DIGITAL STUDENT BOOK
ONLINE VERSION

STUDENT BOOK

Wilderness First Aid

2015 GUIDELINES

AMERICAN SAFETY & HEALTH INSTITUTE

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An HSI Company

Wilderness First Aid

Student Book, *Version 8.0*

Purpose of this Student Book

This ASHI *Wilderness First Aid Version 8.0 Student Book* is solely intended to facilitate certification in an ASHI Wilderness First Aid training class. The information in this handbook is furnished for that purpose and is subject to change without notice.

ASHI certification may only be issued when an ASHI-authorized instructor verifies a student has successfully completed the required core knowledge and skill objectives of the program.

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Wilderness First Aid

First aid is the immediate care given to a suddenly ill or injured person until a medical professional can assume responsibility. Emergency medical services (EMS) in the United States has the ability to respond very quickly to most emergencies. Standard first aid training takes this into account and relies heavily on the fact that professional help is only minutes away.

However, there are circumstances in which professional help can be delayed for hours, or even days.

For those who venture out into remote or wilderness areas, a different type of first aid training is required that takes into account things such as limited access to medical supplies, exposure to outdoor elements, and the extended response time for professional help.

Wilderness first aid is the assessment of and treatment given to an ill or injured person in a remote environment where definitive care by a health care professional and/or rapid transport are not readily available.

Long hikes, extended lengths of river, large expanses of ocean, and miles of asphalt may separate the person from a medical facility. You, as a provider, and the ill or injured person may have to endure unexpected heat, cold, rain, wind, or darkness. The equipment needed for treatment may have to be improvised from what is available, and communication with professional medical responders may be limited or nonexistent.

One of the focal points of wilderness first aid is the need to provide extended medical care treatments. In addition to the immediate stabilizing treatments found in standard first aid training, additional care will be necessary over time. For example, wounds will need to be cleaned and dressed after bleeding is controlled. Fractures will need to be splinted after initially immobilizing them with hands-on stabilization.

The need to lift and move ill or injured people is more likely in a wilderness setting. You may need to straighten out an injured person's body in order to provide extended care. An ill or injured person may need to be rolled on to his or her side to clear an airway or to get a protective pad under the person's body. You may need to move someone or create a structure to protect him or her from the outdoor elements.

Medical emergencies that are rarely or never seen in an urban setting can more easily occur in the wilderness. Specific illnesses can occur as a result of increasing altitude. Emergencies created by bites and stings are more possible. Poisonous plants pose a greater risk.

The evacuation of an ill or injured person becomes more of an issue when you are in a remote location. The activation of professional medical help becomes much more involved. Informed and deliberate evacuation decisions to have someone walk out immediately, stay put, or be carried out need to be made depending on the circumstances.

First aid supplies and equipment are typically limited or nonexistent in a wilderness setting. Often equipment such as splints or litters need to be creatively improvised from available material.

At its core, wilderness first aid training is intended to:

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

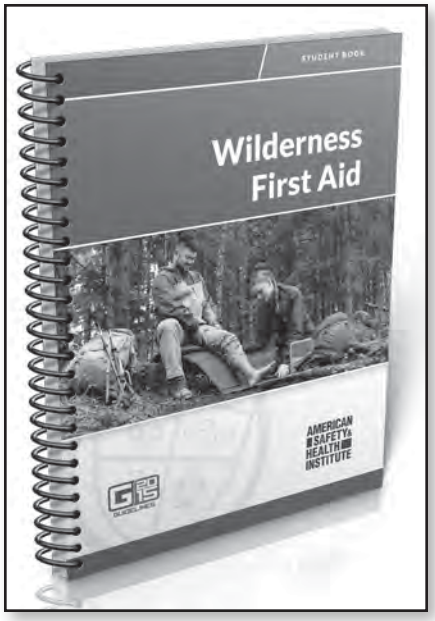
Wilderness First Aid Provider

A wilderness first aid provider is someone trained not only to deal with the immediate care of a suddenly ill or injured person, but also to manage the issues created by being in a remote setting.

Compared to a standard first aid provider, a wilderness first aid provider needs to be trained in a greater breadth of topics and in greater detail.

Purpose of the Wilderness First Aid Course

Wilderness first aid providers need to be prepared to handle a wide variety of situations. This is best accomplished through effective training with plenty of hands-on skill- and scenario-based practice.



This course is designed to provide students with the necessary cognitive knowledge to immediately manage medical emergencies in a remote location, and to initiate and participate in the process of evacuation.

More importantly, this course includes a significant amount of time for practicing skills with hands-on exercises, and for applying those skills to simulated wilderness emergencies. There are limits to the role of the wilderness first aid provider and the level of content covered in this course. This wilderness first aid course has been designed to meet the Wilderness First Aid Curriculum and Doctrine Guidelines, 2017 Edition, established by the Boy Scouts of America for a 16-hour Wilderness First Aid course.

Knowledge Check

What are some issues addressed in training to become a wilderness first aid provider that are not typically included in standard first aid training?

Protecting Yourself

When caring for someone, 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. Take precautions every time, no matter who you are giving first aid care to.

First aid in a remote setting usually involves extended first aid treatment time prior to getting an ill or injured person to professional medical care. Extended first aid treatments can be more involved. Both of these factors substantially increase the risk of disease exposure.

Infectious Bloodborne Diseases

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

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

If you are in a remote or delayed-response situation and suspect you have been exposed to potentially infectious body fluids, report this to any group leader or organizer, and follow up with your healthcare practitioner as soon as you are able.

Standard Precautions

It is important to routinely protect yourself from any exposure. Minimizing your risk of exposure lowers the chance of infection. Standard precautions is a set of protective practices used to prevent the transmission of diseases by exposure to blood or other potentially infectious body fluids, whether or not an infection is suspected. To be effective, your approach is the same for everyone, regardless of relationship or age.

Personal Protective Equipment

Personal protective equipment (PPE) describes protective barriers worn to prevent exposure to infectious diseases.

Disposable, non-latex gloves, such as nitrile, are the most commonly used protective barrier. Make sure they are readily accessible, even in a remote situation, and always use them when managing first aid care.

Inspect gloves for damage or tears when you put them on. If damaged, replace them immediately. If gloves are unavailable or damaged, improvise protective barriers with materials on hand, such as a plastic bag.

After providing care, always remove contaminated gloves carefully and dispose of them properly.

Even after using gloves, 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. Take the time needed to wash thoroughly.

Another commonly used type of PPE, a face shield, can prevent mouth, nose, and eye exposure when there is a possibility of splashing or spraying.

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-latex alternatives can stop the development of latex allergy and new cases of allergic reaction.[1]

Knowledge Check

While you should always protect yourself from exposure to blood or other potentially infectious body fluids when providing first aid care, why is it particularly important to take precautions when providing care in a remote setting?

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 it.
- 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

There are some basic legal considerations to be aware of as a wilderness first aid provider.

Duty to Act

A duty to act is the legal requirement to respond to and care for someone who is ill or injured. For example, this typically applies to professional care providers such as EMTs and paramedics who are identified within a community as emergency medical responders.

The duty to act is not a legal consideration for most workplace first aid trained providers who are trained to help, but are not necessarily required to help.

However, in a wilderness setting, the duty to act may apply to you as a trained first aid provider, especially if you are a designated leader and responsible for managing others in your group.

Consent

Consent is the permission from an ill or injured person to provide help. Every adult has the right to refuse your first aid treatment. Exceptions include children, and adults with cognitive disabilities that are inherent or caused by illness or injury. In regard to children, the age for consent may vary, depending on your state.

Emergency situations can be disruptive and frightening to the person affected. Consent is best obtained by clearly and calmly identifying yourself and the fact that you are trained to help. Rushing to help an ill or injured person may cause him or her to pull back and refuse your help.

Always ask a responsive person, or a legal guardian for a child, if he or she wants help before providing care.

Implied Consent

When someone is unresponsive, or incapable of making informed and appropriate decisions, consent for you to help is legally implied. Implied consent assumes a person or legal guardian would agree to be helped given the circumstances.

The use of implied consent typically applies to children and adults with cognitive disabilities.

Scope of Practice

The level and degree of the treatment you are trained to provide can be recognized as a scope of practice.

If you attempt any treatments on someone that are beyond those covered in your training, you may have exceeded the commonly accepted scope of practice for wilderness first aid and put yourself at legal risk. This is especially true with equipment that is inserted into the body, like an airway device, or creates damage to the body, such as with suturing. Another example is when prescription medications are given to someone they are not prescribed for.

More advanced courses exist for managing medical emergencies in the wilderness, including Wilderness First Responder and Wilderness EMT. Students who want to learn more and expand their scope of practice are encouraged to consider additional training.

Whatever your training level is, the scope of practice may also be limited by regulation, especially for training beyond standard or wilderness first aid. You may be required to become a licensed member of an accredited organization and have current medical direction from a licensed physician.

Abandonment

Once you begin first aid care, you must remain with an ill or injured person until someone with equal or greater emergency medical training takes over. Not doing so could be determined to be legal abandonment. As you can imagine, abandonment of an ill or injured person in a remote setting would more likely result in no care at all as compared to an urban situation.

Leaving someone alone in order to get professional help is an exception to legal abandonment. If you are alone and unable to use a mobile phone or other communication from your location, you can leave to find a spot where communication is possible or find another person who can get help for you.

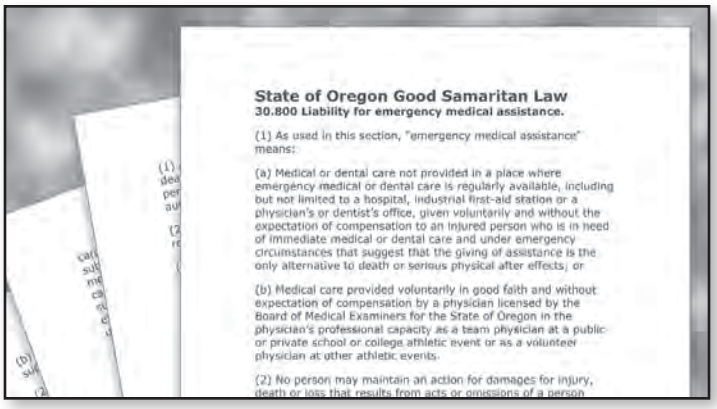
Return to the person as soon as you can. If possible, write down a description of the person's situation and location to ensure you can return to him or her quickly after activating emergency help. Mark your trail using rocks, sticks, or strips of cloth to help you, and others who are responding, more easily find the location of the ill or injured person.

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 in the U.S. 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.


State of Oregon Good Samaritan Law
30.800 Liability for emergency medical assistance.

(1) As used in this section, "emergency medical assistance" means:

(a) Medical or dental care not provided in a place where emergency medical or dental care is regularly available, including but not limited to a hospital, industrial first-aid station or a physician's or dentist's office, given voluntarily and without the expectation of compensation to an injured person who is in need of immediate medical or dental care and under emergency circumstances that suggest that the giving of assistance is the only alternative to death or serious physical after effects; or

(b) Medical care provided voluntarily in good faith and without expectation of compensation by a physician licensed by the Board of Medical Examiners for the State of Oregon in the physician's professional capacity as a team physician at a public or private school or college athletic event or as a volunteer physician at other athletic events.

(2) No person may maintain an action for damages for injury, death or loss that results from acts or omissions of a person

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

Regardless of situation, it is always appropriate to use common sense.

- Introduce yourself and state your level of training.
- Ask a responsive person for permission before giving care.
- Avoid using skills that exceed your training.
- Once you have started, don't stop helping until someone with equal or greater training relieves you.

Other Legal Considerations

Negligence — Occurs when a person is further harmed due to care that did not meet the expected standard of someone with training and a duty to act. In the most serious cases, gross negligence indicates a person intentionally inflicted harm on someone.

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 assault and battery.

Documentation

Documenting information about the emergency situation and the first aid care provided creates a reliable legal record of what happened. If legal issues arise from the help you provided, clear documentation can be helpful in resolving disputes, especially when a significant amount of time has elapsed since the emergency occurred. A common adage to describe the importance of documentation is, "If it wasn't documented, it never happened."

To be prepared for any legal or medical follow-up, write detailed notes about the circumstances of the emergency and the care you provided, preferably using a templated medical care report form. Document the event as soon as you can after the emergency is over.

Knowledge Check

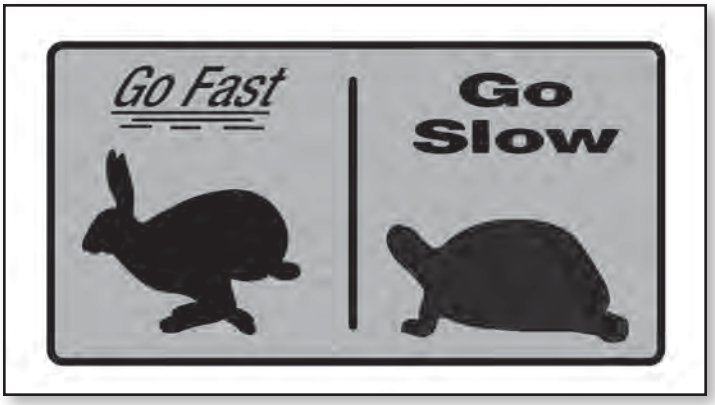
What laws protect bystanders who provide first aid care from being sued?

Getting Help

Understandably, access to professional medical help is not readily available in a remote setting. When sudden illness or injury occurs, decide how best to access those resources. In a wilderness or delayed-help situation, always assume that an ill or injured person's condition could deteriorate. When in doubt, make immediate plans to evacuate the person. Waiting to see if a situation improves can be dangerous.

Consider the amount of time and effort it took to get where you are. Even the duration and distance of an easy day hike can present complications for getting professional medical help quickly. Outside communication can be limited or nonexistent. An ill or injured person may be able to move but in a much slower manner than he or she did prior to the illness or injury. Geographic conditions such as moving water or steep inclines can become dangerous for a person with limited mobility, as well as to responding rescuers with rescue gear. If you are going to rely on rescuers to come to you, they may require a significant amount of time to prepare to respond appropriately.

Go Fast or Go Slow



Typically in a remote situation, the first decision to make is the degree of effort made to get an ill or injured person professional medical help. This can be described as go fast or go slow.

Go fast means you will make every effort possible to reduce the time it takes to get an ill or injured person to professional medical care. Situations that require you to go fast involve problems that require professional medical help as soon as possible to prevent long-term disability or death.

Go slow means that you can manage a person's medical condition with care that could improve the person's outcome but may extend the time it takes to get professional medical care. A decision to go slow allows professional resources to be used elsewhere if there is greater need. Situations in which you can go more slowly typically involve medical problems that can be managed appropriately for a length of time with supportive care.

A number of considerations need to be taken into account in your go fast or go slow decision:

- What resources are available for medical care?
- Is the ill or injured person able to walk safely without aggravating the problems found?
- Can the problems found be managed in place?
- How accessible is the current location for responding rescue personnel?
- What are the current and forecasted weather conditions?
- What resources are available nearby for water, food, protection, and shelter?

Each situation is different and unique. Often, changing conditions may force a change in your decision. Always try and do what is best for the ill or injured person, but never at the cost of your own safety.

Accessing Professional Medical Help

Emergency medical services (EMS) describes the prehospital emergency medical system developed to respond to medical emergencies 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.

In remote or wilderness areas, the role and availability of EMS is different than in an urban area. The ability to respond effectively can be hampered by limited communication channels. Without roads, EMS response times can be much longer, especially over difficult terrain or in bad weather.

Emergency medical response resources developed for remote areas require specialized training and rescue equipment designed to safely access and transport ill or injured people out of a remote location.

Mobile Phones

Part of the appeal of backcountry travel is getting away from civilization. This makes it more difficult to contact emergency help when needed. Nearly everyone has a mobile phone, but in a remote location you may not be able to get a signal to call for help. Fortunately, as mobile phone service expands geographically, more and more remote and wilderness areas are gaining some coverage.

Mobile phone service is delivered in a "line-of-sight" manner; your phone signal might not reach a service tower if it is blocked by geographical obstructions or too far away. If you cannot get a mobile phone signal, consider sending another person quickly to a location that is higher or nearer to where mobile service may be available.

If mobile phone service is available, activating the EMS system usually consists of calling an easy-to-remember emergency number, such as 911. When you make a phone call to activate EMS, a trained dispatcher will guide you through the call.

The dispatcher will ask for basic information, such as the type of emergency, location, and what care is being provided. Answer questions as clearly and concisely as you can.

Most importantly, provide as much detail as possible on your location and how to access it. If you have a detailed map, use it to provide specific points of reference. Consider packing a global positioning system (GPS) device that can provide longitude and latitude coordinates.

If you are going to be in remote areas where mobile phone service is likely to be unavailable, consider carrying a satellite phone, very high frequency VHF radios, or shortwave radio.

Once EMS is activated and professional rescuers are responding, try to maintain communication with them until they arrive. Follow any directions given to you by EMS or emergency dispatchers.

Location Signaling

Besides providing details about your location in your direct communication with emergency dispatchers, it is helpful to take steps to signal responding rescue personnel to indicate your exact location.

Consider carrying non-electronic signaling devices like flares or mirrors to help rescue personnel who are nearby find you. When there is no risk of accidental fire spread (or fire restrictions in your area), a smoky signal fire can help others find you. When they are searching by air, you can spell out messages in rocks or branches on open ground.

Personal Satellite Communication Devices

Personal satellite communication devices are small, battery-operated electronic devices that communicate with satellites to transmit GPS coordinates.

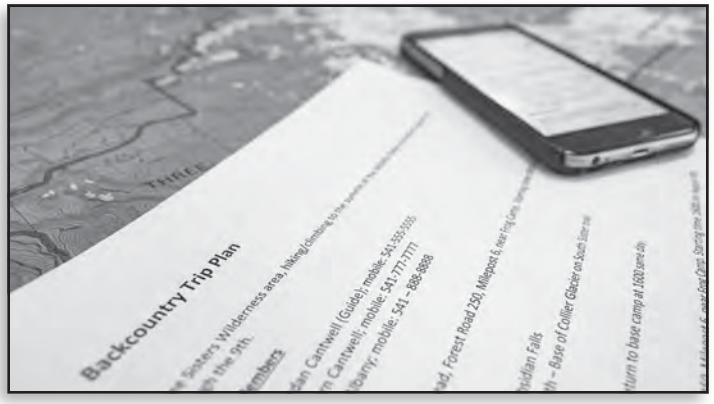
Written Trip Plans

The possibility exists that an injury or illness in a remote location could put you in a situation where you have extremely limited communication and/or mobility. In such cases, the decision to mount a search and rescue effort may be made because you are missing. Unfortunately, it could take a long time to determine you are missing.

Leaving a written or electronic description of your trip plans with family members or friends is recommended. Include the following information:

- Details about and map of the route you are taking
- Starting point, day, and time
- Expected times to be at locations along your route
- Expected return time and date

Arrange for a specific time that you are to check in with somebody. If you do not check in, a person you have left your plans with can notify the appropriate authorities and provide detailed information to aid in search and rescue.



Evacuation

Evacuation is the act of getting an affected person out of a remote location and to professional medical care. The method of evacuation depends on the type of medical problems being dealt with, the decision to go fast or go slow, and the resources available for moving someone who is ill or injured.

In general, evacuation should always be done as soon as possible once it is decided to do so.

If an injury or illness has been treated and stabilized, and would not be aggravated by walking, it is easiest and quickest to assist the person to self-evacuate without delay, ensuring he or she does so safely.

If an ill or injured person cannot walk out, he or she must be carried out in some manner. This greatly complicates the evacuation process. The person can be carried out by others in the group, wait for responding rescue personnel and specialized equipment, or use some combination of both strategies.

Other than self-evacuation, the next fastest approach to evacuation is for others in the group to carry an ill or injured person out of the remote area. However, this increases the risk of additional injury to the person and to those involved in the effort, especially if the terrain is difficult. Additionally, the ability to do this is limited by the number of physically capable people and resources available.

Evacuation can also be accomplished by staying in place and waiting for rescuers to arrive. It is a sensible decision to make in many situations. Unfortunately, this type of evacuation may take many hours, or even days, to accomplish.

If you have determined that you are in a go fast situation and are waiting for help to come to you, do your best to help responding rescue personnel get to you as quickly as possible. It could be helpful to send someone out to meet responding rescuers and directly guide them to the location of the ill or injured person.

Depending on the circumstances, evacuations could use a combination of walking, carrying, and waiting in place. Use your best judgement based on your assessment and situation.

To shorten response times, evacuations may also be accomplished through the use of all-terrain vehicles, or in a more limited fashion, transport helicopters. If you are talking to an emergency dispatcher, be clear about how accessible your remote location is, and provide as much detail about your location as you can.

Knowledge Check

You are providing care to an injured person in your hiking party. You have taken all relevant factors into consideration and still can't decide whether or not to evacuate. What should you do?

Moving and Lifting

Generally, 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. The greatest concern in moving a seriously injured person is the chance of making existing problems, such as spinal injury, worse.

However, there are situations in which moving or repositioning someone is clearly necessary. These include:

- The person is in immediate danger or threat of being further injured.
- The position the person is in prevents effective assessment or treatment.
- The person's airway becomes blocked by vomit, blood, or foreign material.
- The person needs to be moved a short distance to be protected from the environment.

There are just a few recommended moves to use when providing first aid care. These moves emphasize protecting yourself and the ill or injured person from injury. One of the key things in any move is to keep in the person's head, neck, and torso aligned when there is a suspicion of spinal injury.

Body Mechanics

Pay attention to basic body mechanics when moving someone. Know your physical ability and respect your limitations.

Before starting, make sure you are in a stable position without risk of losing your balance. Keep your back straight and avoid twisting your body before or during a move. Always establish and keep physical control of the person being moved.

When lifting, always flex at the hips and bend at the knees. Do not bend at the waist. Keep the person's weight close to you so you are not reaching out and extending your body.

When you are lifting as part of a team, good communication between all team members is essential. Designate a single person to guide the actions during the lift. This is typically the person responsible for maintaining control of the ill or injured person's head and neck.

Performing an Emergency Drag

When an ill or injured person and you are in immediate danger, you need to quickly move him or her away to safety. The most effective way to move someone out of harm's way quickly is to use an emergency 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 person's head, or pull a person's body sideways.

Common drags include the following:

- Clothing drag — Grab a handful of the person's shirt at the shoulders with each hand and pull away from the hazard. Keep the person's body as straight as possible. As the shirt rides up, it will support the head and neck like a hammock.
- Blanket drag — Log roll the person onto his or her side and tuck a blanket in behind. Roll the person back down on the blanket, grab the corners of the blanket closest to the person's head, and pull the person to safety. Allow the blanket to support the head and neck.
- Extremity drag — If you cannot move someone using a clothing drag or have time for a blanket drag, simply grasp the person's ankles or forearms and pull.

Log Roll

A log roll is used to roll the entire body as a single unit without twisting, like rolling a log. For a first aid provider, it can be used to roll an ill or injured person onto his or her side from a face-down or face-up position, and back to a face up position.

A log roll can be done quickly as an emergency move, or it can be done in a more controlled manner during assessment and when providing care. Uses for a log roll include the following:

- To quickly clear an airway threatened by fluids or foreign material
- To quickly get an endangered person onto a blanket for a blanket drag
- To inspect the back during a physical assessment of the body
- To place a pad or immobilization device underneath an injured person

Performing a Log Roll with a Single Provider

It is preferable to perform a log roll with multiple providers, but a single provider can perform the move as well.

Kneel next to the person's torso. Get close, but allow enough room for the person to roll.

Prepare the person. If needed, slowly and gently bring head in line with body. Bringing the person's arms in close to his or her sides and crossing the ankles will make the person's body easier to roll.

Place one hand under the person's head to support it. Grasp the far arm near the elbow and press it tightly into the person's side. Use the hand gripping the arm to roll the person towards you. Lean forward and rock back with your body weight to give you some power for the move.

Roll smoothly in a single motion, keeping the head, neck, and torso in line. It will be necessary to lift and maintain support for the head during the roll to keep it in line with the rest of the body. As an alternative, especially for larger people, consider moving the arm, which will be on the bottom side, up against the side of the head, prior to rolling. This allows the arm to support the head during the move.

Performing a Log Roll with Multiple Providers

Log rolling a person with multiple providers is preferred over a single provider because it improves the ability to maintain spinal alignment during the roll.

Position one provider above the head to manually support it during the roll. Position a second provider next to the person's torso, allowing enough room for the person to roll. If available, position a third provider next to the person's legs.

Prepare the person. If needed, the provider at the person's head will slowly and gently bring the head in line with the body and manually maintain the head in position.

Bringing the person's arms in close to his or her sides and crossing the ankles will make the person's body easier to roll. The provider at the side of the torso grasps the opposite shoulder and hip of the person being rolled. If there is a third provider, that person will grasp the opposite hip and lower leg.

The provider at the head typically becomes the team leader and directs actions during the move. On command, the providers on the person's side roll the person smoothly toward them, in a single motion, keeping the head, neck, and torso in line. It is necessary for the provider at the head to lift and maintain support for the head during the roll to keep it in line with the rest of the body.

When a log roll to the side is performed during a physical assessment to inspect the person's back, it is recommended to place a pad or blanket under the person.

When ready to move the person to his or her back, another command is given to smoothly roll the person to a face-up position, again maintaining the head, neck, and back in alignment.

Performing a BEAM Move

There are times when it is necessary to move a person a short distance, or to lift a person in order to get a litter or backboard underneath him or her. To do that, use the body elevation and movement (BEAM) technique.

The BEAM technique requires enough providers to effectively and safely accomplish the desired move. Using both hands, one provider stabilizes the head from a position above the person's shoulders.

Remaining providers assume positions on either side of the ill or injured person. These providers gently push their hands under the person to support the torso, arms, and legs. It may be easier to first slide hands in at the gaps found at the neck, lower back, knees, and ankles, and then move the hands laterally into place to grip and lift. Each provider's hands should be staggered with a provider's hands from the opposite side.

The provider at the head typically becomes the team leader and directs actions during the move. On command from the team leader, the team will lift the person in unison, keeping the person's head, neck, torso, and legs in alignment.

If placing a litter or immobilization device under the person, have another provider quickly slide it into place.

If moving the person to another location, the team should use small shuffling steps to avoid jarring the person's spine. When the team reaches their destination, they lower the person on the team leader's command.

Placing a Person in a Recovery Position

When an unresponsive or semi-responsive person is breathing normally, and is uninjured, place him or her in a side-lying recovery position to help protect the airway. The recovery position helps protect the air passage between the lungs and the mouth by using gravity to drain fluids from the mouth and keep the tongue from blocking the airway.

Prepare the person by placing the arm nearest you up against the side of the person's head. This arm will support the person's head once in the recovery position.

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

Grasping the shoulder and hip, roll the person towards you in a single motion, keeping the head, neck, and torso in alignment. Roll the person until the elbow and knee of the person's opposite side rest on the ground. Make sure to roll the person far enough for his or her face to be angled slightly towards the ground, allowing fluids to drain from the mouth.

If needed, adjust the person's elbow and knee to stabilize the head and body in place. Ensure there is no pressure on the chest that restricts breathing and that the head, neck, and torso remain in alignment.

Frequently assess the breathing of anyone placed in the recovery position. The person's condition could quickly become worse and require additional care.

Knowledge Check

A fellow hiker, who was walking on unstable ground, created a small avalanche that made him fall over and slide down the slope about 30 feet. When you reach him, he is obviously injured and unable to stand. You see that another portion of the slope above you is likely to slide down on top of you and the injured hiker. What should you do?

Performing an Emergency Drag

When an ill or injured person and you are in immediate danger, you need to quickly move him or her away to safety. The most effective way to move someone out of harm's way quickly is to use an emergency drag.

Clothing Drag

- Grab a handful of the person's shirt at the shoulders with each hand and pull away from the hazard.
- Keep the person's body as straight as possible. As the shirt rides up, it supports the head and neck like a hammock.

Blanket Drag

- Log roll the person onto his or her side and tuck a blanket in behind.
- Roll the person back down on the blanket, grab the corners of the blanket closest to the person's head, and pull the person to safety. Allow the blanket to support the head and neck.

Extremity Drag

- If you cannot move someone using a clothing drag or don't have time for a blanket drag, simply grasp the person's ankles or forearms and pull.

Performing a Log Roll with a Single Provider

The log roll is used to move an ill or injured person to his or her side from a face-down or face-up position, and then back to a face-up position, keeping the head, neck, and torso in line.

CAUTION! Classroom activities that involve lifting and moving may aggravate previous back injuries. Do not practice moving simulated victims if you have a history of back injury.

Position Yourself

- Kneel next to person's torso.
- Allow room for person to roll toward you.

Prepare Person

- If needed, slowly and gently bring person's head in line with body.
- Bring person's arms in close to sides.
- If possible, cross person's ankles.

Prepare to Roll

- Place one hand on the side of person's head for support.
- Grab far arm near elbow and compress tightly into side.

Roll Person

- Use the hand gripping the arm to roll the person toward you.
- Lean forward and rock back with your body weight to give you power for the move.
- Roll smoothly in a single motion, keeping the head, neck, and torso in line.
- Lift and support head during roll to keep it in line with body.

The log roll can also be used to move someone from a face-down position to the side, and from the side to the back.

Performing a Log Roll with Multiple Providers

Log rolling a person with multiple providers is preferred over a single-provider roll because it improves the ability to maintain spinal alignment during the roll.

CAUTION! **Classroom activities that involve lifting and moving may aggravate previous back injuries. Do not practice moving simulated victims if you have a history of back injury.**

Position Yourselves

- Position one provider above person's head to support head during the roll.
- Position a second provider next to person's torso.
- If available, position a third provider next to person's legs.

Prepare Person

- If needed, slowly and gently bring person's head in line with body.
- Bring person's arms in close to sides.
- If possible, cross person's ankles.

Prepare to Roll

- Manually support person's head with both hands.
- Provider at chest grasps opposite shoulder and hip.
- If available, third provider grasps opposite hip and lower leg.

Roll Person

- Provider holding head issues commands for other providers.
- Roll the person toward providers on side.
- Roll smoothly in a single motion, keeping the body in line.
- Lift and support head during roll to keep it in line with body.

The log roll can also be used to move someone from a face-down position to the side, and from the side to the back.

Performing a Body Elevation and Movement (BEAM) Move

There are times when it is necessary to move a person a short distance, or to lift the person in order to get a pad, litter, or backboard underneath him or her. To do that, use the body elevation and movement (BEAM) technique.

CAUTION! Classroom activities that involve lifting and moving may aggravate previous back injuries. Do not practice moving simulated victims if you have a history of back injury.

Position Yourselves

- Position one provider above person's head to support head during the move.
- Position multiple providers on both sides of person.

Prepare Person

- If needed, slowly and gently bring head in line with body.
- Bring person's arms in close to sides.

Prepare to Move

- Manually support person's head with both hands.
- Other providers gently slide hands in underneath person to support torso, arms, and legs.
- Providers' hands should be staggered with providers' hands from opposite side.

Move Person

- Provider holding head issues commands for other providers.
- On command, lift person straight up, keeping body in line.
- Lift and support head during move to keep it in line with body.
- On command, person is lowered straight down, keeping body in line.

Placing a Person in a Recovery Position

CAUTION! **Classroom activities that involve lifting and moving may aggravate previous back injuries. Do not practice moving simulated victims if you have a history of back injury.**

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 person toward you in a single motion, keeping head, shoulders, and torso from twisting.
- Roll until the far elbow and knee touch the ground.
- Make sure head ends up resting on extended arm.
- 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.

Scene Assessment

When facing a potential emergency, a quick pause and assessment of the scene can help you stay safe, and enable you to form a general impression of what happened.

Personal Safety

Emergency scenes are often unsafe. Your personal safety is the highest priority, even before the safety of an ill or injured person. If somebody has been injured or is ill because of something in the environment, that hazard could affect you too. Putting yourself in danger to help someone can quickly make the situation worse.

Look at the scene 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!

Protect yourself from exposure to infectious disease by using protective barriers, such as disposable gloves.

General Impression

An important part of your role as a first aid provider is being able to recognize when an emergency exists. Typically, emergency situations are unexpected events and can initially be confusing.

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

- Where is the person located?
- How is the person's body positioned?
- Does the person look sick or injured?
- Is the person's body deformed or bleeding?
- Is there anything nearby in the environment that could be involved?

If more than one person is involved, look closely to identify the number of people who are. If circumstances are encountered that clearly indicate the need for additional or specialized resources, such as digging equipment for avalanche debris, make note of that to pass on to responding professional rescue personnel.

Mechanism of Injury (MOI)

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

Significant MOIs include the following:

- A fall from a height of over 3 feet
- Compression of the head into the neck, such as diving head-first into shallow water and hitting the bottom
- A significant blow to the body
- Penetrations to the body by sharp objects
- Severe deceleration while being restrained

A witnessed or apparent MOI will help you quickly determine if there is a possibility of a spinal cord injury or internal bleeding. Both of these are best suspected and treated early. If you think these are likely or possible given the MOI, immediately begin the process of getting professional help and providing spinal motion restriction.

Nature of the Illness (NOI)

Similar to MOI is the nature of the illness (NOI). This is the medical condition you suspect may be affecting the person based on your general impression.

Significant NOIs include the following:

- Difficulty moving
- Confusion
- Difficulty breathing
- Indication of pain (i.e., grimacing, clutching chest, etc.)

Forming a suspicion early on about an MOI or NOI as part of the general impression within your scene assessment can help you initially identify an emergency situation and help to guide the rest of your assessment and care.

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 first aid provider or responding rescue personnel — you are not alone.

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 hesitate because you think you don't have a lot of medical knowledge.

Extensive medical knowledge is not necessary. First aid is simple and easy to provide.

If it is safe for you to do so, take action. Put what you learn in this training to work. Your actions can help to protect or save a life.

Establish Control

An emergency situation can quickly become confusing and emotionally charged. This can increase the risk of harm to those involved or nearby. People identified in leadership positions need to take charge of the situation and stay in control until the situation becomes safe again.

Leadership qualities best suited to handle emergency situations are competence and confidence. Competence, or an adequate ability to perform, can be gained through a combination of training, practice, and experience. Confidence is the feeling or quality of being certain of one's ability to act in the right or proper way in a given circumstance.

Leaders with confidence will appear steady and capable while managing an unsettling or frightening situation. Speak with authority. Avoid shouting, and listen to others, especially an ill or injured person. Rely on your training, and give directions and guidance to others who can help.

When traveling in a group, establish leadership roles ahead of time to help prevent confusion in an emergency.

Knowledge Check

What is the highest priority at any emergency scene?

Initial (Primary) Assessment

Before you can provide first aid care to an ill or injured person, you must first identify the things that are creating difficulty and harm. This is done through an organized, step-by-step assessment process, used in every situation.

Using a combination of an initial and a focused assessment, this process identifies immediate threats to life, prioritizes treatments, and provides a detailed method for identifying less serious injuries.

Initial Assessment

The goal of an initial assessment is to quickly identify any immediate life threats to an ill or injured person and to provide the indicated life-supporting care without delay. If you discover a threat, stop and attend to it.

Keep this simple and clear goal in mind in every case: Assessing for and treating lesser problems can wait.

The initial assessment steps can be easily remembered using the **ABCDE** mnemonic device:

- **A**irway — Is it clear and open?
- **B**reathing — Is it present? What is the quality of it?
- **C**irculation — Is it present? What is the quality of it? Is there severe bleeding or shock?
- **D**isability — Do you suspect head, neck, or back injury involving the spine?
- **E**nvironment — Are environmental conditions creating immediate threats?

The activation of professional medical help and a rapid evacuation to advanced medical care is essential for any life-threatening condition. Depending on the circumstances, this must be done in the most immediate way possible.

If it is safe to approach, begin your initial assessment by first determining whether or not a person is responsive in any manner. It could be obvious, or require verbal and physical interaction on your part. If you are unsure, determine responsiveness by tapping or squeezing the shoulder and asking loudly, “Are you all right?”

A person who is unresponsive requires treatment learned in a CPR training course.

Airway

Continue your initial assessment of a responsive person by introducing yourself, indicating your level of training, and asking if it is okay to help. This will help to reassure the person that you are there to help and establish the person’s consent for your help.

If he or she consents to your help, ask an open-ended question about the situation, such as “What happened?” or “What’s wrong?” At this point, because the focus of the initial assessment is to identify life-threatening issues, the answer to your question is less important than forcing a response that enables you to identify any serious problems with the airway.

If responsive, gauge the approximate level of responsiveness. People with a diminished level of responsiveness are more likely to develop a blocked airway due to the relaxation of the tongue in the airway. If the person is found to be semi-responsive, consider placing the person in the recovery position to open and protect the airway.

Look for things such as gum, tobacco, blood, or vomit. Listen for sounds such as gurgling or wheezing. If found, immediately attempt to fix them. Log roll the person if needed to drain fluids from the mouth. If seen, sweep the mouth to remove solid or semi-solid matter.

Breathing

Quickly form an impression of whether or not breathing is adequate based on rate, depth, and effort. Adequate breathing is regular, even, and effortless. Inadequate breathing may be fast, slow, shallow, labored, irregular, or gasping. If breathing does not appear to be adequate, look for injury to the chest that could be interfering with the ability to take a breath. Consider the use of supplemental rescue breaths to assist breathing.

Circulation

Scan the body for any signs of severe bleeding such as spurting wounds, large bloodstains, or pooling blood. Check more closely if bulky clothing is worn that could mask signs of bleeding. If significant bleeding is found, immediately expose the wound and attempt to control the bleeding using direct pressure, a tourniquet, or a packed dressing, such as a hemostatic dressing.

Look for progressive signs of impending shock such as a change in mental status. Check for the presence of a radial pulse in the wrist as a quick measurement of adequate blood pressure. Check the skin for tissue color, temperature, and moisture. Pale, cool, and clammy skin is an indication of shock.

If you suspect shock is occurring or likely to occur, make sure your other primary treatments, such as the control of bleeding, are being effectively provided. Place the person in a supine position, and try to maintain a normal body temperature as soon as you are able to.

