SURVIVAL MASTERY

Wilderness First Aid

Emergency Care for Wilderness Locations

Course Objectives

- Gain an understanding of patient assessment in the wilderness setting.
- Develop practical first aid skills utilizing minimum equipment and our survival kit.
- Develop an understanding of making the evacuation decision for a patient in a remote environment.

Your Instructor

Dr. Jason Hunt, my degrees are in ministry, outdoor leadership, and biblical archaeology.

I have 15 years of experience as a First Responder and am an active Firefighter and SAR Team Leader with KY River Fire & Rescue.

I am a certified instructor of emergency medicine to the EMR level, which includes all levels of WFA. I have credentials from NASAR, ASHI, Med-Tact, The American College of Surgeons, and NESTA, and I am TCCC Certified and Certified as a SWAT Medic.

- Module One

Introduction to Wilderness First Aid

M1 Objectives:

- Define Wilderness First Aid
- Describe the differences between "*Wilderness First Aid*" and "*Standard First Aid*"
- Develop an understanding of the Legal & Ethical Considerations, as well as the Psychological & Emotional Issues
- Understand the precautions necessary to protect yourself from infectious disease concerns.

What is wilderness first aid (*WFA*)?

WFA is immediate care given to an injured or suddenly ill person in a wilderness or remote environment. It can occur in a location that may be hours or even days away from “normal” emergency care.

It can take place in a variety of adverse outdoor conditions (rain, sleet, snow, heat, storms, etc.).

Difference between “wilderness” & “standard” first aid

Traditionally, standard first aid courses focus on “urban” first aid—that is, first aid in cities or towns where the emergency response system is accessible quickly.

In wilderness first aid, students are taught to approach the emergency as though “*professional*” rescuers are miles away. WFA providers are taught to provide care for prolonged periods of time with limited resources and improvised equipment.

What makes our WFA Course Unique

Most typical WFA courses utilize industry-standard equipment designed for first aid (band-aids, burn creams, SAM splints, *and other such items*.)

The typical outdoorsman, camper, or hiker often does not carry such items—this course has been designed to use items typically found within the outdoorsman's pack.

We call these items "***The Emergent C's***." They are emergent because they will grow in importance to you, and they are C's because they are in categories of items.

Legal & ethical considerations

Our ***primary rule*** is "**DO NO HARM**." However, despite our best intentions, mistakes happen, and patients may be able to sue us.

However, the threat of being sued should not make you wary of helping someone in an emergency.

General Legal Principles

As a civilian, you are under no obligation to aid a stranger.

A "**Duty to Act**" only applies to licensed medical professionals or on-duty first responders, and that can vary by state.

Follow accepted guidelines.

Reasonable man doctrine

Good Samaritan Laws provide you with protection.

You are not expected to risk your life & safety.

Abandoning a patient is a concern; do not leave once you render aid.

Obtain INFORMED consent.

Psychological & Emotional Issues

In a remote environment, it is typical for the patient, bystander, and first aid provider to feel personal stress due to the isolation, pain, blood, and absence of standard medical care.

We should provide comfort and reassurance – reducing anxiety can aid in reducing pain and stress.

Ways to Reduce Anxiety

Be open and honest.

Listen, but do not judge a patient's fears.

Give realistic answers to questions, but do not paint a grim picture.

Explain the WHY and the WHAT of your treatments.

Use stress management techniques (*controlled breathing* and *visualization exercises*).

Communicate.

Infectious Disease Precautions

BODY SUBSTANCE ISOLATION (BSI) is the primary tool for reducing the risk of exposure to blood-borne pathogens.

Open wounds or sores on your hands or other exposed parts of your body are potential points of entry for pathogens, as are your eyes, mouth, or nose.

Universal Precautions

Universal Precautions in the medical profession include personal protective equipment (PPE) designed to reduce potential exposure, such as *gloves, face shields, and masks*.

It is ***essential*** to learn how to improvise this equipment.

BSI Protects us from:

- Hepatitis A, B, & C
- AIDS / HIV
- Tuberculosis
- Meningitis
- Measles
- Chicken Pox
- Whooping cough
- Mumps
- Pneumonia
- Staphylococcal Skin Infections

The Emergent C's of Survival

The 12 C's are the essential tools an outdoors person should always have.

The first 5 are essential because they are the most difficult to recreate in the wilderness.

The remaining 7 are considered *comfort items* and will make survival a "*little easier*."

The 12 C's of Survival

1. Cutting Tools
2. Combustion Devices
3. Cover Elements
4. Containers (metal)
5. Cordages
6. Cotton Material
7. Compass
8. Candling Devices
9. Canvas Needle
10. Cargo Tape
11. Cerate (IFAK)
12. Circumvention Tools

1. Cutting Tools

The **MOST IMPORTANT** piece of your kit in a survival situation. Knives, axes, and saws enable you to create other tools and shelters.

A Knife is the most common tool, and because of its importance, a sturdy, full-tang knife should always be on your person in the backcountry. The most dependable and versatile design typically has a 5-inch carbon-steel blade and a sharp (90-degree) back edge.

2. Combustion Devices

Making fire is critical in a survival situation. In inclement weather, it's the first order of business—fundamental to maintaining your core temperature. Always carry at least three ways to make a fire in addition to a fire-starting tinder.

1. Ferro Rod
2. Lighter
3. Magnification Lens

3. Cover Elements

Appropriate clothing for the anticipated environment is your primary cover element.

The cover element allows you to create a “micro-climate” to survive temperature extremes.

4. Containers

The ideal wilderness-use containers are stainless-steel water bottles with nesting cups or pots.

The high-quality metal allows you to boil water, cook food, and use it as a warming device.

5. Cordages

550 Paracord and #36 Tarred Bank Line permit many uses, from shelter building and clothing repair to emergency repelling and tying together splinting.

100ft of each is the minimum recommended.

6. Cotton Material

Stuffing a few cotton cloths or bandannas in your pack is no weight or space burden—a level of convenience that belies their versatility in the backwoods. Cotton material is deceptively multi-use, from bandages to signaling flags, fire-starters, char-cloth, head coverings, and hygiene.

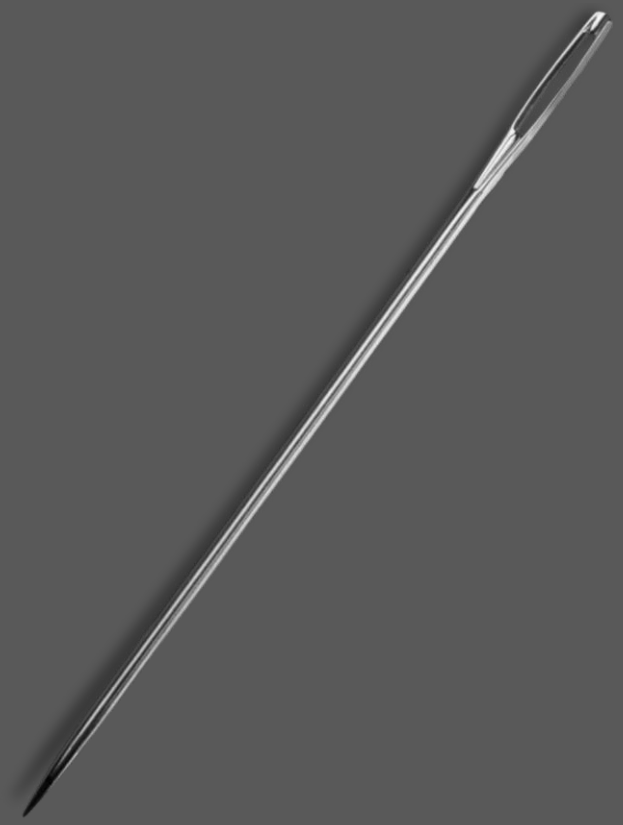
7. Compass

A compass with a sighting mirror is an unfailing tool for precise navigation—one that readily doubles as a signaling mirror with pace beads to keep track of distances traveled.

8. Candling Devices

A hands-free lighting device with spare batteries will permit you to perform patient care with both hands. A spare flashlight can be helpful to leave with injured patients or to use as a secondary light source for injury examinations.

9. Canvas Needle



The canvas needle, a sail needle, can be employed to repair clothing or shelters, dislodge nasty splinters, pierce blisters, and perform other delicate, high-precision operations.

10. Cargo Tape

A roll of Gorilla Tape serves as many functions in the backcountry as it does in the garage, from band-aiding injuries to repairing gear malfunctions.

11. Cerate

A Cerate is a medicinal salve, ointment, or topical application used for first aid, burns, bites, and stings. Other uses include a fire coal extender, tool wax, and lubricant for zippers or tools.

12. Circumvention Tools

Circumvention tools permit you to work around problems. This is a catch-all category.

Water Filters, IFAKS, Handcuff Keys, and Silcock Keys are all types of circumvention tools.

×Module Two

The Emergency Scene

M2 Objectives

Describe the importance of immediately establishing control of the scene.

Describe the importance of establishing a safe scene.

Define Mechanism of Injury (MOI) and its importance.

Demonstrate various patient moves.

Describe the use of aeromedical resources.

Approaching the Patient

As you approach the victim, there should be several things going on in the span of only a couple of minutes:

- Announce yourself – “Do you need help?”
- Scene Survey – look for hazards!
- Mechanism of Injury- look for the cause of the injury
- **Remember it is their emergency, NOT YOURS!!**

Scene Survey

Designed as a safety measure – perhaps the MOST IMPORTANT concept in this training!

Unless you stay safe, you won't be able to help others in their time of need, and you may suffer a serious injury yourself.

Take 10 seconds to determine if the scene is safe – look for widow makers, animal hazards, hazards from the weather, falling rocks, etc.

Ongoing Scene Survey

Because emergencies are ***DYNAMIC*** and always changing, you must continually reevaluate the scene for your safety and the safety of the patient and bystanders.

Mechanism of Injury (MOI)

Part of the scene survey determines the injury's cause (or mechanism).

Look for the things or circumstances that may have contributed to your patient's injury.

The MOI will help you predict the types of injuries or their severity.

MOI Considerations

- Distance of the fall
- Speed involved
- Direction of fall
- Body parts involved
- Expected injuries
- Likelihood of internal injuries
- Spinal injury potential

Rescue Considerations

As a general rule, you should not attempt to rescue another unless it is possible to do so without endangering yourself.

Moving a Patient

It's not uncommon to find patients in "unnatural" anatomical positions – sometimes referred to as "*JAMS & PRETZELS.*"

The ultimate goal is to place the patient in a neutral anatomical position for possible evacuation, and comfort.

Neutral Anatomical Position

In a neutral anatomical position, the patient lies on their back, face forward, arms at their side, and feet forward.

Recovery Position

You should consider the recovery position for patients who do not require rescue breathing and have no serious injuries. This position permits the airway to be somewhat protected.

Extrication

There may be times when you need to move an injured patient out of a dangerous area or remove them from debris in order to properly aid them.

