

DIGITAL STUDENT BOOK  
ONLINE VERSION

STUDENT BOOK



# PediatricPlus

CPR, AED, and First Aid  
for Children, Infants,  
and Adults



# MEDIC First Aid

## PediatricPlus

CPR, AED, and First Aid  
for Children, Infants, and Adults

### Student Book

Version 8.0

#### Purpose of this Guide

This MEDIC First Aid *PediatricPlus Version 8.0 Student Book* is solely intended to facilitate certification in a MEDIC First Aid PediatricPlus CPR, AED, and First Aid for Children, Infants, and Adults training class. The information in this book is furnished for that purpose and is subject to change without notice.

MEDIC First Aid certification may only be issued when a MEDIC First Aid–authorized Instructor verifies a student has successfully completed the required core knowledge and skill objectives of the program.

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# Pediatric First Aid Provider



Medical emergencies involving children can happen anywhere, at any time. Millions of emergency department visits for pediatric injuries and illnesses occur in the United States every year.

## *Pediatric First Aid*

Safe practices in child care settings, home, and play can prevent many pediatric injuries, illnesses, and deaths from occurring. However, once a sudden injury or illness has occurred, effective pediatric first aid can often minimize its severity, improve recovery, or prevent permanent disability or death.

Pediatric first aid is the immediate care given to a suddenly ill or injured child until a medical professional or a parent or legal guardian assumes responsibility. It does not take the place of proper medical treatment.<sup>1</sup>

Pediatric first aid is intended to:

- Preserve life,
- Alleviate suffering,
- Prevent further illness or injury, and
- Promote recovery.

Pediatric first aid can be initiated by anyone in any situation.

## Pediatric First Aid Provider

A pediatric first aid provider is trained to:

- Recognize and assess the need for first aid,
- Provide appropriate first aid care, and
- Recognize limitations, and seek professional medical assistance when necessary.



### *CHILDREN AND EMERGENCIES*

Organizations with staff members trained in pediatric first aid, including pediatric CPR, and a facility designed to ensure the safety of children reduce the potential for the death or injury of a child. Wherever children are commonly found, it is appropriate to have an adult trained to assess for and provide initial treatment for common pediatric injuries, illnesses, and life-threatening emergencies.

### *AGE-RELATED BEHAVIORS*

Behavior at each stage of development also carries increased risk. An infant may turn over unexpectedly and fall if left unattended on a changing table, couch, or other high surface.

At 3 to 6 months of age infants begin putting things in their mouths. Their underdeveloped sense of taste and inability to recognize danger increases the risk of poisoning and choking.

As infants learn to move, they can encounter new and unexpected hazards. Toddlers love to independently walk, run, and explore. They can get into problems quickly, without warning.

The risk of injury increases as children learn to use new things such as bicycles, scooters, skates, and skateboards. Curiosity can lead to the risk of burns from matches, lighters, wood stoves, and ovens.

### *DISRUPTION TO ROUTINE*

Certain circumstances or disruptions in a child's routine can increase risk of a medical emergency. These can include traveling; a move to a new home; a busy holiday; when the child is hungry or thirsty; when someone other than the normal caregiver is taking care of the child; when the child is left unattended; when another family member is ill; or when the caregiver is tired and stressed.



### **COMMUNICATION**

Another special consideration when providing first aid care for children is that communicating with a child is more difficult. Using child-friendly communication techniques can help you effectively provide care. These include:

- Maintain a calm, confident tone while speaking to him or her.
- Tell the child your name and ask for his or hers, then use his or her name during the course of your care.
- Look and talk to the child, involving him or her in making decisions.

### **BUILDING TRUST**

Consider the following recommendations to help quickly build trust when communicating with an ill or injured child.

- Get down to the child's eye level.
- Approach slowly and establish eye contact.
- Involve parents/guardians if present or say if you have contacted them.
- Remain calm and use a gentle voice.
- Ensure the child understands you by speaking slowly, simply, and asking questions.
- Never lie, even to give the child reassurance.
- Reassure the child he or she will not be left alone; you will remain and help.
- Include the child in general conversation when other adults are there.

### **CONTACT INFORMATION**

Maintain current contact information on each child to include the following:

- Name
- Birth date
- Sex
- Date of admission
- Name and phone number of child's physician and dentist
- Dietary restrictions and allergies
- Signed and dated by the parent

Maintain the confidentiality and security of all the records for children.

### **PARENTAL NOTIFICATION**

Whenever a child is seriously ill or injured, a parent or guardian should be contacted as soon as possible. However, never delay calling EMS to do so. Call EMS immediately any time you recognize an emergency exists or you believe a child needs professional medical attention.

Reassure the parent or guardian that a staff member will remain with the child until the parent or guardian assumes responsibility.

## Recognizing an Emergency

As a trained pediatric first aid provider, you must be able to recognize a medical emergency exists. Often, emergency situations are unexpected events and can be confusing.



A general impression is a quick sense of what has occurred, or is occurring, when you first observe an emergency scene. This impression can provide important clues to help guide you as you continue.

- Where is the child located?
- How is the child's body positioned?
- Does the child appear to be responsive?
- Does the child look sick or injured?

## Mechanism of Injury

If you suspect an injury, how do you think it happened? Injuries occur due to physical force against the body. The manner in which force creates an injury is called the mechanism of injury. Mechanisms with significant force are best assumed to result in serious injury until proven otherwise.

## Personal Safety

Emergency scenes are often unsafe. Your personal safety is the highest priority, even before the safety of an ill or injured child. Putting yourself in danger to help can make the situation worse.

Always pause for a moment before approaching. Look for obvious hazards. Consider the possibility of hidden dangers. If the scene is unsafe, do not approach. If your current location becomes unsafe, get out!

### SETUP

SETUP is a mnemonic device that can help you remember the important points of making sure it is safe to provide care:

- Stop — Pause to identify hazards
- Environment — Consider your surroundings
- Traffic — Be careful along roadways
- Unknown Hazards — Consider things that are not apparent
- Personal Safety — Use protective barriers

## Deciding to Help

One of the most difficult decisions to make is whether or not to get involved when you think a medical emergency has occurred. It is normal to feel hesitant about your ability to help.



*You might hesitate because you feel like the problem is too big for you to handle alone.*

- You are only the first link in a progressive chain of emergency care. Your involvement lasts only until relieved by another pediatric first aid provider, responding EMS personnel, or a parent or legal guardian—in most cases, a very short period of time.

*You might hesitate for fear of making things worse.*

- Your training provides you with sound knowledge and skills designed only to help — and not harm — those in need.

*You might also hesitate because you think you don't have a lot of medical knowledge.*

- Extensive medical knowledge is not necessary. Pediatric first aid is simple and easy to provide.

*Finally, you might hesitate because there are others around who you think might take charge.*

- In fact, others may feel the same way, resulting in no one stepping forward to help.

If it is safe to do so, take action! Put what you learn in this program to work. Your actions can help to protect or save a child's life.



## Knowledge Check

You are supervising children playing outside at a daycare facility. One of the children, riding a scooter, abruptly collides and knocks down another child standing in the play yard. The child on the scooter appears uninjured, but the child who was struck is holding his abdomen and groaning. You have been trained as a pediatric first aid provider and think you can help, but you hesitate because you are unsure about your ability to help. What should you do?

# Protecting Yourself



When caring for a child, you can be exposed to blood or other potentially infectious body fluids. While the risk of contracting a disease is very low, it is wise to take simple measures to avoid exposure in the first place.

## *Infectious Bloodborne Diseases*

Infectious bloodborne diseases include Hepatitis B, Hepatitis C, and HIV, the virus that causes AIDS.

Exposure can occur through the direct contact of infectious material with an open wound or sore, or absorbed through the membranes of the mouth, nose, and eyes. Exposure can also occur through a skin puncture with a contaminated, sharp object.

## *Standard Precautions*

Reducing exposure lowers the chance of infection. Standard precautions is a set of protective practices used whether or not an infection is suspected. To be effective, your approach is the same for everyone, regardless of relationship or age.



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## Personal Protective Equipment

Personal protective equipment (PPE), describes protective barriers worn to prevent exposure to infectious diseases. Disposable gloves are the most commonly used protective barrier. Make sure they are readily available and always use them.

Inspect gloves for damage or tears when you put them on. If damaged, replace them immediately. After providing care, always remove contaminated gloves carefully. Throw away gloves in an appropriate container to prevent any further contact.



Even after using gloves, use soap and water to clean your hands or any exposed skin. Use an alcohol-based hand sanitizer if soap and water are not available.

A CPR mask or shield is recommended when providing rescue breaths during CPR.

Another commonly used PPE, a face shield, can be used to prevent mouth, nose, and eye exposure from the possibility of the splashing or spraying body fluids, such as in severe bleeding.

The use of PPE is expected in your role as a trained pediatric first aid provider at work. Your employer is responsible for making sure appropriate PPE is available. It is recommended to have and use PPE outside of work. Depending on the circumstances and your relationship to a child, you may elect not to use it.

## OSHA Bloodborne Pathogens Standard

In 1991, the Occupational Safety and Health Administration (OSHA) released the Bloodborne Pathogens Standard to protect workers from the risk of exposure to bloodborne infectious diseases. The standard applies to anyone who has occupational exposure to blood or other potentially infectious materials and provides information on how to reduce risk of exposure in the workplace.

Employees should review their company's Exposure Control Plan for site-specific information on how to reduce exposure. More information can be found at [www.osha.gov](http://www.osha.gov) and [www.cdc.gov](http://www.cdc.gov).

## Hand Washing Procedures

Hand washing is the simplest and most effective method of reducing the spread of infectious disease.

Use soap, preferably liquid and warm running water. Rub your hands vigorously as you wash them. This action removes germs. Wash all surfaces, including the back of the hands, wrists, and between fingers.

Rinse your hands well. Leave the water running and dry your hands with a single-use towel. Turn off the water using the paper towel instead of bare hands.

## Spreading Disease

There are some common things that can contribute to the spread of disease:

- Inability to wash hands
- Preparation of food
- Shared bathrooms
- Use of diapers
- Multiple people in a shared space
- Handling pets



## Knowledge Check

True or false? You are caring for your 11-year-old niece, who has been injured and is bleeding heavily. Because she is related to you, it is not important to use personal protective equipment to protect yourself from possible exposure to an infectious disease.

## Disinfecting Surfaces

It is no longer possible to provide a generic bleach recipe for sanitizing and disinfecting in early care and education programs. The current recommendation is to use an Environmental Protection Agency (EPA) registered product and follow the label instructions for use.<sup>2</sup>

For more information, see <https://www.epa.gov/pesticide-registration/selected-epa-registered-disinfectants>.

## Latex Allergy

Natural rubber latex allergy is a serious medical problem. Anyone who uses latex gloves frequently is at risk for developing it. Simple measures such as the use of non-powdered latex gloves or non-latex alternatives can stop the development of latex allergy and new cases of sensitization. A person with latex allergy must limit or avoid exposure to latex products and should carry an epinephrine auto-injector for emergency treatment.<sup>3</sup>

# Removing Contaminated Gloves



## Grasp First Glove

- After providing care, always remove contaminated gloves carefully.
- Avoiding bare skin, pinch the glove at either palm with the gloved fingers of the opposite hand.



## Remove Inside Out

- Gently pull the glove away from the palm and toward the fingers, turning the glove inside out without snapping.
- Gather the glove you just removed with your gloved hand.



## Slide Finger under Second Glove

- Carefully slide your bare index finger inside the wrist band of the gloved hand.



## Remove Inside Out

- Gently pull outwards and down, inverting the glove and trapping the first glove inside.
- Throw away gloves in an appropriate container to prevent any further contact.
- Use soap and water to clean your hands and any exposed skin. Use an alcohol-based hand sanitizer if soap and water are not available.



# Legal Considerations



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From a legal perspective, medical emergencies involving young children and adolescents are different than those involving adults.

## *Consent*

A pediatric first aid provider must have permission, or consent, from a parent or legal guardian to give first aid care. In the child care or school setting, consent is typically established ahead of time during the enrollment process by obtaining a signed authorization for emergency medical or dental care.<sup>4</sup>

## *Implied Consent*

When a child has a life-threatening illness or injury and a parent or guardian is not present, the legal concept of “implied consent” assumes a parent or legal guardian would give permission to provide care for their child.<sup>5</sup>

### *OTHER LEGAL CONSIDERATIONS*

**Duty to Act** — A predetermined requirement to provide care, typically by job description (such as firefighter, police officer, or lifeguard) or by relationship (such as parent or guardian). In general, a pediatric first aid provider is encouraged, but not required by duty, to act.

**Negligence** — Occurs when someone is caused further harm due to care that did not meet the expected standard of someone with a duty to act.

**Assault and Battery** — Placing a person in fear of bodily harm. Forcing care on a person against his or her wishes may be considered grounds for this.



## Abandonment

Once care has begun, remain with an ill or injured child until someone with equal or greater emergency medical training takes over or a parent or legal guardian assumes responsibility. If you are alone, and unable to use a mobile phone, you may need to leave to activate EMS. Return to the child as soon as you can.

## Good Samaritan Laws

Some people fear being sued as a result of incorrectly performing first aid in an emergency. In almost every case, this fear is unwarranted.

All states have passed what are known as Good Samaritan laws to encourage bystanders to assist those in need. These laws help protect anyone who

- Voluntarily provides assistance, without expecting or accepting compensation,
- Is reasonable and prudent,
- Does not provide care beyond the training received, and
- Is not grossly negligent, or completely careless, in delivering emergency care.



Good Samaritan laws vary from state to state. Become familiar with the laws in your state and other states where you work or travel.

Regardless of location, simply use common sense and never attempt skills that exceed your training.



## Knowledge Check

You are taking care of some things in your backyard when you hear a commotion in the yard next to yours. Looking over the fence, you see one of your neighbor's sons pulling his 7-year-old brother's limp body out of their backyard pool. Their parents do not appear to be home. You climb the fence and help lay the boy on the grass and he does not respond to your voice or touch. You immediately begin to help. What legal concept related to providing first aid care applies in this situation?

# Calling for Help



An essential role of the pediatric first aid provider is recognizing when additional help is needed and knowing how to call for it. This includes learning how and when to activate the EMS system, contact your local poison control center, and use the emergency plan in your workplace.

## ***Emergency Medical Services (EMS)***

Emergency medical services (EMS), describes the prehospital emergency medical response system developed within a community. An EMS system uses specialized emergency communication equipment to gather information and dispatch appropriate emergency resources.

Trained EMS providers within the system respond directly to emergency scenes, provide advanced medical care, and transport ill or injured people to a hospital.

Activating the EMS system usually consists of calling an easy to remember emergency number, such as 911.



EMS activation is appropriate when there are immediate threats to life, a significant mechanism of injury has occurred, warning signs of serious illness exist, or if you are unsure about the severity of a child's condition.

When you make a phone call to activate EMS, a trained dispatcher will guide you through the call. EMS dispatchers are also trained to guide you in the care you provide, especially with CPR.



The dispatcher will ask for basic information, such as your location, the type of emergency that has occurred, and what care is being provided. Answer questions as clearly and concisely as you can. Appropriate resources will be notified to respond while you are on the line.

The majority of emergency calls in the U.S. are now made on mobile phones. With a mobile phone, you can quickly activate EMS while staying in place next to the affected child. The speaker function of a phone allows you to listen to the dispatcher and provide care at the same time.

### Poison Help Line

Young children are much more likely to be involved in a poisoning than an adult. Poison control centers offer free, confidential medical advice 24 hours a day, seven days a week through the national Poison Help line at 1-800-222-1222. This service provides a primary resource for poisoning information and care for suspected poisonings.

### Emergency Plans

A child care facility should have a written emergency plan for urgent medical problems that provides detailed information on how to respond to and report on emergencies involving children, staff, or volunteers.



When a medical emergency occurs, procedures should also be in place to ensure other children are moved away from the emergency, properly supervised, accounted for, and safe.

Emergency plans should take into account the specific layout, size, and features of a particular location. Child care providers should review the plan when employed and at least annually after.

Activating an emergency action plan may be as simple as dialing 911. Make sure you understand your emergency action plan so you know how to report and respond to emergencies at work.

## EMERGENCY PLANS

In the United States, the Occupational Safety and Health Administration (OSHA) regulations require employers to have an emergency plan in writing, kept in the workplace, and available to employees. In a typical workplace, the emergency plan should contain specific procedures on the following:

- How designated first aid workplace providers are notified to respond
- What is expected of workplace providers when they respond
- How to activate EMS from the worksite
- How to efficiently help EMS get to an ill or injured person

A child care facility should have a written plan for handling emergencies involving children, staff, or volunteers. All child care providers should review the plan upon employment and at least once a year after that. It is essential to be familiar with the facility's emergency plan. According to national standards, it should include, at a minimum, procedures for:

- Managing emergencies for children with special health needs
- Notification of parent or guardian
- Accompanying a child to an urgent care facility and remaining with the child until the parent or guardian assumes responsibility
- Getting emergency medical care and consent forms signed by the parent or guardian to medical personnel
- Managing other children during an emergency
- Providing a backup caregiver, teacher, or substitute
- Pre-planning what urgent care facility to use
- Completion of a written incident or injury report
- Inspection and restocking of first aid kits
- Reviews of staff members' ability to perform first aid
- Staff supervision following an incident when a child is lost, missing, or seriously injured

## Children with Special Health Needs

Children with special health needs are children who require prescription medication; need extra medical, mental health, or educational services; have ongoing emotional, behavioral, or developmental problems; have activity restrictions; or use specialized therapies.<sup>6</sup>



Some children have conditions that require daily treatments. The need for prescription medication is by far the most common.<sup>6</sup> However, some children just require attention to signs of impending illness and a timely response.<sup>7</sup>

A child with a known medical condition should have both a routine and emergency individual care plan provided by the child's primary medical provider.

If a child with a potentially life-threatening special healthcare need is present, a staff member trained in pediatric CPR, first aid, and the administration of any required medication should be available at all times.<sup>8</sup>

More information on children with special health needs, including a care plan form, can be found in *Caring for Our Children: National Health and Safety Performance Standards; Guidelines for Early Care and Education Programs*, 3rd Edition at <http://nrckids.org/CFOC3>.

### **Injury Reporting**

State child care licensing offices require reporting of injuries. Many states have specific forms that must be used. You should be familiar with the reporting requirements in your state.



National standards recommend that report forms provide the following information:

- Name, sex, and age of the injured child
- Date and time of injury
- Location where injury took place
- Description of how the injury occurred, including those who saw the incident, what they reported, and what was reported by the child
- Body parts involved
- Description of any consumer product involved
- Name and location of the staff member responsible for supervising the child at the time of the injury
- Actions taken by staff members on behalf of the injured
- Recommendations for preventive strategies to avoid future occurrences
- Name of person who completed the report
- Name, address, and phone number of the facility
- Signature of the child’s parent or guardian or of the adult injured
- Documentation that the report was sent home the day of the injury

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Most states require that child care facilities maintain first aid supplies in each location where children are cared for, including on field trips and in vehicles. Supplies should be clearly labeled, accessible to staff, and out of reach of children.



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### Knowledge Check

You are monitoring a group of first grade children on the playground during recess when you notice one of the students curled up on the ground. You approach her and can see she is in distress. You are unsure about what is happening, but you feel it could be serious. Should you activate EMS?