Disability

If you suspect a spinal injury may have occurred, immediately place a hand gently on the person's forehead and ask the person to stay still. If another provider is available, have that person manually establish spinal motion restriction as soon as possible.

Environment

If the environmental conditions, such as severe weather, create a serious burden or risk to the immediate or ongoing ability of the person to survive, attempt to change the conditions quickly. If possible, move the person to a more protected or safer area. If you cannot move the person, protect him or her from the environmental conditions as best you can.

Additional Considerations

If an initial assessment has revealed problems that you cannot determine the severity of because they are hidden by clothing or the position of the person, quickly expose the affected area to take a look. Examples would include a chest injury affecting breathing or a wound that is severely bleeding. Cut or tear clothing away as necessary. Log roll a person to expose areas of the body that are inaccessible.

It is okay to do multiple things at the same time. For example, if the mechanism of injury clearly suggests injury to the head, neck, or back, then spinal motion restriction from another provider can be established from the beginning of the assessment. In many cases, the initial assessment takes only seconds when there are no obvious ABCDE life-threatening problems.

Remember to stay focused on only looking for life-threatening issues. Highly visual moderate and minor things such as open wounds can draw your attention away. Treating those effectively does not matter if a person does not survive a primary problem like loss of an airway or inadequate breathing that you neglected to care for.

If a life-threatening condition is present, immediately activate the process for getting help. Do not delay activation with additional assessment or care.

Multiple Injured or Ill People

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

The initial assessment steps are easily remembered using the ABCDE mnemonic device. What are the 5 steps?

Performing an Initial Assessment — Unresponsive

Pause and assess the scene for safety. If unsafe, or if it becomes unsafe at any time, get out!

Airway

- Check for response. Tap or squeeze shoulder and ask loudly, “Are you all right?”
- If unresponsive, have someone activate professional medical help and, if available, get an AED.

Breathing

- Position person 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 Immediate Care

- If person is not breathing, or only gasping, perform CPR beginning with compressions. Apply an AED as soon as possible.
- If normal breathing is found, place an uninjured person in recovery position.
- Resume initial assessment only if circumstances allow.

Performing an Initial Assessment — Responsive

Pause and assess the scene for safety. If unsafe, or if it becomes unsafe at any time, get out! Activate professional medical help when a life-threatening condition is found or suspected.

Airway

- Introduce yourself, indicate your level of training, and ask if it is okay to help.
- Check for diminished level of responsiveness. Look and listen for airway issues.
- Consider recovery position. Drain fluids and sweep solid material from mouth if found.

Breathing

- Quickly assess for adequate breathing. If inadequate, consider the use of supplemental rescue breaths.

Circulation

- Scan body for heavy bleeding. If found, control it immediately.
- Check skin signs. Look at face to check tissue color. Depending on skin tone, it may be easier to check tissue color on the palms, fingernails, inside eyelid, or inside the lip. Touch person's forehead with bare wrist to assess skin temperature. Note whether the skin is dry or wet. If shock is suspected, treat for it.

Disability

- Consider if mechanism of injury makes you suspicious of spinal injury. If so, initiate spinal motion restriction.

Environment

- Consider if environmental conditions will impact survival. If so, move person or protect from extreme elements.

Focused (Secondary) Assessment

When you complete your initial assessment and are sure that the injured or ill person has a clear and open airway, is breathing adequately, and you have controlled any obvious serious bleeding, it is time to continue assessing the person using a focused, or secondary, assessment.

This focused assessment, performed after you have determined the person has no immediate life threats, allows you to systematically identify other injuries or medical conditions that need to be managed.

Your goal is to find every problem that requires medical care. The focused assessment helps you determine all potential problems and establish a baseline for the person's status.

If you are performing CPR or other lifesaving measures, you may never begin a focused assessment: **immediate life threats involving the airway, breathing, circulation, disability, and environment** are always your priority.

If at any point the person no longer has an open airway, or is no longer breathing adequately, stop your focused assessment and immediately manage these higher priority problems.

The focused assessment includes three parts:

- Hands-on physical exam
- SAMPLE history
- Vital signs

All of these assessments need to be done for every ill or injured person. The order of doing these can vary, depending on the situation and the resources available. In general, a physical exam provides the greatest amount of information when someone is injured. A SAMPLE history is usually more helpful when someone is ill.

Evacuation decisions can vary, depending on the results of your focused assessment and the circumstances of your situation. When in doubt, evacuate. More detailed information on evacuation will be provided in the topical chapters of this student book.

Chief Complaint

As you recall, an open-ended question, such as, "What happened?" or "What's wrong?" is recommended early in the initial assessment as a means to measure the quality of the airway. This questioning is also an important first step of the focused assessment. It can provide a starting point about what the ill or injured person feels is going on. This is known as the chief complaint. The chief complaint can help guide you through the remainder of your focused assessment.

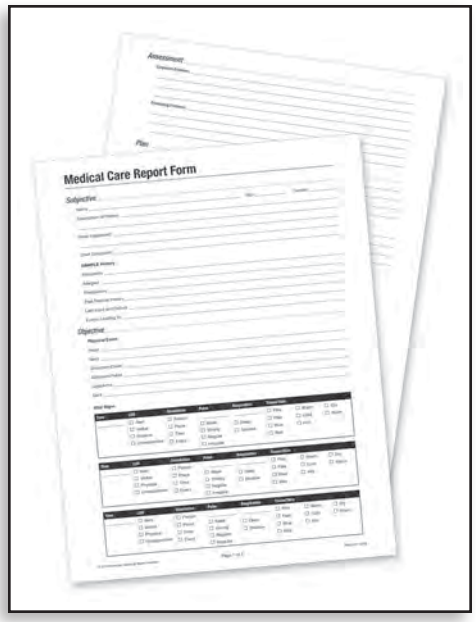
Ask the person what he or she thinks the problem is, even if it seems obvious. This may reveal a problem more pressing than what you initially see. For example, a person who was injured in a fall may describe weakness on one side and difficulty in speech that began before the fall happened.

If the person has a diminished level of responsiveness, ask bystanders who may have witnessed the circumstances leading up to the injury or illness about what happened.

Documentation

When managing an injury or illness in a remote environment, it is important to document your assessment findings and the care you provide. Documentation enables you to track whether the person's condition improves over time, and gives healthcare providers who have responded more detailed information about the situation and what has been done prior to their arrival.

Much of the detailed documentation is done in relation to the focused assessment. A physical exam, vital signs, and SAMPLE history all provide important information to record. Vital signs are repeated periodically and documenting them can help indicate any upward or downward trends in an ill or injured person's condition.



A pre-established medical care report form, designed to be complementary to your assessment process, can be an important addition to your first aid kit. The form should follow the natural flow of your assessment and care, and have fill-in blanks to keep your information organized.

If possible, have another wilderness first aid provider record the information while you perform your assessment. If you do have a second provider recording information, do your best not to describe alarming findings out loud so that the ill or injured person can hear. If you are alone, document your findings as soon as you are able.

SOAP

The mnemonic device SOAP can help you remember what information to record and how to organize your documentation in a manner that will make it more understandable to others.

- **S**ubjective information is what is described to you by the ill or injured person or guessed by you based on what you see. Examples include the description of the person (i.e., age, weight, and fitness), what happened, the person's chief complaints, and SAMPLE history answers.
- **O**bjective information is the gathered and measured results of the physical exam, and vital signs measurements.
- **A**ssessment information is what you think is wrong with the person and what other problems are developing.
- **P**lan information describes what you are doing or going to do to treat the person medically. This includes immediate treatments, evacuation decisions, and ongoing or extended treatments if evacuation is delayed.

Hands-On Physical Exam

The hands-on physical exam involves checking the ill or injured person's body in a head-to-toe manner looking for indications of injury. The **DOTS** mnemonic device reminds you what to look for.

- **D**eformities — Unusual body presentation, differences from one side of the body to the other
- **O**pen wounds — Bleeding injuries
- **T**enderness — Painful areas, especially when touched
- **S**welling — Swollen and discolored areas

Explain to the person that you are going to perform a hands-on physical assessment to look for anything else requiring medical care, and ask permission to touch him or her. You will look and feel for signs of injury. As you move down the body, look closely for blood and deformity. Apply gentle, firm pressure with your hands. Everywhere you touch, ask the person if it hurts. Look for a reaction to pain.

If the person has a diminished level of responsiveness, take more time and care to do your physical exam.

In general, the human body is symmetrical. Use side-to-side comparisons as another means to identify abnormalities.

If you suspect the person's clothes are hiding an injury, remove or cut away the clothing to get a better look. If this is necessary, do your best to minimize the clothing removed, both for personal privacy and to protect the person from the elements.

Begin at the person's **head**. Run your fingers through the person's hair. Press gently on the scalp. Look for DOTS. Look at your gloves to see if there is any blood on them. Examine the person's eyes, ears, nose, and mouth to look for damage or fluid. Be aware of any unusual smells or sounds like breath odor or coughing.

Check the person's **neck**. Feel carefully along both sides and along the back for DOTS. Look for a stoma, a surgical opening for breathing. If found, consider it a part of the person's airway. Look for a medical alert necklace. If found, note the information found for the SAMPLE history.

Make sure both **shoulders** look the same. Press them together slightly. Gently touch the length of both collar bones, examining one side at a time.

Ask the person to take a deep breath and make sure the **chest** rises evenly on both sides. Press your hands along the ribs. Have the person take a breath while you hold the lower part of the rib cage.

Draw an imaginary plus sign across the person's **abdomen**. Use the navel as the center. Gently push on each of the four sections individually. Refer to these as upper right, lower right, upper left, and lower left based on the person's right and left.

Press in on the pelvis from both sides. Inspect for incontinence. In males, check to see if there is an uncontrolled erection, known as priapism. This can be an indication of spinal injury.

Use both hands to squeeze your way down the front and back of each **leg**. Do this one leg at a time. Look for symmetry between the legs. Ask the person to move his or her feet. See if the person can feel you touching each foot. Perform the same examination on both **arms**. Check the wrists for a medical alert bracelet. If found, note the information found for the SAMPLE history.

If you found the person facing up, you will need to carefully perform a log roll to assess the person's **back**. Perform the roll carefully if there is a possibility of a spinal cord injury. Gently run your hand along the length of the spinal column.

If available, this is a good time to put a pad in place to protect the person from the cold ground or to prepare to move him or her.

When completed, record your physical exam findings on a medical care report form.

Vital Signs

There are four vital signs you will check as part of the focused assessment. These signs won't tell you what is wrong, but give you a good indication of how the person is doing. Repeat taking vital signs regularly.

Changes to vital signs could indicate that the person is improving or getting worse over time. This can be valuable information for making decisions and when communicating with health care providers who have responded to your situation.

Level of Responsiveness

The first vital sign is the person's level of responsiveness (LOR). You will also hear this referred to as level of consciousness (LOC). It is an assessment on how well the brain is functioning and processing information.

The most common LOR assessment is done using the AVPU mnemonic device:

- Alert — Alert and openly responsive
- Verbal — Responsive to verbal stimulus such as asking a question or saying the person's name aloud
- Physical — Responsive only to physical stimulus such as shaking or squeezing
- Unresponsive — Unresponsive to any stimulus

If someone is alert, it can be helpful to determine how oriented he or she is. There are four basic orientation questions to ask based on person, place, time, and event:

- What is your name?
- Do you know where you are?
- Do you know what today's date is?
- Do you know what happened to you?

Orientation is commonly described using the number of correct answers given. For example, someone who answers three of the four orientation questions correctly can be described as alert and oriented times three.

Pulse

The person's **pulse rate** and quality will give you an indication how the person's circulatory system is functioning. The pulse rate is typically determined by feeling for the radial pulse at the wrist, counting for 15 seconds, and then multiplying that number by four to get a per-minute rate.

The radial pulse is the preferable pulse to use. It can be felt on the inside of either wrist, near the base of the palm. Press gently in the groove on the thumb side with a fingertip or two.

Check the carotid pulse in the neck if you are unable to find a radial pulse. Find the person's Adam's apple on the front of the neck and slide a couple of fingertips down into the groove on either side of the neck between the bony cartilage and neck muscle.

An adult's pulse rate is typically between 50 and 100 beats per minute. Very high or low rates can indicate a potential problem with the body's ability to deal with an underlying problem.

Also note the quality of the pulse. A pulse may be described as weak or strong, regular or irregular. A rapid, bounding heartrate might be an indication that the heart is working harder to compensate for an underlying medical problem. An irregular pulse could indicate an existing medical problem with the heart.

Respirations

Count the person's breaths over a full minute to check the **respiratory rate**. Avoid openly showing or telling the person you are counting, as that might cause him or her to become self-conscious and alter the breathing rate. A normal breathing rate for an adult is 12 to 20 breaths a minute.

Note the quality of respirations. Breaths can be deep or shallow in volume. Similar to the pulse, rapid shallow breathing can indicate that the body is having difficulty compensating for an underlying injury or illness. Identify if there are any unusual breathing sounds. Unusual breathing sounds typically indicate a problem with the airway.

Skin Signs

The final vital sign is skin signs, including **tissue color, skin temperature, and skin moisture (TCTM)**. Skin signs indicate how well a person is perfusing, or distributing blood to body tissue. 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.
- A red, or flushed color, can also indicate a serious underlying issue.

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

With the back of your bare hand, check for skin temperature on the forehead. It should feel warm to the touch. Cold or very warm are both indications of potential problems. Skin should also feel dry. If the person is moist and sweaty without a reasonable explanation, like recent exertion, this can be an indication of a problem.

Vital signs help provide you with a sense of how well a person's body is doing when dealing with an illness or injury and can help influence your decision on evacuation.

After taking an initial set of vital signs during your focused assessment, repeat them at regular intervals. Always include the time they were taken. Repeat them more frequently for seriously ill or injured people. When completed, record your initial and ongoing vital sign findings on a medical care report form.

Checking Blood Circulation and Capillary Refill

It is beneficial to also check for adequate blood circulation at the feet and hands when performing a physical exam. The best method to do so is by locating a local pulse, such as the radial pulse on the arms.

Another, more generalized, method to check circulation is by capillary refill under the fingernails or toenails. Simply press down hard enough on a nail to turn the underlying tissue white and then release the pressure and allow the normal pink tissue color to return. A general indication of adequate circulation is determined when the color returns within a few seconds.

SAMPLE History

A SAMPLE history gives you a quick and useful historical perspective on things that might be related to the current situation.

SAMPLE stands for **s**ymptoms, **a**llergies, **m**edications, **p**ast medical history, **l**ast input and output, and **e**vents leading up to the current situation.

To collect the SAMPLE history, ask a series of questions and record the person's answers. If the person is unable to answer your questions, ask bystanders who may know the person. Be careful to ask these questions calmly and without leading the person. For example, ask, "Describe your pain?" rather than, "Is your pain sharp?"

Do your best to be considerate and respectful. You will get better answers to your questions. The person may be in significant pain, so be patient.

SAMPLE questions:

- Symptoms — How do you feel? Where does it hurt? Can you describe the pain? How bad is the pain?
- Allergies — What are you allergic to? Can you describe a past allergic reaction?
- Medications — What medications are you taking? What are the medications for? Have you taken them as directed?
- Past medical history — What medical problems do you have? What are you seeing a doctor for? What medical problems have you had in the past? Try to keep this discussion focused on medical history related to the situation.
- Last input and output — What was the last thing you had to eat or drink? When did you do that? Was what you ate or drank out of the ordinary for you? When did you last urinate and defecate? What was the coloring and physical makeup of it?
- Events leading to — What were you doing just before this happened? Were you doing anything out of the ordinary for you?

Ask other questions if prompted by the person's answers.

When completed, record your SAMPLE history findings on a medical care report form.

Pain Severity Scale

When discussing pain, it is common to ask the person to rate the pain on a scale of 0–10 with 10 being the worst pain he or she has ever experienced and 0 being no pain at all. Understand that everyone has a different pain tolerance. Don't judge. Just record the responses.

Ongoing Assessment

After completing an initial and focused assessment, provide the necessary treatment by priority, treating the most serious problems first. Make an evacuation decision based on your findings, the resources you have available, and the environmental conditions you are in.

It is important to understand that the assessment process never stops. Anyone who is ill or injured needs to be continuously monitored for developing problems through ongoing assessment. Keep asking how an ill or injured person is feeling, monitor treatment for effectiveness, watch for developing signs of associated problems, and take vital signs repeatedly. Review your evacuation decision if conditions change.

Knowledge Check

You and several others are hiking in the woods when you come upon an injured hiker and his friend. The hiker says he tripped on some roots, landing on his hands and knees, not long before you arrived. A quick primary assessment shows there are no immediate life threats. What are the three techniques you will use to gather more information?

Focused Assessment

A focused assessment should only be done after identifying and managing any immediate life threats. It is best to always document your focused assessment findings in writing.

Chief Complaint

- Ask person about what happened and how he or she is feeling.
- If the person has a diminished level of response, ask bystanders.

Physical Exam

- Look and feel for unusual physical signs (DOTS) on the entire body from head to toe.
  - Deformities
  - Open wounds
  - Tenderness
  - Swelling

SAMPLE History

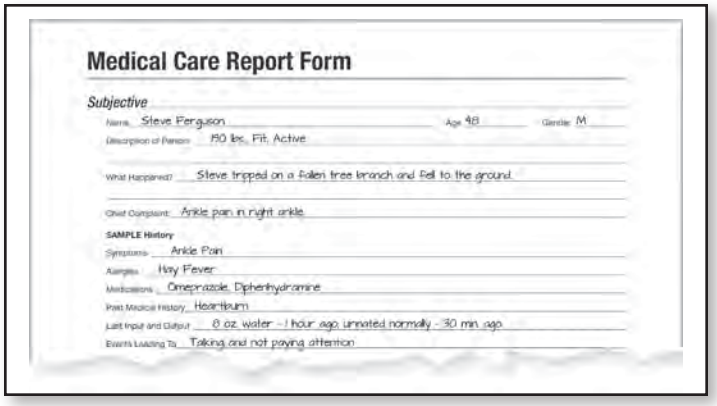
- Using SAMPLE, gather important history information.
  - Symptoms
  - Allergies
  - Medications
  - Past medical history
  - Last input and output
  - Events leading up to current situation
- If the person has a diminished level of response, ask bystanders.

Vital Signs

- Measure the person's vital signs.
  - Level of responsiveness and orientation
  - Pulse
  - Respirations
  - Skin signs

Documentation

Write down your findings and the care you provided to give to healthcare providers who have responded to your situation. If possible, use a templated medical care report form to help guide you on what information to record. Consider using the subjective, objective, assessment, plan (SOAP) approach to documentation.



Medical Care Report Form

Subjective

Name: Steve Ferguson Age: 48 Gender: M

Description of Person: 150 lbs. Fit. Active

What Happened? Steve tripped on a fallen tree branch and fell to the ground.

Chief Complaint: Ankle pain in right ankle

SAMPLE History

Symptoms: Ankle Pain

Allergies: Hay Fever

Medications: Omeprazole, Diphenhydramine

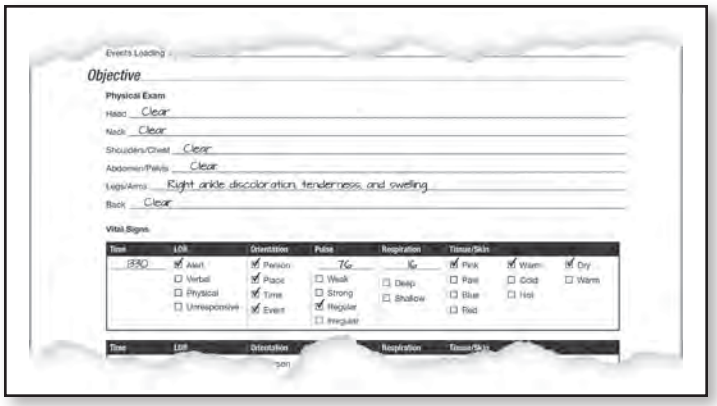
Past Medical History: Heartburn

Last Input and Output: 8 oz. water - 1 hour ago, urinated normally - 30 min. ago

Events Leading To: Talking and not paying attention

Subjective Information

- Description of person (age, weight, fitness)
- Description of what happened
- Person's chief complaint
- SAMPLE history



Events Leading:

Objective

Physical Exam

Head: Clear

Neck: Clear

Shoulders/Chest: Clear

Abdomen/Pelvis: Clear

Legs/Arms: Right ankle discoloration, tenderness, and swelling

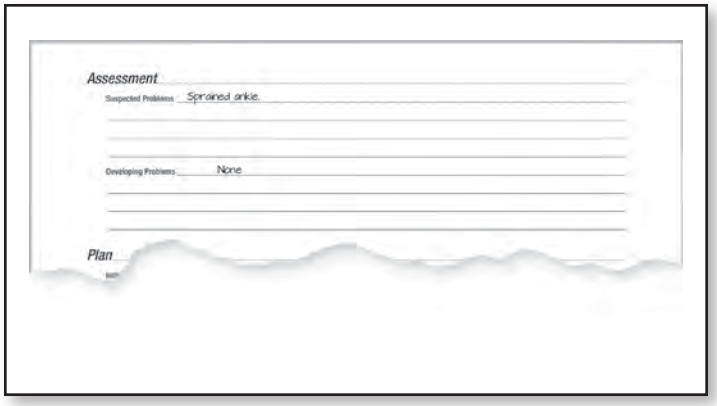
Back: Clear

Vital Signs

Time	LOI	Orientation	Pulse	Respiration	Tissue/Skin		
1330	☑ Alert	☑ Person	76	16	☑ Pink	☑ Warm	☑ Dry
	☐ Verbal	☑ Place	☐ Weak	☐ Deep	☐ Pale	☐ Cold	☐ Warm
	☐ Physical	☑ Time	☐ Strong	☐ Shallow	☐ Blue	☐ Hot	
	☐ Unresponsive	☑ Event	☑ Regular		☐ Red		
			☐ Irregular				

Objective Information

- Physical exam findings
- Vital signs (multiple times, time when taken)



Assessment

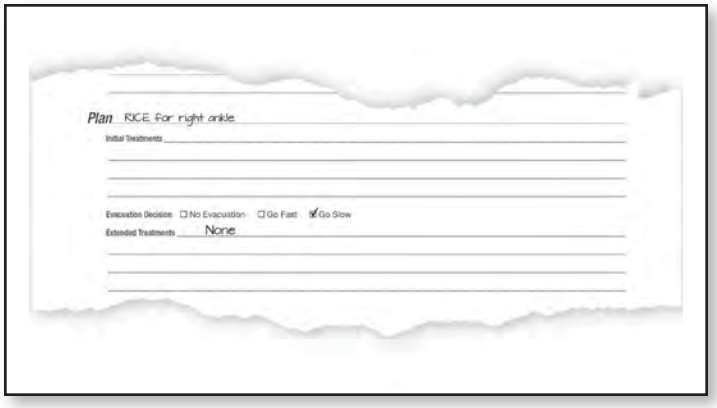
Suspected Problems: Sprained ankle.

Developing Problems: None

Plan

Assessment

- Describe what you suspect is going on with the person.
- Describe any problems developing over time.



Plan RICE For right ankle

Initial Treatments

Evacuation Decision: ☐ No Evacuation ☐ Go Fast ☑ Go Slow

Extended Treatments: None

Plan

- Describe the short-term treatments provided.
- Describe the evacuation decision.
- Describe any extended treatments provided due to a delayed evacuation.

Performing a Hands-On Physical Exam

Inform the person about what you are doing. Look and feel for deformity, open wounds, tenderness, or swelling (DOTS). Remove or cut away clothing as necessary to expose body for inspection. Document your findings.

Head

- Inspect hair and scalp; look for blood on gloves.
- Check eyes, ears, and nose.
- Inspect mouth, teeth, and jaw.
- Check for unusual odors and breathing sounds.

Neck

- Feel sides and back of neck.
- Look for stoma.
- Check for medical alert necklace.

Shoulders/Chest

- Press shoulders together slightly.
- Feel collarbones, press gently on sternum.
- Press both sides of rib cage while person takes breath.
- Inspect chest wall.

Abdomen/Pelvis

- Press four quadrants of abdomen.
- Place a hand on each hip and press inward.
- Inspect for incontinence and priapism.

Extremities

- Feel full length of each leg, front and back.
- Check each foot for movement and sensation.
- Perform the same examination on arms.

Back

- Log roll the person carefully and inspect back.

Taking Vital Signs

Take vital signs regularly, about every 15 minutes. Take more often if the person is seriously ill or injured. Document your findings.

Level of Responsiveness

- **A** — Alert and openly responsive
- **V** — Responsive to verbal stimulus such as asking a question or saying the person's name aloud
- **P** — Responsive only to physical stimulus such as shaking or squeezing
- **U** — Unresponsive to any stimulus

Orientation

- What is your name?
- Do you know where you are?
- Do you know what today's date is?
- Do you know what happened to you?

Pulse

- Find radial pulse in wrist, carotid in neck if necessary.
- Count pulse beats for 15 seconds and multiply by 4.
- Note strength and regularity of pulse.

Respirations

- Count breaths for a full minute.
- Avoid showing or telling person you are counting.
- Note volume of breathing.
- Listen for any unusual breath sounds.

Skin Signs

- Look at person's face for color. Use palms, fingernails, inside lip or eyelids depending on skin tone.
- Check temperature with back of hand on person's forehead.
- Look for any moisture on surface of skin.

Taking a SAMPLE History

SAMPLE stands for **s**ymptoms, **a**llergies, **m**edications, **p**ast medical history, **l**ast input and output, and **e**vents leading up to the illness or injury. Ask the affected person open-ended questions about each of these things. If the person cannot answer the questions, ask bystanders. Document your findings.

Symptoms

- How do you feel?
- Where does it hurt?
- Can you describe the pain?
- How bad is the pain?

Allergies

- What are you allergic to?
- Can you describe a past allergic reaction?

Medications

- What medications are you taking?
- What are the medications for?
- Have you taken them as directed?

Past Medical History

- What medical problems do you have?
- What are you seeing a doctor for?
- What medical problems have you had in the past?

Last Input and Output

- What was the last thing you had to eat or drink?
- When was that?
- Was what you ate or drank out of the ordinary for you?
- When did you last urinate and defecate?
- What was the coloring and physical makeup of it?

Events Leading Up to Injury or Illness

- What were you doing just before this happened?
- Were you doing anything out of the ordinary for you?

Shock

Shock can develop when an illness or injury results in a decrease of oxygen transfer to body tissue, most importantly to the brain and vital organs. If not addressed, shock can progress, become irreversible, and result in death.

It is important not to confuse shock with an emotional reaction. While there is some relation, emotional reactions produce an effect that typically self-corrects within minutes. Shock, in its truest form, is a body's physical inability to meet its demand for oxygen due to an illness or injury. Without treating the underlying cause of shock, the body will eventually lose the ability to compensate for its effect and reach a point at which survival is not possible. Treating and preventing the development of shock is a critical life-supporting treatment for anyone who is ill or injured.

The most common mechanisms for developing shock are:

- Fluid loss from the body — Severe bleeding, vomiting, diarrhea, sweating, burns
- Failure of the heart to adequately pump oxygenated blood — Breathing difficulty, heart failure, heart attack
- Abnormal dilation of the blood vessels — Spinal injury, anaphylaxis, poisoning, drug use, infection

Because the body tries to compensate, early signs of shock can be difficult to detect. Initially a person may simply appear uneasy, restless, or worried. The person can become extremely thirsty.

Other, more serious signs can emerge gradually. The person may become confused and have difficulty staying awake. The skin can become pale, cool, and sweaty. The pulse becomes rapid and weak. Breathing becomes rapid and shallow.

As shock progresses, the body loses the ability to compensate. This is often described as "crashing." How quickly this occurs is dependent on the health of the person, the seriousness of the problem, and the treatment provided. This progresses rapidly until shock becomes irreversible and the person will not survive, regardless of the treatment provided.

Even before signs of shock develop, treat anyone who is ill or injured for shock to slow progression of this condition. Since shock is typically caused by an underlying illness or injury, the most important treatment is to first manage these problems as effectively as you can.

If possible, lay the person flat. In some cases, such as with breathing difficulty or chest pain, the person may want to sit in a position of comfort, most likely a seated reclining position.

Maintain a normal body temperature by insulating on top and underneath to prevent heat loss.

When possible, it is appropriate to replace fluids lost through mechanisms such as vomiting, diarrhea, sweating, and burns. In these cases, dehydration can accelerate the development of shock.

When bleeding occurs, oxygen-carrying red blood cells are lost in addition to fluid. In these cases, oral fluids should be provided, but will have a much smaller preventative effect on shock development. Rapid professional medical care may provide the only chance for survival.

To give oral fluids, a person must be alert and able to swallow without difficulty or vomiting. Water is acceptable, or an oral rehydration solution can be used. The person should sip small amounts of fluid instead of large swallows.

Give the person nothing to eat, even if asked. Keep the person as comfortable and calm as possible.

Go fast on evacuation. A person in shock must get to a hospital as quickly as possible. Early recognition and ongoing supportive treatment is essential for survival.

Continuously monitor the person and your treatments for effectiveness. Repeat vital signs and document your findings.

Knowledge Check

One of your hiking companions was going too fast down a slope and ran into a branch of a tree, which hit hard into her abdomen. Concerned, you ask her how she is doing. She tells you that it hurt a lot at first and knocked the wind out of her, but that it feels better now. You are concerned whether she injured herself internally. What signs do you look for?

Treating for Shock

Shock can develop when an illness or injury results in a decrease of oxygen transfer to body tissue, most importantly to the brain and vital organs. If not addressed, shock can progress, become irreversible, and result in death.

Manage Injuries or Illnesses

- Maintain an open and clear airway.
- Ensure adequate breathing.
- Control serious bleeding.

Position Person

- Lay person flat on back on ground.
- Allow a person with breathing difficulty to find a position of comfort.

Maintain Normal Body Temperature

- Cover person on top and underneath to prevent heat loss.

Monitor Person

- Calm, comfort, and reassure person.
- Provide something to drink if person can swallow without difficulty. Have person drink in small sips.
- Give nothing to eat.

Control of Bleeding

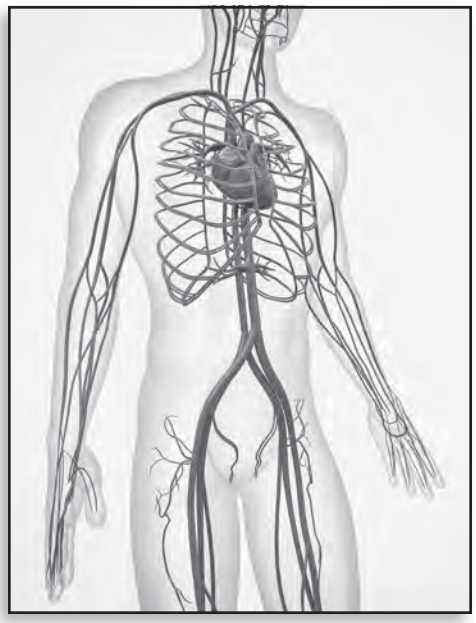
Traumatic injuries are unexpected. They can happen at any time and in any place. Traumatic injury is one of the leading causes of death for people under 50 years of age in the United States. A large portion of those deaths are from severe bleeding. Bleeding is the most treatable cause of death due to trauma.

Common mechanisms for traumatic injuries include the following:

- Falls from great height
- Significant blows to the body
- Motor vehicle crashes
- Slicing or stabbing from sharp objects
- Firearm shootings
- Explosions and shrapnel

Death from severe bleeding can occur rapidly. The sooner bleeding is controlled, the more likely it is an injured person will survive. The treatment for severe bleeding is best started immediately by the nearest person able to help.

Blood Vessels and Bleeding



The circulatory system includes the heart and a network of blood vessels that are found in all body tissue, including skin, muscles, and organs. When a significant force hits the body, serious injury to soft tissue and blood vessels will result in bleeding. It can be external through a visible injury, or it can be internal and hidden from sight.

Vessels called arteries carry oxygenated blood away from the heart. Arteries, with pulsing high pressure from the heart, branch down into very small vessels called capillaries that allow oxygen to be transferred directly into body cells so it can be used for energy production. Veins, with a lower and much steadier pressure than arteries, return oxygen-poor blood back to the heart and lungs where the cycle repeats.

Heavy bleeding is likely if a large blood vessel is cut or lacerated. Arterial bleeding is bright red and will often spurt from a wound. It can be difficult to control due to the high pressure created by the heart's contractions. If blood is dark red and flowing steadily, it is likely coming from a vein. Bleeding from veins can be heavy, but is typically easier to control than bleeding from an artery.

Clot-forming fibers naturally collect at wound sites to try to stop bleeding, but heavy bleeding can overwhelm this and prevent clotting.

Bleeding reduces the amount of oxygen that can be delivered to the body. If heavy or uncontrolled, shock and death from the loss of blood can occur quickly.

Protective Barriers

External bleeding can expose you, the provider, to potentially infectious body fluids. Use disposable gloves as a barrier to protect both you and the injured person. Wear protective eyewear to protect against splashing or spraying blood. If needed, have the injured person use direct pressure on the bleeding wound while you put on barriers.

Avoid Cross Exposure

To eliminate the risk of cross exposure when multiple people are injured, avoid using the same gloves or dressings on more than one person.

Considerations for Protective Barriers

The use of protective barriers is recommended. When disposable gloves are not available, an improvised barrier, such as a plastic bag, can be used.

Depending on the circumstances, or your relationship with the injured person, you may decide to not use barriers if there is nothing available. If the skin on your hands is unbroken and intact, the risk of infection is low. Even so, be sure to clean your hands immediately and thoroughly after the event.

Direct Pressure

Pressure applied directly to a bleeding site until bleeding stops is the standard method for controlling external bleeding. It is simple to do, requires few materials, and works well most of the time.

The use of pressure points or elevation of a bleeding limb are no longer recommended external bleeding control measures.

Keep in mind that serious bleeding occurs when a large vessel is damaged. The focus of direct pressure should be on the bleeding vessel within the wound. Quickly expose and inspect the wound to try to identify a point of bleeding before applying pressure.

Using a clean pad or dressing, apply pressure directly on the point of bleeding with your fingers or the palm of your hand. Controlling heavy bleeding requires firm pressure. Push hard when needed, even if it is painful to the injured person.

If a pad or dressing is not available, apply direct pressure with any clean fabric, cloth, or just a gloved hand alone.

To maintain any clotting that occurs, leave the initial pad in place. If blood soaks through it, apply another pad on top and continue to apply pressure. Replace the second pad if it also becomes soaked. Too much padding can reduce the effectiveness of direct pressure.

Once you have applied pressure and controlled bleeding, it is essential to maintain the pressure until more advanced care is available.

A bandage or a wrap designed to hold a dressing in place can be used as long as it maintains enough pressure to control bleeding. For minor and moderate bleeding, a simple roller bandage will most likely accomplish this.

Commercial Bleeding Control Devices

Military experience in the past few decades has guided the adoption and use of commercial bleeding control devices such as pressure bandages, tourniquets, and packed dressings in non-military settings to improve the speed at which serious external bleeding is stopped.

- Pressure bandages — Commercial pressure bandages are designed to quickly and effectively provide the well-aimed direct pressure needed to control heavy bleeding.
- Tourniquets — Commercial tourniquets have been found to be very effective in controlling heavy bleeding. Previous fears of complications had prevented widespread use, but military evidence has shown that complications are actually minimal and the benefit of using a tourniquet, when needed, far outweighs the risk.
- Packed dressings — Commercial packed dressings, including hemostatic dressings, have proved to be beneficial, especially when other bleeding control measures such as direct pressure and tourniquets don't work or cannot be applied.

Pressure Bandages

For heavy external bleeding, consider the use of a pressure bandage. A pressure bandage is specially designed to exert focused additional pressure directly on a bleeding site. This is accomplished by the use of a hard structure embedded in the bandage.

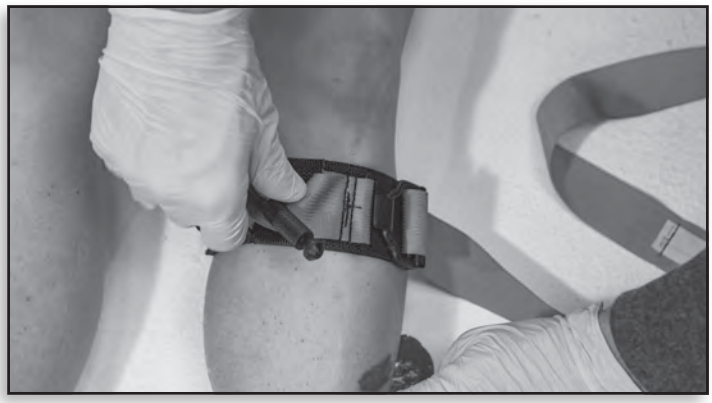
Commercial pressure bandages are easier to use and more effective than improvised ones. When using a commercial pressure bandage, place the hard embedded piece over the point of bleeding. Wrap this piece tightly to place more pressure directly under it than anywhere else under the wrap.

Once in place, monitor a pressure bandage for effectiveness. A pressure bandage only needs to apply enough pressure to stop bleeding.

Be careful not to apply too much pressure that could prevent blood flow to the body beyond the bandage. Make note and alert responding medical personnel if the skin beyond the bandage becomes cool to the touch, bluish, or numb.

If you do not have a commercial pressure bandage, you can improvise one by placing a roll of spooled gauze or folded pad directly over the point of bleeding and wrapping it tightly in place.

Tourniquets



If direct pressure or a pressure bandage is unable to control external bleeding on a limb, use a tourniquet.

Tourniquets use circumferential compression around a limb to physically collapse and block blood vessels, completely stopping blood flow and bleeding.

A tourniquet can also be considered as the first step to control severe limb bleeding when it is clear direct pressure cannot be used effectively, such as in the following circumstances:

- When many people are hurt
- For an amputated limb
- For a person with large or multiple injuries
- In a dangerous environment
- For a wound you can't access

Commercial tourniquets are designed to be easy to apply and are extremely effective.