Moving a patient should be planned, orderly, and safe. The technique used will depend on the urgency of the move and could require emergency moves, urgent moves, or *non-urgent moves.*

Emergency Moves

Emergency Moves are used to move a patient before the initial assessment and initial care are provided due to a potential for serious harm or danger to the patient or to the rescuer. These conditions might include entanglement, flooding, dangerous lightning, avalanches, wildfires, or other similar situations.

Urgent Moves

Typically used for patients with altered levels of consciousness, inadequate ventilation or shock. Extreme weather can also make an urgent move possible.

Non-urgent Moves

When the scene and patient are stable, you are essentially moving the patient to be evacuated.

By this time, our moves should be taking place in a timely, orderly, and safe fashion—reducing the potential for additional injury to the patient or to the rescuers.

Moving Techniques

Clothes drag

One-person assist

Blanket drag

Front cradle carry

Helicopter Evacuation & Signaling

When signaling for air rescue, fire, and smoke are excellent signaling modes.

The key is CONTRAST – white smoke in a dark terrain and black (dark) smoke in a light terrain.

Helicopter Landing Zone

A flat 100’ x 100’ area clear of overhead wires is preferred for a landing zone.

ESTABLISHING A LANDING ZONE

- 100 ft x 100 ft square
- Less than 10° slope
- Area free of obstacles
- Location of LZ, bordering hazards
- Determine wind speed, direction

HELICOPTER SAFETY

- Approach helicopter with blades turning only with pilot approval
- Approach only from front or side
- Avoid tail area **at all times**
- No running, smoking, operation of doors or handles

- Module Three

The Patient Assessment

M3 Objectives

Describe the step in the *Primary Survey*

Understand the use of *A-V-P-U*

Discuss the importance of a hands-on *physical exam*

Discuss the importance of *vital signs* and their changes over time

Demonstrate a physical exam using *DCAP-BTLS*

Discuss the importance of taking a SAMPLE history

Primary Survey

The *primary survey* is used to detect any life-threatening conditions needing URGENT CARE.

It is during this survey we will determine the patient's "Level of Responsiveness" – *LOR.*

We use the *A-V-P-U scale* for a quick reference on how well the brain is communicating with the outside world.

A-V-P-U Scale

The A-V-P-U scale is a tool we can use to determine and monitor a patient's LOR.

A – Alert: They speak or respond when spoken to.

V – Verbal: A person can react to spoken commands or questions but doesn't open their eyes on their own.

P – Painful: A person only responds to pain, such as a pinch or knuckle to the chest.

U – Unresponsive: No response.

ABC's

Once we determine a level of responsiveness, we need to assess the patient's *ABC's.*

A – Airway

B – Breathing

C – Circulation

Airway

Check the patient's airway.

A patient who is able to talk has an obvious open airway, but you should ask if they are having *difficulty breathing.*

If a patient is unresponsive, look for a blocked airway. We may need to remove blood, spittle, or foreign bodies from the airway.

Breathing

If breathing is difficult, we must determine WHY and assist them in fixing the problem or getting evacuation.

Circulation

Responsive - check for a pulse at the wrist.

Unresponsive - check for pulses at the neck.

Scan for any MAJOR bleeding & apply direct pressure

Vital Signs

Vital signs are the measurement of the physiological process normal to body system function.

The most common vitals signs are *LOR, Heart Rate, Respiratory Rate, Capillary Refill, & Skin Color/Temperature/Moisture*

Heart Rate

A patient's *heart rate* is equal to the number of heartbeats in one minute (bpm).

To determine the rate, count the number of beats for fifteen (15) and multiply by four (4). Also note the rhythm and quality (feels strong or weak| feels fast, slow, or rapid).

A normal heart rate for adults and school-age children is 50–100 beats per minute. Newborns, Infants, and Toddlers average 60-180 bpm.

Capillary Refill

Can be used as a “quick test” of local circulation.

Press on the nail bed and see how long it takes to turn pink again.

Most effective in patients under the age of 6 – unreliable in adults.

Respiratory Rate

Respiratory rate is the number of breaths taken in one minute.

Patients will alter their breathing patterns if they realize you are watching them breathe.

Best to count for 15 seconds and multiply by 4.

Normal rate is 12 – 20 breaths per minute.

Note the rhythm and quality.

Skin Color, Temperature & Moisture

Changes in a patient's skin condition (color, temperature, or moisture) can indicate underlying issues that need to be identified and addressed.

Normal skin is warm and dry.

Purple or bluish skin: This can indicate cyanosis or low blood oxygen. If this is accompanied by dyspnea (shortness of breath) or bradypnea (slow respiration), it can be a sign of hypoxia (lack of oxygen).

Pale skin: This can indicate anemia (low blood cells), dehydration, or shock. It means the body either doesn't have enough red blood cells or is not allowing blood to flow to the skin. The body will redirect blood from the surface to the core to conserve it.

Jaundice: Yellow skin discoloration is a sign of acute or chronic liver disease.

Flushed skin: This can indicate too much blood flow to the skin's surface. Heat overexposure and fever can cause the same as the body re-routes the blood to the surface to release heat.

Physical Exam

The *physical exam* (the head-to-toe exam) is a vitally important part of the injury assessment.

It is very important to find the “primary” injuries and look for “secondary” injuries as well.

When in doubt, CHECK IT OUT!!

Physical Exam Sequence

Head & Neck

Shoulders & Chest

Abdomen

Pelvis

Legs & feet

Arms & hands

DCAP-BTLS

D – Deformity

C – Contusion

A – Abrasions

P – Punctures

B – Burns

T – Tenderness

L – Lacerations

S - Swelling

Sample History

Generally used for patients suffering from an illness or other medical condition.

Ask all the questions.

Do not “lead” the patient – ask open-ended questions.

Sample

S = Signs & Symptoms

A = Allergies

M = Medications

P = Pertinent Medical History

L = Last oral intake

E = Events leading up to the incident

Ongoing Assessment

For **STABLE** patients with non-life-threatening injuries, reassess AVPU, ABCs, and vital signs every 15 minutes.

For **UNSTABLE** patients or those with more substantial injuries, reassess every 5 minutes.

✖Module Four

Treatment of Bleeding, Wounds & Burns

“Uncontrolled bleeding is the number one cause of preventable death from trauma.”

American College of Surgeons

M4 Objectives

Define *serious bleeding*

Define *abrasion, laceration, incision, puncture wound, avulsion & amputation*

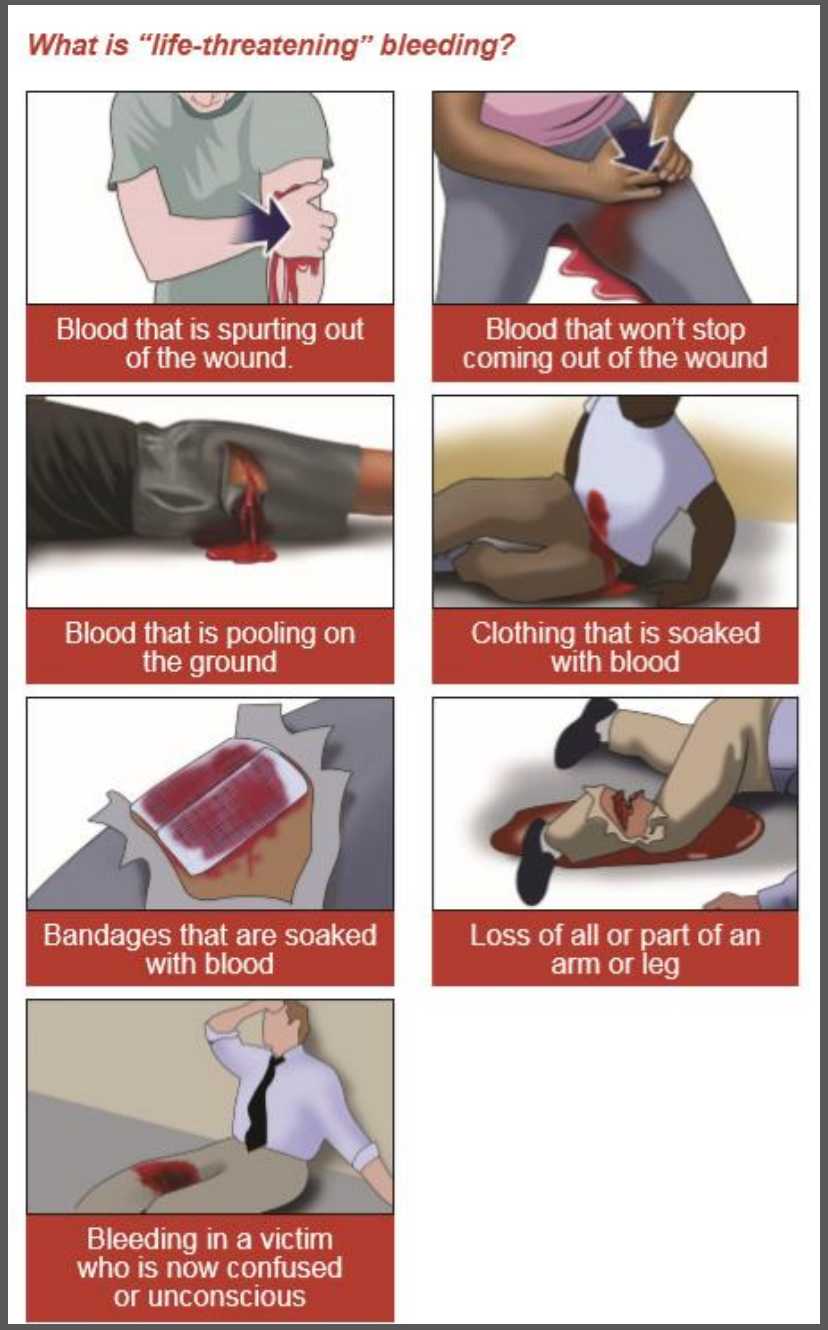
Describe the treatment of open wounds

Describe the signs/symptoms & treatment of wound and skin infections.

Define superficial, partial-thickness & full-thickness burns.

Bleeding

Life-threatening bleeding is classified as bleeding that spurts from or will not stop coming from a wound, bleeding that pools on the ground, soaks through bandages or clothing, or bleeding that has caused the injured person to become confused or lose consciousness.



Bleeding

There are several methods of stopping bleeding, all of which involve compressing a bleeding blood vessel.

Compression: *If you don't have a trauma first aid kit*, apply direct pressure on the wound. Use a clean cloth and apply firm pressure with both hands.

