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Part 17: First Aid

2010 American Heart Association and American Red Cross Guidelines for First Aid

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The American Heart Association (AHA) and the American Red Cross (Red Cross) cofounded the National First Aid Science Advisory Board to review and evaluate the scientific literature on first aid in preparation for the *2005 American Heart Association (AHA) and American Red Cross Guidelines for First Aid.*[1] In preparation for the 2010 evidence evaluation process, the National First Aid Advisory Board was expanded to become the International First Aid Science Advisory Board with the addition of representatives from a number of international first aid organizations (see Table). The goal of the board is to reduce morbidity and mortality due to emergency events by making treatment recommendations based on an analysis of the scientific evidence that answers the following questions:

- In which emergency conditions can morbidity or mortality be reduced by the intervention of a first aid provider?
- How strong is the scientific evidence that interventions performed by a first aid provider are safe, effective, and feasible?

A critical review of the scientific literature by members of the International First Aid Science Advisory Board is summarized in the 2010 *International Consensus on First Aid Science With Treatment Recommendations* (*ILCOR 2010 CPR Consensus*), from which these guidelines are derived.[2] That critical review evaluates the literature and identifies knowledge gaps that might be filled through future scientific research.

Background

The history of first aid can be traced to the dawn of organized human societies. For example, Native American Sioux medicine men of the Bear Society were noted for treating battle injuries, fixing fractures, controlling bleeding, removing arrows, and using a sharp flint to cut around wounds and inflammation.[3]

Modern, organized first aid evolved from military experiences when surgeons taught soldiers how to splint and bandage battlefield wounds. Two British officers, Peter Shepherd and Francis Duncan, are said to have been the first to expand the concept to civilians and to develop the first curriculum in first aid.[4] Organized training in civilian first aid began in the United States in 1903 when Clara Barton, president of the Red Cross, formed a committee to establish instruction in first aid among the nation's industrial workers, where, under dangerous conditions, accidents and deaths were all too frequent.

The Evidence Evaluation Process

The International First Aid Science Advisory Board first identified 38 questions in first aid practice that either were not raised in previous evidence evaluations or were in need of updating. Two or more board members volunteered to review the scientific literature independently and develop an evidence-based review worksheet summarizing the literature relevant to each question (see Part 2: "Evidence Evaluation and Management of Potential or Perceived Conflicts of Interest"). After each worksheet was presented to, and reviewed by, the full board, a summary draft of the scientific evidence and a treatment recommendation were crafted. The evidence-based review for each question was presented and discussed a second time at a subsequent board meeting. All first aid worksheets, co-copyrighted by the American Heart Association and the American Red Cross, can be viewed through hyperlinks in the 2010 American Heart Association and American Red Cross International Consensus on First Aid Science with Treatment Recommendations.[2] Each question, evidence-based review, draft summary of science, and draft treatment recommendation was presented, discussed, and debated on 2 separate occasions until a consensus was reached. These guidelines are based on the scientific consensus findings reported in the *2010 International Consensus on First Aid Science with Treatment Recommendations*.[2]

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Table. International First Aid Science Advisory Board Member Organizations

American Academy of Pediatrics
American Burn Association
American College of Emergency Physicians
American College of Occupational and Environmental Medicine
American College of Surgeons
American Heart Association
American Pediatric Surgical Association
American Red Cross
American Red Cross Advisory Council on First Aid, Aquatics, Safety and Preparedness (ACFASP)
American Safety & Health Institute (ASHI) (Observer)
Austrian Red Cross
Canadian Red Cross
Divers Alert Network
European Reference Center on First Aid Education
Egyptian Red Crescent
French Red Cross
Grenada Red Cross
Hong Kong Red Cross
Hungarian Red Cross
International Federation of Red Cross and Red Crescent Societies
Medic First Aid International (Observer)
National Association of EMS Educators
National Association of EMS Physicians
National Athletic Trainers' Association
National Safety Council
Norwegian Red Cross
Occupational Safety and Health Administration
Red Cross Society of China
Resuscitation Council of Asia
St. John Ambulance, UK

Previous reports[5–8] have noted the paucity of scientific evidence supporting many interventions in prehospital emergency care. In reviewing the medical literature, members of the International First Aid Science Advisory Board once again found a paucity of evidence to guide first aid interventions. Very little research is being conducted in first aid, and many of the following recommendations are extrapolated from the experience of healthcare professionals. It is important to recognize the limitations of the evidence that supports many of these guidelines so that research can be undertaken and future guidelines can be based on a larger body of scientific evidence.