To use one, simply place the wide-compressing band around the limb, directly on the skin and a few inches above the open injury and use a cinching mechanism to tighten the band evenly around the limb until bleeding stops.

When a commercial tourniquet is not available, you can quickly improvise a tourniquet using commonly found materials. Apply something you can wrap as a wide band around the injured limb and use some means to cinch the wrap in place. Avoid thin wraps, which are ineffective and can cause more injury.

Commercial tourniquets are generally more effective than improvised ones. Take that into consideration when putting together your first aid equipment and supplies.

There are some important things to consider when using a tourniquet.

- Tourniquet placement — Place a tourniquet a few inches above the wound site, between the wound and the torso. Never place a tourniquet over the knee or elbow where adequate compression can be difficult to achieve.
- Tightening a tourniquet — You must tighten a tourniquet enough to stop blood flow in both the large veins and arteries in the limb. It is possible to stop blood flow in the veins that are nearer to the surface and not the arteries. This could result in increased bleeding. If you can feel a pulse in the limb past the tourniquet, the tourniquet has not stopped arterial blood flow and needs to be tighter. Tightening a tourniquet can be uncomfortable to the injured person, but is necessary to control bleeding as a life-saving measure.

- Second tourniquet — Consider the use of a second tourniquet when a pulse is still present or for large limbs. Place the second tourniquet next to the first one, closer to the torso.
- Visible identification — Visibly identify that a tourniquet is being used and the time it was applied. Most tourniquets provide a place to do so on them. Consider writing a "T" on the injured person's forehead along with the time the tourniquet was applied using an indelible marker.
- Monitor continuously — When a tourniquet has been used, continuously monitor the wound and limb to make sure bleeding remains controlled. If bleeding resumes, make sure the band of the tourniquet is correctly placed and tighten it further.
- Single-use devices — Tourniquets are single-use devices. They cannot be re-used, except for reapplication as described below. Do not use tourniquets intended for real-life application for training. Keep dedicated training tourniquets separated from ones intended for treatment.

Limb complications can develop over time due to tourniquet pressure and how long a tourniquet is left in place. However, there is not enough evidence to determine how long it takes for this damage to occur.

The control of blood loss is a critical step in a remote care situation. It is recommended to not loosen a tourniquet once it has been applied, especially if the only intent is to resupply the limb with fresh blood. This can result in excessive blood loss and shock.

Loosening a Tourniquet

If a tourniquet has been used because direct pressure or a pressure bandage was unable to control bleeding, it is important to keep the tourniquet in place. If a tourniquet was applied as the first step in bleeding control or as a preventative measure, and it is not clear whether other methods may work, consider transitioning the bleeding control from the tourniquet to wound packing and/or pressure bandage.

Only loosen a tourniquet if it seems feasible that applying direct pressure will fully control the bleeding. This must be done with 2 hours of applying the tourniquet and should not be attempted if it will be longer than 6 hours for the injured person to receive definitive treatment in a hospital.[2]

In these circumstances, leave the tourniquet in place while packing the wound and applying a pressure bandage. Slowly loosen the tourniquet until it is no longer applying pressure to the limb. Leave the tourniquet in place in case it needs to be reapplied. Inspect the wound to see if the other bleeding control measures are working. If bleeding resumes, tighten the tourniquet again to control bleeding and leave it in place until the person reaches definitive care.

Go fast on evacuation. Help facilitate rapid evacuation to a hospital when a tourniquet is used so removal can be accomplished as soon as possible.

> *Inaccessible Wound*
>
> If a bleeding site cannot be quickly seen or accessed, apply a tourniquet high and tight on a limb as near to the torso as possible. Do not place a tourniquet over any solid objects within clothing.

Packed Dressings

When direct pressure is unable to control external bleeding on a large gaping wound, or the injury is located where a tourniquet cannot be applied or work effectively, consider the use of a packed dressing. As its name implies, a packed dressing is a dressing that is packed down into an open wound instead of being placed over it.

A commonly used packed dressing is a hemostatic dressing, which is impregnated with an agent that speeds up the clotting process. Commercially manufactured packed dressings are folded in a manner so that you simply pull on one end to continuously pack it into the wound.

There are some important things to consider when using a packed dressing.

- Pack the dressing tightly into the wound and directly on the point of bleeding. Push it into every available space.
- More than one dressing might be required. If needed, readjust the dressing in the wound to be more effective.
- Anything that is absorbent, such as clothing or towels, can be used as an improvised packed dressing.

External Bleeding Control

Remember that rapid bleeding control by a trained bystander can help to improve chance of survival from traumatic injury.

Having a simple, planned approach is important in order to be effective.

Before anything else, pause and assess the scene for hazards, especially for any related to the mechanism of injury. Don't let what happened to the injured person happen to you.

Use disposable gloves and eye protection as barriers to help prevent any exposure to blood. When gloves are not available, an improvised barrier, such as a plastic bag, can be used.

As part of your initial assessment, scan the person's body thoroughly for evidence of heavy bleeding. Look for the following:

- Visible pulsing or steady bleeding from a wound
- Blood stains or pooling on the ground below a wound
- Clothes or bandages soaked with blood
- Signs of shock

Scanning for Bleeding in Cold Environments

It can be more difficult to quickly spot heavy bleeding when the injured person is wearing bulky clothing. Physically brush under the body, and other areas you can't see, with your gloved hands and then look for blood on your gloves. If needed, slide your hands under outer clothing layers, with only the base layer between the skin and your gloves.

Severe external bleeding is immediately life threatening and has a higher priority than almost all other treatments. Control it without delay:

- Quickly expose and inspect wounds to get a clear view of where the source of bleeding is located.
- Start with direct pressure focused on the point of bleeding.
- Consider a pressure bandage to provide more effective direct pressure.
- If direct pressure cannot control bleeding on a limb, use a tourniquet.
- If direct pressure cannot control bleeding and the wound is located where a tourniquet cannot be applied or work effectively, consider the use of a packed dressing.

Bleeding control measures can be painful. Complaints of pain do not indicate an incorrect application. Treat the person for shock, even if shock signs are not present. Monitor the person and maintain your bleeding control treatments until you have transferred responsibility to EMS personnel.

Go fast on evacuation whenever severe bleeding occurs. Shock may occur as a result of the blood loss. Complications can occur over time with the use of tourniquets.

Being Prepared

Unexpected severe external bleeding can occur at any time in any place. Your quick action and practiced skills can keep it from becoming life-threatening. Preparation is the key to being able to respond effectively and improve an injured person's chance for survival.

Commercial bleeding control products are a recommended addition to your first aid kit. They are generally easier to use and more effective than improvised ones.

For the treatment external bleeding, consider adding the following items to your wilderness first aid kit.

- Disposable gloves
- Eye protection
- Dressings and roller bandages
- Commercial tourniquets
- Cleaning wipes and disposable bags

Depending on your circumstances, consider the addition of a commercial pressure bandage and/or a commercial packed dressing.

Internal Bleeding

A significant blow or penetrating injury can damage soft tissue and cause bleeding inside the body. This is especially true for blood vessels and organs in the chest and abdomen. Fractures of the pelvis or upper legs can also result in significant internal blood loss. A weak or deformed blood vessel can burst open and bleed inside the body.

Because you cannot clearly see the injury, internal bleeding can be difficult to detect. Often, the mechanism of injury is the best indication that it is possible. Signs of shock may be the earliest indication that it is occurring. External signs of injury such as bruising or swelling may be present.

Go fast on evacuation. Serious internal bleeding can quickly lead to shock and death. Surgical intervention at a hospital is required in most cases.

Knowledge Check

What is the standard method for controlling external bleeding?

Using Direct Pressure

Pressure applied directly to a bleeding site until bleeding stops is the standard method for controlling external bleeding. It is simple to do, requires few materials, and works well most of the time.

Assess Injury

- Quickly expose and inspect wound to try to identify a point of bleeding.

Apply Direct Pressure

- Using a clean, absorbent pad or dressing, apply firm pressure with your fingers or palm directly on the bleeding site.
- Push hard when needed, even if it is painful to the injured person.

If Blood Soaks Through Pad

- Leave initial pad in place. Place another pad on top and continue to apply pressure.
- Replace the second pad if it soaks through.

If Bleeding is Controlled

- Maintain direct pressure until more advanced care is available.
- Check frequently to ensure bleeding remains controlled.

Using a Pressure Bandage

A pressure bandage can provide focused direct pressure for the control of external bleeding.

Place Bandage

- Unwrap bandage to expose pad.
- Place pad on wound with hard embedded pressure piece positioned over the point of bleeding.

Wrap Bandage

- Wrap elastic bandage around limb, overlapping first wrap to secure pad and pressure piece in place.
- Tightly apply additional wraps on top of pressure piece, using counter pressure to keep limb from rolling. Use twists in bandage to provide more focused pressure.
- Apply enough pressure to stop bleeding.

Secure Bandage

- Latch hook at end of bandage to one of previous wraps to secure bandage in place.

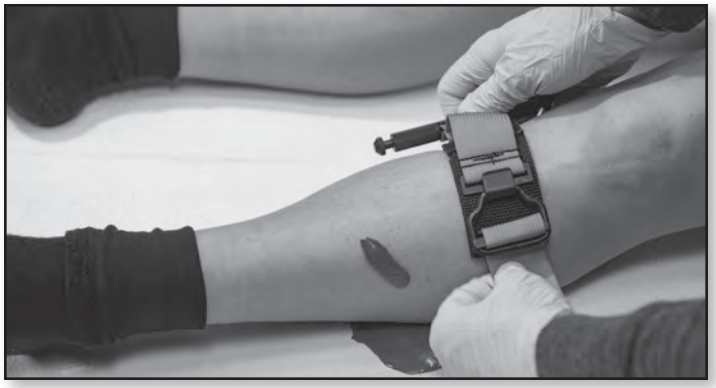
Monitor Bandage

- Check frequently to ensure bleeding remains controlled.

Using a Commercial Tourniquet

A tourniquet should be used if direct pressure is unable to control external bleeding or in certain situations where direct pressure is impractical or impossible to apply.

CAUTION! During student practice, take care while working on another person. Do not bind a tourniquet down tight against the person's limb.



Place Tourniquet

- Loop band around limb. If needed, unbuckle strap, wrap band around limb, and re-buckle.
- Place band directly on skin, a few inches above wound site, and not over a joint.
- Hand-tighten band snugly around limb.

Apply Tourniquet Compression

- Use cinching mechanism to tighten tourniquet.
- Tighten band until bleeding stops.

Secure Tourniquet

- Lock the cinching mechanism in place.

Monitor Tourniquet

- Document time of application and inform professional medical providers when they arrive.
- Check frequently to ensure bleeding remains controlled.
- Do not loosen or remove tourniquet unless directed by qualified medical personnel.

Using an Improvised Tourniquet

A tourniquet should be used if direct pressure is unable to control external bleeding or in certain situations where direct pressure is impractical or impossible to apply.

CAUTION! **During student practice, take care while working on another person. Do not bind a tourniquet down tight against the person's limb.**

Place Tourniquet

- If using a triangular bandage, fold it into a long, wide, band.
- Place center of band directly on skin, a few inches above wound site, and not over a joint.
- Wrap band snugly around limb, bringing both ends back to the top. Tie half knot to secure in place.

Apply Tourniquet Compression

- Place a rigid stick-like object on top of half knot. Tie a full knot over stick.
- Twist stick either direction to tighten tourniquet.
- Tighten band until bleeding stops.

Secure Tourniquet

- Wrap tails of band around stick to prevent unwinding and tie stick in place to secure it.

Monitor Tourniquet

- Document time of application and inform professional medical care providers when they arrive.
- Check frequently to ensure bleeding remains controlled.
- Do not loosen or remove tourniquet unless directed by qualified medical personnel.

Using a Packed Dressing

A packed dressing, such as a hemostatic dressing, can be used in situations where direct pressure is unable to control external bleeding and a tourniquet cannot effectively be used.

Assess Injury

- Expose and inspect the injured area.

Prepare Dressing

- Remove dressing from packaging. Dressing is folded in Z pattern for easier use.
- Hold dressing in one hand and pull end outward with other hand.

Pack Dressing Into Wound

- Pack dressing tightly into wound, directly on point of bleeding. Push into every available space.
- When wound is fully packed, place remainder of dressing on top of wound and apply direct pressure until bleeding stops.

Monitor Dressing

- Check frequently to ensure bleeding remains controlled.

Major Wounds

Some wounds, due to location or type, have a greater chance of becoming life threatening or for causing serious long-term harm. Looking for and treating these injuries is a higher priority than most wounds.

High-risk wounds include wounds that:

- Are heavily contaminated,
- Are open at a joint,
- Involve tendons or ligaments,
- Were caused by an animal bite,
- Are deep and on the face,
- Involve impalement, or
- Were caused by crushing mechanism of injury.

Large Wounds

A significant mechanism of injury, such as a fall from a great height, can result in a condition known as multi-system trauma in which a person receives multiple injuries of various size throughout the body. Injuries to the brain, spine, chest, internal organs, pelvis, and extremities can be present.

Multi-system trauma often includes large, gaping external wounds. Controlling bleeding is always the priority for any large, open wound. Secondarily, suspect associated internal injury to bones, muscles, and organs. As best you can, given the priorities of care, protect large wounds from exposure to the environment. Cover wounds to keep debris out of them. Pack clean or sterile dressings soaked in drinking water or normal saline into wounds to protect exposed internal body structures.

Go fast on evacuation for any person who is suspected of having multi-system trauma.

Injury to the Chest

With normal breathing the diaphragm and muscles in the chest contract, expanding the size of the chest cavity and creating a vacuum that pulls air filled with oxygen into the airway and lungs. Serious injury to the chest can reduce or take away this ability.

During assessment, be sure to expose and check the front and back of the chest wall thoroughly if the mechanism of injury indicates a chest injury may have occurred.

Bruised or fractured ribs can be very painful and cause someone to guard, or hold, the injured area. It is common to limit the effort to breathe as a means to minimize the pain.

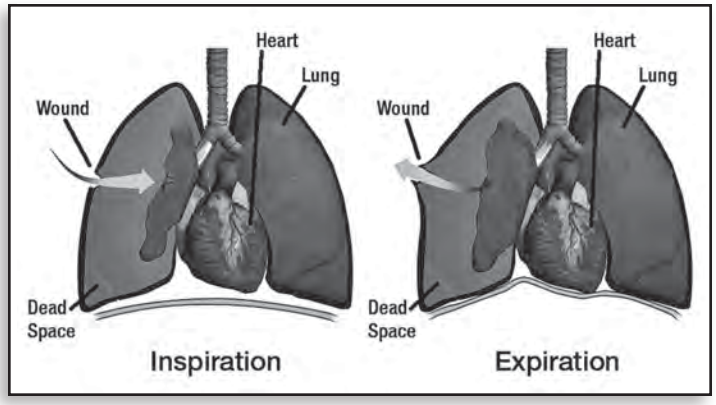
Taping the injured area, or strapping the person's arm against the injured side, may provide some pain relief. Never tape completely around the chest. Have the person assume a position which he or she is most comfortable. Encourage the person to relax as much as possible and concentrate on taking slow and effective breaths.

If a large enough portion of the chest wall becomes unstable because of multiple rib fractures, this floating piece can visually move in an opposite manner to the rest of the chest wall because of the vacuum created on inhalation.

Known as a flail chest, this type of injury can severely reduce a person's ability to take a breath. Strapping or holding a large, bulky object such as a coat or blanket against the injury can provide better stability and improve the effort to breathe. Never strap completely around the chest cavity.

If a chest injury prevents a person from creating the vacuum necessary to take an adequate breath and your initial treatments do not improve things, consider the use of supplemental rescue breaths. Identical to the rescue breaths given in CPR, supplemental rescue breaths can provide needed oxygen by forcing air in with positive pressure instead of the negative pressure used in normal breathing. There is enough air in your exhaled breath to adequately meet the injured person's need. Use a CPR mask and give a single breath every 5–6 seconds, 10–12 times per minute. Use a bag-mask device if one is available and you are trained to use one. If you can, try to coordinate your rescue breaths with the person's attempt to inhale.

An open or penetrating injury through the chest wall can also disrupt a person's ability to take a breath. Air from outside the body can be pulled, or "sucked," through the wound and become trapped in the chest cavity, progressively collapsing the lungs and impairing breathing over time.



Expose the injury site. Check to see if there is an exit injury on the other side of the chest. Control bleeding on both locations. The hole may bubble and make noise, and you may hear gurgling sounds when the person breathes.

Sealing this type of chest wound with an airtight, or occlusive, dressing makes sense to prevent air from being drawn into the chest cavity through the opening. However, it is important to understand that in some circumstances, injury to the chest wall also results in injury to the lungs. This can allow air being brought in through the normal breathing mechanism to escape from the lungs to inside the chest cavity.

If an open chest wound is sealed completely, the escaping air from the lungs can result in a buildup of pressure inside the chest cavity known as tension pneumothorax. This is the greatest concern associated with sealing an open chest wound. In fact, standard first aid measures recommend not sealing open chest wounds and letting quick-responding EMS providers manage them. But with an extended response time for professional medical personnel in a remote area, sealing an open chest wound becomes a more practical first aid consideration.

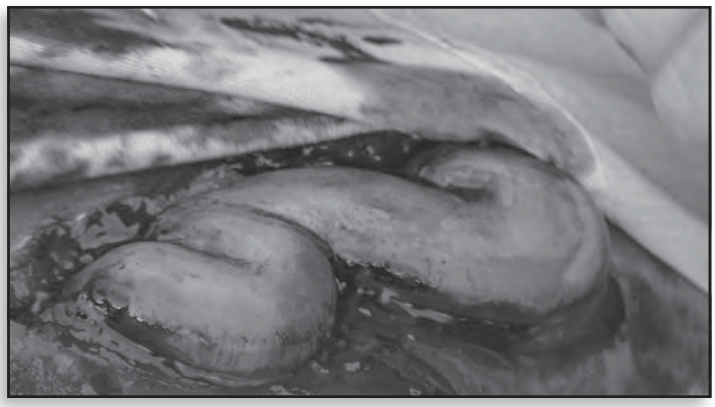
In a wilderness setting, immediately cover an open chest wound with an occlusive dressing, something that lets no air or water pass through, such as gauze impregnated with white petroleum, plastic wrap, or aluminum foil. Tape this dressing down securely on all four sides.

Monitor breathing closely. If breathing becomes more difficult after applying the dressing, remove the tape from one side of the dressing to create a relief valve for air to escape and to prevent further trapping of air in the chest cavity.

If the person is conscious, allow him or her to assume a position of comfort. Be prepared to provide supplemental rescue breaths if breathing becomes inadequate, or perform CPR if breathing stops.

Go fast on evacuation for an open chest wound or when there is breathing difficulty associated with a closed chest wound. Go slow, typically by self-evacuation, if you suspect someone has bruised or fractured ribs.

Injury to the Abdomen



Unlike the bony construction of the head and chest, the human abdominal cavity is relatively unprotected from traumatic injury by external forces such as a blunt blow, or penetration by a sharp object.

The abdomen is packed with hollow and solid body organs. When damaged, hollow organs can spill contents into the abdominal cavity and result in severe infections. Solid organs, rich with blood vessels, can bleed profusely.

As discussed earlier, shock can develop when bleeding results in a lower volume of circulating blood. If there is a mechanism of injury that suggests a closed abdominal injury, especially when external bruising, rigidity, or tenderness is noted, treat for shock.

An open injury to the abdomen may result in a condition known as evisceration, in which abdominal organs protrude through the open wound. Typically, these are still functioning organs and the primary treatment is to protect them from exposure outside the body and from further injury.

If evisceration is noted in your assessment, have the person assume a position of comfort. Cover any protruding organs with a thick, moist dressing. Do not push the organs back inside the body. Do not apply direct pressure on the wound or exposed internal parts, as this could cause further injury. Closely monitor the person and your treatment.

Go fast on evacuation. The person requires immediate advanced medical care in a hospital.

Amputation

Amputation is the complete detachment of a body part. If an amputation has occurred, first quickly assess for and control any severe bleeding. Suspect and treat for shock if severe bleeding has occurred.

Amputated body parts can often be surgically reattached. When possible, locate the severed part. Wrap it in a sterile or clean cloth. Place the body part in a tightly sealed plastic bag or waterproof container. If available, cool the bag or container with snow, ice, or a chemical cold pack. Do not soak the severed part in water, and do not put it directly on snow or ice. Inform responding healthcare providers about the severed part. Keep the part with the injured person during evacuation.

An avulsion is a wound similar to an amputation where a cut enters at an angle, leaving a skin flap over a wound or completely removing a section of skin along with underlying tissue.

If the wound is bleeding severely and the skin flap is still attached, apply direct pressure with the skin flap in place.

Go fast on evacuation for anyone who has severe bleeding associated with an amputation or avulsion, or if there is a possibility an amputated part can be reattached.

Impaled Objects

An impaled object is an object that penetrates a body part and remains embedded. Impaled objects can be small and unstable; large and immovable; or anything in between.

As a general rule, never remove an impaled object. First, if it has pierced through any large blood vessels, it can act like a plug, helping to prevent serious blood loss. Second, movement of the object, or the body part it is in, could create additional injury, especially if the object is embedded in muscle, bone, or organs below the skin.

During your assessment, expose the skin to confirm an object has penetrated the skin and look for any serious bleeding.

Keep both the object and the affected body part still to prevent movement. If the injury site is bleeding, apply direct pressure around the base of the object to control it. Do not apply pressure to the object itself.

To immobilize an impaled object, place bulky padding such as clothing around it, where it enters the body, for stabilization. Hold the padding in place with your gloved hands or a bandage.

If possible, without causing pain or further injury, consider cutting through the object, close to the person, if it is long or part of a larger object. This can help facilitate ongoing treatment and evacuation. Do not attempt if you do not have the proper equipment to cut the object. Stop immediately if cutting makes the problem worse.

An exception that necessitates removal is when an object is impaled into the airway. If the airway is threatened by the object or associated bleeding, remove that object and control bleeding on the outside and on the inside, if possible.

Other exceptions that allow for removal include an object you are unable to stabilize, one that will most likely fall out, one that prevents evacuation, or one that prevents the effective control of bleeding.

Being impaled on a larger, more immovable object typically requires additional care and specialized rescue equipment. If needed, support the person's weight to relieve pressure on the impalement. Use bulky padding underneath the body to provide stability and comfort.

Go fast on evacuation for any significant impalement, especially if additional resources will be required to facilitate the evacuation.

Knowledge Check

A camp member has fallen into a small crevasse while gathering wood for the camp fire. After pulling him out, you notice he is wincing in pain and holding his hand on his chest near his right shoulder. On inspection, you see a hole through his clothing. You expose the area and see an open wound that was apparently caused by a sharp object he fell onto. The blood in the wound is visibly bubbling. Why will you apply an airtight, or occlusive, dressing to this wound?

Treating an Open Chest Wound

An open, or penetrating injury through the chest wall can disrupt a person's ability to take a breath. Air from outside the body can be pulled, or "sucked," through the wound and become trapped in the chest cavity, progressively collapsing the lungs and impairing breathing over time.

Expose Wound

- If needed, cut or tear away clothing.
- Look for bubbling and listen for noises at wound site.

Apply Occlusive Dressing

- Use dressing material that is air- and water-tight.
- Tape dressing down on all four sides.

Watch for Breathing Difficulty

- If breathing becomes more difficult, air pressure may be rising inside the chest.
- Remove tape from one side of dressing to create relief valve to allow air to escape.

Monitor Dressing

- Inspect dressing regularly to ensure it is working properly.

Facial Injuries

External injuries to the head and face pose some unique challenges compared to injuries on other parts of the body. The mouth and nose are the starting point for the airway that allows air, containing life-sustaining oxygen, to enter the lungs. The eyes, ears, and nose provide critical sensory input for sight, hearing, and smell. Along with basic wound management, functional ability needs to be considered when dealing with facial injuries.

Along with mechanism of injury, external injury to the head or face can also be an indication of possible internal injury to the brain, neck, or spine.

Scalp

The skin around the around the face and head is richer with blood vessels than about any other place on the body. A cut to the face or head may initially seem to bleed dramatically. Fortunately, bleeding from facial injuries is relatively easy to control with direct pressure.

Go slow on evacuation for most bleeding injuries to the face and head. If bleeding is severe or you are in doubt, go fast. If internal injury is suspected, go fast.

Eyes

A number of injuries involving the eyes can benefit from supportive first aid care in a remote environment.

Traumatic Injury

A blunt blow or penetrating injury to the eye can result in permanent damage to a person's sight. Depending on the location of the damage, the effect on sight can vary. Rapid professional medical treatment may be able minimize the amount of permanent damage.

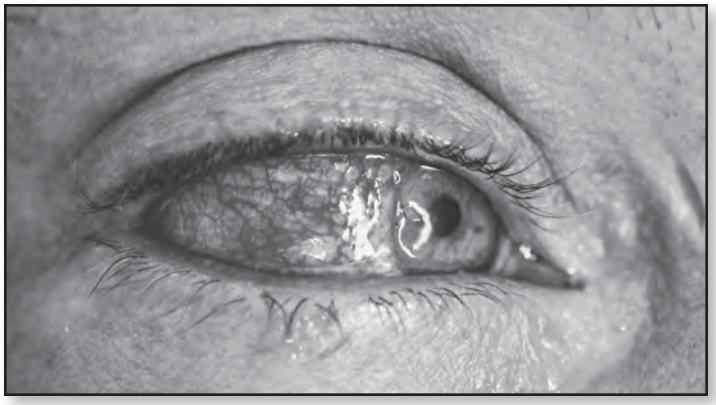
Cover the injured eye with a loose pad, being careful not to place any pressure on the eye itself. Eyes move together. Cover the other eye to prevent movement of the affected eye and bandage over both eyes. Covering both eyes can be distressing. Do not leave the person alone. Calm, comfort, and reassure him or her.

Impaled Object in the Eye

Stabilize the object in place to prevent additional injury. Do not allow the person to rub the eye. Never try to remove an embedded object.

Stabilize a large object with clean pads. Place a protective cover over the object, such as a paper cup or cone. Cover the uninjured eye with a pad and bandage both eyes. With smaller objects, loosely cover both eyes with pads and bandage. This injury requires professional medical care.

Chemicals in the Eye



Chemicals, or irritating fluids such as skunk spray, splashed into an eye can quickly result in pain and could damage eye tissue. Affected eyes will become painful and appear red and watery.

Immediately flood the eye with as much drinking water as possible. Carefully hold the eye open and flush slowly and continuously for at least 15 minutes, or as long as your supply of water lasts. If pain persists after flushing, continue flushing.

Flush outward from the nose side of the affected eye to prevent contamination of an unaffected eye. If the person is wearing contact lenses and they are not removed by the flushing, have the person try to remove them as flushing continues. Besides water, normal saline or another commercial eye irrigating solution can be used.

If you suspect damage occurred to eye tissue, additional medical care is needed. Cover the injured eye with a loose pad and bandage in place.

Covering one eye will impact a person's depth perception. Always assist the person in moving and walking to prevent further injury.

Eye Infection

An irritation can lead to an eye infection. If the eye looks pink or red with inflammation, itching, tearing, pus, crusted eyelashes, or lids stuck together, the person may have an eye infection. Rinse the eye regularly with water, normal saline, or another commercial eye irrigating solution. An eye infection requires professional medical care.

Go fast on evacuation if traumatic injury or impalement occurs. Go slow for small foreign bodies, damage from chemicals in the eye, or early signs of eye infection.

> *Irritated Eyes*
>
> Small objects on the surface of an eye, such as dust particles, can cause irritation and discomfort. If this occurs, encourage the person not to rub the affected eye. Have the person blink several times to see if the eyelid or tearing can remove the object naturally. If not, flush the eye with drinking water or saline eyewash solution. Flush outward from the nose side of the eye. For general irritation, the use of a commercial eye lubricating solution is an excellent way to lessen discomfort.

Nose

Nosebleeds can occur when small blood vessels inside the nostrils are ruptured.

To care for someone with a nosebleed, have the person 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 ten minutes. Do not tilt the head back or have the person lie down. These actions will cause the person to swallow blood and may cause him or her to vomit. Have the person spit out any blood that collects in his or her mouth.

If the bleeding persists, repeat pinching until bleeding stops. Continued bleeding can be treated by packing the nostrils gently with gauze soaked with antibiotic ointment or a decongesting nasal spray.

Nosebleeds that result from trauma can appear serious, but generally respond well to treatment and do not reoccur. Spontaneous nosebleeds, which appear to have no specific cause, are prone to reoccurring. This is usually due to instability of the scab that forms over the bleeding wound. It will take about 10 days for the scab to heal firmly. Advise the person not to blow their nose during this time period as this tends to remove the scab and restart the bleeding.

Most nosebleeds are not serious and can be handled easily. However, it is possible for noses to bleed further back in the nose where your pinching is ineffective. Blood typically runs down the throat and not out the nose. These types of nosebleeds are serious and need professional medical attention and rapid evacuation.

Blows to the nose that cause deformity may be treated with cold packs. Deformity typically requires professional medical care to correct issues with function or looks.

Nosebleeds that are easily managed do not require evacuation. Go slow on evacuation, using self-evacuation if possible, for an injured and deformed nose. Go fast on evacuation for nosebleeds that are bleeding heavily, or are difficult or impossible to control within 20 minutes.

Teeth

Lost Filling or Cavity

If a filling has fallen out or a cavity has developed, pain usually first occurs when cold, food, or the tongue hits the spot.

After rinsing the area clean, a drop of clove oil (eugenol) will ease the pain. A temporary filling is the best treatment until you can reach a dentist. Commercial temporary filling kits are available to add to your first aid supplies. A temporary filling can be made from mixing zinc oxide powder and eugenol. To improvise, fill the cavity with candle wax, ski wax, or sugarless gum. Temporary filling material can also be used to hold a dislodged crown back in place.

Knocked-Out Tooth

A blow to the mouth can break, dislocate, or even knock out teeth. When a tooth has been knocked out, treat it without delay. Dental professionals believe immediate reimplantation results in the greatest chance of tooth survival.

Control any bleeding. Have the person gently bite down on a clean absorbent pad over the bleeding socket. 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.

When it is not possible to get to a dentist quickly, there is a chance the tooth can be salvaged if you can get it back into the empty socket.

Hold the tooth by the crown and avoid touching the root. Rinse it (without scrubbing) with clean water. Determine the orientation of the tooth required for reimplanting it and press it gently back into the socket.

If it will not go back in, save it until you can get to a dentist. Keeping the tooth moist can help extend the time for successful reimplantation. The best way to store the loose tooth is for the person to hold the tooth in his or her mouth, with obvious care being taken not to swallow it. If this is not practical, store the tooth in milk (whole milk is best), coconut water, or other recommended solution. At a minimum, have the person spit into a cup and place the tooth in the saliva. Avoid storage in water.

Go fast, typically by self-evacuation. Get the person to a dentist as quickly as possible. The faster you act, the better the chance of saving the tooth.

Alternative Solutions for Knocked-Out Teeth

Commercial tooth-saving products are available. There are also alternative solutions that are more effective for temporary storage of a displaced tooth than saliva (avoid water):

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

Tooth Infection

An infected tooth is indicated by pain and swelling in the surrounding gum and the cheek. Discoloration of the gum may be visible.

Go fast, typically by self-evacuation. Cold packs on the cheek may give some relief. Have the person rinse his or her mouth with warm, salty water. Antibiotic therapy is usually required.

Ear

Object in Ear

If something is lodged in the ear canal, never use a swab, tweezers, or other tool to forcibly remove it. If there is no damage to the eardrum, small objects can be rinsed out with drinking water.

An insect in the ear canal can be treated by placing drops of room-temperature sweet or cooking oil into the ear. This can effectively decrease an insect's movement, or suffocate it in place. It may also cause the insect to slip out of the ear canal unaided.

Leave an object that cannot be easily rinsed out of the ear in place, until it can be removed by professional medical personnel.

If an object can be rinsed out of the ear canal and there are no lingering issues, evacuation is usually not necessary. Go slow, typically by self-evacuation if an object remains in the ear.

Ear Infection

An outer ear infection, or swimmer's ear, is usually indicated by an increase in pain when pulling on the earlobe.

For an ear suspected of being infected, rinse daily with a solution of 50% water and 50% vinegar or alcohol. If pain persists, seek professional medical help.

Middle ear infections do not increase in pain when the earlobe is tugged and are often accompanied by vertigo. These infections require professional medical attention.

An evacuation is usually not required for an outer ear infection if treatment is being provided. However, go slow, typically by self-evacuation, if pain persists or if you suspect a middle ear infection. An ear infection may create difficulty in a person's balance and ability to walk easily. Always assist the person in moving and walking to prevent accidental injury.

Knowledge Check

What is an important consideration in the appropriate treatment of facial injuries?

Minor Wounds

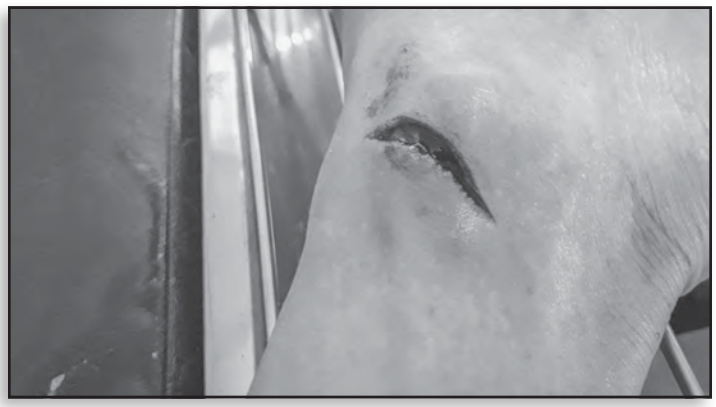
Minor wounds are a common occurrence in a wilderness setting. Minor wounds can impair a person's ability to do ordinary tasks or activities, like walking or carrying something, and are cause for greater concern if they become infected.

General wound management involves controlling any bleeding, thoroughly cleaning the wound, keeping additional damage from occurring, and preventing the wound from becoming infected.

Lacerations

Lacerations are cuts through the skin that are caused by sharp objects. Depending on the sharpness of the object, lacerations can have even or ragged edges. They vary in size and depth.

Immediately control any bleeding with a clean or sterile pad. Clean the wound, apply a thin layer of antibiotic ointment to the skin surface (if there are no allergies), apply a clean or sterile dressing, and bandage the dressing in place.



Avulsions

For small avulsions, always clean the wound, apply a thin layer of antibiotic ointment (if no allergies), and then dress and bandage the wound with the skin flap in place. This helps to improve the survival of the flap, protect underlying tissues, and aid in healing.

Abrasions

Abrasions are shallow, often dirty, wounds that occur when some skin has been scraped away by a rough surface, such as the surface of a boulder or gravel. Abrasions often become dirty with debris if the surface that caused the wound was also dirty or gritty.

To treat an abrasion immediately, apply a thick layer of antibiotic ointment (if no allergies) and cover it with a clean or sterile dressing. Bandage the dressing in place.

At some point, abrasions should be scrubbed clean, irrigated, covered with a thin layer of antibiotic ointment (if no allergies), dressed, and bandaged.

Local Cooling

For many minor wounds, local cooling can help decrease bleeding, swelling, and pain. Crushed ice works best, as it conforms to the shape of the area. Do not put ice directly on skin — put it in a plastic bag and wrap it in a shirt or sock. If you don't have ice, soak the wound in cold water or apply chemical cold packs, if available. During warmer months, another option is to wrap the wound in wet cotton and let evaporation cool the damaged area. Limit application to 20 minutes or less.

Blisters

Blisters result when outer layers of skin rub against inner layers. The tough outer layer of skin separates from the sensitive inner layer. Fluid fills the space created between the layers.

Blisters on feet are a very common problem for hikers or adventurers in a backcountry setting. In general, they are a small problem, but they can become serious if left uncared for. Prevent blisters by preventing friction between the outer and inner layers of skin.

Prevent blisters on feet with these tips:

- Wear boots or shoes that fit and are broken in.
- Wear a thin inner sock under a thicker outer sock.
- Treat "hot spots" before they become blisters, by readjusting the sock and shoe.
- Take off your boots to let your feet dry, or put on new, dry socks, when you take a break from hiking.

Blisters feel better when deflated, and controlled draining is far better than having them rupture inside a dirty sock. Leaving the roof of the blister intact will make it feel better and heal faster.

Clean around the site thoroughly. Use the point of a very clean or sterilized needle or knife to create an opening at the edge of the blister big enough to easily and gently massage the fluid out. Carefully clean where you have created the opening.

If the roof of the blister has been rubbed away, clean the wound thoroughly.

In all cases, apply an adherent dressing that limits friction. Many commercial products are available that are ideal for this purpose. You can also build a moleskin donut, which is a round piece of moleskin with a hole cut in the center.

Place the dressing with the hole in it centered on the blister site. Fill the hole with ointment. An antibiotic ointment is preferable (if no allergies), but any lubricating ointment will work. Place tape or a strip of moleskin over the hole to keep the ointment in place.

The person can now resume activity using the injured area. Check the dressing often to make sure it remains in place and is effective in limiting additional damage. Replace as necessary.

Chafing

Chafing is irritation and soreness on the skin caused by repeated rubbing. For hikers, it is common in the groin area, between the thighs, or around straps of hiking gear. It can be treated with a layer of lubricating oil or ointment, such as petrolatum jelly or cooking oil. It may be messy but relieves the irritation.

Chafing is easier to prevent than treat. Consider the following:

- Wear loose cotton pants and underwear to hike in when it is not too cold. Sweat gets absorbed, and dry skin chafes less.
- Apply a layer of lubricating ointment or chafe-prevention powder to chafe-prone areas prior to hiking.
- Apply an antiperspirant to chafe-prone areas.

Splinters

Splinters are small, sharp pieces of foreign material that become embedded in the skin. They need to be removed to keep a wound from becoming inflamed or infected.

