING THE AIRWAY

Step 1 is to lay the victim on their back on a flat firm surface, provided they have not suffered injuries to the neck, back or head area.

Step 2 is to place your hand on the forehead and using two fingers of your free hand gently tilt the head back by lifting the chin thus opening the airway.

Quick CPR Reference Card

Step 1
Call 911

Step 2
Tilt head, Lift chin, Check breathing

Step 3
Give 2 Breaths

Step 4
Position hands in the center of the chest

Step 5
Firmly push down 2 inches on the chest 15 times

Continue with 2 breaths and 15 pushes until help arrives

KEEPSAFTER®
Your Safety Is Our Business
CALL
CALL 911

BLOW
TILT HEAD, LIFT CHIN, CHECK BREATHING
GIVE TWO BREATHS

PUMP
POSITION HANDS IN THE CENTER OF THE CHEST
FIRMLY PUSH DOWN TWO INCHES ON THE CHEST 30 TIMES

CONTINUE WITH TWO BREATHS AND 30 PUMPS UNTIL HELP ARRIVES
Simplifying to hands-only CPR

Experts now believe an adult who suddenly collapses due to cardiac arrest has enough air in his lungs and blood during CPR and doesn't need mouth-to-mouth breathing.

If you see someone collapse ...

- Call 9-1-1.
- Position unresponsive adult.
- Press about 2 inches below chest center.
- Lift hands slightly after each to allow chest to recoil.
- Take turns with a bystander until emergency medical services arrive.

Use an automated external defibrillator if available. Keep CPR interruptions to a minimum.

SOURCES: University of Arizona Sarver Heart Center; American Heart Association
1. Tilt the head back and lift the chin until the teeth almost touch. Look and listen for breathing.

2. If the person is not breathing, pinch the nose closed and cover the person’s mouth with yours. Give 2 full breaths.

3. Put your hands in the center of the person’s chest between the nipples. Place one hand on top of the other. Push down 30 times. Continue with 2 breaths then 30 pushes until medical help arrives or the person starts moving.

Tilt the infant’s head back, cover nose and mouth with your mouth and exhale into the infant’s mouth.
**CPR for infants and children**

**DETERMINE CONSCIOUSNESS**
If infant/child is unconscious, lie him or her on back on a flat surface.

**OPEN AIRWAY, CHECK FOR BREATHING**
Place your hand on the infant's/child's forehead and put your fingers under the chin. Gently tilt the head slightly backward. Place your ear near the mouth and listen for breathing. Look for chest movement. If neither is present, make sure nothing is in the victim's mouth and begin breathing for the victim.

**Have someone call 911. If you're alone, use rescue breathing for one minute before calling 911.**

**RESCUE BREATHING**
Cover infant's nose and mouth with your own (for a child, pinch the nose shut) and give one slow breath until the chest gently rises.

- **If there are signs of life, but no breathing:** Give one breath every 3 seconds.
- **If there is no breathing and there are no signs of life:** Give 30 compressions and two breaths continuously.

**CHECK FOR SIGNS OF LIFE**
Check for any indication of breathing, coughing, movement, eye movement or eyes opening.

**CHEST COMPRESSION**
Infant less than 1 year old

- If there are no signs of life, place two fingers below an imaginary line between nipples, not below the sternum. Press gently 30 times.

Child 1 to 8 years old

- If there are no signs of life, place the heel of one or two hands about center of the breast bone and press. Press gently 30 times.

**CONTINUE CYCLES**
Continue cycles until:
- Another trained person takes over CPR for you
- Emergency medical services (EMS) personnel arrive and take over care of the person
- An automated external defibrillator (AED) becomes readily available
- You are exhausted and unable to continue
- The scene becomes unsafe
- Signs of life return

Sources: American Red Cross, American Heart Association, Phoenix Fire Department, Columbia University Health Sciences.
Signs of a Heart Attack

- **Brain**: anxiety, dizziness, trouble sleeping
- **Chest**: chest pain, chest pressure, fullness or squeezing (lasts more than a few minutes or comes and goes)
- **Skin**: cold sweat
- **Lungs**: trouble breathing
- **Stomach**: upset stomach, urge to throw up
- **Body**: feel tired and weak

Dash line indicates that organ is behind other main organs.
Cut this out, pin it to your wall, Xerox it for a friend or place a copy in your purse or wallet as a reminder of the basic steps of CPR!

CALL

CALL 911

BLOW

TILT HEAD, LIFT CHIN, CHECK BREATHING

GIVE TWO BREATHS

PUMP

POSITION HANDS IN THE CENTER OF THE CHEST

FIRMLY PUSH DOWN TWO INCHES ON THE CHEST 30 TIMES

CONTINUE WITH TWO BREATHS AND 30 PUMPS UNTIL HELP ARRIVES
pictures on China, AC Milan, San Antonio spurs, Dennis Johnson

The first sport study with the Quantum Xrroid technology was on members of the Cleveland Browns football team in 1988. The results were amazing and all of the participants went all Pro over the next five years. Having worked with the power lifting team of Hungary in 1991 they went from moderate to gold medal performance.

AC Milan bought some systems and their injury level dropped 91%. This was because the system can stimulate and accelerate healing of injured tissue. They asked for us to develop the device to sharpen the athletic skills of the clients. With this in mind we developed a way to sharpen coordination endurance and strength. AC Milan won the European championship the next two years. We worked with Dennis Johnson ex twice NBA MVP in the San Antonio Spurs system. The results were amazing.

The Chinese Olympic team had us do a study. Out of their 467 athletes in the 2008 Olympic Games, they assigned 150 of the sick, old, weak, and tired to us. The study was to see if we could repair injured tissue and get an athlete back onto the field. The results were astounding. Out of the hundred medals won by the Chinese our 30% of the injured performers won 33 % of the medals. Our athletes were not supposed to win. And because of this Desire’ was awarded an honorary Gold medal.

Sports medicine has entered the energetic arena. There are those who want to win and they differ from those who want to conform.

Some of the best cyclists in the world have used the SCIO to win championships
Anaphylaxis: First aid

A severe allergic reaction (anaphylaxis) can produce shock and life-threatening respiratory distress and circulatory collapse.

In sensitive people, anaphylaxis can occur within minutes, but may also occur up to several hours after exposure to a specific allergy-causing substance. A wide range of substances — including insect venom, pollen, latex, and certain foods and drugs — can cause anaphylaxis. Some people have anaphylactic reactions from unknown causes.

If you're extremely sensitive, you might break out in hives and your eyes or lips might swell severely. The inside of your throat might swell as well, even to the point of causing difficulty breathing and shock. Your blood pressure drops, and your internal organs can be affected. Dizziness, mental confusion, abdominal cramping, nausea, vomiting or diarrhea also may accompany anaphylaxis.

How you can be ready:
If you've had an anaphylactic reaction in the past, carry medications with you as an antidote. Epinephrine is the most commonly used drug for severe allergic reactions. It comes only as an injection that must be prescribed by your doctor. You can self-administer epinephrine with an auto-injector, such as the EpiPen. Be sure to read the injection instructions as soon as you receive an auto-injector, and have your household members read them as well.

You should also carry an antihistamine pill, such as diphenhydramine (Benadryl, others), because the effects of epinephrine are only temporary. Seek emergency medical attention immediately after taking these medications.

If you observe someone having an allergic reaction with signs of anaphylaxis:

Call 911 or your local medical emergency number.

Check for special medications that the person might be carrying to treat an allergic attack, such as an auto-injector of epinephrine (for example, EpiPen). Administer the drug as directed — usually by pressing the auto-injector against the person's thigh and holding it in place for several seconds. Massage the injection site for 10 seconds to enhance absorption. After administering epinephrine, have the person take an antihistamine pill if he or she is able to do so without choking. Look for a medical emergency ID bracelet or necklace.

Have the person lie still on his or her back with feet higher than the head.

Loosen tight clothing and cover the person with a blanket. Don't give anything else to drink.

If there's vomiting or bleeding from the mouth, turn the person on his or her side to prevent choking.
Animal bites: First aid

If an animal bites you or your child, follow these guidelines:

- **For minor wounds.** If the bite barely breaks the skin and there is no danger of rabies, treat it as a minor wound. Wash the wound thoroughly with soap and water. Apply an antibiotic cream to prevent infection and cover the bite with a clean bandage.

- **For deep wounds.** If the animal bite creates a deep puncture of the skin or the skin is badly torn and bleeding, apply pressure with a clean, dry cloth to stop the bleeding and see your doctor.

- **For infection.** If you notice signs of infection, such as swelling, redness, increased pain or oozing, see your doctor immediately.

- **For suspected rabies.** If you suspect the bite was caused by an animal that might carry rabies — including any wild or domestic animal of unknown immunization status — see your doctor immediately.

Doctors recommend getting a tetanus shot every 10 years. If your last one was more than five years ago and your wound is deep or dirty, your doctor may recommend a booster. You should have the booster within 48 hours of the injury.

Domestic pets cause most animal bites. Dogs are more likely to bite than cats are. Cat bites, however, are more likely to cause infection. Bites from nonimmunized domestic animals and wild animals carry the risk of rabies. Rabies is more common in raccoons, skunks, bats and foxes than in cats and dogs. Rabbits, squirrels and other rodents rarely carry rabies.

Black eye: First aid

The so-called black eye is caused by bleeding beneath the skin around the eye. Sometimes a black eye indicates a more extensive injury, even a skull fracture, particularly if the area around both eyes is bruised (raccoon eyes) or if there has been a head injury.

Although most black eye injuries aren't serious, bleeding within the eye, called a hyphema, is serious and can reduce vision and damage the cornea — the clear, protective "window" at the front of the eye. In some cases, abnormally high pressure inside the eyeball (glaucoma) also can result.

To take care of a black eye:

- Using gentle pressure, apply a cold pack or a cloth filled with ice to the area around the eye. Take care not to press on the eye itself. Apply cold as soon as possible after the injury to reduce swelling, and continue using ice or cold packs for 24 to 48 hours.

- Be sure there's no blood within the white and colored parts of the eye.
Seek medical care immediately if you experience vision problems (double vision, blurring), severe pain, or bleeding in the eye or from the nose.

**Blisters: First aid**

Common causes of blisters include friction and burns. If the blister isn't too painful, do everything possible to keep it intact. Unbroken skin over a blister provides a natural barrier to bacteria and decreases the risk of infection. Cover a small blister with an adhesive bandage, and cover a large one with a porous, plastic-coated gauze pad that absorbs moisture and allows the wound to breathe.

Don't puncture a blister unless it's painful or prevents you from walking or using one of your hands. If you have diabetes or poor circulation, call your doctor before considering the self-care measures below.

To relieve blister-related pain, drain the fluid while leaving the overlying skin intact. Here's how:

- **Wash your hands and the blister** with soap and warm water.
- **Swab the blister** with iodine or rubbing alcohol.
- **Sterilize a clean, sharp needle** by wiping it with rubbing alcohol.
- **Use the needle to puncture the blister.** Aim for several spots near the blister's edge. Let the fluid drain, but leave the overlying skin in place.
- **Apply an antibiotic ointment** to the blister and cover with a bandage or gauze pad.
- **Cut away all the dead skin** after several days, using tweezers and scissors sterilized with rubbing alcohol. Apply more ointment and a bandage.

Call your doctor if you see signs of infection around a blister — pus, redness, increasing pain or warm skin.

To prevent a blister, use gloves, socks, a bandage or similar protective covering over the area being rubbed. Special athletic socks are available that have extra padding in critical areas. You might also try attaching moleskin to the inside of your shoe where it might rub, such as at the heel.

**Shoe-shopping tips**

Remember the following when you shop for shoes:

- **Shop during the middle of the day.** Your feet swell throughout the day, so a midday fitting will probably give you the best fit.
- **Wear the same socks you'll wear when walking,** or bring them with you to the store.
- **Measure your feet.** Shoe sizes change throughout adulthood.
- **Measure both feet and try on both shoes.** If your feet differ in size, buy the larger size.
• Go for flexible, but supportive, shoes with cushioned insoles.
• Leave toe room. Be sure that you can comfortably wiggle your toes.
• Avoid shoes with seams in the toe box, which may irritate bunions or hammertoes.

**Bruise: First aid**

A bruise forms when a blow breaks small blood vessels near your skin's surface, allowing a small amount of blood to leak out into the tissues under your skin. The trapped blood appears as a black-and-blue mark. Sometimes, there also are tiny red dots or red splotches.

If your skin isn't broken, you don't need a bandage. You can, however, enhance bruise healing with these simple techniques:

• Elevate the injured area.
• Apply ice or a cold pack several times a day for a day or two after the injury.
• Rest the bruised area, if possible.
• Consider acetaminophen (Tylenol, others) for pain relief.

**See your doctor if:**

• You have unusually large or painful bruises — particularly if your bruises seem to develop for no known reasons.
• You bruise easily and you're experiencing abnormal bleeding elsewhere, such as from your nose or gums, or you notice blood in your eyes, your stool or your urine.
• You have no history of bruising, but suddenly experience bruises.

These signs and symptoms may indicate a more serious problem, such as a blood-clotting problem or blood-related disease. Bruises accompanied by persistent pain or headache also may indicate a more serious underlying illness and require medical attention.

**Burns: First aid**

To distinguish a minor burn from a serious burn, the first step is to determine the degree and the extent of damage to body tissues. The three classifications of first-degree burn, second-degree burn and third-degree burn will help you determine emergency care:

**First-degree burn**
The least serious burns are those in which only the outer layer of skin is burned. The skin is usually red, with swelling and pain sometimes present. The outer layer of skin hasn't been burned through. Treat a first-degree burn as a minor burn unless it involves substantial portions of the hands, feet, face, groin or buttocks, or a major joint.
Second-degree burn
When the first layer of skin has been burned through and the second layer of skin (dermis) also is burned, the injury is called a second-degree burn. Blisters develop and the skin takes on an intensely reddened, splotchy appearance. Second-degree burns produce severe pain and swelling.

