T1

The American Heart Association (AHA) and the American Red Cross (ARC) cofounded the National First Aid Science Advisory Board (Table) to review and evaluate the scientific literature on first aid. The goals of the National First Aid Science Advisory Board were to reduce morbidity and mortality due to emergency events and to analyze the scientific evidence that answers the following questions:

- What are the most common emergency conditions that lead to significant morbidity and mortality?
- In which of these 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?

This critical review of the scientific literature resulted in a Consensus on Science for First Aid With Treatment Recommendations, from which these guidelines are derived.1 The critical review and evaluation of the literature identified areas for future scientific research.

**Background**

From the perspective of the 21st century, the need for first aid training seems self-evident, but the history of organized first aid spans only 120 years. There is evidence, though, that Native Americans practiced first aid and taught it. For example, 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 inflammations.2

Modern first aid evolved from military experience 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 develop the first curriculum in first aid.3 Training in first aid began in the United States in 1903 when Clara Barton, president of the ARC, 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. In 2000 the first evidence-based guidelines in first aid were developed by the AHA in collaboration with the International Liaison Committee on Resuscitation (ILCOR).4 Many organizations have developed training programs in first aid.

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**What Really Works in First Aid?**

Members of the National First Aid Science Advisory Board reviewed morbidity data from the Centers for Disease Control and Prevention and first aid texts and reviewed published studies to identify and evaluate the scientific basis for first aid recommendations. Previous studies5–7 have noted the paucity of scientific evidence to support many interventions in prehospital emergency care. Many first aid practices rest on an equally precarious scientific foundation. The information presented here represents a consensus of evaluation of the evidence on common first aid interventions.

**Definition of First Aid**

The National First Aid Science Advisory Board defined first aid as 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. The board recognizes that certain conditions that can be treated with first aid may not require EMS involvement or assistance by other medical professionals. The National First Aid Science Advisory Board strongly believes that education in first aid should be universal: everyone can learn first aid and everyone should.

The National First Aid Science Advisory Board recognized that the scope of first aid is not purely scientific and is related to both training and regulatory issues. The definition of scope is therefore variable, and it should be defined according to circumstances, need, and regulatory requirements.

These 2005 First Aid Guidelines differ from the recommendations in the First Aid section in the ECC Guidelines 2000 in the increased number of topics, the inclusion of representatives from many organizations involved with First Aid education in discussions leading to the guidelines, and the cosponsorship by the AHA and ARC. An important byproduct of these discussions is to again emphasize the paucity of evidence to guide first aid interventions. Very little research is being conducted in first aid, and many of the following recommendations have had to be made by extrapolation from the experience of healthcare professionals. It is important to recognize the limitations of the evidence so that research can be undertaken and future guidelines can be based on a larger body of scientific evidence.

**Calling for Help**

The single most important information for a first aid provider is to know how to get help. Rescuers should learn how and when to access the EMS system, how to activate the on-site...
Positions the Victim
As a general rule, a victim should not be moved, but there are times when you should do so:

- If the area is unsafe for you or the victim, move the victim to a safe location.
- If the victim is face down and needs CPR, turn the victim face up.
- If the victim is unresponsive, has an open airway, and is breathing spontaneously, turn the victim onto his or her side (recovery position) with the victim’s hand in front of the face, breathing difficulty, shock, and even death. Many people with a history of anaphylaxis carry a lifesaving epinephrine auto-injector. With proper training, parents can be taught to correctly use the auto-injector to administer epinephrine to their child. Unfortunately all too often neither the victim nor family members know how to use an auto-injector correctly. First aid providers should be familiar with the epinephrine auto-injector so that they can help someone having an anaphylactic reaction self-administer the epinephrine. First aid providers should be able 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 (Class IIb; LOE 7). They are not expected to make a diagnosis, but they can assist the victim under the following conditions:
  - The victim states that he or she is having an asthma attack and has medications or an inhaler.
  - The victim identifies the medication and is unable to administer it without assistance.

Seizures
The general principles of first aid management of seizures are to (1) prevent injury, (2) ensure an open airway, and (3) ensure that the airway remains open after the seizure has ended.

Medical Emergencies
There is insufficient evidence to recommend for or against the use of oxygen by a first aid provider (Class Indeterminate), and concern exists that oxygen administration may delay other interventions.

