WILDERNESS FIRST AID CURRICULUM AND DOCTRINE GUIDELINES

2017 EDITION



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Course prerequisites: Minimum age 14; current certification in an adult CPR course; completion of AED training.

Certification: Organizations and individuals may provide students who successfully complete the attached 16-hour curriculum a certificate of completion of a class that meets the criteria of the Boy Scouts of America for Wilderness First Aid (WFA). The content of this course may not deviate, either through additions or deletions, from the approved curriculum. This certificate will be valid for two years.

Foreword

The Development of the Curriculum and Doctrine

The 2010 edition of the *Boy Scouts of America Wilderness First Aid Curriculum and Doctrine Guidelines* (BSA WFA) were developed with content which was epidemiologically driven, evidence based, legally responsible, and based on modern education theory. The Task Force turned to the Wilderness Medical Society for epidemiological data and for evidence-based techniques. The American Red Cross provided experts for the input on education theory and protocol development. Additional members were selected from the education, medical, and legal community to form the Task Force. The Task Force developed the definition, scope, prerequisites, course length, curriculum subjects, and objectives, and wrote the doctrine for the course content. This identical product was adopted by the American Red Cross and was the basis for the course "Wilderness and Remote First Aid" released in March 2010. The BSA WFA was also adopted by multiple other national and local organizations which provided input to the revision now being released.

In preparing the revised 2017 edition of the *Boy Scouts of America Wilderness First Aid Curriculum and Doctrine Guidelines,* the comments of instructors, participants, and organizations utilizing the curriculum were considered as well as input from the BSA national and regional high-adventure programs.

This edition of the *BSA Wilderness First Aid Curriculum and Doctrine Guidelines* had oversight by members of the Boy Scouts of America Wilderness First Aid Task Force with significant input from its many members. The task force is particularly grateful to the lead writer, Buck Tilton, MS, EMT-W, whose wide experience and technical writing skills were unselfishly provided for the first edition and this edition of the project. Further specific gratitude is extended to Toney Islas, M.D., past president of the Wilderness Medical Society, for his assistance in the original epidemiological studies that led to this project's focus, and to Brad Bennett, Ph.D., NREMT-P, FAWM, Capt., USN (Ret.), immediate past president of the Wilderness Medical Society, for assuring a cohesive approach to military Tactical Combat Casualty Care curriculum concepts and applicable portions of the current guidelines of the Wilderness Medical Society.

The core curriculum has been changed to 12 hours that are considered mandatory to meet the BSA WFA requirement, and four additional hours to be chosen from the list of seven elective topics. Each elective topic has been specified a course content and time allocation. The total time allocation for the course remains at 16 hours. The minimum age requirement remains at 14 years. Recertification is required by repeating the course every two years. CPR and AED certification are prerequisites.

BSA requires that courses taught to BSA members conform to the curriculum now established as the *Boy Scouts of America Wilderness First Aid Curriculum and Doctrine Guidelines,* 2017 edition.

William Hurst, BSA Health and Safety Support Committee Chairman

William W. Forgey, M.D., BSA Wilderness First Aid Task Force Chairman

Core Curriculum

Introduction

Time
30 minutes

Objectives
Upon completion of this lesson, the participant will be able to:

1. Articulate all course goals, requirements, and resources.
2. Define wilderness first aid.
3. Describe the difference between wilderness first aid and standard first aid.

General Information

Definition: 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.

In this WFA class, course participants will learn how to assess, treat, and when possible, prevent medical and traumatic emergencies within the scope of their training.

Time is the essential element distinguishing WFA from standard first aid. When calling 911 is not an immediate option, or when help could be an hour or even days away, the task of managing the injured and the ill will challenge you beyond the first-aid knowledge and skills you will learn in this course. Long hikes, extended lengths of rivers, large expanses of ocean, and miles of asphalt may separate the patient from a medical facility. You may have to endure heat or cold, rain, wind, or darkness. The equipment needed for treatment and evacuation may have to be improvised from what is available, and communication with the "outside world" may be limited or nonexistent. Remote locations and harsh environments may require creative treatments. Each of these things may be a part of the world of WFA.

Note: *In addition to defining and providing an overview of the course, this half hour may be used for participants to meet each other and to be introduced to the instructor(s); a clear presentation of the course learning objectives and how those objectives will be evaluated; the handling of course paperwork, if any; and logistical matters such as the timing of lunch breaks, etc.*

Patient Assessment—Initial and Focused

Lessons I and II—Total Time
2 hours, 30 minutes

Patient Assessment I: Initial (Primary) Assessment—Sizing Up the Scene

Time
30 minutes

Objectives
Upon completion of this lesson and skill practice, the participant will be able to:

1. Describe the importance of immediately establishing control of the scene.
2. Describe the importance of establishing a safe scene including checking for hazards and standard precautions.
3. Define *mechanism of injury* (MOI) and describe why it is important as a factor in patient assessment.
4. Demonstrate how to perform an initial assessment including a quick scan for major bleeding and assessing airway, breathing, circulation, disability, and the environment (ABCDEF method).
5. Assess the number of victims and the need for additional resources.

General Information

"Patient" is the term used to describe the person to whom you will be giving first aid. You have to assess what is wrong with a patient before you can give first aid. An assessment is a step-by-step process. Although some of the steps might change depending on the immediate status of the patient, no step should be left out.

Establish Control

Emergencies, small or large, may be charged with emotion and confusion. Even minor chaos increases the risk of injury to rescuers and bystanders and the risk of inadequate care for the patient. Emergencies most often call for a leader to be directive, at least until the scene is safe and the patient is stabilized. This is best accomplished by discussing leadership in case of an emergency with other members of your party *before* a potentially critical situation occurs.

In an emergency, two qualities in a leader are necessary. The first is competence. That means you know your stuff; you are capable and ready to act. The second is confidence. You appear able to deal with the situation. You don't have to *feel* confident, but you should appear confident and sound confident. Avoid shouting. Speak with quiet authority, and then listen. Your goals should be, first, to provide the greatest good for the greatest number in the shortest time, and second, to do no harm.

Assess the Scene

Before rushing to a patient's side, take a few moments to stand back and survey the scene, checking for specific information. You must do all you can to ensure your actions won't make matters worse. Humans are resources. So creating additional patients would not only double the trouble but also reduce the resources. The problem would become more than twice as serious.

Establish body substance isolation (BSI). Take precautions—put on nonlatex gloves and/or glasses, for example—to protect you and the patient from germ transmission. This part of the process is termed "universal or standard precautions."

If possible, determine the MOI. Are there clues suggesting what happened to the patient or the forces involved in the patient's injury? For example, how far did a patient fall, and what did he or she land on?

Perform an Initial Assessment: ABCDE

After assessing the scene, your goal is to identify and treat any immediate threats to life. If you discover a threat, stop and attend to it. Death may occur due to loss of an airway; inadequate or nonexistent breathing; loss of adequate circulation because the heart has stopped or the patient has serious internal or external bleeding; damage to the spinal cord; or extremes of the environment. You should be asking questions. A patient who cannot respond requires your immediate CPR assessment training.

If you encounter a scene with many victims and few emergency responders, quickly applying a tourniquet to a person with a severed limb(s) may be the first technique you utilize to stop severe bleeding and save their life. Although opening the airway is the first treatment given to an unresponsive patient, assessing the entire situation quickly and determining the best effective treatment to save the most lives may include applying a tourniquet first.

Identify yourself, if necessary, and your level of training. Then ask for consent to provide care. Say something like "Hi, my name is _____ and I've been trained in first aid. Can I help you?" A patient who responds positively, or who does not respond negatively, has agreed to your treatment.

Control the patient and gather information. Say something like "Please do not move until I know more about you. Can you tell me who you are and what happened?" The patient may identify a chief complaint, saying something such as "I twisted my knee, and it really hurts."

If no chief complaint is identified, ask what the patient thinks is wrong. If the information you gather leads you to suspect a spine injury, place a hand on the patient's head and remind the patient to remain still.

Assess using the ABCDE method.

(A) Check the patient's airway. A patient who is speaking has an open airway, but ask if he or she has any problem breathing.

(B) Assess breathing. If breathing is difficult, you need to figure out why and fix the problem. This course will address some breathing problems that were not covered in your CPR course.

(C) Perform a quick scan for major bleeding. If you find bleeding, immediately expose the wound and use direct pressure to control the bleeding. However, using a tourniquet on a limb may be the first bleeding control measure necessary if it is clear that direct pressure will not be effective. Assess circulation. Check for a pulse at the wrist. This course will address something you can do for a pulse that is too fast or too slow.

(D) Assess for disability. If you suspect a spine injury, keep a hand on the patient's head or ask someone else to take control of the head. This course will address spinal injuries.

(E) Assess any threats in the environment. Prolonged exposure to environmental extremes can cause changes in body core temperature that may threaten the patient's life. The most common threat is cold. To avoid changes in body core temperature, a patient should be protected from the environment. If the threat is not extreme, protection may wait until you know more. If necessary, you must sometimes expose parts of the patient's body at skin level in order to assess the extent of damage and provide immediate care.

Patient Assessment II: Focused (Secondary) Assessment

Time
2 hours

Objectives
Upon completion of this lesson and skill practice, the participant will be able to:

1. Discuss the importance of a hands-on physical exam.
2. Demonstrate a physical exam on a patient.
3. Discuss the importance of vital signs and how they can change over time.
4. Demonstrate how to take a set of vital signs including level of response (LOR); heart rate, regularity and quality (HR); respiratory rate, rhythm, and quality (RR); and skin color, temperature, and moisture (SCTM).
5. Discuss the importance of taking a patient history and how to do so.
6. Demonstrate taking a patient history by asking questions related to symptoms, allergies, medications, pertinent medical history, last intake and output, and events surrounding the incident (SAMPLE).
7. Discuss the importance of documentation.
8. Demonstrate documentation in written and verbal form using information gathered via the subjective, objective, assessment, and plan (SOAP) format.

Note: *At this level of training, the participants will demonstrate mastery of these objectives by following written class notes—not from memory.*

General Information

When the patient is free from immediate threats to life, you are ready to perform a focused assessment—gathering clues about what the patient needs. The goal is to find every problem requiring first aid. The focused assessment includes three phases:

Hands-On Physical Exam

Check the patient from head to toe systematically in order to find any injuries. Look for wounds, swelling, or other deformities. Ask where it hurts and if it hurts when touched. Feel gently but firmly. Be aware of unusual smells such as breath odor, or sounds such as coughing. If you suspect an injury may be hidden beneath clothing, you must take a look at skin level.

Check:

Head. Feel for depressions in the skull, open injuries, swelling, damage to the eyes, and fluid in the ears, nose, or mouth.

Neck. Feel both sides for pain or deformity.

Shoulders. Feel for pain, and look for symmetry between the shoulders. Include the collar bone as well.

Chest. Press both sides simultaneously and check for the ability to take a deep breath. Check also for uneven breathing movements of the chest wall and abnormal breathing sounds.

Abdomen. Gently press on all four quadrants to check for pain (with the belly button as the central point).

Pelvis. Gently push in simultaneously on the sides of the pelvic crests, but do not rock the pelvis as this can increase serious damage if it is broken.

Legs. Check with both hands, looking for symmetry and the ability to move the feet.

Arms. Check for symmetry and the ability to move the hands. Check one extremity at a time and not simultaneously.