If the second-degree burn is no larger than 3 inches (7.5 centimeters) in diameter, treat it as a minor burn. If the burned area is larger or if the burn is on the hands, feet, face, groin or buttocks, or over a major joint, treat it as a major burn and get medical help immediately.

For minor burns, including first-degree burns and second-degree burns limited to an area no larger than 3 inches (7.5 centimeters) in diameter, take the following action:

- **Cool the burn.** Hold the burned area under cold running water for at least five minutes, or until the pain subsides. If this is impractical, immerse the burn in cold water or cool it with cold compresses. Cooling the burn reduces swelling by conducting heat away from the skin. Don't put ice on the burn.

- **Cover the burn with a sterile gauze bandage.** Don't use fluffy cotton, which may irritate the skin. Wrap the gauze loosely to avoid putting pressure on burned skin. Bandaging keeps air off the burned skin, reduces pain and protects blistered skin.

- **Take an over-the-counter pain reliever.** These include aspirin, ibuprofen (Advil, Motrin, others), naproxen (Aleve) or acetaminophen (Tylenol, others). Never give aspirin to children or teenagers.

Minor burns usually heal without further treatment. They may heal with pigment changes, meaning the healed area may be a different color from the surrounding skin. Watch for signs of infection, such as increased pain, redness, fever, swelling or oozing. If infection develops, seek medical help. Avoid re-injuring or tanning if the burns are less than a year old — doing so may cause more extensive pigmentation changes. Use sunscreen on the area for at least a year.

**Caution**

- **Don't use ice.** Putting ice directly on a burn can cause frostbite, further damaging your skin.

- **Don't apply butter or ointments to the burn.** This could prevent proper healing.

- **Don't break blisters.** Broken blisters are vulnerable to infection.

Third-degree burn
The most serious burns are painless, involve all layers of the skin and cause permanent tissue damage. Fat, muscle and even bone may be affected. Areas may be charred black or appear dry and white. Difficulty inhaling and exhaling, carbon monoxide poisoning, or other toxic effects may occur if smoke inhalation accompanies the burn.

For major burns, dial 911 or call for emergency medical assistance. Until an emergency unit arrives, follow these steps:

- **Don't remove burnt clothing.** However, do make sure the victim is no longer in contact
with smoldering materials or exposed to smoke or heat.

**Don't immerse large severe burns in cold water.** Doing so could cause shock.

**Check for signs of circulation (breathing, coughing or movement).** If there is no breathing or other sign of circulation, begin cardiopulmonary resuscitation (CPR).

**Elevate the burned body part or parts.** Raise above heart level, when possible.

**Cover the area of the burn.** Use a cool, moist, sterile bandage; clean, moist cloth; or moist towels.

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**Cardiopulmonary resuscitation (CPR): First aid**

Cardiopulmonary resuscitation (CPR) is a lifesaving technique useful in many emergencies, including heart attack or near drowning, in which someone's breathing or heartbeat has stopped. CPR involves a combination of chest compression and mouth-to-mouth rescue breathing that keeps oxygenated blood flowing to the brain and other vital organs until more definitive medical treatment can restore a normal heart rhythm.

When the heart stops, the absence of oxygenated blood can cause irreparable brain damage in only a few minutes. Death will occur within eight to 10 minutes. Time is critical when you're helping an unconscious person who isn't breathing.

To learn CPR properly, take an accredited first-aid training course, including CPR and how to use an automatic external defibrillator (AED).

**Before you begin**

Assess the situation before starting CPR:

- Is the person conscious or unconscious?
- If the person appears unconscious, tap or shake his or her shoulder and ask loudly, "Are you OK?"
- If the person doesn't respond and two people are available, one should call 911 or the local emergency number and one should begin CPR. If you are alone and have immediate access to a telephone, call 911 before beginning CPR — unless you think the person has become unresponsive because of suffocation (such as from drowning). In this special case, begin CPR for one minute and then call 911.
- If an AED is immediately available, deliver one shock if advised by the device, then begin CPR.

**Remember the ABCs**

Think ABC — Airway, Breathing and Circulation — to remember the steps explained below. Move quickly through Airway and Breathing to begin chest compressions.
AIRWAY: Clear the airway

Put the person on his or her back on a firm surface.

Kneel next to the person's neck and shoulders.

Open the person's airway using the head-tilt, chin-lift maneuver. Put your palm on the person's forehead and gently tilt the head back. Then with the other hand, gently lift the chin forward to open the airway.

Check for normal breathing, taking no more than five or 10 seconds: Look for chest motion, listen for breath sounds, and feel for the person's breath on your cheek and ear. Gasping is not considered to be normal breathing. If the person isn't breathing normally and you are trained in CPR, begin mouth-to-mouth breathing. If you believe the person is unconscious from a heart attack and you haven't been trained in emergency procedures, skip mouth-to-mouth rescue breathing and proceed directly to chest compression.

BREATHING: Breathe for the person

Rescue breathing can be mouth-to-mouth breathing or mouth-to-nose breathing if the mouth is seriously injured or can't be opened.

With the airway open (using the head-tilt, chin-lift maneuver) pinch the nostrils shut for mouth-to-mouth breathing and cover the person's mouth with yours, making a seal.

Prepare to give two rescue breaths. Give the first rescue breath — lasting one second — and watch to see if the chest rises. If it does rise, give the second breath. If the chest doesn't rise, repeat the head-tilt, chin-lift maneuver and then give the second breath.

Begin chest compressions to restore circulation.

CIRCULATION: Restore blood circulation with chest compressions

Place the heel of one hand over the center of the person's chest, between the nipples. Place your other hand on top of the first hand. Keep your elbows straight and position your shoulders directly above your hands.

Use your upper body weight (not just your arms) as you push straight down on (compress) the chest 2 inches (approximately 5 centimeters). Push hard and push fast — give two compressions per second, or about 120 compressions per minute.

After 30 compressions, tilt the head back and lift the chin up to open the airway. Prepare to give two rescue breaths. Pinch the nose shut and breathe into the mouth for one second. If the chest rises, give a second rescue breath. If the chest doesn't rise, repeat the head-tilt, chin-lift maneuver and then give the second rescue breath. That's one cycle. If someone else is available, ask that person to give two breaths after you do 30 compressions.

If the person has not begun moving after five cycles (about two minutes) and an automatic external defibrillator (AED) is available, apply it and follow the prompts. The American Heart Association recommends administering one shock, then resuming CPR — starting with chest compressions — for two more minutes before administering a second shock. If
It is scientific fact that when a low level voltage and micro-current pulse is applied to the body osmosis, enzyme activity, and healing are increased. The SCIO will let the patient's body electric autofocus a harmonic pulse to maximize this effect. This current applied to the cranium has been shown to stimulate the learning process and increase memory retention, and learning. There is published research on these therapies. The new world of energetic medicine can help you to learn twice as much in half the time comfortably and easily.

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you're not trained to use an AED, a 911 operator may be able to guide you in its use. Trained staff at many public places are also able to provide and use an AED. Use pediatric pads, if available, for children ages 1 to 8. Do not use an AED for infants younger than age 1. If an AED isn't available, go to No. 5 below.

Continue CPR until there are signs of movement or until emergency medical personnel take over.

**To perform CPR on a child:**

The procedure for giving CPR to a child age 1 through 8 is essentially the same as that for an adult. The differences are as follows:

- If you're alone, perform five cycles of compressions and breaths on the child — this should take about two minutes — before calling 911 or your local emergency number or using an AED.
- Use only one hand to perform heart compressions.
- Breathe more gently.
- Use the same compression-breath rate as is used for adults: 30 compressions followed by two breaths. This is one cycle. Following the two breaths, immediately begin the next cycle of compressions and breaths.
- After five cycles (about two minutes) of CPR, if there is no response and an AED is available, apply it and follow the prompts. Use pediatric pads if available. If pediatric pads aren't available, use adult pads.

Continue until the child moves or help arrives.

**To perform CPR on a baby:**

Most cardiac arrests in infants occur from lack of oxygen, such as from drowning or choking. If you know the infant has an airway obstruction, perform first aid for choking. If you don't know why the infant isn't breathing, perform CPR.

To begin, assess the situation. Stroke the baby and watch for a response, such as movement, but don't shake the child.

If there's no response, follow the ABC procedures below and time the call for help as follows:

- If you're the only rescuer and CPR is needed, do CPR for two minutes — about five cycles — before calling 911 or your local emergency number.
- If another person is available, have that person call for help immediately while you attend to the baby.

**AIRWAY: Clear the airway**

Place the baby on his or her back on a firm, flat surface, such as a table. The floor or ground
also will do.

Gently tip the head back by lifting the chin with one hand and pushing down on the forehead with the other hand.

In no more than 10 seconds, put your ear near the baby's mouth and check for breathing:
Look for chest motion, listen for breath sounds, and feel for breath on your cheek and ear.

If the infant isn't breathing, begin mouth-to-mouth breathing immediately.

**BREATHING: Breathe for the infant**

Cover the baby's mouth and nose with your mouth.

Prepare to give two rescue breaths. Use the strength of your cheeks to deliver gentle puffs of air (instead of deep breaths from your lungs) to slowly breathe into the baby's mouth one time, taking one second for the breath. Watch to see if the baby's chest rises. If it does, give a second rescue breath. If the chest does not rise, repeat the head-tilt, chin-lift maneuver and then give the second breath.

If the chest still doesn't rise, examine the mouth to make sure no foreign material is inside. If the object is seen, sweep it out with your finger. If the airway seems blocked, perform first aid for a choking infant.

Begin chest compressions to restore circulation.

**CIRCULATION: Restore blood circulation**

Imagine a horizontal line drawn between the baby's nipples. Place two fingers of one hand just below this line, in the center of the chest.

Gently compress the chest to about one-third to one-half the depth of the chest.

Count aloud as you pump in a fairly rapid rhythm. You should pump at a rate of about 100 to 120 pumps a minute.

Give two breaths after every 30 chest compressions.

Perform CPR for about two minutes before calling for help unless someone else can make the call while you attend to the baby.

Continue CPR until you see signs of life or until a professional relieves you.

**Chemical burns: First aid**

If a chemical burns the skin, follow these steps:

- **Remove the cause of the burn** by flushing the chemicals off the skin surface with cool, running water for 20 minutes or more. If the burning chemical is a powder-like substance, such as lime, brush it off the skin before flushing.
Remove clothing or jewelry that has been contaminated by the chemical.

Apply a cool, wet cloth or towel to relieve pain.

Wrap the burned area loosely with a dry, sterile dressing or a clean cloth.

Rewash the burned area for several more minutes if the person experiences increased burning after the initial washing.

Minor chemical burns usually heal without further treatment.

Seek emergency medical assistance if:

- The victim has signs of shock, such as fainting, pale complexion or breathing in a notably shallow manner.

- The chemical burn penetrated through the first layer of skin, and the resulting second-degree burn covers an area more than 3 inches (7.5 centimeters) in diameter.

- The chemical burn occurred on the eye, hands, feet, face, groin or buttocks, or over a major joint.

- The victim has pain that cannot be controlled with over-the-counter pain relievers such as acetaminophen (Tylenol, others) or ibuprofen (Advil, Motrin, others).

If you're unsure whether a substance is toxic, call the poison control center at 800-222-1222. If you seek emergency assistance, bring the chemical container or a complete description of the substance with you for identification.

Chemical splash in the eye: First aid

If a chemical splashes into your eye, take these steps immediately:

Flush your eye with water. Use clean, lukewarm tap water for at least 20 minutes, and use whichever of these approaches is quickest:

- Get into the shower and aim a gentle stream of lukewarm water on the forehead over the affected eye. Or, aim the stream on the bridge of the nose if both eyes are affected.

- Or, put your head down and turn it to the side. Then hold your affected eye open under a gently running faucet.

- Young children may do best if they lie down in the bathtub or lean back over a sink while you pour a gentle stream of water on the forehead over the affected eye or on the bridge of the nose for both eyes. Remember to flush for at least 20 minutes no matter which method you choose.

Wash your hands with soap and water. Thoroughly rinse your hands to be sure no chemical or soap is left on them. Your first goal is to get the chemical off the surface of
your eye, but then you need to make sure to remove the chemical from your hands.

**Remove contact lenses.** If they didn't come out during the flush, then take them out.

**Caution:**

- Don't rub the eye — this may cause further damage.
- Don't put anything except water or contact lens saline rinse in the eye, and don't use eyedrops unless emergency personnel tell you to do so.

**Seek emergency medical assistance**

After following the above steps, seek emergency care or, if necessary, call 911 or your local emergency number. Take the chemical container or the name of the chemical with you to the emergency department. If readily available, wear sunglasses because your eyes will be sensitive to light.

**Chest pain: First aid**

Causes of chest pain can vary from minor problems, such as indigestion or stress, to serious medical emergencies, such as a heart attack or pulmonary embolism. The specific cause of chest pain is often difficult to interpret.

As with other sudden, unexplained pains, chest pain may be a signal for you to get medical help. Use the following information to help you determine whether your chest pain is a medical emergency.

**Heart attack**

A heart attack occurs when an artery that supplies oxygen to your heart muscle becomes blocked. A heart attack generally causes chest pain that lasts longer than 15 minutes. But a heart attack can also be silent and produce no signs or symptoms.

Many people who suffer a heart attack have warning symptoms hours, days or weeks in advance. The earliest predictor of an attack may be recurrent chest pain that's triggered by exertion and relieved by rest.

Someone having a heart attack may experience any or all of the following:

- Uncomfortable pressure, fullness or squeezing pain in the center of the chest lasting more than a few minutes
- Pain spreading to the shoulders, neck or arms
- Lightheadedness, fainting, sweating, nausea or shortness of breath

**If you or someone else may be having a heart attack:**

- **Dial 911 or call for emergency medical assistance.** Don't "tough out" the symptoms of
a heart attack for more than five minutes. If you don't have access to emergency medical services, have someone such as a neighbor or friend drive you to the nearest hospital. Drive yourself only as a last resort, if there are absolutely no other options. Driving yourself puts you and others at risk if your condition suddenly worsens.