Most splinters can be easily treated. If there is a protruding end, use clean tweezers to grab the splinter and pull it out in the direction it entered. Clean and cover the area where the splinter was removed. Following use, tweezers should be washed thoroughly with soap and water.

Knowledge Check

What are the general steps for minor wound management?

Treating a Blister

Blisters on feet are a common problem for hikers or adventurers in a backcountry setting. In general, they are a small problem, but they can become serious if left untreated.

Drain Blister

- Clean blister site thoroughly.
- If blister is intact, use point of clean or sterile needle or knife to create an opening on base of blister.
- Gently massage fluid out of blister.
- After draining, clean site again.

Apply Dressing

- Center commercial or improvised adherent dressing with hole in middle on blister site.
- Fill hole with antibiotic (if no allergies) or lubricating ointment.
- Tape over hole to keep ointment in place.

Monitor

- Check dressing often to make sure it remains in place and is effective.
- Replace as necessary.

Cleaning, Closing, and Dressing Wounds

Being away from professional medical help in remote locations increases the possibility that even minor injuries can become significantly problematic. Infection is a serious concern. Proper and effective wound cleaning, closing, and dressing can prevent most wound infections, speed healing, and reduce scarring.

Wound Cleaning

Start the cleaning process by washing your own hands with soap and drinking water, and putting on protective gloves.

The most effective method for wound cleaning is irrigation, using a strong stream of water or disinfecting solution to flush out a wound.

This is easiest to do using a medical syringe with the needle removed. If you do not have an irrigation syringe, improvised methods include using a biking water bottle, creating a pinhole in the center of the lid of a disposable water bottle, or punching a pinhole in the bottom corner of a clean plastic bag. Be sure to clean any irrigating device thoroughly before using it.

For most wounds, the easiest cleaning solution is disinfected water or clean drinking water. Commercial wound cleaning solutions are also available for use.

Whatever device you use, create a forceful stream and direct it throughout the wound. Position the injury to allow the used solution to run out of the wound.

Completely flush out any visible debris. If large pieces of debris remain in the wound after irrigation, carefully remove with clean or sterilized tweezers. Once removed, irrigate the wound again.

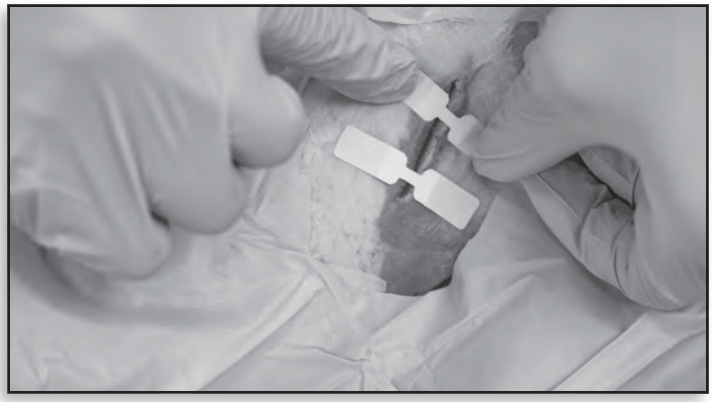
If you use a cleaning solution other than water, complete your irrigation by rinsing with a final flush of disinfected water or drinking water.

Abrasions should be scrubbed with a dressing or a clean, soft cloth with soap and water before irrigation to remove embedded debris.

Leave open any large dirty wounds; wounds that expose bones, tendons, or ligaments; and wounds caused by animal bites. After cleaning, cover these types of wounds with a clean or sterile dressing for protection and wait for professional medical treatment.

Exceptionally dirty wounds should be left open. After an attempt at cleaning, pack a dressing moistened with drinkable water or normal saline solution into the wound and cover with a dry dressing. This will allow the wound to drain until professional medical help is provided.

Wound Closing



The sides of deeper wounds tend to spread apart. This increases the likelihood a wound will begin to bleed again, become infected, or heal improperly. Holding this gap closed prior to dressing and bandaging can help prevent these types of issues.

Do not close wounds that are wider than one-half inch. If you decide to close a smaller gap, the wound must be thoroughly cleaned before closing.

The simplest wound closure strip in the field is the butterfly bandage. Resembling a butterfly's shape, it has flat adhesive pads on both ends and a thin, non-adhering connecting strip in the middle.

Use two closure strips. Clean and dry the skin well where the strips will adhere. Apply one end of one strip to one side of the wound and one end of the other strip to the opposite side of the wound. Using the opposing strips as handles, pull the wound edges together. Bring the skin as close as possible to where it should lie naturally.

If hair gets in the way of wound closure, it can be carefully clipped short, but it should not be shaved.

You can improvise wound closures using medical, athletic, or duct tape. Just be careful not to get the tape in the wound itself.

Wound Dressing

After cleaning a wound, and closing it if necessary, a wound should be covered with dressing and bandaged in place. This will aid in protecting the wound from additional injury and infection.

Dressings are designed to be applied directly to a wound. Most dressings simply cover a wound, but others can be packed down into a wound. Desirable traits for dressings include being clean or sterile, non-adherent, porous, resistant to bacterial invasion, and easy to use.

A dressing used over a wound should completely cover it and ideally extend a half-inch or so beyond the wound edges.

Wounds heal faster with less scarring if dressings are kept slightly moist with an antibiotic ointment. Keep in mind that some people are allergic to antibiotic ointment. If an antibiotic ointment is not usable or not available, a dressing that holds in the body's moisture, such as a micro-thin film dressing, can be used. Film dressings have the added advantages of being see-through and water-repellent. If you use a micro-thin film dressing, do not use an ointment.

Dressings, ideally, should be changed at least once every 24 hours, although transparent film dressings may be left in place until healing is complete. Replace any dressing if it becomes wet, dirty, or saturated with body fluids.

Bandaging

The function of a bandage is to hold a dressing in place, assist in the use of direct pressure, and protect the dressing from the elements or physical damage. Bandages are generally rolls or strips of material that can wrap around an extremity or body part.

Common bandages include conforming gauze, adhering gauze, tape, elastic wraps, or cloth strips. Bandages can easily be improvised out of everyday materials.

Before bandaging, remove rings, jewelry, watches, or anything that could cut off circulation if swelling occurs.

To use a bandage, hold one end in one hand and the rest of the roll in the other hand. Lay a portion of the bandage across the dressing and then wrap the rolled end around the body part being bandaged. Overlap the starting end of the bandage and dressing to hold them in place. Apply additional bandage wraps, stretching the bandage to apply the desired pressure on the dressing. A bandage is not effective if it is too loose, and it can be dangerous when too tight. Make sure you can easily slide a finger underneath it.

Be careful to not accidentally rotate the body part being bandaged when pulling on the bandage. Cover the dressing completely. Overlap your wraps in a neat and orderly manner. When finished, secure the end of the bandage, making sure there is not an exposed edge that could catch on something.

Check bandages often. Once applied, check within 15 minutes to make sure the bandage has not constricted circulation and the blood loss is controlled, and replace daily or as required to ensure cleanliness.

Evacuation

With the appropriate supplies and care, many minor wounds can be managed in a remote setting and not require evacuation. However, go slow on evacuation, using self-evacuation when possible, for wounds that are going to require professional medical care.

Changing Dressings

Depending on the time needed for evacuation, change dressings when discolored or soiled. Remove used dressings (soak them off with clean, lukewarm water if necessary), clean the wound, and cover the area with a fresh, clean dressing.

Knowledge Check

What are the advantages to properly cleaning, closing, and dressing wounds?

Cleaning, Closing, and Dressing Wounds

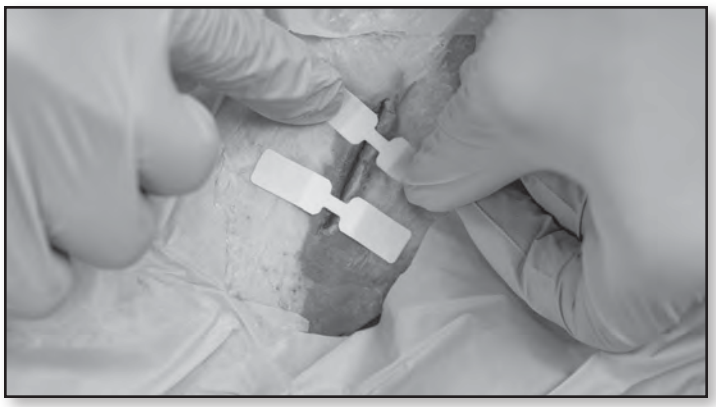
Basic wound care for minor lacerations, avulsions, and abrasions is very similar.

Initial Care

- Control bleeding using a clean or sterile pad.

Clean Wound

- Scrub abrasions with clean pad, and soap and water.
- Irrigate with forceful stream of water or cleaning solution.
- Remove large pieces of debris with clean tweezers.
- Rinse with final flush of water.



Close Wound

- If a small laceration is spread open, use a butterfly bandage or similar to hold closed.
- Using two strips adhered on opposite sides, pull the wound edges together and adhere to hold wound edges in place.
- For small avulsions, place skin flap back in place.

Dress Wound

- Spread a thin layer of antibiotic ointment (if no allergies) over wound.
- Cover wound completely with dressing.
- Pack large or dirty wounds with moist dressing and cover with dry one.
- Wrap bandage around dressing and body part to hold dressing in place.
- Ensure bandage is not too loose or too tight.

Burns

A burn is an injury to skin, and possibly underlying tissues, caused by exposure to extreme heat, chemicals, electricity (including lightning), and radiation (especially solar radiation from the sun).

Burn severity can range from a minor irritation to a serious, life-threatening condition. Deeper burns resulting in blistering or broken skin are more serious. Burns over large areas of a body's surface, even those with a shallow depth, are also serious. Burn location can also contribute to severity, especially when it is related to movement or other body functions. Burns involving the face, neck, hands, genitals, and feet that limit function in some manner are considered serious.

Even after separating a person from the cause of the burn, the burning process within the body can continue to injure tissue. Quickly stopping this process is the goal of your initial care.

When a burn occurs, always make sure the situation is safe for you to help. Don't let what happened to the person you are helping happen to you.

Thermal Burns

Thermal burns are a common type of burn created by exposure to extreme heat. If it is safe, begin your initial treatment as quickly as you can.

Immediately remove the person from the source of the burn. If clothes or other materials are burning or on fire, act immediately to put the fire out. Direct the person to stop, drop, and roll. Smother the burning material with a coat, rug, or blanket, or douse the material with water.

Next, try to quickly stop the burning process in the body, within 30 seconds if possible.

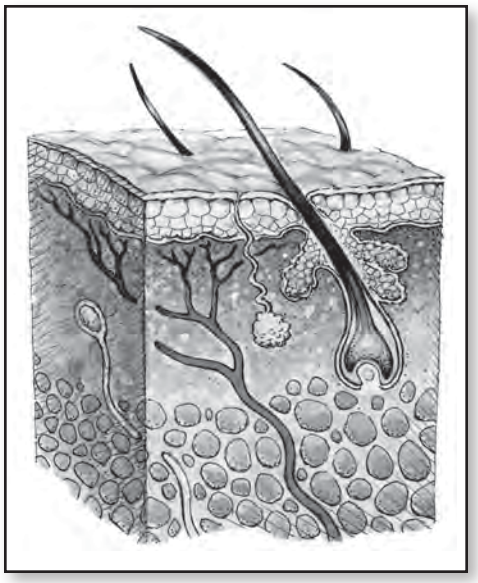
Cool the burn with cool or cold water for at least 10 minutes. Use a clean, cool or cold dressing soaked with water as an alternative when a large volume of water is not available. Never use ice or a frozen compress to cool a burn.

During cooling, carefully expose burned areas by removing clothing. If needed, cut or tear clothing away. If clothing is stuck to the burn, cut around it, but do not attempt to remove it. Remove any jewelry near the burned area.

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.

Be suspicious of burns to the face and/or neck, soot in the nose and/or mouth, singed facial hair, or a dry cough. Serious injury within the airway from inhaling hot air can impair the person's ability to breathe adequately. It is essential to monitor a person you suspect of being injured in this manner for developing airway complications.

Burn Depth and Extent



Once you have stopped the burning process, it is helpful to assess the depth and the extent of the injury. Your estimations will be rough, but they can help you determine the supportive treatment for the burn and the urgency with which you evacuate the injured person.

Depth

Burn depth is often estimated by the appearance of the burn:

- Superficial burns damage only the outer layer of the skin known as the epidermis. Skin is red, painful, and perhaps swollen.
- Partial-thickness burns damage the epidermis of the skin and portions of the inner layer, or dermis. Skin is red, painful, and swollen, and blisters can form, sometimes more than an hour after cooling.
- Full-thickness burns damage both the epidermis and dermis, and may extend into the tissue below the skin. Skin is painless and without blisters but generally pale (scalded) or charred in appearance.

Often, serious burns include areas of varying depths and appearances.

Extent

The extent, or size of a burn, can be estimated as a percentage of the total body surface area of the person that has been injured. Commonly, this estimate is based on a technique that the person's palmer surface area (inner surface of the palm, including fingers) equals about 1% of his or her total body surface area.

In general, the larger the burn, the more serious the injury. Burns involving more than 30–40% of the body can be fatal without emergency treatment.[3]

Estimate the percentage of the person's body that has been burned with partial-thickness or full-thickness burns only.

> *Burn Pain*
>
> In addition to depth and extent, do not underestimate the value of pain as a burn assessment tool. If the person is in a lot of pain, that is an indication of the need for professional medical treatment.

Supportive Treatment

Once you believe the burning process has stopped within the burn, provide supportive care for the burn. This treatment can vary, depending on how serious the burn is.

Gently clean smaller burns with slightly warm water and mild soap. Pat dry. If blisters are present, leave them intact. If there is no allergy to it, apply a thin layer of antibiotic ointment. Cover the burn with a clean or sterile dressing or cloth to reduce pain and prevent loss of body fluid due to evaporation.

Keep larger burns clean and protected. Separate burned fingers or toes with clean or sterile dressings. Cover the burn area with a dry, clean pad or cloth.

If possible, elevate burned extremities to minimize swelling. Swelling slows healing and increases the risk of infection.

Exercise of the burned area may also help in preventing complications, especially on areas of the body involved in movement. Encourage the person, as much as possible, to gently and regularly move affected areas.

Maintain a normal body temperature. Insulate above and below the person as necessary to retain body heat. Fluid loss, as a result of the body's response to being burned, can be significant. Keep the person well hydrated.

Never cover or pack burned areas in snow or ice. Avoid natural burn remedies such as honey or potato peels. Never apply butter, ointment, lotion, or antiseptic to a serious burn.

Electrical Burns

Electrical burns 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.

Make sure any electrical current is off before approaching or touching the injured person. An electric shock can cause 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.

Check for burn injuries at the point of contact and at a secondary grounding point, such as the hands and feet. A person who has received an electrical shock should seek professional medical care because serious internal injuries can occur.

> *Changing Burn Dressings*
>
> Depending on the time needed for evacuation, change burn dressings at least twice a day. Remove used dressings (soak them off with clean, lukewarm water if necessary), clean the wound, and cover the burn area with a fresh, clean dressing.

Chemical Burns

Some chemicals can damage skin tissue on contact. The priority is to quickly remove the chemical to minimize any damage. Immediately flood the affected area with large amounts of water. Take care to prevent additional exposure to the injured person or yourself.

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

Carefully remove any contaminated clothing while continuing to flush the area. Flush for at least 15 minutes. Some chemicals take longer than others to be flushed away. If still painful, resume flushing. If no longer painful, cover any visible burns loosely with a dry, clean dressing and seek further medical attention.

Evacuation

With the appropriate supplies and care, many minor burns can be managed in a remote setting and not require evacuation. Go slow on evacuation, using self-evacuation when possible, for burns that are going to require professional medical care or are creating discomfort to the injured person. Go fast on evacuation for any burn you consider to be serious because of depth, extent, location, or level of pain.

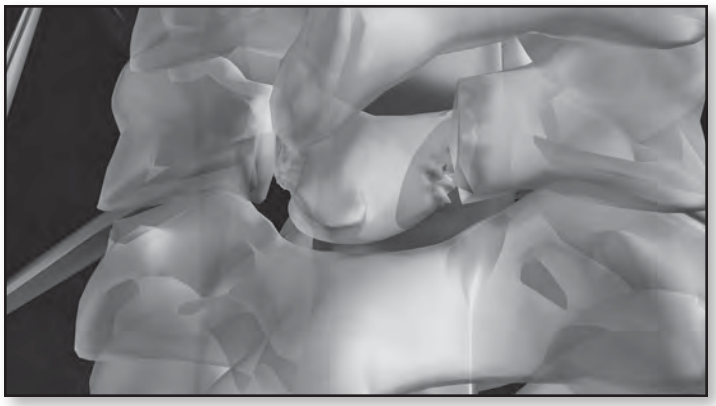
Prevention

It is best to prevent burns from occurring in a remote location. Carry and use sunscreen to prevent sunburns. Take care when handling hot liquids or foods to prevent accidental spilling.

Knowledge Check

A fellow camper gets too close to a campfire and accidentally ignites her shirt sleeve on fire. As a trained first aid provider, you quickly put out the flames by throwing a nearby coat over her arm. When you remove the coat, you can see that her arm has been burned badly. What is your next step to remove heat from the burned area and prevent additional damage?

Head, Neck, or Back Injuries



Mechanisms of injury in which external force is directed at the head, neck, or back can result in internal injury to the brain or spinal cord. Injuries to the brain or spinal cord can result in a number of serious conditions including the loss of consciousness, loss of breathing, profound shock, paralysis, and death. Early suspicion and quick supportive care are essential in preventing further injury and enabling the best outcome possible.

Injury to the Spine

The spinal cord is the main neurological pathway from the brain to the rest of the body. In general, the length of the spinal cord is related to the length of the body. Injury to a higher part of the cord will result in neurological losses, such as feeling and movement, to the majority of the body. Injuries lower on the cord may result in losses only to the lower portions of the body.

The spinal cord is protected by the vertebrae bones of the spinal column. The cord runs through channels in the middle of each vertebra. The cord begins at its connection to the brain and ends at the bony structure of the pelvis.

The most vulnerable location for injury to the spinal column is in the neck, where the flexible cervical vertebrae are open to mechanisms of injury involving rapid movements of the heavily weighted head. Bony and muscular structures afford more protection for the spinal column in the back and abdomen.

Permanent injury results when the spinal cord is severed completely or nearly cut through. In these cases, supportive care such as rescue breaths may be required to manage any symptoms created by the injury, such as the loss of the ability to take a breath.

Non-permanent injury can result when the cord is partially damaged or is being compressed due to damage to other nearby body structures. Symptoms may be similar to those associated with a completely severed cord.

In some cases there can be injury, such as fractured vertebrae, to the protective structure around the spinal cord, but no damage to the cord itself. This results in a situation where there are no neurological losses, but any movement of a damaged and unstable spinal column could quickly cause damage to the cord.

Suspicion of Spinal Injury

Suspicion of a spinal injury depends heavily on the mechanism of injury, especially when other external injuries are visible. In addition, neurological symptoms such as numbness, tingling, burning, or a loss of sensation described by the injured person in the arms, hands, legs, or feet should raise a first aid provider's suspicion of spinal injury.

The lack of symptoms or obvious injury does not mean that the spine is not injured. If a significant mechanism of injury occurred, it is best to assume a spinal injury exists. If someone is found unresponsive, it is best to suspect a spinal injury until clearly proven otherwise.

Suspect spinal injury when a mechanism of injury involves significant force to the body, such as the following:

- Falling from heights greater than 3 feet
- Compression/axial loading, such as falling and landing on the head or buttocks
- Excessive flexion of the head, as when the chin is forced to the chest
- Excessive extension or rotation of the head, such as tumbling downhill without skis releasing
- Distraction of the head, such as an attempted hanging
- Penetration, as from a gunshot or stabbing in the area of the spine
- Sudden and violent deceleration or impact

Caring for Spinal Injury

The immediate care for a suspected spinal injury is to keep the person's body from moving, especially the head. This is intended to prevent any additional injury to the spinal cord. Calmly encourage the person not to move. Provide spinal motion restriction by manually stabilizing the head in place with your hands. If available, have another provider do it.

> *Airway First*
>
> An open and clear airway for an unresponsive person is a higher priority than protecting a suspected injury to the spine. However, movements to deal with airway problems should take suspected spinal injury into consideration.
>
> - If the airway is threatened by foreign material such as vomit or blood, log roll the person as needed to clear and protect it. Keep the head, shoulders, and torso from twisting as best you can.
> - 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 person with a suspected spinal injury alone to get help, place the person in a recovery position to protect the airway before you go.

Straightening the Body

Someone suspected of having a spinal injury will often be found crumpled in an odd body position. In a remote setting, without the benefit of a quick response of professional medical care providers, it is important to get the person into a position better suited for additional care or moving. This is referred to as the anatomical body position in which the head, neck, torso, and legs are in a straight alignment and the arms are straight along the sides of the body. The person is face up on the ground.

If the injured person's neck lies at an odd angle, straighten it with slow, gentle movements to align it with the neck and spine. Never pull the head away from the body or push it towards the body while doing this. This straightening can improve the airway, reduce pressure on the vertebrae, and make spinal motion restriction easier. If this movement, at any time, causes pain or meets resistance, stop and stabilize the person's head in the position it is in.

While another provider maintains spinal motion restriction at the head, slowly and gently align arms and legs with the torso, one at a time. This is done with slight traction, holding the lower part of the limb and pulling slightly in the normal lengthwise line of the limb.

Slowly and gently align shoulders, chest, and hips to form a neutral spinal position.

If needed, position the person by using a log roll to move the person from his or her side or abdomen, onto the back. Keep the head and neck in alignment with the rest of the body during the move.

Whenever someone with a suspected spine injury has to be moved a short distance, such as into a tent for warmth, accomplish the move using the body elevation and movement (BEAM) technique discussed earlier. The BEAM move is not intended for moving long distances, such as those required for evacuation.

Improvised Cervical Collar

With the body aligned in the anatomical position, you can improve your manual spinal motion restriction with an improvised cervical collar that provides some passive motion restriction of the head and neck.

You can improvise one by rolling extra clothing, such as a long-sleeved fleece sweater, or by cutting off the end of a foam sleeping pad to fit the person's neck and taping it in place. A collar goes completely around the person's neck. Slide one end through the gap under the neck. Wrap and cross the ends across the lower part of the neck. Take care not to apply significant pressure to the front of the neck, or any area of injury.

If the improvised collar varies in thickness, place the thickest part between the chin and chest. It is important to understand that cervical collars, even commercially produced ones, cannot totally restrict motion of the head and neck. Manual spinal motion restriction must be maintained until the person is fully immobilized in a litter or onto a rigid immobilization board or device.

Spinal Immobilization

In a remote setting, an extended wait time for spinal immobilization equipment is expected, but attempting to transport a person with a suspected spinal injury without it creates great risk and is not recommended.

Learning how to immobilize a person takes additional training beyond the scope of this course. However, you may be asked by someone with a higher level of training to assist in immobilizing someone. Having a basic understanding of the concept and process may help to prepare you for such a possibility.

When a litter or rigid immobilization device is available, the person will be FOAMed in place — made free of any movement — using padding and straps. The person will first be placed onto the rigid surface of the litter or immobilization device. Padding will be used to fill any voids where the body could shift, such as those under the person's knees or lower back, between the legs, between the arms and torso, and around the outside of the body. Straps will be used to firmly hold the padding and body in place. The person's head is strapped and immobilized last, finally allowing manual spinal motion restriction to be discontinued.

Once immobilized, the injured person is ready to be safely transported out of a remote or wilderness area.

Evacuation

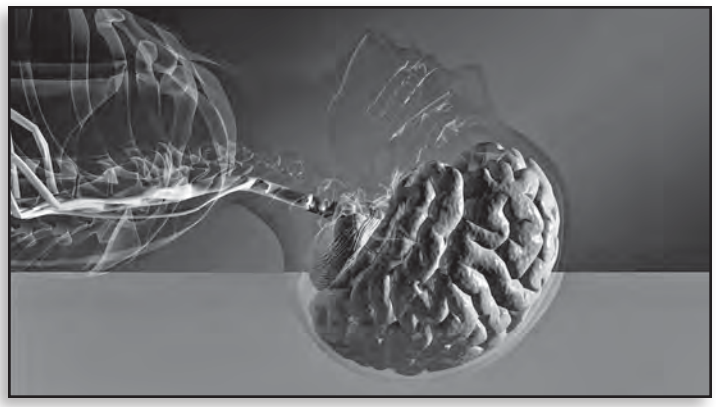
Go fast on evacuation for anyone suspected having a spinal cord injury. Expect an extended time to transport the person safely.

Prevention

In addition to approaching activities safely in general, avoid climbing without safety ropes, diving headfirst into water, riding in a vehicle without seat belts fastened, and skiing with bindings that do not release under the appropriate pressure.

Injury to the Brain

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.



The primary concern involving a brain injury is significant swelling or bleeding of brain tissue. The brain completely fills the cranial space inside the rigid bony skull. The cranial space has only a few restricted openings, primarily for the spinal cord and optic nerves of the eyes. Because of this, swelling and bleeding inside the cranial space can result in increased pressure that will damage delicate brain tissue.

Death can occur quickly from brain injury. Surgical intervention to relieve pressure may be the only treatment. Survival from a serious brain injury in a remote setting may be difficult.

Suspicion of Brain Injury

Suspicion of a brain injury depends heavily on the early determination of the mechanism of injury, especially when signs of external injuries to the head, such as bleeding or swelling, are visible.

Additional signs of head injury include the following:

- Mental status deterioration — from disoriented, to irritable, to combative, to coma
- Personality changes
- Loss of coordination and/or speech
- Debilitating headache
- Visual disturbances
- Seizures
- Persistent nausea and vomiting
- Relapse into unconsciousness

In later stages, the affected person's pulse may slow down and respirations may become erratic.

Skull fractures are often associated with brain injury. The presence of a skull fracture, though serious, can provide some relief from the developing pressure inside the skull. The areas of the skull that commonly fracture are at the base of the skull near the ear canals and at the sinus cavities where the wall of the skull is most weak. This can result in a mixture of cerebrospinal fluid (fluid that surrounds the brain and spinal cord) and blood coming out of the ears or nostrils.

Signs of a skull fracture include the following:

- A depression in the skull
- A fracture visible where the scalp has been torn, revealing the fracture
- Bruising around both eyes (raccoon eyes) or behind both ears (also known as Battle's sign)
- Cerebrospinal fluid (clear fluid) and/or blood seeping from nose or ears

Caring for Brain Injury

A person with suspected brain injury must be evacuated immediately.

Consider the possibility of an associated cervical spinal injury and provide immediate spinal motion restriction. If present, do not attempt to stop the flow of blood or fluid from the ears or nose.

A diminishing level of responsiveness will likely result in difficulty for the person to maintain an open and clear airway. The person may vomit. Provide the necessary airway support as the condition progresses.

If the person has a seizure, protect the head as much as possible and prevent him or her from bumping into nearby objects. Do not restrain the person tightly and do not place anything in his or her mouth. Seizures will generally last for just a few minutes. When the seizure stops, assess the person's breathing and ability to respond. Provide CPR if necessary.

If spinal immobilization equipment is available and there are providers present that are trained in its use, elevate the head approximately 6 to 8 inches. Do this by tilting the person's entire body, after transferring and properly securing the person to a litter or rigid immobilization device. Do not raise just the head or torso.

Go fast on evacuation for suspected brain injury and /or skull fracture. Clearly communicate the circumstances of the injury and condition of the injured person to professional healthcare providers who are responding.

Concussion

A concussion is a brain injury that generally results in less immediate or obvious signs of harm. Most concussions are temporary and resolve naturally, but it is possible for one to progress into a life-threatening condition.

Suspect a concussion after a significant blow to the head or body when the affected person is unable to remember what happened just before or after the incident, or recall simple facts about it. The person may move clumsily, answer questions slowly, or show a change in mood or personality. Additional signs include the following:

- Looking stunned or dazed
- Headache
- Nausea and vomiting
- Dizziness
- Difficulty in balance
- Visual problems

You may be called upon to give advice on whether someone who may have a concussion is okay to return to normal activities. Currently, there is no concussion evaluation process for use by those trained in first aid.

If you suspect a concussion may have occurred, the affected person should be evaluated by a healthcare provider as soon as possible. During an extended evacuation, monitor the injured person closely, especially during the first 24 hours. At night awaken the person every two hours during the night to check for signs of developing problems.

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

Evacuation

Go fast on evacuation for a suspected concussion. If possible, have the person self-evacuate.

Prevention

Prevention of head injuries should rank high among your priorities. In addition to approaching activities safely, wearing a helmet approved for specific activities such as biking and climbing is a must. The Guide to Safe Scouting has additional information and can be found online at http://www.scouting.org/filestore/pdf/34416.pdf. The helmet must fit the user and be held in place with a non-stretching chinstrap. Wearing a helmet does not eliminate the chance of a serious injury, but it does reduce the risk.

Knowledge Check

You are hiking through a remote area when witness a hiker in another group who slips and falls over a ledge to the rocky ground about 10 feet below. He lands on his head and shoulder, severely pushing the side of his head into his shoulder. Trained as a first aid provider, you stop to help. The scene is secured and the person who fell has no immediate life threats that you can quickly assess. There is a small cut on his forehead, but he does not complain of pain in his neck, or numbness and tingling in his arms or legs. You elect to manually stabilize his head with your hands. Why?

Providing Spinal Motion Restriction

The immediate care for a suspected spinal injury is to keep the person's body, especially the head, from moving. This is intended to prevent any additional injury to the spinal cord.

Initial Considerations

- Make sure it is safe to provide care.
- Immediately encourage person not to move.

Stabilize Head

- Get into a comfortable position behind or above the person.
- Cup your hands on both sides of the head to stabilize it.
- Slowly and gently bring head in line with body without pulling it away from or pushing it towards torso. Stop if you feel resistance or this causes pain. Maintain head in the position it is in.

Improvising a Cervical Collar

- Maintain manual spinal motion restriction while you prepare the collar.
- Slide one end of collar through gap under neck.
- Wrap and cross ends across lower part of neck. Ensure there is no significant pressure on front of neck or injury.
- Maintain manual spinal motion restriction, even with collar applied.

Straightening the Body

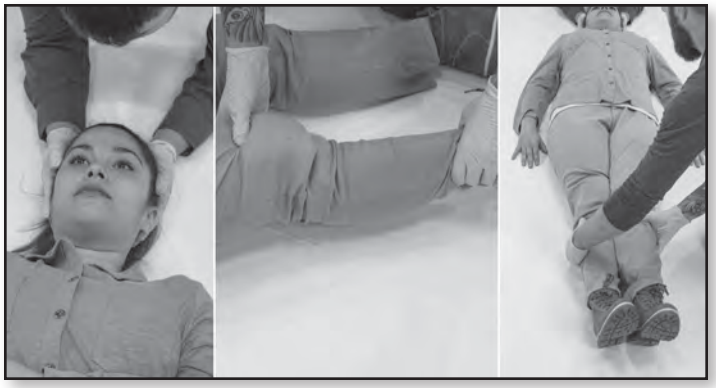
Someone suspected of having a spinal injury will often be found crumpled in an odd body position. In a remote setting, without the benefit of a quick response of professional medical care providers, it is important to get the person into a position better suited for additional care or moving.

Straightening the person's body requires enough providers to effectively and safely accomplish the task.

CAUTION! **Classroom activities that involve lifting and moving may aggravate previous back injuries. Do not practice moving simulated victims if you have a history of back injury.**

Position Yourselves

- Position one provider above head to manually support head during straightening.
- Position at least one more provider on person's side.



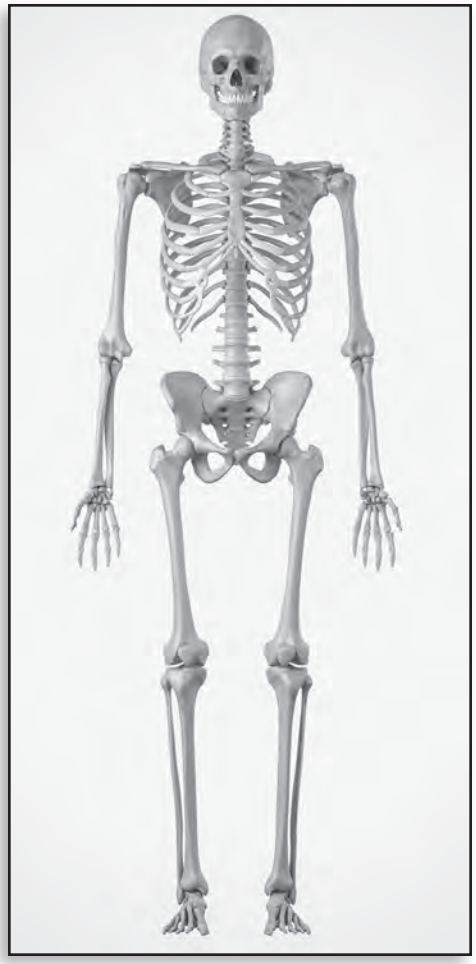
Align Person's Body

- Slowly and gently bring head in line with body.
- Using slight traction, slowly and gently align arms and legs with body.
- Slowly and gently align shoulders, chest, and hips.

If Needed, Position Person onto Back

- Provider holding head issues commands for other providers.
- Roll the person towards provider(s).
- Roll smoothly in a single motion, keeping head and neck in alignment with rest of body.
- Lift and support head during roll to keep it in line with body.

Musculoskeletal Injuries



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. Arms and legs are the most exposed body parts to external forces and injury.

Injuries to the musculoskeletal system are among the most common in wilderness activities.[4]

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.

Assessment

When you suspect someone has injured a limb, pay close attention to the injured person's description of what happened.

- How did the injury occur? (High-speed impacts cause more damage than low-speed impacts.)
- Does the person think a bone is fractured? (People are often correct in this assessment.)
- How bad does it hurt? (Muscle spasms surrounding an injury site create pain and give evidence as to the seriousness of the injury.)

During your hands-on physical exam remember to look for deformity, open wounds, tenderness, and swelling (DOTS) on the arms and legs. Remove clothing, if needed, to clearly inspect an area you suspect might be injured.

Sometimes the assessment of a fracture, or broken bone, is simple: A bone is sticking out through the skin, or an angular bend appears on a limb where it shouldn't. Dislocations can result in a joint that looks wrong and different from the opposite side of the body.

However, distinguishing the exact type of musculoskeletal injury is often difficult and it is not necessary to do so in the field. Instead, focus your approach determining if the limb is usable or not, if an evacuation is necessary, and how you should support the injured area until the person can receive professional medical attention.

Strains and Sprains

Strain or sprain injuries to the soft tissue of muscles, tendons, and ligaments can pose a minor, mild annoyance, or be so serious as to render a person unable to use a joint. They are often accompanied by pain and sometimes by bruising in the area of the injury.

Have the person actively move the joint and evaluate the amount of pain involved. Move the joint more aggressively with your hands and evaluate the pain response. Finally, if the joint appears usable, have the person test it with movement, or his or her body weight. A usable joint can remain active within certain limits, especially after some early supportive treatment.

These types of injuries may respond well to treatment based on the RICE mnemonic device:

- Rest — The person should rest the injured limb. Have him or her avoid movement that causes pain.
- Immobilize — Have the person keep the injured limb still. Immobilization can lessen pain and prevent further damage.
- Cold — Use local cooling on the injured area. Applying ice or a cold pack can help reduce swelling and ease pain.
- Elevate — If possible, raise the injured area above heart level to reduce swelling.

Whether usable or unusable, keep the injured area at rest while you reduce its temperature as much as possible without freezing. Immobilization can be effectively attained with an elastic wrap. Wrap it snugly but not tight enough to cut off healthy circulation, and wrap from below the injury toward the heart.

After 20 minutes of RICE, remove the cold treatment and let the joint warm naturally for 10 to 15 minutes before use.

Local Cooling

Local cooling can help decrease the bleeding, swelling, and pain associated with a sprain or strain. Crushed ice works best, as it conforms to the shape of the area. Do not put ice directly on skin—put it in a plastic bag and wrap it in a shirt or sock. If you don't have ice, soak the injured joint in cold water or apply chemical cold packs, if available. During warmer months, another option is to wrap the joint in wet cotton and let evaporation cool the damaged area. Limit application to 20 minutes or less.

Usable upper-extremity sprains generally do not require support. Unusable upper extremities can be stabilized using the sling-and-swathe technique of binding an arm to the chest with triangular bandages or similar material.

A person with a usable knee sprain may be aided by creating a walking splint for the knee, which restricts movement without putting pressure on the kneecap. Place a pad behind the knee within the splint to keep the knee slightly flexed. The person can be further supported by using a stick or staff for balance. A person with strained or sprained usable ankles should have his or her boots laced firmly and should also walk with a stick or staff. Unusable lower extremities will benefit from splinting for stabilization.

Go slow on evacuation for strains and sprains that result in unusable joints.

Bone Injuries

A fracture results in the loss of the integrity of a bone and creates an unusable extremity.

As described above, a fracture may be obvious on observation. An open fracture is indicated by an open wound at the point of fracture. Bones may or may not be visible. An abnormal angle of a limb where there is no joint indicates the presence of an angulated fracture.

There are some other, less obvious, indications of fracture that may help in your assessment process. During your physical exam you may find a particular spot on a person's limb that hurts significantly more when touched than the rest of the limb. This is known as point tenderness and is an indication of a possible fracture.

Loss of a pulse, numbness, tingling, and inability to move at the hand or foot of an injured limb can indicate an impact to blood vessels or nerves associated with a possible fracture. This is commonly referred to as distal CMS (circulation, motion, and sensation).

When in doubt, assume a fracture is possible and treat it accordingly.

The immediate treatment for a suspected fracture is the restriction of movement. The movement of unstable bones can damage surrounding tissue. Encourage the person not to move or use the injured limb. Expose the injury site to look for an open wound. Gently control any bleeding, if present with direct pressure. If needed, manually stabilize the injured limb with your hands in the position it was found. Use padding in gaps underneath limb to provide additional stabilization.