Definition of First Aid

We define first aid as the assessments and interventions that can be performed by a bystander (or by the victim) with minimal or no medical equipment. A first aid provider is defined as someone with formal training in first aid, emergency care, or medicine who provides first aid. First aid assessments and interventions should be medically sound and based on scientific evidence or, in the absence of such evidence, on expert consensus. Administration of first aid must not delay activation of the emergency medical services (EMS) system or other medical assistance when required. We strongly believe that education in first aid should be universal: everyone can learn first aid and everyone should.

The scope of first aid is not purely scientific; it is influenced by both training and regulatory issues. The definition of scope is therefore variable, and should be defined according to circumstances, need, and regulatory requirements.

Calling for Help

A first aid provider must be able to recognize when help is needed and how to get it. First aid providers should learn how and when to access the EMS system, how to activate the on-site emergency response plan (ERP), and how to contact the Poison Control Center (see "Poison Emergencies" below).

Positioning the Victim

As a general rule a victim should not be moved, especially if you suspect, from the victim's position or the nature of the injury, that the victim may have a spinal injury (see "Spine Stabilization" below). There are times, however, when the victim should be moved:

- If the area is unsafe for the rescuer or the victim, move the victim to a safe location if it is safe to do so.
- If the victim is face down and is unresponsive, turn the victim face up.
- If the victim has difficulty breathing because of copious secretions or vomiting, or if you are alone and have to leave an unresponsive victim to get help, place the victim in a modified **H**igh **A**rm **IN** **E**ndangered **S**pine (HAINES) recovery position:[9,10] Extend one of the victim's arms above the head and roll the body to the side so the victim's head rests on the extended arm. Bend both legs to stabilize the victim (Class IIb, LOE C).
- If a victim shows evidence of shock, have the victim lie supine. If there is no evidence of trauma or injury, raise the feet about 6 to 12 inches (about 30° to 45°) (Class IIb, LOE C). Do not raise the feet if the movement or the position causes the victim any pain.

The evidence for a benefit to raising the feet is extrapolated from leg raising studies on volume expansion; there are no studies on the effect of leg raising as a first aid maneuver for shock. The results of the volume expansion studies are contradictory with some showing an increase in cardiac output,[11–13] while others show no change in cardiac output or mean arterial pressure[14–18] with leg raising.

Oxygen

There is insufficient evidence to recommend routine use of supplementary oxygen by a first aid provider for victims complaining of chest discomfort[19,20] or shortness of breath[21]

(Class IIb, LOE C). Supplementary oxygen administration may be beneficial as part of first aid for divers with a decompression injury (Class IIb, LOE C[22]).

Medical Emergencies

Breathing Difficulties

The incidence of acute asthma is increasing, especially in urban populations.[23] Many victims with asthma take a prescribed bronchodilator medication and can self-administer it.[24–26] First aid providers are not expected to make a diagnosis of asthma, but they may assist the victim in using the victim's prescribed bronchodilator medication (Class IIa, LOE B) under the following conditions:

- The victim states that he or she is having an asthma attack or symptoms associated with a previously diagnosed breathing disorder, and the victim has the prescribed medications or inhaler in his or her possession.
- The victim identifies the medication and is unable to administer it without assistance.[24]

First aid providers should become familiar with inhalers so that they can assist a victim with an acute asthma attack in using the inhaler.