- **Chew a regular-strength aspirin.** Aspirin can inhibit blood clotting. However, you shouldn't take aspirin if you're allergic to aspirin, have bleeding problems or your doctor previously told you not to do so.

- **Take nitroglycerin, if prescribed.** If you think you're having a heart attack and your doctor has previously prescribed nitroglycerin for you, take it as directed. Do not take anyone else's nitroglycerin.

- **Begin CPR.** If the person suspected of having a heart attack is unconscious, a 911 dispatcher or another emergency medical specialist may advise you to begin cardiopulmonary resuscitation (CPR). Even if you're not trained, a dispatcher can instruct you in CPR until help arrives.

**Pulmonary embolism**

An embolus is an accumulation of foreign material — usually a blood clot — that blocks an artery. Tissue death occurs when the tissue supplied by the blocked artery is damaged by the sudden loss of blood. Pulmonary embolism describes the condition that occurs when a clot — usually from the veins of your leg or pelvis — lodges in an artery of your lung.

Signs and symptoms of pulmonary embolism include:

- Sudden, sharp chest pain that begins or worsens with a deep breath or a cough, often accompanied by shortness of breath
- Sudden, unexplained shortness of breath, even without pain
- Cough that may produce blood-streaked sputum
- Rapid heartbeat
- Anxiety and excessive perspiration

As with a suspected heart attack, dial 911 or call for emergency medical assistance immediately.

**Pneumonia with pleurisy**

Frequent signs and symptoms of pneumonia are chest pain accompanied by chills, fever and a cough that may produce bloody or foul-smelling sputum. When pneumonia occurs with an inflammation of the membranes that surround the lung (pleura), you may have considerable chest discomfort when inhaling or coughing. This condition is called pleurisy.

One sign of pleurisy is that the pain is usually relieved temporarily by holding your breath or putting pressure on the painful area of your chest. This is not true of a heart attack. See your
doctor if a cough and a fever or chills accompany your chest pain. Pleurisy alone, however, isn't a medical emergency.

Chest wall pain

One of the most common varieties of harmless chest pain is chest wall pain. One kind of chest wall pain is costochondritis. It consists of pain and tenderness in and around the cartilage that connects your ribs to your breastbone (sternum).

Often, placing pressure over a few points along the margin of the sternum results in considerable tenderness limited to those small areas. If the pressure of a finger duplicates your chest pain, you probably can conclude that a serious cause of chest pain, such as a heart attack, isn't responsible.

Other causes of chest pain include:

- Strained chest muscles from overuse or excessive coughing
- Chest muscle bruising from minor trauma
- Acute anxiety with rapid breathing
- Pain from the gastrointestinal tract, such as esophageal reflux, peptic ulcer pain, or gallbladder pain.

Choking: First aid

Choking occurs when a foreign object becomes lodged in the throat or windpipe, blocking the flow of air. In adults, a piece of food often is the culprit. Young children often swallow small objects. Because choking cuts off oxygen to the brain, administer first aid as quickly as possible.

The universal sign for choking is hands clutched to the throat. If the person doesn't give the signal, look for these indications:

- Inability to talk
- Difficulty breathing or noisy breathing
- Inability to cough forcefully
- Skin, lips and nails turning blue or dusky
- Loss of consciousness

If choking is occurring, the Red Cross recommends a "five-and-five" approach to delivering first aid:

- **First**, deliver five back blows between the person's shoulder blades with the heel of your hand.
- **Next**, perform five abdominal thrusts (also known as the Heimlich maneuver).
• Alternate between five back blows and five abdominal thrusts until the blockage is dislodged.

If you're the only rescuer, perform back blows and abdominal thrusts before calling 911 (or your local emergency number) for help. If another person is available, have that person call for help while you perform first aid.

To perform abdominal thrusts (Heimlich maneuver) on someone else:

• **Stand behind the person.** Wrap your arms around the waist. Tip the person forward slightly.

• **Make a fist with one hand.** Position it slightly above the person's navel.

• **Grasp the fist with the other hand.** Press hard into the abdomen with a quick, upward thrust — as if trying to lift the person up.

• **Perform a total of five abdominal thrusts,** if needed. If the blockage still isn't dislodged, repeat the "five-and-five" cycle.

If you're alone and choking, you'll be unable to effectively deliver back blows to yourself. However, you can still perform abdominal thrusts to dislodge the item.

To perform abdominal thrusts (Heimlich maneuver) on yourself:

• **Place a fist** slightly above your navel.

• **Grasp your fist** with the other hand and bend over a hard surface — a countertop or chair will do.

• **Shove your fist** inward and upward.

Clearing the airway of a pregnant woman or obese person:

• **Position your hands a little bit higher** than with a normal Heimlich maneuver, at the base of the breastbone, just above the joining of the lowest ribs.

• **Proceed as with the Heimlich maneuver,** pressing hard into the chest, with a quick thrust.

• **Repeat** until the food or other blockage is dislodged or the person becomes unconscious.

Clearing the airway of an unconscious person:

• **Lower the person** on his or her back onto the floor.

• **Clear the airway.** If there's a visible blockage at the back of the throat or high in the throat, reach a finger into the mouth and sweep out the cause of the blockage. Be careful not to push the food or object deeper into the airway, which can happen easily in young children.
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• **Begin cardiopulmonary resuscitation (CPR)** if the object remains lodged and the person doesn't respond after you take the above measures. The chest compressions used in CPR may dislodge the object. Remember to recheck the mouth periodically.

**Clearing the airway of a choking infant younger than age 1:**

• **Assume a seated position and hold the infant facedown** on your forearm, which is resting on your thigh.

• **Thump the infant gently but firmly** five times on the middle of the back using the heel of your hand. The combination of gravity and the back blows should release the blocking object.

• **Hold the infant faceup on your forearm** with the head lower than the trunk if the above doesn't work. Using two fingers placed at the center of the infant's breastbone, give five quick chest compressions.

• **Repeat the back blows and chest thrusts** if breathing doesn't resume. Call for emergency medical help.

• **Begin infant CPR** if one of these techniques opens the airway but the infant doesn't resume breathing.

If the child is older than age 1, give abdominal thrusts only.

To prepare yourself for these situations, learn the Heimlich maneuver and CPR in a certified first-aid training course.

**Corneal abrasion (scratch): First aid**

The most common types of eye injury involve the cornea — the clear, protective "window" at the front of your eye. Contact with dust, dirt, sand, wood shavings, metal particles or even an edge of a piece of paper can scratch or cut the cornea. Usually the scratch is superficial, and this is called a corneal abrasion. Some corneal abrasions become infected and result in a corneal ulcer, which is a serious problem.

Everyday activities can lead to corneal abrasions. Examples are playing sports, doing home repairs or being scratched by children who accidentally brush your cornea with a fingernail. Other common injuries to the cornea include splash accidents — contact with chemicals ranging from antifreeze to household cleaners.

Because the cornea is extremely sensitive, abrasions can be painful. If your cornea is scratched, you might feel like you have sand in your eye. Tears, blurred vision, increased sensitivity or redness around the eye can suggest a corneal abrasion. You may get a headache.

In case of injury, seek prompt medical attention. Other immediate steps you can take for a corneal abrasion are to:

• **Use saline solution, if available, or clean water to rinse the eye.** Use an eyecup or
small, clean glass positioned with its rim resting on the bone at the base of your eye socket. If your work site has an eye-rinse station, use it. Rinsing the eye may wash out an offending foreign body.

- **Blink several times.** This movement may remove small particles of dust or sand.
- **Pull the upper eyelid over the lower eyelid.** The lashes of your lower eyelid can brush a foreign body from the undersurface of your upper eyelid.

Take caution to avoid certain actions that may aggravate the injury:

- **Don't try to remove an object** that's embedded in your eyeball. Also avoid trying to remove a large object that makes closing the eye difficult.
- **Don't rub your eye after an injury.** Touching or pressing on your eye can worsen a corneal abrasion.
- **Don't touch your eyeball** with tweezers, cotton swabs or other instruments. This can aggravate a corneal abrasion.

### Cuts and scrapes: First aid

Minor cuts and scrapes usually don't require a trip to the emergency room. Yet proper care is essential to avoid infection or other complications. These guidelines can help you care for simple wounds:

**Stop the bleeding.** Minor cuts and scrapes usually stop bleeding on their own. If they don't, apply gentle pressure with a clean cloth or bandage. Hold the pressure continuously for 20 to 30 minutes. Don't keep checking to see if the bleeding has stopped because this may damage or dislodge the fresh clot that's forming and cause bleeding to resume. If the blood spurts or continues to flow after continuous pressure, seek medical assistance.

**Clean the wound.** Rinse out the wound with clear water. Soap can irritate the wound, so try to keep it out of the actual wound. If dirt or debris remains in the wound after washing, use tweezers cleaned with alcohol to remove the particles. If debris remains embedded in the wound after cleaning, see your doctor. Thorough wound cleaning reduces the risk of infection and tetanus. To clean the area around the wound, use soap and a washcloth. There's no need to use hydrogen peroxide, iodine or an iodine-containing cleanser.

**Apply an antibiotic.** After you clean the wound, apply a thin layer of an antibiotic cream or ointment such as Neosporin or Polysporin to help keep the surface moist. The products don't make the wound heal faster, but they can discourage infection and allow your body's healing process to close the wound more efficiently. Certain ingredients in some ointments can cause a mild rash in some people. If a rash appears, stop using the ointment.

**Cover the wound.** Bandages can help keep the wound clean and keep harmful bacteria out. After the wound has healed enough to make infection unlikely, exposure to the air will
speed wound healing.

**Change the dressing.** Change the dressing at least daily or whenever it becomes wet or dirty. If you're allergic to the adhesive used in most bandages, switch to adhesive-free dressings or sterile gauze held in place with paper tape, gauze roll or a loosely applied elastic bandage. These supplies generally are available at pharmacies.

**Get stitches for deep wounds.** A wound that is more than 1/4 inch (6 millimeters) deep or is gaping or jagged edged and has fat or muscle protruding usually requires stitches. A strip or two of surgical tape may hold a minor cut together, but if you can't easily close the mouth of the wound, see your doctor as soon as possible. Proper closure within a few hours reduces the risk of infection.

**Watch for signs of infection.** See your doctor if the wound isn't healing or you notice any redness, increasing pain, drainage, warmth or swelling.

**Get a tetanus shot.** Doctors recommend you get a tetanus shot every 10 years. If your wound is deep or dirty and your last shot was more than five years ago, your doctor may recommend a tetanus shot booster. Get the booster within 48 hours of the injury.

## Dislocation: First aid

A dislocation is an injury in which the ends of your bones are forced from their normal positions. The cause is usually trauma, such as a blow or fall, but dislocation can be caused by an underlying disease, such as rheumatoid arthritis.

Dislocations are common injuries in contact sports, such as football and hockey, and in sports that may involve falls, such as downhill skiing and volleyball. Dislocations may occur in major joints, such as your shoulder, hip, knee, elbow or ankle or in smaller joints, such as your finger, thumb or toe.

The injury will temporarily deform and immobilize your joint and may result in sudden and severe pain and swelling. A dislocation requires prompt medical attention to return your bones to their proper positions.

**If you believe you have dislocated a joint:**

**Don't delay medical care.** Get medical help immediately.

**Don't move the joint.** Until you receive help, splint the affected joint into its fixed position. Don't try to move a dislocated joint or force it back into place. This can damage the joint and its surrounding muscles, ligaments, nerves or blood vessels.

**Put ice on the injured joint.** This can help reduce swelling by controlling internal bleeding and the buildup of fluids in and around the injured joint.
Electrical burns: First aid

An electrical burn may appear minor or not show on the skin at all, but the damage can extend deep into the tissues beneath your skin. If a strong electrical current passes through your body, internal damage, such as a heart rhythm disturbance or cardiac arrest, can occur. Sometimes the jolt associated with the electrical burn can cause you to be thrown or to fall, resulting in fractures or other associated injuries.

Dial 911 or call for emergency medical assistance if the person who has been burned is in pain, is confused, or is experiencing changes in his or breathing, heartbeat or consciousness.

While helping someone with an electrical burn and waiting for medical help, follow these steps:

Look first. Don't touch. The person may still be in contact with the electrical source. Touching the person may pass the current through you.

Turn off the source of electricity if possible. If not, move the source away from both you and the injured person using a dry nonconductive object made of cardboard, plastic or wood.

Check for signs of circulation (breathing, coughing or movement). If absent, begin cardiopulmonary resuscitation (CPR) immediately.

Prevent shock. Lay the person down with the head slightly lower than the trunk and the legs elevated.

Cover the affected areas. If the person is breathing, cover any burned areas with a sterile gauze bandage, if available, or a clean cloth. Don't use a blanket or towel. Loose fibers can stick to the burns.

Electrical shock: First aid

The danger from an electrical shock depends on how high the voltage is, how the current traveled through the body, the person's overall health and how quickly the person is treated.

Call 911 or your local emergency number immediately if any of these signs or symptoms occur:

- Cardiac arrest
- Heart rhythm problems (arrhythmias)
- Respiratory failure
- Muscle pain and contractions
- Seizures
- Numbness and tingling
• Unconsciousness

While waiting for medical help, follow these steps:

**Look first. Don't touch.** The person may still be in contact with the electrical source. Touching the person may pass the current through you.

**Turn off the source of electricity if possible.** If not, move the source away from you and the affected person, using a nonconducting object made of cardboard, plastic or wood.

**Check for signs of circulation (breathing, coughing or movement).** If absent, begin cardiopulmonary resuscitation (CPR) immediately.

**Prevent shock.** Lay the person down and, if possible, position the head slightly lower than the trunk, with the legs elevated.

**Caution**

- **Don't touch the person with your bare hands** if he or she is still in contact with the electrical current.

- **Don't get near high-voltage wires** until the power is turned off. Stay at least 20 feet away — farther if wires are jumping and sparking.

- **Don't move a person** with an electrical injury unless the person is in immediate danger.