---

# Emergency Moves



It is best not to move a seriously injured child unless he or she is clearly endangered or requires life-supporting care. The greatest concern is the chance of making existing problems, such as a spinal injury, worse.

If it is necessary to move a smaller child, it may be easiest to simply carry him or her. To move a larger child you cannot carry, the most effective move to use is a drag. When using a drag, pull in the direction of the long axis of the body to keep the spine in line. Never pull on a child's head, or pull a child's body sideways.

When moving someone, use your legs, not your back, and keep the child as close to your body as possible. Avoid twisting. Consider the child's weight. Know your physical ability and respect your limitations.

Common drags include the following:

- Extremity drag — grasp and pull on the ankles or forearms
- Clothing drag — pull on a child's shirt in the neck and shoulder area
- Blanket drag — roll a child onto a blanket and drag the blanket



## Knowledge Check

A fire has broken out in the elementary school you are working in, and you are quickly evacuating with other staff and students. As you exit, you find a student who has collapsed to the floor and is not moving. Smoke is quickly filling the area you are in. What should you do for the collapsed student?



# Cardiac Arrest

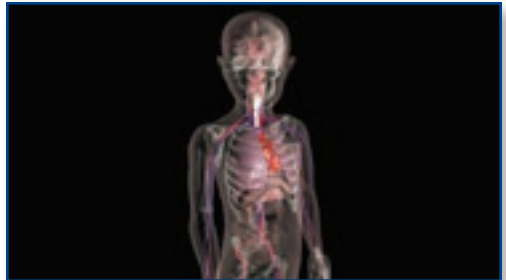


Because the human body cannot store oxygen, it must continually supply tissues and cells with oxygen through the combined actions of the respiratory and circulatory systems.

## *Oxygen and the Human Body*

The respiratory system includes the lungs and the airway, the passage from the mouth and nose to the lungs. Expansion of the chest during breathing causes suction, which pulls outside air, containing oxygen, through the airway and into the lungs. Relaxation of the chest increases the pressure within and forces used air to be exhaled from the lungs.

The circulatory system includes the heart and a body-wide network of blood vessels. Electrical impulses stimulate contractions of the heart to create pressure that pushes blood throughout the body. Blood vessels in the lungs absorb oxygen from inhaled air. The oxygen-rich blood goes to the heart, then out to the rest of the body.



Large vessels called arteries carry oxygenated blood away from the heart. Arteries branch down into very small vessels that allow oxygen to be absorbed directly into body cells. Veins return oxygen-poor blood back to the heart and



lungs where the cycle repeats. The brain is especially sensitive to a lack of oxygen. When oxygen is cut off, cell damage, and death, can occur within a matter of minutes.

### Secondary Cardiac Arrest

Cardiac arrest is the loss of the heart's ability to pump blood to the body. Cardiac arrest in children is usually the end result of the loss of breathing. This is known as secondary cardiac arrest.

Causes of secondary cardiac arrest include the following:

- Sudden Infant Death Syndrome (SIDS)
- Suffocation
- Entrapment
- Drowning
- Choking
- Drug overdoses

With no incoming oxygen, the heart progressively becomes weaker until signs of life become difficult or impossible to assess.



#### SIDS

Sudden Infant Death Syndrome (SIDS) is the sudden and unexplained death of a baby under one year of age. Because many SIDS babies are found in their cribs, it is often referred to as “crib death.”

The exact cause of SIDS is not yet known, but it is the leading cause of death in babies after one month of age. Most deaths occur in babies who are between 2 and 4 months old.

Babies placed on their stomachs to sleep are much more likely to die of SIDS than babies placed on their backs.

For more information about SIDS and the National Institute of Child Health and Human Development's Back to Sleep campaign, visit <http://www.nichd.nih.gov/sids/>

There are other causes of sudden unexpected infant death that occur during sleep, including suffocation, asphyxia, and entrapment. The American Academy of Pediatrics recommends focusing on a safe sleep environment to reduce the risk of all sleep-related infant deaths, including SIDS. These recommendations include use of a firm sleep surface, breastfeeding, room-sharing without bed-sharing, routine immunizations, consideration of using a pacifier, and avoidance of soft bedding, overheating, and exposure to tobacco smoke, alcohol, and illicit drugs.<sup>9</sup>

## Cardiopulmonary Resuscitation (CPR)

Cardiopulmonary resuscitation (CPR) is the immediate treatment for cardiac arrest. CPR restores limited oxygen to the brain through a combination of chest compressions and rescue breaths.



When a child's heart stops or is too weak to create obvious signs of life, early CPR, with an emphasis on effective rescue breaths, offers the best chance for survival.<sup>10</sup>

CPR skills vary a bit, depending on age. When describing age groups in relation to CPR, an infant is younger than 1 year of age. A child is 1 year of age until the onset of puberty. Puberty can be estimated by breast development in females and the presence of armpit hair in males. An adult is from the onset of puberty and older.

### Pediatric Chain of Survival

The pediatric chain of survival is often used to describe the best approach for treating a child in cardiac arrest. Each link in the chain is essential for a child to survive. If a single link is weak or missing, the chances for survival are greatly reduced. The greatest chance exists when all the links are strong.



- Prevention of the typical causes for airway and breathing emergencies
- Early CPR, with an emphasis on effective rescue breaths
- Prompt activation of EMS to quickly get professional care
- Effective basic and advanced EMS care and transport, and
- Effective post-cardiac arrest care at a hospital

### Opioid Overdose

The abuse of opioid drugs is a serious and growing health problem. Increasing prescriptions for opioid pain relievers, such as hydrocodone and oxycodone, have made them more commonly available. The use of heroin, a highly addictive opioid, is also contributing to the problem.

As a result, overdoses and deaths from prescription opioids and heroin have risen dramatically among both adults and adolescents.<sup>11</sup> With wider availability, the chance of an accidental overdose of a young child has also increased.

Opioids, taken in excess, can depress and stop breathing. Opioid overdose is a clear cause of secondary cardiac arrest.



Naloxone, also known as Narcan, is a medication that can temporarily reverse the life-threatening effects of opioids. Naloxone is becoming more readily available to those without formal medical training.

### **Sudden Cardiac Arrest**

Different than secondary cardiac arrest, sudden cardiac arrest primarily affects adults. It can happen with little or no warning. Victims abruptly become unresponsive and collapse. Abnormal gasping can occur. Breathing stops.



The most likely cause of sudden cardiac arrest is an unexpected disruption to the heart's electrical system in which normally organized electrical pulses become disorganized and a chaotic quivering condition known as ventricular fibrillation occurs. Blood flow, along with the oxygen it carries, stops. Without blood flow, brain damage occurs rapidly and quickly leads to death.

### **CPR**

CPR is the immediate treatment for sudden cardiac arrest. However, CPR alone is not enough.

### **Early Defibrillation**

The most effective way to end fibrillation is defibrillation, using a defibrillator and electrode pads applied to the chest. A controlled electrical shock is sent through the heart to stop ventricular fibrillation, allowing the heart's normal electrical activity to return and restore blood flow.

Successful defibrillation is highly dependent on how quickly defibrillation occurs. For each minute in sudden cardiac arrest, the chance of surviving goes down by about 10 percent. After as few as 10 minutes, survival is unlikely.



Simply activating EMS will not help. Even in the best EMS systems, the amount of time it takes from recognition of the arrest to EMS arriving at the side of the victim is usually longer than 10 minutes.

An automated external defibrillator, or AED, is a portable, computerized device that is simple for anyone to operate. Bystander use of AEDs has been growing steadily, with common placements of the devices in public locations such as airports, hotels, and workplaces.

Turning on an AED is as simple as pushing a power button. Once on, an AED provides voice instructions to guide an operator through its use.

An AED automatically analyzes the heart rhythm to determine if a shock is needed. If a shock is advised by the AED, the operator clears the person and pushes a button to deliver the shock.

### Adult Chain of Survival

The adult chain of survival is often used to describe the best approach for treating sudden cardiac arrest.

- Early recognition of cardiac arrest and activation of EMS
- Immediate CPR with high-quality chest compressions
- Rapid defibrillation of the heart
- Effective basic and advanced EMS care and transport, and
- Effective post-cardiac arrest care at a hospital

### Sudden Cardiac Arrest in Children

Although rare, children can experience sudden cardiac arrest with ventricular fibrillation due to existing heart problems or an accident such as a blow to the chest or an electrocution. When available, include the use of an AED when cardiac arrest of a child or infant occurs.



### Knowledge Check

The adult chain of survival is often used to describe the best approach for treating sudden cardiac arrest. The first three links of the chain are typically the responsibility of a trained first aid provider. Describe those links.

# Chest Compressions



There is a set of basic CPR skills used to treat cardiac arrest:

- Chest compressions
- Rescue breaths
- Use of an automated external defibrillator
- Checking for life-threatening emergencies using a Primary Assessment

External compression of the chest increases pressure inside the chest and directly compresses the heart, forcing blood to move from the chest to the lungs, brain, and the rest of the body.

Quality matters. The better you compress, the greater the influence on survival. Focus on high-quality techniques. For a child:

- Compress deeply, at least  $\frac{1}{3}$  the depth of the chest or about 2 inches.
- Compress fast, between 100 and 120 times a minute.
- Get close and do not lean on the chest. Allow the chest wall to fully recoil, or rebound, at the top of each compression.



Compression rate can be improved during practice with the use of a device such as mobile metronome app.

Compressions can be tiring. If you need to, use two hands to perform compressions on a child.

### Adults

The two-handed compression technique is also used for adults.

For an adult:

- Compress deeply, at least 2 inches.
- Compress fast, between 100 and 120 times a minute.
- Get close and do not lean on the chest. Allow the chest wall to fully recoil, or rebound, at the top of each compression.



CPR feedback devices measure things such as depth, rate, and timing are available to improve adult compression quality during practice.

When compressing properly on an adult, you may hear and feel changes in the chest wall. This is normal. Forceful external chest compressions may cause chest injury, but are critical if the person is to survive. Reassess your hand positioning and continue compressions.

### Infants

Infant chest compressions are performed using the tips of two fingers just below an imaginary line drawn between the nipples.

For an infant:

- Compress deeply, at least  $\frac{1}{3}$  the depth of the chest or about  $1\frac{1}{2}$  inches.
- Compress fast, between 100 and 120 times a minute.



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### Knowledge Check

What are 3 measures of high-quality chest compressions for a child?



# Chest Compressions — Children



## Position Your Hand(s)

- Position child face up on a firm, flat surface. Kneel close to chest.
- Place heel of one hand on lower half of breastbone, just above point where ribs meet. Use both hands if needed.



## Position Your Body

- Bring your body up and over chest so your shoulders are directly above your hand. Straighten your arm and lock your elbow.



## Compress

- Bending at waist, use upper body weight to push straight down  $\frac{1}{3}$  depth of chest, or about 2 inches.
- Lift your hand and allow chest to return fully to its normal position. Move immediately into downstroke of next compression.
- Avoid leaning on chest at top of each compression.
- Continue compressions at a rate of 100–120 times per minute.

# Chest Compressions — Adults



## Position Your Hands

- Position person face up on a firm, flat surface. Kneel close to chest.
- Place heel of one hand on center of chest, on lower half of breastbone.
- Place heel of your other hand on top of and parallel to first. You can interlace your fingers to keep them off chest.



## Position Your Body

- Bring your body up and over chest so your shoulders are directly above your hands. Straighten your arms and lock your elbows.



## Compress

- Bending at the waist, use upper body weight to push straight down at least 2 inches.
- Lift hands and allow chest to fully return to its normal position. Move immediately into downstroke of next compression.
- Avoid leaning on chest at the top of each compression.
- Continue compressions at a rate of 100–120 times per minute.



## Chest Compressions — Infants



### Positioning

- Position infant face up on a firm, flat surface.
- Place 2 fingertips on breastbone just below nipple line.



### Compress

- Compress at least  $\frac{1}{3}$  depth of chest, or about  $1\frac{1}{2}$  inches.
- Lift fingers and allow chest to return fully to its normal position. Move immediately into downstroke of next compression.
- Continue compressions at a rate of 100–120 times per minute.

# Rescue Breaths



Rescue breaths are artificial breaths given to someone who is not breathing. They are given by blowing air into the mouth to inflate the lungs. The air you breathe contains about 21% oxygen. Your exhaled air still contains between 16% and 17% oxygen. This exhaled oxygen is enough to support someone's life.

## *Establishing an Airway*

To give rescue breaths, you need to make sure there is an open airway. The airway is the only path for getting air into the lungs.

A child who is unresponsive can lose muscle tone. If flat on his or her back, the base of the tongue can relax and obstruct the airway. This is the most common cause of a blocked airway.



The tongue is attached to the lower jaw. Lifting the jaw forward, while keeping the mouth open, pulls the tongue away from the back of the throat and opens the airway.

You can open a child's airway by using the head tilt-chin lift technique.

- Place one hand on the forehead.
- Place the fingertips of your other hand under the bony part of the chin.
- Apply firm, backward pressure on the forehead while lifting the chin upward. This will tilt the head back and move the jaw forward.
- Avoid pressing into the soft tissue of the chin with your fingers, as this can also obstruct the airway.
- Leave the mouth slightly open.

### **Using Barrier Devices**

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Even though the risk is very low, as a trained provider, use a protective barrier such as a CPR mask, or overlay shield, when giving rescue breaths to minimize your exposure to infectious disease. Use a mask or shield appropriate for the size of the child.

### **Delivering Breaths**

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Each breath should be about 1 second in length and have only enough air to create a visible rise of the chest, but no more. Additional air is unnecessary.

During CPR, 2 rescue breaths are given at a time. Remove your mouth between breaths. Take a breath before delivering the second rescue breath.

When you remove your hands from the head, the airway will close again. It is necessary to open the airway each time you give rescue breaths.

If you cannot get the chest to rise with a breath, reposition the head further back by using head tilt-chin lift again, and try another breath.



### **Adults**

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Rescue breaths for adults are performed in the same manner as for children. Establish and maintain an open airway. Each breath should be about 1 second in length and have only enough air to create a visible rise of the chest, but no more.

## Infants

Rescue breaths for infants are also performed the same as for children. Use an appropriately sized CPR mask when performing rescue breaths on an infant.

Special care must be taken not to give too much air in a single breath. Provide only enough air to make the chest visibly rise, but no more.

The airway of an infant may collapse if the head is tilted too far. Tilting the head to only a neutral or slightly extended position may provide the most effective airway.



### *GIVING RESCUE BREATHS WITHOUT A BARRIER DEVICE*

Depending on your relationship with a child or the availability of PPE, you may elect to perform rescue breaths without the use of a barrier device such as a CPR mask or overlay shield. Mouth-to-mouth breaths can be given by pinching the nose, opening your mouth wide, and sealing your mouth around the child's mouth. Mouth-to-nose breaths can also be done by pressing the lips closed and sealing your mouth around the child's nose. With smaller children and infants, it may be necessary to seal your mouth around both the mouth and nose.



### Knowledge Check

What is the recommended length and volume of a rescue breath?

# Rescue Breaths — CPR Mask



## Position Mask

- Use appropriately sized mask.
- Inspect mask to make sure one-way valve is in place.
- Place mask flat on child's face with top of mask over bridge of nose.
- Use thumb and forefinger to provide uniform pressure around top of mask.
- Use thumb of your other hand lifting chin to control bottom.



## Open Airway

- Hook fingertips of hand controlling bottom of mask under bony ridge of chin.
- Tilt head and lift chin to open airway. Lift face up into mask to create an airtight seal.



## Deliver Breath

- Blow through valve opening to deliver breaths. Each breath is 1 second in length.
- Give only enough air to create a visible rise of chest, but no more.
- Remove your mouth and let child exhale between breaths.



## Adults/Infants

- Given in the same manner as children.
- Give enough air to create a visible rise of chest, but no more.

# Rescue Breaths — CPR Shield



## *Position Shield*

- Place breathing port of shield between teeth and into child's mouth.



## *Open Airway*

- Place one hand across forehead.
- Hook fingertips of your other hand under bony ridge of chin.
- Tilt head and lift chin to open airway.
- Seal nose by pinching nostrils closed over or under the shield.



## *Deliver Breath*

- Open your mouth wide. Press your mouth on shield around child's mouth to create airtight seal.
- Blow through port to deliver breath. Each breath is 1 second in length.
- Give only enough air to create a visible rise of chest, but no more.
- Remove your mouth and let child exhale between breaths.



## *No Barrier*

- The same technique can be used to give direct mouth-to-mouth rescue breaths if you elect not to use a barrier device.



# Automated External Defibrillation



Early defibrillation with an AED is the desired treatment for sudden cardiac arrest, which primarily affects adults. AEDs are designed to be simple to use. Voice, lights, and screen instructions guide a user in operating the device.

## ***AED Operation***

There are many different brands of AEDs, but the same basic steps for operation apply to all.

### **Turn on the AED**

Opening the lid will turn on the power for some AEDs. With others, simply press the power button. This starts voice instructions and readies the device for use.

### **Adhere Defibrillation Pads to Chest**

Pads must be applied to a bare chest. Quickly tear away or use scissors to remove all clothing from the torso. For a woman, remove the bra to provide better access for pad placement.



Locate and pull out the defibrillation pads. The pads have pictures on them to show proper placement. Peel the pads from the backing sheet one at a time and place them as shown in the pictures. For an adult, place one pad below the right collarbone, above the nipple, and beside the breastbone. Make sure it adheres well by pressing it flat. Place the other pad lower on the left side, over the ribs, and a few inches below the armpit. Again, press firmly.

### **Allow the AED to Analyze Heart Rhythm**

Most AEDs automatically start analyzing once the pads are in place. Stop CPR. Movement can interrupt the analysis. Be certain no one is touching the person. If defibrillation is advised, the AED will begin to charge for shock delivery.



### **Deliver Shock if Directed to by AED**

To prevent the accidental shock of a rescuer, quickly look to make sure no one, including you, is in contact with the person before delivering the shock. For most AEDs, a button is pressed to deliver the shock. Once delivered, immediately resume CPR starting with chest compressions.

#### ***TWO OR MORE PROVIDERS***

When another person is available to operate an AED, do not stop CPR. Continue compressions as best you can until the AED is ready to analyze the heart rhythm.

#### ***AUTOMATIC SHOCK DELIVERY***

Some AEDs shock automatically after charging. An accidental shock can be prevented by making sure no one is in contact with the person being defibrillated.

### ***Children and Infants***

Conditions can occur for which defibrillation of a child or infant is warranted. Most AEDs have specially designed pads or mechanisms available that reduce the defibrillation energy to a level more appropriate for a smaller body size.

The steps for using an AED on a child or infant are the same as for an adult, but the recommended pad placement is different.





For smaller chests, place one pad on the center of the chest just below the collarbones. Attach the second pad on the center of the back between the shoulder blades.

Follow the AED's voice instructions to provide the appropriate care. If an AED specifically equipped for use on a child or infant is not available, an AED configured for an adult can be used instead.

### ***AED Troubleshooting and Considerations***

AEDs are also designed to detect problems during use and guide you through corrective actions. If a troubleshooting message occurs at any time, stay calm and follow the AED's voice instructions.