Anaphylaxis

Allergies are relatively common, but only a small proportion of people with allergies develop anaphylactic reactions. An anaphylactic reaction is a progressive series of signs and symptoms characterized by swelling, breathing difficulty, an itching rash, and eventually shock, which, if left untreated, may lead to death. Some of these signs and symptoms can also be present in other conditions, and first aid rescuers should not be expected to make a diagnosis of anaphylaxis.[27–30]

Older patients who suffer from anaphylactic reactions know their signs and symptoms and many carry a lifesaving epinephrine auto-injector. With proper training, parents can be taught to correctly use an auto-injector to administer epinephrine to their allergic children.[31] All too often, however, neither the victim nor family members know how to correctly use an auto-injector.[32–34] First aid providers should be familiar with the epinephrine auto-injector so that they can help a victim with an anaphylactic reaction to self-administer it. First aid providers should also know how to administer the auto-injector if the victim is unable to do so, provided that the medication has been prescribed by a physician and state law permits it (Class IIb, LOE B).

In retrospective studies[35–37] 18% to 35% of patients having signs of anaphylaxis required a second dose of epinephrine if symptoms persisted or progressed after the first dose. Because of the difficulty in making a diagnosis of anaphylaxis[27–30,38,39] and the potential harm from epinephrine if the diagnosis is incorrect,[40–43] first aid providers are advised to seek medical assistance if symptoms persist, rather than routinely administering a second dose of epinephrine. In unusual circumstances, when advanced medical assistance is not available, a second dose of epinephrine may be given if symptoms of anaphylaxis persist (Class IIb, LOE C).

Seizures

The general principles of first aid management of seizures are to

- Ensure an open airway.
- Prevent injury.

Do not restrain the victim during a seizure. Do not try to open the victim's mouth or try to place any object between the victim's teeth or in the mouth. Restraining the victim may cause musculoskeletal or soft-tissue injury. Placing an object in the victim's mouth may cause dental damage or aspiration (Class IIa, LOE C). It is not unusual for the victim to be unresponsive or confused for a short time after a seizure.

Chest Discomfort

Because it is very difficult, even for the healthcare professional, to differentiate chest discomfort of cardiac origin from other chest discomfort, the first aid provider should assume that chest discomfort is cardiac until proven otherwise. Cardiac chest discomfort is often described as "crushing" or "pressing" and is often accompanied by shortness of breath or perspiration. But cardiac chest discomfort may not have these classical characteristics, especially in women. Call EMS immediately for anyone with chest discomfort. Do not delay and do not try to transport the patient to a healthcare facility yourself.

While waiting for EMS to arrive, the first aid provider may encourage the victim to chew 1 adult (not enteric coated) or 2 low-dose "baby" aspirin if the patient has no allergy to aspirin or other contraindication to aspirin, such as evidence of a stroke or recent bleeding (Class IIa, LOE A).[44–46]

Injury Emergencies

Bleeding

Control of bleeding is a basic skill of first aid and one of the few actions with which a first aid provider can critically influence outcome.

Direct Pressure

Bleeding is best controlled by applying pressure until bleeding stops[47–53] or EMS rescuers arrive (Class I, LOE A). The amount of pressure applied and the time the pressure is held are the most important factors affecting successful control of bleeding. The pressure must be firm, and it must be maintained for a long time. Methods of applying pressure include

- Manual pressure on gauze or other cloth placed over the bleeding source. If bleeding continues, do not remove the gauze; add more gauze on top and apply more pressure.
- If it is not possible to provide continuous manual pressure, wrap an elastic bandage firmly over gauze to hold it in place with pressure.[54–57]

Tourniquets

Although tourniquets have been shown to control bleeding effectively on the battlefield[58–60] and during surgery and have been used by paramedics in a civilian setting without complications,[61] there are no studies on controlling bleeding with first aid provider use of a tourniquet. Potential dangers of prolonged tourniquet application include temporary[62] or permanent[63] injury to the underlying nerves and muscles,[64] and systemic complications resulting from limb ischemia,[65] including acidemia, hyperkalemia, arrhythmias, shock, and death. Complications are related to tourniquet pressure[66] and duration of occlusion,[67] but there is insufficient evidence to determine a minimal critical time beyond which irreversible complications may occur. Because of the potential adverse effects of tourniquets and difficulty in their proper application, use of a tourniquet to control bleeding of the extremities is indicated only if direct pressure is not effective or possible (Class IIb, LOE B). Specifically designed tourniquets appear to be better than ones that are improvised,[60,68–71] but tourniquets should only be used with proper training (Class IIa, LOE B). If a tourniquet is used, make sure that you note the time it was applied and communicate that time to EMS personnel.