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**Fainting: First aid**

Fainting occurs when the blood supply to your brain is momentarily inadequate, causing you to lose consciousness. This loss of consciousness is usually brief.

Fainting can have no medical significance, or the cause can be a serious disorder. Therefore, treat loss of consciousness as a medical emergency until the signs and symptoms are relieved and the cause is known.

**If you feel faint:**

- Lie down or sit down.

- If you sit down, place your head between your knees.

Discuss recurrent fainting spells with your doctor.

**If someone else faints:**

**Position the person on his or her back.** Elevate the legs above heart level — about 12 inches (30 centimeters), if possible.

**Check the person's airway to be sure it's clear.** Watch for vomiting.
Check for signs of circulation (breathing, coughing or movement). If absent, begin CPR.
Call 911 or your local emergency number. Continue CPR until help arrives or the person responds and begins to breathe.

Help restore blood flow. If the person is breathing, restore blood flow to the brain by raising the person's legs above the level of the head. Loosen belts, collars or other constrictive clothing. The person should revive quickly. If the person doesn't regain consciousness within one minute, dial 911 or call for emergency medical assistance.

If the person was injured in a fall associated with a faint, treat any bumps, bruises or cuts appropriately. Control bleeding with direct pressure.

**Fever: First aid**

Fever is one of your body's reactions to infection. What's normal for you may be a little higher or lower than the average temperature of 98.6 F (37 C). But a rectal temperature higher than 100.4 F (38 C) is always considered a fever. A rectal temperature reading is generally 1 degree F (about 0.5 degree C) higher than an oral reading.

For very young children and infants, even slightly elevated temperatures may indicate a serious infection. In newborns, a subnormal temperature — rather than a fever — also may be a sign of serious illness.

Don't treat fevers below 102 F (38.9 C) with any medications unless advised to do so by your doctor. If you have a fever of 102 F (38.9 C) or higher, your doctor may suggest taking an over-the-counter medication, such as acetaminophen (Tylenol, others) or ibuprofen (Advil, Motrin, others). Adults may also use aspirin. But don't give aspirin to children. It may trigger a rare, but potentially fatal, disorder known as Reye's syndrome. Also, don't give ibuprofen to infants younger than 6 months of age.

**How to take a temperature**

You can choose from several types of thermometers. Today most have digital readouts. Some take the temperature quickly from the ear canal and can be especially useful for young children and older adults. Other thermometers can be used rectally, orally or under the arm. If you use a digital thermometer, be sure to read the instructions so you know what the beeps mean and when to read the thermometer. Under normal circumstances, temperatures tend to be highest around 4 p.m. and lowest around 4 a.m.

Because of the potential for mercury exposure or ingestion, glass mercury thermometers have been phased out and are no longer recommended.

**Rectally (for infants)**

To take your child's temperature rectally:

- Place a dab of petroleum jelly or other lubricant on the bulb.
- Lay your child on his or her stomach.
- Carefully insert the bulb one-half inch to one inch into the rectum.
• Hold the bulb and child still for three minutes. To avoid injury, don't let go of the thermometer while it's inside your child.

• Remove and read the temperature as recommended by the manufacturer.

• A rectal temperature reading is generally 1 degree F (about 0.5 degree C) higher than a simultaneously taken oral reading.

Taking a rectal temperature is also an option for older adults when taking an oral temperature is not possible.

Orally
To take your temperature orally:

• Place the bulb under your tongue.

• Close your mouth for the recommended amount of time, usually three minutes.

Under the arm (axillary)
Although it's not the most accurate way to take a temperature, you can also use an oral thermometer for an armpit reading:

• Place the thermometer under your arm with your arm down.

• Hold your arms across your chest.

• Wait five minutes or as recommended by your thermometer's manufacturer. Then remove the thermometer and read the temperature.

• An axillary reading is generally 1 degree F (about 0.5 degree C) less than an oral reading.

To take your child's axillary temperature, sit your child in your lap with your child facing to the side. Place the thermometer under your child's near arm, which should be against your chest.

Get medical help for a fever in these cases:

• If a baby is younger than 3 months of age and has a rectal temperature of 100.4 F (38 C) or higher. Even if your baby doesn't have other signs or symptoms, call your doctor just to be safe.

• If a baby is older than 3 months of age and has a temperature of 102 F (38.9 C) or higher.

• If a newborn has a lower than normal temperature — less than 97 F (36.1 C) rectally.

• If a child younger than age 2 has a fever for more than one day, or a child age 2 or older has a fever for more than three days. If your child has a fever after being left in a very hot car, seek medical care immediately.

• If an adult has a temperature of more than 103 F (39.4 C) or has had a fever for more than three days.
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Call your doctor immediately if any of these signs or symptoms accompanies a fever:

- A severe headache
- Severe swelling of the throat
- Unusual skin rash
- Unusual eye sensitivity to bright light
- A stiff neck and pain when the head is bent forward
- Mental confusion
- Persistent vomiting
- Difficulty breathing or chest pain
- Extreme listlessness or irritability
- Abdominal pain or pain when urinating
- Any other unexplained symptoms

When reporting a fever to your doctor, don't attempt to convert from a rectal reading to an oral reading. It's simpler to just report what the reading was and how you took it.

**First-aid kits: Stock supplies that can save lives**

A well-stocked first-aid kit can help you respond effectively to common injuries and emergencies. Keep at least one first-aid kit in your home and one in your car. Store your kits in easy-to-retrieve locations that are out of the reach of young children. Children old enough to understand the purpose of the kits should know where they are stored.

You can purchase first-aid kits at many drugstores or assemble your own. Contents of a first-aid kit should include:

**Basic supplies**

- Adhesive tape
- Aluminum finger splints
- Antibiotic ointment
- Antiseptic solution or towelettes
- Bandages, including a roll of elastic wrap (Ace, Coban, others) and bandage strips
- Band-Aid, Curad, others) in assorted sizes
- Instant cold packs
- Cotton balls and cotton-tipped swabs
- Disposable latex or synthetic gloves, at least two pair
- Gauze pads and roller gauze in assorted sizes
- Eye goggles
- First-aid manual
- Petroleum jelly or other lubricant
- Plastic bags for the disposal of contaminated materials
- Safety pins in assorted sizes
- Save-A-Tooth storage device containing salt solution and a travel case
- Scissors, tweezers and a needle
- Soap or instant hand sanitizer
- Sterile eyewash, such as a saline solution
- Thermometer
- Triangular bandage
- Turkey baster or other bulb suction device for flushing out wounds

**Medications**

- Activated charcoal (use only if instructed by your poison control center)
- Anti-diarrhea medication
- Over-the-counter oral antihistamine (Benadryl, others)
- Aspirin and nonaspirin pain relievers (never give aspirin to children)
- Calamine lotion
- Over-the-counter hydrocortisone cream
- Personal medications
- If prescribed by your doctor, drugs to treat an allergic attack, such as an auto-injector of epinephrine (EpiPen)
• Syringe, medicine cup or spoon

Emergency items

• Cell phone and recharger that utilizes the accessory plug in your car dash
• Emergency phone numbers, including contact information for your family doctor and pediatrician, local emergency services, emergency road service providers and the regional poison control center
• Small, waterproof flashlight and extra batteries
• Candles and matches for cold climates
• Sunscreen
• Mylar emergency blanket
• First-aid instruction manual

Give your kit a checkup
Check your first-aid kits regularly, at least every three months, to be sure the flashlight batteries work and to replace supplies that have expired.

In addition, take a first-aid course to prepare for a possible medical emergency. Be sure the course covers cardiopulmonary resuscitation (CPR) and how to use an automatic external defibrillator (AED). Renew your CPR certification at least every two years.

Prepare children for medical emergencies in age-appropriate ways. The American Red Cross offers a number of helpful resources, including classes designed to help children understand and use first-aid techniques.

Food-borne illness: First aid

All foods naturally contain small amounts of bacteria. But poor handling of food, improper cooking or inadequate storage can result in bacteria multiplying in large enough numbers to cause illness.

Parasites, viruses, toxins and chemicals also can contaminate food. Food-borne illness from these sources, however, is less common than food-borne illness caused by bacteria.

Signs and symptoms of food poisoning vary with the source of contamination. Generally diarrhea, nausea, abdominal pain and, sometimes, vomiting occur within hours after eating contaminated food.

Whether you become ill after eating contaminated food depends on the organism, the amount of exposure, your age and your health. High-risk groups include:

• Older adults. As you get older, your immune system may not respond as quickly and as effectively to infectious organisms as when you were younger.
• **Infants and young children.** Their immune systems haven't fully developed.

• **People with chronic diseases.** Having a chronic condition, such as diabetes or AIDS, or receiving chemotherapy or radiation therapy for cancer reduces your immune response.

**If you develop food poisoning:**

• Rest and drink plenty of liquids

• Don't use anti-diarrheal medications because they may slow elimination of bacteria from your system

Food-borne illness often improves on its own within 48 hours. Call your doctor if you feel ill for longer than two or three days or if blood appears in your stools.

**Dial 911 or call for emergency medical assistance if:**

• You have severe symptoms, such as watery diarrhea that turns very bloody within 24 hours.

• You belong to a high-risk group.

• You suspect botulism poisoning. Botulism is a potentially fatal food poisoning that results from the ingestion of a toxin formed by certain spores in food. Botulism toxin is most often found in home-canned foods, especially green beans and tomatoes. Signs and symptoms usually begin 12 to 36 hours after eating the contaminated food and may include headache, blurred vision, muscle weakness and eventual paralysis. Some people also have nausea and vomiting, constipation, urinary retention, difficulty breathing and dry mouth. These signs and symptoms require immediate medical attention.

**Foreign object in the ear: First aid**

A foreign object in the ear can cause pain and hearing loss. Usually you know if an object is stuck in your ear, but small children may not be aware of it.

If an object becomes lodged in the ear, follow these steps:

• **Don't probe the ear with a tool.** Don't attempt to remove the foreign object by probing with a cotton swab, matchstick or any other tool. To do so is to risk pushing the object farther into the ear and damaging the fragile structures of the middle ear.

• **Remove the object if possible.** If the object is clearly visible, pliable and can be grasped easily with tweezers, gently remove it.

• **Try using gravity.** Tilt the head to the affected side to try to dislodge the object.

• **Try using oil for an insect.** If the foreign object is an insect, tilt the person's head so that the ear with the offending insect is upward. Try to float the insect out by pouring mineral oil, olive oil or baby oil into the ear. The oil should be warm but not hot. As you pour the
oil, you can ease the entry of the oil by straightening the ear canal. Pull the earlobe gently backward and upward for an adult, backward and downward for a child. The insect should suffocate and may float out in the oil bath.

- **Don't use oil to remove any object other than an insect.** Do not use this method if there is any suspicion of a perforation in the eardrum — pain, bleeding or discharge from the ear.

If these methods fail or the person continues to experience pain in the ear, reduced hearing or a sensation of something lodged in the ear, seek medical assistance.

**Foreign object in the eye: First aid**

If you get a foreign object in the eye, try to flush it out with clean water or saline solution. Use an eyecup or a small, clean glass positioned with its rim resting on the bone at the base of your eye socket.

**To help someone else:**

Wash your hands.

Seat the person in a well-lighted area.

Gently examine the eye to find the object. Pull the lower lid down and ask the person to look up. Then hold the upper lid while the person looks down.

If the object is floating in the tear film on the surface of the eye, try flushing it out. If you're able to remove the object, flush the eye with a saline solution or clean, lukewarm water.

**Caution**

- Don't try to remove an object that's imbedded in the eyeball.
- Don't rub the eye.
- Don't try to remove a large object that makes closing the eye difficult.

**When to call for help**

Seek emergency medical assistance when:

- You can't remove the object.
- The object is imbedded in the eyeball.
- The person with the object in the eye is experiencing abnormal vision.
- Pain, redness or the sensation of a foreign body in the eye persists after the object is removed.
Foreign object in the nose: First aid

If a foreign object becomes lodged in your nose:

- **Don't probe at the object** with a cotton swab or other tool.
- **Don't try to inhale the object** by forcefully breathing in. Instead, breathe through your mouth until the object is removed.
- **Blow your nose gently** to try to free the object, but don't blow hard or repeatedly. If only one nostril is affected, close the opposite nostril by applying gentle pressure and then blow out gently through the affected nostril.
- **Gently remove the object** if it's visible and you can easily grasp it with tweezers. Don't try to remove an object that isn't visible or easily grasped.
- **Call for emergency medical assistance** or go to your local emergency room if these methods fail.

Foreign object in the skin: First aid

If a foreign object is projecting from your skin:

- **Wash your hands and clean the area well** with soap and water.
- **Use tweezers** to remove splinters of wood or fiberglass, small pieces of glass or other foreign objects.

If the object is completely embedded in your skin:

- **Wash your hands and clean the area well** with soap and water.
- **Sterilize a clean, sharp needle** by wiping it with rubbing alcohol. If rubbing alcohol isn't available, clean the needle with soap and water.
- **Use the needle to break the skin** over the object and gently lift the tip of the object out.
- **Use tweezers** to remove the object. A magnifying glass may help you see the object better.
- **Wash and pat-dry the area.** Follow by applying antibiotic ointment.
- **Seek medical help** if the particle doesn't come out easily or is close to your eye.

Foreign object inhaled: First aid

If you or your child inhaled a foreign object, see your doctor. If the inhaled object causes choking, the American Red Cross recommends the "five-and-five" approach to delivering first
First, deliver five back blows between the victim's shoulder blades with the heel of your hand.

Next, perform five abdominal thrusts (also known as the Heimlich maneuver).

Alternate between five back blows and five abdominal thrusts until the blockage is dislodged.

If you're the only rescuer, perform back blows and abdominal thrusts before calling 911 or your local emergency number for help. If another person is available, have that person call for help while you perform first aid.