When it becomes necessary to troubleshoot an AED, CPR should be provided, without interruption, until the problem is corrected or another AED becomes available. Pauses of CPR lasting longer than 10 seconds should be avoided.

If the AED indicates a problem with the pads, the pads are not completely adhered to the skin or there is a poor connection to the AED. Press pads firmly, especially in the center, to make sure they are adhering well. Make sure the pads' cable connector is firmly connected to the AED.

If the chest is wet, dry the chest before applying pads. If the chest becomes wet after the pads are applied, remove the pads and dry the chest. Apply a new set of pads, if available.

Thick chest hair may prevent the AED pads from adhering to the skin. If chest hair is excessive, quickly shave the hair in the areas where the pads will be placed. If pads were placed over chest hair and do not adhere, pull the pads off quickly and shave the hair. Attach another set of pads, if available. Otherwise, re-apply the original pads.

Another troubleshooting message may indicate that analysis has been interrupted due to movement. Stop all sources of movement, such as chest compressions or rescue breaths.

If a message indicates the need to replace a battery, there may be only enough energy for a limited number of shocks and only a few more minutes of operation. If the AED fails to operate, the depleted battery should be removed and replaced with a new one. If a battery needs replacement during resuscitation, it should be replaced during a CPR interval.

A person should be removed from standing water before using an AED. It is okay to use an AED when a person is lying on a wet surface, such as in the rain or near a swimming pool. An AED should never be immersed in water or have fluids spilled on it.



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

Someone may have a surgically implanted device in the chest, such as a pacemaker or an automated internal defibrillator. A noticeable lump and surgical scar will be visible. If the implanted device is in the way of correct pad placement, place the pads so the edges are at least 1 inch away from the device.

Defibrillating over medication patches could reduce the effectiveness of the shock. If a medication patch is interfering with placement, use a gloved hand to peel off the patch and wipe away any remaining residue before placing pads.



### Knowledge Check

You are working as a camp counselor at a baseball camp. You are responding with an AED to a report of a 12-year-old boy who collapsed after being struck in the chest with a baseball. As you approach the ball field you can see another counselor is performing CPR. You kneel next to the child and lay the AED next to his head. What are the 4 basic steps you will take to use the AED on him?

## Using an AED — Adults



### Perform CPR

- If person is unresponsive and not breathing, immediately perform CPR.
- Provide continuous cycles of 30 compressions and 2 rescue breaths.



### When Available, Attach AED

- Turn on AED and bare person's chest.
- Peel first pad from backing and place below right collarbone, above nipple, and beside breastbone.
- Remove second pad from backing and place on left side, over ribs, and a few inches below armpit.



### If Indicated, Deliver Shock

- Allow AED to analyze heart. Stop CPR. Do not touch the person.
- If shock is advised, clear everyone and press button to deliver shock.



### Resume CPR

- Quickly resume CPR with chest compressions. Follow any additional voice instructions from AED.
- Continue until another provider or EMS personnel take over.
- If person responds, stop CPR and place in recovery position. Leave AED on and attached.

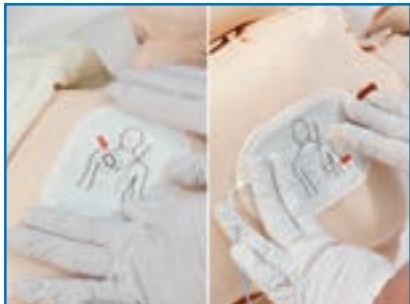
# Using an AED — Children and Infants

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## Perform CPR

- If child is unresponsive and not breathing, immediately perform CPR.
- Provide continuous cycles of 30 compressions and 2 rescue breaths.



## When Available, Attach AED

- Turn on AED and bare child's chest.
- Peel first pad from backing and place in center of chest just below collarbones.
- Roll child and place second pad on center of back between shoulder blades.



## If Indicated, Deliver Shock

- Allow AED to analyze heart. Stop CPR. Do not touch the child.
- If shock is advised, clear everyone and press button to deliver shock.



## Resume CPR

- Quickly resume CPR with chest compressions. Follow any additional voice instructions from AED.
- Continue until another provider or EMS personnel take over
- If child responds, stop CPR and place in recovery position. Leave AED on and attached.

# Primary Assessment — Unresponsive



The primary assessment is a simple way to quickly identify if a life-threatening condition is present. It is the initial approach to anyone suspected of being ill or injured.

Before anything else, pause and assess the scene for hazards. If the situation is dangerous to you, do not approach.

If safe, begin by checking for responsiveness. Tap or squeeze the shoulder and ask loudly, “Are you all right?” For an infant, tap the foot.



If unresponsive, have a bystander activate EMS and get an AED.

Quickly look at the face and chest for normal breathing. Take no longer than 10 seconds. Normal breathing is effortless, quiet, and regular.

Weak, irregular gasping, snorting, or gurgling sounds can



## ***When Alone During a Primary Assessment***

If you are alone with an unresponsive child, use a mobile phone, if available, to activate EMS yourself. The speaker function will allow you to talk with the EMS dispatcher and provide care at the same time.

If you need to leave the child to activate EMS or get an AED, provide about two minutes of CPR before you go. Return as quickly as you can.

occur early in cardiac arrest. These actions provide no usable oxygen. This is not normal breathing. If you are unsure, assume breathing is absent.

If the child is not breathing, or only gasping, perform CPR, beginning with compressions.

If the child is breathing normally, and uninjured, place him or her in a side-lying recovery position to help protect the airway.

### **Recovery Position**

The recovery position is the same for all ages. It helps protect the airway by using gravity to drain fluids from the mouth and keep the tongue from blocking the airway.



After a child is placed in a recovery position, frequently assess and monitor breathing. The child's condition could quickly become worse and require additional care.

If child has been seriously injured, do not place in a recovery position unless fluids are in airway, or you need to leave to get help.

Always perform a primary assessment anytime you suspect someone is ill or has been injured to quickly determine the need for CPR.



### **Knowledge Check**

A fourth grade student collapses near you during a student assembly. As a trained pediatric first aid provider, you move to help. You kneel next to him, squeeze his shoulder, and loudly ask, "Are you all right?" He is unresponsive, so you direct a nearby teacher to activate EMS and get an AED. As you look closely at the face and chest for breathing; he makes a brief gasping snort, but then remains still. What do you do next?



# Primary Assessment — Unresponsive



## Assess Scene

- Pause and assess scene for safety.
- If unsafe, or if it becomes unsafe at any time, GET OUT!



## Check for Response

- Tap or squeeze shoulder and ask loudly, “Are you all right?”
- For an infant, tap the foot.
- If unresponsive, have someone activate EMS and get an AED.



## Look for Normal Breathing

- Position child face-up on a firm, flat surface.
- Look at face and chest for normal breathing. Take no longer than 10 seconds. If unsure, assume breathing is not normal.
- Weak, irregular gasping, snorting, or gurgling is not normal breathing.



## Provide Indicated Care

- If child is not breathing, or only gasping, perform CPR, beginning with compressions.
- If normal breathing is found, place an uninjured child in recovery position.



# Recovery Position



## Prepare

- Place arm nearest you up alongside head.
- Bring far arm across chest and place back of hand against cheek.
- Grasp far leg just above knee and pull it up so the foot is flat on ground.



## Roll

- Grasping shoulder and hip, roll child toward you in a single motion, keeping head, shoulders, and body from twisting.
- Roll far enough for face to be angled toward ground.



## Stabilize

- Position elbow and legs to stabilize head and body. Ensure there is no pressure on chest that restricts breathing.
- Make sure head ends up resting on extended arm and head, neck, and body are aligned.

# Caring for Cardiac Arrest



Early recognition of cardiac arrest, prompt activation of EMS, and immediate CPR offers the greatest chance for survival.

## *Children and Infants*

Although sudden cardiac arrest could occur, the most likely cause of cardiac arrest for a child or infant is secondary cardiac arrest due to the loss of breathing. Early suspicion and determination using a primary assessment is critical, followed quickly by repeating cycles of high-quality chest compressions and effective rescue breaths.

The ratio of compressions to breaths for child and infant CPR is 30:2. Once CPR has started, minimize any interruption. Do not stop until the child shows signs of life, an AED has been turned on and attached, another provider or EMS personnel take over, or you are too exhausted to continue.



Do the best you can. A child in cardiac arrest will not survive without help. Nothing you can do can make the outcome worse.

## Adults

Adults are more likely than children to suffer sudden cardiac arrest and benefit from early defibrillation. Immediate, high-quality CPR and defibrillation with an AED can double or even triple the chance for survival from sudden cardiac arrest.



Adults can also suffer secondary cardiac arrest.

Similar to children and infants, early suspicion and determination of cardiac arrest using a primary assessment is essential. As with children, the ratio of compressions to breaths for adult CPR is 30:2. Compressions and breaths are repeated until the person shows signs of life, an AED has been turned on and attached, another provider or EMS personnel take over, or you are too exhausted to continue.

Quality matters. Blood pressure is created and maintained with ongoing compressions. When compressions stop, pressure is quickly lost and has to be built up again. Avoid interruptions to maintain high-quality CPR.

## Compression-Only CPR

Compression-only CPR for adults is being widely promoted to people who are not trained in CPR in order to encourage and increase the chance for bystander care.



Simple instructions in compression-only CPR are being shared through things such as social media and public service announcements. EMS dispatchers are also providing compression-only instructions during emergency calls.

However, rescue breaths are extremely important to infants and children in cardiac arrest. As a trained provider, you should perform both compressions and breaths during pediatric CPR.

However, if you are unable or unwilling to perform rescue breaths, you should provide high-quality, uninterrupted compressions at a minimum.

**SPECIAL CPR SITUATIONS**

- **Fluids in airway:** Roll the child on side to quickly drain fluids. Roll without twisting, like a log. Remove any material still in mouth with a gloved finger.
- **Cold environments:** Handle a cold child gently to prevent cardiac arrest. If body is solid, do not start CPR.
- **Electric shock/lightning strike:** Approach only if it is safe. Electric shock can cause ventricular fibrillation. When safe, perform CPR and use an AED.

**Drowning**

Secondary cardiac arrest due to drowning is one of the leading causes of deaths for children. Often, a child that has drowned and is not breathing may respond quickly to only a few rescue breaths.

Change your approach slightly to give rescue breaths earlier. After safely removing a child from the water, perform a primary assessment. If the child is not breathing, begin CPR with rescue breaths, instead of compressions. Perform ongoing cycles of 30 compressions and 2 rescue breaths after that.

Always get an AED if one is available. If the child has not responded to CPR, use the AED immediately. Dry the chest before applying pads.

Do not attempt to remove water from the airway or lungs using abdominal thrusts.

**Drowning Prevention**

Drowning is one of the leading causes of unintentional injury deaths for children ages 1 to 14.<sup>12</sup>

Children under 1 year of age most often drown in bathtubs, buckets, and toilets. Children ages 1 to 4 most often drown in backyard pools. They are typically last seen in the house and have been out of sight for less than 5 minutes. This occurs all while the children are in the care of their parents.<sup>13</sup>

To prevent drowning, be aware of water hazards like creeks, ponds, drainage ditches, and construction sites. Be cautious around rivers and oceans, where there are dangerous currents and tides, or where depth can increase suddenly. Do not leave standing water in buckets, other containers, or wading pools. Do not leave children unattended in the bathroom. Always stay close when children are in the bathtub. Keep a lid on diaper pails and secure toilet seats with lid closed.

It is recommended for you and children you care for to have swimming lessons, but always continue to watch children closely around water. Never allow children to swim alone. Child care facilities that have a swimming pool should require at least one staff member with current pediatric CPR to be on duty at all times during business hours.<sup>14</sup>

Pools should have a 5-foot fence surrounding them, with self-closing or self-latching gates. Gates need to latch securely and effortlessly. The latch on a gate should be out of reach for small children, at least 55 inches from the ground.

Always require flotation devices when in a boat. Do not allow children to ride in the front of a boat.

There is a high chance a child who has drowned will vomit during your care. If this occurs, quickly roll the child on to his or her side and use your finger to clear the mouth.

If a child begins breathing normally, place him or her in a recovery position. Monitor the child and provide any additional required care.



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### Knowledge Check

You are at the beach on your day off from your child care job when you hear a commotion near the water. A man is carrying a very young girl, who is limp in his arms and soaking wet. He is yelling for help. As a trained pediatric first aid provider you go to help. Your primary assessment shows she is unresponsive and does not appear to be breathing. Describe the basic details for performing CPR and using an AED in this situation.

# Caring for Cardiac Arrest — Children



## Assess Child

- If safe, tap or squeeze the shoulder. Ask loudly, “Are you all right?”  
**No response!**
- Have someone activate EMS and get an AED. If alone, perform CPR for 2 minutes before doing this yourself.
- Check face and chest for normal breathing. **Normal breathing absent!**



## Give 30 Compressions

- Place heel of one hand on lower half of breastbone, just above point where ribs meet. Use both hands if needed.
- Bring body up and over chest, using upper body weight to push down at least  $\frac{1}{3}$  depth of chest or about 2 inches.
- Push fast, at a rate of 100–120 times per minute. Allow chest to fully recoil.



## Give 2 Rescue Breaths

- Using a barrier device, tilt head and lift chin to open airway.
- Make chest visibly rise with each breath, but no more.
- Take a fresh breath between rescue breaths. Give breaths in less than 10 seconds.



## Continue CPR

- Provide continuous cycles of 30 compressions and 2 rescue breaths.
- Use an AED immediately if one arrives. Follow the AED’s voice instructions.
- Continue until another provider or EMS personnel take over, the child shows signs of life, or you are too exhausted to continue.



# Caring for Cardiac Arrest — Infants



## Assess Infant

- If safe, tap the foot. Yell loudly. **No response!**
- Have someone activate EMS and get an AED. If alone, perform CPR for 2 minutes before doing this yourself.
- Check face and chest for normal breathing. **Normal breathing absent!**



## Give 30 Compressions

- Place 2 fingertips on breastbone just below nipple line.
- Compress at least  $\frac{1}{3}$  depth of chest, or about  $1\frac{1}{2}$  inches.
- Push fast, at a rate of 100–120 times per minute. Allow chest to fully recoil.



## Give 2 Rescue Breaths

- Using a barrier device, tilt head and lift chin to open airway.
- Make chest visibly rise with each breath, but no more.
- Take a fresh breath between rescue breaths. Give breaths in less than 10 seconds.



## Continue CPR

- Provide continuous cycles of 30 compressions and 2 rescue breaths.
- Use an AED immediately if one arrives. Follow the AED's voice instructions.
- Continue until another provider or EMS personnel take over, the infant shows signs of life, or you are too exhausted to continue.



# Caring for Cardiac Arrest — Adults



## Assess Person

- If safe, tap or squeeze the shoulder. Ask loudly, “Are you all right?”  
**No response!**
- Have someone activate EMS and get an AED.
- Check face and chest for normal breathing. **Normal breathing absent!**



## Give 30 Compressions

- Place heel of one hand on center of chest. Place heel of other hand on top of first.
- Bring body up and over chest, using upper body weight to push down hard, at least 2 inches.
- Push fast, at a rate of 100–120 times per minute. Allow chest to fully recoil.



## Give 2 Rescue Breaths

- Using a barrier device, tilt head and lift chin to open airway.
- Make chest visibly rise with each breath, but no more.
- Take a fresh breath between rescue breaths. Give breaths in less than 10 seconds.
- Provide continuous cycles of 30 compressions and 2 rescue breaths.



## Use an AED

- If AED becomes available, stop CPR and use it immediately. Turn AED on and follow its voice instructions.
- Deliver a shock if indicated by AED. Immediately resume CPR after a shock is delivered or no shock is advised.
- Continue until another provider or EMS personnel take over, the person shows signs of life, or you are too exhausted to continue.

# Multiple Provider Approach to CPR



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Commonly, more than one trained provider is available to help when a cardiac arrest occurs. Providers can work together to improve performance and reduce interruptions.

CPR is tiring, and switching providers about every two minutes helps to maintain CPR quality. Communicate about the switch ahead of time. Coordinate your actions to switch smoothly and quickly.

## **Prior to AED Arrival**

Switch at the end of a CPR cycle, while the person who is going to move out is giving rescue breaths. The new provider can get into position to start compressions immediately. When rescue breaths are completed, immediately resume compressions.

## **After an AED is Attached**

Switch while the AED is analyzing the heart, which occurs about every two minutes. After a shock is delivered, or if no shock is indicated, the new CPR provider immediately starts compressions.

When 2 or more providers are present, simply take turns doing CPR.



## **Knowledge Check**

As a trained pediatric first aid provider, you respond to a situation in which CPR is already being performed on a young athlete who has collapsed at a soccer game. An AED is coming but has not yet arrived. The CPR provider looks exhausted. How would you smoothly integrate yourself to take over doing CPR?

# Multiple Provider Approach to CPR



## Consider a Switch

- CPR is tiring. When available, switch CPR providers about every 2 minutes.
- Clearly communicate switches ahead of time so everyone understands.



## Prior to the Arrival of an AED

- Incoming CPR provider moves into place while outgoing provider is giving rescue breaths.
- New CPR provider immediately begins compressions when rescue breaths are completed.



## When an AED Is Attached

- Switch CPR providers when AED analyzes heart. This occurs about every 2 minutes.
- Immediately begin compressions after a shock is delivered or when AED advises no shock is indicated.



## More than 2 Providers

- Rotate extra providers in if more than 2 providers are present.