Pressure Points and Elevation

Elevation and use of pressure points are not recommended to control bleeding (Class III, LOE C). This new recommendation is made because there is evidence that other ways of controlling bleeding are more effective. The hemostatic effect of elevation has not been studied. No effect on distal pulses was found in volunteers when pressure points were used.[72] Most important, these unproven procedures may compromise the proven intervention of direct pressure, so they could be harmful.

Hemostatic Agents

Among the large number of commercially available hemostatic agents, some have been shown to be effective.[73–76] However, their routine use in first aid cannot be recommended at this time because of significant variation in effectiveness by different agents and their potential for adverse effects, including tissue destruction with induction of a proembolic state and potential thermal injury (Class IIb, LOE B).

Wounds and Abrasions

Superficial wounds and abrasions should be thoroughly irrigated with a large volume of warm or room temperature potable water with or without soap[77–82] until there is no foreign matter in the wound (Class I, LOE A). Cold water appears to be as effective as warm water, but it is not as comfortable. If running water is unavailable, use any source of clean water. Wounds heal better with less infection if they are covered with an antibiotic ointment or cream and a clean occlusive dressing (Class IIa, LOE A).[83–85] Apply antibiotic ointment or cream only if the wound is an abrasion or a superficial injury and only if the victim has no known allergies to the antibiotic.

Burns

Thermal Burns

Cool thermal burns with cold (15° to 25°C) tap water as soon as possible and continue cooling at least until pain is relieved (Class I, LOE B).[86–93] Cooling reduces pain, edema, and depth of injury. It speeds healing and may reduce the need for excision and grafting of deep burns. Don't apply ice directly to a burn; it can produce tissue ischemia (Class III, LOE B). Prolonged cold exposure to small burns, and even brief exposure if the burn is large, can cause further local tissue injury[93–95] and hypothermia.

Burn Blisters

Loosely cover burn blisters with a sterile dressing but leave blisters intact because this improves healing and reduces pain (Class IIa, LOE B).[96–99]

Electric Injuries

The severity of electric injuries can vary widely, from an unpleasant tingling sensation caused by low-intensity current to thermal burns, cardiopulmonary arrest, and death. Thermal burns may result from burning clothing that is in contact with the skin or from electric current traversing a portion of the body. When current traverses the body, thermal burns may be present at the entry and exit points and along its internal pathway. Cardiopulmonary arrest is the primary cause of immediate death from electrocution.[100] Cardiac arrhythmias, including ventricular fibrillation, ventricular asystole, and ventricular tachycardia that progresses to ventricular fibrillation, may result from exposure to low- or high-voltage current.[101] Respiratory arrest may result from electric injury to the respiratory center in the brain or from tetanic contractions or paralysis of respiratory muscles.

Do not place yourself in danger by touching an electrocuted victim while the power is on (Class III, LOE C). Turn off the power at its source; at home the switch is usually near the fuse box. In case of high-voltage electrocutions caused by fallen power lines, immediately notify the appropriate authorities (eg, 911 or fire department). All materials conduct electricity if the voltage is high enough, so do not enter the area around the victim or try to remove wires or other materials with any object, including a wooden one, until the power has been turned off by knowledgeable personnel.

Once the power is off, assess the victim, who may need CPR, defibrillation, and treatment for shock and thermal burns. All victims of electric shock require medical assessment because the extent of injury may not be apparent.

Spine Stabilization

There is approximately a 2% risk of injury to the cervical spine after blunt trauma that is serious enough to require spinal imaging in an emergency department,[102,103] and this risk is tripled in patients with craniofacial injury.[104] Most victims with spinal injuries are males between the ages of 10 and 30 years. Motor vehicles cause approximately half of all spinal injuries; many of the remainder are caused by falls (especially from a height or diving), sports, and assaults.[105]

If the cervical spine is injured, the spinal cord may be unprotected, and further injury (secondary spinal cord injury) could result from stresses to the cord that occur when the victim is manipulated or moved. This could result in permanent neurological damage including quadriplegia.[106,107] Only one controlled but underpowered study with some methodological problems[108] has examined this question. In the study, the group of injured victims with spinal immobilization by emergency medical technicians using equipment failed to show any neurological benefit compared with a group of injured victims without spinal immobilization.