Back. If found facing up, roll the patient over to assess the back. If you suspect a spinal injury, perform the roll carefully. Press on every bone of the spine. The spinal injury training will show you how to properly roll a person.

Note: *This is an appropriate time to place the patient on a pad as protection from the cold ground.*

Vital Signs

Vital signs are measurements of the physiological processes necessary for normal functioning. They do not often tell you what is wrong, but they do tell you how the patient is doing. Changes in vital signs over time are indicators of changes in the condition of your patient. Check early and keep checking, and record your findings on your report form. To better monitor a patient, record the time at which you take a set of vitals on your report form.

Level of Responsiveness

The level of responsiveness (LOR), also called level of consciousness, is a check on how well the brain is communicating with the outside world.

Is the patient awake and oriented? Does the patient know who he or she is, where they are, approximately what time it is, and what happened? Or is the patient awake but disoriented? Or is the patient unconscious?

Heart Rate

To determine the heart rate (HR), count the number of heartbeats per minute. For speed, count for 15 seconds and multiply by four. Note the quality of the pulse. Is it weak or strong? Normal heart rates are strong and regular and are typically between 50 and 100 beats per minute.

Respiratory Rate

To determine the respiratory rate (RR), count the number of breaths per minute without telling the patient what you are doing. A patient who knows you are checking often alters the breathing rate in an attempt to be accommodating. Note the quality of respirations. Normal lungs work about 12 to 20 times per minute at regular and unlabored pace. Record any unusual noises associated with breathing.

Skin Color, Temperature, and Moisture

When assessing skin color, temperature, and moisture (SCTM), normal skin is pink (in nonpigmented areas such as the inner surface of the lips and eyelids), warm, and dry to your touch.

SAMPLE History

Usually, more information is gathered by subjective questioning than by objective checking.

This information is known as a patient's history. Hopefully, the patient will provide the answers. Sometimes witnesses are sources of important information. Ask calmly, and *do not* use leading questions. (For example, say "Describe your pain" instead of "Is it a sharp pain?") Be aware of your tone of voice, body language, and eye contact. Patients usually feel better and respond better if they think you are nice—but *do not* make promises you cannot keep. If you gain trust, you must maintain trust.

The SAMPLE Questions

(**S**) **Symptoms:** How do you feel?

(**A**) **Allergies:** Do you have any allergies?

(**M**) **Medications:** Are you taking any medications?

(**P**) **Past medical history:** Are you seeing a doctor for any reason or have you been treated in the past for a serious condition?

(**L**) **Last intake and output:** When did you last eat, drink, urinate, defecate?

(**E**) **Events:** What happened that led to the illness or injury?

Documentation

The acronym SOAP reminds you to write everything down as soon as possible on your report form—as long as taking notes does not interfere with patient care. Retention of information for medical and legal reasons is important.

(**S**) **Subjective information:** Who (age and gender) is the patient? What are his or her complaints? What happened?

(**O**) **Objective information should be obtained,** including the results of the patient exam, vital signs, and SAMPLE history.

(**A**) **Assess the patient.** What do you think is wrong?

(**P**) **Plan your treatment.** What are you going to do immediately for the patient? Answer the evacuation question—stay or go, fast or slow? A part of every plan is to *monitor* the patient for changes and developing needs.

Chest Injuries

Time
30 minutes

Objectives
Upon completion of this lesson and skill practice, the participant will be able to:

1. Demonstrate a field assessment of a patient with a chest injury.
2. Describe the emergency treatment of and long-term care for a chest injury.
3. Describe situations that would require an evacuation versus a rapid evacuation.

General Information

Any significant injury to the chest may lead to difficulty breathing, a potentially serious and life-threatening problem. You must be able to properly identify and provide first aid for all chest injuries, recognize when a chest injury is serious, and know when and how quickly you need assistance. The chest examination must include both the front and back side.

Guidelines for Assessment and Treatment of Chest Injury

Pain is present with a chest injury, and the patient often complains of an increase in pain when a deep breath is taken. Take a look at the chest at skin level. There may be discoloration (bruising) where the injury occurred. You may notice some swelling. The patient often guards the injury, protecting it from being moved or touched. Help the patient assume a position that makes it easiest to breathe. Suspending the arm on the affected side in a sling-and-swathe may assist in comfort.

If the chest has been opened by a penetrating object, the hole may bubble and make noise when the patient breathes.

The hole should be immediately covered with an occlusive dressing, something that lets no air or water pass through. Clean plastic will work. Tape this dressing down securely on all four sides. If symptoms become much worse immediately after applying the occlusive dressing, a tension pneumothorax—air trapped in the pleural space between the lung and its lining—may be developing. Remove just one side of the dressing to allow for air to escape and to prevent further trapping of air in the pleural space. Evacuate this patient immediately.

Increased difficulty in breathing usually indicates the injury is becoming worse. This situation requires a speedy evacuation.

Guidelines for Evacuation

Evacuate—go slow—any patient with a simple chest injury. Often, a patient with this injury is able to walk. Evacuate rapidly—go fast—any patient who has sustained a chest injury associated with increasing difficulty breathing. In this circumstance, the patient will need to be transported.

Shock and Heart Attack

Time
30 minutes

Objectives
Upon completion of this lesson and skill practice, the participant will be able to:

1. Define shock and discuss briefly the stages of shock.
2. List the signs and symptoms of shock and describe the patient in which shock may be a potential threat to life.
3. Demonstrate the emergency treatment of and describe the long-term care for a patient in shock.
4. Define heart attack and list the signs and symptoms of a heart attack.
5. Demonstrate the emergency treatment of and describe the long-term care for a patient having a heart attack.
6. Describe situations that would require an evacuation versus a rapid evacuation.

General Information

Shock is inadequate perfusion, a condition that results when the cardiovascular system is challenged, causing the patient's brain and other body cells to receive a less than sufficient flow of oxygenated blood. It can occur from a great variety of injuries and illnesses including but not limited to: loss of the needed level of fluid in the body via blood loss or significant dehydration; failure of the heart to pump adequately due to heart attack; or loss of adequate pressure in the blood vessels of the body due to spinal cord damage or a severe allergic reaction. Whatever the cause, shock patients tend to share similar signs and symptoms, and you must be able to intervene with proper care and know when the patient needs a higher level of care than you can provide.

Guidelines for Assessment and Treatment of Shock

Patients in shock progress through stages as they deteriorate.

In the early stages, look for:

1. Level of responsiveness (LOR) that is anxious, restless, and/or disoriented.
2. Heart rate (HR) that is rapid and weak.
3. Respiratory rate (RR) that is rapid and shallow.
4. Skin color, temperature, and moisture (SCTM) that is pale, cool, and clammy (but may be pink and warm in some cases, such as if the shock is the result of an allergic reaction).
5. Symptoms that include nausea (and sometimes vomiting), dizziness, and thirst.

In the later stages, look for:

1. LOR that continually decreases with eventual unresponsiveness.
2. HR in which the radial pulse (the pulse at the wrist) grows increasingly rapid, weakens, and eventually disappears.

Since shock can kill, and since what you can do for shock is limited in the wilderness, early recognition and management are critical.

1. Treat shock early, before serious signs and symptoms develop.
2. If a cause can be identified, such as bleeding or dehydration, treat the cause immediately.
3. Keep the patient calm and reassured.
4. Keep the patient lying down, as found in most cases. If no trauma is involved, raising the lower extremities up to 12 inches may be helpful for a short period of time. However, do not do this if it causes the patient any pain.
5. Protect the patient from loss of body heat.
6. Sips of cool water may be given to prevent dehydration with shock from any cause if the patient tolerates fluids, and his or her mental status allows holding and drinking from a container.

Guidelines for Assessment and Treatment of Heart Attack

Heart attack (damage or death of part of the heart muscle due to lack of adequate perfusion) is the leading cause of deaths in the United States. A heart attack may, but not always, lead to shock. Not only does shock make the situation more serious—it is often fatal. What you do, therefore, is of critical importance.

Patients may complain of center-chest discomfort such as crushing, squeezing pain, or heavy pressure. Pain, predominantly on the left side, may radiate to the shoulder, down the arm, or into the jaw. Nausea, sweating, and shortness of breath are common. Patients often deny the possibility that this could be a heart attack.

In all situations, you need to keep the patient physically and emotionally calm, in a position of comfort (usually not lying down) and warm. Do not allow the patient to walk, even short distances. Call for help. Give the patient aspirin if there are no allergies and it is safe to do so. Choose either two low-dose aspirin (81 mg each) or one adult aspirin (325 mg). Have the patient chew the aspirin. If swallowed whole, the pill(s) will take too long to be absorbed.

Guidelines for Evacuation

Evacuate any patient with signs and symptoms of shock that do not stabilize or improve over time. Evacuate rapidly—go fast—any patient with decreased mental status or worsening vital signs, especially if the patient's heart rate keeps speeding up. Go fast if your assessment is heart attack. All of these patients will need to be carried.

Head (Brain) and Spine Injuries

Time
1 hour, 30 minutes

Objectives
Upon completion of this lesson and skill practice, the participant will be able to:

1. Demonstrate a field assessment for injuries to the head.
2. List the signs and symptoms of a closed head injury and a skull fracture.
3. Describe the emergency treatment of and long-term care for a head injury.
4. Describe how some head injuries could be prevented.
5. List the most common mechanisms of injury that can lead to spinal trauma.
6. List the signs and symptoms of spinal injury.
7. Demonstrate a field assessment for injuries to the spine.
8. Demonstrate how to properly restrict spinal motion with an improvised collar.
9. Discuss the importance of proper lifting and moving of patients.
10. Demonstrate a one-rescuer roll from back to side, side to back, and facedown to back with placement of a protective pad underneath the patient.
11. Demonstrate a two- and three-rescuer roll from back to side, side to back, and facedown to back with placement of a protective pad.
12. Demonstrate body elevation and movement (BEAM) of a patient.
13. Describe how some spinal injuries could be prevented.
14. Describe situations that would require an evacuation versus a rapid evacuation.

Head (Brain) Injury General Information

Anyone who has received a significant blow to the head or face runs the risk of bleeding and swelling of the brain. Because there is little room inside the head for swelling to occur, brain injuries can cause death in a relatively short period of time.

Guidelines for Assessment and Treatment of Head Injury

Despite the possibility of heavy bleeding from a scalp wound or the growth of a goose egg–sized bump, a serious threat to the patient is rare if the skull is intact and the brain is relatively undamaged. With a mild head injury, there will be very short-term loss of consciousness or no loss at all. Symptoms may include short-term amnesia, briefly blurred vision, nausea, headache, dizziness, and/or lethargy. Treat wounds appropriately: Apply pressure from a bulky dressing on the bleeding scalp and a cold pack for the bump. Monitor the patient for about 24 hours. Awaken the patient every two hours during the night to check for signs and symptoms of serious brain damage.

A period of unconsciousness during which the patient does not respond to aggressive stimulation should be considered long-term unconsciousness and may indicate serious brain damage. The injury may or may not involve a skull fracture, which should always be considered severe.

Signs of a skull fracture include:

1. A depression in the skull.
2. A fracture visible where the scalp has been torn revealing the fracture.
3. Bruising around both eyes (raccoon eyes) or behind both ears (Battle's Sign).
4. Cerebrospinal fluid (clear fluid) and/or blood weeping from nose or ears.

Without an obvious skull fracture, patients may at first appear to have recovered but later may start to deteriorate. With or without evidence of a skull fracture, you must watch for signs and symptoms of brain injury.