Splinting

Over time, muscles in the injured limb may begin to spasm and contract. This movement has the potential to cause additional damage to the limb and could significantly increase the pain involved. Because of the extended time it takes to get to professional medical care in a remote setting, it is best to immobilize any suspected fracture with a splint.

Splinting is also necessary to safely move someone over long distances because it lowers the risk of further damage caused by the move.

A splint is a rigid device that is strapped externally to a limb to prevent movement of a broken bone. The purpose of a splint is to prevent further injury and minimize discomfort until an injured person can reach professional care.

Due to the structure of the body, there is not a single splint that fits all situations. The upper and lower parts of arms and legs, as well as the hands and feet, all have unique splinting needs. However, there are some basic guidelines to follow when splinting:

- Check distal circulation, motion, and sensation (CMS) on the hand or foot before and after applying a splint.
- Cut away clothing and remove any jewelry on a limb before splinting it.
- To effectively immobilize a suspected fracture, a splint must immobilize the injury site along with the joints above and below it.
- Treat associated open wounds as part of your fracture care.
- Attempt to straighten angulated limb fractures before splinting them.

In general, a splint has three primary parts:

- Something rigid for external stability
- Padding to fill and support contoured gaps around limb
- Something to strap or bind the splint and limb together

It is possible to improvise a splint from basic medical supplies and commonly found items in a wilderness setting. Commercial splints, such as a malleable aluminum splint, are also available and are designed for remote use.

Improvised Splinting Materials

In choosing materials for an improvised splint, you are only limited by imagination. For a rigid support, there are items such as sticks, tent poles, ski poles, ice axes, lightweight camping chairs, and internal and external pack frames. Sleeping bags, foam pads, extra clothing, and soft debris from the forest floor stuffed into extra clothing can all be used for padding. Splints can be secured in place with things like bandannas, strips of clothing, pack straps, belts, and rope. Useful items in your first aid kit for securing splints include tape, elastic wraps, and roll gauze. Large triangular bandages are helpful in creating slings and swathes.

Splint Application

Splints should hold the body part as close to natural position of function as possible. Functional splinting positions for the limbs include:

- Legs almost straight with padding behind the knees for slight flexion
- Feet at 90 degrees to legs with ankles aligned with knees
- Arms flexed to cross the heart
- Hands loosely cupped and palm side to the chest or curved with padding in the cupped hand

Be prepared before applying a splint. Gather everything you will need. Be sure to maintain manual motion restriction of an injured limb until a splint is fully applied.

Measure and prepare the rigid piece you will be using. Make sure it is large enough to splint the joint above and below the injury site. If needed, place padding to provide comfort or fill in expected voids. Carefully slide it into place around the injured limb.

Limbs are tapered, getting narrower as they extend out from the torso. There are natural voids around joints, such as at the knee and ankle. Before binding a splint to a limb, make sure all spaces and voids are filled adequately with padding. Don't forget to fill any open spaces underneath the limb.

Finally, use strapping to securely attach the splint to the injured limb. Compress the padding to a point that it firmly cradles the limb. Place straps on both sides of any joint and on both sides of the injured area, never on top of a joint or injury. Leave the area of the injury open and accessible.

If needed to complete immobilization, secure the splinted limb further by strapping it to another part of the body. A good example of this is the sling-and-swathe method, which uses a couple of triangular bandages (or similar material) to immobilize an injured arm to the person's chest. One bandage creates a sling in which the forearm, with or without a rigid splint, can comfortably lie. Lifting the bottom of the person's shirt up over the arm on the injured side and safety-pinning it in place can also work. The second bandage wraps around the chest, capturing both the lower and upper arm, holding them tightly against the chest wall.

After splinting, check distal CMS to ensure splinting has not limited circulation or feeling to the outer part of the limb. Check this frequently as part of your ongoing assessment.

Once a splint is in place, and the circumstances of the injury allow for it, use the RICE (rest, immobilization, cold, and elevation) treatment concept to provide additional supportive care.

Splinting Extremities

- Collarbone — Use a sling and swathe to immobilize suspected collarbone (clavicle) fractures. Be sure the sling lifts the elbow to take pressure off the shoulder.
- Upper Arm — Immobilize suspected upper arm (humerus) fractures in a sling and swathe. Leave the elbow free from the sling to help ease the pain. Include a rigid splint if the arm appears unstable.
- Lower Arm — Immobilize suspected lower arm (radius and/or ulna) fractures (including wrist and hand) in a rigid splint, held in place with a sling-and-swathe. Place a roll of something soft in the hand to keep it in a position of function. If hand bones are injured, be sure to immobilize the hand within the splint. Keep the fingers accessible for checking distal CMS.
- Fingers — Tape injured fingers to nearby healthy fingers with padding between them.
- Upper Leg — Immobilize suspected fractures of the upper leg (femur) using a rigid splint. Pad behind the knee for comfort. Immobilize the pelvis joint by having the person lie flat on ground. Fractures of the femur can result in significant internal blood loss as a result of associated injury to large arteries in the upper leg. Treat and monitor for developing shock. Muscles in the upper leg are very powerful and can often move fractured bones even when a rigid splint is applied. This results in a significant amount of pain. Someone with higher training may be able to apply a traction splint, which is designed to pull the leg away from the body and help separate, and relieve pressure, on the broken bone ends. This helps to prevent movement and reduce pain.
- Lower Leg — Immobilize suspected lower leg (tibia and/or fibula) fractures (including the ankle and foot) in a rigid splint. Pad behind the knee for comfort. Immobilize the foot at a 90-degree angle to the leg in a position of function. If foot bones are injured, be sure to immobilize the foot within the splint. Keep the toes accessible for checking distal CMS.

Open Fractures

When there is an associated wound with a suspected fracture, caring for the wound is an essential part of your overall fracture care. If there is an open wound, control any bleeding, clean the wound, and cover it with a dressing before applying a splint.

If bone ends stick out of the wound, how to manage them depends on how long it will take to get the injured person professional medical care. Generally, if it will be less than four to six hours, splint the limb in place, preventing the bone ends from slipping back into the wound. This will help prevent infection from occurring.

If it takes a long time to get the person to help, your care will be significantly different:

- Clean the wound and bone ends without touching them, using irrigation.
- Apply gentle in-line traction to the injured limb and pull the bone ends back under the skin.
- Dress the wound.
- Splint the limb.

Infection is likely, but survival of bone tissue will improve if pulled back inside the body.

Angulated Fractures

Angulated fractures in long bones of the arm or leg are best straightened prior to splinting, especially when distal CMS signs indicate an associated problem with circulation and/or feeling. To straighten an angulated fracture, use gentle traction on end of the injured limb, pulling in the direction of the line in which the limb would normally lie, as though to lengthen the limb. Traction stretches the muscles and reduces the pressure on broken bone ends. This lessens pain and allows you to move the broken bone slowly and gently back into normal alignment.

Straighten an angulated limb as soon as you are able. To prevent additional damage or pain, maintain the traction until the limb is securely strapped within a splint.

Do not use force. If at any time you meet resistance, or a significant increase of pain, stop your attempt to straighten the limb and splint the limb in the position it is in.

Non-Extremity Splinting

Splinting areas of the body that are not extremities requires a different approach.

- Jaw — Immobilize suspected jaw fractures in place with a wide wrap that goes around the head. Be sure the wrap can be removed quickly if the person feels like vomiting.
- Ribs — Immobilize rib fractures by bracing the arm on the injured side against the chest with a sling and swathe. Do not bind the swathe too snugly around the person's chest. Encourage the person regularly to take deep breaths, even if it hurts, to keep the lungs clear. Be sure to watch for increased breathing difficulty.
- Pelvis — Without a litter or rigid immobilization device in place, immobilize a person with a suspected pelvis fracture by placing the person on his or her back, flat on the ground. Pad under the small of the back. Bind around the body at the pelvis with a large bandage or strap for circumferential stabilization of the pelvis. Place padding between the legs and bind the legs to each other. Fractures of the pelvis can result in significant internal blood loss as a result of associated injury to large arteries that run through it. Treat and monitor for developing shock. Use of a litter or immobilization device will be required for evacuation.

Injuries to Joints

A joint dislocation occurs when stretching or damage to ligaments causes a bone end to pull out and separate from the joint. Dislocations result in unusable extremities. The misalignment of the bone ends at the joint may be apparent during physical assessment.

Dislocations are painful. The injured person may lose the ability to move the affected limb or have a reduction in the normal range of motion for it.

It may be difficult to distinguish a dislocation from other musculoskeletal injuries. For example, a bone fracture near a joint can appear to be a dislocation. When in doubt, splint a possible dislocation by immobilizing the bones on either side of the injured joint.

With some dislocations a field reduction, or realignment, may be considered. Reducing a dislocation is done by manipulating the area near the dislocation and easing the dislocated bone end back into its normal position in the joint. This can reduce pain and allow for more normal function of the affected joint.

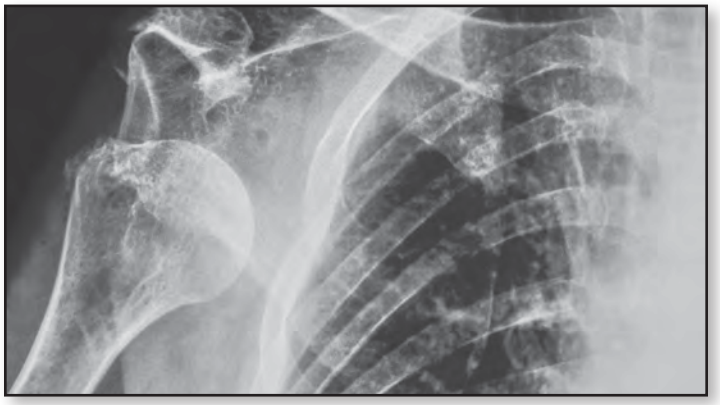
Specific dislocations can be considered for reduction in the field:

- Anterior (forward) shoulder
- Finger
- Kneecap (patella)
- Toe

Typically, the earlier a reduction is attempted, the easier it is for the person. Work quickly but calmly. Encourage the person to relax as much as possible, with special concentration on relaxing the injured joint. Reduction may cause pain, but stop your attempt if pain increases dramatically. Once reduced, the injury should be splinted. Use RICE (rest, immobilization, cold, and elevation) to reduce swelling and pain.

Shoulder

Anterior shoulder dislocations are a very common type of joint dislocation. The Stimson technique for reducing a shoulder dislocation has little chance of causing more harm. It does take time and may not always work.



To use the Stimson technique:

- Position the person prone (face down) across a rock or log with the arm on the injured side dangling down vertically.
- With a soft cloth, tie 5–10 pounds of weight to the dangling wrist.
- Wait. This process may take 20 to 30 minutes to work.

The key is for the person to be relaxed and allow the gentle pull of the weight to slowly tire the chest and back muscles, thus allowing the head of the upper arm bone (humerus) to slip along the chest wall and then snap back up into position in the shoulder joint (glenoid fossa). Too much weight will cause increased spasms and prevent this method from working.

A person who has experienced a shoulder dislocation can possibly reduce it him- or herself if he or she acts fast enough. Standing or sitting, the person pulls the injured arm straight forward away from the body, gripping the wrist of the affected arm with the opposite hand. This needs to be done quickly. A delay of more than a few minutes will cause so much spasm in the chest muscles that this technique will probably not work.

After a shoulder has been reduced, use a sling and swathe to immobilize the joint. If the person needs to use the arm in an emergency, such as during the evacuation, remove the swathe.

Kneecap (patella)

Kneecap dislocations are typically easy to reduce. Apply gentle traction to the affected leg to straighten and lengthen it. If this does not ease the kneecap back into place, massage the thigh and push the kneecap gently back into normal alignment with your hand. After reduction, splint the knee joint without putting pressure on the kneecap.

Finger

Finger dislocations are common. Keep the injured finger partially flexed and pull on the end while pressing the dislocated joint back into place with your other thumb. After the finger is reduced, tape the injured finger to a neighboring one with a small dressing between them. Do not tape directly over the joint itself.

Toe

Toe dislocations are treated similarly to finger dislocations. Keeping the injured toe partially flexed, pull on the end while gently pressing the dislocated joint back into place with your other thumb. Tape the injured toe to a neighboring one with a small dressing between them. Do not tape directly over the joint itself.

Evacuation

With a usable musculoskeletal injury, the person's degree of comfort can help determine the need to evacuate. Go slow on evacuation, using self-evacuation when able, for any unusable musculoskeletal limb injury and with first-time dislocations (except possibly fingers and toes). Go fast on evacuation for any person with angulated fractures; open fractures; fractures of the pelvis, hip, or femur (thigh); and injuries that create a decrease in circulation or sensation beyond the injury.

Prevention

Attention to safety prevents many musculoskeletal injuries. Adequate and properly fitted footwear decreases the chance of injury. Pre-trip physical conditioning prior to wilderness activities may decrease the chance of injury.

Knowledge Check

One of your fellow hikers stepped into a hole on the trail and fell forward, injuring his left leg as it was bent over during the fall. You carefully cut his pant leg open to expose the injury site and find middle of the lower leg is swollen, discolored, and painful to your touch. You suspect he bones of the lower leg are broken. You are about a three-hour hike back to the trailhead. What will be your treatment strategy for the leg due to the time it will take to get professional help?

Supportive Care for Soft-Tissue Joint Injuries (RICE)

Use the mnemonic device RICE (rest, immobilization, cold, elevation) to remember how to provide supportive treatment for soft-tissue joint injuries. RICE is also useful for suspected fractures and dislocations.

Rest

- Avoid using the injured limb.
- Avoid movement that causes pain.

Immobilize

- Encourage the person to keep the injured area still.
- Immobilization can be effectively attained with an elastic wrap.

Cold

- Apply cold using snow, ice, or chemical cold pack.
- Use thin cloth or dressing between cold pack and skin.
- Limit application to 20 minutes.

Elevate

- Raise injured area above the level of the heart.
- Keep limb in a straight line when using elevation.
- After 20 minutes, remove cold treatment and let the joint warm naturally for 10 to 15 minutes before use.

Manual Stabilization of an Injured Extremity

The immediate treatment for a suspected fracture is the restriction of movement. The movement of unstable bones can damage surrounding tissue.

Expose Injury

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

Manage Open Wounds

- Gently control bleeding with direct pressure.

Restrict Movement of Limb

- Initially leave injured limb in position it was found.
- Use your hands to manually stabilize limb.
- Place padding in gaps underneath limb to provide additional stabilization.

Using a Sling and Swathe

A sling and swathe is designed to bind and immobilize an injured arm to the chest. It can be incorporated, if needed with a rigid splint.

Prepare

- Locate and gather all materials needed.
- Ensure manual stabilization of limb until sling and swathe is applied.

Apply Sling

- Holding up one tail of a triangular bandage, slide it underneath the injured arm with the head of the triangle out towards the elbow.
- With the wrist of the injured arm angled upwards, wrap both tails around the back of the neck and tie securely. For comfort, tie slightly to one side or include a small pad.
- If the elbow is included in the sling, tie a knot in the head of the bandage to help keep the arm in place.

Apply Swathe

- Fold a second triangular bandage into a long, wide strap.
- Place center of bandage on outside of upper part of injured arm.
- Wrap bandage firmly around torso, including upper and lower part of injured arm.
- Tie bandage securely on side of torso.

Monitor Limb

- Monitor distal CMS on far side of splint for deficits.

Splinting a Long Bone Using a Malleable Splint

Malleable aluminum splints, such as the SAM® Splint, are compact, flexible splints that can easily be molded into a rigid form for splinting.

Assess Injured Limb

- Expose and inspect injury site for open wounds.
- Ensure manual stabilization of limb until splinted.

Prepare to Splint

- Gather the materials needed. Besides the malleable splint, you need padding and something to bind the splint to the limb.
- Fold and shape splint to make rigid; match size and contours of limb.
- Apply padding to fill gaps around limb.

Apply Splint

- Carefully position splint to immobilize injury site and joints above and below.
- Bind splint firmly to limb, but not over injury site.
- Bind both sides of a joint, and allow hand or foot to assume a natural position.
- If needed, bind splint to another body part.

Monitor Limb

- Monitor distal CMS on far side of splint for deficits.
- If limb past splint is discolored or cool to touch, loosen binding on splint to improve blood flow.

Splinting a Long Bone Using an Improvised Splint

It is possible to improvise a splint from basic medical supplies and commonly found items in a wilderness setting.

Assess Injured Limb

- Expose and inspect injury site for open wounds.
- Ensure manual stabilization of limb until splinted.

Prepare to Splint

- Gather the materials needed. You will need something rigid, padding, and something to bind the splint to the limb.
- Size rigid portion of splint to injured limb.
- Apply padding to fill gaps around limb.

Apply Splint

- Carefully position splint to immobilize injury site and joints above and below.
- Bind splint firmly to limb, but not over injury site.
- Bind both sides of a joint, and allow hand or foot to assume a natural position.
- If needed, bind splint to another body part.

Monitor Limb

- Monitor distal CMS on far side of splint for deficits.
- If limb past splint is discolored or cool to touch, loosen binding on splint to improve blood flow.

Splinting Extremities

Due to the structure of the body, there is not a single splint that fits all situations. Various body areas have unique splinting needs.

Collarbones

- Apply sling and swathe to immobilize.
- Support elbow with sling.

Upper Arm

- Immobilize with sling and swathe.
- Leave elbow free in sling to ease pain.
- Include rigid splint if arm is unstable.

Lower Arm

- Immobilize with rigid splint.
- Include wrist and hand (in position of function) in splint.
- Hold rigid splint in place with sling and swathe.

Fingers

- Tape injured finger to nearby healthy fingers.
- Use padding between fingers.

Upper Leg

- Immobilize with rigid splint, padding behind knee for comfort.
- Immobilize pelvis joint by having person lay flat on ground with padding under the small of the back.

Lower Leg

- Immobilize with rigid splint, padding behind knee for comfort.
- Include ankle and foot (90 degrees to leg) in splint.

Splinting Complicated Fractures

Fractures are considered more complicated to care for if they are associated with an open wound or if a limb is at an odd angle.

Angulated Fractures

- Apply gentle traction on lower part of injured limb, pulling in direction of line in which limb would normally lie.
- Straighten limb to its natural alignment.
- If resistance is felt, or pain increases, stop any movement and splint limb in place.
- Maintain traction until limb is securely strapped within a splint.

Open Fractures

- Control any bleeding, clean wound, and cover with protective dressing before splinting.
- If time to professional medical help is 4–6 hours or less, prevent bone ends from slipping back into wound.
- If longer than 4–6 hours to professional help, clean bone ends and use traction to pull bone ends back under skin.

Splinting Non-Extremities

Due to the structure of the body, there is not a single splint that fits all situations. Various body areas have unique splinting needs.

Jaw

- Immobilize with a wide wrap that goes around head.
- Allow wrap to be removed quickly if person vomits.

Ribs

- Brace arm on injured side against chest with sling and swathe.
- Monitor for increased difficulty breathing.

Pelvis/Hip

- Place person on back, flat on ground, with padding under the small of the back.
- Bind around the pelvis for circumferential support.
- Place padding between legs and bind them together.

Reducing an Anterior Shoulder Dislocation

Anterior shoulder dislocations, in which the end of the upper arm bone (humerus) dislocates forward, are a very common type. There are a couple of simple, low-risk approaches to reducing this type of dislocation.

CAUTION! **If conducting skill practice, limit the time a weight is applied to the wrist to no longer than a few minutes. Discomfort can develop if left on longer.**

Self-Reduction

- Act fast, within a few minutes.
- Standing or sitting, grasp wrist of affected arm with other hand.
- Pull the injured arm straight forward, away from body.

Stimson Technique

- Position person face down across rock or log with arm on injured side dangling down.
- With soft cloth, tie 5–10 pounds of weight to wrist of affected arm.
- Be patient and wait. It may take 20 to 30 minutes for joint to correct.

Splint Affected Arm

- After reduction, use sling and swathe to immobilize arm.
- If arm needs to be used in an emergency, like during evacuation, remove swathe.

Reducing Dislocations

There are some dislocations that are easy to reduce in a remote setting.

Kneecap (Patella)

- Apply traction to affected leg and straighten it.
- If straightening does not reduce dislocation, push kneecap gently back into normal alignment with hand.
- Splint knee without putting pressure on kneecap.

Finger

- With finger partially flexed, pull on end while pressing dislocated joint back in place with your other thumb.
- Splint finger by taping it to neighboring finger with a small dressing between them. Do not tape directly on injured joint.

Toe

- With toe partially flexed, pull on end while pressing dislocated joint back in place with your other thumb.
- Splint toe by taping it to neighboring toe with a small dressing between them. Do not tape directly on injured joint.

Extended Injury Management

It is likely in a remote setting that you will be responsible for providing not only initial first aid care, but also ongoing care over a period of hours or even days in the case of an extended evacuation. Being prepared to manage progressive problems related to injuries is an important part of your role as a wilderness first aid provider.

Ongoing Assessment

After performing an initial and focused assessment, and initially treating any problems found, ongoing assessment and care are essential. Until an injured person is turned over to professional care providers, continuously monitor your treatments for effectiveness and the person for any developing problems.

Wound Infection

Infection related to injury is primarily caused by the introduction of bacteria that are not normally present into the body. These bacteria can multiply, and the body's immune system responds to fight against it.

Normally, skin and internal body organs provide a protective barrier for underlying body tissue to prevent infection. Injury, whether external or internal, creates pathways for infection to occur.

Infectious material can be introduced from or by the mechanism of injury. Dirty objects can pierce the skin and underlying tissue. Hollow body organs inside the body can become damaged and spill infectious contents into body cavities.

Infection can also be the direct result of the care you provide. Using dirty hands or unclean material when treating someone can cause infection to develop.

Prevention

The best method to reduce the chance of a wound-related infection is prevention. Use appropriate infection prevention measures when providing care:

- Use clean or sterile materials when treating open wounds.
- Use disposable gloves.
- Sterilize metal treatment tools with boiling water or clean with disinfectant.
- When possible, clean open wounds thoroughly.
- Cover or dress open wounds after treatment.
- Change dressings when appropriate.
- Protect open wounds from debris in the environment.

Recognition

In situations where access to medical help is delayed, or when you decide to continue with a trip despite a wound, keep in mind the potential for infection.

As part of your ongoing assessment process, monitor all injuries regularly for signs of developing infection. Early signs of infection include pain, redness, swelling, and small amounts of light-colored pus, a thick fluid produced by infected tissue.

As the infection progresses and the immune system response intensifies, other more serious signs can emerge:

- Increasing pain, redness, and swelling at the wound site
- Increasing heat at the wound site
- Pus increasing in volume and growing darker in color
- Red streaks just under the skin near the wound
- Rise of overall body temperature

Treatment

It is best to react to a developing infection as early as possible. Because antibiotic medication may be essential medical treatment, plan to go fast on evacuation, especially if the person can still self-evacuate. Remove used dressings on wounds, apply warm compresses to encourage drainage, clean the wounds well, and apply new dressings.

If serious signs of infection have developed, allow the wound to reopen and let it drain. You may need to encourage the process with soaks in water as hot as the person can tolerate. Pack the wound with a clean or sterile dressing soaked in drinking water or normal saline, and cover it with dry dressing. This wet-to-dry layering encourages additional draining. Repeat the process of cleaning and packing the wound twice a day during an extended evacuation.

Go fast on evacuation for any serious infection. Professional medical intervention is required.

MRSA

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a specific infectious bacterium that results in staphylococcus, or staph, infections. MRSA infections are more difficult treat than other types because the bacterium is resistant to some commonly used antibiotics.

Staph bacteria, including MRSA, are very common. Many people already carry it without being infected by it. It is one of the most common causes of skin infections in the United States. It can be a bigger problem if it manages to get into the body, such as from the skin of a first aid provider treating an injured person.

Effective treatment for staph infections is provided by antibiotics; however some strains, like MRSA, are more difficult to treat.

Hygiene

When traveling in remote settings it is beneficial and advisable for every person to maintain a high level of hygiene, both personally and as part of a group. A lack of adequate hygiene can increase the risk of general illness and can create conditions in which minor and moderate medical problems become much more serious.

Use soap and water to wash hands frequently, especially after bowel movements or urinating, before meal preparation, and before and after providing first aid care. When washing hands with running water is difficult, use a liquid hand sanitizer.

Disinfect all drinking water, especially that used for first aid care, via boiling (bring it to a rolling boil), chemical disinfectants such as chlorine dioxide, filtration (or a combination of filtering and iodine or chlorine), or an ultraviolet light device.

Knowledge Check

On an extended hike into a remote area, one of your fellow adventurers sustained a large abrasion on her leg when she slid down a graveled portion of the trail. You have cleaned and dressed the injury and have determined to continue hiking, but will monitor the wound for signs of developing infection. What will you be looking for?

Altered Mental Status

Altered mental status is a significant or unusual change in a person's personality, behavior, or consciousness, and is typically a warning sign of a serious underlying problem. It can be caused by a number of serious medical conditions as well as the use of alcohol, medications, or drugs.

Regardless of the cause, an altered mental status is considered a medical emergency.

Fainting

Fainting is a momentary loss of consciousness caused by an unexpected drop in blood pressure and blood flow to the brain. Most often, this is a result of the nervous system reacting to and trying to compensate for some type of sudden stress on the body.

There are many causes of feeling faint or fainting, including:

- Anxiety or fear
- Pain
- Stress
- Standing in place too long
- Rapid changes in position, such as standing up quickly from a seated or lying position
- Medication or an underlying medical condition

In most cases, the fainting reaction is self-correcting, generally within a few minutes. The condition should quickly pass and allow the person to get back to normal activities. The recommended treatment is to support the body's attempt to restore normal body function.

If someone complains of suddenly feeling warm, lightheaded, or that his or her vision is narrowing, follow these guidelines:

- Quickly lay the person flat on his or her back on the ground.
- Elevate the feet about 6 to 12 inches, which allows some blood from the legs to move back into the body.
- Do not elevate the feet if it causes pain or you suspect the person may be injured.

If a person faints, or becomes unresponsive, follow these guidelines:

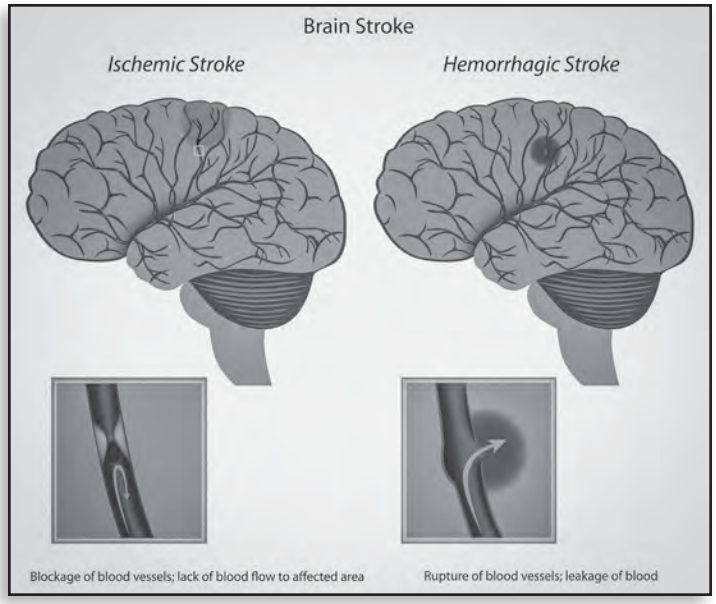
- If possible, try to prevent the person from collapsing or falling in a manner that may cause injury. Protect the head and neck as a priority.
- Perform a full initial and focused assessment to rule out any serious issues and identify any injury that might have resulted from the fall.
- Position the person flat on his or her back on the ground, preferably with an insulated pad beneath.
- Elevate the feet about 6 to 12 inches. Do not elevate the feet if it causes pain or you suspect the person may be injured.
- If there are no complicating problems, allow the person to resume activities when he or she feels ready.

If you suspect an underlying medical condition, continue with the appropriate treatment and ongoing assessment.

It is unlikely that someone who has felt faint or fainted requires evacuation unless you suspect the reaction is the result of a more serious medical condition.

Stroke

A stroke, or brain attack, occurs when the blood supply to a portion of the brain is suddenly interrupted. Most strokes are caused by a blood clot that blocks a blood vessel in the brain. A stroke can also occur when a weak spot in the wall of a blood vessel, known as an aneurysm, bursts open and bleeds into the surrounding brain tissue. In both cases, brain cells die and the person is suddenly affected.



The signs and symptoms of stroke include the following:

- A severe, sudden headache
- Numbness or weakness of the face, arm, or leg, especially on one side of the body
- Confusion
- A change in the ability to speak or be understood
- Changes in sight and balance

Medications are available at hospitals that can limit the severity of a stroke. The earlier they can be given the better. Early recognition, along with rapid evacuation to a hospital, is critical for limiting damage and for survival.

A simple stroke assessment, such as following the FAST mnemonic, helps decrease the time it takes to suspect a stroke:

- **F**ace — Ask the person to smile. Is one side of the face drooping?
- **A**rms — Ask the person to raise both arms with the eyes closed. Does one arm appear weak or drift downward?
- **S**peech — Ask the person to repeat a simple phrase. Is the person unable to speak or is speech slurred or strange?
- **T**ime to a Hospital — If you observe any of these signs in a delayed-help situation, go fast on evacuation. Note the time when symptoms first appeared, as this may impact treatment options once definitive care is reached.

Go fast on evacuation. Treatment and medication at a professional medical care facility are the only means to limit the potential damage to the brain. Generally, you have no more than 3 hours to get to a hospital before some treatment options are no longer practical.

Immediate first aid treatment is limited, and mostly supportive, in a remote environment.

A person experiencing a stroke can become frustrated at being unable to move or communicate clearly. The person may appear confused but still be aware of what is happening.

Calm, comfort, and reassure the person.

Do not give anything to eat or drink. If a person's level of responsiveness becomes diminished, be prepared to protect and maintain his or her airway. If uninjured, place the person in a recovery position to protect the airway.

Be prepared for possible sudden cardiac arrest, the need for CPR, and the use of an AED, if one is available.

Stroke can happen to anyone at any time. To help prevent stroke from occurring, maintain a healthy diet and weight, control blood pressure and cholesterol levels, moderate alcohol consumption, avoid tobacco and illicit drugs, and exercise regularly.

Diabetes Mellitus

Diabetes mellitus is a disease in which the body cannot effectively use sugar for energy. Glucose, or blood sugar that is derived from food, is unable to transfer easily from the bloodstream into body cells where it is stored and turned into energy. Insulin is a hormone secreted by the pancreas that is the facilitating agent needed to get glucose into body cells. In normal metabolism, the body manages an effective working balance between glucose and insulin.

Diabetes limits the body's ability to produce an adequate amount of insulin. Treatment for diabetes focuses on helping the body become more efficient at insulin production, or giving insulin as a medication to ensure adequate levels for managing glucose. Diabetic emergencies are directly related to an imbalance between glucose and insulin.

Hypoglycemia (Low Blood Sugar)

The most serious diabetic emergency is hypoglycemia, or low blood sugar, a condition that can rapidly develop and become life threatening. Hypoglycemia results when a person has a higher level of insulin than needed for the amount of glucose in the blood. Available glucose is swept into body cells, leaving little or no sugar in the bloodstream.

The most serious earliest effects of hypoglycemia are in the cells of the brain. Similar to the need for oxygen, brain cell damage can occur very quickly from the lack of glucose for energy production.

Common causes of hypoglycemia include taking too much insulin, failing to eat properly, and overexertion.

Early recognition and treatment can prevent the condition from worsening. The most common indication of hypoglycemia is an altered mental status in which the person may act odd and/or confused. Additional signs of hypoglycemia include the following:

- Slurred speech, inability to communicate
- Trembling, shaking, or loss of coordination
- Weakness, fainting
- Pale, cool, sweaty skin

It is likely that someone who is experiencing hypoglycemia has already been diagnosed with diabetes and is taking treatment for it. Often, it is the improper application of the treatment that results in the excessive amount of available insulin. Another common description of hypoglycemia is insulin shock.

If the person is unable to communicate clearly, look for a medical alert bracelet or necklace that may help identify the underlying condition. You can also check with others who may be familiar with the person's medical history or medications he or she may be taking.

The simple and direct treatment for hypoglycemia is to give oral sugar in order to help restore the balance between blood sugar and insulin. However, the ability to swallow effectively and safely becomes limited as a person's level of responsiveness diminishes. These factors will influence your treatment decisions.

If you suspect hypoglycemia, and the person can swallow without difficulty, follow these guidelines:

- Diabetics often carry oral glucose specifically for the treatment of low blood sugar. Provide 15 to 20 grams of oral glucose tablets to chew, if available.
- If glucose tablets are not available, provide something with dietary sugar instead, such as orange juice, candy, fruit leather, or whole milk. Sugary foods are converted into glucose much more rapidly than other types of food. Food or drink with artificial sweeteners will not help.

As the person responds to the sugar, his or her mental status will gradually improve. Calm, comfort, and reassure the person during this time. When the person is able to understand, inform him or her about what happened and the care you provided. If the person has diabetes, this is likely something he or she has experienced before.

Once a normal mental status has returned, a diabetic person should check his or her blood glucose level to ensure it has returned to a normal level. The person may follow up with a meal designed to prevent reoccurrence of the hypoglycemia. Generally, no further treatment is required.

If there is no response to sugar within 10 to 15 minutes or the condition worsens, provide additional glucose or sugar.

- If you suspect someone is having a diabetic emergency, and at any point he or she becomes unresponsive, unable to follow simple commands, or has difficulty swallowing, change your approach. Put the person in a recovery position to protect and maintain the airway.
- Repeatedly place small amounts of oral glucose or dietary sugar under the person's tongue, or between the gums and teeth. Be very careful to prevent aspiration of the sugar into the airway.
- Provide any required supportive care.
- Initiate a go fast evacuation.

Glucagon Emergency Kit

A diabetic person may carry an emergency kit containing glucagon, an injectable medication used to treat low blood sugar. Friends or family members of the diabetic person may be trained in how to use the kit to administer glucagon in an emergency. You can provide assistance if a trained person is administering glucagon. Prescribed medications should only be used on the person they are prescribed for.

Hyperglycemia (High Blood Sugar)

Hyperglycemia results when a person continues to create blood sugar from food, but has little or no insulin to get the glucose into the body cells. Sugar accumulates in the bloodstream with very little of it getting into body cells.

Hyperglycemia is less common than hypoglycemia, and is more likely for a person who has developed diabetes but is not diagnosed as such. Similar to having too little sugar in the bloodstream, a change in mental status is the most noticeable effect of having too much sugar in the bloodstream and not enough getting into body cells. In contrast to low blood sugar, someone with high blood sugar may have skin that appears flushed and dry, and his or her breath may have a fruity odor.

Because of the similarity between high and low blood sugar conditions, and the difficulty of a first aid provider being able to determine the difference, giving oral glucose or dietary sugar is the recommended treatment for any suspected diabetic emergency. However, this treatment will have no appreciable effect on improving mental status when high blood sugar is the underlying condition.

There are no specific first aid treatments for hyperglycemia. Professional medical care is required. Fortunately, the development of serious symptoms from hyperglycemia does not occur rapidly. It is likely that early signs of a developing change in mental status will result in a decision to address the problem before serious signs emerge.

Frequent urination can occur as a person's body tries to get rid of excess sugar. Dehydration can result if fluids are not replenished. Treatment for someone who is ill should include regular fluid intake. If the person is able to swallow without difficulty, assist him or her in drinking water, preferably with electrolytes. Keeping an ill person hydrated is an important treatment consideration.

It is imperative for you to understand that insulin is not an emergency medication. It is never appropriate to administer insulin to a diabetic person in an emergency situation.

Evacuation

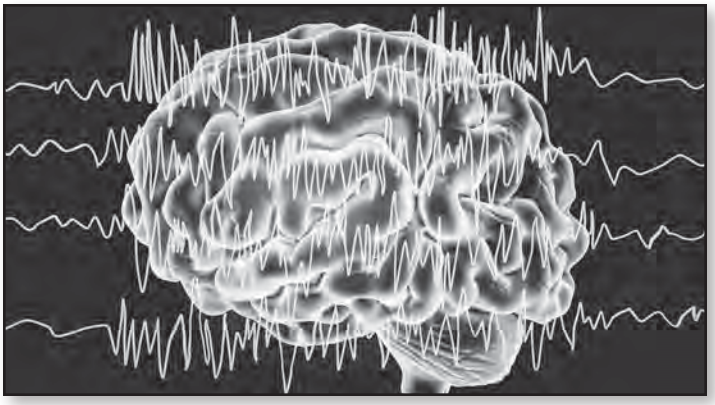
The return of a diagnosed diabetic person to a normal mental status after taking oral sugar generally does not require evacuation. Encourage the person eat something with complex carbohydrates, such as a sandwich, to better balance with the insulin in the bloodstream. Advise the person to pay more attention to medication and food intake. Monitor the person for reoccurrence.

Go slow on evacuation if there are coexisting issues such as another illness, lack of appetite, suspicion of dehydration, or when you are in doubt about the person's condition. Go fast on evacuation for anyone who becomes unresponsive, or has an altered mental status not relieved by oral sugar.

Prevention

Advanced preparation can help reduce the risk of hypoglycemia. A diabetic should be able to reasonably predict the amount of food and insulin that will be required during a wilderness trip. A diabetic should alert the group to his or her condition at the outset. In preparation for the trip, a diabetic should consume similar food and exercise at a similar level as what is expected on the trip. This will help him or her better manage insulin dosage and food intake to reduce the likelihood of hypoglycemia.

Seizure



A seizure is a sudden and uncontrolled change in physical activity or behavior triggered by excessive electrical activity within the brain. Seizures are the result of an underlying problem in the brain such as an infection, high fever, brain injury, drug use, cancer, or a disease such as epilepsy, a brain disorder recognized for causing recurrent seizures. Regardless of cause, the recognition and treatment for a seizure is always the same.