To perform the Heimlich maneuver on someone else:

- **Stand behind the person.** Wrap your arms around the waist. Tip the person forward slightly.
- **Make a fist with one hand.** Position it slightly above the person's navel.
- **Grasp the fist with the other hand.** Press hard into the abdomen with a quick, upward thrust — as if trying to lift the person up.
- **Perform a total of five abdominal thrusts,** if needed. If the blockage still isn't dislodged, repeat the five-and-five cycle.

To perform the Heimlich maneuver on yourself:

- **Place a fist** slightly above your navel.
- **Grasp your fist** with the other hand and bend over a hard surface — a countertop or chair will do.
- **Shove your fist** inward and upward.

**Foreign object swallowed: First aid**

If you swallow a foreign object, it will usually pass through your digestive system uneventfully. But some objects can lodge in your esophagus, the tube that connects your throat and stomach. If an object is stuck in your esophagus, you may need to remove it, especially if it is:

- A pointed object, which should be removed as quickly as possible to avoid further injury to the esophageal lining
- A tiny watch- or calculator-type button battery, which can rapidly cause local tissue injury and should be removed from the esophagus without delay

If a swallowed object blocks the airway, the American Red Cross recommends the "five-and-five" approach to first aid:
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Their money controls governments, regulators, and the small minded media. The Ultra Rich Master Echelon Computer now sees and hears all the things we say, write, and do. Rights of privacy are gone worldwide. They have taken away our rights of free speech.

The Ultra Rich control the media and refuse to tell stories that expose or offend the Ultra Rich Power. They control every movie that gets distribution, every song that hits the radio, everything that is put on the world news. They use science and psychology to control and manipulate the minds of the masses.

But medicine is controlled by Universities that teach medicine. There is now one university starting to defend Natural Medicine. IMUNE has a new 12 month home study course that can be bought with Karma and you can learn how to do natural medicine and how to break free from the Ultra Rich control.

Well, the game of Reality Monopoly is still being played all over the world. One percent of the world’s population is winning and now controls over 80% of the wealth. The law allows the game to continue till we will see one winner and 6 billion plus losers.
First, deliver five back blows between the victim’s shoulder blades with the heel of your hand.

Next, perform five abdominal thrusts (also known as the Heimlich maneuver).

Alternate between five back blows and five abdominal thrusts until the blockage is dislodged.

Call 911 or your local emergency number for help.

To perform abdominal thrusts (the Heimlich maneuver) on someone else:

- **Stand behind the person.** Wrap your arms around the waist. Tip the person forward slightly.

- **Make a fist with one hand.** Position it slightly above the person's navel.

- **Grasp the fist with the other hand.** Press hard into the abdomen with a quick, upward thrust — as if trying to lift the person up.

- **Perform a total of five abdominal thrusts,** if needed. If the blockage still isn't dislodged, repeat the five-and-five cycle.

You can't perform back blows on yourself. But you can perform abdominal thrusts.

To perform abdominal thrusts (the Heimlich maneuver) on yourself:

- **Place a fist** slightly above your navel.

- **Grasp your fist** with the other hand and bend over a hard surface — a countertop or chair will do.

- **Shove your fist** inward and upward.

**Fractures (broken bones): First aid**

A fracture is a broken bone. It requires medical attention. If the broken bone is the result of major trauma or injury, call 911 or your local emergency number. Also call for emergency help if:

- The person is unresponsive, isn't breathing or isn't moving. Begin cardiopulmonary resuscitation (CPR) if there's no respiration or heartbeat.

- There is heavy bleeding.

- Even gentle pressure or movement causes pain.

- The limb or joint appears deformed.

- The bone has pierced the skin.
• The extremity of the injured arm or leg, such as a toe or finger, is numb or bluish at the tip.

• You suspect a bone is broken in the neck, head or back.

• You suspect a bone is broken in the hip, pelvis or upper leg (for example, the leg and foot turn outward abnormally).

Take these actions immediately while waiting for medical help:

• **Stop any bleeding.** Apply pressure to the wound with a sterile bandage, a clean cloth or a clean piece of clothing.

• **Immobilize the injured area.** Don't try to realign the bone, but if you've been trained in how to splint and professional help isn't readily available, apply a splint to the area.

• **Apply ice packs to limit swelling and help relieve pain until emergency personnel arrive.** Don't apply ice directly to the skin — wrap the ice in a towel, piece of cloth or some other material.

• **Treat for shock.** If the person feels faint or is breathing in short, rapid breaths, lay the person down with the head slightly lower than the trunk and, if possible, elevate the legs.

### Frostbite: First aid

When exposed to very cold temperatures, skin and underlying tissues may freeze, resulting in frostbite. The areas most likely to be affected by frostbite are your hands, feet, nose and ears.

You can identify frostbite by the hard, pale and cold quality of skin that has been exposed to the cold. As the area thaws, the flesh becomes red and painful.

**If your fingers, ears or other areas suffer frostbite:**

• **Get out of the cold.**

• **Warm your hands** by tucking them under your arms. If your nose, ears or face is frostbitten, warm the area by covering it with dry, gloved hands.

• **Don't rub the affected area.** Never rub snow on frostbitten skin.

• **If there's any chance of refreezing, don't thaw out the affected areas.** If they're already thawed out, wrap them up so they don't refreeze.

• **Get emergency medical help** if numbness remains during warming. If you can't get help immediately, warm severely frostbitten hands or feet in warm — not hot — water. You can warm other frostbitten areas, such as your nose, cheeks or ears, by covering them with your warm hands or by applying warm cloths.
Gastroenteritis: First aid

Gastroenteritis is an inflammation of your stomach and intestines. Common causes are:

- Viruses.
- Food or water contaminated by bacteria or parasites.
- Reaction to a new food. Young children may develop signs and symptoms for this reason. Infants who are breast-fed may even react to a change in their mothers' diets.
- Side effect from medications.

Characteristic signs and symptoms include:

- Nausea or vomiting
- Diarrhea
- Abdominal cramps
- Bloating

A low-grade fever may accompany these signs and symptoms. Depending on the cause of the inflammation, symptoms may last from one day to longer than a week.

If you suspect gastroenteritis in yourself:

- **Stop eating and drinking for a few hours** to let your stomach settle.
- **Drink plenty of liquids**, such as Gatorade or water, to prevent dehydration.
- **Ease back into eating.** Gradually begin to eat bland, easy-to-digest foods, such as soda crackers, toast, gelatin, bananas, rice and chicken. Stop eating if your nausea returns. Avoid milk and dairy products, caffeine, alcohol, nicotine, and fatty or highly seasoned foods for a few days.
- **Consider acetaminophen** (Tylenol, others) for relief of discomfort, unless you have liver disease.
- **Get plenty of rest.** The illness and dehydration can make you weak and tired.

Get medical help if:

- Vomiting persists for more than two days.
- Diarrhea persists for longer than several days.
- Diarrhea turns bloody.
• Fever is 101°F (38.3°C) or higher.
• Lightheadedness or fainting occurs with standing.
• Confusion develops.
• Worrisome abdominal pain develops.

If you suspect gastroenteritis in your child:

• Allow him or her to rest.

• When your child's vomiting stops, begin to offer small amounts of an oral rehydration solution, such as Pedialyte. Don't use only water. In children with gastroenteritis, water isn't absorbed well and won't adequately replace lost fluids. Also avoid apple juice and milk, which can make diarrhea worse.

• Gradually introduce bland, easy-to-digest foods, such as toast, rice, bananas and potatoes. Avoid giving your child dairy products and sugary foods, such as ice cream, sodas and candy. These can make diarrhea worse.

• Consider acetaminophen (Tylenol, others) for relief of discomfort, unless your child has liver disease. Don't give your child aspirin.

• If you have a sick infant, let your baby's stomach rest for 30 to 60 minutes, then offer small amounts of liquid. If you're breast-feeding, let your baby nurse. If your baby is bottle-fed, offer a small amount of an oral rehydration formula (Pedialyte, Infalyte) or regular formula.

Get medical help if your child:

• Becomes unusually drowsy.

• Vomits blood.

• Has bloody diarrhea.

• Shows signs of dehydration, such as dry mouth and skin, marked thirst, sunken eyes, or crying without tears. In an infant, be alert to the soft spot on the top of the head becoming sunken and to diapers that remain dry for more than eight hours.

• Is younger than age 2 and has a fever for longer than one day or is age 2 or older and has a fever for longer than three days.

Head pain: First aid

Most headaches are minor, and you can treat them with a pain reliever. Some head pain, however, signals a dangerous or serious medical problem. Don't ignore unexplained head pain or head pain that steadily worsens. Get medical attention right away if your head pain:
Develops suddenly and severely
Accompanies a fever, stiff neck, rash, mental confusion, seizures, changes in vision, dizziness, weakness, loss of balance, numbness or difficulty speaking
Is severe and follows a recent sore throat or respiratory infection
Begins or worsens after a head injury, fall or bump
Is a new pain, and you're older than 50
Is excruciating and affects just one, reddened eye
Progressively worsens over the course of a single day, or persists for several days

**Head trauma: First aid**

Most head trauma involves injuries that are minor and don't require hospitalization. However, dial 911 or call for emergency medical assistance if any of the following signs are apparent:

- Severe head or facial bleeding
- Bleeding from the nose or ears
- Severe headache
- Change in level of consciousness for more than a few seconds
- Black-and-blue discoloration below the eyes or behind the ears
- Cessation of breathing
- Confusion
- Loss of balance
- Weakness or an inability to use an arm or leg
- Unequal pupil size
- Repeated vomiting
- Slurred speech
- Seizures

**If severe head trauma occurs:**

- **Keep the person still.** Until medical help arrives, keep the injured person lying down and quiet in a darkened room, with the head and shoulders slightly elevated. Don't move the
person unless necessary and avoid moving the person's neck.

- **Stop any bleeding.** Apply firm pressure to the wound with sterile gauze or a clean cloth. But don't apply direct pressure to the wound if you suspect a skull fracture.

- **Watch for changes in breathing and alertness.** If the person shows no signs of circulation (breathing, coughing or movement), begin CPR.

# Heart attack: First aid

A heart attack occurs when an artery supplying your heart with blood and oxygen becomes blocked. This loss of blood flow injures your heart muscle. A heart attack generally causes chest pain for more than 15 minutes, but it can also be "silent" and have no symptoms at all.

Many people who suffer a heart attack have warning symptoms hours, days or weeks in advance. The earliest predictor of an attack may be recurrent chest pain that's triggered by exertion and relieved by rest (angina).

Someone having an attack may experience any or all of the following:

- Uncomfortable pressure, fullness or squeezing pain in the center of the chest. The pain might last several minutes or come and go. It may be triggered by exertion and relieved by rest.

- Prolonged pain in the upper abdomen.

- Discomfort or pain spreading beyond the chest to the shoulders, neck, jaw, teeth, or one or both arms.

- Shortness of breath.

- Lightheadedness, dizziness, fainting.

- Sweating.

- Nausea.

# If you or someone else may be having a heart attack:

- **Dial 911 or your local emergency medical assistance number.** Don't tough out the symptoms of a heart attack for more than five minutes. If you don't have access to emergency medical services, have a neighbor or a friend drive you to the nearest hospital. Police or fire-rescue units also may be a source of transportation. Drive yourself only as a last resort, if there are absolutely no other options, and realize that it places you and others at risk when you drive under these circumstances.

- **Chew and swallow an aspirin, unless you're allergic to aspirin or have been told by your doctor never to take aspirin.** But seek emergency help first, such as calling 911.
- **Take nitroglycerin, if prescribed.** If you think you're having a heart attack and your doctor has previously prescribed nitroglycerin for you, take it as directed. Do not take anyone else's nitroglycerin, because that could put you in more danger.

- **Begin CPR.** If you're with a person who might be having a heart attack and he or she is unconscious, tell the 911 dispatcher or another emergency medical specialist. You may be advised to begin cardiopulmonary resuscitation (CPR). If you haven't received CPR training, doctors recommend skipping mouth-to-mouth rescue breathing and proceeding directly to chest compression. The dispatcher can instruct you in the proper procedures until help arrives.

### Heat cramps: First aid

Heat cramps are painful, involuntary muscle spasms that usually occur during heavy exercise in hot environments. The spasms may be more intense and more prolonged than typical nighttime leg cramps. Inadequate fluid intake often contributes to heat cramps.

Muscles most often affected include those of your calves, arms, abdominal wall and back, although heat cramps may involve any muscle group involved in exercise.

**If you suspect heat cramps:**

- Rest briefly and cool down
- Drink clear juice or an electrolyte-containing sports drink
- Practice gentle, range-of-motion stretching and gentle massage of the affected muscle group
- Call your doctor if your cramps don't go away in one hour

### Heat exhaustion: First aid

Heat exhaustion is one of the heat-related syndromes, which range in severity from mild heat cramps to heat exhaustion to potentially life-threatening heatstroke.

Signs and symptoms of heat exhaustion often begin suddenly, sometimes after excessive exercise, heavy perspiration and inadequate fluid intake. Signs and symptoms resemble those of shock and may include:

- Feeling faint or dizzy
- Nausea
- Heavy sweating
- Rapid, weak heartbeat
• Low blood pressure
• Cool, moist, pale skin
• Low-grade fever
• Heat cramps
• Headache
• Fatigue
• Dark-colored urine

If you suspect heat exhaustion:

• Get the person out of the sun and into a shady or air-conditioned location.
• Lay the person down and elevate the legs and feet slightly.
• Loosen or remove the person's clothing.
• Have the person drink cool water.
• Cool the person by spraying or sponging him or her with cool water and fanning.
• Monitor the person carefully. Heat exhaustion can quickly become heatstroke.

If fever greater than 102 F (38.9 C), fainting, confusion or seizures occur, dial 911 or call for emergency medical assistance.

Heatstroke: First aid

Heatstroke is the most severe of the heat-related problems, often resulting from exercise or heavy work in hot environments combined with inadequate fluid intake.

Young children, older adults, people who are obese and people born with an impaired ability to sweat are at high risk of heatstroke. Other risk factors include dehydration, alcohol use, cardiovascular disease and certain medications.