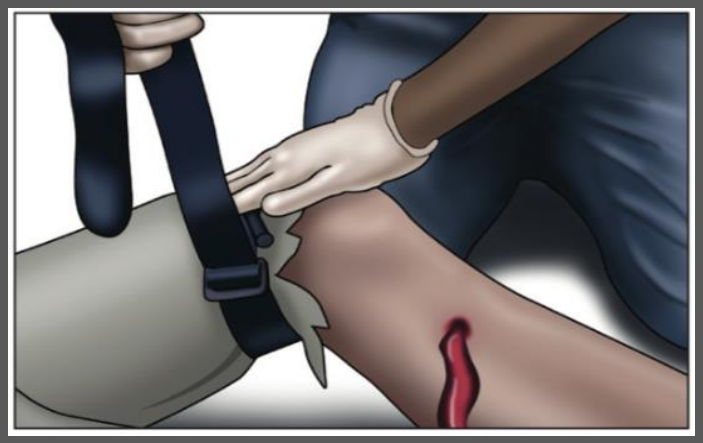
Here, Direct Pressure is applied using a Freeze Bag glove. Apply continuous firm pressure to control or stop bleeding. Do not relieve pressure until a pressure dressing, tourniquet, or medical responders relieve you.

Bleeding

If you have a trauma first aid kit, apply a Tourniquet.

For life-threatening bleeding from an arm or leg, place around the injured limb about 2-3 inches above the bleeding site (go above the joint if necessary). Pull the free end, tightening the strap around the injured limb. Secure the free end, then turn the windlass until the bleeding stops.

Tourniquets



1. Pull tight and secure the strap.

2. Rotate Windlass until bleeding stops

3. Secure the Windlass.

4. Note time of application on strap

Wound Types

Abrasions are scrapes or “road” rash that result from a partial loss of the skin’s surface layer, usually with slight bleeding.

Lacerations are cuts into the skin with jagged edges, which can cause major bleeding.

Incisions are smooth-edged cuts – usually resulting from a sharp edge like a knife.

Wound Types

Puncture wounds are produced by objects that leave minor entrance wounds (nails, sticks) but may extend deep into the body.

Avulsions are tearing wounds that create a flap of tissue still attached to the body.

Amputations result when a body part is separated from the body.

Minor Wound Treatment

1. Clean it thoroughly – it is essential to remove any foreign matter that may carry bacteria.
2. For a shallow wound, cleanse inside and around the area.
3. Flush the wound with potable water.
4. Cover the wound with a dressing.

Irrigation

Forceful irrigation aids in flushing small bits of matter out of the wound.

A large syringe is the most effective tool for irrigating. Water filter syringes work, too!

A plastic bag with a hole in the corner can also be used.

You may need to use tweezers or a sail needle to remove embedded dirt, then re-irrigate.

Wound Closure

In WFA, we DO NOT use sutures to close a wound in the field.

If a wound remains primarily closed, fashion butterfly bandages from tape to pull the edges together.

If the wound remains open, pack it with sterile dressings held in place with a bandage.

Wound Packing

For life-threatening bleeding, when a Tourniquet is not available or when the bleeding is not on a limb, such as a shoulder or groin, Pack the wound with gauze or a hemostatic agent (Quick Clot style Gauze).

1: Open the clothing to view the wound and wipe away pooled blood.

2: Press the gauze deep into the wound origin with your finger, using a 1 x 1 press method: one finger in, followed by the next finger in until the wound cavity is filled with pressure from the gauze.

3: Maintain firm pressure on the wound gauze until relieved by a pressure dressing or medical provider.

1.

2.

3.

Bleeding Control

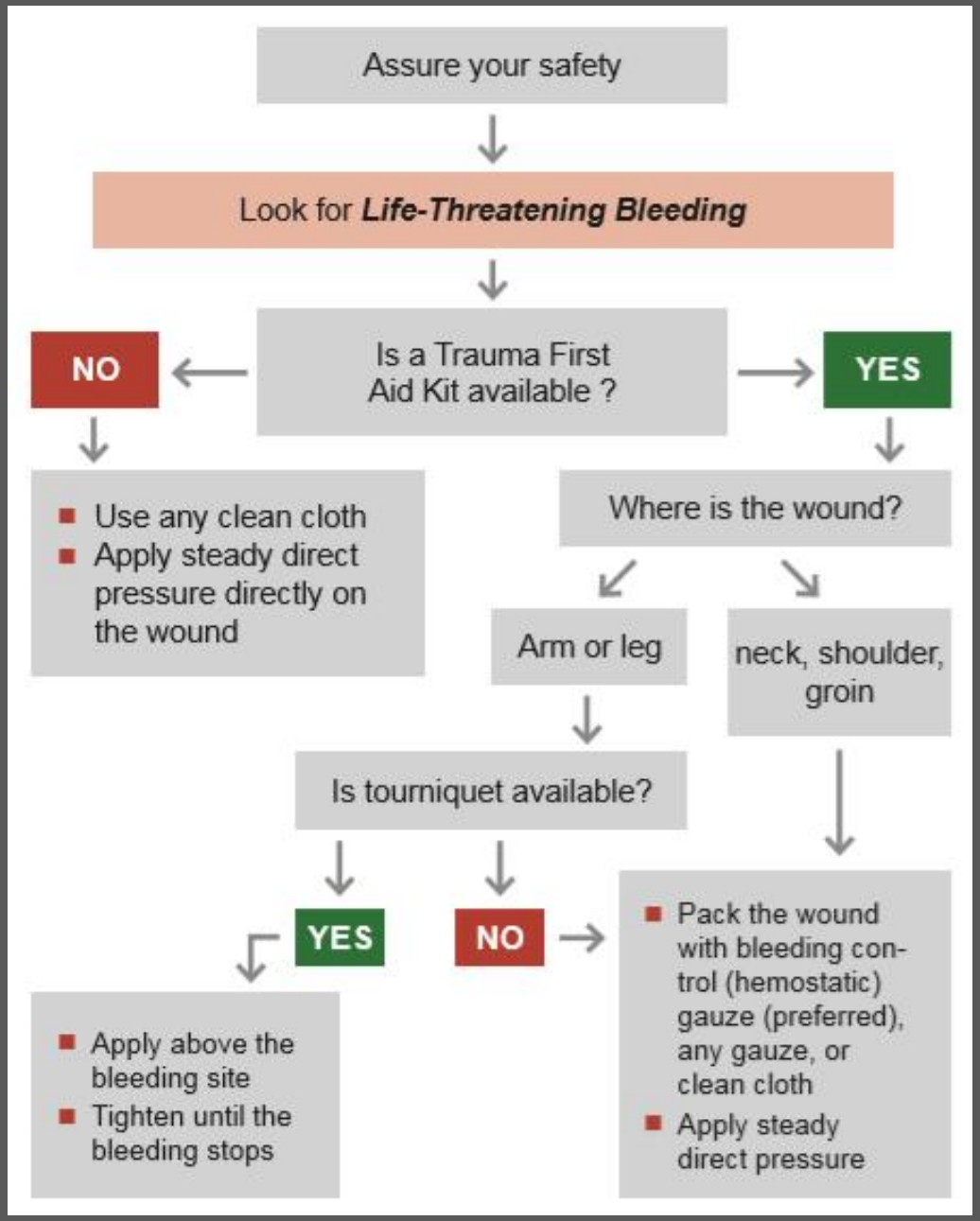
By following these guidelines provided by the American College of Surgeons, WFA practitioners will be well-equipped to control life-threatening bleeding, including that from sports-related gunshot wounds.

A wilderness trauma intervention kit should include, at a minimum:

1. Nitrile Gloves
2. Tourniquet
3. Wound packing gauze

Improvised from the 12 C's:

1. Food or Freezer Bag
2. Drum liner and Tent Stake
3. Shemagh



Infection Concerns

If the body senses that the number of bacteria in the wound increases, it will respond in several ways:

1. It will send chemicals to loosen the bonds between the cell walls – this is what causes the redness and warm feeling.

2. It will release white blood cells to devour the bacteria (puss).

Infection Concerns

3. If the infection spreads, you may notice red streaks towards the heart.

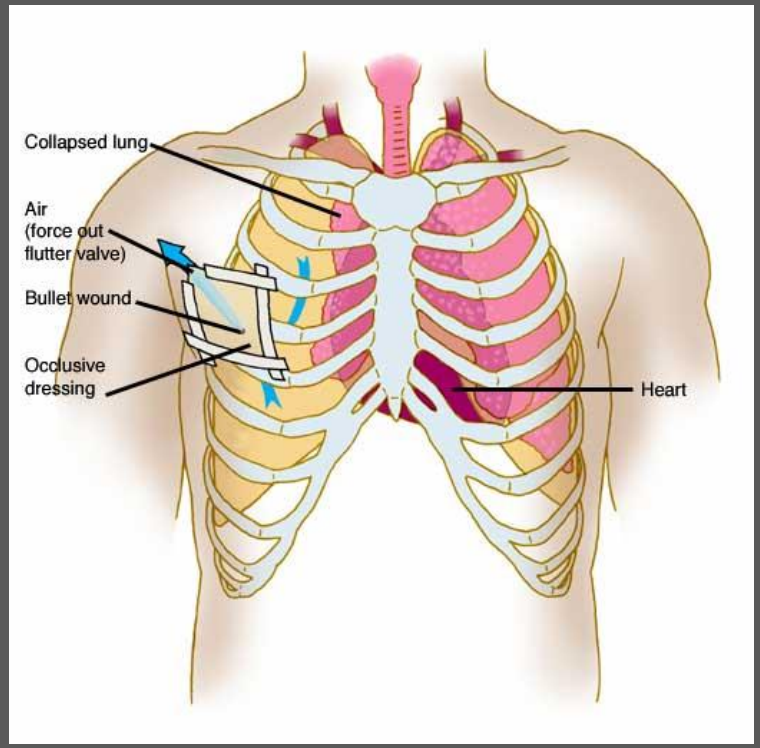
4. You may also notice a fever – the body raises its temperature to make itself less hospitable.

If these conditions exist for over 12 hours, the patient will require antibiotics and should be evacuated **RAPIDLY**.

Sucking Chest Wound

Sucking chest wounds occur when the chest wall is pierced, and the air is sucked through the hole, which can cause the lung to collapse.

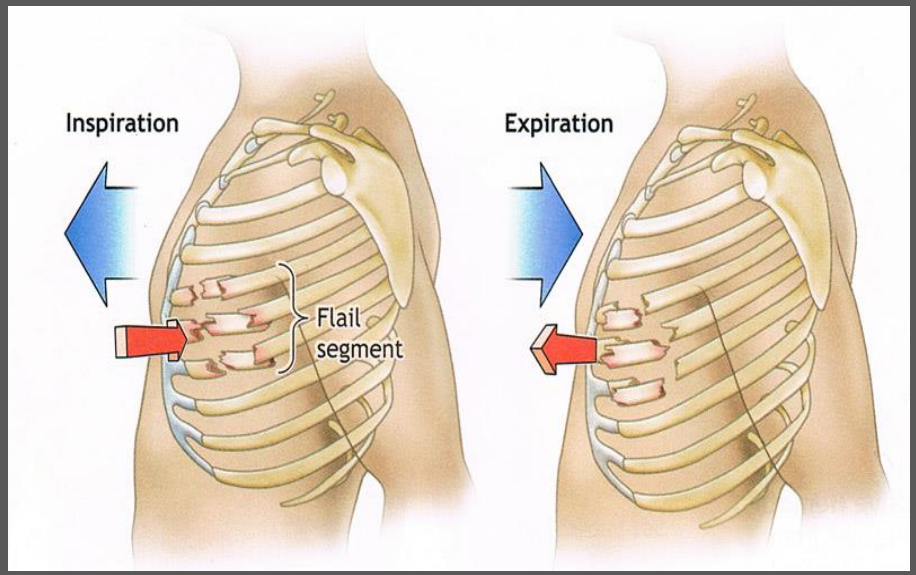
Field Treatment: Immediately apply an occlusive dressing, typically a commercially available chest seal, to cover the wound completely, securing it on three sides to create a one-way valve effect, allowing air to escape on exhalation but preventing air from entering during inhalation; if a dedicated chest seal isn't available, improvise with readily available materials like plastic wrap, aluminum foil, or even a ziplock bag, and always prioritize calling for immediate medical assistance.