There are varying types and degrees of seizures that can occur. Some result in brief periods of inattention. Others can result in uncontrolled twitching movement of a specific body part. The type of seizure associated with an emergency situation is a generalized full body seizure, often described as a grand mal seizure that results in uncontrolled muscle convulsions throughout the body.

Signs of seizure include the following:

- A sudden loss of responsiveness and collapse
- Body rigidity or arching back
- Jerking movements of the body
- Absent breathing
- Loss of bladder and/or bowel control
- Tongue biting
- Vomiting

When someone is actively seizing:

- Protect the person from injury due to the seizure, protecting the head as a priority. Clear the area of objects that he or she may bump into.
- Support the person with your hands, but do not restrain him or her. Allow the seizure to take its course.
- If possible, roll the person onto one side during the seizure to allow saliva to drain from his or her mouth. This can reduce the risk for aspiration should vomiting occur.
- Do not attempt to put anything in the mouth, including your finger. There is no danger of the tongue being swallowed.

Maintain your protection for as long as the seizure continues. Most seizures last only a short time and stop without any special treatment. Immediately perform an initial assessment. If responsiveness and breathing are absent after a seizure stops, begin CPR and use an AED if one is available. If breathing is adequate, place the person in the recovery position to protect the airway.

Normally, once a seizure stops, responsiveness slowly improves. Provide continual reassurance as the person improves. Provide privacy and offer assistance with incontinence to minimize embarrassment. It is best not to allow the person to perform actions that could pose a risk for additional injury. Do not give the person anything by mouth until the person's mental status returns to normal and he or she can drink or eat without assistance.

If the person has a history of seizures, assist him or her to make sure he or she is following appropriate medical directions in regard to any prescribed seizure medication.

It is best to evacuate anyone who has experienced a seizure, especially when the underlying cause is unknown. Go slow on evacuation, using self-evacuation when possible, for someone who has had a seizure and has returned to a normal mental status.

Go fast on evacuation if the person is injured or vomits during the seizure, has no history of seizure, has multiple seizures, or continues to seize for more than 5 minutes.

Knowledge Check

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

Breathing Difficulty, Shortness of Breath

Breathing difficulty or shortness of breath is a medical emergency. It is generally caused by an underlying medical illness such as asthma, allergic reaction, heart failure, or lung disease.

At rest, normal breathing is regular and effortless. Signs of breathing difficulties include the following:

- Increase in the effort to breathe and the rate at which breaths are occurring
- Decrease in the strength of breaths
- Coughing, wheezing, or other unusual breathing sounds
- Bluish purple tissue color, especially in the lips or fingers, indicating a developing lack of oxygen
- Altered mental status, and decreasing level of responsiveness

If a person is having difficulty breathing, do not wait to see if the condition will improve. Have the person stop all activity. Allow the person to find the most comfortable position in which to breathe. Loosen any tight clothing.

Ask about and assist in giving any medication, such as an asthma inhaler or epinephrine auto-injector prescribed for the person.

Breathing difficulty can quickly become life threatening. Be prepared to provide supplemental rescue breaths or CPR if breathing stops. If an AED is available, have someone get it.

Go fast on evacuation for any person experiencing difficulty breathing or shortness of breath who does not respond effectively to treatment.

To prevent breathing difficulties and shortness of breath, avoid triggers known to cause difficulties. Maintaining a healthy lifestyle and staying fit can also prevent breathing difficulties.

Asthma and Inhalers

Asthma is a medical condition in which certain substances, exertion, or environmental conditions trigger an inflammation of the airways and make it difficult for a person to breathe.

Signs of asthma include the following:

- Wheezing and coughing
- A feeling of tightness or squeezing of the chest
- Shortness of breath

It is likely that a person with a history of asthma carries a prescribed quick-relief medication, delivered by an inhaler device, that works fast to help control asthma symptoms. If a person having breathing difficulty has an inhaler, assist him or her in using it.

A metered-dose inhaler is a portable device used to deliver a measured amount of inhaled medicine from a pressurized canister. To use one:

- First make sure the medication is prescribed for the person it will be used for.
- If so, have the person remove the cap on the mouth port and shake the inhaler three or four times.
- Have the person tilt his or her head back slightly and breathe out, away from the inhaler.
- Holding the inhaler upright, have the person place the inhaler port into his or her mouth, between the teeth, and wrap his or her lips around it.
- Have the person press down on the inhaler canister to release the medicine. Tell him or her to breathe in slowly for three to five seconds, and then let go of the pressure on the canister.
- Instruct the person to hold his or her breath for ten seconds, if possible, to help the medicine get deep into the lungs.
- Repeat as directed by the dosage instructions on the medicine canister.
- Observe the person for 20 minutes for reoccurrence.

A spacer device may be available for use with a metered-dose inhaler to improve the delivery of medication into the lungs.

Evacuation is generally not needed if normal breathing returns in response to the medication. Normal activity can resume when the person feels ready. Go fast on evacuation if the symptoms seem serious, get worse, or if there is no response to the medication within 5 minutes.

To prevent symptoms of asthma from occurring, a person with asthma should avoid known triggers and begin treatment at the first signs of asthma. A person with asthma should carry a metered-dose inhaler at all times if one is prescribed.

Allergic Reaction and Anaphylaxis

An allergic reaction is a response of the body's immune system to an allergen, a foreign substance the body is sensitive to. The body releases histamines and other substances to confront and remove allergens. A person with an allergy can be very sensitive to an allergen that is harmless to others.

Allergens can be ingested, inhaled, injected, or absorbed through the skin. Common allergens include foods, medications, insect venom, latex, pollen, animal dander, and plant oils.

The immune response can vary. It could be limited to a local reaction, such as swelling and tenderness at the site of the exposure, which can easily be treated with local cooling and over-the-counter anti-itch ointment. It can also result in a full-body, systemic reaction which can vary in severity. Minor and moderate reactions can result in a stuffy nose, flushed and itchy skin, and watery eyes. These reactions can generally be treated effectively in the field with an oral antihistamine.

Some people are severely allergic to certain allergens and can experience a rapidly developing life-threatening reaction called anaphylaxis. Anaphylaxis is the result of an excessive response of the immune system to the allergen. Serious conditions can quickly develop, and can include the following:

- A drop in blood pressure due to the dilation of blood vessels
- Constriction of airways in the lungs
- Significant swelling of the face, eyelids, lips, tongue, and soft tissue of the throat
- Itchy raised lumps on the skin called hives, particularly on the face and chest
- Nausea and abdominal cramping

The most obvious sign is the rapid development of extreme difficulty in breathing. Breathing will become faster and shallower, wheezing may be heard, and the person may only be able to speak a few words at a time, or none at all.

A severe allergic reaction can develop rapidly. In general, the faster the reaction occurs, the more severe it is. Without treatment, death can occur within a few minutes.

The body will naturally take steps to control an allergic reaction. Unfortunately, with anaphylaxis, a person will die of as a result of the severe symptoms before the reaction can be controlled. The only treatment for anaphylaxis is an immediate injection of epinephrine, a medicinal form of adrenaline. Epinephrine can temporarily reverse the life-threatening effects of anaphylaxis and give the body time to correct the underlying reaction.

A person with a history of allergic reactions may have a prescribed epinephrine auto-injector. 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 you suspect an anaphylactic reaction may be occurring, allow the person to find the most comfortable position in which to breathe. If the person has a prescribed epinephrine auto-injector available, assist him or her in quickly using it on him- or herself.

An epinephrine auto-injector may or may not have an exposed needle after using. Carefully place the auto-injector needle-first, back in the case to prevent an accidental needlestick and place it somewhere safe. Give it to responding medical personnel for disposal.

If the person does not respond to an initial dose of epinephrine within a few minutes, a second dose may be given using another auto-injector.

Calm, comfort, and reassure the person. When the person can swallow easily, assist the person in taking an oral antihistamine. Monitor the person closely and keep him or her well hydrated. Continue the use of oral antihistamines until turned over to professional medical care providers.

Epinephrine can only reverse the life-threatening symptoms for a limited time. It is possible for a dose of epinephrine that initially relieved symptoms to wear off and for the symptoms to return. If this occurs, a second dose of epinephrine may be given.

Assisting with Medication

As a general guideline, a prescription medication like an epinephrine auto-injector should only be self-administered by the person it is prescribed to. As a first aid provider, you can assist a person in doing so. However, you may be able to use and administer an epinephrine auto-injector on another person if your state law or regulation allows for it in certain circumstances, such as being in a remote location. Be aware of the regulations in your area. Becoming skilled in using an auto-injector may require additional training.

When epinephrine is not available for anaphylaxis, survival is unlikely. If the person can swallow without trouble, provide oral antihistamines alone. Attempt supplemental rescue breaths if the person becomes too exhausted to breathe on his or her own.

Mild and moderate allergic reactions can be managed in the field and typically do not require evacuation. Go fast on evacuation for anyone suspected of having an anaphylactic reaction, even if given epinephrine. The underlying reaction may return after using all of your available epinephrine.

Every precaution should be taken to avoid contact with known allergens. Trip leaders who know of anyone in their party susceptible to severe reactions should avoid taking known allergens on the trip. Individuals on trips who are susceptible to anaphylaxis should carry at least three epinephrine auto-injectors and oral antihistamines. Epinephrine can be ruined by extremes of cold and heat. Store in manner to provide protection from temperature extremes.

Oral Antihistamine and Anaphylaxis

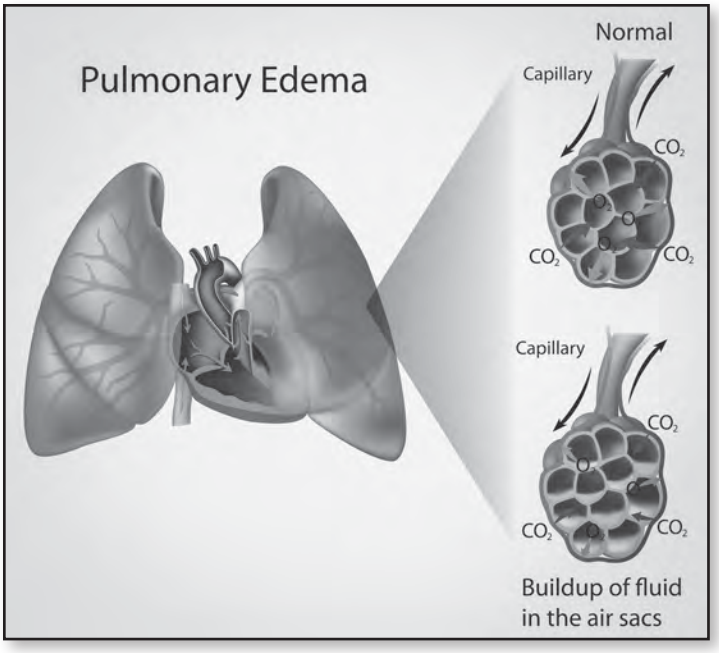
In the remote setting treatment of anaphylaxis, the use of an oral antihistamine, or diphenhydramine, in combination with an epinephrine auto-injector is recommended. Epinephrine can control the immediate life-threatening symptoms, but does not address the underlying cause. Oral antihistamines directly address the underlying cause, but require epinephrine to give them time to work effectively. Use normal dosing recommendations when administering diphenhydramine.

Pulmonary Edema

Pulmonary edema, or fluid in the lungs, can occur from an existing medical condition, such as heart failure, or from an illness caused by environmental conditions like high altitude. Altitude-related illnesses will be covered later in this book.

Heart failure describes the failure of the heart to mechanically provide an adequate output of blood volume. Blood returning to the heart backs up into the body, most notably into the lungs. Common medical causes of heart failure include coronary artery disease (a hardening or narrowing of the blood vessels that supply blood to the heart), high blood pressure, and diabetes.

Pulmonary edema is most commonly noticed as difficulty in breathing. This is due to blood fluid filling up the normally empty air sacs in the lungs where oxygen is absorbed into the body. The person may cough up a frothy pink or red-streaked fluid.



Pulmonary edema is a serious medical emergency that requires professional medical care.

To treat someone with suspected pulmonary edema, have the person stop all activity. Allow the person to find a position of comfort that facilitates breathing. This is typically a sitting position where the person is leaning back. This position allows gravity to move excessive fluid to the lower portions of the lung. This will clear the higher portions of the lung for normal oxygen transfer.

If the person has any prescribed medication, such as diuretics (also called "water pills") or nitroglycerin for known heart issues, assist him or her in self-administering it.

Go fast on evacuation for a person with difficulty breathing that you suspect is a symptom of pulmonary edema. If the person affected is at an altitude above 8000 feet, help him or her to descend immediately.

Knowledge Check

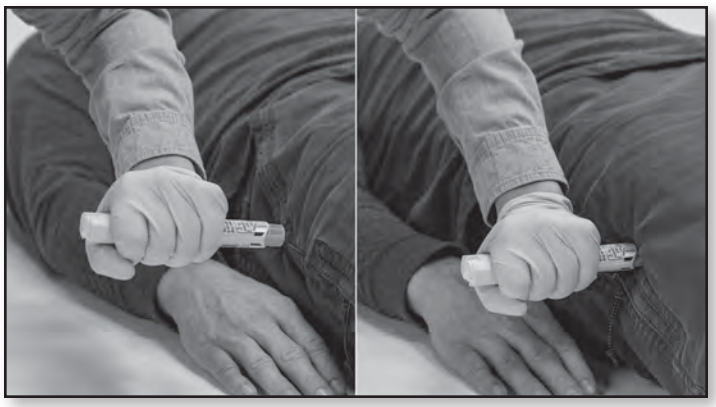
You are using an epinephrine auto-injector on someone who is having a severe allergic reaction. After removing the device from its storage container, you do not place your thumb, fingers, or hands over the red or orange tip. Why?

Using an EpiPen® Auto-Injector

The EpiPen auto-injector is a commonly used epinephrine delivery device. Available in both adult and child dosages, the EpiPen is designed to work through clothing.

Prepare EpiPen

- Remove EpiPen from its storage container.
- Never put thumb, fingers, or hand over orange tip.
- Form a fist around auto-injector with orange tip pointing downward and pull off blue safety release cap.

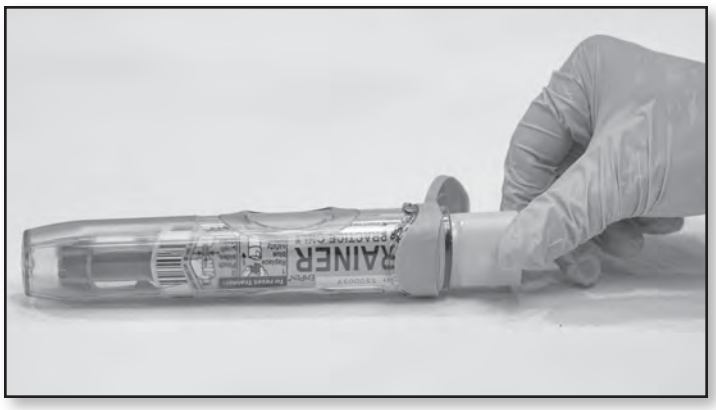


Administer Epinephrine

- Position EpiPen near middle of person's outer thigh.
- Swing and firmly push orange tip at a 90-degree angle against thigh so it clicks.
- For a child, hold leg to prevent movement prior to and during injection.
- Hold device firmly on thigh for approximately 3 seconds to deliver epinephrine.

Remove EpiPen

- Pull device straight out.
- The needle will retract underneath safety cap.
- Firmly massage injection area for about 10 seconds.



Following Administration

- Carefully place used EpiPen somewhere safe.
- Give a second dose with a new EpiPen if symptoms persist after a few minutes.
- Give a second dose if symptoms return after being relieved by first dose.

Using an Epinephrine Injection, USP Auto-Injector

The Epinephrine Injection, USP auto-injector is a commonly used epinephrine delivery device. Available in both adult and child dosages, it is designed to work through clothing.

Prepare Auto-Injector

- Remove auto-injector from its storage container.
- Pull off both end caps to reveal a red tip at one end. Never put thumb, fingers, or hand over red tip.
- Form a fist around auto-injector with red tip pointing downward.

Administer Epinephrine

- Place red tip of auto-injector against middle of person's outer thigh.
- Firmly push tip in at a 90-degree angle against thigh until it clicks.
- For a child, hold leg to prevent movement prior to and during injection.
- Hold device firmly on thigh for approximately 10 seconds to deliver epinephrine.

Remove Auto-Injector

- Pull device straight out.
- Look at the red tip. If needle is exposed, epinephrine was delivered. If needle is not visible, attempt to administer again.
- Firmly massage injection area for about 10 seconds.

Following Administration

- Using one hand, carefully slide used device needle-first into storage container. Place somewhere safe.
- Give a second dose with a new auto-injector if symptoms persist after a few minutes.
- Give a second dose if symptoms return after being relieved by first dose.

Abdominal Problems

The abdomen of the human body contains a variety of body organs related to processing food and drink, regulating body functions, reproduction, and the elimination of waste. Medical problems involving the abdomen are wide ranging in presentation and severity.

Abdominal pain and discomfort is a common complaint in a remote setting. It is important to be able to manage milder problems and recognize when a more serious problem may be occurring. Because these problems are internal, it can be difficult to determine what the specific issue is.

A person with an abdominal-related illness can exhibit a wide variety of generalized signs:

- Abdominal pain or tenderness to touch
- Nausea, loss of appetite
- Abdominal cramps
- Low-grade fever and malaise
- Vomiting
- Diarrhea

While mild cases of stomachache, or gastroenteritis, and diarrhea will usually resolve on their own within 24 hours, all complaints of abdominal pain should be assessed. When assessing someone complaining of abdominal pain in a remote setting, the goal is to quickly determine whether the issue could be serious and require immediate evacuation, or if the illness is mild and can be treated in the field.

Abdominal Pain

Pain in the abdomen is often the most obvious sign that a problem may exist. Even for minor abdominal complaints, pain is common. You must determine whether a serious underlying medical problem may be present. In general, you can suspect a more serious problem if pain is severe, sudden, or localized.

Higher levels of pain can indicate a more serious problem. Ask the person how he or she rates the pain on a scale of zero to ten, with zero being no pain at all and ten being the worst pain imaginable.

Watch for other signs related to pain that can point to a serious abdominal problem:

- The pain occurs with a sudden onset.
- The pain persists for more than 12 hours, especially if the pain is constant.
- The pain is localized to a specific area or spot.
- The person seems protective of the area (guarding).
- There is increased pain on touch.
- The abdominal wall is rigid and/or distended.
- Pain increases with movement, jarring, or on each foot strike when walking.
- Blood appears in vomit, feces, or urine.
  - In vomit, blood may look like coffee grounds.
  - In stool, blood may appear like black tar.
  - In urine, blood appears as a reddish color.
- Nausea, vomiting, and/or diarrhea persist for longer than 24 hours, especially if the person is unable to stay well hydrated.
- A fever rises above 102°F, which may show as chilling or shivering.
- The pain is possibly associated with pregnancy or there is vaginal bleeding.
- The pain is accompanied by developing signs of shock.

If you suspect a serious abdominal problem exists, allow the person to assume a position that provides the most comfort. Encourage hydration with clear liquids, including sports drinks and oral rehydration solution. Restrict the person from eating solid food.

Go fast on evacuation for an abdominal problem you suspect is serious.

Stomachache (Gastroenteritis)

Gastroenteritis, often called a stomachache, is an inflammation of the gastrointestinal tract. It can be caused by viruses, bacteria, or protozoa in something that was eaten or drunk.

Signs of gastroenteritis include gradually increasing and widespread abdominal discomfort, often worse in the lower abdominal region, and often with abdominal cramping, nausea, and vomiting.

Improperly cooked or stored food is often the culprit in gastroenteritis, typically 8–12 hours after ingestion. Unfiltered water is also a common cause.

To treat someone with gastroenteritis, allow the person to find a position of comfort and to rest as needed. Encourage hydration with water or an electrolyte sports drink. When the person feels ready to eat, a bland diet is recommended.

Most cases of gastroenteritis resolve on their own and do not require evacuation. Go slow on evacuation for a person with persistent gastroenteritis that does not respond to treatment. Monitor the person for the development of more serious abdominal problem.

Diarrhea

Diarrhea is frequent, loose, watery stools, often associated with gastroenteritis. Because of the increased loss of body fluid, dehydration can occur as a result. Along with the loss of body fluid is the loss of electrolytes, mineral elements such as sodium, potassium, and calcium that are essential in maintaining normal body function.

Dehydration occurs when the level of fluid in the body is below what is needed for normal function. The body attempts to manage the imbalance, but without supportive hydration, serious life-threatening problems will develop. Signs of serious dehydration include a fast heart rate, dry mucous membranes, lethargy, dark yellow urine, and decreased urine output. The skin, when gently pinched, will remain in place and not return to its original state.

Abdominal cramping or pain is often associated with diarrhea. The person may have a sudden urgent need to have a bowel movement or may lose bowel control completely.

For mild cases of diarrhea, encourage the person to stay hydrated by drinking water, diluted clear fruit juices, or sports drinks.

Persistent diarrhea requires more treatment focus on the replacement of electrolytes as well as hydration. Oral rehydration solutions are best for treating serious diarrhea. Commercial oral rehydration solutions are available, or you can make an oral rehydration solution by adding 1 teaspoon of salt and 8 teaspoons of sugar to a quart of water. The person should drink about one-fourth of this solution every hour, along with all the water he or she will tolerate. Avoid excessive hydration.

If the person wants to eat, it is recommended to start with rice, grains, bananas, applesauce, dry toast, or potatoes. Avoid fats, dairy products, caffeine, and alcohol.

Consider carrying over-the-counter medications for the prevention of watery diarrhea. Make sure the medications do not contain salicylates (aspirin) if the person is a youth. Do not use these medications if the person has a fever or if there is obvious pus or mucous in the stool.

Go slow on evacuation for a person with persistent diarrhea that does not respond to treatment.

Constipation

Constipation is defined as having fewer than 3 bowel movements a week with stool that is painful or difficult to pass. Symptoms include abdominal pain, bloating pain, and pain and difficulty when having a bowel movement.

Follow these guidelines to treat someone who is constipated:

- Encourage the person to drink more water, and to eat water- and fiber-rich foods such as fruits and vegetables.
- If able, have the person exercise or keep moving.
- Encourage the person to avoid pushing or straining when having a bowel movement.
- Assist the person in taking a gentle over-the-counter laxative if the person desires.

While uncomfortable, constipation is generally treatable and does not require evacuation. Go slow on evacuation if it persists or you suspect it is related to a more serious problem.

Prevention of constipation is similar to its treatment: stay hydrated; eat a healthy, high-fiber diet; exercise regularly; and allow time for and keep a regular schedule for bowel movements.

Hemorrhoids

Hemorrhoids, swollen and inflamed veins of the anus or lower rectum, are very common in both men and women. By age 50, about half of all men and women will have hemorrhoids.[5] The most common symptoms of hemorrhoids include the following:

- Bright red blood on the stool, on toilet paper, or in the toilet
- Anal itching and pain

To treat hemorrhoids, have the person apply a hemorrhoid cream to the affected area to relieve pain and itching.

Hemorrhoids typically do not require evacuation. Go slow on evacuation if a person becomes unable to walk due to hemorrhoids. Anyone with rectal bleeding should see a doctor when possible.

To prevent hemorrhoids, eat high-fiber foods and stay hydrated to make stools softer and easier to pass, and avoid straining during bowel movements.

Bladder Infection

Bladder infections are most often caused by bacteria that has entered the urinary tract and reached the bladder. Signs and symptoms of a bladder infection include the following:

- Strong and sudden urge to urinate
- Pain when urinating
- Difficulty urinating
- Loss of bladder control

Follow these guidelines to treat a bladder infection:

- Provide pain relief if tolerated.
- Encourage the person to drink lots of water to encourage urination and flush the bacteria out of the body.

Bladder infections generally do not require immediate evacuation; however, a bladder infection can progress to the kidneys. Go slow on evacuation, using self-evacuation if possible, if pain spreads and worsens, blood appears in the urine, or a fever develops.

To prevent bladder infections, follow these guidelines:

- Drink plenty of water.
- Urinate often and as soon as the urge is felt.
- After urinating or having a bowel movement, always wipe from front to back to help keep bacteria from entering the urinary tract.
- Wear loose-fitting, cotton clothing and underwear to help keep the area dry.

Kidney Stones

A kidney stone is a solid piece of material that forms in the kidney from a buildup of minerals in urine. In general, it can be as small as a grain of sand or as large as a pearl. Kidney stones usually pass out of the body on their own, but sometimes they get stuck in the urinary tract and can be extremely painful. Signs and symptoms of a kidney stone include the following:

- Blood in urine
- Urine that smells bad or looks cloudy
- A burning feeling when urinating
- Fever and chills
- Vomiting
- Extreme, persistent pain in the back, side, lower belly, or groin

Follow these guidelines to treat someone with a kidney stone:

- Allow the person to find a position of comfort. Provide over-the-counter pain relief medication if tolerated and the person is not allergic to it.
- Encourage the person to drink lots of water in order to promote urination to flush the stone out of the body.

If a person passes a kidney stone, evacuation is not required and normal activity can be resumed as soon as the person feels ready. A kidney stone that does not pass on its own requires rapid medical intervention. Go fast on evacuation if symptoms persist for more than a day, or pain worsens or spreads.

To help prevent kidney stones from forming, stay hydrated. Proper hydration helps prevent the buildup of minerals in urine that form kidney stones.

Personal and Camp Hygiene

Good personal and camp hygiene, along with effective water disinfection, can prevent many abdominal illnesses. Follow these best practices to help prevent abdominal problems:

- Wash hands prior to food preparation.
- Do not share personal items such as spoons, cups, water bottles, and lip balm.
- Do not use a personal spoon to take food from a pot. Do not eat from a communal food bag.
- Avoid raw meat, seafood, and fish as well as unpasteurized cheese and dairy products.
- Thoroughly reheat leftover food.
- Keep kitchen gear clean and well rinsed.
- Use a multi-step filtration/disinfection process to disinfect water from open sources.

Knowledge Check

What are some general indicators of severity when dealing with abdominal pain?

Pain, Severe Pressure, or Discomfort in Chest

Pain, pressure, and/or discomfort in the chest are possible signs of acute coronary syndrome (ACS). ACS is brought on by a sudden, reduced blood flow to heart tissue. Often described as a heart attack, ACS is a serious condition that can result in significant damage to the heart.

Someone with ACS will generally experience pain, pressure, or discomfort in the chest, although women may not experience chest pain and may describe indigestion, weakness, or fatigue instead. Shortness of breath, nausea, and lightheadedness can also occur. The person may experience pain in the arms or between the shoulder blades on the back. The person's skin may become pale, cool, and sweaty.

A person who has had previous heart problems is at risk for reoccurrence. During your assessment, ask the person or any bystanders about prior heart problems, or medications being taken for heart-related issues.

A person who is having a heart attack may deny it. This is a common occurrence. Accept it, but never let this alter your approach to care.

If you suspect ACS, immediately:

- Have the person stop any activity.
- Allow the person to find the most comfortable position in which to breathe and rest.
- Loosen any tight clothing.
- Maintain a normal body temperature.
- Calm, comfort, and reassure the person.

The early administration of aspirin can be life saving for a person having a heart attack. Encourage the person to chew and swallow 1 adult (325 mg) aspirin, or 2 to 4 low-dose (81 mg) "baby" aspirin. If swallowed whole, the aspirin pills will take too long to be absorbed.

Do not encourage aspirin use if the person has an allergy to aspirin, evidence of a stroke, a recent bleeding problem, the pain does not appear to be related to the heart, or if you are uncertain or uncomfortable with giving aspirin.

Someone with a heart condition may carry a prescribed medication known as nitroglycerin. If so, assist the person in the self-administration of it.

Whenever a heart attack is suspected, be prepared for the possibility of sudden cardiac arrest, and the need for CPR and the use of an AED if one is available.

Go fast on evacuation. A person with ACS requires early professional medical care. Do not allow the person to exert him- or herself or even walk short distances. A person with suspected ACS is best carried.

A healthy lifestyle can help lower the risk of heart disease. Eat a healthy diet, maintain a healthy weight, and be physically active. Avoid smoking and other forms of tobacco, limit alcohol use, and manage other medical conditions.

Knowledge Check

True or false? A person who is having a heart attack may deny it.

Poisoning

Any substance that can enter the body and create a harmful reaction in the body can be described as a poison. By far, poisoning most often occurs by ingestion. Children under 6 years account for over half of all poisonings. Most poisoning deaths are accidental, but some deaths are intentional.[6]

Common ingested poisons include the following:

- Prescribed medications
- Personal care products
- Household cleaning products

In a remote setting, you are likely to encounter additional poisoning risks, such as contact with plants that have poisonous oils or plants that are poisonous when ingested.

Poison Oak, Ivy, and Sumac

Poison oak, poison ivy, and poison sumac are plants that grow throughout North America. Contact with poison oak, ivy, or sumac can cause an irritation of the skin. The irritation is caused by the body's reaction to an oil, urushiol, contained in the plants. Urushiol is present in all parts of these plants, not just the leaves. Besides direct contact with a plant, urushiol can also be transferred to the skin indirectly, such as by clothing, a pet that has had contact with a plant, or from one part of the body to another.

Skin irritation from contact with poison oak, ivy, or sumac normally takes a few days to develop. Signs include redness, mild swelling, itching, and a blistery, fluidic rash.

The rash typically goes away on its own within a few weeks. Treatment during this time is aimed at the prevention of scratching at itchy skin, which can limit sleep, further irritate skin, and lead to infection. Follow these guidelines to treat skin irritation caused by contact with urushiol:

- Apply calamine lotion or an over-the-counter corticosteroid to help stop the itching.
- Consider an oral antihistamine, if tolerated.
- Apply cool, wet compresses or soak in a cool bath.

Prevention of exposure to urushiol is the best approach to take overall. Avoid contact, directly or indirectly, with poison oak, ivy, and sumac to prevent the skin irritation associated with these plants.

Learn how to identify poison oak, ivy, and sumac. The adage "leaves of three, let it be" applies, as poison oak and ivy have three leaves, but be aware that the plants can grow as low shrubs or as vines, and all parts of the plants contain urushiol.

Avoid areas where the plants may be growing. Do not set up camp near or in these areas. Remember that oil can be transferred on animal fur, shoes, and clothing. Do not let pets run through these areas.

Do not burn these plants. Urushiol can be carried in the smoke and irritate the lungs and airway.

Even during winter months, snow or ice can make it harder to clearly identify these plants, but even in these conditions, urushiol can be transferred if contact occurs.

If you suspect accidental contact with urushiol, thoroughly wash the affected area with soap and water to remove the urushiol as soon as possible. Consider using a commercial cleaning product designed specifically for this purpose. Wash pets and clothing as soon as contact is suspected to prevent secondary contact.

Washing within 30 minutes of contact can help prevent the rash, and within 1 hour can help reduce its severity. Thoroughly clean all clothing and gear after traveling where these plants are located, as urushiol can continue to cause irritation for years if transfer from the plant source is not removed.

Evacuation is typically not necessary for skin rash associated with urushiol contact. Go slow on evacuation, using self-evacuation if possible, if rash is severe, affects the airway, becomes infected, or if a fever develops.

Wild Parsnip

Wild parsnip, also described as hogweed, is an invasive plant that can be found throughout most of the United States, generally along roadsides, in fields, and along edges of woody areas.

When skin comes in contact with wild parsnip and is exposed to sunlight, skin inflammation occurs. This type of inflammation can range in severity; mild cases may look like a minor sunburn, and more serious cases could have blistering that resembles a scalding burn, with dark discoloration of skin.

Blisters should be left alone if possible. Keep the area clean and use an antibiotic ointment, if there are no allergies, to avoid infection.

Avoid exposure to wild parsnip if possible. Learn to recognize it. If exposed, wash the affected area as soon as possible.

Poisonous Plants and Mushrooms

Foraging for mushrooms and other edible plants in a wilderness setting is not recommended unless you are properly trained. Without training, it is often difficult to differentiate between plants and mushrooms that are edible and those that are poisonous.

Illnesses as a result of ingesting poisonous plants or mushrooms can range from gastrointestinal discomfort to kidney or liver failure. Symptoms can appear immediately after ingestion or may be delayed up to 12 hours. Symptoms of plant or mushroom poisoning include the following:

- Nausea and vomiting
- Diarrhea
- Abdominal pain
- Headache
- Hallucinations

In the United States, it is appropriate to contact a regional poison control center if you suspect poisoning. This can be done directly by calling the national Poison Help line at 1-800-222-1222, or indirectly through an emergency dispatcher. Poison control centers can quickly provide information regarding the immediate treatment for exposure to any substance.

You can help the poison control center by clearly identifying the substance and providing details about the incident. Save any vomit, bottles, or containers for responding medical personnel.

Provide supportive treatment if you suspect poisoning:

- Have the person stop any activity.
- Do not administer anything by mouth for a suspected poison ingestion unless advised to do so by a poison control center or the emergency dispatcher.
- Calm, comfort, and reassure the person.
- Reassess the person regularly.

Go fast on evacuation if you suspect a serious reaction is occurring due to poisoning from an ingested plant or mushroom.

Prevent mushroom and plant poisoning by avoiding mushrooms and plants that you are not certain are edible.

Knowledge Check

Why is it important to quickly and thoroughly clean any skin surfaces that have come into contact with poison oak, ivy, or sumac?

Heat Emergencies

When a person is exposed to warm, humid temperatures, his or her internal body temperature begins to rise. Normally, the body reacts by sweating, which evaporates and pulls heat out and away from the body. Heat-related problems occur when the body's normal temperature-reducing mechanisms get overwhelmed and become inefficient or stop working.

Heat-related illnesses range from heat cramps, which can easily be treated, to heat stroke, a serious medical emergency that can quickly cause permanent damage to the brain.

Heat-related illnesses are associated with high air temperatures, but there are other factors that can increase the risk of heat illnesses:

- High humidity
- Moderate to severe dehydration
- Being overweight
- Being very young or very old
- Not being accustomed or acclimatized to heat
- Having an illness with fever and taking certain drugs, such as antihistamines
- Not removing layers of clothing when overheated or wearing anything that interferes with heat loss (e.g., helmets, clothing with vapor-barrier lining)

Dehydration

Dehydration is often associated with heat emergencies. Sweating not only results in the loss of body fluid, but also in the loss of electrolytes (mineral elements such as sodium, potassium, and calcium). These elements are essential for maintaining normal body function.

Dehydration occurs when the level of fluid in the body is below what is needed for normal function. The body attempts to manage the imbalance, but without supportive hydration, serious life-threatening problems will develop. Signs of serious dehydration include a fast heart rate, dry mucous membranes, lethargy, dark yellow urine, and a decreased urine output.

Simply rehydrating someone suspected of being slightly dehydrated due to physical exertion and sweating could prevent more serious heat-related problems from developing. Drinking a carbohydrate-electrolyte drink, such as a sports drink, works well to do this. Use water if a sports drink is not available. Coconut water and 2% milk have also been shown to promote rehydration after exertion. Avoid excessive hydration.

Prevention

Reduce your risk of dehydration and heat-related illnesses by following these guidelines:

- Stay appropriately hydrated; "drink to thirst" meaning if you are thirsty, drink.
- Drink water and sports drinks. Avoid alcohol and caffeinated drinks.
- Wear a cool commercial or improvised wrap around your neck.
- Wear baggy, loosely woven clothing that allows evaporation of sweat. Keep your head covered and your face shaded.
- Stay fit, and allow time for acclimatization when you are new to a hot environment. Go slow the first few days and avoid exercising during the hottest times of day.
- Beware of drugs that increase your risk of heat-related illness, including alcohol and antihistamines.
- Rest often in the shade.

Heat Cramps

Heat cramps are uncontrollable spasms of a muscle, usually affecting the calves, arms, abdominal muscles, and back, and are caused by the body's deficiency in sodium or other electrolytes. Being unaccustomed to the heat, as well as heavy sweating, can make a person more susceptible to heat cramps. They can occur suddenly, and are more likely to occur during or after physical exertion.

Stop and treat heat cramps as soon as they occur. Have the affected person stop activity and move to a shaded area. Replenish fluids and electrolytes; drink a sports drink, or drink water and have a salty snack. Have the person stretch or apply direct, massaging pressure to the affected muscle. Have the person resume activity when he or she feels ready.

Heat Exhaustion

Heat exhaustion can occur as a result of the body's effort to maintain a normal temperature in a hot environment, especially with exertion. The loss of fluids from sweating, along with inadequate hydration, can result in dehydration and developing shock.

Signs of heat exhaustion include the following:

- Pale and sweaty or flushed skin
- Headache, nausea, vomiting
- Dizziness, weakness
- Thirst
- Decreased urine output, dark yellow urine
- Elevated heart rate and respiratory rate
- Slightly elevated or normal core temperature

Although it may not appear serious, treat heat exhaustion quickly. Without early recognition and treatment, it could progress to heat stroke, a life-threatening condition.

Follow these guidelines to treat heat exhaustion:

- Stop all activity and move to a cooler place.
- Loosen or remove excess clothing.
- Have the person lie flat on the ground. If the person is uninjured, consider raising his or her legs 6 to 12 inches. Do not elevate the legs if it causes pain or the person is injured.
- Spray water on or apply cool, wet cloths to the head and torso. Fan the person to increase the cooling effect.
- If the person is able to follow simple commands and swallow without trouble, encourage the person 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 person is confused or he or she has difficulty swallowing.
- Allow the person to sleep if he or she desires. Resume activity when the person feels ready.

In most cases, the person's condition will gradually get better. Go slow on evacuation if the person does not improve or seems to get worse. Avoid self-evacuation as it may make the condition worse.

Heat Stroke

Heat stroke is a life-threatening condition. Heat stroke is most commonly recognized by a significant rise in body temperature. The body's normal cooling systems are overwhelmed, or have shut down as a result of extended exposure to a warm or hot environment. The person is producing core heat faster than it can be shed.

Heat stroke is a serious medical emergency and can quickly cause permanent damage to the brain. Early recognition and effective cooling of the core body temperature are key to survival for someone with heat stroke.