Signs and symptoms of a head (brain) injury include:

1. Mental status deterioration—from disoriented, to irritable, to combative, to coma
2. Personality changes
3. Loss of coordination and/or speech
4. Debilitating headache
5. Visual disturbances
6. Seizures
7. Persistent nausea and vomiting
8. Relapse into unconsciousness

In later stages, heart rate may slow and bound, respiratory rate may become erratic, and pupils may become unequal.

If there is an obvious head injury, consider the possibility of a cervical (neck) spine injury. Specific measures to implement during evacuation include the critical importance of establishing and maintaining an airway in all unconscious patients. You can usually keep an airway open by keeping the patient in a stable side position (the HAINES position). Alternatively, with consideration for possible spinal injury, place the patient with his or her head elevated approximately 6 to 8 inches. Do this only by tilting the patient's entire body. Do not raise just the head or torso. This may be accomplished by transferring and properly securing the patient to a litter, and then tilting the litter/patient.

Guidelines for Prevention of Head Injuries

Adequate care for a brain injury is not possible in the wilderness. Prevention 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 nonstretching chinstrap. Wearing a helmet does not eliminate the chance of a serious injury, but it does reduce the risk.

Guidelines for Evacuation

Evacuate any patient who does not respond initially to aggressive attempts at stimulation after a blow to the head. When responsive, this person can walk out if there are no indications of serious head injury. Evacuate rapidly—go fast—any patient with signs and symptoms of severe head injury, especially a skull fracture and/or a decrease in mental status. Serious patients require carrying.

Spine Injury General Information

Damage to the spinal cord may result in permanent paralysis or death. The spinal cord of nerves is protected by the spinal column of bone. Injury to the bones may not always lead to damage of the nerves, but it is an indicator that spinal precautions should be taken. For that reason, proper management of a patient with suspected damage to the spine is critical to prevent spinal cord damage (if it hasn't occurred already). In the initial assessment, any patient who has a mechanism for a spine injury, especially a cervical injury, should be kept still with your hands on his or her head and calming words said until secondary treatment can be applied.

Note: *A patient found unconscious should be considered spine-injured.*

Highly suspect mechanisms of injury include:

1. Compression/axial loading, such as falling from a height or landing on the head
2. Excessive flexion, as when the chin is forced to the chest
3. Excessive extension or rotation, such as tumbling downhill without skis releasing
4. Distraction, such as an attempted hanging
5. Penetration, as from a gunshot or stabbing in the area of the spine
6. Sudden and violent deceleration

Guidelines for Assessment and Treatment of Spine Injury

Signs and symptoms of spine injury include spine pain, spine tenderness to touch, and obvious injury to the spinal column.

Signs and symptoms of spinal cord injury include:

- Altered sensations in and the ability to move the extremities such as numbness, tingling, unusual weakness, inability to move, or unusual hot or cold sensations
- Respiratory difficulty
- Loss of bowel control
- Signs and symptoms of shock

Patients on their back can be log-rolled onto their side to assess the back for injuries. Manual stabilization of the head and neck is critical during the roll. At the command of the head-holder, the patient is rolled as a unit, keeping the neck and back in line. Patients must be held stable during the check and rolled back with the same precautions. Moving a spine-injured patient must only be performed when absolutely necessary, and proper planning must be in place to decrease unnecessary movements.

Note: *A log-roll can also be used to roll a patient onto her or his side in order to place a pad underneath before rolling the patient back onto the pad.*

Patients can also be rolled from side to back and from facedown to back using the same precautions. Although it is possible for one rescuer to perform such rolls, two or three rescuers make the job easier and safer for the patient.

If the patient's neck lies at an odd angle, it may be straightened with slow, gentle movement—performed by the rescuer—to line it up with the rest of the spine. This straightening improves the airway and makes immobilization easier. If this movement causes pain or meets resistance, stop and immobilize the patient's head as it lies.

A patient with a possible spinal injury who is found crumpled into an odd body position may be straightened with slow, gentle movement of one body part at a time. This typically makes the patient more comfortable and provides for better immobilization.

When the spine-injured patient has to be moved, such as into a tent for warmth, accomplish the move via **body elevation and movement** (BEAM). A BEAM requires a sufficient number of rescuers kneeling on both sides of the patient and another rescuer holding the head. The rescuers on the sides gently push their hands underneath the patient. At the command of the head-holder, lift the patient as a unit with as little spine movement as possible. Then carefully carry the patient, using shuffling steps, to a predesignated spot. The patient is then lowered via commands from the head-holder.

With the spine in normal alignment, the next step is to restrict spine motion with a cervical collar—but only if evacuation is delayed; ambulances carry rigid cervical collars. You can improvise one in the wilderness 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 patient's neck and taping it in place. A collar goes completely around the patient's neck. If an improvised collar varies in thickness, the thickest part should be placed between the chin and chest. Collars, even commercial products, cannot totally stabilize the cervical spine.

Hands-on attention should still be maintained, if possible, until the whole patient is stabilized in a rigid litter. In the backcountry, you're often looking at a long wait for a litter, but attempting to move a spine-injured patient without one creates great risk and is *not* recommended. When a litter is available, the patient should be FOAMed in place—made **free of any movement**—with an adequate amount of padding and straps. Fill any voids with pads under the knees, in the small of the back, and anywhere there is space that could let the patient shift. The patient's head should always be strapped down last. Proceed with care.

Guidelines for Prevention of Spine Injuries

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.

Evacuation Guidelines

Evacuate any patient being treated for a possible spinal injury. Evacuate rapidly—go fast—any patient with the signs and symptoms of spinal cord injury.

Bone and Joint Injuries

Time
2 hours

Objectives
Upon completion of this lesson and skill practice, the participant will be able to:

1. Define muscle injury, fracture, and dislocation.
2. List the signs and symptoms of a strain, sprain, fracture, and dislocation.
3. Demonstrate a field assessment for injuries to bones and joints.
4. Define RICE (rest, immobilize, cold, and elevate) and describe its use.
5. Demonstrate and/or describe the emergency treatment, including the use of improvisation, for:
    a. Strains and sprains
    b. Fractures
    c. Dislocations, including realignment of fingers, toes, patella, and shoulder
6. Describe the emergency treatment for:
    a. Angulated fractures
    b. Open fractures
7. Describe the long-term care for injuries to bones and joints.
8. Describe how to prevent some bone and joint injuries.
9. Describe situations that would require an evacuation versus a rapid evacuation.

General Information

Injuries to the musculoskeletal system—bones, ligaments, muscles, tendons, and cartilage—are among the most common in wilderness activities. You will often be unsuccessful in your attempt to assess exactly what is wrong, but you need to know how to handle these emergencies.

Guidelines for Assessment and Treatment of Muscle Injuries

Muscle injuries are here defined as overstretched muscles, tendons (which attach muscles to bones) or ligaments (which attach bones to bones). Muscle injuries can range from a mild annoyance to debilitating. They are indicated by pain and sometimes by bruising in the area of the injury.

These injuries can be used within the limits of pain—in other words, tell the patient if it hurts, do not do it. RICE can be helpful:

(**R**) The patient should **rest** the injured area. Have him or her avoid movement that causes pain.

(**I**) **Immobilize** the injured area. Immobilization can lessen pain and prevent further damage.

(**C**) Apply **cold** to the injured area. Applying ice or a cold pack can help reduce swelling and ease pain.

(**E**) **Elevate** the injured area above heart level to reduce swelling. Serious injuries to the limbs may preclude this.

RICE should be applied after an initial evaluation of the injury. The primary goal of the evaluation is to determine if the joint is usable or not. Get the patient at rest and relaxed, and take a look at the injury. Look for deformities, swelling, and perhaps discoloration. Have the patient 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 patient test it with their body weight. A usable joint can remain active within certain limits. Unusable joints may require a splint.

Usable or unusable, keep the injured area at rest for half an hour while you reduce its temperature as much as possible without freezing. 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 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.

Immobilization can best be attained with a compression dressing; this requires an elastic wrap. Wrap it snugly but not tight enough to cut off healthy circulation, and wrap from below the injury toward the heart. Elevation refers to keeping the injury higher than the patient's heart. After 20 to 30 minutes of RICE, remove the treatment and let the joint warm naturally for 10 to 15 minutes before use.

Usable upper-extremity sprains do not require support. With usable knee sprains, the patient may be aided by creating a walking splint for the knee—which restricts movement without putting pressure on the kneecap. A pad should be placed behind the knee within the splint to keep the knee slightly flexed. The patient will be further supported by using a stick or staff for balance. Patients with usable ankles should have their boots laced firmly and should also walk with a stick or staff.

Guidelines for Assessment and Treatment of Fractures

Sometimes the assessment of a fracture, or broken bone, is simple: bones that stick out through the skin, or angular bends appearing where they shouldn't. In less obvious situations, and without an X-ray, rescuers can base an assessment on specific guidelines. The goal, again, is to determine whether or not the injured area is usable.

Remove clothing carefully, and take a look at the site of the injury. Is there discoloration and swelling? Does the patient move the injury easily or guard it, preventing motion? Compare the injured side to the uninjured side. Does it look broken?

Ask the patient: How did the injury occur? (High-speed impacts cause more damage than low-speed impacts.) Do you think it is broken? (The patient is often correct in their assessment.) How bad does it hurt? (Surrounding muscle spasms create pain and give evidence of the seriousness of the injury.)

Gently touch the damaged area. Does the patient react to your touch? Does it feel like the muscles are in spasm? Does the area feel unstable? Is there point tenderness—one particular spot that hurts noticeably more when touched? These are indications of a fracture.

Check for CSM—circulation, sensation, and motion—beyond the site of the injury. Loss of a pulse, numbness, tingling, and inability to move are signs that normal blood flow and nerve messaging have been reduced—serious complications with a fracture. After splinting, check CSM often to assure circulation is not cut off by wraps that are too tight.

Remember: Patients will usually benefit from RICE, whether the bone is broken or not.

Splinting

The general rule is: *When in doubt, splint!* A splint should restrict movement of the broken bone(s), prevent further injury, and maximize patient comfort until a medical facility can be reached. To do this best, a splint needs to be made of something to pad the injury comfortably and something rigid enough to provide support. Padding should fill all the spaces within the system to prevent movement of the injury. In addition, a splint should be long enough to restrict the movement of the joints above and below a broken bone, or restrict the movement of the bones above and below an injured joint.

Splints should hold the injury in the position of function or as close to position of function as possible. Functional positions include:

- Spine, including neck and pelvis, straight with padding in the small of the back
- Legs almost straight with padding behind the knees for slight flexion
- Feet at 90 degrees to legs
- Arms flexed to cross the heart
- Hands in a functional curve with padding in the palms

In choosing materials for splinting, you are only limited by imagination: sleeping bags, foam pads (and they can be cut to fit the problem), extra clothing, and soft debris from the forest floor stuffed into extra clothing can all serve as splints. For rigidity, there are items such as sticks, tent poles, ski poles, ice axes, lightweight camping chairs, and internal and external pack frames. Lightweight commercial splints are available as additions to your first-aid kit. 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.

Specific Fractures

Jaw fractures can be held in place with a wide wrap that goes around the head. Be sure the wrap can be removed quickly if the patient feels like vomiting.

Collarbone (clavicle) fractures can be secured with a sling-and-swathe. Slings can be made from triangular bandages or improvised by lifting the tail of the patient's shirt up over the arm on the injured side and safety-pinning it in place. Be sure the sling lifts the elbow to take pressure off the shoulder.