# CPR Summary

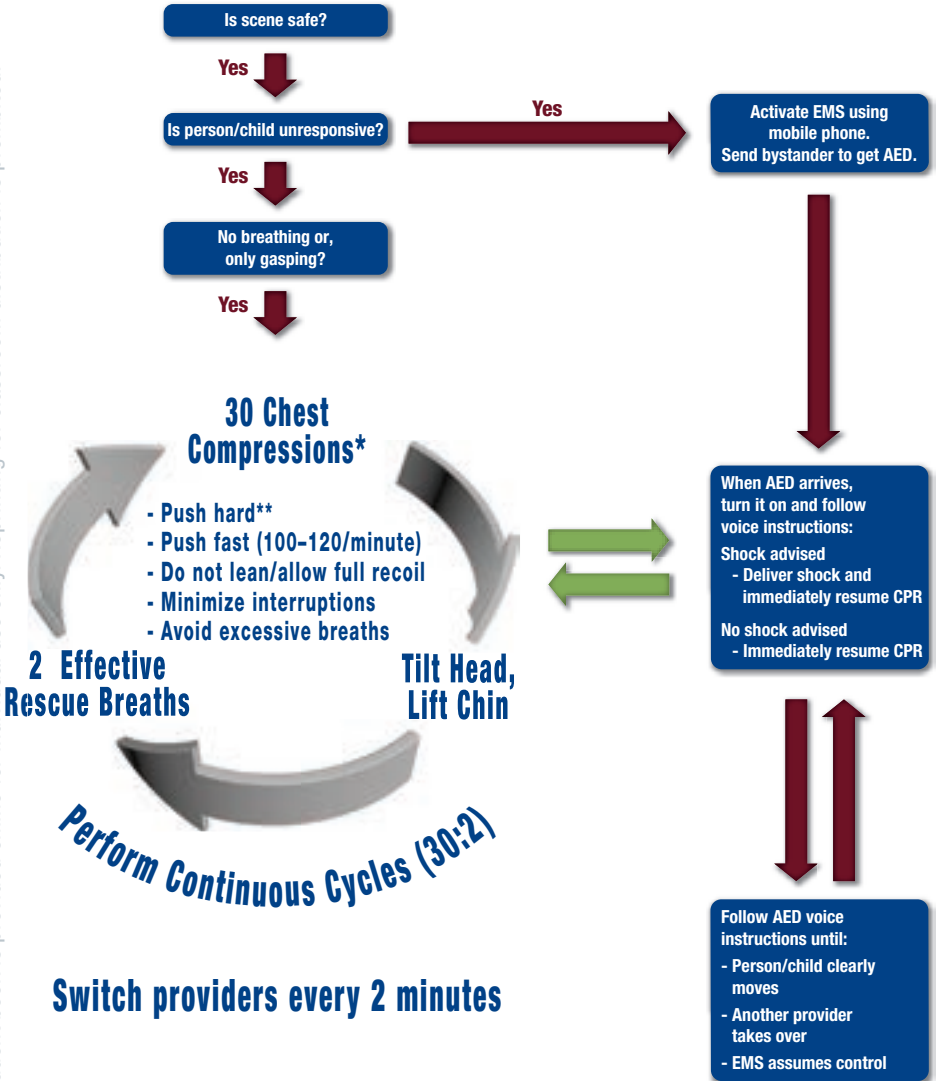
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	CHILD	INFANT	ADULT
<i>Age Determination</i>	1 year until onset of puberty	Less than 1 year of age	Onset of puberty and older
<i>Scene Safety?</i>	If the scene is unsafe or at any time becomes unsafe, Get out!	If the scene is unsafe or at any time becomes unsafe, Get out!	If the scene is unsafe or at any time becomes unsafe, Get out!
<i>Response?</i>	Tap shoulder, shout name.	Tap foot, shout out.	Tap shoulder, shout name.
<i>Activate Emergency Response System/ Get an AED</i>	Send a bystander. When alone, perform about 2 minutes of CPR before doing it yourself.	Send a bystander. When alone, perform about 2 minutes of CPR before doing it yourself.	Send a bystander. When alone, do it yourself immediately.
<i>Breathing?</i>	Look at face and chest for no breathing or only gasping.	Look at face and chest for no breathing or only gasping.	Look at face and chest for no breathing or only gasping.
<i>Normal Breathing Present?</i>	Place child in recovery position and monitor breathing.	Place infant in recovery position and monitor breathing.	Place person in recovery position and monitor breathing.
<i>Normal Breathing Absent?</i>	Perform CPR starting with compressions.* Provide continuous cycles of 30 compressions and 2 rescue breaths.	Perform CPR starting with compressions.* Provide continuous cycles of 30 compressions and 2 rescue breaths.	Perform CPR starting with compressions. Provide continuous cycles of 30 compressions and 2 rescue breaths.
<i>Compressions</i>	<ul style="list-style-type: none"> <li>■ One or two hands on lower half of breastbone</li> <li>■ At least 1/3 diameter of chest or about 2 inches in depth</li> <li>■ Rate of 100–120 times per minute</li> <li>■ Hard, fast, full recoil, minimize interruption</li> </ul>	<ul style="list-style-type: none"> <li>■ Two fingers on breastbone just below nipple line</li> <li>■ At least 1/3 diameter of chest or about 1 1/2 inches in depth</li> <li>■ Rate of 100–120 times per minute</li> <li>■ Hard, fast, full recoil, minimize interruption</li> </ul>	<ul style="list-style-type: none"> <li>■ Two hands on center of chest; lower half of breastbone</li> <li>■ At least 2 inches in depth</li> <li>■ Rate of 100–120 times per minute</li> <li>■ Hard, fast, full recoil, minimize interruption</li> </ul>
<i>Rescue Breaths</i>	<ul style="list-style-type: none"> <li>■ Tilt head, lift chin to open airway first</li> <li>■ 1 second in length</li> <li>■ Make chest visibly rise, but no more</li> </ul>	<ul style="list-style-type: none"> <li>■ Tilt head, lift chin to open airway first</li> <li>■ 1 second in length</li> <li>■ Make chest visibly rise, but no more</li> </ul>	<ul style="list-style-type: none"> <li>■ Tilt head, lift chin to open airway first</li> <li>■ 1 second in length</li> <li>■ Make chest visibly rise, but no more</li> </ul>
<i>Defibrillation with AED</i>	<ul style="list-style-type: none"> <li>■ Use pediatric system, if not use AED for adult</li> <li>■ Turn on power</li> <li>■ Attach pads</li> <li>■ If indicated, deliver shock</li> <li>■ Immediately resume CPR</li> <li>■ Follow voice instructions</li> </ul>	<ul style="list-style-type: none"> <li>■ Use pediatric system, if not use AED for adult</li> <li>■ Turn on power</li> <li>■ Attach pads</li> <li>■ If indicated, deliver shock</li> <li>■ Immediately resume CPR</li> <li>■ Follow voice instructions</li> </ul>	<ul style="list-style-type: none"> <li>■ Turn on power</li> <li>■ Attach pads</li> <li>■ If indicated, deliver shock</li> <li>■ Immediately resume CPR</li> <li>■ Follow voice instructions</li> </ul>

\* For a suspected drowning, this is modified slightly. If the child is not breathing or only gasping begin CPR with rescue breaths instead of compressions.

# Caring for Cardiac Arrest Algorithm

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\* For a suspected drowning, this is modified slightly. If the child is not breathing or only gasping begin CPR with rescue breaths instead of compressions.

\*\* Child: At least 1/3 diameter of chest or about 2"  
 Infant: At least 1/3 diameter of chest or about 1 1/2"  
 Adult: At least 2"

# Choking



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Choking can occur when something solid, such as a piece of food or a small object, enters a narrowed part of the airway and becomes stuck. On inhalation, the object can be drawn tighter into the airway and block air from entering the lungs.

A forceful thrust beneath the ribs and up into the diaphragm can pressurize the air in the chest and “pop” an obstruction out of the airway. Compression of the chest over the breastbone can also create enough pressure to expel an object.

Young children are particularly at risk for choking because of the small size of their air passages, inexperience with chewing, and a natural tendency to put objects in their mouths.

## **Mild Obstruction**

To provide the appropriate care, you must first be able to recognize the difference between a mild blockage and a severe blockage.

With a mild blockage, a child can speak, cough, or gag. This type of blockage is typically cleared naturally through forceful coughing. Allow a child with a mild blockage to try and resolve the problem on his or her own. Stay close and be ready to take action if things worsen.





## Severe Obstruction

When a severe blockage occurs, a child cannot take in enough air to dislodge the object. Signs of severe obstruction include very little or no air exchange, the lack of sound, and the inability to speak or cough forcefully. The child may hold his hands to his throat while attempting to clear the obstruction.

Repeated abdominal thrusts are recommended on a child to relieve a severe airway obstruction.

Do not hesitate. A child with an obstructed airway requires your help to survive.



## Choking Prevention

- Cut large pieces of food into smaller pieces before eating.
- Avoid talking at the same time you are eating. Chew food well.
- Keep small objects away from children who may put objects into their mouths.

## Adults

The care for an adult with a severe blockage is the same as for a child, repeated abdominal thrusts until the obstruction is cleared.

When someone is clearly pregnant or obese, use chest thrusts instead of abdominal thrusts. Position yourself directly behind the person.

Reach under the armpits and place the thumb side of your fist on the center of the chest. Grasp your fist with your other hand and thrust straight backward. Try to not put pressure on the ribs.

If you are choking and alone, try pressing your abdomen quickly against a rigid surface, such as the back of a chair. If one is not available, attempt abdominal thrusts on yourself.





## Infants

Since infants do not speak, it may be more difficult to recognize choking. The sudden onset differentiates this from other breathing emergencies.

Signs include weak, ineffective coughs, and the lack of sound, even when an infant is clearly attempting to breathe.



Different than children and adults, a repeated combination of five back blows between the shoulder blades and five chest thrusts on the breastbone just below the nipple line are used on an infant to relieve a severe obstruction.



### Knowledge Check

You are in the school cafeteria supervising elementary students eating lunch. A student sitting near you suddenly stands up and grasps his throat with his hands. You move to see what is wrong, noticing there are grapes on the table in front of him. He clearly looks distressed, so you kneel down next to him and ask, “Are you choking?” He is unable to answer you and completely silent. You decide to perform abdominal thrusts. Describe how to perform them.

# Choking — Children



## Assess Child

- Ask, “Are you choking?”
- If child nods yes, or is unable to speak or cough, act quickly.
- If available, have a bystander activate EMS.



## Position Yourself

- If needed, kneel behind child. Reach around and locate navel.
- Make a fist with other hand and place thumb side against abdomen, just above navel and below ribs.
- Grasp fist with other hand.



## Give Thrusts

- Quickly thrust inward and upward into abdomen.
- Repeat. Each thrust needs to be given with intent of expelling object.
- Continue until child can breathe normally.



## If Child Becomes Unresponsive

- Carefully lower child to ground.
- If alone, provide 2 minutes of CPR before activating EMS and getting an AED.
- Begin CPR, starting with compressions.
- Look in mouth for an object before giving rescue breaths. Remove any object seen.
- Continue CPR until child shows obvious signs of life, or another provider or EMS personnel take over.

# Choking — Adults



## Assess Person

- Ask, “Are you choking?”
- If person nods yes, or is unable to speak or cough, act quickly.
- If available, have a bystander activate EMS.



## Position Yourself

- Stand behind person. Reach around and locate navel.
- Make a fist with other hand and place thumb side against abdomen, just above navel and below ribs.
- Grasp fist with other hand.



## Give Thrusts

- Quickly thrust inward and upward into abdomen.
- Repeat. Each thrust needs to be given with intent of expelling object.
- Continue until person can breathe normally.



## If Person Becomes Unresponsive

- Carefully lower person to ground.
- If not already done, activate EMS and get an AED, if one is available.
- Begin CPR, starting with compressions.
- Look in mouth for an object before giving rescue breaths. Remove any object seen.
- Continue CPR until person shows obvious signs of life, or another provider or EMS personnel take over.

# Choking — Infants



## Assess Infant

- Look at infant's face.
- If infant has weak, ineffective coughs, or lack of sound even when clearly attempting to breathe, act quickly!
- If available, have a bystander activate EMS.



## Give 5 Back Blows

- Lay infant face down over your forearm with legs straddled and with head lower than the chest. Support the head by holding the jaw.
- Using heel of other hand, give 5 back blows between shoulder blades.



## Give 5 Chest Thrusts

- Sandwich infant between your forearms and turn onto back.
- Place 2 fingers on breastbone just below nipple line and give 5 chest thrusts.
- Repeat back blows and chest thrusts until infant can breathe normally.



## If Infant Becomes Unresponsive

- Gently place infant on firm surface.
- If alone, provide 2 minutes of CPR before activating EMS yourself.
- Begin CPR, starting with compressions.
- Look in mouth for an object before giving rescue breaths. Remove any object seen.
- Continue CPR until infant shows obvious signs of life, or another provider or EMS personnel take over.

# Primary Assessment — Responsive



As with an unresponsive child, the purpose of a primary assessment for a responsive child is to quickly identify immediately life-threatening problems, such as severe bleeding and shock.

If it is safe to approach, do so. Introduce yourself. Let the child know you are able to help. Assess for any difficulty in breathing. Look for any unusual effort or rate. Listen for any unusual sounds.

Briefly scan the body for serious bleeding. If found, control it immediately.

Look for obvious signs of shock. Check the face for tissue color. Tissue color indicates the amount of blood circulating below the skin.

- Normal tissue color is light pink.
- Paleness indicates blood loss or shock.
- A bluish color indicates a lack of oxygen.



Depending on skin tone, it may be easier to look at tissue color in the palms of hands, fingernails, or inside the lip.

Check skin temperature by touching the forehead with your bare wrist.

- Normal skin feels warm and dry.
- Cool, wet skin can be an indication of shock.

If a life-threatening medical condition is found or suspected, immediately activate EMS and provide any indicated care.

### ONGOING ASSESSMENT

Emergencies are dynamic events that can change at any time. Always use ongoing assessment or continuous observation of an ill or injured child to monitor his or her condition and the effectiveness of your care.

### PRIORITIZATION OF CARE

When there are multiple people affected in an emergency, treat the most seriously ill or injured first. Bypass those with minor problems or even ask them for their help. Leave anyone who is obviously dead alone. Focus first on those who have immediate life-threatening problems, and then move on to those who still need intervention.



## Knowledge Check

As a cook for a summer camp for children, you are in the kitchen of the mess hall preparing an evening meal when you hear a loud crash and the sound of glass shattering. As a trained pediatric first aid provider, you cautiously go out front to see what happened. A frightened young camper is sitting on the floor next to a table that has collapsed. He is surrounded by broken plates and glasses. You carefully get to him. He appears aware of what happened and is breathing normally. You scan the floor around him and see a growing pool of blood behind him. The back of his shirt is soaked with blood. What do you do next?

## SECONDARY ASSESSMENT

When a primary assessment indicates no life-threatening problems, consider performing a secondary assessment. A secondary assessment is an organized approach to gather more information about an ill or injured child. It is the same regardless of the situation. Many components can be done by careful observation without touching the child.

If you find or begin to suspect a life-threatening problem is occurring while performing a secondary assessment, stop, quickly activate EMS, and provide the necessary care.

Begin by trying to identify what happened. Determine if the child has a primary, or chief, complaint.

- If the child cannot answer, ask bystanders.
- Consider hidden injuries if any significant force impacted the body.
- If at any time you suspect an injury to the head, neck, or back, immediately instruct the child to remain still.
- Look around. Clues, such as the presence of medications or containers, may also help identify what happened.
- Check if the child has a medical alert bracelet or necklace identifying an underlying medical condition.

Physically assess the child. Briefly evaluate the body moving from head to toe. Look and feel for signs of illness and injury.

The DOTS mnemonic device can help you remember what to look for during a physical assessment:

- **Deformities:** Unusual body presentation, differences from other side
- **Open injuries:** Bleeding injuries
- **Tenderness:** Painful areas, especially when touched
- **Swelling:** Swollen and discolored body areas

If covered, remove or carefully cut away clothing to get a better look at an injured or painful body part.

Ask questions to gather more information. Use the mnemonic device SAMPLE to help you remember what to ask about:

- **Signs and symptoms:** Things the child is feeling, such as pain, nausea, dizziness; anything related to the situation
- **Allergies:** Things the child may be allergic to
- **Medications:** Medications the child has been prescribed or is taking
- **Past medical problems:** Medical problems that may be related to what is going on
- **Last oral intake:** When and what the child last ate or drank
- **Events leading to the problem:** What the child was doing just prior to the problem occurring

If a secondary assessment reveals any specific problems, provide the indicated care. If you are unsure or concerned about what is going on, activate EMS.



# Primary Assessment — Responsive



## Assess Scene

- Pause and assess scene for safety.
- If unsafe, or if it becomes unsafe at any time, **Get out!**



## Introduce Yourself

- Tell child you are first aid trained and let child know you can help.
- Check for diminished level of responsiveness or altered mental status.
- Assess for any breathing difficulty.



## Check for Bleeding

- Scan body for heavy bleeding. If found, control it immediately.



## Check Tissue Color and Temperature

- Look at face to check tissue color. Depending on skin tone, it may be easier to check tissue color on the palms, fingernails, or inside the lip.
- Touch child's forehead with your bare wrist to assess body temperature.
- Activate EMS and provide any care indicated when a life-threatening condition is found or suspected.

# Control of Bleeding



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The natural curiosity of children and inability to judge risks, makes them more prone to injury. Unintentional injury is the leading cause of death for children under 15 years old.<sup>12</sup>

Injuries can occur quickly and may become life threatening.

Bleeding occurs when blood vessels, found throughout the body, are damaged. Heavy bleeding is likely if a large blood vessel is involved.

Arterial bleeding is bright red and will often spurt from a wound. It can be difficult to control due to the pressure created by the heart's contractions. If blood is dark red and flowing steadily, it is likely coming from a damaged vein.

Clot-forming fibers naturally collect at a wound site to try and stop bleeding, but heavy bleeding can overwhelm this and prevent clotting from occurring. Bleeding reduces the amount of oxygen that can be delivered to the body. If heavy or uncontrolled, bleeding can quickly become life threatening.

A wound of similar size in a child and adult will result in the same amount of blood loss, but the percentage of loss will be higher for the child and have a more serious effect.

Pressure applied directly to a bleeding site until bleeding stops is the standard method for controlling external bleeding. Activate EMS immediately for any heavy bleeding. Maintain direct pressure. Bleeding may restart if pressure is released.

If direct pressure stops bleeding, you may be able to apply a pressure bandage using roller gauze or an elastic bandage to maintain bleeding control. Care must be taken to prevent a pressure bandage from becoming too tightly wrapped and restricting blood flow. Make sure a finger can be slipped under the bandage once it is applied.

Bleeding exposes you, the provider, to potentially infectious body fluids. Always use disposable gloves as a barrier to protect both you and the injured child. When gloves are not available, an improvised barrier, such as a plastic bag, can be used.

### Tourniquets

If direct pressure is unable to control bleeding on a limb, use a tourniquet. Tourniquets utilize a simple binding method around a limb to stop blood flow.

Commercially made tourniquets are much easier to use than improvised ones. A compressing band is placed snugly around a limb a few inches above the open injury. A solid handle, connected to the band, is twisted to tighten the band evenly around the limb until bleeding stops. The handle is secured in place to maintain the pressure.



Improvised tourniquets, using the same concept, can be created with nearby materials such as triangular bandages and something solid to twist with.

A tourniquet can also be considered as a primary step to control severe limb bleeding when it is clear direct pressure cannot be applied effectively, such as in a mass casualty event, a child with large or multiple injuries, a dangerous environment, or for an inaccessible wound.

Early and effective external bleeding control is essential to protect life.

### HEMOSTATIC DRESSINGS

A hemostatic dressing is designed for use when direct pressure is unable to control bleeding, and the injury is located where a tourniquet cannot be applied.

A hemostatic dressing contains an agent that speeds up the clotting process. A hemostatic dressing is packed into an open wound and held in place with direct pressure or a pressure bandage. Pressure is maintained until bleeding has stopped.

## Internal Bleeding

A significant blow can create injury and bleeding inside the body. Internal bleeding can be difficult to detect because you cannot clearly see the injury.

The large liver and spleen, with their rich blood supply, along with weak abdominal muscles, make children more vulnerable to internal bleeding from a blow to the abdomen.



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## Knowledge Check

What is the standard method for controlling external bleeding?

# Control of Bleeding



## Apply Direct Pressure

- Quickly expose and inspect wound.
- Using a clean pad, apply pressure directly on point of bleeding. Use just gloved hand if pad not available.
- If blood soaks through pad, leave it in place. Apply second pad on top of first.
- When controlled, maintain continuous direct pressure.



## If Bleeding is Controlled

- Consider a pressure bandage. Wrap a conforming bandage around limb and over dressings to provide continuous direct pressure.
- Avoid wrapping so tight that skin beyond the bandage becomes cool to the touch or blue in color. Be able to slip a finger under it.