What makes heatstroke severe and potentially life-threatening is that the body's normal mechanisms for dealing with heat stress, such as sweating and temperature control, are lost. The main sign of heatstroke is a markedly elevated body temperature — generally greater than 104 F (40 C) — with changes in mental status ranging from personality changes to confusion and coma. Skin may be hot and dry — although if heatstroke is caused by exertion, the skin may be moist.

Other signs and symptoms may include:

• Rapid heartbeat
• Rapid and shallow breathing
• Elevated or lowered blood pressure
• Cessation of sweating
• Irritability, confusion or unconsciousness
• Feeling dizzy or lightheaded
• Headache
• Nausea
• Fainting, which may be the first sign in older adults

**If you suspect heatstroke:**

• Move the person out of the sun and into a shady or air-conditioned space.
• Dial 911 or call for emergency medical assistance.
• Cool the person by covering him or her with damp sheets or by spraying with cool water. Direct air onto the person with a fan or newspaper.
• Have the person drink cool water, if he or she is able.

**Human bites: First aid**

Human bites can be as dangerous as or even more dangerous than animal bites because of the types of bacteria and viruses contained in the human mouth. If someone cuts his or her knuckles on another person's teeth, as might happen in a fight, this is also considered a human bite.

If you sustain a human bite that breaks the skin:

**Stop the bleeding** by applying pressure.

**Wash the wound** thoroughly with soap and water.

**Apply an antibiotic cream** to prevent infection.

**Apply a clean bandage.** If the bite is bleeding, apply pressure directly on the wound using a sterile bandage or clean cloth until the bleeding stops.

**Seek emergency medical care.**

If you haven't had a tetanus shot within five years, your doctor may recommend a booster. In this case you should have the booster within 48 hours of the injury.
Hypothermia: First aid

Under most conditions your body maintains a healthy temperature. However, when exposed to cold temperatures or to a cool, damp environment for prolonged periods, your body's control mechanisms may fail to keep your body temperature normal. When more heat is lost than your body can generate, hypothermia can result.

Wet or inadequate clothing, falling into cold water, and even having an uncovered head during cold weather can all increase your chances of hypothermia.

Hypothermia is defined as an internal body temperature less than 95 F (35 C). Signs and symptoms include:

- Shivering
- Slurred speech
- Abnormally slow breathing
- Cold, pale skin
- Loss of coordination
- Fatigue, lethargy or apathy
- Confusion or memory loss

Signs and symptoms usually develop slowly. People with hypothermia typically experience gradual loss of mental acuity and physical ability, so they may be unaware that they need emergency medical treatment.

Older adults, infants, young children and people who are very lean are at particular risk. Other people at higher risk of hypothermia include those whose judgment may be impaired by mental illness or Alzheimer's disease and people who are intoxicated, homeless or caught in cold weather because their vehicles have broken down. Other conditions that may predispose people to hypothermia are malnutrition, cardiovascular disease and an underactive thyroid (hypothyroidism).

To care for someone with hypothermia:

Dial 911 or call for emergency medical assistance. While waiting for help to arrive, monitor the person's breathing. If breathing stops or seems dangerously slow or shallow, begin cardiopulmonary resuscitation (CPR) immediately.

Move the person out of the cold. If going indoors isn't possible, protect the person from the wind, cover his or her head, and insulate his or her body from the cold ground.

Remove wet clothing. Replace wet things with a warm, dry covering.

Don't apply direct heat. Don't use hot water, a heating pad or a heating lamp to warm the
victim. Instead, apply warm compresses to the neck, chest wall and groin. Don't attempt to warm the arms and legs. Heat applied to the arms and legs forces cold blood back toward the heart, lungs and brain, causing the core body temperature to drop. This can be fatal.

**Don't give the person alcohol.** Offer warm nonalcoholic drinks, unless the person is vomiting.

**Don't massage or rub the person.** Handle people with hypothermia gently, because they're at risk of cardiac arrest.

**Insect bites and stings: First aid**

Signs and symptoms of an insect bite result from the injection of venom or other substances into your skin. The venom triggers an allergic reaction. The severity of your reaction depends on your sensitivity to the insect venom or substance.

Most reactions to insect bites are mild, causing little more than an annoying itching or stinging sensation and mild swelling that disappear within a day or so. A delayed reaction may cause fever, hives, painful joints and swollen glands. You might experience both the immediate and the delayed reactions from the same insect bite or sting. Only a small percentage of people develop severe reactions (anaphylaxis) to insect venom. Signs and symptoms of a severe reaction include:

- Facial swelling
- Difficulty breathing
- Abdominal pain
- Shock

Bites from bees, wasps, hornets, yellow jackets and fire ants are typically the most troublesome. Bites from mosquitoes, ticks, biting flies and some spiders also can cause reactions, but these are generally milder.

**For mild reactions**

- **Move to a safe area** to avoid more stings.
- **Scrape or brush off the stinger** with a straight-edged object, such as a credit card or the back of a knife. Wash the affected area with soap and water. Don't try to pull out the stinger. Doing so may release more venom.
- **Apply a cold pack** or cloth filled with ice to reduce pain and swelling.
- **Apply hydrocortisone cream** (0.5 percent or 1 percent), calamine lotion or a baking soda paste — with a ratio of 3 teaspoons baking soda to 1 teaspoon water — to the bite or sting several times a day until your symptoms subside.
• Take an antihistamine containing diphenhydramine (Benadryl, Tylenol Severe Allergy) or chlorpheniramine maleate (Chlor-Trimeton, Actifed).

Allergic reactions may include mild nausea and intestinal cramps, diarrhea or swelling larger than 2 inches in diameter at the site. See your doctor promptly if you experience any of these signs and symptoms.

For severe reactions

Severe reactions may progress rapidly. Dial 911 or call for emergency medical assistance if the following signs or symptoms occur:

• Difficulty breathing
• Swelling of the lips or throat
• Faintness
• Dizziness
• Confusion
• Rapid heartbeat
• Hives
• Nausea, cramps and vomiting

Take these actions immediately while waiting with an affected person for medical help:

Check for special medications that the person might be carrying to treat an allergic attack, such as an auto-injector of epinephrine (for example, EpiPen). Administer the drug as directed — usually by pressing the auto-injector against the person's thigh and holding it in place for several seconds. Massage the injection site for 10 seconds to enhance absorption.

Have the person take an antihistamine pill if he or she is able to do so without choking, after administering epinephrine.

Have the person lie still on his or her back with feet higher than the head.

Loosen tight clothing and cover the person with a blanket. Don't give anything to drink.

Turn the person on his or her side to prevent choking, if there's vomiting or bleeding from the mouth.

Begin CPR, if there are no signs of circulation (breathing, coughing or movement).

If your doctor has prescribed an auto-injector of epinephrine, read the instructions before a problem develops and also have your household members read them.
Motion sickness: First aid

Any type of transportation can cause motion sickness. It can strike suddenly, progressing from a feeling of uneasiness to a cold sweat, dizziness and then vomiting. Motion sickness usually quiets down as soon as the motion stops. The more you travel, the more easily you'll adjust to being in motion.

You may escape motion sickness by planning ahead. If you're traveling, reserve seats where motion is felt least:

- **By ship**, request a cabin in the front or middle of the ship, or on the upper deck.
- **By plane**, ask for a seat over the front edge of a wing. Once aboard, direct the air vent flow to your face.
- **By train**, take a seat near the front and next to a window. Face forward.
- **By automobile**, drive or sit in the front passenger's seat.

If you're susceptible to motion sickness:

- **Focus on the horizon** or on a distant, stationary object. Don't read.
- **Keep your head still**, while resting against a seat back.
- **Don't smoke** or sit near smokers.
- **Avoid spicy and greasy foods and alcohol**. Don't overeat.
- **Take an over-the-counter antihistamine**, such as meclizine (Antivert, Bonine), or one containing dimenhydrinate (Dramamine) at least 30 to 60 minutes before you travel. Expect drowsiness as a side effect.
- **Consider scopolamine (Transderm Scop)**, available in a prescription adhesive patch. Several hours before you plan to travel, apply the patch behind your ear for 72-hour protection. Talk to your doctor before using the medication if you have health problems, such as asthma, glaucoma or urine retention.
- **Eat dry crackers** or drink a carbonated beverage to help settle your stomach if you become ill.

Nosebleeds: First aid

Nosebleeds are common. Most often they are a nuisance and not a true medical problem. But they can be both.

Among children and young adults, nosebleeds usually originate from the septum, just inside the nose. The septum separates your nasal chambers.
In middle-aged and older adults, nosebleeds can begin from the septum, but they may also begin deeper in the nose's interior. This latter origin of nosebleed is much less common. It may be caused by hardened arteries or high blood pressure. These nosebleeds begin spontaneously and are often difficult to stop. They require a specialist's help.

To take care of a nosebleed:

- **Sit upright and lean forward.** By remaining upright, you reduce blood pressure in the veins of your nose. This discourages further bleeding. Sitting forward will help you avoid swallowing blood, which can irritate your stomach.

- **Pinch your nose.** Use your thumb and index finger and breathe through your mouth. Continue to pinch for five to 10 minutes. This maneuver sends pressure to the bleeding point on the nasal septum and often stops the flow of blood.

- **To prevent re-bleeding after bleeding has stopped,** don't pick or blow your nose and don't bend down until several hours after the bleeding episode. Keep your head higher than the level of your heart.

- **If re-bleeding occurs,** blow out forcefully to clear your nose of blood clots and spray both sides of your nose with a decongestant nasal spray containing oxymetazoline (Afrin, Neo-Synephrine, others). Pinch your nose in the technique described above and call your doctor.

Seek medical care immediately if:

- The bleeding lasts for more than 20 minutes

- The nosebleed follows an accident, a fall or an injury to your head, including a punch in the face that may have broken your nose

**For frequent nosebleeds**

If you experience frequent nosebleeds, make an appointment with your doctor. You may need to have the blood vessel that's causing your problem cauterized. Cautery is a technique in which the blood vessel is burned with electric current, silver nitrate or a laser. Sometimes your doctor may pack your nose with special gauze or an inflatable latex balloon to put pressure on the blood vessel and stop the bleeding.

Also call your doctor if you are experiencing nasal bleeding and are taking blood thinners, such as aspirin or warfarin (Coumadin). Your doctor may advise adjusting your medication intake.

Using supplemental oxygen administered with a nasal tube (cannula) may increase your risk of nosebleeds. Apply a water-based lubricant to your nostrils and increase the humidity in your home to help relieve nasal bleeding.

**Poisoning: First aid**

Many conditions mimic the signs and symptoms of poisoning, including seizures, alcohol intoxication, stroke and insulin reaction. So look for the signs and symptoms listed below if you
suspect poisoning, but check with the poison control center at 800-222-1222 (in the United States) before giving anything to the affected person.

Signs and symptoms of poisoning:

- Burns or redness around the mouth and lips, which can result from drinking certain poisons
- Breath that smells like chemicals, such as gasoline or paint thinner
- Burns, stains and odors on the person, on his or her clothing, or on the furniture, floor, rugs or other objects in the surrounding area
- Empty medication bottles or scattered pills
- Vomiting, difficulty breathing, sleepiness, confusion or other unexpected signs

When to call for help:

Call 911 or your local emergency number immediately if the person is:

- Drowsy or unconscious
- Having difficulty breathing or has stopped breathing
- Uncontrollably restless or agitated
- Having seizures

If the person seems stable and has no symptoms, but you suspect poisoning, call the poison control center at 800-222-1222. Provide information about the person's symptoms and, if possible, information about what he or she ingested, how much and when.

What to do while waiting for help:

- If the person has been exposed to poisonous fumes, such as carbon monoxide, get him or her into fresh air immediately.
- If the person swallowed the poison, remove anything remaining in the mouth.
- If the suspected poison is a household cleaner or other chemical, read the label and follow instructions for accidental poisoning. If the product is toxic, the label will likely advise you to call the poison control center at 800-222-1222. Also call this 800 number if you can't identify the poison, if it's medication or if there are no instructions.
- Follow treatment directions that are given by the poison control center.
- If the poison spilled on the person's clothing, skin or eyes, remove the clothing. Flush the skin or eyes with cool or lukewarm water, such as by using a shower for 20 minutes or until help arrives.
• Take the poison container (or any pill bottles) with you to the hospital.

What NOT to do

Don't administer ipecac syrup or do anything to induce vomiting. In 2003, the American Academy of Pediatrics advised discarding ipecac in the home, saying there's no good evidence of effectiveness and that it can do more harm than good.

Puncture wounds: First aid

A puncture wound doesn't usually cause excessive bleeding. Often the wound seems to close almost instantly. But these features don't mean treatment isn't necessary.

A puncture wound — such as results from stepping on a nail or being stuck with a tack — can be dangerous because of the risk of infection. The object that caused the wound may carry spores of tetanus or other bacteria, especially if the object has been exposed to the soil. Puncture wounds resulting from human or animal bites, including those of domestic dogs and cats, may be especially prone to infection. Puncture wounds on the foot are also more vulnerable to infection.

If the bite was deep enough to draw blood and the bleeding persists, seek medical attention. Otherwise, follow these steps:

Stop the bleeding. Minor cuts and scrapes usually stop bleeding on their own. If they don't, apply gentle pressure with a clean cloth or bandage. If bleeding persists — if the blood spurts or continues to flow after several minutes of pressure — seek emergency assistance.

Clean the wound. Rinse the wound well with clear water. A tweezers cleaned with alcohol may be used to remove small, superficial particles. If larger debris still remains more deeply embedded in the wound, see your doctor. Thorough wound cleaning reduces the risk of tetanus. To clean the area around the wound, use soap and a clean washcloth.

Apply an antibiotic. After you clean the wound, apply a thin layer of an antibiotic cream or ointment (Neosporin, Polysporin) to help keep the surface moist. These products don't make the wound heal faster, but they can discourage infection and allow your body to close the wound more efficiently. Certain ingredients in some ointments can cause a mild rash in some people. If a rash appears, stop using the ointment.

Cover the wound. Exposure to air speeds healing, but bandages can help keep the wound clean and keep harmful bacteria out.