Lower arm (radius and/or ulna) fractures (including wrist and hand) can be secured to a well-padded, rigid support, and then held in a sling-and-swathe. Place a roll of something soft in the hand to keep it in position of function. If bones of the hand are damaged, be sure to secure the hand well to the splint with, as always, lots of padding.

Fingers that are broken can be secured to nearby healthy fingers with padding between the fingers.

Upper arm (humerus) fractures can be placed in a sling-and-swathe. Leaving the elbow free sometimes eases the pain. Secure the broken bone to the patient's chest wall with a wide, soft wrap.

Rib fractures can be protected by supporting the arm on the injured side with a sling-and-swathe. Do not wrap a band snugly around the patient's chest. Do encourage the patient regularly to take deep breaths, even if it hurts, to keep the lungs clear. Be sure to watch the patient for increasing difficulty breathing.

Pelvis and hip fractures should include securing the entire patient on a rigid litter before attempting a carry-out. Conforming wraps around the pelvis will provide some support and security. Secure the legs comfortably to each other. Be sure to watch the patient for signs of shock due to internal bleeding common with pelvic fractures.

Leg (femur, tibia, and/or fibula) fractures (including the ankle and foot) can be secured on a well-padded, rigid support that includes immobilization of the ankle and foot. Sleeping pads and lightweight camping chairs can make excellent leg splints. Pad behind the knee for comfort.

Complicated Fractures

An *angulated fracture* (angles in bones) needs to be straightened. Pull gentle traction on the broken bone *along the line in which it lies*. This relaxes the muscles and reduces the pain, allowing you to move the broken bone slowly and gently back into normal alignment. The sooner this movement takes place the better. Do not use force. Do not continue if the patient complains of increasing pain. Once aligned, splint as usual. If alignment cannot be achieved, splint as best you can.

An *open fracture* is indicated by an open wound at the point of fracture. Bones may or may not be visible. The wound should be irrigated and dressed appropriately, and the bone should be splinted. If bone ends stick out of the wound, and if the doctor is more than four to six hours away:

- Clean the wound and bone ends without touching them.
- Apply gentle traction in line to the fracture and pull the bone ends back under the skin.
- Dress the wound.
- Splint the fracture. Infection is on the way, but bones survive better if pulled back inside the body.

Guidelines for Assessment and Treatment of Dislocations

With a dislocation, the bone ends in a joint are no longer properly aligned. The patient typically experiences pain in the joint and a loss of normal range of motion. The joint will look wrong. Many dislocations can only be managed in the field by splinting in the most comfortable position. With some dislocations, a field reduction (realignment) may be attempted.

Work quickly but calmly. Typically, the sooner a reduction is attempted, the easier it is on patient and rescuer. Encourage the patient to relax as much as possible, with special concentration on relaxing the injured joint. Reduction may cause pain, but stop if pain increases dramatically. Once reduced, the injury should be splinted.

Specific Reducible Dislocations

Anterior shoulder dislocations are one of the most common types. There are several ways to reduce a dislocated shoulder. With the Stimson technique there is little chance of harm to the patient, although it takes time and sometimes fails to work:

1. Position the patient prone (face down) across a rock or log with the arm on the injured side dangling down vertically.
2. With a soft cloth, tie something of about 5–10 pounds of weight to the dangling wrist.
3. Wait. This process takes 20 to 30 minutes to work. The key to success is for the patient to be relaxed and to allow the gentle pull of the weight to slowly fatigue the chest and back muscles, thus allowing the head of the 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.

Persons experiencing a shoulder dislocation can frequently pull their shoulder back into place, if they perform virtually the same maneuver immediately upon themselves. Standing or sitting, the patient should pull the injured arm straight forward away from the body by gripping their wrist with the opposite hand. This is the same mechanical maneuver that the Stimson technique employs. If the victim delays more than a few minutes in attempting this reduction, the dislocation will cause so much spasm in the chest muscles that this technique will probably not work.

Upon reducing the shoulder, the patient should be placed in a sling-and-swathe. Do not swathe the patient if the person may need to use their arm in an emergency, such as escaping from an overturned raft or preventing a fall. While it is best that the shoulder be immobilized, allow the patient the ability to use the arm in an emergency.

Finger dislocations are also common. Keeping the injured finger partially flexed, pull on the end while gently pressing the dislocated joint back into place with your other thumb. Tape the injured finger to a neighbor with a gauze pad between them. Do not tape directly over the joint itself.

Kneecap (patella) dislocations are typically very easy to reduce. Apply gentle traction to the leg to straighten it out. Sometimes the kneecap pops back into place when the leg is straightened. If it does not, massage the thigh and push the kneecap gently back into normal alignment with your hand. With a splint that does not put pressure on the kneecap, the patient may be able to walk out.

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 neighbor with a gauze pad between them. Do not tape directly over the joint itself.

Guidelines for Preventing Bone and Joint Injuries

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

Guidelines for Evacuation

With a usable injury, the patient's degree of comfort, more than anything, will determine the need to evacuate. Evacuate any patients with unusable injuries and with first-time dislocations (except perhaps dislocations of the outer joints of the fingers and toes). Evacuate rapidly—go fast—any patients 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.

Wounds and Wound Infection

Time
2 hours

Objectives

Upon completion of this lesson and skill practice, the participant will be able to:

1. Define serious bleeding and demonstrate control of bleeding including direct pressure, packing the wound, and tourniquets.
2. Define abrasion, laceration, and blister, and demonstrate wilderness treatment, including the use of improvisation, for each.
3. Demonstrate proper wound-cleaning techniques, including pressure irrigation, scrubbing, and rinsing.
4. Define and demonstrate the proper management of superficial, partial-thickness and full-thickness burns in short- and long-term settings.
5. Define and describe the treatment for chafing.
6. Define and describe treatment for common medical problems related to ears, nose, and teeth.
7. Describe treatment and prevention of bites from mosquitoes, ticks, and venomous snakes.
8. Describe the signs, symptoms, and treatment of wound and skin infections.
9. Describe personal and camp hygiene and their role in prevention of skin infections.
10. Describe how some wounds and wound infections could be prevented.
11. Describe situations that would require an evacuation versus a rapid evacuation.

General Information

Wounds, burns, and problems related to the ears, nose, and teeth are among the most common ailments dealt with by all providers of first aid. All wounds should be considered and treated as contaminated. Goals of management include stopping serious blood loss, cleaning wounds and keeping them clean, and treating wounds in order to increase comfort and promote healing.

Note: *Use nonlatex gloves when there is any possibility of exposure to blood or other body fluids.*

Guidelines for Treatment of Bleeding

When the heart beats, it sends blood through the arteries in pulsations. As the blood returns to the heart, it moves under less pressure and flows in a steady stream. Life-threatening arterial bleeding spurts from a wound each time the patient's heart beats, or flows rapidly if muscle and tissue prevent it from spurting. Venous bleeding, which can also be serious, flows smoothly and rapidly.

A quick visual scan of the patient is often enough to detect serious bleeding—but not always! Check inside the clothing of someone wearing bulky winter gear or rain gear. Check beneath someone who is lying in sand, rocks, snow, or any other terrain that might disguise blood loss.

Note: *Severe blood loss can also be from an internal injury (e.g., artery or organ) and not visible, so monitor for shock.*

Almost all bleeding can be stopped with direct pressure, usually applied with pressure from your hand directly on the wound with a barrier between you and the wound. If there is time, place a sterile dressing on the wound before applying pressure. If there is no time, grab anything absorbent to press into the wound. In cases of severe bleeding, packing a wound initially with your fingers, then switching to and packing with absorbent material, can supplement continued direct pressure.

Be aware that some wounds should not be treated with direct pressure. Pressure to a wound on a patient's neck may cut off the air supply. Instead, stop the bleeding by carefully pinching the opening closed. Pressure to a head wound may push cracked bone fragments into the patient's brain or other vital organs in the head (e.g., eye, inner ear). Cover the wound with a bulky dressing and press lightly instead.

If blood loss is significant, a commercial or improvised tourniquet can be used on an arm or leg. While direct pressure will stop most bleeding, in a wilderness situation control of blood loss is a priority and may make the "tourniquet first" approach appropriate in order to prevent shock. There are two military approved commercial strap and windlass style tourniquets: Combat Action Tourniquet (C-A-T) or the Special Operations Forces Tactical Tourniquet (SOFT-T). Otherwise use an improvised tourniquet. Tie a band of soft material (e.g., a large triangular bandage), approximately 3 inches in width, around the limb and about 2 to 3 inches above the wound. Do not use anything narrow such a belt, rope, or string as a tourniquet. The minimal width for a tourniquet would be 1½ inches. Tie a short stick or another rigid object into the material to create a windlass technique. Then twist it, tightening the tourniquet until bleeding stops—and no more. Attach the stick to the windlass by incorporating it into the knot, and fasten one end of the windlass when it has been adequately tightened by tying a square knot over it and the limb.

It is critically important to check the pulse *beyond the tourniquet* after application. If you can find a pulse, the tourniquet is not tight enough and should be tightened more. If the windlass applied tourniquet does not stop the bleeding, apply a second one directly above the first. These arterial tourniquets are rarely necessary and should only be used in the event of life-threatening bleeding that is not stopped by direct pressure. However, if a second tourniquet is required to control bleeding, apply and keep it on continuously until the patient receives definitive surgical care. In a very remote area where care might not be reached for days, continuous application can result in loss of the limb. Of course, it is always more important to save a life than a limb.

In all situations, it is best to apply a tourniquet before any signs or symptoms of shock can appear. A rule of thumb is to leave a tourniquet on any extremity with severe arterial bleeding—not venous bleeding—no longer than two hours, then start a transition to wound packing and a pressure dressing to control the bleeding. However, it is important to only loosen the tourniquet and leave it in place around the extremity in case bleeding occurs again. If a tourniquet has to be left on an extremity longer than six hours, then it is recommended to leave it on until definitive care can be reached. Tourniquets should not be released periodically just to resupply the limb with blood since this can cause excessive blood loss resulting in shock. The control of blood loss is a critical step in a remote care situation. Only remove the tourniquet if it seems feasible that applying direct pressure will fully control the bleeding.

There are now three hemostatic dressings approved by the military. These are special bandages that help clot blood. They are expensive and not suggested as part of the basic curriculum, but they are appropriate to use with the proper training. When used, place hemostatic dressings into the wound, if possible on the bleeding vessel, in the same manner as wound packing with cotton gauze. Do not apply these dressings on top of other bandage material. Continuous direct pressure must also be applied for a minimum of five minutes or per the manufacturer's recommendations for hemostatic dressings.

Guidelines for Assessment and Treatment of Specific Wounds

Abrasions are shallow and often dirty wounds that occur when some skin has been scraped away. If you are able to treat the abrasion within about 10 minutes, simply applying a thick layer of antibiotic ointment—if the patient is not allergic—covering it with a sterile dressing will work. If treated later, abrasions should be scrubbed clean. You can scrub with a gauze pad or a clean, soft cloth with soap and water. Follow scrubbing with irrigation or rinsing. Apply a thin layer of antibiotic ointment if no allergies, then a dressing and bandage.