Because of the dire consequences if secondary injury does occur, maintain spinal motion restriction by manually stabilizing the head so that the motion of head, neck, and spine is minimized (Class IIb, LOE C). First aid providers should not use immobilization devices because their benefit in first aid has not been proven and they may be harmful (Class III, LOE C). Immobilization devices may be needed in special circumstances when immediate extrication (eg, rescue of drowning victim) is required, but first aid providers should not use these devices unless they have been properly trained in their use.

First aid rescuers cannot conclusively identify a victim with a spinal injury, but they should suspect spinal injury if an injured victim has any of the following risk factors (these have been modified slightly from the *2005 American Heart Association and American Red Cross First Aid Guidelines*[103,109–114]):

- Age ≥65 years
- Driver, passenger, or pedestrian, in a motor vehicle, motorized cycle, or bicycle crash
- Fall from a greater than standing height
- Tingling in the extremities
- Pain or tenderness in the neck or back
- Sensory deficit or muscle weakness involving the torso or upper extremities
- Not fully alert or is intoxicated
- Other painful injuries, especially of the head and neck
- Children 2 years of age or older with evidence of head or neck trauma

Musculoskeletal Trauma

Sprains and Strains

Soft-tissue injuries include joint sprains and muscle contusions. Cold application decreases hemorrhage, edema, pain, and disability,[115–120] and it is reasonable to apply cold to a soft-tissue injury. Cooling is best accomplished with a plastic bag or damp cloth filled with a mixture of ice and water; the mixture is better than ice alone.[121–123] Refreezable gel packs do not cool as effectively as an ice-water mixture.[124,125] To prevent cold injury, limit each application of cold to periods ≤20 minutes.[126–128] If that length of time is uncomfortable, limit application to 10 minutes.[129] Place a barrier, such as a thin towel, between the cold container and the skin (Class IIb, LOE C[126,128]).

It is not clear whether a compression bandage is helpful for a joint injury. Heat application to a contusion or injured joint is not as good a first aid measure as cold application.[115]

Fractures

Assume that any injury to an extremity includes a bone fracture. Cover open wounds with a dressing. Do not move or try to straighten an injured extremity (Class III, LOE C). There is no evidence that straightening an angulated suspected long bone fracture shortens healing time or reduces pain prior to permanent fixation. Expert opinion suggests that splinting may reduce pain[130] and prevent further injury. So, if you are far from definitive health care, stabilize the extremity with a splint in the position found (Class IIa, LOE C). If a splint is used, it should be padded to cushion the injury. If an injured extremity is blue or extremely pale, activate EMS immediately because this could be a medical emergency. A victim with an injured lower extremity should not bear weight until advised to do so by a medical professional.

Human and Animal Bites

Irrigate human and animal bites with copious amounts of water (Class I, LOE B). This irrigation has been shown to prevent rabies from animal bites[131,132] and bacterial infection.[133]

Snakebites

Do not apply suction as first aid for snakebites (Class III, LOE C). Suction does remove some venom, but the amount is very small.[134] Suction has no clinical benefit[135] and it may aggravate the injury.[136–138]

Applying a pressure immobilization bandage with a pressure between 40 and 70 mm Hg in the upper extremity and between 55 and 70 mm Hg in the lower extremity around the entire length of the bitten extremity is an effective and safe way to slow the dissemination of venom by slowing lymph flow (Class IIa, LOE C[139,140]). For practical purposes pressure is sufficient if the bandage is comfortably tight and snug but allows a finger to be slipped under it. Initially it was theorized that slowing lymphatic flow by external pressure would only benefit victims bitten by snakes producing neurotoxic venom, but the effectiveness of pressure immobilization has also been demonstrated for bites by non-neurotoxic American snakes.[140,141] The challenge is to find a way to teach the application of the correct snugness of the bandage because inadequate pressure is ineffective and too much pressure may cause local tissue damage. It has also been demonstrated that, once learned, retention of the skill of proper pressure and immobilization application is poor.[142,143]