## If Bleeding Continues on a Limb

- Apply a commercial tourniquet. If not available, use an improvised one instead.
- Snugly place compressing band a few inches above injury. Twist handle and tighten band until bleeding stops. Secure handle in place.

# Shock



Shock can develop when a serious illness or injury limits the amount of oxygen available for normal body functions.

Things that can result in shock include heart problems, breathing problems, injury to the spine, dehydration, and external or internal bleeding. If not treated early, shock can get worse and become life threatening.

Early signs can be difficult to detect. A child may simply begin to appear uneasy, restless, or worried.

Other, more serious signs can emerge gradually. The child may become confused. The skin may become pale, cool, and sweaty.

A child in shock must get to a hospital as quickly as possible in order to survive. Early recognition, treatment, and activation of EMS are essential for survival.

To limit the effects of shock, help the body maintain adequate oxygen by ensuring an open and clear airway, confirm adequate breathing, and controlling any external bleeding. If there is no difficulty in breathing, lay the child flat on the ground.

Maintain a normal body temperature. Insulate on top and underneath to prevent heat loss. Be careful not to overheat. Give nothing to eat or drink, even if the child asks for it. Keep the child as comfortable and calm as possible. Reassess regularly until another provider or EMS take over.



### Knowledge Check

At the elementary school where you teach, one of your students tells you that another child fell off the play structure at recess. Concerned, you approach the child who fell and ask her what happened. She tells you she hit her belly on one of the bars when she fell and that it hurt a lot at first, but that it feels better now. You are concerned whether she injured herself internally. What signs do you look for?



# Head, Neck, or Back Injury



When the body suffers a significant force, such as from a high fall, shooting, or motor vehicle crash, serious injury can result, most notably to the spine.

## *Spinal Injury*

Injury to the spinal cord can result in temporary or permanent paralysis. Paralysis of chest muscles could result in the loss of breathing. Serious shock may also occur.

After an initial injury, the movement of damaged spinal bones can result in additional injury to the spinal cord or surrounding tissue. Always make sure it is safe to provide care. If you suspect a spinal injury could have occurred, quickly tell the child to remain still.

Suspect a spinal injury when the following occur:

- Obvious injuries to head, neck, or back
- Numbness, tingling, burning, or a loss of sensation in the arms, hands, legs, or feet

The lack of symptoms or obvious injury does not mean the spine is not injured. If a significant mechanism of injury occurred, it is best to assume a spinal injury exists.

Activate EMS. Prevent further injury by restricting spinal movement with manual stabilization of the head. Comfort, calm, and reassure the child. Reassess regularly until another provider or EMS personnel take over.



Establishing an airway for an unresponsive child is a higher priority than protecting a suspected injury to the spine. Tilt the head and lift the chin when necessary to maintain an open airway or give rescue breaths.

If you need to leave an unresponsive child with a suspected spinal injury alone to get help, place the child in a recovery position to protect the airway before you go.

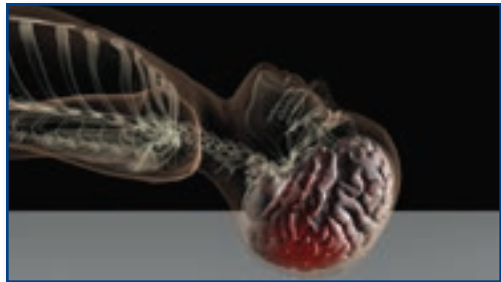
### FLUID IN THE AIRWAY

When a head, neck, or back injury is suspected, it is best to leave the person in the position found. However, if the airway is threatened by vomiting or a collection of fluids, quickly roll the person as needed to clear and protect it. Keep the head, shoulders, and torso from twisting as best you can.

## Brain Injury

A child's head is large compared to the rest of the body and the neck muscles are weak. The higher center of gravity makes it more likely for a child to hit his or her head in a fall.

Injury to the brain can occur from a significant blow to the head or by rapid movements of the head that force the brain to bounce around within the skull. Significant swelling or bleeding inside the skull can result in increased pressure that damages delicate brain tissue.



### Brain Injury Prevention

Always use safety equipment such as seat belts, bicycle or motorcycle helmets, and hard hats during activities that could result in brain damage.

Suspect serious brain injury when a blow to the head clearly results in a diminished mental status. Surgical intervention may be the only treatment. Ensure EMS is being activated and continue to manually stabilize the head with your hands. If present, do not attempt to stop the flow of blood or fluid from the ears or nose.

Abusive head trauma, also known as shaken baby syndrome, is a brain injury caused when an infant or young child is shaken. Weak muscles in the neck and a large head relative to the body, allows an infant's brain to bounce against the inside of the skull and become injured.

### Concussion

A concussion is a brain injury that generally results in a less immediate or obvious change to mental status.

Suspect a concussion if a child is unable to remember what happened just before or after a significant blow to the head or body, or recall simple facts about it. The child may move clumsily, answer questions slowly, or show a change in mood or person-



#### SHAKEN BABY SYNDROME

Even mild shaking can result in serious, permanent brain damage or death. Many states have passed legislation requiring education and training in preventing and identifying Shaken Baby Syndrome/Abusive Head Trauma for child care workers and teachers. Check your individual state's requirements. For more information and resources visit <http://www.dontshake.org>.<sup>15</sup>

#### CHILD ABUSE

Child abuse is any act that endangers or impairs a child's physical or emotional health and development. It may be physical violence, emotional injury, sexual abuse, or consistent neglect.

In the United States, a national child abuse hotline has been established. The phone number is 1-800-4ACHILD. For additional information you can visit online at [www.childhelp.org](http://www.childhelp.org).

#### MANDATED REPORTING

All states, the District of Columbia, American Samoa, Guam, the Northern Mariana Islands, Puerto Rico, and the U.S. Virgin Islands have laws identifying persons who are required to report suspected child maltreatment. For a comprehensive list of professionals required to report, a summary of individual state laws, and more, visit "Mandatory Reporters of Child Abuse and Neglect" at <https://www.childwelfare.gov/topics/systemwide/laws-policies/statutes/manda/>

ality. The child may appear stunned or dazed, have a headache, be nauseated or dizzy, have difficulty in balance, or experience visual problems.

A pediatric first aid provider may be called upon to give advice on whether a child who is suspected of having a concussion is okay to return to normal activities. Unfortunately, there is no current concussion evaluation for use by those trained in first aid. Most concussions are temporary and resolve naturally, but it is possible for one to progress into a life-threatening condition.

If you suspect a concussion may have occurred, the child should be evaluated by a healthcare provider or EMS personnel as soon as possible.

Because a concussion could worsen, it is best to not allow the child to perform actions that could pose a risk for additional injury until he or she can be adequately assessed by a healthcare professional.



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### Knowledge Check

While playing outside at a daycare facility, one of the children you are supervising has accidentally fallen backwards off a ladder leading up to a slide. She landed on her head and shoulders, striking the backpack full of books she had left at the base of the ladder. There is a small cut on her forehead, but she does not complain of pain in her neck or numbness or tingling in her arms or legs. You elect to manually stabilize her head with your gloved hands. Why?

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# Manual Spinal Motion Restriction



## Initial Considerations

- Make sure it is safe to provide care.
- Immediately encourage child not to move.
- Have a bystander activate EMS.



## Stabilize Head

- Get into a comfortable position behind the child.
- Cup your hands on both sides of the head, to manually stabilize it.
- Minimize any motion.
- Comfort, calm, and reassure the child.



## Protect the Airway

- If fluids are collecting in the mouth and airway, roll the child onto side to drain.
- If you are alone and need to leave to get help, roll the child into recovery position before you go.

# Swollen, Painful, or Deformed Limb



External force to a limb can result in an injury to the underlying skeletal system.

Bones, muscles, and joints give the body shape, allow movement, and protect vital internal organs. Long bones form the upper and lower parts of each limb. Muscles, ligaments, and tendons attach to the bones, allowing for movement where the bones come together at joints. These bones are the most exposed to injury.

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

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

Common signs of these types of injuries include swelling, pain, numbness, and discoloration. Distinguishing the type of injury is often difficult. It is best to treat everything as a possible fracture.

The limb may appear deformed and the child may guard it by holding it against her body. Unstable bones or joints can damage surrounding tissue. Encourage the child to not move or use the injured limb. If the injury seems serious, or you are not sure, activate EMS.

Expose the injury site by gently cutting or tearing away clothing. An open wound may be present in association with a fracture. Control any bleeding using a clean dressing and firm, continuous, direct pressure on the bleeding site. Do not push a bone back under the skin.

Use padding in the gaps around the limb to provide a stable and comfortable spot for the limb to rest. If needed, place your hands above and below the injured area to help immobilize the limb. Local cooling can help decrease bleeding, swelling, and pain.

### **LOCAL COOLING**

For many injuries, local cooling can help decrease bleeding, swelling, and pain. A plastic bag filled with a mixture of ice and water works best. Place a thin cloth between the bag and skin to prevent cold related problems. Limit application to 20 minutes or less.

It is best to not straighten an injured limb that is unnaturally angled. Leave the limb in the position found. If a limb becomes blue or extremely pale, circulation may be compromised by the injury. If you have not yet done so, activate EMS if this occurs.



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

Comfort, calm, and reassure the child. Reassess the child and injury regularly until EMS personnel take over.



### **Knowledge Check**

While playing outside, a young child trips and falls onto her outstretched arm. She is awake, crying, and appears to be in severe pain. As a responding pediatric first aid provider, you carefully expose the injury site and see the forearm near the wrist is bent at an unnatural angle. The child's hand beyond the injury is a purplish-blue color. What do you do?



# Manual Stabilization of a Limb



## Expose Injury

- Encourage child not to move injured limb.
- Expose injury site to look for an open wound.



## Cover Open Wounds

- Cover an open wound with a clean absorbent pad.
- Gently control bleeding with firm, continuous, direct pressure around bone or injury site.
- Never push an exposed bone back under skin.



## Stabilize Limb

- Leave injured limb in position it was found.
- Use padding in gaps and holes underneath limb to provide a stable and comfortable spot for it to rest.
- If needed, use your hands to manually stabilize limb.



## Additional Considerations

- If injury seems serious, or you are not sure, activate EMS.
- Comfort, calm, and reassure child.
- Local cooling can help decrease bleeding, swelling, and pain.

# Burns



A burn is an injury to skin, and possibly underlying tissues, caused by exposure to extreme heat, chemicals, or electrical contact.

## *Thermal Burns*

A thermal burn occurs when heat directly affects a skin surface. Common causes of thermal burns include direct contact with hot liquids, flames, or hot objects. Thermal burns can also be caused by radiant heat from a hot environment or extended exposure to the sun.

Most thermal burns are minor in nature and may only require basic care. However, more serious burns require additional care.

The severity of a burn is related to its depth and size. Deeper burns resulting in blistering or broken skin are more serious. Larger burns, even those with a shallow depth, are also more serious.



A comparable burn covers a greater percentage of surface area on a child compared to an adult, and could be much more serious.

Burn location contributes to severity. Burns involving the face, neck, hands, genitals, and feet can result in complications related to movement and other basic functions.

Difficulty breathing as a result of inhaling hot air indicates a serious burn injury within the airway.

When a burn occurs, make sure the situation is safe for you to help. If flames are present, immediately direct a child to stop, drop, and roll, smother the burning material with a coat, rug, or blanket, or douse the material with water.

Activate EMS if you think the burn is severe or you are unsure. Carefully expose burned areas by removing clothing and any jewelry. If needed, carefully cut clothing away. If clothing is stuck to the burn, cut around it.

Cool a burn with cool or cold water as quickly as possible. Early cooling can reduce pain and minimize the risk and depth of burn injury. Cool for at least 10 minutes. Use a clean, cool or cold dressing as an alternative when water is not available. Never use ice or a frozen compress to cool a burn. There are also burn dressings, presoaked with a specially formulated gel, to promote cooling of the burn.

When cooling large burns, watch for signs of overcooling, such as shivering. Children have a larger surface area in relation to weight than adults and are more likely to have complications from overcooling.

After cooling, separate fingers or toes with sterile dressings or pads. To improve healing, leave any blisters intact. Loosely cover the burn area with a dry, clean pad or clean sheet to help keep it clean and protected.



### Burn Prevention

- If someone is on fire, tell the child to STOP, DROP, and ROLL. Try to smother flames with a coat, rug, or blanket, or douse them with water.
- Scalds from hot liquids or steam are the most common burns in young children. Prevent scalding burns by adjusting your hot water heater thermostat to 120 degrees Fahrenheit or lower. Test bath water. Turn handles of boiling pots inward on stoves and never leave food unattended.<sup>16</sup>
- Keep matches and lighters in a secured drawer or cabinet.

### Electrical Safety

- Keep a safe distance between power lines and ladders, tools, and work materials.
- Consider any fallen or broken wire extremely dangerous. Do not approach within 8 feet of a wire, victim, or vehicle that is possibly energized.
- Notify the local utility and have trained personnel sent to the scene. Never attempt to handle wires yourself unless you are properly trained and equipped.

Avoid natural burn remedies such as honey or potato peels. Never apply butter, ointment, lotion, or antiseptic to a serious burn. Give the child nothing to eat or drink.

All serious burns, or ones you are unsure about, should be evaluated by a healthcare provider. Keep the child calm and comfortable while awaiting EMS.

### **Electrical Burns**

Medical emergencies involving electricity can occur when there is direct contact with an energized object, such as an electrical wire or outlet or when someone is struck by lightning.

Be safe! Turn off any electrical current before touching the child. If you cannot stop the flow of electricity, do not enter the area around the child or attempt to care for him or her.



An electric shock can cause ventricular fibrillation, an abnormal heart rhythm in which the heart stops moving blood. When it is safe, perform CPR and use an AED if one is available. Don't stop unless the child shows signs of life, another provider or EMS personnel take over, or you are too tired to continue.

When a body part comes into contact with an exposed electrical source, electricity can travel from the point of contact to a second point of contact that is grounded. Common points of contact include the hands and the feet.

If the child affected is responsive and no longer in contact with the electrical source, look for burns at any suspected points of contact. Cool the burn as you would with a thermal burn.

A child who has received an electrical shock should always seek professional medical care because serious internal injuries can occur.

### **Chemical Burns**

Some chemicals can damage skin tissue on contact. The priority is to quickly remove the chemical to minimize any damage.

Carefully remove any contaminated clothing. Immediately flood the affected area with large amounts of water. Take care to prevent additional exposure to the injured child or yourself. Flush for at least 15 minutes. Some chemicals take longer than others to be flushed away. If still painful, resume flushing.

When involved, brush off any dry powder with a gloved hand or cloth prior to flushing. Do this carefully to avoid additional exposure.



If no longer painful, cover any visible burns loosely with a dry, clean dressing and seek further medical attention.

Without interrupting care, contact the Poison Help line at 1-800-222-1222 for treatment advice when a chemical burn occurs. If not possible, talk to the EMS dispatcher or a medical provider.

### **Chemicals in the Eye**

Corrosive chemicals splashed into an eye can quickly damage eye tissue. Affected eyes will become painful and appear red and watery.

If possible, immediately flush the eye with clean water. Continue to flood the eye with large amounts of water. Carefully hold the eye open and flush continuously for at least 15 minutes, or until EMS personnel take over. Flush outward from the nose side of the affected eye to prevent contamination of an unaffected eye.

If a child is wearing contact lenses and they are not removed by the flushing, have the child try to remove them as flushing continues.

If running water is not available, normal saline or another commercial eye irrigating solution can be used.

Chemical burns to the eye require professional medical care. Activate EMS as quickly as possible.



### **Chemical Injury Prevention**

When not in active use, all chemicals used inside or outside should be stored in a safe and secure manner in a locked room or cabinet, fitted with a child-resistant opening device, inaccessible to children, and separate from stored medications and food.<sup>17</sup>



### **Knowledge Check**

You are serving as a camp counselor for a group of fifth graders. The whole group is gathered around a fire pit, roasting marshmallows. One child accidentally ignites his shirt sleeve on fire when bending over the pit. As a trained pediatric first aid provider, you quickly put out the flames by throwing a nearby coat over his arm. When you remove the coat, you can see that his arm has been burned badly. What is your next step to remove heat from the burned area and prevent additional damage?

# INJURY PREVENTION

## **Motor Vehicle Safety**

Motor vehicle crashes are the leading cause of unintentional injury deaths to children.<sup>18</sup> The proper use of child safety seats and booster seats secured with seat belts reduces the risk of injury and death.

Never allow children to ride on an adult's lap or share seat belts. All children age 12 and under should ride in the back seat of automobiles equipped with passenger-side air bags.

Always lock car doors securely and never leave a child alone in a car.

## **Bicycle Safety**

Bicycle and pedestrian accidents are a leading cause of injury in children and the leading cause of severe closed-head injuries.

Bicycle helmets greatly reduce the risk of head injury. Helmets should be introduced to children at an early age and be required for use with any wheeled equipment, such as bicycles, scooters, skateboards, and skates. Helmets should be worn flat on the head, not tipped back. The chin strap needs to be snug.

Choose the right size tricycle or bicycle for each child. Buying a bike that's too big so the child will grow into it can be dangerous. Enroll your children in a bicycle safety course.

## **Pedestrian Safety**

Teaching children good pedestrian habits will reduce the risk of injury and death.

- Hold an adult's hand when crossing the street.
- When a crosswalk is not available, cross at a corner. Look left, right, and left again before crossing.
- Use a sidewalk whenever possible.
- When walking at dusk or at night, wear light-colored clothing; use reflective tape on clothes and shoes; and carry a flashlight. Walk facing the traffic so you can see oncoming traffic and the drivers can see you.
- Never run out from between two cars.

## **Fall Prevention**

Children love to climb and participate in activities that carry the risk of falling.

Children's heads are larger in proportion to their bodies as compared to adults. This increases the chance of falling head first and causing serious or even fatal head injuries.

Children should be supervised around stairs, porches, and balconies. Teaching children good climbing habits will reduce risk of falls when adults can't be there to supervise.



# Specific Injuries



Some injuries can benefit from additional first aid care.

## Amputations

An amputation is the complete detachment of a portion of a limb, hand, or foot.

### *AVULSION*

An avulsion occurs when the skin has been forcibly torn away from the body. Avulsions often have remaining tissue attachment to the body, along with some blood supply. Placing an avulsed piece back in place may help with bleeding control.

If an amputation has occurred, quickly assess for and control any severe bleeding using a clean pad and direct pressure. Have the child sit or lie, even if it is on the ground. Activate EMS.

Once bleeding is being managed, locate the severed part. Amputated body parts can often be surgically reattached. Wrap it in a sterile or clean cloth. Place the part in a tightly sealed plastic bag or waterproof container. If available, cool the bag or container with ice or a chemical cold pack.





Do not soak severed part in water or put directly on ice. Give it to EMS providers for transport with the child to the hospital.

Calm, comfort, and reassure the child. Reassess regularly until another provider or EMS take over.

## Minor Injuries

The occurrence of minor injuries is common when dealing with children.

### Abrasions

Abrasions can occur when a bare skin surface is scraped across a rough surface and the outer layers of the skin are damaged. Removing embedded foreign material will be important to prevent infection.



### Lacerations

Lacerations occur when a sharp object penetrates and moves across an exposed skin surface creating a long, narrow wound. The depth and length of a laceration can vary. Deeper and longer lacerations may require suturing, or stitches, to help them heal appropriately.