Lacerations are cuts through the skin that have either even or ragged edges. They will vary in depth. Skin around a laceration should be washed clean prior to thorough irrigation of the wound. There is no definitive amount of water to use when irrigating a laceration, but plan on using at least a half-quart. In most cases, deep lacerations that you had to hold open in order to irrigate thoroughly should be held closed with wound closure strips or thin strips of tape after cleaning. Apply a thin layer of antibiotic ointment if not allergic, then a dressing and bandage.

Blisters result from sheer forces that cause aggressive rubbing of outer layers of skin against inner layers. The tough outer layer of skin separates from the sensitive inner layer. Fluid fills the space created between the layers. Blisters feel better when deflated, and controlled draining is far better than having them rupture inside a dirty sock. Clean around the site thoroughly. Sterilize the point of a needle or knife, or use a sterile scalpel, and open the blister wide enough to easily massage the fluid out. Leaving the roof of the blister intact will make it feel better and heal faster. If the roof has been rubbed away, clean the wound. In all cases, apply a 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 rounded piece of moleskin with a hole cut in the center. Center the blister site in the hole and fill the hole with ointment. An antibiotic ointment is preferable, but any lubricating ointment will work. Tape or a strip of moleskin needs to be placed over the hole to keep the ointment in place.

Notes on Wound Cleaning

Proper wound cleaning, closing, and dressing will prevent most wound infections. Cleaning also speeds healing and reduces scarring. Start by washing your own hands and putting on protective gloves.

The best method for cleaning is mechanical irrigation. Irrigation involves a high-pressure stream of an acceptable solution directed into the wound, best directed from an irrigation syringe. For most wounds, the best cleaning solution is disinfected water or at least potable water (water safe to drink). Draw the water into the syringe, hold it about 2 inches above the wound and perpendicular to the wound, and push down forcefully on the plunger. Keep the wound tipped so the water runs out. Without an irrigation syringe, you can improvise by using a biking water bottle, melting a pinhole in the center of the lid of a standard water bottle, or punching a pinhole in a clean plastic bag. If you use something other than disinfected water, follow irrigation with a final flush of disinfected water or potable water.

Large dirty wounds, wounds that expose bones, tendons, or ligaments, and wounds caused by animal bites should be left open. They are difficult to clean well enough to prevent infection. After irrigation, cover these wounds with sterile gauze. Exceptionally dirty wounds should be packed open with moist sterile gauze and covered with dry gauze to allow them to drain until a physician can be consulted.

Notes on Laceration Closure

If hair gets in the way of laceration closure, it can be carefully clipped short, but it should not be shaved. When using closure strips, apply one end of one strip to one side of the wound and another to the opposite side. By using the opposing strips as handles, you can pull the wound edges together, pulling the skin as close as possible to where it should lie naturally.

Notes on Wound Dressing

A dressing is the primary covering of a wound. It works best if it is sterile, nonadherent, porous, resistant to bacterial invasion, and easy to use. Wounds heal faster with less scarring if they are kept slightly moist with an antibiotic ointment, if not allergic, or with a dressing that holds in the body's moisture, such as a micro-thin film dressing. Film dressings have the added advantages of being see-through and water-repellent. The dressing should completely cover the wound and ideally extend a half-inch or so beyond the wound's edge. 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 bodily fluids.

The function of a *bandage* is to fix, protect, and further assist the dressing. It can be conforming gauze, tape, elastic wraps, clean cotton strips, or improvised out of anything available. A bandage loses its usefulness if it is too loose and can be dangerous when too tight. Remove rings, jewelry, watches, or anything that could cut off circulation if swelling occurs. 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.

Guidelines for Assessment and Treatment of Burns

Burns may result from heat, chemical reactions, electricity (including lightning), and radiation (including solar radiation). Initial treatment needs to be given immediately following a quick initial assessment.

1. Remove the patient from the source of the burn.
2. Stop the burning process, the faster the better—within 30 seconds, if possible. Burns can continue to injure tissue for a surprisingly long time. No first aid will be effective until the burning process has stopped. Smother flames, if appropriate, then cool the burn with water. Do not try to remove tar or melted plastic from the burn wound.
3. Be immediately suspicious of possible airway complications with burns to the face and/or neck, soot in the nose and/or mouth, singed facial hair, and a dry cough. It is essential to maintain ongoing patient assessment for potentially delayed airway complications.

Specific burn treatment depends on your assessment of the depth and extent of the injury. Even though this assessment may be rough, it will be your basis for deciding how the patient will be managed, whether evacuation is required, and how urgently.

Burn Depth

Superficial burns: Skin is red, painful, and perhaps swollen.

Partial-thickness burns: Skin is red, painful, and swollen, and blisters form, sometimes more than an hour after cooling.

Full-thickness burns: Skin is painless and without blisters but generally pale (scalded) or charred in appearance. These burns may also be surrounded by partial-thickness burns.

Burn Extent

Use the Rule of Palmar Surface to estimate the extent of the burn: The patient's palmar surface—the inner surface of your palm, including the fingers—equals about 1 percent total body surface area (TBSA). The more TBSA burned, of course, the more serious the injury.

Note: *In addition to depth and extent, do not underestimate the value of pain as a burn assessment tool. If the patient is in a lot of pain, that is an indication of the need for a physician's care.*

To treat a burn, once the burning process has stopped:

1. Gently wash the burn with slightly warm water and mild soap. Pat dry.
2. Leave the burn blisters intact.
3. Dress the burn with a thin layer of antibiotic ointment, if there are no allergies.
4. Cover the burn with a gauze pad or a thin layer of roll gauze, or apply clean clothing. Covering wounds reduces pain and evaporative losses.
5. Do not pack wounds or patient in ice.
6. Elevate burned extremities to minimize swelling. Swelling retards healing and encourages infection. Get the patient, as much as possible, to gently and regularly move burned areas.
7. If you have no ointment or dressings, leave the burn alone. The burn's surface will dry into a scab-like covering that provides a significant amount of protection.
8. Keep the patient warm.
9. Keep the patient well-hydrated.

Note: *When evacuation is imminent, do not redress or re-examine the injury. But if evacuation is delayed, redress the injury twice a day by removing old dressings (soak them off with clean, lukewarm water if necessary), rewashing to remove the old ointment, and putting on a clean covering.*

Guidelines for Treatment of Chafing

Chafing in the groin area and between the thighs can be treated with a layer of lubricating oil or ointment, such as petrolatum jelly (Vaseline®) or cooking oil. It is messy but relieves the irritation.
Chafing is easier to prevent than treat. Consider the following:

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

Guidelines for Assessment and Treatment of Ear, Nose, and Teeth Problems

Ear

If something is lodged in the ear, *do not* use force to remove it. If the object is small, it can often be rinsed out with water if the eardrum is intact. An insect in the ear canal can be treated by instilling room temperature sweet oil or any cooking oil into the ear, which effectively decreases the insect's movement and may rinse it out or suffocate it until it can be removed by trained medical personnel. An outer ear infection, or swimmer's ear, hurts more when you pull on the earlobe. Rinse the ear daily with a solution of 50 percent water and 50 percent vinegar or alcohol. If pain persists, seek trained medical help. Middle ear infections do not increase in pain when the earlobe is tugged and are often accompanied by vertigo. These infections require a physician's attention.

Nose

To stop a nosebleed, keep the patient sitting and leaning forward, and pinch the meaty part of the nose firmly shut. Hold it for 10 minutes. If the bleeding persists, pinch for another 10 minutes and repeat until the bleeding stops. Continued bleeding can be treated by packing the nostrils gently with gauze soaked with antibiotic ointment or a decongesting nasal spray. Most nosebleeds are not serious, but it is possible for noses to bleed from the back, and for excessive blood to run down the throat. These posterior nosebleeds are serious and need a physician's attention and rapid evacuation. Blows to the nose that cause deformity may be treated with cold packs. Nosebleeds that result from trauma can be very brisk, but generally stop within 15 to 20 minutes and usually do not recur. However, spontaneous bleeds are prone to recurring until the scab heals firmly, which takes about 10 days. Ask the patient not to blow their nose as this tends to remove the clot and restart the bleeding. It is best to seek professional help within 10 days if the nose is deformed by trauma.

Teeth

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 a dentist can be found. 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.

If a tooth is knocked out, there is a chance it can be salvaged if you can get it back into the empty socket. Hold the tooth by the crown and avoid touching the root. After rinsing the tooth with clean water (do not scrub it), press it gently back in. If it will not go back in, at least save it until you find a dentist. The best way to store the loose tooth is for the person to hold the tooth in their 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 solutions. If none of these options are possible, store the tooth in water.

An infected tooth is indicated by pain and swelling in the surrounding gum and the cheek. Discoloration of the gum may be visible. Cold packs on the cheek may give some relief. If evacuation is delayed, have the patient rinse their mouth several times a day with warm, salty water. Antibiotic therapy is usually required, and evacuation should not be delayed.

Guidelines for Treatment and Prevention of Insect Bites

Common insect bites include those received from mosquitoes and ticks. Although primarily a nuisance, these bites may carry the risk of disease.

Mosquitoes

The itching from mosquito bites can be treated with topical agents available over the counter. In all cases, scratching should be avoided to prevent open wounds that may become a source of infection.

Some mosquito bites carry the risk of West Nile virus. Flulike illness that develops within two weeks of receiving mosquito bites should be evaluated by a physician. In addition to the West Nile virus, mosquitoes can carry many other diseases such as malaria, yellow fever, chikungunya, and Zika. Some mosquito bites can be prevented by avoiding exposure during prime biting times, usually dawn and dusk. Be sure tents have adequate netting on doors and windows. Set camps well away from high-risk areas: standing water, swampy ground, dense brush. Repellents that work with mosquitoes include products containing DEET, with the long-acting version being the most effective repellent. Concentrations of DEET higher than 30 percent do not improve repellency, but they do require reapplication less often. 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. With all repellents, read and follow the directions on the labels.

Treat clothing, tents, and sleeping bags with 0.5 percent 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 percent of bites from disease-bearing mosquitoes and ticks.

Ticks

In the United States, ticks may carry one of at least eight diseases. Depending on the specific pathogen, the tick has to feed from several hours to several days to pass enough germs to cause disease. Any illness that develops after removal of an embedded tick should be evaluated by a physician.

Ticks are repelled by many of the same repellents that keep mosquitoes from biting. Body checks for ticks should be performed twice daily when hiking and camping in tick-infested country. All ticks need to be removed immediately. Embedded ticks should be pulled out slowly using tweezers to grasp the tick perpendicular to its long axis and near the patient's skin line.

Snakes

Venomous snakes of the United States include pit vipers and coral snakes. The risk of death from a bite is low. With all snake bites, keep the patient physically and emotionally calm, and gently wash the bite site. Splint any bitten extremities and keep the bite site at approximately the level of the patient's heart. Do not cut, suck, apply a constricting band, or apply cold. Go for help. The patient should not walk unless it is unavoidable for evacuation. The treatment of choice for snake bite is your car keys—which means you need to evacuate the patient swiftly. Snake bites need to be evaluated by a physician. Snake bites are puncture wounds that might cause infections, including tetanus.

Guidelines for Assessment and Treatment of Wound Infection

Mild infection is indicated by pain, redness, swelling, and a little light-colored pus. These wounds should be recleaned, redressed, and monitored closely. Monitor for signs of serious infection:

- Increasing pain, redness, and swelling are primary indicators of serious infection.
- Increasing heat at the site
- Pus increasing and growing darker in color
- Appearance of red streaks just under the skin near the wound
- Systemic fever

Persons with signs of serious infection require rapid evacuation. If you see any signs of serious infection, allow the wound to reopen and let it drain. You may need to encourage the process with soaks in water as hot as the patient can tolerate. Pack the wound with moist, sterile gauze to keep it draining, and dress it with dry, sterile gauze. Wet-to-dry dressings encourage draining. Reclean and repack the wound twice a day during an extended evacuation.