Change the dressing regularly. Do so at least daily or whenever it becomes wet or dirty. If you're allergic to the adhesive used in most bandages, switch to adhesive-free dressings or sterile gauze and hypoallergenic paper tape, which doesn't cause allergic reactions. These supplies are generally available at pharmacies.

Watch for signs of infection. See your doctor if the wound doesn't heal or if you notice any redness, drainage, warmth or swelling.
If the puncture is deep, is in your foot, is contaminated or is the result of an animal or human bite, see your doctor. He or she will evaluate the wound, clean it and, if necessary, close it. If you haven't had a tetanus shot within five years, your doctor may recommend a booster within 48 hours of the injury.

If an animal — especially a stray dog or a wild animal — inflicted the wound, you may have been exposed to rabies. Your doctor may give you antibiotics and suggest initiation of a rabies vaccination series. Report such incidents to county public health officials. If possible, the animal should be confined for 10 days of observation by a veterinarian.

**Severe bleeding: First aid**

If possible, before you try to stop severe bleeding, wash your hands to avoid infection and put on synthetic gloves. Don't reposition displaced organs. If the wound is abdominal and organs have been displaced, don't try to push them back into place. Cover the wound with a dressing.

For other cases of severe bleeding, follow these steps:

- **Have the injured person lie down.** If possible, position the person's head slightly lower than the trunk or elevate the legs. This position reduces the risk of fainting by increasing blood flow to the brain. If possible, elevate the site of bleeding.

- **While wearing gloves, remove any obvious dirt or debris from the wound.** Don't remove any large or more deeply embedded objects. Don't probe the wound or attempt to clean it at this point. Your principal concern is to stop the bleeding.

- **Apply pressure directly on the wound.** Use a sterile bandage, clean cloth or even a piece of clothing. If nothing else is available, use your hand.

- **Maintain pressure until the bleeding stops.** Hold continuous pressure for at least 20 minutes without looking to see if the bleeding has stopped. You can maintain pressure by binding the wound tightly with a bandage (or even a piece of clean clothing) and adhesive tape.

- **Don't remove the gauze or bandage.** If the bleeding continues and seeps through the gauze or other material you are holding on the wound, don't remove it. Instead, add more absorbent material on top of it.

- **Squeeze a main artery if necessary.** If the bleeding doesn't stop with direct pressure, apply pressure to the artery delivering blood to the area of the wound. Pressure points of the arm are on the inside of the arm just above the elbow and just below the armpit. Pressure points of the leg are just behind the knee and in the groin. Squeeze the main artery in these areas against the bone. Keep your fingers flat. With your other hand, continue to exert pressure on the wound itself.

- **Immovilize the injured body part once the bleeding has stopped.** Leave the bandages in place and get the injured person to the emergency room as soon as possible.

If you suspect internal bleeding, call 911 or your local emergency number. Signs of internal
bleeding may include:

- Bleeding from body cavities (such as the ears, nose, rectum or vagina)
- Vomiting or coughing up blood
- Bruising on neck, chest, abdomen or side (between ribs and hip)
- Wounds that have penetrated the skull, chest or abdomen
- Abdominal tenderness, possibly accompanied by rigidity or spasm of abdominal muscles
- Fractures
- Shock, indicated by weakness, anxiety, thirst or skin that's cool to the touch

**Shock: First aid**

Shock may result from trauma, heatstroke, allergic reactions, severe infection, poisoning or other causes. Various signs and symptoms appear in a person experiencing shock:

- **The skin is cool and clammy.** It may appear pale or gray.
- **The pulse is weak and rapid.** Breathing may be slow and shallow, or hyperventilation (rapid or deep breathing) may occur. Blood pressure is below normal.
- **The eyes lack luster and may seem to stare.** Sometimes the pupils are dilated.
- **The person may be conscious or unconscious.** If conscious, the person may feel faint or be very weak or confused. Shock sometimes causes a person to become overly excited and anxious.

**If you suspect shock, even if the person seems normal after an injury:**

- **Dial 911** or call your local emergency number.
- **Have the person lie down** on his or her back with feet higher than the head. If raising the legs will cause pain or further injury, keep him or her flat. Keep the person still.
- **Check for signs of circulation** (breathing, coughing or movement). If absent, begin CPR.
- **Keep the person warm and comfortable.** Loosen belt(s) and tight clothing and cover the person with a blanket. Even if the person complains of thirst, give nothing by mouth.
- **Turn the person on his or her side** to prevent choking if the person vomits or bleeds from the mouth.
- **Seek treatment for injuries**, such as bleeding or broken bones.
Snakebites: First aid

Most North American snakes aren't poisonous. Some exceptions include the rattlesnake, coral snake, water moccasin and copperhead.

Excepting the coral snake, these poisonous snakes have slit-like eyes. Their heads are triangular, with a depression, or pit, midway between the eyes and nostrils.

Other characteristics are unique to certain poisonous snakes:

- **Rattlesnakes** make a rattling sound by shaking the rings at the end of their tail.
- **Water moccasins** have a white, cottony lining in their mouth.
- **Coral snakes** have red, yellow and black rings along the length of their body.

To reduce your risk of a snakebite, avoid picking up or playing with any snake. Most snakes usually avoid people if possible and bite only when threatened or surprised.

If you've experienced a snakebite:

- Remain calm
- Don't try to capture the snake
- Immobilize the bitten arm or leg and try to stay as quiet as possible
- Remove jewelry, because swelling tends to progress rapidly
- Apply a loose splint to reduce movement of the affected area, but make sure it is loose enough that it won't restrict blood flow
- Don't use a tourniquet or apply ice
- Don't cut the wound or attempt to remove the venom

Seek medical attention as soon as possible, especially if the bitten area changes color, begins to swell or is painful.

Spider bites: First aid

Only a few spiders are dangerous to humans. Two that are present in the contiguous United States and more common in the Southern states are the black widow spider and the brown recluse spider. Both prefer warm climates and dark, dry places where flies are plentiful. They often live in dry, littered, undisturbed areas, such as closets, woodpiles and under sinks.

**Black widow spider**
The female black widow gives the more serious bite, but its bite is rarely lethal. You can identify this spider by the red hourglass marking on its belly. The bite feels like a pinprick. You may not
even know you've been bitten. At first you may notice only slight swelling and faint red marks. Within a few hours, though, intense pain and stiffness begin. Other signs and symptoms of a black widow spider bite include:

- Chills
- Fever
- Nausea
- Severe abdominal pain

**Brown recluse spider**
You can identify this spider by the violin-shaped marking on its top. The bite produces a mild stinging, followed by local redness and intense pain within eight hours. A fluid-filled blister forms at the site and then sloughs off to leave a deep, enlarging ulcer. Reactions from a brown recluse spider bite vary from a mild fever and rash to nausea and listlessness. On rare occasions death results, more often in children.

**If bitten by a spider**
Clean the site of the spider bite well with soap and water. Apply a cool compress over the spider bite location. Aspirin or acetaminophen (Tylenol, others) may be used to relieve minor signs and symptoms in adults. Don't give aspirin to children. Give children acetaminophen instead. Treatment in a medical facility may be necessary for children under 6 years old and for adults with severe signs and symptoms.

**If bitten by a brown recluse or black widow spider**

- **If possible, make a positive identification.** If the spider bite is on an arm or a leg, tie a snug bandage above the bite to help slow or halt the venom's spread. Ensure that the bandage is not so tight as to cut off circulation in the arm or the leg.

- **Use a cold cloth at the spider bite location.** Apply a cloth dampened with cold water or filled with ice.

- **Seek immediate medical attention.** Treatment for the bite of a black widow may require an antivenom medication. Doctors may treat a brown recluse spider bite with corticosteroids.

**Spinal injury: First aid**
If you suspect a back or neck (spinal) injury, **do not move the affected person.** Permanent paralysis and other serious complications can result. Assume a person has a spinal injury if:

- There's evidence of a head injury with an ongoing change in the person's level of consciousness.
- The person complains of severe pain in his or her neck or back.
• The person won't move his or her neck.
• An injury has exerted substantial force on the back or head.
• The person complains of weakness, numbness or paralysis or lacks control of his or her limbs, bladder or bowel.
• The neck or back is twisted or positioned oddly.

If you suspect someone has a spinal injury:

• Dial 911 or call for emergency medical assistance.
• Keep the person still. Place heavy towels on both sides of the neck or hold the head and neck to prevent movement. The goal of first aid for a spinal injury is to keep the person in much the same position as he or she was found.
• Provide as much first aid as possible without moving the person's head or neck. If the person shows no signs of circulation (breathing, coughing or movement), begin CPR, but do not tilt the head back to open the airway. Use your fingers to gently grasp the jaw and lift it forward.
• If you absolutely must roll the person because he or she is vomiting, choking on blood or in danger of further injury, use at least two people. Work together to keep the person's head, neck and back aligned while rolling the person onto one side.

Sprain: First aid

Your ligaments are tough, elastic-like bands that attach to your bones and hold your joints in place. A sprain is an injury to a ligament caused by excessive stretching. The ligament can have tears in it, or it can be completely torn apart.

Of all sprains, ankle and knee sprains occur most often. Sprained ligaments swell rapidly and are painful. Generally the greater the pain, the more severe the injury. For most minor sprains, you can probably treat the injury yourself.

Follow the instructions for P.R.I.C.E.

Protect the injured limb from further injury by not using the joint. You can do this using anything from splints to crutches.

Rest the injured limb. But don't avoid all activity. Even with an ankle sprain, you can usually still exercise other muscles to prevent deconditioning. For example, you can use an exercise bicycle, working both your arms and the uninjured leg while resting the injured ankle on another part of the bike. That way you still get three-limb exercise to keep up your cardiovascular conditioning.

Ice the area. Use a cold pack, a slush bath or a compression sleeve filled with cold water to help limit swelling after an injury. Try to apply ice as soon as possible after the injury. If
you use ice, be careful not to use it for too long, as this could cause tissue damage.

**Compress** the area with an elastic wrap or bandage. Compressive wraps or sleeves made from elastic or neoprene are best.

**Elevate** the injured limb whenever possible to help prevent or limit swelling.

After the first two days, gently begin using the injured area. You should feel a gradual, progressive improvement. Over-the-counter pain relievers, such as ibuprofen (Advil, Motrin, others) and acetaminophen (Tylenol, others) may be helpful to manage pain during the healing process.

Get emergency medical assistance if:

- You heard a popping sound when your joint was injured, you can't use the joint, or you feel unstable when you try to bear weight on the joint. This may mean the ligament was completely torn. On the way to the doctor, apply a cold pack.

- You have a fever higher than 100 F (37.8 C), and the area is red and hot. You may have an infection.

- You have a severe sprain. Inadequate or delayed treatment may cause long-term joint instability or chronic pain.

- You aren't improving after the first two or three days.

**Stroke: First aid**

A stroke occurs when there's bleeding into your brain, or normal blood flow to your brain is blocked. Within minutes of being deprived of essential nutrients, brain cells start dying — a process that may continue over the next several hours.

A stroke is a true emergency. Seek immediate medical assistance. The sooner treatment is given, the more likely it is that damage can be minimized. Every moment counts.

If you notice a sudden onset of one or more of the following signs or symptoms, call 911 or your local emergency number immediately:

- Sudden weakness or numbness in your face, arm or leg on one side of your body
- Sudden dimness, blurring or loss of vision, particularly in one eye
- Loss of speech or trouble talking or understanding speech
- Sudden, severe headache — a bolt out of the blue — with no apparent cause
- Unexplained dizziness, unsteadiness or a sudden fall, especially if accompanied by any of the other symptoms

Risk factors for stroke include having high blood pressure, having had a previous stroke,
smoking, having diabetes and having heart disease. Your risk of stroke increases as you age.

**Sunburn: First aid**

Signs and symptoms of sunburn usually appear within a few hours of exposure, bringing pain, redness, swelling and occasional blistering. Because exposure often affects a large area of your skin, sunburn can cause headache, fever and fatigue.

**If you have a sunburn:**

- Take a cool bath or shower. Adding 1/2 cup (about 120 milliliters) of cornstarch, oatmeal or baking soda to your bath water may provide some relief.
- Apply an aloe vera lotion several times a day.
- Leave blisters intact to speed healing and avoid infection. If they burst on their own, apply an antibacterial ointment on the open areas.
- If needed, take an over-the-counter pain reliever such as aspirin, ibuprofen (Advil, Motrin, others), naproxen (Aleve) or acetaminophen (Tylenol, others). Don't give children or teenagers aspirin. It may cause Reye's syndrome, a rare but potentially fatal disease.

Do not use petroleum jelly, butter or other home remedies on your sunburn. They can prevent or delay healing.

If your sunburn begins to blister or if you experience immediate complications, such as rash, itching or fever, see your doctor.

**Tick bites: First aid**

Some ticks transmit bacteria that cause illnesses such as Lyme disease or Rocky Mountain spotted fever. Your risk of contracting one of these diseases depends on what part of the United States you live in, how much time you spend in wooded areas and how well you protect yourself.

**If you've received a tick bite:**

- **Remove the tick promptly and carefully.** Use tweezers to grasp the tick near its head or mouth and pull gently to remove the whole tick without crushing it.
- **If possible, seal the tick in a jar.** Your doctor may want to see the tick if you develop signs or symptoms of illness after a tick bite.
- **Use soap and water to wash your hands** and the area around the tick bite after handling the tick.
- **Call your doctor if** you aren't able to completely remove the tick.

See your doctor if you develop:
• A rash
• A fever
• A stiff neck
• Muscle aches
• Joint pain and inflammation
• Swollen lymph nodes
• Flu-like symptoms

If possible, bring the tick with you to your doctor's appointment.

Call 911 or your local emergency number if you develop:
• A severe headache
• Difficulty breathing
• Paralysis
• Chest pain or heart palpitations

Tooth loss: First aid

If your tooth is knocked out, get emergency dental care. It's sometimes possible to successfully reimplant permanent teeth that have been knocked out. But this is an option only if you follow the steps below immediately — before you see a dentist.