### Puncture Wounds

Puncture wounds penetrate through the skin and into the underlying tissue. Because of the difficulty of cleaning a puncture wound, the possibility of infection is high.

### Splinters

Splinters are small foreign bodies that get embedded underneath the surface of the skin. They can occur when the skin is drawn across rough or jagged pieces of wood, metal, or glass.

Splinters need to be removed to keep the wound from becoming inflamed, or infected. Most of them are easily removed. Using a pair of tweezers, grab the protruding end of the splinter and pull it out along the direction it entered.

If a splinter appears deeply embedded or you have only been able to remove a piece of it, do not attempt further care. The wound should be seen by a health-care professional.

### Blisters

Blistering can occur when a skin surface is exposed to repetitive rubbing. A fluid-filled sac appears underneath the skin surface. It is best to keep blisters intact to promote proper healing.

## Minor Wound Care

Regardless of the type or cause, most minor wounds can benefit from simple first aid care. Gently wash wound with clean, running water, with or without soap. Continue to wash wound until all foreign matter has been removed.



Wound cleaning could result in minor bleeding. Use firm, continuous, direct pressure to control it.

In a child care setting, do not apply prescription or non-prescription antibiotic ointments or other topical medications without written orders from a prescribing health professional and written permission from a parent or guardian.<sup>19</sup>

Cover the wound with a clean adhesive bandage or gauze pad. Local cooling can help to reduce ongoing pain and swelling of minor wounds.

Seek further medical attention if a wound won't stop bleeding; it's very deep or long; it's on the face or a place where the skin stretches on movement; or if it involves injury to underlying structures.

Wounds that also require further medical care are those caused by a dirty or rusty object; still have embedded material such as dirt or gravel stuck in them; were caused by an animal or human bite; are extremely painful; or look infected.

If you are concerned or have questions about any wound, do not hesitate to seek further medical attention.

### **TETANUS**

Tetanus is a severe and often fatal infection associated with open injury. A tetanus shot is recommended if it is unclear about the date of his or her last tetanus vaccination, or if it has been 10 years since the last vaccination.

A tetanus booster is recommended within 5 years for open injuries with a high potential for infection, such as dirty, ragged, or puncture wounds. If not current, a person needs to get a tetanus booster within 72 hours of injury.

### **Nosebleed**

Nosebleeds can occur when small blood vessels inside the nostrils are ruptured. Most nosebleeds are not serious and can be easily handled.

To care for someone with a nosebleed, have the child sit up straight with his or her head tilted forward, chin down. Pinch the soft portion of the nose with your thumb and index finger and hold it for about 10 minutes. Do not tilt the head

back or have the child lie down. These actions will cause the child to swallow blood and may cause him or her to vomit. Have the child spit out any blood that collects in his or her mouth.

Monitor the child. If the nose continues to bleed, or you see signs of developing shock, seek further medical help.

### **Injured Mouth**

Injury to the soft tissue in and around the mouth can occur from a blunt blow or sharp object against the face. Often, an injury is caused by the child's teeth. Control any bleeding to the lips or face by applying direct pressure with a clean pad or dressing. If there is bleeding inside the mouth, have the child gently bite down on a clean absorbent pad.



### **Knocked-Out Tooth**

A blow to the mouth can break, dislocate, or even knock out teeth.

Young children have primary, or baby, teeth that are naturally replaced with permanent teeth beginning at about six years of age. Primary teeth are less of a concern when knocked out.

When a permanent tooth has been knocked out, it is best to get it treated without delay. Successful reimplantation of the tooth is dependent on how quickly the child is treated by a dental professional.

Handle the tooth only by the chewing surface, called the crown. Do not touch the root, the part of the tooth that extends into the gum. Never scrub the tooth or remove any attached tissue fragments.

Do not place the tooth back in the child's mouth. Have the child spit into a cup and place the tooth in the saliva. Keeping the tooth moist can help extend the time for successful reimplantation. Avoid storage in water.

There are alternative solutions that are more effective for temporary storage of a displaced tooth than saliva. The solutions include the following:

- Hank's Balanced Salt Solution
- Egg white
- Coconut water
- Whole milk



Get the child to a dentist as quickly as possible. The faster you act, the better the chance of saving the tooth.

### **Objects in the Eye**

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Small foreign objects on the surface of an eye will cause irritation and discomfort.

Encourage the child not to rub the affected eye. Have the child blink several times to see if the eyelid or tearing can remove the object naturally.

If not, flush the eye with tap water or saline eyewash solution. Flush outward from the nose side of the eye. If pain continues or the child feels like something is still in the eye, cover the eye lightly with a gauze pad and seek professional medical care.

Objects that penetrate, or impale, the surface of the eye are most likely caused by being propelled at a high rate of speed.

Activate EMS. Prompt professional medical care is required anytime an object impales the surface of the eye. Do not allow the child to rub the eye.

Never try to remove an embedded object. Place a protective cover over the eye to prevent pressure on the object, such as a paper cup or cone. Eyes move together. Cover the uninjured eye with a pad and bandage over both eyes to prevent movement of the affected eye.



Covering both eyes can be distressing. Stay with the child. Calm, comfort, and reassure him or her to help reduce anxiety. Regularly assess the child until EMS personnel take over.



### **Knowledge Check**

When a tooth has been knocked out, what is the most critical factor in being able to successfully reimplant the tooth?

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# Warning Signs of Sudden Illness



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Underlying medical conditions and illnesses can suddenly trigger an unexpected medical emergency. In general, suspect a serious illness when, without warning, a child suddenly appears weak, ill, or in severe pain. In many cases, the human body displays warning signs to alert us to serious illness.

The most common warning signs of serious illness in a child are altered mental status and breathing difficulty or shortness of breath. Other, more specific, warning signs may be present. These include fever, headache, stiff neck, and a blood-red or purple rash.

Even if the underlying cause is not clear, early recognition and EMS activation for these warning signs alone can be appropriate.

## ***MENINGITIS***

Meningitis can occur as a result of an infection of the fluid surrounding the brain and spinal cord. The infected fluid causes inflammation of the protective membranes around the brain and spinal cord. Common signs include a sudden onset of fever, headache, vomiting, and stiff neck.

## ***SEPSIS***

Children and infants have a higher risk of getting sepsis, a serious illness that occurs when the body's immune system has an overwhelming response to a bacterial infection. Widespread inflammation and poor blood flow occurs as a result. Common signs include fever, rapid breathing, rash, and altered mental status.

# Altered Mental Status



Caused by a number of medical conditions, as well as alcohol, medications, or drugs, an altered mental status is a significant or unusual change in a child's personality, behavior, or consciousness. It is an indication of a change in brain function.

Regardless of the cause, an altered mental status is a warning sign of a serious problem and is considered a medical emergency.

- Activate EMS.
- Position the child for comfort.
- Calm and reassure the child as best you can.
- If the child's level of responsiveness is or becomes severely diminished, consider placing him or her in a recovery position to protect the airway.
- Reassess regularly until another provider or EMS personnel take over. The condition could deteriorate quickly and require additional care.

## Hypoglycemia

Diabetes is a disease in which the body cannot effectively use sugar for energy. Hypoglycemia, or low blood sugar, is a diabetic condition that can rapidly develop and become life threatening. Early recognition and treatment by a pediatric first aid provider can prevent the condition from worsening.





Suspect hypoglycemia with a child who begins to act oddly or becomes confused. The child may be trembling, or shaking, and his or her skin may be pale, cool, and sweaty.

A medical alert bracelet or necklace may help identify the underlying condition or someone present may know the child's medical history. In a child care facility or school follow the child's special needs care plan.

If a child is unresponsive, unable to follow simple commands, or has difficulty swallowing, quickly activate EMS. Do not give anything to eat or drink, and provide any required supportive care.

If the child is responsive, able to follow directions, and can swallow without difficulty, give about 15 grams of oral glucose tablets, if they are available. If not available, use something with dietary sugar instead, such as orange juice, candy, fruit leather, or whole milk. Things that use artificial sweeteners will not help.

It is important to note that insulin is not considered an emergency medication. It is never appropriate to administer insulin to a diabetic child in an emergency setting.

Calm, comfort, and reassure the child. If he or she responds to the sugar, mental status will gradually improve. If there is no response to sugar within 10 to 15 minutes or the condition worsens, activate EMS, and provide additional glucose or sugar. Reassess regularly until another provider or EMS personnel take over or a parent or legal guardian assumes responsibility.

### ***BASIC DIABETES CARE<sup>20</sup>***

The American Diabetes Association (ADA) recommends basic training in diabetes care for young children for all staff in a child care setting. The training should be provided by a diabetes health care professional, the parent, or legal guardian. All staff members responsible for a child with diabetes should receive basic training that provides an overview of diabetes, including information on how to recognize and respond to both low (hypoglycemia) and high (hyperglycemia) blood sugar.

In addition to the above, the ADA recommends advanced training for a small group of child care staff. The training should include additional instruction to how to perform blood glucose monitoring; insulin and glucagon administration; urine and/or blood ketone checks; recognition and treatment of hypo- and hyperglycemia; and basic carbohydrate counting/monitoring carbohydrates.

The number of staff members trained should be sufficient to ensure that at least one staff member who can provide routine and emergency diabetes care, such as insulin and glucagon administration, will be available at all times.



## Seizure

Generalized seizures are triggered by excessive electrical activity within the brain. The result is uncontrolled muscle convulsions throughout the body. Typically, seizures happen without warning. The child can lose control of his or her bowel or bladder, and may vomit.



While there are many things that can cause a seizure to occur, the care provided is always the same.

- Protect the child from injury during the seizure.
- Move objects away he or she may bump in to. Protect the child's head from injury as a priority.
- Do not restrain the child. Allow the seizure to take its course.
- Do not put anything in the mouth, including your finger. There is no danger of the tongue being swallowed.
- If possible, roll the child on to his or her side during the seizure to allow saliva to drain from the mouth.

Activate EMS if the child:

- is injured or vomits during the seizure,
- has no history of seizure, or
- continues to seize for more than 5 minutes.

Most seizures last only a short time, and stop without any special treatment. Once stopped, place the child in the recovery position to protect the airway. If responsiveness and breathing are absent after a seizure stops, begin CPR and use an AED, if one is available.

Normally, once a seizure stops, responsiveness improves slowly over time. Provide continual reassurance as the child improves. Provide privacy to minimize embarrassment. Continue to monitor until EMS personnel take over care, a parent or legal guardian assumes responsibility, or the child returns to normal.

## Fainting

Fainting is a momentary loss of consciousness caused by an unexpected drop in blood pressure and blood flow to the brain. The condition is not serious, although a child may be injured when collapsing. Common causes of feeling faint or fainting include anxiety or fear, pain, standing in place too long, or rapid changes in position, such as standing up quickly. A medication or underlying medical condition might also contribute to the cause.

If a child complains of suddenly feeling warm, lightheaded, or that his or her vision is narrowing, quickly lay the child flat on his or her back on the ground. You can elevate the feet about 6 to 12 inches, which allows blood from the legs to move back into the body. Do not elevate the feet if it causes pain or you suspect the child is injured.



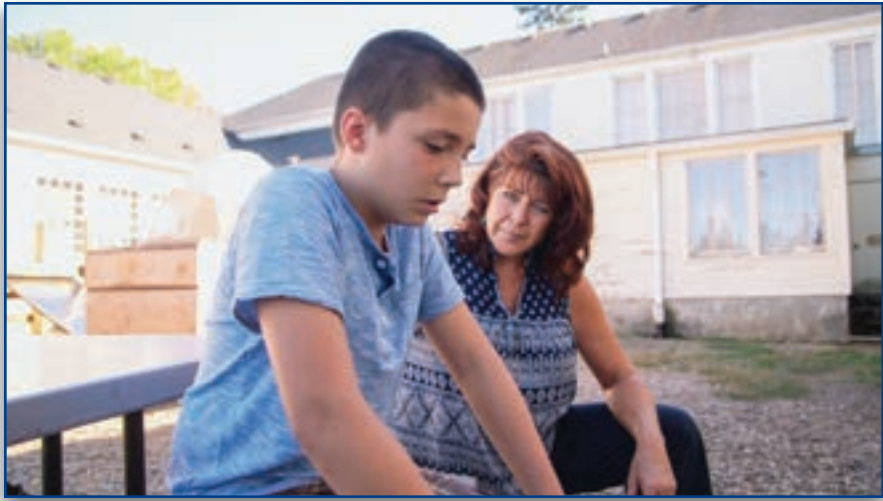
This is most often a temporary condition that passes quickly. However, monitor the child closely to see if it may be related to a more serious problem.



### Knowledge Check

Often with an altered mental status, a child may develop a severely diminished level of responsiveness. What can you do to help that child to protect and maintain an open airway?

# Breathing Difficulty, Shortness of Breath



Breathing difficulty is generally caused by an underlying medical illness such as asthma, allergic reaction, heart failure, or lung disease.

Normal breathing is regular and effortless. You may first suspect difficulty when there is a noticeable increase in the effort to breathe and the rate at which breaths are occurring. Coughing or unusual breathing sounds may occur.

A bluish-purple tissue color, especially in the lips or fingers, indicates a lack of oxygen and is a serious warning sign. If breathing difficulty occurs:

- Activate EMS. Do not wait to see if a child's condition will improve.
- Allow the child to find the best position in which to breathe.
- Loosen any tight clothing.
- Reassess regularly until another provider or EMS take over.

Breathing difficulty can quickly become life-threatening as a child becomes exhausted from the breathing effort. If breathing stops, be prepared to provide CPR and attach an AED if one is nearby.

## ***Asthma and Inhalers***

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Asthma is a medical condition in which certain things can trigger a physical reaction in the lungs and make it difficult for a child to breathe.

Asthma triggers include:

- Allergens such as pollen and molds
- Irritants such as smoke, fumes, and dust
- Medications, such as aspirin or acetaminophen
- Extreme weather conditions
- Exercise or stress

In an asthma attack, the small airways in the lungs narrow due to swelling and the production of mucus. Airflow into and out of the lungs is restricted.

A child may use an inhaler device to deliver a quick-relief medication to help control asthma symptoms. If the child has a prescribed inhaler for asthma, assist him or her in using it.



Monitor the child for any changes in condition. If not already done, activate EMS immediately if symptoms get suddenly worse, the child is unable to speak, or if there is no response to the medication within 5 minutes.

If breathing improves, continue to monitor the child closely. Consider the need for further professional medical evaluation.

### **Severe Allergic Reaction**

A severe allergic reaction, known as anaphylaxis, is an extreme response of the body's immune system to something it is sensitive to. There are common things that can initiate a severe reaction:

- Bee stings
- Peanuts
- Latex
- Penicillin



#### **USING A NEBULIZER**

A nebulizer is a larger powered device that turns liquid medicine into a fine mist that can be inhaled easily. A child simply breathes in and out normally through a mask or mouth-piece connected to the nebulizer. For more information on nebulizer use for children, see <http://www.nationwidechildrens.org/how-to-use-a-nebulizer>

When anaphylaxis occurs, the airway can constrict due to swelling of the throat. Wheezing may be heard. Swelling of the lips, eyelids, and face may occur. Itchy raised lumps, or hives, can appear on the face and chest. The child may complain of nausea and abdominal cramping.

A severe allergic reaction can develop rapidly. In general, the faster the reaction occurs, the more severe it is. Death can occur within minutes.<sup>21</sup>

A child with a history of allergic reactions may have a prescribed epinephrine auto-injector. Epinephrine can quickly reverse the effects of the reaction and may be lifesaving.

Auto-injectors use a spring-loaded needle to rapidly administer a measured, single dose of epinephrine. They are easy to use with minimal training. If the child has an auto-injector available and knows how to use it, assist the child in using it on him or herself.



When a child is unable to self-administer an injection, you may be able to do it for him or her. State law or regulation must allow you to do so and training may be required.

Activate EMS immediately. If the child has not responded to an initial dose of epinephrine and EMS is still at least 5–10 minutes away, a second dose may be given.

Carefully place a used auto-injector somewhere safe. Give it to EMS providers for proper disposal. Reassess regularly until another provider or EMS personnel take over.

### ***ASSISTING WITH MEDICATION***

State laws and regulations may define specific practices, rules, and standards for non-medical personnel to assist another person with prescribed medication in an emergency. Be familiar with the laws and regulations in your state. Childcare facilities should not give medication to a child without standing orders from the prescribing physician or parent/guardian.<sup>19</sup>



## **Knowledge Check**

You are a childcare provider at a daycare helping a child who has difficulty breathing. You suspect asthma is the underlying cause and have assisted the child in using his inhaler. After five minutes, the child is still having trouble breathing and it seems like it may even be worse. What should you do?

# Using an Inhaler



## Prepare Inhaler

- Remove cap on mouth port
- Shake inhaler well



## Have Child Breathe Out

- Tilt head back slightly
- Hold inhaler upright
- Exhale completely



## Deliver Medication

- Place port of inhaler in mouth
- Inhale slowly and deeply. Press down once on canister to release medication
- Remove inhaler from mouth and hold breath for 5-10 seconds to help medicine get deep into lungs.
- Repeat process as directed by dosage instructions



## Use a Spacer, if Available

- A spacer is a device that attaches to an inhaler and can help deliver medication more effectively.



# Poisoning



Any substance that can enter the body and create a harmful reaction in the body can be described as a poison.

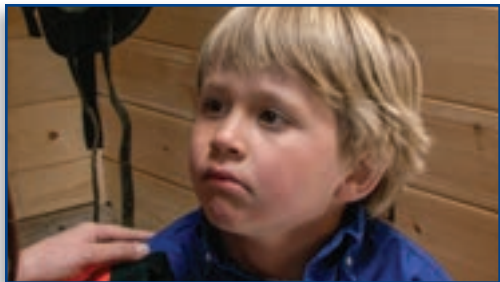
## ***Ingested Poisoning***

By far, poisoning most often occurs by ingestion. Younger children like to explore and taste things, increasing the chance for ingesting something poisonous. Children under six years old account for nearly half of all poisonings.<sup>22</sup>

Common ingested poisons include the following:

- Prescribed medications
- Personal care products
- Household cleaning products

The effects of ingested poisons are wide ranging and often resemble those of common illnesses. Abdominal pain or cramping, nausea, and vomiting may occur. A child may also have an altered mental status.



There may be clues to help you suspect poisoning has occurred. The child may openly admit to the ingestion. Open and empty containers, unusual smells, and odd staining on clothes, skin, or lips may be present.



If you suspect a child has ingested something poisonous, act quickly. Activate EMS if the child is displaying any serious signs or symptoms.

In the United States, calling the national Poison Help line at 1-800-222-1222 automatically transfers you to a regional poison control center. Poison control centers can quickly provide information regarding the immediate treatment to exposure of any substance.



You can help EMS providers and poison control by identifying the substance and providing details about the incident. Save any vomit, bottles, or containers for EMS.

As it may be harmful, do not induce vomiting, or give water, milk, or activated charcoal to the child unless you are advised to do so by poison control or EMS personnel. Do not use syrup of ipecac to induce vomiting.<sup>23</sup> Keep the child still. Calm, comfort, and reassure. Follow the advice given to you by poison control personnel.