Guidelines for Personal and Camp Hygiene

Maintaining a high level of personal and camp hygiene can reduce the risk of skin infections. Use soap and water to wash hands at least once a day and before meal preparation. In the backcountry, when washing hands with running water is difficult, use a hand sanitizer after bowel movements and urinating as well as before and after you provide patient care.

Body washing is not mandatory but should be considered on extended trips and performed at least 200 feet from natural water sources. During cold or inclement weather, powdering the groin, underarms, and feet with talcum powder can provide protection from moisture and accumulating body odor and oils.

Guidelines for Prevention of Wounds and Wound Infection

Standard safety precautions will prevent many wounds. Most wound infections can be prevented with adequate cleaning, dressing, and bandaging.

Blisters can be prevented by:

1. Wearing boots or shoes that fit and are broken in
2. Wearing a thin inner sock under a thicker outer sock
3. Treating "hot spots" *before* they become blisters
4. Taking off your boots to let your feet dry when you take a break from hiking

Evacuation Guidelines

Evacuate—go slow--any patient with a wound that cannot be closed in the field. Evacuate rapidly—go fast—any patient with a wound that:

1. Is heavily contaminated
2. Opens a joint space
3. Involves tendons or ligaments
4. Was caused by an animal bite
5. Is deep and on the face
6. Involves an impalement
7. Was caused by a crushing injury

Wounds that gape more than one half-inch should not be closed in the field but instead evacuated for closure by a physician.

Evacuate any patient with an infected wound or skin infection that does not improve within 12 hours of treatment or which spreads to other parts of the body. Evacuate rapidly—go fast—any patient with signs and symptoms of a serious infection. If more than one person on the trip breaks out in skin boils or abscesses, be concerned about group contamination with MRSA, a serious staph infection, and immediately evacuate to seek professional medical care.

Evacuate all patients with serious burns to the face, neck, hands, feet, armpits, or groin, and all patients with full-thickness burns. Rapidly evacuate—go fast—any patient with burns threatening the airway, with partial- or full-thickness circumferential burns, and with blisters and/or full-thickness burns covering 10 percent TBSA.

Allergies and Anaphylaxis

Time
30 minutes

Objectives
Upon completion of this lesson, the participant will be able to:

1. Describe the basics of an allergic response and its treatment and prevention.
2. Define and list the signs and symptoms of anaphylaxis.
3. Describe the function of epinephrine and describe conditions under which an injection of epinephrine will be considered.
4. Describe the use of the EpiPen® injection system.
5. Describe the function of oral antihistamines in anaphylaxis, and discuss when and how much will be used.
6. Describe how some allergic reactions including anaphylaxis could be prevented.
7. Describe situations that would require an evacuation versus a rapid evacuation.

General Information

The human body's immune system produces and releases histamines and other substances in response to the presence of foreign allergens. An allergic reaction is an overproduction and excessive release of these same substances. Allergens can be ingested, inhaled, injected, or absorbed, and they include foods and drugs, pollen, bee venom, and plant oils.

Guidelines for Assessment and Treatment of Allergies and Anaphylaxis

For simplicity, allergic reactions can be divided into two types: non-life-threatening and life-threatening. Non-life-threatening reactions are characterized by stuffy noses, flushed and itchy skin, hay fever signs and symptoms, swelling (at a bite site), and/or hives. They can be treated in the field with an antihistamine.

A severe reaction, known as anaphylaxis, is a true emergency. At first, there may be signs and symptoms of a non-life-threatening reaction. Anaphylaxis may then produce shock but is more often typified by extreme difficulty breathing, causing the sufferer to be unable to speak or to speak only in one- or two-word clusters. Swelling of the face, lips, tongue, and perhaps the hands and feet are indicative. These signs and symptoms can appear in as little as five minutes and most often within 45 minutes to one hour. Death is imminent. Anaphylaxis is reversible only by an immediate injection of epinephrine (adrenaline). Epinephrine reverses the effects of an overproduction of histamines. Injectable epinephrine is available commercially, and by prescription only, in spring-loaded syringes that function when pressed into the thigh. You may need to assist someone with the injection. Injections can be repeated if the first one fails or a relapse occurs.

Use of an EpiPen® Auto-Injector

The EpiPen® is an auto-injection system with two injection units available per box. It is available in adult and child doses. Using the EpiPen® involves three simple steps:

1. Pull off the blue safety cap.
2. Place the orange tip on the outer thigh, half-way between the hip and knee (lateral side)—preferably against the skin, although it can be used through thin clothing.
3. Push the unit against the thigh until it clicks, and hold it in place for a count of 3.
4. Rub the injection area for 10 seconds.

After injection of epinephrine, and when the patient can breathe and swallow easily, an oral antihistamine should be given, following the directions on the label, to continue suppressing the overproduction of histamines. The patient should also be kept well-hydrated.

Everyone who knows they are susceptible to severe allergic reactions should carry injectable epinephrine. Epinephrine can be ruined by extremes of cold and heat and needs to be protected from these extremes.

Guidelines for Prevention of Allergies and Anaphylaxis

Every precaution should be taken to avoid contact with 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 injections of epinephrine.

Evacuation Guidelines

Mild to moderate reactions can be managed in the field and do not require evacuation. Anyone treated for anaphylaxis should be evacuated rapidly—go fast. During evacuation, the patient should be well-hydrated and kept on a regimen of oral antihistamines.

Electives

Hypothermia

Time

45 minutes

Objectives

Upon completion of this lesson, the participant will be able to:

1. Describe the mechanisms of heat loss versus heat gain.
2. Define hypothermia.
3. List the signs and symptoms of mild and severe hypothermia.
4. Demonstrate the emergency treatment of and describe the long-term care for mild and severe hypothermia.
5. Describe the prevention of hypothermia.
6. Describe situations that would require an evacuation versus a rapid evacuation.

General Information

The human body constantly generates heat through its metabolism. At rest, heat is generated through basal metabolic activity. Exercise increases metabolic heat production dramatically, the rate depending on the fitness of the person and the level of activity. Some heat may be absorbed from external heat sources. Heat is constantly shed by radiation from skin, conduction via contact with cold material such as the ground, convection via the movement of air across skin, and evaporation of moisture from skin. The human thermoregulatory system typically balances heat gain and heat loss to keep the body core temperature around 99.6 degrees Fahrenheit (98.6 degrees oral temperature).

Hypothermia is a lowering of the body's core temperature to a point where normal brain and/or muscle function is impaired. This condition may be mild, moderate, or life-threateningly severe.

Guidelines for Assessment and Treatment of Hypothermia

There are several degrees of hypothermia that are clinically significant and may require hospital treatment. These levels, determined by the core temperature of the patient, are mild hypothermia (89.6 to 95F), moderate hypothermia (82.4 to 89.6F), and severe or profound hypothermia (below 82.4F). But in the wilderness, the ability to determine the degree of cold and the method of treatment resolves into these categories: the cold individual who is not hypothermic, has mild hypothermia, or who experiences moderate or severe hypothermia.

A person with normal mental function who is shivering may not be hypothermic, but may simply be cold and responding by shivering. Application of heat packs would be ineffective and might decrease the shivering response, which would make the condition worse. Instead, change the individual's environment so that the heat being produced internally is not lost. Get the patient out of wet clothes and into something dry, or out of the wind and cold and into some kind of shelter—even if the only shelter available is the protection of waterproof, windproof clothing. Cover the patient's head and neck. If the patient can eat and drink, give them simple carbohydrates to "stoke the inner fire." Fluids are more important than solids to a cold person. A warm, sweet drink will add a negligible amount of heat but a lot of simple sugar for energy, plus fluid. Even cold fluids are better than no fluids. If the patient is still capable of exercise (e.g., slow walking), keep them moving after initial treatment to increase internal heat production.

Moderate hypothermia manifests itself in a patient through shivers, inability to perform complex tasks, confusion, apathy, sluggish thinking, slurred speech, and altered gait. Together, these symptoms are sometimes referred to as the "umbles": fumbling, grumbling, mumbling, and stumbling. Patients with moderate hypothermia cannot adequately take care of themselves. Protect them from further cooling using insulation and vapor barrier. Remove wet clothing only if there is a warm shelter available. Support shivering with calorie replacement. Active rewarming is beneficial. Apply heat to upper torso (chest, armpits, and back) using large heat packs. Don't use the smaller, hand-warmer packs because heat in only small amounts may actually prolong recovery by decreasing the shivering response. No standing or walking for 30 minutes will help a shivering patient to rewarm and prevent a drop in core temperature from exercising while they are warming from the moderate into the mild hypothermic state.

In a patient with severe hypothermia, shivering has stopped. The patient may experience increasing muscle rigidity, stupor progressing to coma, decreasing pulse, and respirations to the point where they are undetectable (but still present!). Do all you can to encourage inner heat production: Remove clothing and bundle the patient in as much dry insulation as possible. Insulate well from the ground. Keep them close to others who are warm. Wrap hot water bottles or heat packs in a dry sock or shirt and place them appropriately as with mild hypothermia. Finish with a vapor barrier such as a tent fly, sheet of plastic, or garbage bags—something to trap any heat still left in the patient. The final product is a cocoon, a hypothermia wrap open only to the mouth and nose. Do not try to force food or drink. Treat for severe hypothermia even if the patient appears to be dead. Call for help immediately. Evacuate only through gentle means; rough handling of a severe hypothermic patient can potentially cause a fatal abnormal heart rhythm.

Guidelines for Prevention of Hypothermia

It is far easier to maintain core temperature than to regain core temperature, so:

- Wear clothing that retains body heat even when wet. Do not wear cotton clothing if the temperature could drop below 77 degrees Fahrenheit.
- Stay dry by wearing layers of clothing, taking off layers before sweating starts, and adding them back before chilling occurs.
- 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.**

Evacuation Guidelines

Patients who recover from mild to moderate hypothermia may remain in the field. Evacuate rapidly—go fast (but with extreme gentleness)—any patient with moderate to severe hypothermia. Take special care with patients who have experienced moderate to severe trauma to the head, chest, or abdomen. These trauma victims are even more vulnerable to cold stress.

Heat Problems

Time
1 hour

Objectives
Upon completion of this lesson, the participant will be able to:

1. Define heat cramps, heat exhaustion, heat stroke, and dilutional hyponatremia.
2. List the signs and symptoms of heat exhaustion, heat stroke, and dilutional hyponatremia.
3. Describe the emergency treatment of and long-term care for heat exhaustion, heat stroke, and dilutional hyponatremia.
4. Describe the prevention of heat illnesses.
5. Describe situations that would require an evacuation versus a rapid evacuation.

General Information

Heat illness describes a range of problems associated with very warm to hot air temperatures. In addition to air temperatures, other factors increase the risk of heat illness:

- High humidity
- Being overweight
- Being very young or very old
- Being unaccustomed to heat
- Illness with fever and taking certain drugs, such as antihistamines
- Wearing anything that interferes with heat loss (e.g., certain helmets, clothing with vaper-barrier lining), or not removing layers of clothing when overheated
- Being moderately to severely dehydrated (This is often the most important factor. Promote a "drink to thirst" approach to prevent a weight loss of greater than 2 percent.)