Oxygen

Anaphylaxis
Allergies are relatively common, but only a small proportion of people with allergies develop anaphylactic reactions. An anaphylactic reaction is characterized by swelling, especially of the face, breathing difficulty, shock, and even death. Many people with a history of anaphylaxis carry a lifesaving epinephrine auto-injector. With proper training, parents can be taught to correctly use the auto-injector to administer epinephrine to their child. Unfortunately all too often neither the victim nor family members know how to use an auto-injector correctly. First aid providers should be familiar with the epinephrine auto-injector so that they can help someone having an anaphylactic reaction self-administer the epinephrine. First aid providers should be able 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 (Class IIb; LOE 7).
Injury Emergencies

Bleeding
Control of bleeding is one of the few actions by which you can critically influence outcome. Control external bleeding by first aid providers are unknown, but the use of tourniquets is potentially dangerous (Class Indeterminate). Tourniquets are routinely used in the operating room under controlled conditions and have been effective in controlling bleeding from an extremity, but potential undesired effects include temporary or permanent injury to the underlying nerves and muscles, as well as systemic complications resulting from limb ischemia, including acidemia, hyperkalemia, arrhythmias, shock, limb loss, and death. Complications are related to tourniquet pressure and occlusion time. Pressure has been found to be superior to tourniquets in controlling bleeding, although tourniquets may be useful under some unique conditions (eg, the battlefield, when rapid evacuation is required and ischemic time is carefully monitored). The method of application and the best design of tourniquets are under investigation.

There is insufficient evidence to recommend for or against the first aid use of pressure points or extremity elevation to control hemorrhage (Class Indeterminate). The efficacy, feasibility, and safety of pressure points to control bleeding have never been subjected to study, and there have been no published studies to determine if elevation of a bleeding extremity helps in bleeding control or causes harm. Using these unproven procedures has the potential to compromise the proven intervention of direct pressure.

Wounds and Abrasions
Injure wounds and abrasions with clean running tap water (Class IIa; LOE 1; 53,36; 73–39) for ≥5 minutes or until there appears to be no foreign matter in the wound. If running water is unavailable, use any source of clean water. Wounds heal better and with less infection if an antibiotic ointment or cream is used (Class IIa; LOE 1; 40,41; and evidence extrapolated from LOE 2 studies to first aid = LOE 7;42–47); triple antibiotic ointment appears to be superior to single antibiotic ointment or cream (Class IIb; LOE 141). Apply antibiotic ointment or cream only if the victim’s wound is an abrasion or is superficial.

Burns

Thermal Burns
Cool thermal burns with cold water as soon as possible (Class IIa; LOE 4; 49; 50–52; 64) and continue at least until pain is relieved. Cooling reduces the injury and relieves pain. There is some evidence that brief cooling of small burns with ice water may be effective (LOE 5), but direct application of ice to a burn may produce tissue ischemia, and prolonged cold exposure even of small burns can lead to further injury. Avoid cooling of burns with ice or ice water for longer than 10 minutes, especially if the burn is large (>20% of body surface area) (Class III; LOE 6).
Dental Injuries
Traumatic dental injuries are common. The first aid for dental injuries:

- Handle the tooth by the crown, not the root (do not handle the part that was embedded in the gum).
- Clean bleeding wounds with saline solution or tap water.
- Stop bleeding by applying pressure with a piece of cotton for 5 minutes.
- If there is an avulsed tooth, rinse it in water (do not scrub it), place it in milk, and bring it with you and consult a dentist as quickly as possible (Class IIa).88–91
- If there are other dental injuries, consult a dentist.

Environmental Emergencies
Snakebite
Do not apply suction as first aid for snakebite (Class III; LOE 592; 693,94). Suction does remove some venom, but the amount is very small, and suction has no clinical benefit, and it may aggravate the injury.96

In case of an elapid (eg, coral) snakebite, wrap a bandage snugly (comfortably tight but loose enough to slip or fit a finger under it) around the entire length of the bitten extremity, immobilize the extremity, and get definitive medical help as rapidly as possible (Class IIa; LOE 397; 698–100). Wrapping the extremity slows dissemination of venom by slowing lymph flow.97–101 There is a paucity of studies evaluating whether pressure and immobilization bandage are effective in bites by nonelapid snakes.