Flail Chest Wound

Flail chest is a condition where a series of multiple rib fractures leads to a segment of the chest wall being "free-floating" and will lead to difficulty breathing.

Field Treatment: Stabilize the patient's breathing by applying direct pressure to the affected area (manual splinting), manage pain with appropriate medication, and rapidly transport the patient to a medical facility, as immediate surgical intervention may be necessary in severe cases; do not attempt to manipulate the fractured ribs yourself and prioritize airway management if needed.



Blisters

There are three types of blisters we encounter in WFA:

- **Blood blisters:** When something pinches your skin, you can get blood blisters. Instead of clear liquid, blood floods the area from broken blood vessels and damage to the lower layers of the skin. The blood pools and forms a blister.
- **Friction blisters:** Caused by rubbing on the skin, friction blisters form when clear fluid builds up in the upper layers of the skin. Many people get friction blisters from walking too much in poor-fitting shoes or not wearing socks. You can also get them on your hands by holding things like shovels or other tools.
- **Heat blisters:** You can get these blisters from burns or sunburns. They may also form after you warm up from frostbite. Blistering skin is part of a second-degree burn.

Treating Blisters

Blisters generally heal on their own within a few days. You can do a few things to make them more comfortable:

- Wash the area gently with a mild soap.
- Apply an antibacterial cream or ointment.
- Cover the blister with a bandage, moleskin, or gauze.

Be sure to change the bandage at least once a day. And resist the temptation to pop or break a blister or peel it off. The skin on the blister protects deeper layers of skin from infection.

Thread a Blister to permit it to drain and remain clean and covered to minimize the risk of infection or making it worse.

Lance the blister with a needle and run thread through it to permit it to drain.

Burns & Burn Classification

Superficial burns will cause the skin to redden due to increased circulation to the site. The outer layer of skin may peel off.

Treatment involves placing a cool compress over it to relieve the pain and swelling. You may do this for 5 to 15 minutes and then remove the compress. Avoid using ice or extremely cold compresses because they can aggravate the burn.

Burns & Burn Classification

Partial-thickness burns involve several layers of skin, typically blistering and being more painful due to more damage to tissue and nerve endings.

Treatment consists of placing a cool compress and then covering it with a clean, dry bandage or bandana. Do not wrap the covering around a hand, arm, foot, or leg.

Take ibuprofen or acetaminophen to relieve pain.

Burns & Burn Classification

Full thickness *burns* are those that exhibit a charred, deep red, or white color or an area that may be burned away revealing deeper tissue.

Treatment consists of STOPPING the burning and covering the area with a clean, dry bandage.

Infection is a BIG concern.

Evacuation of Burn Victims

Any burn that covers more than 5% of the body or burns to the face, hands, feet, or genitals requires evacuation. Even a superficial burn of more than 20% needs to be evacuated.

After pain management, fluid loss is our next concern with a severe burn as it will ooze fluid – that fluid has to be replaced by drinking water.

Burn Field Treatment: Clean, Cover, Treat Pain, Hydrate with water, and consider evacuation.

✖MODULE FIVE

Creating dressings & bandages

M5 Objectives

Discuss the difference between a dressing and a bandage.

Demonstrate the proper application and removal techniques of dressings/bandages.

Discuss the signs of improper bandaging.

Dressing vs. Bandage

Simply put, a dressing is a cover placed directly over a wound to protect it, while a bandage holds the dressing in place.

When creating dressings/bandages in the wilderness, ALWAYS use the patient's kit & stuff first.

Cotton bandana + gorilla tape = excellent band aid

Application & Removal of Dressings

To apply a dressing, first, wash or sanitize your hands. Prepare a clean cloth, preferably sterile. Gently apply it to the wound.

To remove a dressing, again, wash your hands. Dressings may become stuck to the wound, so lightly dampening them before removal may be helpful.

Bandaging Techniques

Bandaging can be done with gauze rollers, strips of fabric, or disposable tape.

The purpose of the bandage is to “lock” the dressing in place.

Signs a bandage is too tight

- Blue tinge of the nail beds
- Blue or pale skin color
- Coldness of the extremity
- Tingling or loss of sensation
- Inability to move fingers or toes
- Pain beyond the bandage

MODULE SIX

Bone and joint injuries

M6 Objectives

Define strain, sprain, fracture and dislocation.

List the signs and symptoms of a strain, sprain, fracture and dislocation

Define RICE (rest, immobilize, cold and elevate and describe its use.

Describe the emergency treatment for angulated and open fractures.

Describe situations that would require rapid evacuation of a patient with a bone or joint injury.

Open & Closed Fractures

An ***OPEN FRACTURE*** is a bone break that causes the bone end to protrude through the skin.

A ***CLOSED FRACTURE*** does not break through the skin.

A big concern with an open fracture is the open pathways for infection to the bone marrow.

One **major goal of treatment is to prevent further injury to the fractured area, protect open fractures,** *and keep closed fractures closed*.

Splinting

The purpose of splinting is to **IMMOBILIZE** the joint above and below the injury to prevent any additional injury from occurring.

Splints should generally be B-U-F-F.

- BIG
- UGLY
- FLUFFY
- FIRM

Splinting Resources

Several items in the “12 C’s” kit will work well for splinting.

Cargo Tape – for securing the splint.

Cordage – also useful for securing the splint and for creating traction devices.

Cutting tool – for retrieving limbs to use in the splint’s construction.

Cover – wool blankets can be very useful in providing padding.

Resources

The key is always to utilize the **PATIENT'S** resources before digging into your own.

R – I – C – E

Throughout caring for a possible bone injury, we should try to utilize the ***R – I – C - E*** acronym:

- R – Rest the injured extremity
- I – Immobilize to prevent further injury
- C – Cold packs will aid with pain & swelling*
- E – Elevation will also assist with swelling

*Steel water bottles can be cold packs, and dampened shemaghs do well for evaporative cooling of inflamed areas.

Dislocations

Dislocations occur when a joint comes apart and stays apart with the bone ends no longer in their normal position.

The **MAIN SIGN** is *deformity* of the joint.

They may also have similar signs and symptoms of a fracture: severe pain and inability to move the joint.

Treatment of Dislocations

Treat similar to a suspected fracture: RICE

If medical care will be delayed, it may be necessary to attempt to *reduce* (put back into place) a dislocation of the shoulder, finger or kneecap only.

Sprains

A **SPRAIN** is a joint injury in which the ligaments and other tissues are damaged by stretching and twisting.

Treatment involves evaluation for a possible fracture, *R – I – C – E*, and splint or tape for support.

Strains

STRAINS are “pulled muscles” caused by stretching a muscle beyond its normal range of motion, which tears some of the fibers.

Treatment involves R – I – C – E and gentle stretches.

Cramps

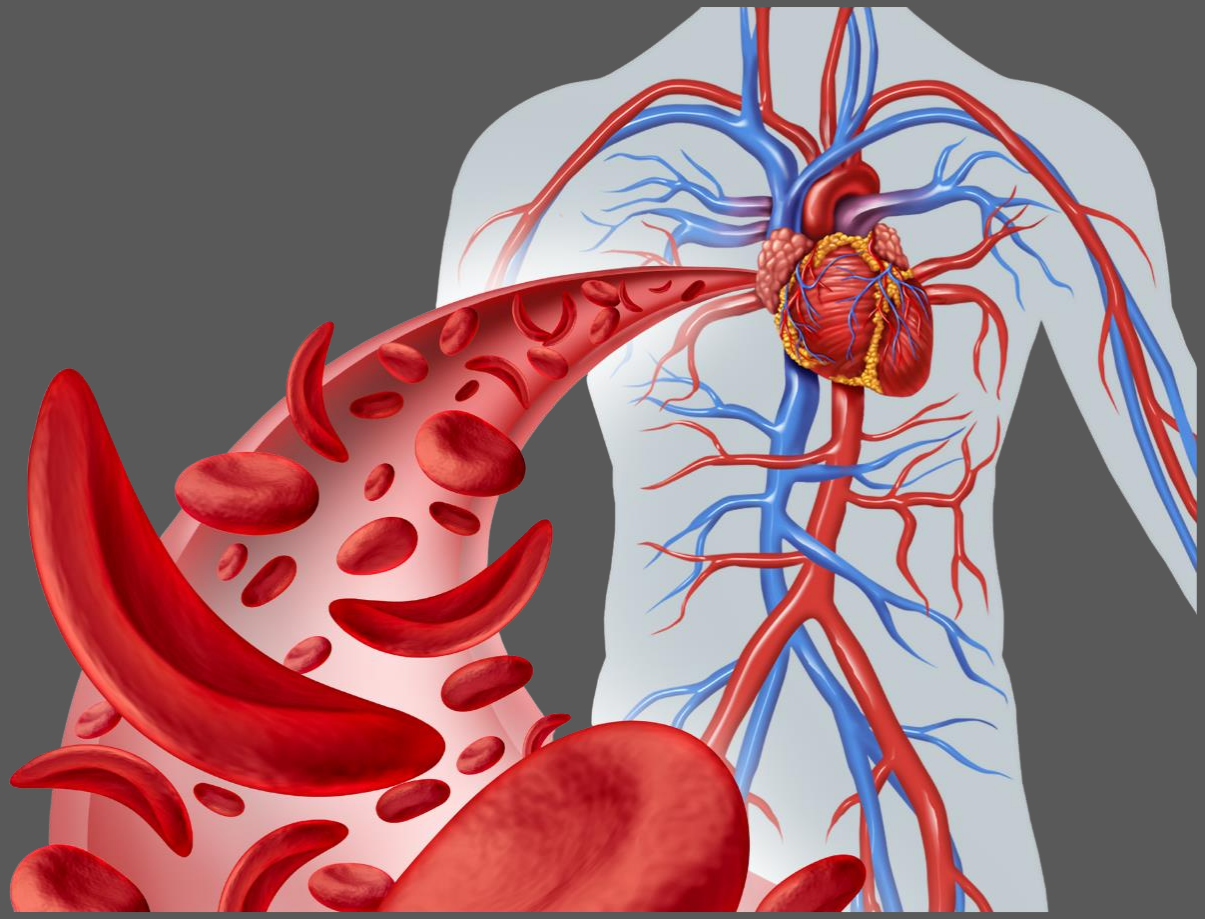
Muscle **cramps are uncontrolled spasms and contractions of a muscle or group of muscles that result** in severe pain and a restriction of movement or use.