Guidelines for Assessment and Treatment of Heat Exhaustion

Heat exhaustion is a result of heat stress, water and electrolyte loss (most often through perspiration), and less-than-adequate hydration. The patient has usually been exercising and sweating out water and salt, and now feels very tired. Skin may appear pale and sweaty or flushed. The patient complains of a headache, perhaps nausea, and sometimes vomiting. Thirst is typical as well as a decreased urine output. Dizziness may strike when the patient stands quickly. An elevated heart rate and respiratory rate are common. The core temperature with heat exhaustion may have risen a few degrees but more often not at all.

Treatment is suggested by the name of the condition: Exhaustion calls for rest, preferably in a cool, shady spot. Have the patient remove excess clothing. Replace lost fluids with water. Replace lost salt by adding a pinch of it to a quart of water or by eating salty snacks. Oral rehydration salts or a sports drink will work. Do not use salt tablets, which are too concentrated. To increase the rate of cooling, wet down and fan the patient's skin. A drowsy patient may be allowed to sleep in a cool setting. When the patient feels OK, they may continue their activity.

Guidelines for Assessment and Treatment of Heat Stroke

Heat stroke occurs when a patient is producing core heat faster than it can be shed. The patient may be overexerting and/or seriously dehydrated, and the core temperature rises to 105 degrees Fahrenheit or more. Disorientation and bizarre personality changes are common signs. The patient may be found unconscious. Skin turns hot and red, and sometimes dry. Look for a fast heart rate, fast and shallow breathing, and complaints of a headache.

Heat stroke is a temperature problem and is life-threatening. The patient is too hot internally. Once the human brain gets too hot, it is an immediate emergency and only rapid whole-body cooling will save the patient. The ideal treatment is to remove any heat-retaining clothing and immerse the patient in cold water until they regain consciousness. If a large source of water is not available, drench the patient with the coolest water possible and protect them against breathing

the water in. Fan the patient vigorously and constantly to increase evaporation. Monitor the patient closely and stop cooling efforts when a normal mental state returns. Give the patient a cup of cold water when they are able to drink it. Do not give them fever-reducing drugs. The patient must see a physician as soon as possible, even if they appear to have recovered. During evacuation, a careful watch on the patient should be maintained. Relapses are common.

Guidelines for Assessment and Treatment of Dilutional Hyponatremia

This form of hyponatremia (salt deficiency) results when the blood sodium level falls too low to maintain normal body function. This is usually the result of drinking more than enough water while failing to eat. The rule of thumb is to only drink if you are thirsty. This prevents overhydration.

Common signs and symptoms include headache, weakness, fatigue, lightheadedness, muscle cramps, nausea with or without vomiting, and sweaty skin. Core temperature is normal with slightly elevated or normal pulse and respirations, and a rising level of anxiety. The challenge is that these patients may appear to have heat exhaustion or heat stroke since the signs and symptoms overlap. But if you treat it like heat exhaustion by just adding water, you will make the hyponatremia worse. More severe signs of hyponatremia include a patient who is disoriented, irritable, and combative—which gives the problem its more common name: water intoxication. Untreated, the result will be seizures, coma, and death.

Heat-exhausted patients typically have a low output of yellowish urine (urinating every six to eight hours) combined with thirst. Hyponatremia patients have urinated recently and the urine was probably clear; they may have been drinking a lot of water (many liters over many hours) and deny that they're thirsty.

Patients with mild to moderate symptoms and a normal mental state may be treated in the field. Have them rest in the shade with beverages (not even sports electrolyte drinks) and a gradual intake of salty foods while the kidneys reestablish a sodium balance. The ideal fluid treatment is to give them a 9 percent 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 output, the problem is solved. Fortunately restriction of fluids for someone who is well-hydrated is harmless. Patients with an altered mental state require rapid evacuation to a medical facility—no question about it.

Guidelines for Prevention of Heat-related Illnesses

- To stay appropriately hydrated (not under or over), you should "drink to thirst." That is to say, if you are thirsty, drink.
- Avoid alcohol and caffeinated drinks.
- Wear baggy, loosely woven clothing that allows evaporation of sweat. Keep your head covered and your face shaded.
- Keep yourself 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.

Evacuation Guidelines

Evacuate—go slow—any patient who does not fully recover from heat exhaustion or mild dilutional hyponatremia. Evacuate rapidly—go fast—any patient who has an altered mental state due to heat or dilutional hyponatremia.

Lightning

Time

30 minutes

Objectives

Upon completion of this lesson, the participant will be able to:

1. Describe how lightning can cause injury and/or death.
2. Describe the emergency treatment of and long-term care for lightning-induced injuries including respiratory arrest and cardiac arrest.
3. Describe the prevention of a lightning-induced injury and/or death.
4. Describe situations that would require an evacuation versus a rapid evacuation.

General Information

Lightning strikes can cause harm through a direct strike (the patient is hit); splash (the strike jumps from its direct target to hit a patient); ground current (the electrical charge radiates out from its strike point through the ground, reaching the patient); long conductors (the patient is touching a long conductor such as a fence when the conductor is hit); blast injury (the patient is thrown by the exploding air); or penetrating injury (from wood fragments when nearby trees are hit by lightning).

Lightning strikes may produce several types of injuries including:

- Cardiac and/or pulmonary arrest
- Neurological problems such as loss of responsiveness, paralysis, or seizures
- Blindness, often temporary
- 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

Guidelines for Assessment and Treatment of Lightning Injuries

When the scene is safe—remember that lightning can strike twice in the same place—patients require a full assessment. Rescue breathing or CPR should be started immediately if needed. Other injuries require appropriate treatment.

Guidelines for Prevention of Lightning Injuries

- Know local weather patterns. Lightning storms, in general, tend to roll in quickly in the afternoons of summer months.
- Plan turnaround times in lightning-prone areas, and stick to the plan.
- Before a storm hits, find a safer location. Move downhill. Avoid high places, high objects (such as tall trees), open places, damp caves, overhangs, flood zones, places obviously struck in the past, and long conductors (such as fences). In the mountains climb to high areas before noon, then climb down to low areas to avoid afternoon summer storms. Metal conducts electricity, so avoid metal. Remove any metallic frame packs and do not stay near them. Water also 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 insulating 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 safe campsites, ones that meet the criteria of a safe spot as mentioned above.
- Be sure everyone in the group understands these guidelines.

Evacuation Guidelines

Evacuate rapidly—go fast—any patient who has been struck by lightning, even if he or she appears to have recovered soon after the injury. Serious problems sometimes develop later.

Altitude Illnesses

Time
30 minutes

Objectives

Upon completion of this lesson, the participant will be able to:

1. Define altitude illnesses including acute mountain sickness (AMS), high altitude cerebral edema (HACE), and high altitude pulmonary edema (HAPE).
2. List the signs and symptoms of AMS, HACE, and HAPE.
3. Describe the emergency treatment of and long-term care for AMS, HACE, and HAPE.
4. Describe the prevention of AMS, HACE, and HAPE, including, briefly, the process of acclimatization.
5. Describe situations that would require an evacuation versus a rapid evacuation.

General Information

Altitude illnesses are the result of insufficient oxygen in the blood (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.

Guidelines for Assessment and Treatment of Altitude Illnesses

Acute Mountain Sickness

Signs and symptoms of acute mountain sickness (AMS) in someone who has recently arrived at an altitude of 8,000 feet or higher include headache, loss of normal appetite, nausea (with or without vomiting), insomnia, and lassitude (unusual weariness and exhaustion). The syndrome resembles an alcohol hangover. There are no characteristic physical findings. Signs and symptoms of AMS may appear below 8,000 feet, but are then more often the result of a problem other than AMS such as dehydration or heat-related illness.

Basic treatment is to descend, or to stop ascending and wait for improvement before going higher. Continuing ascent in the presence of symptoms is not recommended. After stopping the ascent, more advanced treatment should include administering supplemental oxygen, which is especially helpful during sleep. If the illness progresses, descent is mandatory.

High Altitude Cerebral Edema

Untreated, mild AMS illness may progress to a more severe condition. The most important early sign of this progression is often loss of coordination, or ataxia. An ataxic patient cannot walk a straight line or stand straight with feet together and eyes closed. Ataxia typically indicates the patient is progressing into a severe form of altitude illness known as 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 and symptoms include a severe headache unrelieved by rest and medication, bizarre changes in personality, perhaps seizures, and/or coma. Note that some patients suffer HACE without complaining of a severe headache. *Severely ill patients need to descend as soon as possible.* In addition to descent, the best treatment is supplemental oxygen. Other possible treatments include the use of a Gamow bag (a portable hyperbaric chamber). Do not use a Gamow bag instead of descent.

Note: *Persons going to an altitude higher than 8,000 feet should discuss with their personal physician drugs that are specifically known to assist in the treatment and prevention of some altitude illnesses.*

High Altitude Pulmonary Edema

Severe altitude illness may present as high altitude pulmonary edema (HAPE), fluid collecting in the air spaces of the lungs. If enough fluid collects, the patient cannot breathe adequately, and death may result.

The signs and symptoms of HAPE often appear initially as a 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. The cough becomes productive, producing frothy sputum early and reddish sputum later. *Severely ill patients need to descend as soon as possible.* A descent of 1,000 to 1,500 feet may produce remarkable results. In addition to descent, the best treatment is supplemental oxygen. Use the Gamow bag, if it is available, but not instead of descent.

Guidelines for Prevention of Altitude Illnesses

Most altitude illnesses are preventable. The following guidelines 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.

1. **Staged ascent:** The most critical factor in preventing illness is to gain altitude no faster than your body can acclimatize (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. Proceed higher during the day, if you wish, but return to a lower elevation to sleep (climb high, sleep low).
2. **High-carbohydrate diet:** A diet of at least 70 percent carbohydrates reduces symptoms of AMS by about 30 percent at altitudes higher than approximately 16,000 feet, and can be started one to two days prior to reaching 16,000 feet.
3. **Appropriate exercise level:** Until acclimatized, exercise moderately. Avoid intense exercise, which could result in excessive shortness of breath and fatigue.
4. **Hydration:** To offset increased fluid losses at high altitudes, stay well-hydrated.

Note: *No drug should be taken, even if available, without directions from a physician. Persons going to an altitude higher than 8,000 feet should discuss obtaining personal prescriptions of acetazolamide, nifedipine, and/or dexamethasone with their personal physician.*

Evacuation Guidelines

Patients with AMS should stop ascending until the symptoms resolve. If the symptoms do not resolve, evacuation is required. Patients with HACE or HAPE require a rapid—go fast—evacuation to a lower altitude (at least 1,000 to 1,500 feet) and evaluation as soon as possible by a physician.

Abdominal Problems

Time
30 minutes

Objectives

Upon completion of this lesson and skill practice, the participant will be able to:

1. Demonstrate a field assessment for abdominal pain and/or discomfort.
2. Define and describe the treatment of and long-term care for stomachache and diarrhea.
3. List the indications causing serious abdominal pain and/or discomfort.
4. Describe personal and camp hygiene and their role in prevention of abdominal problems.
5. Describe situations that would require an evacuation versus a rapid evacuation.

General Information

Abdominal pain and discomfort, a common wilderness problem, can have numerous sources ranging from mild and nonthreatening to serious and life-threatening. You may never discover the source, but you must be able to manage mild problems and know when a problem is serious, requiring an evacuation. General assessment includes asking the appropriate questions about the pain and/or discomfort. Assessment may include pressing gently on the four quadrants of the abdomen with your hand flattened. Note this assessment on your report form and any changes over time.