Signs of heat stroke include the following:

- Skin that is very warm or hot to the touch
- Skin that is red and completely dry (sweating may be present due to recent exertion)
- Confusion, odd behavior, difficulty communicating
- Headache
- Seizure, unconsciousness
- Fast heart rate, fast and shallow breathing

Rapid cooling of the whole body to lower core body temperature is essential for survival. Use these guidelines to treat for heat stroke:

- Remove any heat-retaining clothing.
- Immerse the person up to the chin in cold water.
- If immersion is not possible:
  - Spray or pour cold water on the person, and fan him or her to increase cooling effect.
  - Apply cold packs to the neck, groin, and armpits.
  - Cover the person with a cold, wet sheet, and fan him or her to enhance cooling.
- Monitor the person closely and stop cooling efforts when a normal mental state returns.
- Avoid giving liquids until condition improves. Give the person a cup of cold water when he or she is able to drink it. Do not give the person fever-reducing medications.

Go fast on evacuation when the person is able, even if he or she appears fully recovered. Monitor the person closely, as relapse is not uncommon.

Low Body Sodium Level (Dilutional Hyponatremia)

Dilutional hyponatremia, or salt deficiency, results when the blood sodium level falls too low to maintain normal body function. Distinctly different from dehydration, this can occur when someone drinks too much water and fails to eat, causing blood sodium electrolyte levels to drop. Left untreated, this low sodium level can lead to seizures, coma, and death.

Signs of dilution hyponatremia include the following:

- Headache
- Weakness, fatigue, lightheadedness
- Muscle cramps
- Nausea, vomiting
- Sweaty skin
- Anxiety, irritability
- Altered mental state
- Core body temperature that is typically normal or slightly elevated, along with normal pulse and respirations

Recognizing and managing dilutional hyponatremia is challenging because the signs and symptoms are similar to heat exhaustion, but the treatment is completely different. The key to differentiating heat exhaustion and dilutional hyponatremia is urine output. A person with dilutional hyponatremia will have urinated recently and the urine was likely clear, whereas a person with heat exhaustion would not have urinated for an extended time and would have dark yellow urine.

Follow these recommendations to treat mild to moderate signs of dilutional hyponatremia:

- Move the person to a cooler, shaded area and rest.
- Restrict the person from drinking fluids. Additional ordinary fluids will make the condition worse. Encourage salty snacks, such as trail mix. This will help the body restore a proper blood sodium level. One fluid treatment that is okay is to give the person a 9% salt solution, the equivalent of three or four bouillon cubes in half a cup of water.

Once a patient develops hunger and thirst combined with normal urine volume output, the person can resume normal activity.

If caught early, dilutional hyponatremia can be treated effectively and not require evacuation. However, go fast on evacuation for anyone with an altered mental status.

Knowledge Check

You are hiking through a remote area on a very hot day. In the distance you see another group of hikers trying to help one of the members to walk, when he suddenly falls to his knees. You approach to see if you can help. Your initial assessment shows he is very confused. His skin is sweaty, but surprisingly hot to your touch. What should you do for him?

Cold Emergencies

Normally, the human body constantly generates heat through metabolism, even at rest. Exertion increases heat production. A cold or cool, wet environment can pull this heat away from the body in several different ways:

- Radiation away from the body
- Through exhaled breath
- Conduction through contact with cold material, such as the ground
- Convection by the movement of air across the skin
- Evaporation of moisture from the skin, especially from sweating due to exertion

If the loss of heat through these mechanisms is greater than the body's ability to create heat, the result is a lowering of internal core body temperature.

Hypothermia and frostbite are the most dangerous cold-related conditions.

Hypothermia

Hypothermia occurs when the body's core temperature lowers to a point where normal brain and/or muscle function is impaired. This condition may be mild, moderate, or life threatening. It is best to recognize and treat hypothermia early. The chance for survival decreases as the condition progresses.

The body's temperature regulation system strives to balance heat gain and heat loss to keep the body core temperature around 99.6°F (98.6°F oral temperature).

There are several stages of hypothermia related to a person's core temperature that are significant and may require professional medical care:

- 89.6° to 95°F — Mild hypothermia
- 82.4° to 89.6°F — Moderate hypothermia
- Below 82.4°F — Severe or profound hypothermia

In a wilderness setting, the focus should be on preventing a cold individual who is not hypothermic from becoming so, and assessing for and treating mild, moderate, or severe hypothermia.

Obtaining a core body temperature with a thermometer in the field can be difficult and is not always possible, so the stage of hypothermia is usually determined by the symptoms the person is exhibiting.

Prevention

Preventing a decrease in core temperature is easier than raising core temperature. Always suspect the possibility of a lowering core body temperature when in a significantly cold environment for an extended period. A person with normal mental function who is shivering may not be hypothermic, but may simply be cold. However, shivering is a warning sign of potential hypothermia and should be addressed. Prevention recommendations include the following:

- Wear clothing that retains body heat even when wet. Avoid wearing cotton clothing and underclothing.
- Stay dry by wearing layers of clothing, taking off layers before sweating starts, and adding them back before chilling occurs.
- Wear a base layer of synthetic fabric that allows moisture to wick away from skin.
- Stay well hydrated. Eat regularly, especially carbohydrates.
- Maintain a pace that prevents overexertion. Rest often.
- In a group, watch each other for signs of hypothermia. Treat early, and if one person is treated, treat everyone.

Remember the acronym COLD for proper use of your clothing: Keep it **clean,** avoid **overheating,** wear it **loose** and in layers, and keep it **dry.**

Mild Hypothermia

Mild hypothermia occurs when the body's core temperature drops to between 89.6° and 95°F. It may be difficult to distinguish mild hypothermia from someone who is simply cold. Signs include skin that is pale to the touch, shivering, and the loss of fine coordination of movement. A key distinction of mild hypothermia from more serious hypothermia is that the person will have a normal mental status.

Treatment for mild hypothermia includes the following:

- Remove wet clothes and replace them with something warm and dry. Cover the person's head and neck where significant heat loss can occur.
- Protect the person from the wind and cold, like with waterproof, windproof clothing. If possible, move the person into a shelter. Insulate from the below to protect the person from cold ground.
- Wrap hot water bottles or heat packs in a dry sock or shirt and apply to the upper torso (chest, armpits, and back).
- If the person can swallow without difficulty, give him or her a warm, sweet, non-alcoholic drink. This will add a negligible amount of heat but a lot of simple sugar for energy, plus fluid. Cold fluids are better than no fluids.
- If the person is still capable of exercise, have him or her walk after initial treatment to increase internal heat production.

A person who is cold, or suspected of having mild hypothermia, and recovers to normal function generally does not require evacuation.

Moderate Hypothermia

Moderate hypothermia occurs when the body's core temperature drops to between 82.4° and 89.6°F. It is a much more serious condition than mild hypothermia. Signs of moderate hypothermia include the following:

- Uncontrollable shivering
- Inability to perform complex tasks
- Confusion, apathy, sluggish thinking
- Slurred speech
- Altered gait

These symptoms are sometimes referred to as the "umbles": fumbling, grumbling, mumbling, and stumbling. A person with moderate hypothermia requires immediate attention and care.

Follow these treatment recommendations for moderate hypothermia:

- Move the person to a warmer place. Move the person slowly and without hurried movements. Treat the person gently. The rapid movement of cool blood from the extremities back through the heart may cause a life-threatening heart arrhythmia.
- Remove wet clothes and replace them with something warm and dry. Cover the person's head and neck where significant heat loss can occur.
- Actively rewarm by applying heat to the upper torso (chest, armpits, and back) using heated objects such as water bottles filled with warm water, heated rocks, or commercial heat packs. Place a thin cloth between the heated object and bare skin to prevent any injury to the skin.
- Shivering is the body's method of creating heat. Support shivering with calorie replacement. If the person can swallow without difficulty, give him or her a warm, sweet, non-alcoholic drink. Encourage the person to eat something.
- Supportive measures that allow a person to produce heat internally and then hold that heat close to the body are the best approach to rewarming in a remote location. Encourage inner heat production. Do this by creating a hypothermia wrap. A hypothermia wrap encloses an affected person in a thick layer of insulation with an outer waterproof vapor barrier to trap heat and moisture inside. External heat from hot water bottles or chemical heat packs is added inside the wrap, placed near the neck, armpits, and groin, and the person is provided warm sugar water as fuel for internal heat production.
- Do not allow the person to stand or walk for at least 30 minutes, and only if he or she returns to a normal mental state. The movement of cold blood from the extremities may lower the core body temperature again.

A person with moderate hypothermia who recovers to normal function generally does not require evacuation. Go fast on evacuation for anyone who does not return to a normal mental status. Be extremely gentle with the person.

Severe or Profound Hypothermia

When a person has severe hypothermia, shivering stops. The person may experience muscle rigidity, stupor progressing to coma, and decreasing pulse and respirations.

Severe hypothermia is a life-threatening condition. Do all you can to prevent further heat loss and encourage internal heat production:

- Move the person to a warmer place. Move the person slowly and without hurried movements. Carry the person in profound cases. Treat the person gently. The rapid movement of cool blood from the extremities back through the heart may cause a life-threatening heart arrhythmia.
- Remove wet clothes and replace them with something warm and dry. Cover the person's head and neck where significant heat loss can occur.
- Use a hypothermia wrap to protect the person from cooling any further. Do not give anything to eat.

Pulse and respirations may slow down to a point that they are difficult to detect. If the person is unresponsive and not breathing, or only gasping, begin CPR. Protect the person from the environment as best you can. Continue CPR as long as possible. If cardiac arrest has occurred, the person's colder internal temperature can prolong the time that CPR efforts may be helpful.

Go fast on evacuation for severe hypothermia. Be extremely gentle with the person. Take special care if the person has experienced moderate to severe trauma to the head, chest, or abdomen, as this person is even more vulnerable to cold stress.

Localized Cold Injuries

Localized cold injuries occur when skin and underlying body tissue become very cold or freeze in very cold environments. Body parts that are commonly exposed to extreme cold are the most likely to be affected, such as the fingers, toes, earlobes, cheeks, and nose. The degree of injury is determined by how deeply body tissue is affected.

Non-Freezing Cold Injury

Non-freezing cold injury, also described as frostnip, does not result in actual freezing of skin or body tissue, just a lowering of temperature. It typically does not cause any permanent damage to the skin or underlying tissue.

Signs of non-freezing cold injury include a pins-and-needles sensation, tingling, or throbbing. The skin is cold to the touch and may be pale or very red.

It is important to treat non-freezing cold injury promptly so that it does not progress to frostbite:

- Protect the affected area from further exposure. Get the person to a warmer place. Remove jewelry and wet clothes.
- Use skin-to-skin contact such as holding the affected part in a warm hand or tucking hands into armpits to gently warm the affected areas.
- Avoid direct heat sources as these could cause burns.

A tingling or burning sensation is normal during rewarming. Allow the person to resume activity when the affected area looks and feels normal. Evacuation is generally not necessary for non-freezing cold injury.

Frostbite

Frostbite occurs when there is some level of freezing of skin and underlying body tissue. Once freezing occurs, the condition becomes much more serious and will require professional medical care.

Signs of frostbite include the following:

- Blotchiness; skin turns from red to white or pale
- Firm, hard, pale skin
- Numbness, loss of sensation, pain, or discomfort in the affected area

Follow these recommendations to treat frostbite:

- Protect the affected area from further exposure. Get the person to a warmer place. Remove wet clothes and any jewelry on the affected body part. Do not rub or massage the frostbitten area, as this could damage tissue.
- If you are far from professional medical care, and there is no chance refreezing will occur, rewarm the affected part:
  - Immerse the frostbitten area in warm water for 20 to 30 minutes. The water should be warm, not hot (99–102°F) — just above normal body temperature.
  - Check and maintain the water temperature often.
  - Severe burning pain, swelling, blistering, and color changes may occur.
  - Chemical warmers can reach temperatures that result in burns. They should not be used to rewarm frostbitten tissue. Avoid using radiant heat or massage.
- After rewarming, protect the affected area to prepare for evacuation. Use extreme care when handling affected body parts.
  - Place clean pads between frostbitten fingers and toes.
  - Gently wrap the area in clean towels or blankets.
  - Do not let the person use the affected part after it is thawed. Keep the affected part still and protected during evacuation.
- Calm, comfort, and reassure the person.

If the risk of refreezing during evacuation is high, avoid rewarming. Wrap and insulate the area to prevent accidental thawing and protect the area from further injury. Clearly communicate with responding medical personnel of the treatment you have provided.

Go fast on evacuation for a person with frostbite. Protect the affected area from additional injury.

Prevention

Frostbite can be prevented. Follow these recommendations to help minimize your risk of frostbite:

- Limit your time in cold, wet, or windy weather. Take breaks in shelter whenever possible.
- Dress to protect.
  - Dress in layers for better insulation.
  - Wear windproof and waterproof outerwear and moisture-wicking undergarments.
  - Hats should fully cover ears and provide wind protection.
  - Choose mittens over gloves, and use moisture-wicking glove liners inside either.
  - Wear glove liners at a minimum when performing fine motor tasks.
  - Make sure footwear fits properly. Shoes that are too tight can restrict blood flow to toes, making them more prone to chill.
- Do not touch frozen metal objects with bare hands.
- Be aware of signs of mild frostbite and treat immediately.
- Remember that staying warm is easier, safer, and takes less energy than rewarming.
- Stay well hydrated and eat sufficiently.
- Avoid alcoholic beverages and smoking.

Knowledge Check

Besides temperature, what indications would you find that may lead you to believe a hypothermic person is in severe hypothermia?

Creating a Hypothermia Wrap

A hypothermia wrap is designed for treating serious cases of hypothermia in a remote location using materials commonly carried for back-country trips.

Prepare Wrap

- Lay a foam pad on ground for insulation.
- Lay a waterproof sheet over foam pad for use as a vapor barrier.
- Place a thick layer of blankets, sleeping bags, or clothes on top of vapor barrier for insulation.

Position Affected Person

- Make sure person is dry and wearing a wicking layer of clothing, such as polypropylene.
- Use something absorbent, covered by a plastic garbage bag, as a diaper to prevent urine from soaking insulation.
- Lay person on top of insulation.

Add Heat

- Place hot water bottles, warm rocks, or activated chemical heat packs in areas where large arteries are near the body surface (neck, armpit, groin).
- Insulate skin from heated objects by putting a thin layer of cloth between them.

Wrap Person

- Add another thick layer of insulation on top of person.
- Using vapor barrier, wrap person, heated objects, and insulation in a cocoon-style wrap, leaving only the face exposed.
- Provide warm sugar water as fuel for internal heat production.

Bites and Stings

Stinging Insects

Bees and wasps may sting when agitated or in defense of their nests or territories. While wasps can sting repeatedly, the stinger of a honey bee detaches from its body, remains embedded in the skin, and continues to inject venom.

Signs of a bee or wasp sting include local pain, redness, swelling, and itching at the sting site.

A stinger with an attached venom sack may be visible. If present, remove it as quickly as possible by flicking or brushing it off.

Treatment includes:

- Removing jewelry from the affected area,
- Cleaning the site of the sting with soap and water,
- Covering the area with an adhesive bandage or a pad, and
- Using local cooling to help reduce swelling and pain.

It is possible for a life-threatening allergic reaction, anaphylaxis, to develop. Symptoms of a severe allergic reaction include the following:

- Swelling of the lips, eyelids, face, throat and/or tongue
- Itchy raised lumps, or hives, on the face and chest
- Difficulty breathing
- Nausea and abdominal cramping

If the person affected has a known allergy to bee or wasp stings, he or she may carry an epinephrine auto-injector. Assist the person in self-administration of epinephrine using the auto-injector and the administration of an oral antihistamine.

Evacuation is generally not required for a mild and localized reaction to an insect sting. Go fast on evacuation for anyone suspected of having an anaphylactic reaction.

Mosquito Bites

Reaction to mosquito bites varies from mild discomfort to swelling and severe itching.

To treat a local reaction from a mosquito bite, clean the bite thoroughly and apply an over-the-counter topical anti-itch agent. Avoid scratching to prevent an open wound that could become infected. If needed, use local cooling to help reduce any swelling.

The biggest concern from a mosquito bite is the risk of infectious disease. Some mosquito bites carry the risk of West Nile virus, which results in a flu-like illness that develops within two weeks of receiving the bite. Mosquitoes can also carry other diseases such as malaria, yellow fever, chikungunya, and Zika.

Any suspicion of an illness caused by a mosquito bite should be evaluated by a professional medical care provider.

Measures to prevent mosquito bites can help reduce the risk of contracting mosquito related diseases:

- Avoid exposure during prime biting times, usually dawn and dusk.
- Ensure tents have adequate netting on doors and windows.
- Set camps well away from high-risk areas like standing water, swampy ground, and dense brush.
- Use mosquito repellents. Read and follow the directions on the labels.
  - Long-acting varieties containing DEET are the most effective. Concentrations of DEET higher than 30% do not improve repellency, but they do require less frequent reapplication.
  - In the United States, picaridin is also available and is effective for light infestations of flies, gnats, and mosquitoes.
  - Some nonchemical repellents work for short periods of time.
- Treat clothing, tents, and sleeping bags with 0.5% permethrin every six weeks in advance of your trip. Follow manufacturer application recommendations. Studies have shown that the combination of permethrin on clothing and an appropriate insect repellent on skin can prevent nearly 100% of bites from disease-bearing mosquitoes and ticks.[7]

Evacuation is generally not required for a mild and localized reaction to a mosquito bite.

Tick Bites

Ticks are blood-feeding insects that are typically found in tall grass and shrubs. When a tick bites, it attaches itself firmly to the skin.

In the United States, ticks may carry any of several diseases, including Lyme disease.[8] During the time it is attached, a tick can pass disease-carrying pathogens to its host.

Follow these recommendations to treat a tick bite:

- Remove the embedded tick.
  - Grasp the tick close to the skin with tweezers or a tick removal tool.
  - Pull straight up with a steady, slow motion until the tick releases.
- After removal, clean the area well with soap and water or a disinfecting wipe.
- Wash hands thoroughly when finished removing the tick.

Do not use fingernail polish, petroleum jelly, a glowing hot match, or alcohol to remove a tick. These actions have not been proven effective and may cause additional problems.

Prevent tick bites and help reduce the likelihood of a tick-transmitted disease by following these recommendations:

- Use repellants. Ticks are repelled by many of the same repellents used to keep mosquitoes from biting.
- Perform body checks for ticks twice daily when hiking and camping in tick-infested areas.

When infected with Lyme disease, a circular rash that looks like a shooting target with the bite at the center may appear within 3–30 days. A fever may follow. Any illness that develops after removal of an embedded tick should be evaluated by a professional medical care provider.

Evacuation is generally not required for a mild and localized reaction to a tick bite.

Insect Bites and Infectious Disease

Infectious diseases can be transmitted through insect stings. The latest information on this can be found by visiting the U.S. Centers for Disease Control and Prevention website at www.cdc.gov.

Snakebites

Only a few types of venomous snakes are found in North America, and very few of the snakebites that occur are fatal. However, because fatalities have occurred, a suspected venomous snakebite should be considered and treated as a medical emergency.

Pit Vipers

Pit vipers include venomous cottonmouths, copperheads, and rattlesnakes. Pit vipers strike once and leave a characteristic bite mark. Signs of a pit viper bite include the following:

- Bite mark with single or double fang mark
- Intense, burning pain
- Rapid local swelling

If you suspect a pit viper bite, reassure the person that effective medical treatment is available:

- Calm, comfort, and reassure the person.
- Have the person sit still and stay calm to slow the spread of venom within the body.
- Remove any jewelry or other constricting items from the affected limb.
- Control any bleeding with a clean pad and direct pressure.
- Immobilize the injured part and keep it below heart level.

Coral Snakes

A bite from a venomous coral snake differs from that of a pit viper. Instead of a single strike, coral snakes will chew with fixed fangs.

Pain and swelling at the bite site may be minimal or absent. Serious effects are often delayed. When they do appear, signs include the following:

- Abdominal pain
- Nausea and vomiting
- Rapid heartbeat
- Difficulty breathing
- Drooling
- Altered mental status

If you suspect a bite from a coral snake, reassure the person that effective medical treatment is available:

- Calm, comfort, and reassure the person.
- Have the person sit still and remain calm. Move the person only if needed.
- Immobilize the injured part and keep it below heart level.

Do not apply a tourniquet, cold compresses, or try to suck out the venom by mouth for any snakebite. These treatments are not effective and may be harmful.

Go fast on evacuation for any person with a snakebite suspected of being venomous. Effective treatment using antivenin drugs is available from professional medical care providers. Minimize any activity of the affected person during evacuation.

Even non-venomous snakebites need to be professionally evaluated. Snakebites are puncture wounds that might cause infections, including tetanus.

Scorpion Stings

A scorpion sting occurs when a scorpion uses a venomous stinger on a curved tail, usually in defense if the scorpion feels threatened. Stings are characterized by intense pain. Life-threatening conditions rarely occur, with the most severe reactions occurring in children and the elderly.

Most stings only result in a local reaction of intense pain, numbness, tingling, and swelling. More serious, full-body reactions can occur, especially in children, resulting in breathing difficulty, sweating, nausea, vomiting, and a fast heart rate. Anaphylaxis can occur. Seek professional medical help immediately for a child who is stung, or for anyone who is displaying more serious symptoms.

Spider Bites

Spiders typically inhabit out-of-the-way places such as wood piles or outbuildings. Venomous spiders, including the black widow and brown recluse, can be dangerous to humans.

Initially, spider bites are often difficult to identify as venomous. Only small puncture marks and bleeding at the bite site may be seen. Over time other, more serious signs may develop that indicate the spider was venomous:

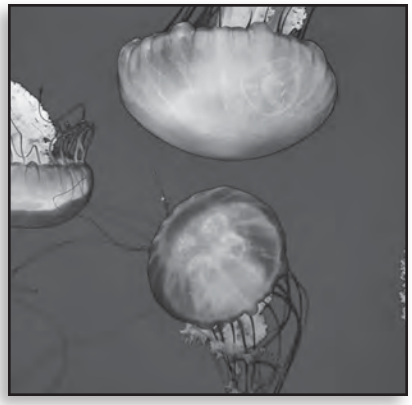
- Increased tenderness, swelling, pain, itchiness, and redness at the bite site
- Cramping pain and muscular rigidity in the body
- Fever, weakness, nausea and vomiting, or difficulty breathing

Follow these recommendations for treating a person with a spider bite:

- Calm, comfort, and reassure the person.
- Clean the bite site with soap and water.
- Apply local cooling to the bite site.
- Elevate the limb the bite is on.
- Assist the person in taking an over-the-counter pain reliever or antihistamine.

Most spider bites are not venomous, and evacuation is not required for a mild and localized reaction. Go slow on evacuation if pain does not subside or gets worse.

Marine Animal Stings



Stings from marine animals (such as fire coral, sea anemones, and jellyfish) and puncture wounds from animals such as stingrays can occur when a person is in or around the ocean environment.

Jellyfish

Signs of a jellyfish sting include significant pain at the sting site and a raised, red, itchy rash.

Follow these recommendations for treating a person with a jellyfish sting:

- Wash the sting site liberally with household vinegar as soon as possible for at least 30 seconds to deactivate the venom and prevent further stinging.
- Shower or immerse the sting site in hot water for at least 20 minutes or until the pain subsides. The water should be as hot as the person can safely tolerate.

Jellyfish stings do not typically require evacuation.

Stingray

A stingray is a marine animal with a slender tail and venom-filled spines that can puncture the skin and inject venom. Signs of a stingray sting include a visible puncture wound and intense pain at the sting site.

Follow these recommendations for treating a person with a stingray sting:

- Immerse the injured area in water as hot as the person can tolerate for 30 to 90 minutes to deactivate the venom and help relieve pain.
- Thoroughly clean out the wound site.

Marine animal venom may cause a severe reaction. Signs of a severe reaction include difficulty breathing, heart palpitations, weakness, and fainting.

Go fast on evacuation if a person has a severe reaction to a stingray sting.

Animal and Human Bites

Animal bites and human bites can cause significant injury and bacterial infection. Bites from animals such as raccoons, skunks, bats, and foxes can also cause rabies. Left untreated, rabies is fatal. Signs of an animal or human bite include teeth marks on the skin at the site of the bite.

Follow these recommendations for treating a person with an animal or human bite:

- Apply direct pressure to control any bleeding.
- Wash the bite and flush with large amounts of water.

If the bite did not break the skin, the person can resume normal activity when he or she feels ready. Monitor for worsening symptoms, and evacuate if signs of infection appear.

Go slow on evacuation for a person with an animal or human bite that breaks the skin. Professional medical care is necessary due to the chance of infection.

Knowledge Check

The recommended treatment for slowing the spread of venom from a venomous snakebite is to keep the person still and calm. What other methods for slowing venom spread are not recommended?

Submersion

Drowning can occur during activities as diverse as fording streams, seining for bait, swimming, snorkeling, scuba diving, surfing, and boating. There are many different ways someone can find him- or herself at risk for drowning. Consider the following examples:

- A swimmer may panic after becoming exhausted by swimming too far or fighting against a current. This person may call out for help and reach for a rescue aid.
- A non-swimmer may step off a ledge or fall into the water. This person will not be able to call for help or move even a few feet to safety. A non-swimmer can submerge in less than a minute.
- A person may submerge without warning due to a seizure, stroke, or sudden cardiac arrest. An unconscious person will typically sink rather than float at the surface.

Timely recognition of a person in trouble is vital to successful rescue and treatment. Such recognition requires careful, deliberate, uninterrupted scanning of everyone in an in-water activity. Understanding what happens to someone who is drowning may help you recognize a person who is struggling and at risk.

- A person struggling to remain at the surface will often ingest water. The swallowed water may later lead to vomiting during resuscitation attempts.
- Once someone is unable to keep his or her airway above the surface of the water, the breathing reflex results in water aspiration. An involuntary constriction of the muscles of the upper airway, called a laryngospasm, keeps large amounts of water out of the lungs.
- While keeping water out of the lungs, the laryngospasm also keeps air out of the lungs. This leads to asphyxia, an inadequate intake of oxygen, and causes a loss of consciousness.
- Respiratory arrest and then cardiac arrest follow.
- Brain damage and death usually occur within a few minutes. However, in some cold-water incidents, successful resuscitation has been performed after longer periods.
- When the laryngospasm relaxes, water enters the lungs. Details differ between fresh-water and salt-water incidents, but transfer of oxygen from the lungs may be dangerously compromised.

Rescue

Remember, know your limitations as a first aid provider, and never enter a scene that isn't safe for you. Do not attempt to retrieve someone from water if it puts you in danger or exceeds your swimming skills or training.

Proper planning and preparation are the keys to assisting someone who is submerged or in danger of drowning. Rescue aids should be gathered and procedures discussed prior to any water activity. Continue to monitor the safety of everyone else in the water when attention is focused on an individual in trouble.

Try to retrieve someone in water using an escalating approach, working first from land and then from watercraft before entering water yourself to conduct a rescue. Follow these guidelines for getting a person safely out of water:

- **Reach** with your hand, foot, paddle, or other extension device that allows you to remain safely on land.
- **Throw** a flotation device or line within the grasp of the person if he or she is active in the water.
- **Row** out to — or access the person from some sort of watercraft — and then use reaching or throwing devices as appropriate from the craft.
- **Go** into the water. A good swimmer with water rescue training may swim a flotation aid to a person actively struggling. Rescue of an unconscious person may require a surface dive and physical contact to move him or her to shore.

The **reach, throw, row, and go** progression is also used for unsafe water conditions, but the risk to the rescuer may become unacceptable. For example, a swift water rescue of a kayaker pinned in heavy whitewater calls for expertise from specialized training. Wilderness first aid providers should only undertake rescue activities for which they have proper training.

Cardiac Arrest

Cardiac arrest, as a result of the prolonged submersion and drowning, is one of the leading causes of death for young adults and children in the United States.[9]

Often, a person who has drowned and is not breathing responds quickly to only a few rescue breaths. Change your approach to CPR slightly to give rescue breaths earlier. If trained, give rescue breaths while still in the water.

After quickly and safely removing a person from the water, lay the person on a level surface and perform an initial assessment. If the person 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 person has not responded to CPR, use the AED immediately. Dry the chest before applying pads.

There are some things to consider during your cardiac arrest treatment:

- Do not attempt to remove water from the airway or lungs using abdominal thrusts.
- There is a high chance a person who has drowned will vomit during your care. If this occurs, quickly log roll the person on to his or her side to allow fluid to drain from the mouth. Use your finger to clear any solid material you see from the mouth.
- If a person begins breathing normally, place him or her in a recovery position. Monitor the person and provide any additional required care for other conditions that are found.

Diving headfirst into shallow water is a major cause of sports-related spinal injury. The treatment of cardiac arrest, with consideration for spinal injury during treatment, is the priority.

Evacuation

Go fast on evacuation for a person who became unresponsive, no matter how short a time, during a submersion incident. Keep in mind that a medical condition could have been an underlying cause of the submersion and may require follow-up care. Go fast on evacuation for any responsive person with signs and symptoms of breathing difficulty after a submersion, as these can become life threatening. Go slow, including self-evacuation if possible, for any responsive person who has breathed into the lungs, or aspirated, even a small amount of water. Aspiration requires evaluation by a professional medical care provider.

Prevention

Follow these recommendations for safe water-related activities and to help prevent drowning:

- All swimming and boating activities should be supervised by a mature, conscientious adult trained to respond to water-related emergencies. Training programs are available through the Boy Scouts of America (BSA) such as Safe Swim Defense and Safety Afloat.
- Screen all participants prior to the activity for chronic or temporary medical conditions that may require special precautions in or on the water.
- Confirm that anyone involved in water-related activities is able to easily swim at least 100 yards and to demonstrate an effective resting stroke. Those unable to do so should be restricted to shallow water for swimming activities.
- Boating activities for poor swimmers should be limited to stable craft on calm water where there is little likelihood of capsizing. Poor swimmers should be accompanied by a buddy who is a good swimmer experienced in that craft.
- Wear a Coast Guard-approved personal flotation device (PFD) or life jacket that fits and is adjusted properly during any boating activity.
- All swimming activity should take place in an area that has been investigated and determined safe for swimming.
- Swimmers should always be under observation by both a buddy and a prepared rescue team.
- Do not dive headfirst into water without confirming that the water is deep enough to avoid injury.
- Everyone involved in whitewater activities should have proper training and wear an approved helmet.
- Do not swim or participate in water-based activities under the influence of any alcohol or drugs.

Knowledge Check

It is recommended to rescue someone in water by using an escalating approach, beginning with techniques of the least risk to the rescuer. What are the identified steps of that escalation?

Lightning

Lightning is a discharge of atmospheric electricity that occurs during a storm. If you can hear thunder, you are close enough to a storm to be at risk for a lightning strike. There are several ways that a lightning strike can cause injury or death:

- Direct strike — A person is hit directly by lightning.
- Splash — The lightning strike jumps from its direct target to a person.
- Ground current — The electrical charge radiates out from its strike point through the ground, reaching a person.
- Long conductors — The person is touching a long conductor, such as a fence, when the conductor is hit.
- Blast injury — The person is thrown by the exploding air created by lightning.
- Penetrating injury — The person is injured from wood fragments when nearby trees or structures are hit by lightning.

The treatment for someone injured by lightning depends on the type of injury sustained. A person struck by lightning carries no electrical charge and is safe to touch. Ensure the scene is safe before you approach; lightning can strike twice in the same place.

Begin your initial assessment and follow these recommendations to treat someone following a lightning strike:

- Cardiac arrest may have occurred. If indicated, begin CPR and get an AED, if one is available.
- If the person is responsive, assess for injuries and provide appropriate treatment. Lightning strikes can produce several types of injuries:
  - Neurological problems such as loss of responsiveness, paralysis, or seizures
  - Blindness and/or deafness, often temporary
  - Burns, typically superficial and feathery or fern-like
  - Blunt and penetrating trauma from exploding trees or from being thrown into solid objects
- Prepare for evacuation.
- Calm, comfort, and reassure the person. Allow the person to assume a position that is comfortable for him or her.

Prevention

Prevent or reduce the likelihood of a lightning-related injury by following these recommendations:

- Observe or study local weather patterns. Lightning storms tend to roll in quickly in the afternoons of summer months.
- Have a plan to turn back if conditions become dangerous in lightning-prone areas and lightning-prone seasons. Be sure everyone in the group understands the plan. Stick to the plan.
- Before a storm hits, find a safe location.
  - Move downhill when a storm approaches. Climb to high areas before noon, then climb down to low areas to avoid afternoon summer storms.
  - Avoid high places, high objects (such as tall trees), open places, damp caves, overhangs, flood zones, places with signs of previous lightning strikes, and long conductors (such as fences).
  - Avoid contact with metal. Metal conducts electricity. Remove any metallic frame packs and do not stay near them when a storm is close by.
  - Water conducts electricity, so if you are boating or swimming, get to land and move away from the shore.
  - Seek solid cover such as low rolling hills or trees of about the same size, a low spot among rocks, or deep, dry caves.
  - You can take shelter in a steel-framed building or a hard-topped motor vehicle. In a building, avoid telephones, contact with anything connected to electrical power, and contact with metal. In a vehicle, keep the windows rolled up and avoid contact with metal parts.

- When outdoors, if it isn't possible to move to a safe spot, get into a safe position.
  - Squat or sit in a tight body position on non-conducting material.
  - Do not lie down.
  - If you feel your hair stand on end or your skin get tingly, cover your ears with your hands, close your eyes, and get your head close to your knees.
  - Spread groups out, 100 feet or more between individuals, but try to keep everyone in sight.

Pick campsites that meet the criteria of a safe spot as mentioned above.

Evacuation

Go fast on evacuation for anyone who has been struck by lightning, even if he or she appears to have recovered soon after the injury. Serious problems can develop over time.

Knowledge Check

What are the ways in which a lightning strike can injure or kill someone?

Altitude Illnesses

Altitude illnesses are the result of insufficient oxygen in the blood, or hypoxia, due to decreasing barometric pressure as elevation is gained. As altitude is gained, air grows "thinner" and less oxygen is inhaled with each breath. Conditions may range from uncomfortable to life threatening.

Persons planning on going to an altitude higher than 8,000 feet should talk with a healthcare provider about prescription medication known to assist in preventing and treating altitude illnesses.

More so than other remote areas, trips to high altitudes require greater preparation and travelers need more specialized training and equipment before attempting to climb to a high altitude.

Acute Mountain Sickness

Acute mountain sickness (AMS) can happen to someone as soon as he or she reaches a general altitude of 8,000 feet or higher. When traveling to high altitudes, look for these signs of AMS:

- Headache
- Loss of normal appetite
- Nausea, with or without vomiting
- Insomnia
- Lassitude, or an unusual weariness and exhaustion

The syndrome resembles an alcohol hangover or a case of influenza. If unsure, always treat for AMS. There are no unique physical signs visible on the body to indicate the condition. Follow these recommendations to treat suspected AMS:

- Descend, or stop ascending and wait for improvement before going higher. Continuing ascent in the presence of symptoms is not recommended and can make the condition more serious or life threatening.
- Administer supplemental oxygen, if available and you are trained in its use. This can be especially helpful during sleep.
- If the illness progresses, descent is mandatory.

High Altitude Pulmonary Edema

Severe altitude illness may present as high altitude pulmonary edema (HAPE), which is fluid collecting in the air spaces of the lungs. If enough fluid collects, the person cannot breathe adequately and death may result.

Watch for the progression of HAPE with these signs:

- Dry cough, soon followed by complaints of shortness of breath even at rest
- Shortness of breath becomes more pronounced, with perhaps complaints of chest pain
- Cough becomes productive, producing frothy sputum early and reddish sputum later

Follow these recommendations to treat HAPE:

- Descend as soon as possible. A descent of 1,000 to 1,500 feet may produce significant results.
- Administer supplemental oxygen, if available and you are trained in its use.
- Use a Gamow bag, or a portable hyperbaric chamber. A Gamow bag should be used in addition to, not instead of, descent.

High Altitude Cerebral Edema

If mild AMS is not addressed effectively, it may progress to a more severe form of altitude illness called high altitude cerebral edema (HACE). HACE is caused by fluid collecting within the brain, increasing pressure on the brain until it fails to function properly and eventually fails to function at all, resulting in death. Signs of HACE include the following:

- Ataxia, or the loss of coordination
  - This is the most important early sign. An ataxic person cannot walk a straight line or stand straight with feet together and eyes closed.
- Severe headache unrelieved by rest and medication
  - Some people suffer HACE without complaining of a severe headache.
- Altered mental status; odd behaviors
- Seizures and/or coma

Follow these recommendations to treat HACE:

- Descend as soon as possible.
- Administer supplemental oxygen, if available and you are trained in its use.
- Use a Gamow bag, or a portable hyperbaric chamber. A Gamow bag should be used in addition to, not instead of, descent.

Evacuation

Generally AMS does not require evacuation if normal function returns. Go slow on evacuation, using self-evacuation if possible, for AMS if signs continue or get worse.

Go fast on evacuation for a person suspected of having HACE or HAPE. Immediately evacuate to an altitude at least 1,000 to 1,500 feet lower, followed by additional evacuation to professional medical care.

Prevention

Most altitude illnesses are preventable. The following guidelines can reduce the incidence and severity of illness. Although these measures do not guarantee anyone freedom from illness, they are highly recommended, especially for those without altitude experience.

- Plan a staged ascent. The most critical factor in preventing illness is to gain altitude no faster than your body can acclimatize, or physiologically adjust, to the decrease in barometric pressure.
  - Acclimatize by gradually increasing the altitude of overnight camps. If possible, the first camp should be no higher than 8,000 feet, with an increase of no more than 1,000 to 1,500 feet per night.
  - If a trip is started at higher than 9,000 feet, two nights should be spent acclimatizing at that altitude before proceeding higher.
  - Proceeding higher during the day is acceptable, but return to a lower elevation to sleep (climb high, sleep low).
- Exercise moderately until acclimatized. Avoid intense exercise, which could result in excessive shortness of breath and fatigue.
- Eat a high-carbohydrate diet. A diet of at least 70% carbohydrates reduces symptoms of AMS by about 30% at altitudes higher than approximately 16,000 feet, and can be started one to two days prior to reaching 16,000 feet.
- Stay well hydrated to help offset increased fluid loss at high altitudes.
- Consider carrying and using prescription medication. Persons going to an altitude higher than 8,000 feet should discuss obtaining personal prescriptions of acetazolamide, nifedipine, and/or dexamethasone with a physician prior to departure. No medication should be taken, even if available, without directions from a physician.