If related to exertion in the heat, give **MILDLY** salted water (1/4 to 1 level teaspoon per quart of water or a commercial electrolyte mix.

Nocturnal cramps can be eased by taking *Benadryl* (25-50 mg) at bedtime.

MODULE SEVEN

Circulatory Issues



M7 Objectives

Define **SHOCK** and briefly discuss the stages of shock.

List the signs and symptoms of shock.

Describe a patient in which shock may be a potential threat to life.

Describe situations that would require a rapid evacuation of a patient showing signs and symptoms of shock.

M7 Objectives

Discuss the causes and signs and symptoms associated with internal bleeding and possible treatments

Define the possible causes of “chest pain”

Describe the treatments for chest pain

Shock

When the organ systems of the body are not getting enough oxygen-enriched blood to maintain themselves (*inadequate perfusion*), they start to die. This process is known as **SHOCK**.

We are going to discuss **six types** of shock: *hypovolemic, hemorrhagic, neurogenic, cardiogenic, anaphylactic,* and *septic*.

Hypovolemic & Hemorrhagic Shock

Hypovolemic (too little volume) shock occurs when the blood volume has been decreased by serious bleeding or injury externally or internally (*hemorrhagic shock*) OR because of severe dehydration. This prevents the body from maintaining the liquid portion of the blood (plasma) by routing the body's water to sweat glands.

Neurogenic Shock

Neurogenic shock occurs after a cervical spine injury, causing circulation to become “sluggish” due to an interruption of the signals from the brain to the heart and blood vessels. This results in the heart slowing and the arteries dilating, both of which allow the blood to pool.

Cardiogenic Shock

Cardiogenic shock is a result of damage to the heart from a heart attack or injury – the heart pumps less efficiently, thereby reducing circulation.

Anaphylactic Shock

An allergic reaction to a foreign protein will reduce the supply of air to the lungs due to the airways constricting and will make circulation sluggish because of a dilation of the blood vessels.

A patient will also display signs and symptoms of an allergic reaction – hives, itching, etc.

Septic Shock

Septic shock is caused by an infection that spreads throughout the body and damages body organs and blood vessels to the extent that circulation fails.

Signs and Symptoms of Shock

Regardless of the cause, shock will often present itself with the same signs and symptoms:

Weakness

Dizziness

Weak & rapid pulse

Cool/moist and pale or ashen skin

Feeling of impending doom

Preventing Shock

In many cases we can prevent, or at least minimize, the onset of shock by identifying and treating its cause:

Stop serious bleeding

Reduce pain and further injury through splinting

Protect patients with possible spinal injuries

Assist heart attack victims with prescribed meds

Give appropriate medication for allergic reaction

Prevent, or at least identify, and treat infections

Treatment of Shock

If the patient has a serious injury, we should **ANTICIPATE** the onset of shock and treat for it early – do NOT wait for signs to appear. In the wilderness setting there are four things we can do:

Guard the patient's airway

Give Oxygen, if it is available

Maintain core body temperature

Give psychological support

Internal Bleeding

Internal bleeding can result from medical disorders such as stomach ulcers and miscarriages or from injuries to internal organs from blunt trauma. Fractures can also cause internal bleeding – especially the pelvis, hip or thigh.

Signs & symptoms might include: tender or rigid abdomen, bruises, unexplained signs of shock, tarry black stool, etc.

Treatment of Internal Bleeding

1. Continually monitor ABCs to evaluate severity of bleeding.
2. Be prepared for vomiting – place in the recovery position if not alert.
3. If alert, raise the legs 8-12 inches.
4. Look for large amounts of bruising
5. **EVACUATE IMMEDIATELY!!**

Heart and Chest Pain

When a patient complains of shortness of breath, weakness, has cold and clammy skin and is having crushing, tight or squeezing pain in the chest that may radiate in to the neck, jaw, throat, arms or shoulders, we should consider them to be having a **SERIOUS MEDICAL EMERGENCY**.

Causes of Chest Pain

The cause of most “heart-related” chest pain is *coronary artery disease* due to high cholesterol deposits which narrow the coronary arteries and block the supply of blood to the heart muscle.

Pain relieved by resting or medication is usually *angina*.

Pain that is not relived by rest or medication or lasting more than 15 minutes is often a heart attack and is a **TRUE EMERGENCY**.

Assessment of Chest Pain

Our assessment will often help us identify the possible cause of the chest pain. We should be assessing the following:

1. SAMPLE history indicating previous cardiac issues.
2. Abnormal pulse, respiration and altered responsiveness.
3. Location, type, and severity of the pain.
4. Symptoms of infection
5. Complaints of “bad indigestion”
6. Changes in vital signs

Treatment of Chest Pain

Assist the patient in taking their medication.

Shelter the patient.

Give one aspirin or tea of willow bark.

Give nothing but clear liquids.

Arrange for immediate evacuation.

KEEP THEM AT REST.

✖MODULE EIGHT

Breathing Issues

M8 Objectives

Describe the emergency treatment of and long-term care for:

- Pneumothorax / hemothorax
- Tension pneumothorax
- Open pneumothorax

Describe the causes of asthma & treatment

Discuss hyperventilation & shortness of breath

Chest Injuries

Chest injuries account for 25% of all trauma deaths in the United States. Injuries to the chest can interfere with breathing, lead to a compressed lung or injury to the heart.

Variety of open injuries and closed injuries can occur – each with their own unique problems.

Pneumothorax or Hemothorax

Pneumothorax means "*air in the chest*" – can be a result of a lung punctured by a cracked rib or by a penetrating injury.

Hemothorax means "*blood in the chest*" and occurs when a blood vessel leaks blood between the lung and the chest wall.

Tension Pneumothorax

A tension pneumothorax results when there is an air leak into the chest cavity and there is no way for the air to escape. This can be the result of blunt trauma to the chest or the result of blebs on the lungs.

The pressure reduces the amount of blood that can return to the heart – resulting in distended neck veins.

The injured side may be hyper-resonant and have no breath sounds.

THE ONLY TREATMENT IS IMMEDIATE EVAC

Asthma

Asthma is a lung-condition that exhibits spells of coughing, wheezing or shortness of breath due to allergens, smoke, dust, etc.

Symptoms range from mild to **severe and life-threatening**.

To treat: Place the patient in a position of comfort, assist with medications, give clear fluids, and EVACUATE if no improvement in 2 hours.

MODULE NINE

Neurological Issues

M9 Objectives

Describe the common signs and symptoms of a stroke.

Define common medical emergencies, including seizures, fainting, headaches, and diabetes, and their signs, symptoms and treatment.

Discuss the care for unresponsive patients.

Stroke

A *stroke* is a common cause of a brain disorder that is potentially treatable.

There are several types of stroke

- *Cerebrovascular accident* (CVA)
- *Hemorrhagic* stroke
- *Transient ischemic attack* (TIA)

Cerebrovascular Accident

A *CVA* is an interruption of blood flow to the brain. Lacking the oxygen and glucose received from the blood, the brain cells stop working and die – known as *infarcted cells*.

These cells are no longer able to control body functions.

Can take **several hours** for cell death to occur.

Hemorrhagic Stroke

A *hemorrhagic stroke* is a result of bleeding inside the brain due to a rupture of a blood vessel.

The resulting pressure, as well as the lack of blood flow beyond the rupture, leads to *ischemic cells*.

Transient Ischemic Attack (TIA)

A *TIA* (also known as a "*mini-stroke*") occurs when a blood clot is broken up in the body and the resulting pieces obstruct blood vessels.

This blockage reduces normal function – the blockage is quickly broken loose and normal function is typically restored within 24 hours.

A TIA is an emergency – can be a warning sign that larger, more permanent stroke is pending.

Cincinnati Stroke Scale

The *Cincinnati Prehospital Stroke Scale* is a system used to diagnose a potential stroke in an out-of-hospital setting. It tests three signs for abnormal findings which may indicate that the patient is having a stroke.

Cincinnati Pre-hospital Stroke Scale

1. FACIAL DROOP: *Have patient show teeth or smile.*

Normal: both sides of the face move equally

Abnormal: one side of face does not move as well as the other side

2. ARM DRIFT: *Patient closes eyes & holds both arms out for 10 sec.*

Normal: both arms move the same or both arms do not move at all

Abnormal: one arm does not move or drifts down compared to the other

3. ABNORMAL SPEECH: *Have the patient say "you can't teach an old dog new tricks."*

Normal: patient uses correct words with no slurring

Abnormal: patient slurs words, uses the wrong words, or is unable to speak

INTERPRETATION: If any 1 of these 3 signs is abnormal, the probability of a stroke is 72%.

Stroke Treatment

Airway, Breathing, Circulation: The ABCs are the foundation of care.

Assess & monitor vital signs: Heart rate and respiratory rate.

Neurologic exam: Perform a prehospital stroke scale assessment.

Determine & document time of onset.

EVACUATE as soon as possible.

Remember, time is brain!

Seizures

More of than not, you will not arrive on the scene until after a seizure has taken place and the patient is in a *post-ictal* or recovery state.

Allow the patient to rest in the *recovery position* and protect them from harm until they are fully responsive and functional. Maintain core body temperature and treat for shock until help arrives or evacuation is possible.

Fainting

Fainting, properly termed *syncope*, results from a sudden reaction in the nervous system that produces a temporary, generalized vascular dilation.

It can be caused by fear, bad news, surprise, or unpleasant sights.

Treat for a shock – technically, it is a *psychogenic shock.*

Headaches

Most headaches are harmless and can be relieved by resting and taking *OTC* medications like *aspirin*, *acetaminophen*, or *ibuprofen*.

Altitude, glare off snow or bodies of water, and exertion can also cause headaches in the wilderness.

Migraines

*Migraine*s are usually periodic, one-sided, throbbing headaches – frequently accompanied by nausea and vomiting.

Typically preceded by an *aura*.

Resting in a dark area and taking prescribed medication is often the best course of treatment.

Diabetes

Two types of *diabetes*:

Type I (*Juvenile diabetes*) – causes the destruction of insulin-producing cells. Typically, will carry medication with them.

Type II (*Adult-onset diabetes*) – causes the body's cells to become insulin-resistant, therefore it takes more insulin to utilize the glucose.

Problems occur with either when the fuel (*glucose*) and the insulin get "*out-of-balance*".

Hypoglycemia

Hypoglycemia or ***LOW*** *blood sugar* typically occurs because it has been too long since the last meal or because the patient took too much medication. Exercise and infections can also result in hypoglycemia.

Signs and symptoms include pale, sweaty skin, dizziness, weakness, tremors, irritability, confusion, and a loss of consciousness.

Hyperglycemia

Hyperglycemia or ***HIGH*** blood sugar occurs when there is not enough insulin to transport the sugar (glucose) to the cells. If medical treatment is delayed, patient may slip into a coma.

Signs and symptoms include: red & dry skin, rapid & weak pulse, dehydration, sweet-fruity breath, vomiting, and frequent urination.