Jellyfish Stings

This section is new to the First Aid Guidelines. First aid for jellyfish stings consists of two important actions: preventing further nematocyst discharge and pain relief. To inactivate venom load and prevent further envenomation, jellyfish stings should be liberally washed with vinegar (4% to 6% acetic acid solution) as soon as possible for at least 30 seconds (Class IIa, LOE B). The inactivation of venom has been demonstrated for *Olindias sambaquiensis*[144] and for Physalia physalis (Portuguese man-of-war).[145] If vinegar is not available, a baking soda slurry may be used instead.[145]

For the treatment of pain, after the nematocysts are removed or deactivated, jellyfish stings should be treated with hot-water immersion when possible (Class IIa, LOE B). The victim should be instructed to take a hot shower or immerse the affected part in hot water (temperature as hot as tolerated, or 45°C if there is the capability to regulate temperature), as soon as possible, for at least 20 minutes or for as long as pain persists.[146–149] If hot water is not available, dry hot packs or, as a second choice, dry cold packs may be helpful in decreasing pain but these are not as effective as hot water (Class IIb, LOE B[146,150,151]). Topical application of aluminum sulfate or meat tenderizer, commercially available aerosol products, fresh water wash, and papain, an enzyme derived from papaya used as a local medicine, are even less effective in relieving pain (Class IIb, LOE B[147,152]).

Pressure immobilization bandages are not recommended for the treatment of jellyfish stings because animal studies[153,154] show that pressure with an immobilization bandage causes further release of venom, even from already fired nematocysts (Class III, LOE C).

Dental Injuries

Traumatic dental injuries are common. The first aid for an avulsed tooth is as follows:

- Clean bleeding wound(s) with saline solution or tap water.
- Stop bleeding by applying pressure with gauze or cotton.
- Handle the tooth by the crown, not the root (ie, do not handle the part that was beneath the gum).
- Place the tooth in milk, or clean water if milk is not available.
- Contact the patient's dentist or take the tooth and victim to an emergency care center as quickly as possible (Class IIa, LOE C).[155–158]

Environmental Emergencies

Cold Emergencies

Hypothermia

Hypothermia is caused by exposure to cold. The urgency of treatment depends on the length of exposure and the victim's body temperature. Begin rewarming a victim of hypothermia immediately by moving the victim to a warm environment, removing wet clothing, and wrapping all exposed body surfaces with anything at hand, such as blankets, clothing, and newspapers. If the hypothermia victim is far from definitive health care, begin active rewarming (Class IIa, LOE B[159,160]) although the effectiveness of active rewarming has not been evaluated. Active rewarming should not delay definitive care. Potential methods of active rewarming include placing the victim near a heat source and placing containers of warm, but not hot, water in contact with the skin.

Frostbite

Frostbite usually affects an exposed part of the body such as the extremities and nose. In case of frostbite, remove wet clothing and dry and cover the victim to prevent hypothermia. Transport the victim to an advanced medical facility as rapidly as possible. Do not try to rewarm the frostbite if there is any chance that it might refreeze[161,162] or if you are close to a medical facility (Class III, LOE C).

Minor or superficial frostbite (frostnip) can be treated with simple, rapid rewarming using skin-to-skin contact such as a warm hand.

Severe or deep frostbite should be rewarmed within 24 hours of injury and this is best accomplished by immersing the frostbitten part in warm (37° to 40°C or approximately body temperature) water for 20 to 30 minutes (Class IIb, LOE C[161–170]). Chemical warmers should not be placed directly on frostbitten tissue because they can reach temperatures that can cause burns (Class III, LOE C[171]). Following rewarming, efforts should be made to protect frostbitten parts from refreezing and to quickly evacuate the patient for further care. The effectiveness of ibuprofen or other nonsteroidal antiinflammatory drugs (NSAIDs) in frostbite has not been well established in human studies.[170,172–175]

Heat Emergencies

Heat-induced symptoms, often precipitated by vigorous exercise, may include heat cramps, heat exhaustion, and heat stroke.