If your tooth is knocked out:
• Handle your tooth by the top only, not the roots.
• Don't rub it or scrape it to remove debris. This damages the root surface, making the tooth less likely to survive.
• Gently rinse your tooth in a bowl of tap water. Don't hold it under running water.
• Try to replace your tooth in the socket. If it doesn't go all the way into place, bite down gently on gauze or a moistened tea bag to help keep it in place. Hold the tooth in place until you see your dentist.
• If you can't replace your tooth in the socket, immediately place it in whole milk, your own saliva or a warm, mild saltwater solution — 1/4 teaspoon salt to 1 quart water (1.2 milliliters salt to about 1 liter water).
• Get medical attention from a dentist or emergency room immediately.
If you participate in contact sports, you can often prevent tooth loss by wearing a mouth guard, fitted by your dentist.

**Toothache: First aid**

Tooth decay is the primary cause of toothaches for most children and adults. Bacteria that live in your mouth thrive on the sugars and starches in the food you eat. These bacteria form a sticky plaque that clings to the surface of your teeth.

Acids produced by the bacteria in plaque can eat through the hard, white coating on the outside of your teeth (enamel), creating a cavity. The first sign of decay may be a sensation of pain when you eat something sweet, very cold or very hot. A toothache often indicates that your dentist will need to work on your teeth.

**Self-care tips**

Until you can see your dentist, try these self-care tips for a toothache:

- Rinse your mouth with warm water.
- Use dental floss to remove any food particles wedged between your teeth.
- Take an over-the-counter (OTC) pain reliever to dull the ache.
- Apply an OTC antiseptic containing benzocaine directly to the irritated tooth and gum to temporarily relieve pain. Direct application of oil of cloves (eugenol) also may help. Don't place aspirin or another painkiller directly against your gums, as it may burn your gum tissue.

Swelling, pain when you bite, a foul-tasting discharge and gum redness indicate infection. See your dentist as soon as possible.

**Call your dentist if:**

- The pain persists for more than a day or two
- You have fever with the toothache
- You have trouble breathing or swallowing
SCIENCE REPORT - Chest Pressing Saves Lives

By George Grow

A life-saving treatment called cardiopulmonary resuscitation, or CPR, can save people suffering from cardiac arrest. This happens when a person's heart stops pumping and he or she is no longer breathing.

CPR includes two parts: Blowing air into a person's mouth to force air into the lungs. And pressing on the chest to get the heart pumping. CPR is done to keep blood flowing through the body until emergency medical help arrives.

Now a new study has found that pressing on the chest was just as effective as giving full CPR. The findings were published in The New England Journal of Medicine.

Millions of people have learned CPR. However, fewer than half of all cardiac arrest victims in the United States get CPR before emergency medical workers arrive. Many Americans object to blowing air into the mouth of a stranger for fear of infection. Experts say more victims could be saved if CPR was performed more often.

Researchers at the University of Washington organized the new study. It was based on the results of telephone calls to medical rescue workers in the Seattle area. More than five-hundred people called to report a person was suffering from cardiac arrest.

About half of the callers were told to press the chest of the victim until emergency crews arrived. The other half of the callers were given directions for full CPR. They were told to blow into the victim's mouth and to press the chest. The researchers say the full directions required almost one-and-one-half minutes longer to explain.

Among the group given full CPR directions, about ten percent of the patients survived. In the group given directions for chest pressing only, more than fourteen percent survived.

The researchers noted that chest pressing alone may be the best way for someone not trained in CPR to help a person suffering from cardiac arrest.

The New England Journal of Medicine published a commentary with the study. It said anyone who sees a person suffering from cardiac arrest should quickly start CPR with chest pressing alone.

However, the American Heart Association says the study's findings do not mean that the mouth-to-mouth treatment should be stopped. The group says people should be taught both parts of CPR.
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Please pay to the pay pal under deisfm.net, immune.net under donations.

If you do not have the money pay what you can and if you cannot pay anything please pay the cosmos back with good deeds to others. Pass on the good karma by being good to others and helping them the way I am helping you.
Great Spirits get Incredible Resistance from Mediocre Minds

Small Petty Minds hate to see a Powerful Alive and Free Intellect.

Small Minds often become bureaucrats so they can compensate for their insecurities.

They hate thinking big words like holistic, international, freedom the powers of the mind, the powers of the spirit.

These concepts scare them and they use every rationalization technique available to deny, twist, detract, divert, degrade, and discourage all from thinking big.

Their favorite technique is to shoot the messenger.

Desiré has proven the powers of the mind, the failure of synthetic drugs and many many more false beliefs.
Here is an article from the FDA wanting you the therapists to do clinical research. If you have an idea of what your SCIO has done to help your patients here is your chance to prove it to the world. You can write up a case study on a patient and submit it to us for publication. You might get approved to present it at our world congress in Budapest. But if you want to do a proper study here is your chance.

The FDA is helping people to do Investigator Sponsored Trials, known as IST. The following article is from an FDA approved journal on compliance. We have the proper Institutional Review Board, we have a study protocol for you to work with or amend for your needs, and we have the medical supervision. We have all you need. You just need an idea, some patients, and the dedication to see it thru. If you can finish a full 20 patient dbl blind study you can get a refurbished SCIO from the sponsor Maitreya / SCIO USA. So think this is your chance to get your name on a study and show the world what you are doing. We can do it together.

Prof. Desiré Dubounet
Investigator-sponsored Trials

Thousands of clinical trials are conducted each year around the world. They are sponsored or funded by a variety of organizations such as medical institutions, foundations, voluntary groups and pharmaceutical companies, in addition to federal agencies such as the National Institutes of Health and the Departments of Defense and Veterans Affairs. In addition, some clinical trials, sponsored by individual physicians, are called investigator-sponsored trials (ISTs).

ISTs are like other clinical trials, except that they are mostly single-center studies with an individual physician acting as both the lead investigator and the sponsor. As a result, ISTs tend to be minimally funded. However, if the drug or medical device under investigation in the trial is already available commercially (perhaps for another indication or population), the investigator will often try to engage the manufacturer to obtain some form of funding (e.g., donating the drug or medical device). Data generated through ISTs are often published and contribute significantly to academic research that in turn is referenced and utilized by other treating physicians and entities involved in the disease area or condition. Ownership of the products being investigated in the ISTs remains with the patent holder or manufacturer. Therefore, if the investigator is not the patent holder, he may neither submit the data from ISTs to a regulatory authority nor obtain approval to market the product. The investigator will need to work with the patent holder to obtain the rights to the product and it may be necessary to license the product to a manufacturer to secure the funding needed for the resources required for product approval. Data from ISTs are accepted by many regulatory authorities to support marketing applications or supplements as long as the trials were conducted in strict conformance Good Clinical Practice guidelines and the regulatory authority has access to uninterpreted data from the trial.

ISTs are held to the same regulatory standards as all trials involving human subjects. Investigators who sponsor and/or participate in clinical trials have serious responsibilities because of the involvement of human subjects and their risks in participating. There are many regulations specifying the responsibilities of sponsors and investigators. Investigators who are both sponsors and investigators (investigator-sponsors) of clinical trials must shoulder both sets of responsibilities and become very familiar with all applicable laws and regulations surrounding the conduct of human studies to ensure compliance. In the US, the Code of Federal Regulations (21 CFR Part 312 Subpart D for drugs and biologics and Part 812 Subparts C and E for medical devices) describes these serious responsibilities for both the sponsor (21 CFR 312.50) and the investigator (21 CFR 312.60). Additional responsibilities and requirements are described throughout 21 CFR 312 and 812;

those specifically relating to informed consent and IRB approval are described in 21 CFR Parts 50 (Protection of Human Subjects) and 56 (IRBs), respectively. The specific responsibilities for sponsors and investigators in drug and biologic clinical trials are similar but not identical to those for sponsors and investigators in trials for medical devices.

Investigator-sponsors must determine whether an Investigational New Drug application (IND or Investigator IND) must be submitted to the US Food and Drug Administration (FDA) before beginning the trial. An IND is usually required if the study involves an unapproved product or an approved product for a new indication, or evaluation of an approved product in a new patient population. The IND must include all
the information specified in 21 CFR 312.23. To complete the IND, the investigator-sponsor usually seeks permission from the original product manufacturer to cross-reference the company’s IND or Investigational Device Exemption, or approved New Drug Application or Premarket Application to obtain the necessary information (e.g., data from animal studies and previous human studies and manufacturing information). By submitting an IND, the investigator assumes responsibility for providing all necessary information (such as the study protocol, adverse event information, annual reports, etc.) to FDA to maintain compliance with regulations. It remains the investigator’s responsibility to determine whether the study is exempt from the requirement to submit an IND. FDA generally does not accept INDs it considers exempt (see 21 CFR 312.2(b)(1) for criteria that exempt studies from IND regulations).

Table 1 lists some common reasons why investigators sponsor clinical trials in spite of the tremendous regulatory burden such studies entail. A key challenge investigator-sponsors face is the large amount of time they must dedicate to the study and how that impacts caring for patients in their medical practices. The investigator-sponsor must supervise the trial, interact with the IRB, develop budgets, deal with audits and inspections and travel as needed. Well-qualified, experienced, trained and efficient personnel (in particular the study coordinator, but also including the sub-investigators, research nurses and laboratory personnel) become essential to the investigator in managing the trial workload.

Investigator-sponsors who take the time at the beginning of the trial to train any noncertified personnel in the International Conference On Harmonization (ICH) guideline, **Good Clinical Practice E6(R1)** will generally save lime on the back end and improve the quality of the study.

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<tr>
<th>Table 1. Advantages for Investigators In Sponsoring Clinical Studies</th>
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<td>1. Patient care: Investigators can more rapidly offer their patients unapproved but promising products or</td>
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<td>2. Scientific collaboration: ISTs allow Investigators to remain at the cutting edge of their therapeutic interests.</td>
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<td>3. Scientific contribution: When Investigators publish the results of their studies, they enable manufacturers to</td>
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<td>4. Professional recognition: Publications provide the Investigator with professional recognition as an expert or thought leader in the field. There is value in publishing even those studies that did not meet their primary hypotheses.</td>
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<td>5. Funding: As the Investigator becomes well-known In the field, he is able to secure funding more easily, thereby furthering future research.</td>
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What's in It for the Patient?

ISTs are a very good option for patients to obtain access to new and as yet unapproved research therapies. People often participate in ISTs because they have exhausted approved treatment options that either did not work for them or produced intolerable side effects. Carefully conducted ISTs are a relatively safe and quick way to get access to products that have the potential to treat the disease or condition or that have the potential to improve patient health or quality of life. Further, since investigators are often specialists in the disease area being studied, some patients participate to gain access to expert medical care for their condition, thereby playing a more active role in their own healthcare. Still others participate in ISTs for the purely altruistic reason of wanting to contribute to the advancement of medical knowledge.

Not all patients who apply to participate in an IST will be accepted. Each patient must meet predetermined eligibility criteria, such as age, sex, type and stage of disease, previous treatment history and other medical conditions. These criteria help to reduce the amount of variation and "noise" in the study, without threatening the scientific integrity of the trial, by removing medical variations that might complicate data analyses and the ability to draw relevant and sound conclusions. Patients may also be excluded because the researcher has already enrolled the required number of participants needed to test the hypothesis stated in the study protocol.

Once subjects are selected to participate in the IST, the law requires the investigator to obtain informed consent. The investigator must provide patients with complete and accurate information about what will happen during the trial and disclose all known or suspected risks. Participants must sign a written informed consent form, which indicates they understand the trial is a research study, have been informed about the associated risks and are aware that their participation is voluntary and they can leave the clinical trial at any time. Additionally, the consent form should outline in detail the amount of time participants will have to devote to the trial and the types of activities; for example, they may need to visit the study site at specified intervals, be subjected to additional tests, get more treatments than are normally necessary, stay in the hospital and/or follow complex dosage requirements. Patients use the material in the informed consent document to decide whether or not to enter a clinical trial and to make an informed decision about the level of risk they are willing to accept before they enter the trial.

The investigator should clearly explain to participants (when applicable) that they may not receive the investigational drug and may instead receive a placebo. They should also be prepared mentally for partial or no effectiveness from the treatment. The investigators should encourage the participants to learn as much as possible about the clinical trial and the investigational treatment and to freely discuss their questions and concerns with members of the research team.

Registration of Clinical Trials

Investigators and sponsors usually register their trials with databases such as http://clinicaltrials.gov/, an interactive online database managed by the National Library of Medicine. Clinicaltrials.gov facilitates the registration of trials in accordance with the International Committee of Medical Journal Editors (ICMJE) initiative requiring prior entry of clinical trials in a public registry as a condition for publication. Members of the public can find information about clinical trials by searching http://clinicaltrials.gov/ as it lists both federally and privately supported clinical
research. The site, which is updated regularly, offers information on the objectives of each trial, eligibility criteria, locations and contact details to obtain more information.

**Summary**

For patients, ISTs are a viable option for obtaining access to unapproved treatments. For physicians acting as investigator-sponsors, ISTs offer key benefits such as professional recognition and the opportunity to continue participating and collaborating in cutting-edge scientific investigations (see Table 1). However, ISTs present challenges to both investigators and patients. To be successful, investigators and investigator-sponsors must be highly motivated leaders with the skills and drive to coordinate the activities of many people to ensure completion of all study activities. Success generally requires careful planning, evaluation and management of the multiple aspects of conducting a clinical trial in accordance with all applicable regulations and ensuring that the various pieces of the puzzle fall into place seamlessly.

While ISTs provide patients with accelerated access to new treatments, these treatments have not received thorough review by a regulatory agency such as FDA or the European Medicines Agency, and as such, risks and uncertainties are unavoidable. Volunteers need to ask relevant questions of the researchers, remain vigilant for changes in their health status (particularly adverse changes), report them immediately and, in general, be aware that they shoulder significant responsibility as participants in an IST.

**References**

- Good Clinical Practice: Consolidated Guideline E6(R1), ICH (June 1996).

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