Treatment

If unclear if the patient is suffering from hypo or hyperglycemia, you can give the patient a small amount of sugar or something sugary under the tongue so it may be absorbed rapidly.

If it appears to be **hyper**glycemia, immediate evacuation is required. If the patient is awake, have them drink as much water as possible to "dilute" the sugar.

Caring for the Unresponsive Patient

An unresponsive patient requires a lot of *detective work* on the part of the first aider.

If there are no bystanders nearby to interview, you will be left to determine the Mechanism of Injury (*MOI*) or illness on your own.

When considering "long-term" care for an unresponsive patient, we will need to think about keeping them, warm, dry and sheltered.

Caring for the Responsive Patient

Responsive patients can typically speak with you and will be aid you in the process of care for their needs – depending, of course, on their level of responsiveness and injuries.

Many of the same guidelines for treatment of the unresponsive patient apply to the responsive patient as well.

Injuries to the head and skull

There are three main of head injuries that may involve the brain, scalp tissue or the skull:

Concussion

Closed head injury with swelling to the brain

Skull fracture

Concussion

A concussion can be caused by even a mild blow to the head.

Might complain of: "*see**ing stars***", recent amnesia, or repeating questions.

Recovery is usually quick and complete.

Allow the patient to sleep but awaken every 2-3 hours to assess LOR.

Closed Head Injury

A more serious type of head injury – can have delayed deterioration with bruising of the brain or hemorrhage.

Brain damage from compression caused by bruising or swelling may be permanent.

May complain of a severe headache with repeated vomiting, and an altered LOR or even combativeness leading to unresponsiveness.

Treatment

Protect the airway

Maintain Core Body Temperature

Treat as though unresponsive

EVACUATE immediately.

Skull Fracture

May be OPEN or CLOSED. May see displaced bone fragments or a depressed skull.

Basilar skull fractures can result in clear or blood-tinged fluid (*cerebrospinal fluid*) from the nose or ears.

Treatment involves: maintaining the ABCs and core body temperature and protecting the injury site and **EVACUATE.**

MODULE TEN

Abdominal Issues

M10 Objectives

Define the difference between open and closed injuries of the abdomen.

Discuss the differential causes of abdominal pain in both traumatic and non-traumatic patients.

Discuss treatment modalities for gastrointestinal illnesses.

Open and Closed Injuries

The organs of the abdominal cavity can be injured by falls, collisions, and penetrating injuries.

A rupture of a blood-filled organ (such as the liver and spleen) can cause enough blood loss for a patient to develop severe shock.

About 20% of patients with multiple rib fractures on the left side will have a ruptured spleen and have pain to the shoulder (*Kerr's sign*).

Open and Closed Injuries

If the hollow organs (such as the stomach or intestines) rupture, the patient will experience **SEVERE** pain, inflammation and bloating.

The patient will often display a *guarding reaction* and the muscles will become very rigid.

Open and Closed Injuries

Closed injuries are usually found during the assessment and may present with pooling blood, bruising, abdominal distention and rigidity.

Open Injuries, where there has been a puncture or there is protruding intestines or fatty tissues, require additional protective measures.

Abdominal Pain

We do not attempt to determine the cause of non-traumatic abdominal pain – the pain be coming from an organ underneath the pained area or may be radiating from another area.

Our decision will be mainly on when to evacuate for help – watch for signs of shock, associated nausea or vomiting, or a swollen abdomen may all be indications of a need to evacuate.

Abdominal Pain Treatment

Our treatment options are limited to slow, sipping of fluids (no alcohol or caffeine drinks), antacids, and a warm canteen of water to be used as a heating pad may all be useful.

AVOID solid foods, laxatives or milk products.

Allow the patient to assume a position of comfort.

Nausea and Vomiting

Our treatment for nausea and vomiting is much the same as pain – ample rest and fluids, if possible. The patient may also benefit from carbohydrates in small portions. Avoid any meat or milk for at least 48 hours.

Nausea and vomiting can occur with many conditions

Diarrhea

Diarrhea, the frequent passage of loose, watery or unformed stool, can be commonly caused by bacterial, viral or parasitic infections from food, water or a communicable virus.

Dehydration can occur as a result – especially in the elderly and very young.

Replacement of fluid and electrolytes is of **PRIMARY IMPORTANCE.**

Watch for signs of DEHYDRATION.

Bloody Stool & Hemorrhoids

Small amounts of bright red blood typically stem from hemorrhoids (inflamed or swollen veins around the anus).

Most often resolve themselves in time.

DARK, TARRY stool can be a sign of *serious bowel bleeding* – may present with abdominal cramping and possibly shock. Evacuation is probably indicated.

Hernias

Hernias occur when loops of intestine protrude through weak spots in the abdominal wall.

Most common around the groin and lower abdomen.

Rarely require urgent surgery – most will slide back in with relaxation and a little manual pressure.

Avoid carrying heavy loads in front of the body.

MODULE ELEVEN

Allergies & Diabetes

M11 Objectives

Discuss the possible effects of “being in the wilderness” on a diabetic’s ability to manage their glucose levels.

Define insulin shock and ketoacidosis.

Define anaphylactic shock and discuss the associated treatments.

Discuss the causes of hives.

Diabetics in the Wilderness

- *Diabetes* (a metabolic disease in which the body's inability to produce any or enough insulin causes elevated levels of glucose in the blood) require individuals to eat on a regular schedule and, if they are engaged in unusual physical exertion, they will need to eat more or take less medication (exercises "acts" like insulin).

Insulin Shock

Insulin shock can occur if a diabetic gets too much insulin, too much exercise, or too little food (or some combination of these) which results in a drop in blood sugar (*hypoglycemia*).

Patients will rapidly become sweaty, faint, and dizzy. They may also become unresponsive.

The best treatment is to give the patient sugar in the form of candy, honey, juice, etc.

Ketoacidosis

Ketoacidosis (a serious diabetes complication when the body produces excess blood acids) as a result of *hyperglycemia* (HIGH blood sugar).

Usually has a **gradual onset** (hours to days) and the patient will become flushed, have warm, dry skin and rapid, DEEP respirations with a fruity odor to their breath.

Direct the patient to increase water intake.

Anaphylactic Shock

Anaphylactic shock is an immediate and severe allergic reaction to certain foods, insect stings, drugs or other allergens.

The most common cause of anaphylactic deaths involve the closing of the airways due to swelling. The second leading cause is the collapse of the circulatory system.

Anaphylactic Shock: *Signs and Symptoms*

Severe itching or hives

Sneezing & coughing

Wheezing

Shortness of breath

Tightness of the throat

Swelling of the face & tongue

Convulsions

Loss of Consciousness

Anaphylactic Shock: Treatment

Must act **QUICKLY**

The only life-saving treatment is epinephrine

Most that suffer from anaphylaxis will carry an EpiPen autoinjector.

An inhaler or nasal decongestant spray may also be useful – along with Benadryl.

Hives

Hives can result from an allergic reaction to food, insect stings or bites, pollen and occasionally during a viral infection.

Typically appear as pink, blotches on the skin – may be bumpy and slightly swollen.

Normally pass in 1 day – 1 week.

Antihistamines or topical ointments (*Burleigh Balm*) are often effective.

MODULE TWELVE

Urinary Issues

M12 Objectives

Discuss urinary pain, its causes, and prevention.

Define the various levels of dehydration.

Discuss menstruation & associated abnormalities.

Discuss causes of lower abdominal pain.

Define priapism and its causes.

Discuss kidney stones and associated symptoms

Discuss pregnancy and its effect on participation in outdoor activities.

Painful Urination

Pain during urination is typically caused by some type of infection of the urinary tract.

The pain can usually be eased by drinking plenty of water and avoiding acidic fluid such as juices,

Levels of Hydration

Urine color can be a good indication of overall hydration levels. It is not uncommon for urine to be dark yellow or even light brown in the mornings which is your body's way of saying it is time to rehydrate for the day's activities.

Urine Color Chart

Urine Color	Possible Meaning
Clear	Good hydration, overhydration or mild dehydration
Pale Yellow	Good hydration or mild dehydration
Bright Yellow	Mild or moderate dehydration or taking vitamin supplements
Orange, Amber	Moderate or severe dehydration
Tea-Colored	Severe dehydration

Menstruation

Monthly menstrual bleeding is common in women from their teens into their forties.

However, heavy bleeding (enough to saturate a pad in three hours) is reason enough to treat for shock and prepare for evacuation – as it may be the sign of a serious condition.

Bleeding during pregnancy may be a sign of miscarriage or other complications.

Lower Abdominal Pain

Pain in the lower abdomen often arises from organs in the pelvic girdle in women, in the intestines and urinary tracts.

Not possible to determine a precise cause in the field – if symptoms do not subside or worsen, treat for shock and evacuate.

Priapism

Priapism (a prolonged erection of the penis that isn't caused by sexual stimulation or arousal) can be very painful.

Often occurs with pelvic and spinal injuries.

No treatment in the wilderness – must be evacuated for medical care.

Kidney Stones

Kidney stones (small, hard mineral deposits that form in the kidneys) can cause sudden, severe pain in the small of the back and abdomen – pain can also spread to the groin and cause vomiting and bloody urine.

Increased fluid intake MAY aid in flushing the kidneys.

If severe pain or fever results – EVACUATE.

Pregnancy and Wilderness Travel

Overheating in the first 12 weeks of pregnancy has been associated with abnormal fetal development.

Women, without any major medical problems, that have been exercising before and during their pregnancy typically have no problems engaging in wilderness activities up to 16 weeks.

✖MODULE THIRTEEN

Environmental Hazards

M13 Objectives

Define hypothermia

List the signs & symptoms of mild - severe hypothermia.

Describe situations that would require a rapid evacuation of a patient with hypothermia.

Describe hyperthermia and the associated treatments.

Define altitude sickness.

List the signs and symptoms of altitude sickness.

Describe the possible treatments of altitude sickness.

M13 Objectives

Define frostbite & chilblains.

Discuss the various treatment options for frostbite & chilblains.

Describe the differences between heat exhaustion & heat stroke.

Discuss the treatment for heat related illness.

Describe how lightning can cause injury and/or death.

Describe the treatment of lightning-induced injuries.

Describe the treatment of a victim of submersion.

Hypothermia

Hypothermia results when the core body temperature drops below 95 degrees. A body temperature of 90° - 95° is considered *mild-moderate hypothermia* – anything under 90° is considered *severe hypothermia*.

Signs and symptoms of hypothermia include the ***UMBLES***: fumbles, stumbles, mumbles, & crumbles.

Hypothermia

We lose heat in several different ways:

Radiation - loss of heat to the environment due to the temperature gradient.

Conduction - through direct contact between objects, molecular transference of heat energy. Water conducts heat away from the body 25 times faster than air because it has a greater density (therefore a greater heat capacity). Stay dry = stay alive!

Convection - is a process of conduction where one of the objects is in motion. Molecules against the surface are heated, move away, and are replaced by new molecules which are also heated. The rate of convective heat loss depends on the density of the moving substance.