Heat cramps are painful involuntary muscle spasms that most often affect the calves, arms, abdominal muscles, and back. First aid includes rest, cooling off, and drinking an electrolyte-carbohydrate mixture, such as juice, milk, or a commercial electrolyte-carbohydrate drink.[176–185] Stretching, icing, and massaging the painful muscles may be helpful. Exercise should not be resumed until all symptoms have resolved.

Heat exhaustion is caused by a combination of exercise-induced heat and fluid and electrolyte loss as sweat. Signs and symptoms may start suddenly and include: nausea, dizziness, muscle cramps, feeling faint, headache, fatigue, and heavy sweating. Heat exhaustion is a serious condition because it can rapidly advance to the next stage, heat stroke, which can be fatal. Heat exhaustion must be vigorously treated by having the victim lie down in a cool place, taking off as many clothes as possible, cooling the victim with a cool water spray, and encouraging the victim to drink cool fluids, preferably containing carbohydrates and electrolytes.

Heat stroke includes all the symptoms of heat exhaustion plus signs of central nervous system involvement, including dizziness, syncope, confusion, or seizures. The most important action by a first aid provider for a victim of heat stroke is to begin immediate cooling, preferably by immersing the victim up to the chin in cold water.[186–189] It is also important to activate the EMS system. Heat stroke requires emergency treatment with intravenous fluids. Do not try to force the victim to drink liquids.

Drowning

Drowning is a major cause of unintentional death. Methods of preventing drowning include isolation fencing around swimming pools (gates should be self-closing and self-latching),[190] wearing personal flotation devices (life jackets) while in, around, or on water, never swimming alone, and avoiding swimming or operating motorized watercraft while intoxicated. Outcome following drowning depends on the duration of the submersion, the water temperature, and how promptly CPR is started.[191,192] Occasional case reports have documented intact neurological survival in children following prolonged submersion in icy waters.[193,194]

Remove the victim rapidly and safely from the water, but do not place yourself in danger. If you have special training, you can start rescue breathing while the victim is still in the water[195] providing that it does not delay removing the victim from the water. There is no evidence that water acts as an obstructive foreign body, so do not waste time trying to remove it with abdominal or chest thrusts. Start CPR and, if you are alone, continue with about 5 cycles (about 2 minutes) of chest compressions and ventilations before activating EMS. If 2 rescuers are present, send 1 rescuer to activate EMS immediately.

Poison Emergencies

If the patient exhibits any signs or symptoms of a life-threatening condition, (eg, sleepiness, seizures, difficulty breathing, vomiting) after exposure to a poison, activate the EMS immediately.

Poison Control Centers

There are many poisonous substances in the home and worksite. It is important to understand the toxic nature of the chemical substances in the environment and the proper protective equipment and emergency procedures in case of toxic exposure. The Poison Help hotline of the American Association of Poison Control Centers (800-222-1222) is an excellent resource in the United States for information about treating ingestion of, or exposure to, a potential poison. Further information is available at www.aapcc.org. Similar resources may be available internationally, and their contact information (eg, 112 in Europe) should be standard in international first aid training. When phoning a poison control center or other emergency medical services, know the nature and time of exposure and the name of the product or toxic substance.

Chemical Burns

Brush powdered chemicals off the skin with a gloved hand or piece of cloth. Remove all contaminated clothing from the victim, making sure you do not contaminate yourself in the process. In case of exposure to an acid or alkali on the skin[196–202] or eye,[203–208] immediately irrigate the affected area with copious amounts of water (Class I, LOE B).

Toxic Eye Injury

Rinse eyes exposed to toxic substances immediately with a copious amount of water (Class I, LOE C[203,209,210]), unless a specific antidote is available.[203,210,211]

Ingested Poisons

Treatment With Milk or Water

Do not administer anything by mouth for any poison ingestion unless advised to do so by a poison control center or emergency medical personnel because it may be harmful (Class III, LOE C). There is insufficient evidence that dilution of the ingested poison with water or milk is of any benefit as a first aid measure. Animal studies[212–216] have shown that dilution or neutralization of a caustic agent with water or milk reduces tissue injury, but no human studies have shown a clinical benefit. Possible adverse effects of water or milk administration include emesis and aspiration.