### Inhaled Poisoning

Inhaled poisoning can occur when a high concentration of a harmful substance is breathed in, especially in an enclosed space. Common inhaled poisons include carbon monoxide, natural gas, solvent fumes, and chemical vapors.



Some poisons, such as natural gas, have a telltale odor. Other poisons, such as carbon monoxide, do not.

Symptoms of inhaled poisoning may include the following:

- Headache
- Nausea
- Dizziness
- Difficulty breathing
- Altered mental status

Suspect inhaled poisoning whenever someone is in an enclosed space and feeling ill.

Make sure it is safe for you to help. If you can do so without risk to yourself, immediately move the child to fresh air. Help the child to find a comfortable position. Activate EMS if the child is displaying any serious signs or symptoms.

Call the national Poison Help line at 1-800-222-1222 for additional directions on care. Help identify the substance and provide details about the incident. Keep the child still. Calm, comfort, and reassure. Follow the advice given to you by poison control personnel.

### Poisoning Prevention

- Store all medicines, household cleaning products, and personal-care products in locked cabinets out of reach of small children.
- Safety latches on drawers or cabinets, and child-resistant caps on bottles, are helpful in keeping poisons out of the hands of children. However, they are not “child-proof” and do not substitute for careful and constant supervision.<sup>24</sup>
- Never mix household or chemical products together. A poisonous gas may be created when mixing chemicals.
- Do not burn fuels or charcoal, or use gasoline-powered engines, in confined spaces such as garages, tents, or poorly ventilated rooms.
- Place carbon dioxide monitors near bedrooms.
- To learn more about the potential health effects, and how safety and handling of household products, visit the Household Products Database at <http://householdproducts.nlm.nih.gov/>

#### CONTACT POISONING

Direct skin contact with plants such as poison oak, poison sumac, and poison ivy can cause problematic skin reactions. Usually occurring within hours or days of exposure, these reactions result in itchy, red skin rashes with open sores.

If you know a child has been exposed, you may be able to prevent a reaction by washing the affected area with soap and water as soon as possible to remove the oily plant resin. Carefully handle and wash any clothes or tools that may have been exposed.

#### HAZARD INFORMATION

In child care facilities, employers must provide staff with hazard information, including access to and review of the Safety Data Sheets (SDS) as required by the Occupational Safety and Health Administration (OSHA).<sup>17</sup> For more information, see <https://www.osha.gov/Publications/OSHA3514.html>



### Knowledge Check

In the United States, calling the national Poison Help line automatically transfers you to a regional poison control center. Poison control centers can quickly provide information regarding the immediate treatment to exposure of any substance. What is the number to call?

# General Illness



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Children are more susceptible to general illnesses until their immune systems mature.

Pediatric first aid providers may encounter some common illness-related issues. These include fever, nausea, vomiting, diarrhea, and general malaise.

Fever is a rise of internal body temperature and is typically a result of infection. Fevers measured orally above 101 degrees Fahrenheit, or connected to other warning signs, are generally considered more serious and require medical attention.

There are several types of thermometers used to measure temperature. You should be familiar with using the ones that are available to you.



High fever in a child can result in what is described as a febrile seizure. There are generally few complications associated with these types

of seizures. Manage the seizure as you have learned. After the seizure, seek follow-up medical attention.

Nausea, vomiting, and diarrhea can quickly cause a child to become dehydrated and go into shock. Monitor a child with these symptoms closely and seek medical attention if they persist or seem excessive.



Illnesses are tiring and a child's mental status will clearly be less energetic. Monitor the child for changes that may indicate a more serious problem.



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### Knowledge Check

You are taking care of a child at your school who was complaining of not feeling well. You take her temperature using an oral thermometer and find that it is 103 degrees Fahrenheit. Describe your follow-up plan.

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# Heat Emergencies



When a child is exposed to warm, humid temperatures, internal body temperature begins to rise. The body reacts by sweating, which evaporates and pulls heat out and away from the body. This is especially true during vigorous physical activity.

## *Exertional Dehydration*

Compared to adults, children are more susceptible to dehydration. Simply rehydrating a child suspected of being dehydrated due to physical exertion and sweating can prevent heat-related problems from developing. Drinking a carbohydrate-electrolyte drink, such as a sports drink, works well to prevent dehydration. Use water if a sports drink is not available.

## *Heat Exhaustion*

Heat-related problems occur when a body's normal temperature-reducing mechanisms become ineffective. Heat exhaustion can occur as a combined result of a rising internal temperature and dehydration.

Signs of heat exhaustion include the following:

- Heavy sweating
- Pale, cool, sweaty skin
- Nausea and vomiting
- Headache
- Dizziness
- Feeling weak



Although it may not appear serious, treat heat exhaustion quickly. If left alone, it could progress to heat stroke, a life-threatening condition.



- Have the child stop any activity and move him or her to a cooler place.
- Loosen or remove excess clothing.
- Have the child lie down. Consider raising his or her legs 6 to 12 inches. Do not elevate the legs if it causes pain or you suspect the child is injured.
- Apply cool, wet cloths to the head, neck, and torso. Fanning will increase the cooling effect.
- If the child is able to follow simple commands and swallow without trouble, encourage the child to drink fluids, preferably a carbohydrate-electrolyte sports drink. Use water if a sports drink is not available. Do not give anything to drink if the child is confused or he or she has difficulty swallowing.

In most cases, the child's condition will gradually improve. If the child does not improve or suddenly gets worse, activate EMS.

### Heat Stroke

Heat stroke is a condition in which body temperature rises dramatically because the body's cooling systems are overwhelmed, or simply shut down. Children are more susceptible to temperature extremes and less able to regulate their body temperature compared to adults.



Heat stroke is a serious medical emergency and can quickly cause permanent damage to the brain or death. A young child left in a hot car can die of heat stroke very quickly.

A child with heat stroke will be very warm, even hot to the touch. Sweating could be present, but the skin may be red and completely dry. Typically, the child will be confused and have trouble communicating. The child may become unresponsive and could experience a seizure.



Activate EMS immediately. The most important action a pediatric first aid provider can take is to begin immediate cooling with the resources available.

- When possible, the best method for cooling is to immerse the child up to the chin in cold water.
- If immersion is not possible, spray or pour cold water on the child and fan him or her.
- Apply cold packs to the neck, groin, and armpits.
- Cover the child with a cold, wet sheet and continue fanning.
- Provide continuous cooling until EMS personnel take over care.



### Heat Emergency Prevention

Follow these precautions for children in the heat:

- Make sure they are well hydrated.
- Dress them in clothing that is light-colored, lightweight, and limited to a single layer.
- Find shade and have children rest in it whenever possible.
- Have children avoid exercise or physical activity when the weather is hot or humid.<sup>25</sup>

With early recognition, and immediate and effective cooling, most children suffering from heat stroke can survive.

#### HEAT CRAMPS

Heat cramps are uncontrollable muscle spasms that can affect the calves, arms, abdomen, and back. They can occur suddenly and be very painful.

Manage cramps by stopping activity, moving the child to a cooler location, and having him or her drink a sports drink or water. Stretching and direct pressure to a cramping muscle may help.



### Knowledge Check

You arrive on a hot day to work as a child care provider at a health club and find a frantic woman in the parking lot. She tells you she forgot her sleeping infant son was in his car seat when she went in to work out. As a trained pediatric first aid provider you ask for, and get, permission to help the baby. Your primary assessment shows he is nearly unresponsive. His skin is surprisingly hot to your touch. What should you do for him?



# Cold Emergencies



A cold or cool, wet environment can result in a lowering of internal body temperature. Hypothermia and frostbite are the most dangerous cold-related conditions.

## ***Hypothermia***

Hypothermia, a generalized cooling of the body, occurs when the internal core body temperature has decreased to 95 degrees Fahrenheit or less. It can be a life-threatening condition.

Early signs of hypothermia include the following:

- Pale, cold skin
- Uncontrollable shivering
- Loss of coordination

Young children have a larger body surface area related to their size as compared to adolescents or adults. They are also typically leaner with lower fat stores. Both of these contribute to a quicker development of hypothermia.

As hypothermia progresses, shivering may stop. Breathing and heart rate slow down. Body processes can become impaired and may fail.

To care for the child, follow these guidelines:

- Gently move him or her to a warmer place. Prevent the child from making any excessive or rapid movements.
- Activate EMS.
- Remove wet clothing and cover the child with something dry and warm.
- Cover the head and neck to retain body heat, especially with children, who lose heat more rapidly from the head compared to adults.
- If possible, use your own body to provide additional warmth.
- Keep the child still and calm while you wait for EMS to arrive.



Cardiac arrest could occur. Be prepared to perform CPR. Get an AED if one is accessible.

If you are far from professional medical care, try actively rewarming the child. Place him or her near a heat source. Put containers of warm, but not hot, water in contact with the child's skin.

It is best to recognize and treat hypothermia as quickly as possible. The chance for survival decreases as the condition progresses.

### ***Frostbite***

Frostbite occurs when skin and underlying body tissue freezes. Body parts that are commonly exposed to extreme cold, such as the fingers, toes, earlobes, cheeks, and nose, are the most likely to be affected.

Signs of freezing include a loss of feeling in the affected part and firm, pale, cold, numb skin.

#### ***Frostbite Prevention***

Lowering tissue temperature may cause a pins-and-needles sensation and throbbing before freezing occurs. Frostbite may be prevented by using a simple skin-to-skin rewarming technique, such as holding the affected part in a warm hand.

If you suspect frostbite, quickly get the child to a warmer place and remove any wet clothing. When EMS is available do not try to rewarm the frostbitten area.



- Do not rub or massage the affected area or disturb blisters on frostbitten skin.
- Remove all jewelry from the affected areas.
- Place clean pads between frostbitten fingers and toes.
- Wrap the affected part with a clean towel or pad.
- Keep the affected part still and protected.
- Provide ongoing reassurance until EMS providers can take over care.

If you are far from professional medical care, and there is no chance refreezing will occur, rewarm the affected part yourself.

- Immerse the frostbitten area in warm water for 20 to 30 minutes. The water should be warm, not hot — just above normal body temperature.
- Check and maintain the water temperature often.
- Severe burning pain, swelling, blistering, and color changes may occur.
- Do not let the child use the affected part after it is thawed.
- Get the child to professional medical care as soon as you are able.



### **Cold Emergency Prevention**

Follow these precautions for children in the cold:

- Dress them in layers of loose-fitting, lightweight clothing. When rain or snow is present, outer clothing should be water repellent.
- Have them wear a proper fitting hat, coat, and gloves or mittens.
- Check extremities for normal color and warmth at least every 15 minutes.<sup>26</sup>



### **Knowledge Check**

You are leading a group of children on a day hike through the forest. It rained unexpectedly and it is now late in the day. One child is wearing only a light cotton shirt and shorts, which are now soaked. She is noticeably shivering. When you ask how she is doing, she has trouble responding to you. What do you suspect may be occurring?

# Stinging Insects

A wide variety of insects have the ability to sting. Most stings are not serious and cause only minor swelling, redness, pain, and itching at the sting site.

In general, care for an insect sting by washing the site with soap and water. Cover the area with an adhesive bandage or a pad. Use local cooling to help reduce swelling and pain.

Many insects such as bees, wasps, and fire ants may sting when agitated or in defense of their nests or territories. While wasps and fire ants can sting repeatedly, the stinger of a honey bee detaches, remains embedded in the skin, and continues to inject venom.

If a stinger is present in the skin, remove it as quickly as possible.

It is possible for a life-threatening allergic reaction to occur. Monitor the child for at least 30 minutes to see if signs develop.

If you think a severe allergic reaction is occurring, immediately activate EMS. If the child has a prescribed epinephrine auto-injector, assist the child in using it on him-or-herself. If the child cannot administer the epinephrine him-or-herself, and your state law permits it, quickly administer the epinephrine yourself.



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## **Bite and Sting Prevention**

- Don't harass insects and animals.
- Avoid wearing bright colors.
- Avoid using fragrant perfumes or lotions.
- Keep food garbage picked up and in containers.

## **Allergic Reaction Prevention**

Children can develop allergic reactions to mosquito and fire ant bites, and bee and wasp stings. Monitoring for and eliminating stinging insect nests is important.<sup>27</sup>



## **Knowledge Check**

You are outdoors at lunch with a group of children when one girl suddenly shouts that something stung her. You look at her forearm and see a stinger embedded in her skin. What should you do?

# Spider Bites



Spiders typically inhabit out-of-the-way places such as wood piles or out buildings. There are certain spiders that can be dangerous to humans. These include the black widow and the brown recluse.

Initially, venomous spider bites are often difficult to identify.

- Small puncture marks and bleeding may be seen.
- Tenderness, swelling, pain, itchiness, and redness at the bite site can develop.
- Over time, cramping pain and muscular rigidity in the body may occur.
- A child may experience fever, weakness, nausea and vomiting, or difficulty breathing.

If you suspect a severe reaction from a spider bite, activate EMS. Keep the child warm, reassured, and quiet while awaiting EMS.



## Knowledge Check

You are working with a 10-year-old neighbor boy in an old storage shed to locate some paint cans when he reacts to a sudden burning sensation on his leg. Due to the dim light, you cannot see anything. When you get outside, there is a small red mark that itches. If he was bitten by a poisonous spider, what may happen?

# Animal and Human Bites



Animal bites, such as from an aggressive dog or even from another child, can result in significant injury or bacterial infection.

Bites from animals such as raccoons, skunks, bats, and foxes can also cause rabies. Left untreated, rabies is fatal.

- Wash a bite thoroughly and flush with large amounts of water.
- Control any bleeding with direct pressure.
- Seek professional medical attention.

## **Safety Around Animals**<sup>28,29</sup>

Interaction with animals can be an educational and enriching activity for children. However, animals can also present a serious safety hazard. Only animals that do not pose a health or safety risk should be allowed on the premises of a child care facility. The following animals should not be kept at or brought onto the grounds of a child care facility: bats; hermit crabs; poisonous animals; wolf-dog hybrids; stray animals; chickens or ducks; aggressive animals (except for K-9 Corps dogs for a demonstration under the control of trained officials); reptiles and amphibians; parrots; ferrets; female dogs and cats in heat; or animals less than one year of age.



## **Knowledge Check**

What is the main concern related to bites from animals like raccoons, skunks, bats, and foxes?



# Emotional Considerations



Caring for a child in an emergency can create emotional distress. Exposure to an extreme situation or having a close relationship with the child involved can intensify these feelings.

Common reactions include the following:

- Anxiety
- Trembling or shaking
- Sweating
- Nausea
- Fast breathing
- Pounding heartbeat



This is a normal reaction to a traumatic event. Calm yourself as best you can and acknowledge your limitations as a provider.

When an emergency is over, a provider is often left alone while an ill or injured child is quickly transported away by EMS.

With limited time for closure, you can begin to experience a variety of reactions. These may include the following:

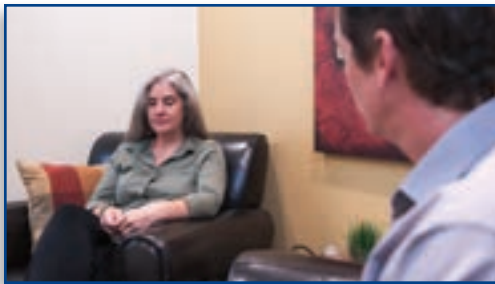
- Feeling abandoned or helpless
- Recalling the event over and over
- Self-doubt about not doing enough



- Difficulty concentrating
- Heaviness in the chest
- Upset stomach or diarrhea
- Difficulty sleeping or nightmares

These feelings are normal and should pass with time. However, there are actions you can take to help work through the difficulty.

- **Share your feelings.**  
Informally talk with someone you trust who will listen without judgment, such as a family member, friend, or coworker.
- **Get back to a normal routine as soon as possible.**
- **Accept it will take time to resolve these emotions.**
- **If unpleasant feelings persist, formal assistance from a professional counselor may be helpful as you deal with your emotions about the event.**



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### Knowledge Check

You responded as a pediatric first aid provider to a child who experienced a life-threatening allergic reaction to a bee sting. She has been transported by EMS to a hospital for further care. The experience was overwhelming, and you still have not heard if her condition has improved. The experience has clearly left you shaken. You keep going over your actions in your head and wonder if you did enough. How can you help address the feelings you are having?

# Recommended First Aid Kit Contents for Child Care Facilities

National health and safety performance standards recommend that child care facilities maintain first aid supplies in each location where children are cared for. First aid supplies should be clearly labeled and stored in a location accessible to staff, but out of reach of the children. Transportable first aid supplies should be available when children are outside the facility. All vehicles that transport children should have transportable first aid supplies.

Child care facility first aid kits should contain, at a minimum, the following:

- Disposable, non-porous gloves (non-latex recommended)
- Scissors (preferably safety shears)
- Tweezers
- Non-glass, non-mercury thermometer to measure temperature
- Bandage tape
- Sterile gauze pads
- Flexible roller gauze
- Triangular bandages
- Safety pins
- Eye patch or dressing
- Pen/pencil and note pad
- Cold pack
- First aid guide
- Coins for use in pay phone, and a cell phone
- Sterile water or saline for cleaning wounds or eyes (2 liters)
- Liquid soap to wash injury
- Hand sanitizer, used with supervision, if hands are not visibly soiled or if water is not present
- Tissues
- Wipes
- Individually wrapped sanitary pads to contain bleeding of injuries
- Adhesive bandages
- Plastic bags for materials contaminated with blood
- Flashlight with spare batteries
- Whistle
- Battery-powered radio

Transportable first aid kits should include all of the supplies listed above and the following:

- List of children in attendance and their emergency contact information
- Special needs care plans for children with special needs
- Emergency medication as specified in the special needs care plans
- List of emergency contacts for:
  - National Poison Help line 1-800-222-1222
  - Local hospitals
  - Emergency care clinics
  - Community resource agencies
- Maps
- Written transportation policy and contingency plans

**Notes:**

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- Do not use syrup of ipecac to induce vomiting. It should not be included in first aid kits or available at a child care program. Contact the national Poison Help line at 1-800-222-1222 for ingested poisoning treatment recommendations.
- Hand sanitizers can be used as an alternative to washing hands with soap and water if wipes are used to remove visible soil before the hand sanitizer is applied.

# Glossary

## abdominal thrust

Thrusts administered to the abdomen of a responsive, choking person to dislodge an object blocking a person's airway.

## abrasion

Rough surface scraping injury in which the outer layers of the skin are damaged.

## acute coronary syndrome (ACS)

Often described as a heart attack, ACS occurs when there is reduced blood flow to the tissues of the heart.

## airway

The passageway between mouth and lungs that allows life-sustaining oxygen into the body.

## altered mental status

A significant change in a person's personality, behavior, or consciousness, which may indicate a serious medical problem.

## amputation

A complete loss of a body part.

## anaphylaxis

A severe allergic reaction with an extreme response of the body's immune system to something it is very sensitive to.

## arterial bleeding

A wound to an artery, which is characterized by bright red, oxygen-rich blood spurting from the wound.

## asthma

Reactive airway disease, narrowing the small air passages in the lungs and causing difficulty in breathing.

## asthma inhaler

Portable device that allows someone with asthma to self-deliver a quick-relief medication that can quickly help control serious asthma symptoms.