Evaporation - heat loss from converting water from a liquid to a gas.

Perspiration- heat loss through sweating.

Respiration - air is heated as it enters the lungs and is exhaled with an extremely high moisture content

Conditions Leading to Hypothermia

Cold temperatures

Improper clothing and equipment

Wetness

Fatigue, exhaustion

Dehydration

Poor food intake

Alcohol intake - causes vasodilation

Mild Hypothermia

Mild Hypothermia - core temperature 95 – 93°

Signs and Symptoms

Shivering - not under voluntary control

Can't do complex motor functions can still walk & talk

Vasoconstriction to periphery

Moderate Hypothermia

Moderate Hypothermia - core temperature 93 – 90°

Signs and Symptoms

Loss of fine motor coordination - particularly in hands - due to restricted peripheral blood flow

Slurred speech

Violent shivering

Irrational behavior - Paradoxical Undressing. cold

"I don't care attitude" - flattened affect

Severe Hypothermia

Severe Hypothermia - core temperature 92 - 86 degrees and below (immediately life threatening)

Shivering occurs in waves, violent then pause, pauses get longer until shivering finally ceases.

Person falls to the ground, can't walk, curls up into a fetal position.

Muscle rigidity develops - because peripheral blood flow is reduced and due to lactic acid and CO2 buildup in the muscles

Skin is pale, Pupils dilate, Pulse rate decreases

At 90 degrees the body tries to move into hibernation, shutting down all peripheral blood flow and reducing breathing rate and heart rate.

At 86 degrees the body is in a state of "metabolic icebox." The person looks dead but is still alive.

Assessing for Hypothermia

If shivering can be stopped voluntarily = mild hypothermia

Ask the person a question that requires higher reasoning in the brain (count backwards from 100 by 9's). If the person is hypothermic, they won't be able to do it

If shivering cannot be stopped voluntarily = moderate - severe hypothermia

If you can't get a radial pulse at the wrist, it indicates a core temp below 90 - 86 degrees

The person may be curled up in a fetal position. Try to open their arm up from the fetal position, if it curls back up, the person is alive. Dead muscles won't contract only live muscles.

Treatment for mild-moderate Hypothermia

Reduce Heat Loss

- Additional layers of clothing
- Dry clothing
- Increased physical activity
- Shelter

Add Fuel & Fluids - It is essential to keep a hypothermic person adequately hydrated and fueled.

Treatment for Severe Hypothermia

Hypothermia Wrap: The idea is to provide a shell of total insulation for the patient.

Add Fuel & Fluids: Warm Sugar Water - for people in severe hypothermia, the stomach has shut down and will not digest solid food but can absorb water and sugars. Give a dilute mixture of warm water with sugar every 15 minutes. Dilute Jello™ works best since it is part sugar and part protein. This will be absorbed directly into the blood stream providing the necessary calories to allow the person to rewarm themselves.

Add Heat: Heat can be applied to transfer heat to major arteries - at the neck for the carotid, at the armpits for the brachial, at the groin for the femoral, at the palms of the hands for the arterial arch.

Hot water bottles, warm rocks, towels, compresses

For a severely hypothermic person, rescue breathing can increase oxygen and provide internal heat.

Hypothermia Wrap

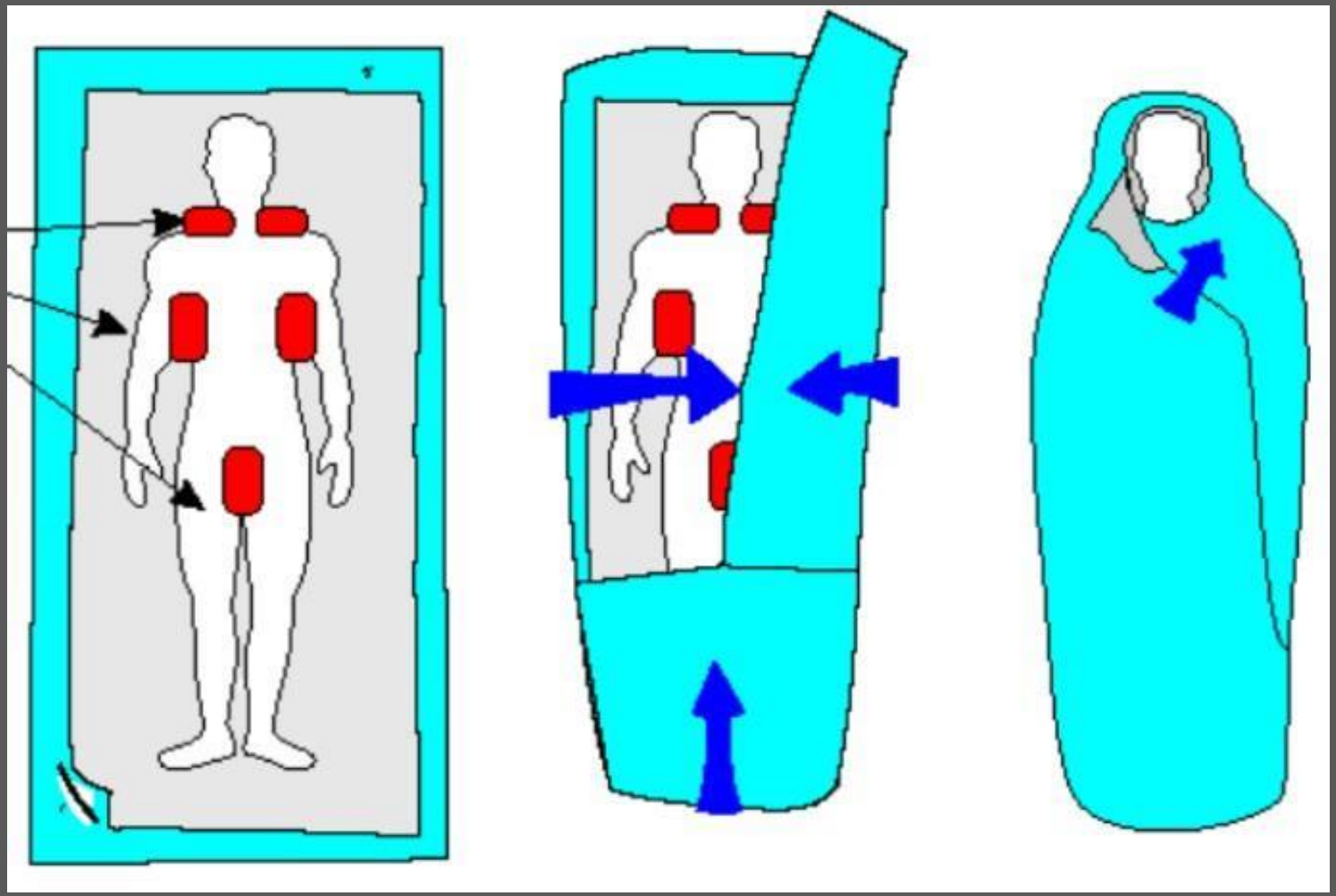
The idea is to provide a shell of total insulation for the patient. No matter how cold, patients can still internally rewarm themselves much more efficiently than any external rewarming.

Make sure the patient is dry. The person must be protected from any moisture in the environment.

Use multiple sleeping bags, wool blankets, etc. to create a minimum of 4" of insulation all the way around the patient, especially between the patient and the ground.

Include an *aluminum "space" blanket* to help prevent radiant heat loss, and wrap the entire ensemble in plastic to protect from wind and water.

Hypothermia Wrap



Hyperthermia

When the core body temperature exceeds 101° a patient has developed *hyperthermia*.

A sustained temperature of 104° is **life-threatening** and immediate cooling is needed.

Signs are hot, dry skin, inability to sweat, low blood pressure, fainting spells, and dizziness.

Hyperthermia Treatment

We can treat **MILD** cases by moving the patients into the shade, loosen restrictive clothing and allowing them to rest and drinking sips of cool water.

With SEVERE cases, it may be beneficial to immerse the patient in cool water or pouring cool water over them or using “cool” compresses.

Altitude Sickness

For every 1000 feet of altitude, the temperature drops about 3.5° and the pressure drops 20mm Hg and the UV radiation increases about 5%. These changes effect the way oxygen is received in the body.

Oxygen remains at 21% but the PO2 (*oxygen partial pressure*) reduces to 2/3 at 10000' and ½ at 18000.

Altitude Sickness

Ascent to altitude, especially too quickly to allow for *acclimatization*, has a number of effects on the body.

At 6500’ one can develop *Acute Mountain Sickness* which can result in breathlessness, headache, and lightheadedness due to hypoxia.

Acute Mountain Sickness (*AMS*)

Signs and Symptoms:

Headache

Apathy

Insomnia

Lightheadedness

Loss of appetite

Edema of the ankles

Weakness

Poor urine output

High Altitude Cerebral Edema (*HACE*)

Signs and Symptoms

Same as AMS, only increased in severity

Loss of muscle coordination & control

Altered mental status which may progress to unresponsiveness.

High Altitude Pulmonary Edema (*HAPE*)

Signs and Symptoms

A dry cough

Increased respiratory distress

Mild chest pain

Decrease in ability to exercise

Late signs include: pink sputum, severe respiratory distress, audible gurgling.

Altitude Illness Treatment

Recognize the problem and **STOP ASCENDING**.

Descend rapidly.

Give oxygen, if available.

Position of comfort

Treat the headache.

Feed and hydrate the patient.

Treat for shock, if unresponsive.

Frostbite

Surface skin temperatures that drop below 59° can trigger a response called *cold-induced vasodilation* (**CIVD**) – also known as "*Hunter's response*".

CIVD results in blood vessel dilating at short intervals to bring surges of warm blood to the skin.

If core temperatures drop (or exposed skin temps drop to 37°-50°) circulation withdraws form the surface.

Risk Factors for Frostbite

Wind chill

Hypothermia

Alcohol consumption

Smoking (causes blood vessels to constrict)

Tight boots (impairs circulation)

Fatigue (slows heat production)

Wet skin (Cools 25 times faster!!)

Frostbite Signs and Symptoms

At first, cold skin and a prickling feeling

Numbness

Red, white, bluish-white or grayish-yellow skin

Hard or waxy-looking skin

Clumsiness due to joint and muscle stiffness

Blistering after rewarming, in severe cases

Frostbite Treatment

- If you or someone in your group is exhibiting signs of frostbite:
- Immerse the extremity in 104-108°water.
- **Do NOT massage** the extremities.
- Continue warming for up to 30 minutes or until the skins is red & pliable.
- The goal of rewarming is to restore circulation as quickly as possible with damaging the tissues.

Chilblains

Chilblains are painful inflammation of small blood vessels in your skin that occur in response to sudden warming from cold temperatures - can cause itching, red patches, swelling and blistering on extremities.

Chilblains result from repeated exposure of bare skin to wet, wind and cold.

The best approach to chilblains is to avoid developing them by limiting your exposure to cold, dressing warmly and covering exposed skin.