In general, to prevent AMS, HAPE, and HACE, a person should stop ascending as soon as symptoms of altitude illness appear and until symptoms resolve. If symptoms do not resolve, evacuation is required.

Knowledge Check

In general, what is the key treatment for most cases of altitude illness?

Emotional Considerations

Even in a situation where help is close by, serious medical emergencies can create emotional distress for the person who is ill or injured, the person providing care, and others nearby. A medical emergency that occurs in a remote location can create additional complications and significantly amplify that distress.

A defined group structure with clearly identified leadership can help to minimize overall confusion and anxiety in an emergency. Know who is in charge of the group and who to go to if a potential medical emergency occurs.

In an emergency, emotional distress can make medical conditions worse or the situation unsafe. Having some basic strategies for managing emotional issues is important.

Anxiety

Anxiety describes the feelings of someone who is worried or afraid of something. Occasional anxiety is normal part of a person's life. However, it can become overwhelming in acute circumstances. Panic is sudden onset of extreme anxiety.

Anxiety can be triggered by an event, the thought of something going wrong, or for no apparent reason. In a remote or wilderness situation, feelings of anxiety can be triggered by an illness or injury (your own or someone else's) or by fear of the unknown.

Anxiety can also seem infectious. It is important to address someone who is experiencing anxiety or panicking before it causes others to also feel anxious or panic.

Signs of anxiety include the following:

- Rapid heart rate, feeling of heart pounding
- Difficulty breathing
- Nervousness, restlessness, tension
- Difficulty sleeping
- Weakness, fatigue
- Gastrointestinal distress
- Impending sense of doom or danger
- Inability to concentrate or focus

To treat someone experiencing anxiety, follow these recommendations:

- Calm, comfort, and reassure the person. This is best accomplished by appearing calm, focused, and confident in your ability to help, even if you feel differently.
- Communicate with clear statements to make sure the ill or injured person understands as much as possible about what is being done to help. Explain what you are going to do ahead of time. Narrate what you are doing as you do it. Inform the person help is being summoned. Make it clear you will stay with him or her until help arrives.
- Allow the person to express what is causing his or her anxiety, and work to calm any fears or concerns. Developing a plan or sharing precautions that have been taken can help reduce fears of the unknown.
- Encourage the person to take deep breaths.

Hyperventilation

Hyperventilation is an extremely rapid, deep breathing condition that can be caused by anxiety or panic. This can upset the normal balance between oxygen and carbon dioxide in the body, resulting in the person feeling that he or she cannot get enough air.

Other signs of hyperventilation include the following:

- Feeling lightheaded, dizzy, weak, or not able to think clearly
- Increased heart rate
- Muscle spasms or cramping in hands or feet
- Numbness in extremities or around the mouth
- Feeling of tightness, fullness, or pressure in the chest

Even though a person may feel like he or she is not getting enough air, hyperventilation actually results in an increase in oxygen in the body. Taking steps to increase the amount of carbon dioxide can eliminate most of your symptoms.

To treat someone who is hyperventilating, follow these recommendations:

- Use a soft, calming voice to encourage the person to slow down his or her breathing. Tell the person what you think is happening.
- Encourage the person to take slower breaths through pursed lips or through his or her nose.

Evacuation is generally not required for someone experiencing anxiety, panic, or hyperventilation. Go slow on evacuation, using self-evacuation if possible, for someone with feelings of anxiety or panic that do not resolve or that reoccur.

Provider Emotions

Caring for someone in an emergency can create emotional distress for you. Exposure to an extreme situation or having a close relationship with the person 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. While caring for another person, calm yourself as best you can and acknowledge your limitations as a provider.

When an emergency is over, a provider is often left alone after care for an ill or injured person is taken over by someone else. 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:

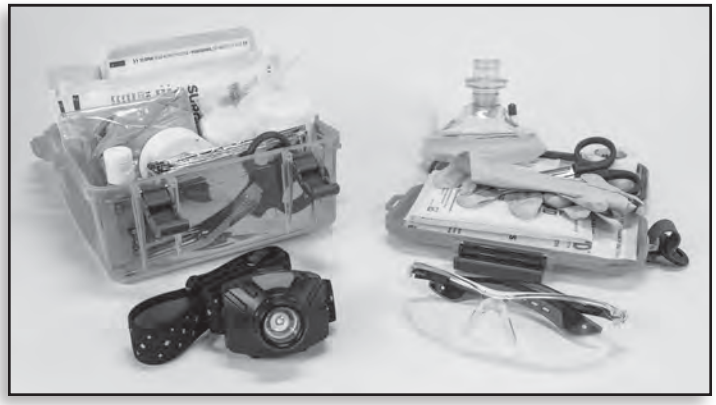
- Share your feelings. Informally talk with someone you trust who will listen without judgment, such as a family member, friend, or coworker.
- Get back to a normal routine as soon as possible.
- Accept that it will take time to resolve these emotions.

If unpleasant feelings persist, formal assistance from a professional counselor may be helpful as you deal with your emotions about the event.

Knowledge Check

What are some common causes of anxiety?

First Aid Kits



A first aid kit is an essential resource for any first aid provider in a remote or delayed-help situation, but there is no "one size fits all" kit. A first aid kit should be assembled based on the circumstances of the trip and those who are traveling.

Consider the following factors when assembling a first aid kit:

- The environment of the destination (such as altitude, bodies of water, inclined terrain, etc.)
- The season and anticipated weather (cold or hot, rainy, windy, snowy, etc.)
- The number of people who will depend on the kit in an emergency
- The number of days the kit will be relied on
- The distance from definitive medical care
- Your medical expertise and that of other members of the group
- Pre-existing conditions of members of the group (such as diabetes, known allergies, asthma, etc.)

Kit Considerations

Even if you have a stocked first aid kit, it is wise to check the contents and repack it before every trip to a remote setting. There may be items in a kit that need to be replaced or refilled, either because the item was used on a previous trip, or due to damage from heat, cold, or moisture. An item with an expiration date may have expired.

Pack items in a first aid kit in disposable plastic bags or protective containers to prevent them from being damaged during your trip. Select a case for your kit that will keep the items clean and dry, is sized appropriately for the number of items and length of stay, is immediately recognizable, and can be carried easily for the duration of the trip.

Consider who may need to use the first aid kit, and select items that can be used by the first aid providers on the trip, including yourself. Do not pack items that you do not know how to use. Before you depart, make sure all members of the group are familiar with the contents of the first aid kit, and know where to find it. Ensure that the items are easy to open, labeled, and latex-free.

When traveling in a group, it is recommended to have a group kit with adequate supplies for the number of people in the group. Additionally, encourage each member to pack and carry a personal first aid kit with high-use items to reduce the size and weight of the kit serving the group. Consider splitting a larger group kit into two kits to reduce the carrying weight for each person and to improve accessibility. Standardize the location of first aid kits in each group member's pack, so anyone can quickly find another person's kit.

Medications

Medications can either be prescribed specifically for a person by a healthcare professional, or purchased by anyone over-the-counter (OTC). Prescription medications should only be used by the person they are prescribed for. Common prescribed medications that members of your group may carry for an existing condition include the following:

- Epinephrine auto-injectors, adult or child dose (come in a two-pack)
- Bronchodilator (asthma inhaler)
- Insulin (never for emergency use)
- Glucagon kit
- Nitroglycerin
- Diuretic (water pill)

You can assist another person in the self-administration of a medication that is prescribed for him or her. Your assistance is usually limited to retrieving medication and handing it to the person to take. It should never be your decision to give a prescribed medication.

Prescribed medications for children may be administered if state law allows for it and written legal permission is obtained from a parent or legal guardian.

Some states allow a trained provider to administer an epinephrine auto-injector to someone who carries one and is unable to self-administer it. Follow the laws and regulations in the states you may be traveling in.

If someone has a known medical condition that requires regular prescription medication, make sure that person is prepared with an adequate amount of the medication for the duration of the trip, and clear directions on the dosing required.

There are many over-the-counter (OTC) medications that can be useful in a remote area. Although they are easily purchased, care still needs to be exercised with OTC medications. Do not exceed the dosing instructions on the package, and check with the person prior to giving any medication to ensure he or she is not allergic to it. Consider the following OTC medications for your first aid kit:

- Oral glucose
- Adult aspirin tablets (325 mg size) or "baby aspirin" (81 mg size) for chest pain
- Aspirin/acetaminophen/ibuprofen/naproxen (for minor pain relief)
- Diphenhydramine (oral antihistamine)
- Antidiarrheal medication
- Electrolyte powdered drink mix
- Topical pain relief cream or gel
- Hydrocortisone cream, 1% (anti-itch)

- Stool softener (for constipation)
- Triple antibiotic ointment
- Normal saline (for cleaning/irrigation)
- Povidone-iodine solution or pads (for cleaning)
- Alcohol pads

First Aid Supplies

Depending on how remote the area is from professional medical care, consider having supplies for extended care situations that last many hours or even days.

The following supplies can be useful when putting together a personal first aid kit:

- Adhesive bandages
- Dressing, 5-by-7-inch (bleeding control)
- 3-by-3-inch sterile dressing pads (minor wounds)
- Adhesive tape, ½-inch wide
- Moleskin material
- Soap and/or alcohol-based hand sanitizing gel
- First aid shears (scissors)
- Tweezers

- Non-latex disposable gloves
- CPR mask or shield
- Sunscreen for face and lips
- Sealable plastic bags

The following supplies can be useful when putting together a group first aid kit:

- 5-by-7-inch sterile dressing pads (bleeding control)
- 4-by-4-inch sterile dressing pads (minor wounds, cleaning)
- 3-by-4-inch sterile non-stick dressing pads (minor wounds, small burns)
- 3-inch wide conforming roller gauze bandage
- 2-inch wide self-adherent bandage
- 3-inch wide elastic bandage
- Triangular bandages
- 1-inch wide adhesive tape
- Butterfly bandages
- Adhesive bandages
- Moleskin material
- Gauze impregnated with white petroleum, and aluminum foil or plastic wrap (for occlusive dressing)
- Gel pads for blisters or burns
- Chemical cold packs
- Chemical hot packs
- Sealable plastic bags
- First aid shears (scissors)
- Tweezers
- Sharp knife
- Safety pins
- Irrigating syringe
- Soap and/or alcohol-based hand sanitizing gel
- Normal saline (for cleaning/irrigation)
- Alcohol or povidone-iodine pads (for wound cleaning)
- Non-latex disposable gloves (multiple pairs)
- Protective glasses/face shield
- CPR mask or shield
- Permanent marker
- Emergency blanket (reflective Mylar®)
- Flashlight
- Pencil and paper (or blank medical care report forms)

Consider the following supplies for extended care situations in more remote locations:

- Malleable aluminum splints
- Commercial pressure bandages
- Commercial tourniquets (at least 2)
- Commercial packed dressings (hemostatic dressing)
- Automated external defibrillator (AED)
- Standard or hypothermia thermometer
- Tooth saving solution
- Signaling equipment
- Emergency locator beacon (ELB)
- Water storage and disinfecting equipment/chemicals
- Food
- Fire-starting supplies
- Shelter-making materials

These lists provide a good basis for building a kit, but you may need to add or subtract items to fit the needs of your group, or the nature of your trip.

Just like everything else carried on a trip into a remote area, there will be size and weight limitations for first aid kits and supplies. Care should be taken to pack the appropriate things, in the amounts necessary, based on the environment you will be in and the time you will be there.

It is possible for a medical emergency to occur that you did not anticipate. Ultimately, your knowledge and skill in first aid care is more valuable in an emergency than the contents of your first aid kit. You may need to improvise and make do with what you have.

Knowledge Check

What should be included in a wilderness first aid kit?

Protection from the Elements

Whether you are on a mountain or in the middle of a large body of water, remote situations call for preparation to protect yourself from the elements. Prolonged exposure to sun, wind, rain, or snow can cause anything from minor discomfort to life-threatening conditions.

Protect yourself from the elements with clothing, gear, and shelter.

Sun

Sun exposure is common for any outdoor excursion, and should not be underestimated. Even when temperatures are mild, there is a risk of serious damage to any area of the body that is exposed to the sun's harmful ultraviolet (UV) rays.

Sunburn

Sunburn is a burn on skin that is caused by exposure to UV radiation, usually from the sun. Someone with a sunburn may complain of pain, red skin that is hot to the touch, dizziness, and fatigue.

To protect against sunburn, use several methods to limit harmful exposure to UV rays:

- Apply a broad-spectrum sunscreen regularly (at least every two hours or sooner) to all exposed skin. Use an ample amount at every application, and apply at least 30 minutes before sun exposure to allow for the sunscreen to bind to skin.
- Sunscreens are rated with a sun protection factor (SPF), such as SPF 15, 30, 45, etc. The rating indicates the percentage of the sun's harmful rays that are being blocked. However, selecting a sunscreen with a higher rating does not guarantee sun damage is not occurring, and does not prolong the duration of time you can go between applications. Apply every two hours, or sooner if your skin is wet or sweaty.
- Seek shade when possible. Take breaks for meals or to make camp in areas with shade, if possible.
- Cover up all skin that you can. Wear lightweight layers in warm weather to allow for arms and legs to be fully covered. Hats are recommended, especially with a wide brim. Darker-color fabrics tend to provide more UV protection than light-color fabrics. Some clothing is certified with a UV protection factor.

Snow Blindness (Photokeratitis)

Photokeratitis, commonly known as snow blindness, is an eye condition caused by damaging exposure to UV rays that are reflected into the eyes. It can occur in wilderness or remote settings when the sun's rays are reflected on snow, ice, sand, or water, or by looking directly at the sun, such as during a solar eclipse.

Symptoms of photokeratitis may not be noticed until sometime after the damage has occurred.

- Eye pain
- Eye redness
- Eye swelling
- Blurry vision
- Sensitivity to light
- Gritty feeling in eyes
- Headache
- Seeing halos
- Small pupils
- Twitching eyelids
- Temporary loss of vision

Symptoms usually resolve in a day or two without any medical intervention. Provide some symptom relief for a person until the symptoms resolve on their own, or the person can be treated by a healthcare provider.

If you suspect photokeratitis and the person is wearing contact lenses, remove the lenses immediately.

- Apply a cold cloth over closed eyes.
- OTC pain relievers may be helpful.
- Avoid rubbing eyes while healing.
- To prevent photokeratitis in a remote setting, wear eye protection that is rated to protect against UV radiation. Sunglasses or snow goggles should block or absorb more than 99% of rays to be effective.

Rain

If someone is unprepared for rain in a remote setting, clothing and gear can become wet and heavy very quickly. Prolonged exposure to rain without relief can lead to hypothermia, even when ambient temperatures are moderate.

Prepare for rain with jackets, ponchos, hats, and appropriate shoes to protect yourself. Gear or bags containing equipment, food, or first aid materials can be covered with tarps or plastic sheeting.

In heavy storms, it may be wise to stay in place to avoid lightning strikes or torrential rains that could displace you from your position.

Seek or create shelter from prolonged or heavy rain, especially if clothing or gear becomes soaked. Once sheltered, remove any wet clothing to avoid hypothermia.

Heat

Much like protecting yourself from the sun, protecting yourself from heat requires some planning, but is simple to manage.

- Dress in layers. As temperatures rise, remove a layer of clothing, but do not expose skin unnecessarily to the harmful UV rays of the sun.
- Tight clothing can prevent sweat from evaporating to aid in heat management, and light-colored clothing of loose weave allows more UV radiation exposure, so it is important to find the right balance of loose fabrics that still protect skin from sunburn.
- Wear breathable fabrics that allow air to circulate to the skin to provide cooling.
- Find shade when temperatures rise, and avoid activity or exercise when the day is at its hottest hours.
- Stay hydrated, especially when engaged in physical activity.
- Wear a hat with a brim and a scarf to cover the neck; wetting these items can assist in keeping cool.

Cold

Prevent serious emergencies by preparing for cold, even if your location has a mild or moderate ambient temperature. When outdoors, evening and nighttime temperatures can drop dramatically. Be prepared for someone to become cold suddenly when vigorous activity ends, or as evening begins.

Sudden weather changes can also affect temperatures; it's important to be ready for any possible weather, even that which you don't expect.

- Dress in layers. Take off layers during activity before you start to sweat, and add them back on before becoming chilled. Wear clothing that holds in heat or is insulated if the environment is known to be mild, cool, or cold.
- Stay hydrated, especially when engaged in physical activity.
- Eat regularly to fuel your body's internal warming.
- If anyone in a group seems affected by cold, consider that the entire group needs attention to prevent cold-related emergencies.
- Wear a hat and cover the neck to keep heat close to the body.
- Remove any wet clothing and replace it with dry clothing to limit heat loss.

In cold weather, ensure that you have shelter for rest periods or if planning to stay outdoors for extended time. Shelter from wind and rain also protects you from cold.

Knowledge Check

Is the risk of getting sunburned related to the environmental temperature?

Water and Food

Keeping water and food clean and safely stored is a priority in any remote setting; contamination can cause illness, gastrointestinal issues, or even death.

Bacteria, microorganisms, and viruses can spread quickly if water or food is contaminated. Abdominal problems such as nausea, vomiting, diarrhea, and constipation are a common result of contaminated water or improperly stored food. Viruses and bacteria such as the following are common in remote settings:

- *E. coli*
- *Salmonella*
- *Giardia lamblia*
- Norwalk-like viruses
- Rotaviruses
- Hepatitis A

If a person is affected by bacterial or viral infection, dehydration can occur from related vomiting and diarrhea.

Water Decontamination

For extended time in a remote setting, water decontamination is critical to survival. Without adequate potable (drinkable) water for each member of the group, dehydration and illness will quickly occur. Ensure that, whatever methods you choose, you can sustain the water needs of the group for more than the planned trip duration.

Any water found in a remote or wilderness setting should be treated as though it is contaminated. Disinfect any water used for drinking, cooking, washing of dishes/utensils, or for providing first aid care, such as when irrigating a wound.

Filtration

Water filtration is often used as an initial step before water disinfection. Filtration alone has limitations in removing bacteria and viruses. The smaller the pores of the filter, the more bacteria can be removed, but many viruses are too small to be removed by a filter. Likewise, some filters allow a percentage of bacteria through, often enough to make a person ill. Filtration also makes water more palatable by removing sediment or bulky debris.

There are various types of water filter devices for remote situations, such as ceramic filters or hollow fiber membrane filters. Be familiar with the type of device you have, how to use it, and its limitations. Some devices require gentle handling, as damage can render them ineffective when you need them most.

Disinfection

Following water filtering with disinfection is recommended, as it ensures that water will be safe to drink. Water can be disinfected by the following methods:

- Heat
- Chemical disinfection
- Ultraviolet radiation

If a heat source and fuel are available, disinfect drinking water by bringing it to a high, vigorous boil for three minutes. Boiling water kills the bacteria and viruses that may be present. Boiling water is the most reliable way to disinfect it for drinking or washing, but it requires time, a heat source, and fuel.

Another alternative is chemical disinfection, which is slightly less reliable than boiling water but requires only small chemical tablets or crystals that are easy to carry and can be used anytime.

However, there are some issues with chemical disinfection. With some types, certain organisms can react with the chemical and render it less effective, while other organisms may be resistant to certain chemicals.

The temperature and volume of water can alter how quickly water is disinfected, making it challenging to determine when water is truly decontaminated. Chemical disinfection also takes longer than boiling water, up to four hours.

The two most common forms of chemical disinfection are chlorine and iodine:

- Chlorine tablets dissolved in water are effective at disinfecting water in about four hours if the tablets are in good condition; tablets can lose efficacy after about six months, or if exposed to heat, cold, or moisture. If the water is cold, disinfection may take longer or be less thorough.
- Iodine added to water takes about 30 minutes at about 70°F to decontaminate it for drinking or washing. Iodine can be added to water as a tablet, or the crystals can be added to water to make a saturated solution that is then added to water for disinfection purposes. Some people have a reaction to iodine, and it is not recommended for some persons (such as pregnant women). Long-term use of iodine is discouraged.

Ultraviolet radiation is a disinfection process known to eliminate the harmful effects of microbes in water. A UV radiation device can treat water quickly without adding any chemical taste. However, these devices need a power source to operate.

It may be desirable to add powdered drink flavoring to water, but ensure that filtration and disinfection are complete before flavoring drinking water.

Always carry more than one method to decontaminate water in case one method is suddenly unavailable or damaged (lack of fuel for heat, chemical tablets damaged, filter part broken, etc.).

Food Storage

Food storage presents several challenges in the wilderness or remote areas. With more hikers and campers in wilderness areas, animals are familiar with human food and can cause damage or injury in their hunt for it. If animals, such as wild bears, become threatening in their search for food, they may have to be killed to protect people traveling to that area.

Proper food storage is imperative to protect the landscape and wildlife. Food storage in a remote area also requires consideration of spoilage and bacteria to prevent foodborne illness.

Protect your food from wilderness predators by storing it out of reach of animals and in containers that are animal resistant. Wild bears are especially adept at retrieving human food, even when it is hung out of reach on a tree branch, or using a counter-balance method. Some wilderness experts believe that hanging an animal-resistant bag between two trees is the best method, and some parks departments encourage the use of metal food-storage boxes, where available.

Consider the environment, the wildlife, and the type of food storage gear you plan to use before you head out to a remote area.

Properly storing food is the first step in protecting wildlife and remote landscapes, but it is also important to manage garbage and even some toiletries with animal-resistant containers.

- Do not leave any food items behind when you depart a site.
- Do not bury garbage.
- Do not pour out leftover food or beverages onto the ground.

These behaviors will draw animals to the area and can cause problems for other travelers.

Prevention of Food- or Waterborne Illness

Keeping hands clean is one of the best ways to prevent contamination of food and water, as it limits the spread of bacteria and viruses. Before handling or preparing food, wash hands with soap and water. Use hand sanitizer if soap and water are not available. Always wash your hands or use sanitizing gel after urinating or defecating.

Wash kitchen gear, dishes, and personal utensils with potable water before and after every use.

In many outdoor or remote settings, keeping food adequately cool to prevent bacteria or spoilage is a challenge.

Use these prevention strategies to avoid contamination of food and water:

- Use dehydrated or freeze-dried foods that are sealed for protection.
- Do not share personal items that come in contact with a person's mouth, such as spoons/forks, cups, water bottles, or lip balm.
- Do not use a personal spoon to take food from a communal container, like a pot or a shared bag of food.
- Keep cooking gear clean.
- Do not eat leftover food unless it can be stored cool and then completely reheated.
- Do not allow anyone with signs of a gastrointestinal illness to handle or prepare food for the group.

Knowledge Check

What is the recommended two-step process for making water from natural sources safe to drink?

Glossary

abrasion
An injury to skin, and possibly underlying tissue, as a result of being scraped across a rough surface such as gravel.

acute coronary syndrome (ACS)
A unique set of physical symptoms, typically highlighted by severe pain, pressure, or discomfort in the chest, which occurs when there is reduced blood flow to the heart. Often described as a heart attack.

acute mountain sickness (AMS)
The development of physical distress caused by poor adjustment to lower oxygen levels at higher altitudes.

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.

angulated fracture
A long bone fracture in which there is an obvious angled deformity to the extremity.

antihistamine
Medication that blocks the effects of histamine released by the body during an allergic reaction.

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.

AVPU
A mnemonic device used in determining the level of responsiveness during a medical emergency:

- Alert
- Responsive to verbal stimulus
- Responsive to physical stimulus
- Unresponsive

avulsion
A wound similar to an amputation where a cut enters at an angle, leaving a skin flap over a wound or completely removing a section of skin along with underlying tissue.

BEAM
An acronym for body elevation and movement, describing an emergency move used by a team to carefully lift and move an injured person suspected of having a spinal injury.

blister
A wound characterized by a fluid-filled sac created by the friction of the outer layers of skin rubbing against the inner layers.

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).

chafing
Irritation and soreness on the skin caused by repeated rubbing.

chief complaint
The initial information about what an ill or injured person thinks is the problem.

dehydration
A body condition characterized by not having enough body fluid to meet the demands of normal function.

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.

dilutional hyponatremia
A deficiency of sodium in a body with a normal or excessive amount of fluid.

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.

distal
A medical term describing a point on an extremity that is further away from the core of the body.

documentation
Material that provides recorded information or legal evidence.

DOTS
A mnemonic device used to help with physical assessment:

- **D**eformities
- **O**pen injuries
- **T**enderness
- **S**welling

emergency medical services (EMS)
An emergency medical response system developed within a geographic area, 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.

evacuation
The action of removing a person from a place of difficulty to one of safety or support.

evisceration
The protrusion of abdominal organs through an open abdominal wound.

FAST
A mnemonic device used to help with stroke assessment:

- **F**ace droop
- **A**rm drift
- **S**peech difficulty
- **T**ime to hospital

flail chest
A condition in which two or more adjacent ribs are fractured in two or more places, resulting in a loose floating segment of the chest wall.

focused (secondary) assessment
The use of a hands-on physical exam, the measurement of vital signs, and a SAMPLE history to gather more detailed information about what is wrong with an ill or injured person.

fracture
A break in a bone.

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

gastroenteritis
Often called stomachache, a viral infection that causes irritation and inflammation of the stomach and intestinal walls resulting in nausea, vomiting, diarrhea, and abdominal pain.

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.

heart attack
See acute coronary syndrome.

heat cramps
Uncontrollable spasms of a muscle, usually affecting the calves, arms, abdominal muscles, and back, caused by the body's deficiency in sodium or other electrolytes.

heat exhaustion
Progressive shock, due to a loss of body fluid that occurs as a result of the body's effort to maintain a normal temperature in a hot environment.

heat stroke
A life-threatening condition most commonly recognized by a significant rise in body temperature when the body's normal cooling systems are overwhelmed, or have shut down as a result of extended exposure to a warm or hot environment.

hemostatic dressing
A commercial medical dressing, designed to be packed into a bleeding wound, that is impregnated with an agent that promotes faster clotting of blood.

high-altitude cerebral edema (HACE)
A serious medical condition caused by being at a higher altitude, in which fluid accumulates in the brain, increasing pressure within the skull.

high-altitude pulmonary edema (HAPE)
A serious medical condition caused by being at a higher altitude, in which fluid accumulates in the small air sacs within the lungs and results in breathing difficulty.

hyperglycemia
High blood sugar as a result of a deficiency in the body's ability to transfer blood sugar into the cells of the body. This conditions typically develops slowly over time.

hyperventilation
A condition characterized by a sense of breathing difficulty, in which the oxygen level of the body is higher than normal and the carbon dioxide is lower than normal.

hypoglycemia
Low blood sugar as a result of having too much insulin in the bloodstream in relation to blood sugar. This condition 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.

immobilization
The action of creating external control of a body part to prevent movement.

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.

incontinence
The lack of control of the excretory functions of urination and defecation.

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

initial (primary) assessment
An initial approach to quickly identify if a life-threatening condition is present.

laceration
A cut through the skin that is caused by a sharp object.

level of responsiveness (LOR)
The degree of brain function, which can exhibit as anything from fully alert to unresponsive.

mechanism of injury (MOI)
A concept used by first aid providers to quickly suspect injury due to a general impression that significant force has impacted a person's body.

medical care report form
A fillable form used to document the findings of assessment and details of treatment for an ill or injured person.

nature of illness (NOI)
A concept used by first aid providers to quickly suspect a certain illness or medical condition based on a provider's general impression.

occlusive dressing
An airtight and watertight dressing.

open chest injury
A penetrating injury to the chest wall through which air may be pulled or "sucked" into the chest cavity through the mechanical action of taking a breath.

open fracture
A bone fracture with an associated open wound.

packed dressing
A dressing that is packed into an open wound instead of just covering the wound.

physical exam
A complete head-to-toe, hands-on physical check of the body for signs of injury or illness.

pressure bandage
A specially designed bandage in which a bulky or hard embedded piece is placed directly over a point of bleeding to provide more focused pressure for bleeding control.

priapism
An uncontrolled penile erection in a male person caused by injury to the spinal cord.

protective barrier
An item that helps reduce the risk of exposure to blood and other potentially infectious body fluids, worn by first aid providers when giving care. Examples include disposable gloves, CPR masks, and face shields.

pulmonary edema
Fluid that accumulates in the small breathing sacs within the lungs due to illness or injury.

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.

RICE
A mnemonic device used to help providers remember the key actions to take when treating a suspected sprain or strain injury:

- **R**est
- **I**mmobilize
- **C**old
- **E**levate

SAMPLE
A mnemonic device used to help providers remember what to ask a person about during a focused assessment:

- **S**ymptoms
- **A**llergies
- **M**edications
- **P**ast medical history
- **L**ast oral intake
- **E**vents leading to problem

scene assessment
An initial pause and assessment of the scene to identify any hazards and enable a general impression of what happened.

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

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

sling and swathe
A soft splinting approach used to help immobilize musculoskeletal injuries to the upper extremities, shoulders, and rib cage.

SOAP
A mnemonic device used to help providers remember what information to document and how to organize documentation:

- **S**ubjective
- **O**bjective
- **A**ssessment
- **P**lan

spinal motion restriction
The use of hands to gently hold both sides of the head to restrict spine. 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 infectious disease is suspected. The approach is the same for everyone, regardless of relationship or age.

strains

Stretching or tearing injuries to muscles or tendons.

stroke

Sudden brain cell death caused by the loss of oxygen to brain tissue, either due to a blockage in a blood vessel or bleeding into brain tissue when a weak blood vessel wall bursts open.

tension pneumothorax

The buildup of air pressure within the chest cavity when injury to the chest and lungs occurs. It may occur due to the disruption of the breathing mechanism alone, or in combination with the use of an occlusive dressing during care.

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.

vital signs

Measured indications of body functions to determine the effect of illness and/or injury. Wilderness first aid vital signs include level of responsiveness, pulse, respirations, and skin signs.

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Knowledge Check Answers

Wilderness First Aid — *Page 2*

A wilderness first aid provider is someone trained not only to deal with the immediate care of a suddenly ill or injured person, but also to manage the issues created by being in a remote setting. Compared to a standard first aid provider, a wilderness first aid provider needs to be trained in a greater breadth of topics and in greater detail. Wilderness first aid training takes into account things such as limited access to medical supplies, exposure to outdoor elements, and extended response time for professional help.

Protecting Yourself — *Page 3*

First aid in a remote setting usually involves extended first aid treatment time prior to getting an ill or injured person to professional medical care, and these extended first aid treatments can be more involved. Both of these factors substantially increase the risk of disease exposure.

Legal Considerations — *Page 7*

Good Samaritan laws are meant to encourage bystanders to assist those in need. Good Samaritan laws protect those who voluntarily provide assistance, who are reasonable and prudent and do not provide care beyond the training received, and who are not grossly negligent, or completely careless, in delivering emergency care.

Getting Help — *Page 10*

When in doubt, make immediate plans to evacuate the person. Waiting to see if a situation improves can be dangerous.

Moving and Lifting — *Page 13*

Using your legs, not your back, drag the injured hiker 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, which is true in this case.

Scene Assessment — *Page 20*

Your personal safety is the highest priority, even before the safety of an ill or injured person. Putting yourself in danger to help someone can quickly make the situation worse. If the scene is unsafe, do not approach. If your current location becomes unsafe, get out!

Initial (Primary) Assessment — *Page 23*

ABCDE stands for airway, breathing, circulation, disability, and environment. Ask the following questions while performing an initial assessment: Is the airway clear and open? Is breathing present and if so, what is its quality? What is the quality of circulation and is there any bleeding? Is there disability or injury involving the head, neck, back, or spine? Are environmental conditions creating immediate threats?

Focused (Secondary) Assessment — *Page 31*

A head to toe physical exam, the measurement of vital signs, and a SAMPLE history.

Shock — *Page 37*

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

Control of Bleeding — *Page 44*

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.

Major Wounds — *Page 52*

Air from outside the body can be pulled, or "sucked," through the wound and become trapped in the chest cavity, progressively collapsing the lungs and impairing breathing over time.

Facial Injuries — *Page 57*

The eyes, ears, and nose provide critical sensory input for sight, hearing, and smell. Along with basic wound management, functional ability needs to be considered when dealing with facial injuries.

Minor Wounds — *Page 59*

General wound management involves controlling any bleeding, thoroughly cleaning the wound, keeping additional damage from occurring, and preventing the wound from becoming infected.

Cleaning, Closing, and Dressing Wounds — *Page 62*

Proper and effective wound cleaning, closing, and dressing can prevent most wound infections, speed healing, and reduce scarring.

Burns — *Page 66*

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

Head, Neck, or Back Injuries — *Page 70*

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

Musculoskeletal Injuries — *Page 79*

Over time, muscles in the injured limb may begin to spasm and contract. This movement has the potential to cause additional damage to the limb and could significantly increase the pain involved. Because of the extended time it takes to get to professional medical care in a remote setting, it is best to immobilize any suspected fracture with a splint.

Extended Injury Management — *Page 91*

Early signs of infection include pain, redness, swelling, and small amounts of light-colored pus, a thick fluid produced by infected tissue. As the infection progresses and the immune system response intensifies, other more serious signs can emerge:

- Increasing pain, redness, and swelling at the wound site
- Increasing heat at the wound site
- Pus increasing in volume and growing darker in color
- Red streaks just under the skin near the wound
- Rise of overall body temperature

Altered Mental Status — *Page 96*

If uninjured, place the person in a recovery position.

Breathing Difficulty, Shortness of Breath — *Page 100*

To avoid an accidental needlestick. The red or orange tip is where the spring-loaded needle emerges during the injection.

Abdominal Problems — *Page 106*

In general, you can suspect a more serious problem if pain is severe, sudden, or localized. Higher levels of pain can indicate a more serious problem.

Pain, Severe Pressure, or Discomfort in Chest — *Page 107*

True. This is a common occurrence in this situation. Accept it, but never let this alter your approach to care.

Poisoning — *Page 109*

Contact with poison oak, ivy, or sumac can cause an irritation of the skin. The irritation is caused by the body's reaction to an oil, urushiol, contained in the plants. Urushiol is present in all parts of these plants, not just the leaves.

Heat Emergencies — *Page 112*

You suspect heat stroke. Begin immediate and aggressive cooling with the resources available. If possible, the best method for cooling is to immerse the person up to the chin in cold water.

Cold Emergencies — *Page 116*

When a person has severe hypothermia, shivering stops. The person may experience muscle rigidity, stupor progressing to coma, and decreasing pulse and respirations.

Bites and Stings — *Page 122*

Do not apply a tourniquet, cold compresses, or try to suck out the venom by mouth for any snakebite. These methods are not effective and may be harmful.

Submersion (Drowning) — *Page 124*

Reach with your hand, foot, paddle, or other extension device that allows you to remain safely on land.

Throw a flotation device or line within the grasp of the person if he or she is active in the water.

Row out to the person, or otherwise access the person from some sort of watercraft. Then use reaching or throwing devices as appropriate from the craft.

Go into the water. A good swimmer with water rescue training may swim a flotation aid to a person actively struggling. Rescue of an unconscious person may require a surface dive and physical contact to move him or her to shore.

Lightning Strikes — *Page 126*

Direct strike — A person is hit directly by lightning.

Splash — The lightning strike jumps from its direct target to a person.

Ground current — The electrical charge radiates out from its strike point through the ground, reaching a person.

Long conductors — The person is touching a long conductor, such as a fence, when the conductor is hit.

Blast injury — The person is thrown by the exploding air created by lightning.

Penetrating injury — The person is injured from wood fragments when nearby trees or structures are hit by lightning.

Altitude Illnesses — *Page 128*

Descending to a lower altitude as quickly as possible.

Emotional Considerations — *Page 130*

Anxiety can be triggered by an event, the thought of something going wrong, or for no apparent reason. In a remote or wilderness situation, feelings of anxiety can be triggered by an illness or injury (your own or someone else's), or by fear of the unknown.

First Aid Kits — *Page 133*

There is no "one size fits all" kit. A first aid kit should be assembled based on the circumstances of the trip and those who are traveling.

Protection from the Elements — *Page 136*

No. Even when temperatures are mild, there is a risk of serious damage to any area of the body that is exposed to the sun's harmful ultraviolet (UV) rays.

Water and Food — *Page 138*

Filtration, followed by disinfection.

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 _____

Instructor _____ Date of Course_____

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. *Thank you for your help.*	4–Excellent	3–Good	2–Average	1–Poor
Course Presentation				
Organization, pace, and flow	☐	☐	☐	☐
Not too basic, not too complex	☐	☐	☐	☐
Time allowed for skill practice	☐	☐	☐	☐
Increased your confidence and ability to take action	☐	☐	☐	☐
Instructor(s)				
Subject knowledge	☐	☐	☐	☐
Teaching ability (clear, concise, organized)	☐	☐	☐	☐
Demeanor (friendly, helpful, engaging)	☐	☐	☐	☐
Program Materials				
Video	☐	☐	☐	☐
PowerPoint®	☐	☐	☐	☐
Student Book	☐	☐	☐	☐
Location and Equipment				
Space	☐	☐	☐	☐
Training equipment	☐	☐	☐	☐
Self Assessment				
How would you rate your emergency care skills BEFORE taking this class?	☐	☐	☐	☐
How would you rate your emergency care skills AFTER taking this class?	☐	☐	☐	☐
How willing would you be to respond in an emergency BEFORE taking this class?	☐	☐	☐	☐
How willing would you be to respond in an emergency AFTER taking this class?	☐	☐	☐	☐
Your overall score for the course	☐	☐	☐	☐

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 course using this Rate Your Program course evaluation form. You may also provide feedback directly to HSI at www.hsi.com/rateyourprogram.

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