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. Immediately begin rewarming a victim of hypothermia (Class IIa; LOE 2102; 5104–108; 8109,110). Move the victim to a warm environment, remove wet clothing, and wrap all exposed body surfaces with anything at hand, including blankets, clothing, newspapers, etc. If you are far from definitive health care, you may begin active rewarming for a victim of hypothermia (Class IIb; LOE 2102; 5103; 8109,110). For example, active rewarming may be achieved by placing the victim near a heat source and placing containers of warm, but not hot, water in contact with the skin. Active rewarming should not delay definitive care.

Frostbite
Frostbite usually affects an exposed extremity. In case of frostbite, remove wet clothing and make sure the victim does not develop hypothermia. Get the victim to a medical facility as rapidly as possible. Do not try to rewarm the frostbite if there is any chance that it might refreeze or if you are close to a medical facility. If you are in a remote area far from a medical facility, you may slowly rewarm the frostbite using warm water (100°F to 105°F) (Class Indeterminate).

Drowning
Drowning is a major cause of unintentional death. It can be prevented with isolation fencing around swimming pools (gates should be self-closing and self-latching),111 wearing personal flotation devices (life jackets) while in, around, or on water, and never swimming alone.

Outcome following drowning depends on the duration of the submersion, the water temperature, and how promptly CPR is started.112,113 Case reports have documented intact neurologic survival in small children following prolonged submersion in icy waters.114,115 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 if it does not delay removing the victim from the water. There is no evidence that water acts as an obstructive foreign body, so don’t waste time trying to remove it. Start CPR with 2 effective ventilations and continue with 5 cycles (about 2 minutes) of chest compressions and ventilations before activating EMS. If 2 rescuers are present, send the second rescuer to activate EMS immediately.

**Poison Emergencies**

**Poison Control Centers**

There are a large number of poisonous substances in the home and worksite. It is important to understand the toxic nature of the chemical substances in your environment and the proper protective equipment and emergency procedures in case of toxic exposure. The Poison Control Center (800-222-1222) is an excellent resource for treating ingestion of, or exposure to, a potential poison. Inform the Poison Control Center of the nature of the exposure, the 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 and make sure not to contaminate yourself in the process. In case of an acid or alkali exposure to the skin or eye, immediately irrigate the affected area with copious amounts of water (Class I; LOE 4; 6).

**Ingested Poisons**

**Milk or Water**

Do not administer anything by mouth unless advised to do so by a poison control center (Class IIb). Animal studies suggest that dilution or neutralization of a caustic agent by water or milk reduces tissue injury, but no human studies have shown a clinical benefit, and the possibility of emesis with aspiration must be considered (Class Indeterminate).

**Activated Charcoal**

There is insufficient evidence to recommend for or against the use of activated charcoal as first aid for ingestions (Class Indeterminate). Until more definitive evidence becomes available, don’t administer activated charcoal unless you have been advised to do so by a poison control center. Activated charcoal is effective for adsorbing toxins, but there is no evidence that charcoal administered by a first aid provider improves outcome. Many children will not take the recommended dose (LOE 3) and there are reports of harm. Ipecac is contraindicated in hydrocarbon or corrosive substance ingestion.

**References**


Mission of the American Red Cross

The American Red Cross, a humanitarian organization led by volunteers and guided by its Congressional Charter and the Fundamental Principles of the International Red Cross Movement, will provide relief to victims of disaster and help people prevent, prepare for, and respond to emergencies.

Development of the Guidelines for First Aid

In 2004 the American Red Cross and the American Heart Association (AHA) co-founded the National First Aid Science Advisory Board to review and evaluate the scientific literature on first aid. The goals of the National First Aid Science Advisory Board are to reduce morbidity and mortality due to emergency events and to analyze the scientific evidence.

Advisory Council on First Aid and Safety

The American Red Cross Advisory Council on First Aid and Safety is an independent panel of nationally recognized health and safety experts formed by Red Cross national headquarters in late 1998. ACFAS includes experts from diverse fields such as emergency medicine, occupational health, sports medicine, school health, EMS response and disaster mobilization. ACFAS was formed to establish the American Red Cross as the standard-setter in first aid care. It is charged with advising the Red Cross in areas related to the development and dissemination of audience-appropriate information and training in first aid and safety.

For more information visit www.redcross.org