Activated Charcoal

Do not administer activated charcoal to a victim who has ingested a poisonous substance unless you are advised to do so by poison control center or emergency medical personnel (Class IIb, LOE C). There is no evidence that activated charcoal is effective as a component of first aid. It may be safe to administer,[217,218] but it has not been shown to be beneficial, and there are reports of it causing harm.[219–221] In addition the majority of children will not take the recommended dose.[222]

Ipecac

Do not administer syrup of ipecac for ingestions of toxins (Class III, LOE B). Several studies[223–225] found that there is no clinically relevant advantage to administering syrup of ipecac; its administration is not associated with decreased healthcare utilization.[226] Untoward effects of ipecac administration include intractable emesis and delayed care in an advanced medical facility.[227,228]

Disclosures

Guidelines Part 17: First Aid: Writing Group Disclosures

Writing Group Member	Employment	Research Grant	Other Research Support	Speakers' Bureau/ Honoraria	Ownership Interest	Consultant/Advisory Board	Other
David Markenson	NYMC–Interim Chair; EMA–Chief Pediatric ED	None	None	None	None	None	None
Jeffrey D. Ferguson	Brody School of Medicine, East Carolina University–Assistant Professor	None	None	None	None	None	*Serving as an expert witness in two ongoing lawsuits involving EMS related cases. Billing for this service has not yet occurred and will likely represent less than $10,000 per 12 months. This payment is expected to come directly to me
Leon Chameides	Emeritus Director Pediatric Cardiology, Connecticut Children's Medical Center, Clinical Professor, University of Connecticut	None	None	None	None	None	None
Pascal Cassan	French Red Cross, National Medical Advisor and Coordinator of the European Reference Centre for first aid education Coordinator of the Scientific Commission of First Aid for the French Interior Ministry (unpaid)	None	None	None	None		None
Kin-Lai Chung	Hong Kong Hospital Authority Hospital Chief Executive	None	None	None	None	None	None
Jonathan Epstein	NorthEast Emergency Medical Services, Inc.– Regional EMS Council: Provide EMS System Oversight. Also provide education (First aid and CPR/AED) as an AHA Training Center. Executive Director; Isis Maternity: Pre-Natal and Post Partum edu.- Provide CPR and First Aid Training via AHA Curriculum. For-Profit Company—Instructor	None	None	None	None	*Volunteer: American Red Cross Advisory Council on First Aid, Aquatics, Safety and Preparedness (ACFASP) Vice-Chair	None
Louis Gonzales	City of Austin - Office of the Medical Director: EMS System Medical Director Staff–Performance Management & Research Coordinator *Beginning July 1, 2009, I will serve as a paid consultant to the AHA ECC Product Development Group as a Senior Science Editor. This assignment will include providing Science review of AHA First Aid Products	None	None	None	None	None	None
Rita Ann Herrington	Minute Clinic–Family Nurse Practitioner	None	None	None	None	None	None
Jeffrey Pellegrino	Kent State University–Assistant Dir Faculty Professional Dev. Center	None	None	None	None	†Wilderness First Aid consultant for StayWell publishing	None
Norda Ratcliff	Bloomington Hospital Prompt Care–Nurse Practitioner	None	None	None	None	None	None
Adam Singer	Stony Brook University-Physician	None	None	None	None	None	None

This table represents the relationships of writing group members that may be perceived as actual or reasonably perceived conflicts of interest as reported on the Disclosure Questionnaire, which all members of the writing group are required to complete and submit. A relationship is considered to be "significant" if (a) the person receives $10 000 or more during any 12-month period, or 5% or more of the person's gross income; or (b) the person owns 5% or more of the voting stock or share of the entity, or owns $10 000 or more of the fair market value of the entity. A relationship is considered to be "modest" if it is less than "significant" under the preceding definition.

*Modest.

†Significant.

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