Heat Exhaustion

Heat exhaustion is a heat-related illness that can occur after you've been exposed to high temperatures, and it often is accompanied by dehydration – usually develops a rapid, weak pulse, headache, PROFUSE sweating.

Treatment includes: **REMOVE** the patient from the heat (place in the shade), rehydrate, and give electrolytes.

Heat Stroke

Heat stroke occurs when heat exhaustion is left untreated and allowed to “run its course”.

When core temperatures reach 106°, the system fails and the cell membranes begin to leak allowing sodium ions to accumulate in the cells which increase heat production.

Classic Heat Stroke (*CHS*)

CHS is known as the "*slow cooker*" and can take days to develop. Typically found in the elderly and patients unable to get out of the heat.

Exertion Heat Stroke (*EHS*)

EHS is the "fast cooker", often appearing in as little as 15 minutes. Typically, found in patients under physical exertion in extreme heat.

Patients may continue to sweat profusely but with a rapid, bounding pulse.

Can develop a coma – the longer the coma lasts, the less likely the chance of recovery.

Lightning Injury

Lightning injuries can result from a direct strike to the victim, splash over from nearby objects, flow through a conductor like water or fence wire, or flow through the ground from a nearby strike.

In about 50% of those struck by lightning, the concussion ruptures the eardrums, most exhibits burns and can have trauma from the muscle spams caused by the electrical surge.

Treating Victims of Lightning Strikes

May require CPR.

Rescue breathing can aid until the pulse returns to normal.

If several injured, FOCUS ON THE QUIET ONES.

Patient may not be able to hear you.

Treat injuries as you would from any other emergency.

Submersion Incidents

If a patient has been submerged in “cold” water in ambient temperatures of 72° or less, assume hypothermic and treat as such.

Remember, wet skin loses heat 25 TIMES faster!!

Cover the patient with insulative materials, protect them from the wind – **preserve their body heat**.

✖MODULE FOURTEEN

Poisonous Plants and Bites

M14 Objectives

Describe plant-induced dermatitis.

Define urushiol and its properties.

Describe poison ivy, oak & sumac.

Discuss the symptoms of and treatment for exposure to urushiol.

Define the risks associated with spider bites.

Describe the treatment for spider bites.

M14 Objectives

Describe the possible consequences of tick bites and tick-borne illnesses.

Define the various types of insect repellents and their applications.

Discuss the risks associated with animal bites.

Describe the various poisonous snakes.

Discuss treatment options for snake bites.

Plant Induced Dermatitis

Poison ivy, oak & sumac are the 3 most common causes of contact dermatitis.

Reactions are due to a reaction to topical contact with *urushiol* in the plant stem and leaves. 50% of the US population is allergic.

Reactions often develop 8-48 hours post exposure – blisters and itching are the most common. The blister fluid does NOT contain the irritant.

Urushiol

More toxic today then it was 10-20 years ago – thought to be a result of “stronger” plants secondary to an increase in carbon dioxide.

After 30 minutes, the resin is permanently bonded to the skin and will require an alcohol-based clean to remove.

Poison Ivy

Leaves of three, let it be.

Poison ivy grows as a shrub, climbing vine or simply blankets an area with low-growing vines.

Poison Oak

Poison oak grows as a vine or shrub. It also has a leaf arrangement similar to poison ivy, with clusters of three leaflets. The leaves may sometimes resemble true oak leaves.

Poison Sumac

Poison sumac grows as a shrub or small tree and typically grows in very wet areas. Each stem contains 9 to 13 leaves arranged in pairs. The leaves are a brilliant, red color in the fall.

Dermatitis Treatment

Wash hands and infected areas IMMEDIATELY with soap and plenty of water – hand sanitizers work great for neutralizing the resin.

Apply calamine, if available.

Jewelweed and Plantain Salves can slow the spread.

Jewelweed & plantain also aid in recovery.

Spider Bites

Many spiders are venomous, but few have either venom that is dangerous to humans or fangs long enough to penetrate human skin. A few exceptions in the US include: black widow, tarantula and brown recluse.

Death from a spider bite in the US is **VERY RARE**.

Black Widow Spiders

The black widow spider is found worldwide – only the female is dangerous and can be identified with a red spot (often in the shape of an hourglass) on the abdomen.

Symptoms of Black Widow Bite

Sharp pinprick MAY be felt.

Faint, red bite marks MAY appear later.

Muscle stiffness & cramps – affecting the bitten limb and ascending into the abdomen and chest.

Headache, chills, fever, heavy sweating, nausea, vomiting, and severe abdominal pain later.

Black Widow Bite Treatment

Maintain airway – check ABCs.

If possible, catch the spider for ID – even if it is crushed.

Clean the bite area with soap and water.

Place ice or cold packs to relieve the pain, administer pain meds and/or apply an astringent herbal poultice.

EVACUTE to medical attention.

Brown Recluse Spider

The brown recluse is a nondescript spider that MAY have a brown or purplish violin-shaped figure on its back. They frequently build their webs in woodpiles and sheds, closets, garages, plenum spaces, cellars, and other places that are dry and generally undisturbed.

Symptoms of a Brown Recluse Bite

The bite will typically have a “bulls-eye” appearance – a central white core surrounded by red, ringed by a whitish or blue border. A blister may form at the bite site hours later.

Local pain, which can become severe – subsiding to aching and itching.

Can develop necrosis of the tissue around the bite.

Fever, weakness, vomiting, joint pain and rash.

Treatment of Brown Recluse Bite

If possible, catch the spider for ID – even if it is crushed.

Clean the bite area with soap and water.

Place ice or cold packs to relieve the pain, administer pain meds and/or apply an astringent herbal poultice.

No immediate danger.

Tarantulas

While frightful in appearance and able to deliver a painful bite, North American tarantulas are typically quite harmless. There may be pain at the bite site but few other symptoms.

Ticks

Tick bites are painless and the tick can remain attached for days without the victim being aware off its presence.

Heaviest in the woodland – field interface.

They sit on the edges of leaves with their “arms” outstretched sensing heat and movement up to 15 feet away.

Tick bites

Most ticks are harmless – however some do carry *Lyme Disease* and *Rocky Mountain Spotted Fever*.

Ticks secrete a “bio-cement” that anchors them to the hosts’ skin – which makes them difficult to remove.

The longer a tick is attached the greater the possibility of infection.

Lyme Disease

Lyme disease is caused by a bacteria and is transmitted to humans through the bite of infected ticks. Typical symptoms include fever, headache, fatigue, and a characteristic skin rash called *erythema migrans*. If left untreated, infection can spread to joints, the heart, and the nervous system.

Most cases of Lyme disease can be treated successfully with a few weeks of antibiotics.

Steps to prevent Lyme disease include using insect repellent, removing ticks promptly, applying pesticides, and reducing tick habitat.

To Remove a Tick

Use tweezers or finger nails.

Grasp the tick close to the skin and pull steadily.

Wash the bite area with soap and water.

If swelling occurs, use cold compresses.

Watch for signs of infection or blood borne illness (severe headache, fever, rash)

Insect Stings

More people in the US die of bee, hornet and wasp stings than die of snake bites.

A single sting can be fatal to someone who is severely allergic. Multiple stings can most certainly kill – even if the person is not allergic to the insect.

Insect Sting Treatment

Search for the embedded stinger – stingers can continue to pulsate & inject venom for 2-3 minutes.

Wash the sting area.

Apply cold compresses to the site.

Use OTC meds to relieve pain & swelling.

Benadryl will reduce localized symptoms.

Insect Repellants

There are 3 categories of insect repellants: natural (*citronella, lemon eucalyptus*), synthetic (*DEET*) and insecticides (*permethrin*) all of which offer different types of protection.

Animal Bites

Animal bites from wild, or domesticated animals, produce injuries associated with tears, punctures and lacerations and fortunately are seldom very serious.

It is unlikely in North America that one will contract *rabies* from an animal bite.

Rabies

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

The rabies virus infects the central nervous system, ultimately causing disease in the brain and death. The early symptoms of rabies in people are similar to that of many other illnesses, including fever, headache, and general weakness or discomfort. As the disease progresses, more specific symptoms appear and may include insomnia, anxiety, confusion, slight or partial paralysis, excitation, hallucinations, agitation, hypersalivation (increase in saliva), difficulty swallowing, and hydrophobia (fear of water). Death usually occurs within days of the onset of these symptoms.

Rabies

While the possibility is extremely low that one will contract rabies in North America, we should consider the possibility if:

- You are bitten by a dog, cat, skunk, fox, or raccoon without provocation.
- You are bitten by a bat.
- You're bitten by a large carnivore
- Or an already open wound is licked by a potentially rabid animal.

Treating Animal Bites

Wash the bite vigorously with soap and water, use betadine or other irrigation solution, if available.

You need to capture or kill the animal if it is safe to do so – the brain must be examined to determine if it's rapid or not.

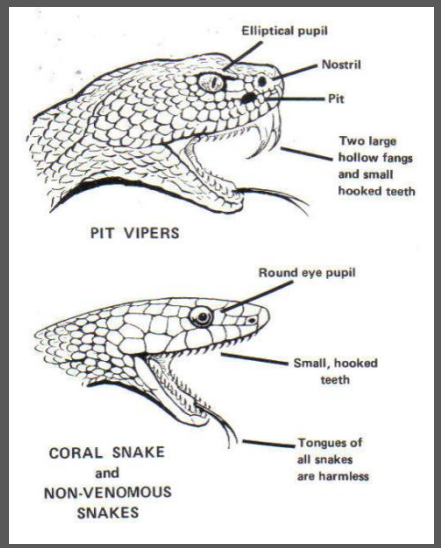
Snake Bites

Only two families of snakes are poisonous in the US – pit vipers (*copperheads, rattle snakes, & water moccasins*) and coral snakes.

Twenty-five percent of venomous snake bites are "dry" – meaning no venom is injected. There maybe a fang mark but no local or systematic symptoms.

Pit Vipers

The pit viper family (copperheads, rattle snakes & water moccasins) have a triangular, flat head that is wider than the head with vertical elliptical pupils and a heat-sensitive “pit” located between the eye and nostril.



Signs and symptoms of a venomous bite

Severe burning or pain at the bite site

Two small puncture wounds at the bite site.

Swelling starting within 5 minutes – progressing up the extremities with an hour.

Discoloration, blood-filled blisters developing within 6-48 hours.

In severe cases: nausea, vomiting, weakness.

Treatment of Snake Bite

Get the patient away from the snake.

Suction with a Sawyer Extractor, if available. DO NOT cut and suck a bite.

Immobilize the extremity.

If there are severe symptoms, keep the victim quiet to slow the spread of the venom.

Evacuate immediately. Antivenom is best given within 4-6 hours of the bite.

Sawyer Extractor®

The only suction tool currently recommended by the Wilderness Medical Society is the Sawyer Extractor®. It can also be used for insect stings. It has proven to be 33% effective.

Again, 33% effectiveness is not 0%, so if you feel that you want to add this item to your kit because you regularly operate within a snake-infested environment, then by all means add it.