### **automated external defibrillator (AED)**

A small, portable, computerized device that allows a minimally trained bystander to provide defibrillation much faster than EMS.

### **avulsion**

Flap of tissue forcibly torn away from the body that often has remaining attachment to the body.

### **bloodborne pathogens**

Infectious microorganisms in human blood that can cause disease in humans. These pathogens include, hepatitis B (HBV), hepatitis C (HCV) and human immunodeficiency virus (HIV).

### **cardiopulmonary resuscitation (CPR)**

A combination of rescue breaths and chest compressions performed on a person experiencing cardiac arrest, intended to restore some oxygen to the brain.

### **chain of survival**

A concept of five interdependent links (early access to EMS, early CPR, rapid defibrillation, effective advanced care, and integrated post-cardiac care) that describe the most effective approach for treating sudden cardiac arrest.

### **chest compression**

A basic CPR skill that creates increased pressure in the chest cavity and direct compression of the heart. This forces blood to move from the chest to the lungs, brain, and rest of the body.

### **chest thrust**

Thrusts administered on the breastbone of a responsive, choking person to dislodge an object stuck in the person's airway.

### **compression-only CPR**

A simple, but limited, approach to treating sudden cardiac arrest that is being widely promoted to people who are not formally trained in CPR.

### **consent**

Permission to provide first aid care.

### **concussion**

Potentially progressive brain injury that generally results in less immediate or obvious change to mental status.

### **CPR mask**

A protective barrier device used to prevent exposure to potentially infectious body fluids while performing rescue breaths on a person. The mask fits over the mouth and nose of the person and includes a one-way valve to blow through.

### **defibrillation**

The delivery of an electric shock through the heart intended to end chaotic electrical activity in the heart and allow the heart's normal electrical activity to return.

### **diabetes**

A disease in which the body cannot effectively use sugar for energy, which can lead to life-threatening problems if not managed properly. A diabetic emergency is often characterized by an altered mental status.

### **direct pressure**

Pressure applied directly to a bleeding site until bleeding stops. It is the standard method for controlling external bleeding.

### **dislocation**

The separation of bone ends at a joint.

### **DOTS**

Mnemonic device used to help with physical assessment:

- Deformities
- Open injuries
- Tenderness
- Swelling

### **emergency action plan (EAP)**

Used to help ensure safe and healthy conditions at work by providing step-by-step procedures on how to report and respond to emergencies.

### **emergency medical services (EMS)**

An emergency medical response system developed within a community, consisting of a specialized communications network and trained professional responders, all accessible through an emergency phone number such as 911.

### **epinephrine auto-injector**

A prescribed medication device with a spring-loaded needle, designed for easy use by a minimally trained person. Intended for use in treating a life-threatening allergic reaction, it delivers a measured single dose of epinephrine.

### **evisceration**

The protrusion of abdominal organs through an open abdominal wound.

### **exertional dehydration**

Excessive loss of body fluids due to physical activity.

### **fracture**

A break in a bone.

### **frostbite**

The freezing of skin and underlying body tissue in extremely cold conditions.

### **general impression**

A quick sense of what has occurred, or is occurring, when you first observe an emergency scene.

### **Good Samaritan law**

A law enacted to legally protect trained providers who voluntarily stop to help, act prudently, do not provide care beyond training, and are not completely careless in delivering emergency care.

### **head tilt-chin lift**

The recommended technique to open and maintain the airway of an unresponsive person. It pulls the jaw forward and lifts the tongue away from the back of the throat.

### **heart attack**

See acute coronary syndrome.

### **hypoglycemia**

Low blood sugar. A diabetic condition that can rapidly develop and become life threatening.

### **hypothermia**

A generalized cooling of the body that is a life-threatening condition, occurring when the internal core body temperature has decreased to 95° F or less.

### **impaled object**

An object that penetrates a body part and remains embedded.



**implied consent**

A legal concept referring to the assumption that an unresponsive person would give permission to be helped if responsive.

**internal bleeding**

A condition in which an injury causes bleeding inside the body, which can be difficult to detect. If it goes untreated, it can lead to shock and become a life-threatening problem.

**mechanism of injury**

A concept used by first aid providers to quickly suspect injury due to evidence that significant force has impacted a person's body.

**naloxone**

A medication that can temporarily reverse the life-threatening effects of opioids. It is administered either through an auto-injector device or through an aerosol that is sprayed into the nose. Naloxone is becoming more readily available to lay providers.

**overlay shield (CPR shield)**

A protective barrier device used to prevent exposure to potentially infectious body fluids while performing rescue breaths on a person. The shield lies over the face and includes a one-way valve or filter to blow through.

**pediatric chain of survival**

A concept of five interdependent links (prevention, early CPR with an emphasis on effective rescue breaths, prompt activation of EMS, effective basic and advanced EMS care, and effective post-cardiac care) that describe the most effective approach for treating pediatric secondary cardiac arrest.

**Poison Help Line**

Nationwide toll-free number (1-800-222-1222) in the U.S. that automatically transfers a caller to a regional poison control center.

**pressure bandage**

Roller gauze or elastic wrap used to apply and maintain direct pressure to control bleeding on an open limb wound.

**primary assessment**

An initial approach to quickly identify if a life-threatening condition is present.

### protective barrier

An item that helps reduce the risk of exposure to blood and other potentially infectious body fluids. Examples include disposable gloves, CPR masks, and face shields.

### rabies

A preventable viral disease of mammals most often transmitted through the bite of a rabid animal. The vast majority of rabies cases reported occur in wild animals like raccoons, skunks, bats, and foxes.

### recovery position

A side-lying position in which an unresponsive breathing person is placed to drain fluids from the mouth and keep the tongue from blocking the airway.

### rescue breaths

Artificial breaths given to someone who is not breathing, administered by blowing air into the mouth to inflate the lungs.

### SAMPLE

Mnemonic device used to help providers remember what to ask a person about:

- Symptoms
- Allergies
- Medications
- Past medical history
- Last oral intake
- Events leading to problem

### secondary assessment

Used when there are no life-threatening conditions to gather additional information about the person's chief complaint, physical signs, and additional information related to what is going on.

### secondary cardiac arrest

Cardiac arrest as a secondary progressive result to the loss of breathing.

### seizure

Jerking or convulsive activity of the body triggered by excessive electrical activity within the brain.

## Shaken Baby Syndrome

A brain injury caused when an infant or young child is shaken. Also described as abusive head trauma.

## shock

A life-threatening condition that develops when poor blood flow creates a shortage of oxygen to body tissues.

## special health needs

Medical issues that require ongoing routine management and/or specific emergency treatment.

## special needs care plan

Individual care plan for routine and emergency healthcare provided by a primary medical provider for a child with special healthcare needs.

## spinal motion restriction

The use of the hands to gently hold both sides of the head to restrict spinal motion. Done to prevent additional damage from a suspected spinal injury.

## splint

A device used externally to immobilize a painful, swollen, or deformed limb in order to decrease pain and prevent further injury.

## sprains

Tearing injuries to ligaments that hold joints together.

## standard precautions

A consistent set of protective practices used whether or not an infection is suspected. The approach is the same for everyone, regardless of relationship or age.

## strains

Stretching or tearing injuries to muscles or tendons.

## Sudden Infant Death Syndrome (SIDS)

A sudden and unexplained death of a baby under one year of age. The leading cause of death in babies after one month of age. Most deaths occur in babies who are between 2 and 4 months old.

### **sudden cardiac arrest (SCA)**

The abrupt loss of the heart's ability to contract and push blood forward through the circulatory system. Typically caused by a sudden disruption of the heart's electrical system.

### **tourniquet**

A binding device used on a limb above a heavily bleeding wound to control bleeding.

### **unresponsive**

A condition in which a person does not respond to physical or verbal attempts to get a response.

### **ventricular fibrillation**

A chaotic, quivering heart rhythm that prevents the normal contraction of the heart and the ability to pump blood.

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# Knowledge Check Answers

## Preparing to Help — Page 5

If the scene is safe, you should still approach and offer to help the child. You are only the first link in a progressive chain of emergency care. Your involvement lasts only until relieved by another pediatric first aid provider or responding EMS personnel — in most cases, a very short period of time. Your training provides you with sound knowledge and skills designed only to help — and not harm — those in need. Extensive medical knowledge is not necessary. Pediatric first aid is simple and easy to provide.

## Protecting Yourself — Page 8

False. Standard precautions is a set of protective practices used whether or not an infection is suspected. To be effective, your approach is the same for everyone, regardless of relationship or age.

## Legal Considerations — Page 11

Implied consent, which assumes the parent or legal guardian of the child would give permission for you to help, applies in this situation.

## Calling for Help — Page 16

Yes. EMS activation is appropriate when there are immediate threats to life, a significant mechanism of injury has occurred, warning signs of serious illness exist, or if you are unsure about the severity of a child's condition.

## Emergency Moves — Page 17

Using your legs, not your back, drag the child from the smoke-filled area to a safer location. It is best not to move an ill or injured person at all unless he or she is clearly endangered or requires life-supporting care, such as in this case.

## Cardiac Arrest — Page 22

1. Early recognition of cardiac arrest and activation of EMS
2. Immediate CPR with high-quality chest compressions
3. Rapid defibrillation of the heart

## Chest Compressions — Page 24

1. Compress deeply, at least 1/3 the full depth of the chest or about 2 inches.
2. Compress fast, between 100 and 120 times per minute.
3. Get close but do not lean on chest, and allow the chest to fully recoil.

## Rescue Breaths — Page 30

Each breath should be about 1 second in length, and only have enough air to create a visible rise of the chest, but no more. Additional air is unnecessary.

**Automated External Defibrillation** — Page 36

1. Turn on the AED.
2. Adhere defibrillation pads to the bare chest.
3. Allow the AED to analyze the heart rhythm.
4. Deliver a shock if directed to by the AED.

**Primary Assessment — Unresponsive** — Page 40

Perform CPR immediately, starting with compressions. Irregular gasping, snorting, or gurgling sounds do not provide oxygen and do not indicate normal breathing.

**Caring for Cardiac Arrest** — Page 46

Begin CPR with 2 rescue breaths, followed by ongoing cycles of 30 compressions and 2 rescue breaths after that. Often, a child that has drowned and is not breathing may respond quickly to only a few rescue breaths.

**Multiple Provider Approach to CPR** — Page 50

Communicate about the switch ahead of time. Coordinate your actions to switch smoothly and minimize interruption time. Prior to the arrival of an AED, switch at the end of a CPR cycle, while the person who is going to move out is giving rescue breaths.

**Choking** — Page 56

Position yourself behind the child, kneeling if needed. Reach around and locate his navel with your finger. Make a fist with your other hand and place the thumb side against the abdomen, just above your finger and below his ribs. Grasp your fist with the other hand and give a quick inward and upward thrust to expel the obstruction. Repeat thrusts until he can breathe normally.

**Primary Assessment — Responsive** — Page 61

Control bleeding immediately.

**Control of Bleeding** — Page 66

Pressure applied directly to a bleeding site until bleeding stops is the standard method for controlling external bleeding. If direct pressure is unable to control bleeding on a limb, use a tourniquet.

**Shock** — Page 69

Early signs of shock can be difficult to detect. A child may simply begin to appear uneasy, restless, or worried. Other, more serious signs can emerge gradually. The child may become confused. The skin may become pale, cool, and sweaty.

**Head, Neck, or Back Injury** — Page 73

The lack of symptoms or obvious injury does not mean the spine is not injured. If a significant mechanism of injury occurred, it is best to assume a spinal injury exists.

**Swollen, Painful, or Deformed Limb** — *Page 76*

Activate EMS. Do not attempt to straighten the injured limb. Stabilize the injury and control any bleeding using a clean dressing and firm, continuous, direct pressure on the bleeding site. Comfort, calm, reassure, and reassess the child and injury regularly until EMS personnel take over.

**Burns** — *Page 81*

Cool the burn with cool or cold water as quickly as possible and for at least 10 minutes.

**Specific Injuries** — *Page 87*

When a permanent tooth has been knocked out, it is best to get it treated without delay. Successful reimplantation of the tooth is dependent on how quickly the child is treated by a dental professional.

**Altered Mental Status** — *Page 92*

If uninjured, place the child in a recovery position.

**Breathing Difficulty, Shortness of Breath** — *Page 95*

If not already done, activate EMS immediately if symptoms get suddenly worse, the child has difficulty breathing, is unable to speak, or if there is no response to the medication within 5 minutes.

**Poisoning** — *Page 99*

1-800-222-1222. Be prepared to give as many details about the incident as possible. Follow all advice given to you by poison control personnel.

**General Illness** — *Page 101*

Seek medical attention. Fevers measured orally above 101 degrees Fahrenheit, or connected to other warning signs, are generally considered more serious and require medical attention.

**Heat Emergencies** — *Page 104*

The child is showing signs of heat stroke. Activate EMS. Begin aggressive cooling immediately, preferably by immersing the child in cool water. If not able to immerse, spray or pour cool water on the child and fan to enhance cooling effect. Apply cold packs to neck, arm pits and groin. Cover with a cold, wet sheet and continue to fan. Continue cooling efforts until EMS arrives.

**Cold Emergencies** — *Page 107*

Hypothermia. Activate EMS. Gently move the child to a warmer place. Remove wet clothing and cover child, including the head and neck, with something warm and dry to retain body heat. If possible, use your own body to provide additional warmth. Calm, comfort, and reassure until EMS arrives.

**Stinging Insects** — *Page 108*

Remove the stinger as quickly as possible.

**Spider Bites** — *Page 109*

Tenderness, swelling, pain, itchiness, and redness at the bite site can develop. Over time, cramping pain, muscular rigidity, fever, weakness, nausea and vomiting, or difficulty breathing may develop.

**Animal and Human Bites** — *Page 110*

Bites from these animals can cause rabies which, if left untreated, is fatal.

**Emotional Considerations** — *Page 112*

Accept that what you are experiencing is normal and that it will take time to resolve these emotions. Try to get back to a normal routine. Talk about the incident with a trusted friend, coworker, or family member. If unpleasant feelings persist, formal assistance from a professional counselor may be helpful.

# Rate Your Program

This course evaluation allows you to rate the training course you have just completed. This evaluation will provide your training provider with feedback on the quality of the instruction you received.

Program Name \_\_\_\_\_  ASHI  MEDIC First Aid

Instructor \_\_\_\_\_ Date of Course \_\_\_\_\_

<i>Please rate the following course elements as indicated below. Place a check in the box that best represents your opinion of the quality of each element.</i>	4-Excellent	3-Good	2-Average	1-Poor
<i>Thank you for your help.</i>				
<b>Course Presentation</b>				
Organization, pace, and flow	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Not too basic, not too complex	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time allowed for skill practice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Increased your confidence and ability to take action	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Instructor(s)</b>				
Subject knowledge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Teaching ability (clear, concise, organized)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Demeanor (friendly, helpful, engaging)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Program Materials</b>				
Video	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PowerPoint®	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Student Book	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Online Training Component (if taken)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Location and Equipment</b>				
Space	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Training equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Self Assessment</b>				
How would you rate your emergency care skills BEFORE taking this class?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
How would you rate your emergency care skills AFTER taking this class?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
How willing would you be to respond in an emergency BEFORE taking this class?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
How willing would you be to respond in an emergency AFTER taking this class?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Your overall score for the course</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What did you like most about this course? \_\_\_\_\_

What did you like least about this course? \_\_\_\_\_

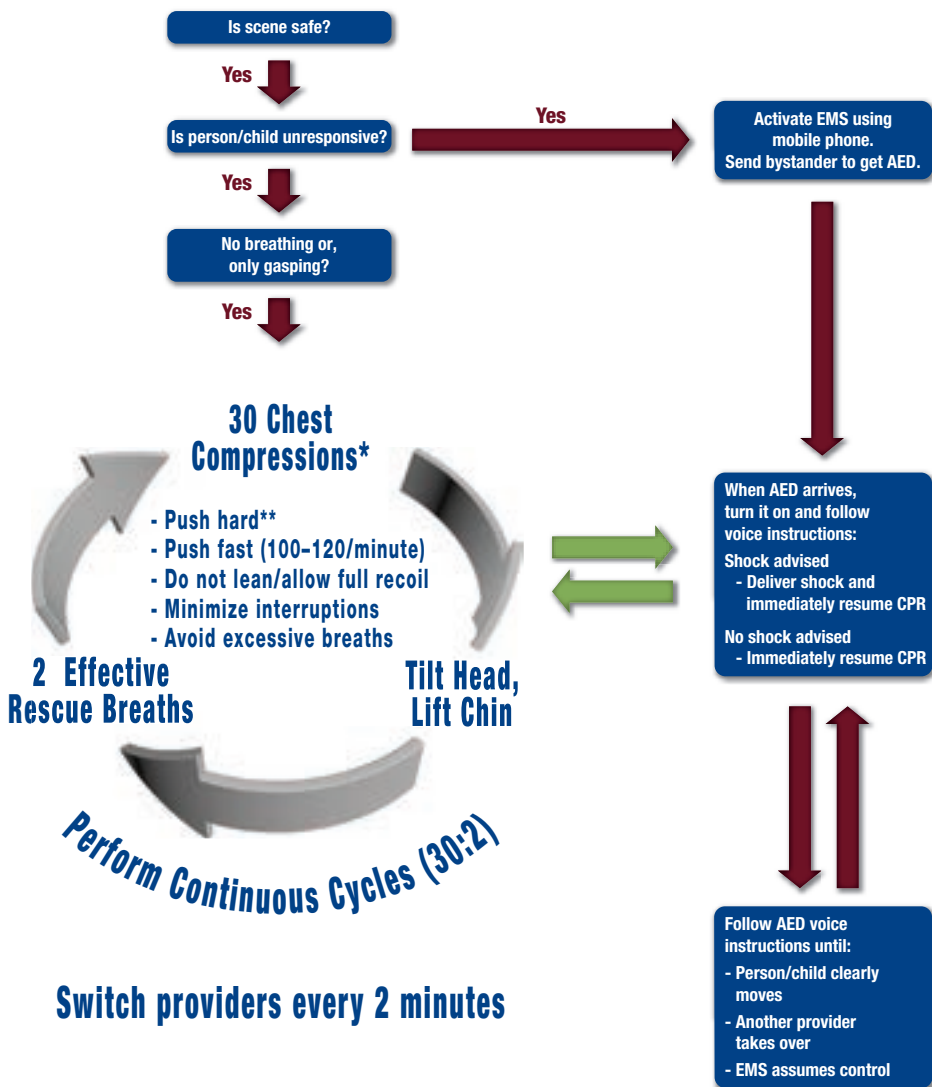
Would you recommend this course to others?  Yes  No

Student input is an essential aspect of our ongoing quality assurance efforts. HSI requires that students be given the opportunity to evaluate their ASHI or MEDIC First Aid course using this "Rate Your Program" course evaluation form. You may also provide feedback directly to HSI at [www.hsi.com/rateyourprogram](http://www.hsi.com/rateyourprogram).





# Caring for Cardiac Arrest Algorithm



\* For a suspected drowning, this is modified slightly. If the child is not breathing or only gasping begin CPR with rescue breaths instead of compressions.

\*\* Child: At least 1/3 diameter of chest or about 2"  
Infant: At least 1/3 diameter of chest or about 1 1/2"  
Adult: At least 2"

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