Guidelines for Assessment and Treatment of Stomachache

Gastroenteritis, often called a stomachache, is an inflammation of the gastrointestinal tract. It can be caused by viruses, bacteria, or protozoa. Mild inflammations are characterized by gradually increasing widespread abdominal discomfort, often worse in the lower abdominal region. Intermittent cramping is common. Nausea and vomiting may occur. The patient should be kept well-hydrated, and a bland diet is recommended.

Guidelines for Assessment and Treatment of Diarrhea

Diarrhea is frequent, loose, watery stools, often associated with gastroenteritis. Mild diarrhea can be treated with water, diluted clear fruit juices or sports drinks. Persistent diarrhea requires more aggressive replacement of electrolytes lost in the stool. Oral rehydration solutions are best for treating serious diarrhea. You can make an oral rehydration solution by adding 1 teaspoon of salt and 8 teaspoons of sugar to a quart of water. The patient should drink about one-fourth of this solution every hour, along with all the water they will tolerate. Rice, grains, bananas, and potatoes are OK to eat. Fats, dairy products, caffeine, and alcohol should be avoided. Over-the-counter medications for watery diarrhea are available; Make sure they do not contain salicylates (aspirin) if the patient is a youth.

Guidelines for Assessing Serious Abdominal Pain

- Pain persists for more than 12 hours, especially if the pain is constant.
- Pain localizes. Check especially for guarding (the patient seems protective of the area), tenderness, abdominal rigidity, and/or distention.
- Pain increases with movement, jarring, or a foot strike when walking.
- Blood appears in the vomit, feces, or urine. In vomit, blood may look like coffee grounds; in stool, it may appear black like tar; and in urine, blood appears as a reddish color.
- Nausea, vomiting, and/or diarrhea persist for longer than 24 hours, especially if the patient is unable to stay well-hydrated.
- A fever rises above 102 degrees Fahrenheit, which may present clinically as chilling or shivers.
- Pain is associated with the signs and symptoms of pregnancy or vaginal bleeding.
- Pain is associated with the signs and symptoms of shock.

Guidelines for Personal and Camp Hygiene

Poor hygiene in the wilderness may be the primary source of abdominal problems. Use soap and water or hand sanitizer to wash/clean 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, and *do not* reach into a communal food bag, such as a bag of trail mix, with your hand. Keep kitchen gear clean. Do not eat leftover food unless it can be stored cool and completely reheated. Disinfect all drinking water 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.

Evacuation Guidelines

Evacuate—go slow—any patient with persistent abdominal discomfort. Evacuate rapidly—go fast—any patient with signs and symptoms of a serious abdominal problem.

Submersion Incidents

Time

30 minutes

Objectives

Upon completion of this lesson, the participant will be able to:

1. Describe briefly the general sequence of events at a submersion (drowning) incident.
2. Describe the safest and most efficient means of removing a submersion victim from the water.
3. Describe emergency treatment for a drowned patient.
4. Describe how to prevent some drowning incidents.
5. Describe situations that would require an evacuation versus a rapid evacuation.

General Information

Drowning accounts annually for several thousand deaths in the United States. Often those incidents would have been easily preventable had the persons involved understood and mitigated the risks. Drowning risks arise from activities as diverse as fording streams, seining for bait, swimming, snorkeling, scuba diving, surfing, and boating. Sometimes the victim is a poor swimmer who panics after becoming exhausted by swimming too far or fighting against a current. Such victims may call out for help and reach for a rescue aid. However, other active drowning victims, such as a non-swimmer stepping off a ledge or falling into the water, will not be able to call for help or move even a few feet to safety. They typically submerge in less than a minute. Still other victims may submerge without warning due to seizures, strokes, or sudden cardiac arrest. Unconscious victims typically sink rather than floating 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.

A person struggling to remain at the surface will often ingest water. The swallowed water may later lead to vomiting during resuscitation attempts. Once victims are unable to keep their airway above the surface of the water, their breathing reflex results in water aspiration. Most people have an involuntary constriction of the muscles of the upper airway—a laryngospasm—which initially keeps large amounts of water out of the lungs. Asphyxia, an inadequate intake of oxygen, 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 much longer periods.

At some point the laryngospasm relaxes, and water enters the lungs. Details differ between fresh-water and salt-water incidents, but transfer of oxygen from the lungs may be dangerously compromised. Aspiration of even a small amount of water requires prompt medical follow-up even if a submerged victim responds promptly to resuscitation.

Guidelines for Recovering a Drowning Victim

Victim assists during a planned swimming activity in safe water conditions should be relatively safe and easy. Rescue aids should be gathered and procedures discussed prior to the activity. The following guidelines are recommended for getting a drowning person safely out of the water. Don't neglect to monitor the safety of everyone else in the water when attention is focused on an individual in trouble.

1. ***Reach*** with your hand, foot, paddle, or other extension device that allows you to remain safely on land.
2. For active victims, ***throw*** a flotation device or line within the grasp of the victim.
2. ***Row***—or access the victim in some sort of watercraft—using reaching or throwing devices as appropriate.
4. ***Go.*** Good swimmers with water rescue training may swim a flotation aid to an active victim. Recovery of an unconscious victim may require a surface dive and contact tow. In turbid water, limit the water depth and/or require participants to wear flotation devices to make recovery easier.

The same *reach, throw, row, go* progression is used in unsafe water conditions, but the risk to the rescuer may become unacceptable. Swift water rescue of a kayaker pinned in heavy whitewater calls for expertise from specialized training. Wilderness groups should only undertake activities for which they have proper training.

Guidelines for Treatment of Drowned Patient

Once the patient is safely accessible, check for an airway and breathing. If necessary, begin rescue breathing. Rescue breathing should be initiated as soon as possible, even with rescuers standing in shallow water, if appropriate. There is no value in attempting to clear the patient's lungs of water, but be ready to roll them to clear the airway if water or vomit comes up. Check for signs of a beating heart, and begin CPR if necessary. If the patient is breathing, or resumes breathing, treat for shock, hypothermia, or other conditions as appropriate. A potentially severe condition may have been the cause of the person's distress in the water. Arrange for transport for anyone who has lost consciousness or may have aspirated water.

Diving headfirst into shallow water is a major cause of sports-related spinal injury. If a person exhibits signs of a spinal injury in the water, then minimize movement if the person is breathing. If breathing is absent, use rescue breathing and CPR as needed. Techniques for providing in-line stabilization in the water for both faceup and facedown victims are covered in water rescue courses.

Scuba diving introduces risks from breathing compressed air. Certified scuba divers are trained to avoid, recognize, and arrange treatment for such problems. Treatment may require transport to a hyperbaric chamber.

Guidelines for Prevention of 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 BSA such as Safe Swim Defense and Safety Afloat.
- Everyone should be screened prior to the activity for chronic or temporary medical conditions that may require special precautions in or on the water.
- Anyone involved in water-related activities should be 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. They should be accompanied by a buddy who is a good swimmer experienced in that craft.
- 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.
- Headfirst diving into shallow water should be prohibited.
- Everyone involved in boating activities should wear a Coast Guard approved life jacket that fits and is adjusted properly.
- Everyone involved in whitewater activities should have proper training and wear an approved helmet.
- No one should swim or participate in water-based activities under the influence of any alcohol or drugs.

Evacuation Guidelines

Evacuate rapidly—go fast—any patient who was unconscious, no matter how short a time, during a submersion incident. Also evacuate rapidly—go fast—any patient with signs and symptoms of respiratory problems after a submersion incident as these can become life-threatening.

Wilderness First-Aid Kits

Time

15 minutes

Objectives

Upon completion of this lesson, the participant will be able to describe the contents and uses of an adequate wilderness first-aid kit based on size of group, destination and duration of trip, and time of year.

General Information

The perfect wilderness first-aid kit does not exist. Despite your best efforts at planning, someday you will want something that is not there, or you may carry an item for years and never need to use it. When considering the contents of a kit, take into account:

- The environment (such as altitude)
- The number of people who will depend on the kit
- The number of days the kit will be in use
- The distance from definitive medical care
- The availability of rescue (such as access to helicopter evacuations)
- Your medical expertise and/or the expertise of other group members
- Pre-existing problems of group members (such as diabetes)

Evaluate and repack your first-aid kit before every trip. Renew medications that have reached expiration dates. Replace items that have been damaged by heat, cold, or moisture. All items should be latex-free. Consider altering the contents dependent on the environment.

Do not fill your kit with items you do not know how to use. Maintain a high level of familiarity with the proper uses of all the items in your wilderness first-aid kit. All members of a group should be familiar with kit contents.

Encourage each group member to pack and carry a personal first-aid kit in order to reduce the size and weight of the general wilderness kit.

Remember that skill and knowledge are more valuable in an emergency than the contents of a kit.

Guidelines for First-Aid Kit Contents

Some of the items listed below require advance training before use (e.g., SAM splints, hemostatic dressing, and tourniquets).

Personal Kit

- Adhesive bandages (6)
- Sterile gauze pads, 3-by-3-inch (2)
- Adhesive tape (1 small roll)
- Moleskin, 3-by-6-inch (1)
- Soap (1 small bar) or alcohol-based hand sanitizing gel (1 travel-sized bottle)
- Bacitracin ointment (1 small tube)
- Scissors (1 pair)
- Nonlatex disposable gloves (1 pair)
- CPR breathing barrier (1)
- Tweezers (1)
- Pencil and incident report forms

Group Kit

- Kerlix/Kling (or equivalent), 3-inch rolls (2)
- Coban self-adhesive bandage, 2-inch roll (1)
- Adhesive tape, 1-inch rolls (2)
- Alcohol pads (12)
- Betadine pads (12)
- Assorted adhesive bandages (1 box)
- Elastic bandages, 3-inch-wide (2)
- Sterile gauze pads 4-by-4-inch (12)
- Moleskin, 3-by-6-inch (4)
- Gel pads for blister and burns (2 packets)
- Bacitracin ointment (1 tube)
- Hydrocortisone cream, 1percent (1 tube)
- Triangular bandages (4)
- Soap (1 small bar) or alcohol-based hand sanitizing gel (1 travel-sized bottle)
- Scissors (1 pair)
- Tweezers (1 pair)
- Safety pins (12)
- Nonlatex disposable gloves (6 pairs)
- Protective goggles/safety glasses (1 pair)
- CPR breathing barrier (1)
- Pencil and paper

Optional Items

- Instant cold compress
- Space blanket
- Original size SAM Splint
- Hemostatic wound dressings
- Tourniquet

Scenarios

Time

2 hours

Objectives

Upon completion of the lesson and skill practice, the participants will be able to demonstrate an adequate response, in several scenarios, to one or more patients who are acting ill or injured and who will require an assessment, treatment (if possible), and a decision concerning evacuation.

General Information

Scenarios are intended to increase the educational value of the WFA course. It is highly recommended that these scenarios are not scheduled in one block of time at the end of the course, but, instead, are spread throughout the course to reinforce learning and help meet the course learning objectives. Appropriate times for scenarios include:

- At the end of the lesson on patient assessment, in order for participants to practice a full patient assessment
- At the end of day one
- At the beginning of day two, as a review of the first day's presentations
- At the end of the course

Scenarios also give the instructor or instructors an opportunity to discuss leadership and group management.

Notes