

Suding Lab Field Safety Protocol

Below are protocols that should be followed if you or a companion is injured in the field. Topics covered include:

- [Contact information](#)
- [UCI recommended procedure for seeking medical treatment if injured on the job](#)
- [Items that should be taken to the field](#)
- [First aid kit](#)
- [Heat injuries \(Dehydrations and heat stroke\)](#)
- [Cold weather injuries \(Hypothermia and frost bite\)](#)
- [Altitude Sickness](#)
- [Encountering a wild animal](#)
- [Animal bites](#)
- [Snake bites](#)
- [Spider bites](#)
- [Ticks](#)
- [Bee stings](#)
- [Chest pain/heart attack](#)
- [Head Injuries](#)
- [Puncture wounds](#)
- [Cuts and abrasions](#)
- [Burns](#)
- [Sprains and strains](#)
- [Broken Bones](#)
- [Lightning](#)
- [Poison ivy – oak- sumac](#)

Contact Information

Emergency (Police, Fire, Ambulance): 911

UCI Police Department: 949-824-5223

Irvine Ranch Conservancy

- **Main office:** 714-508-4757
- **Security:** 949-936-8026 (business hours), 714-544-0120 (after hours)

City of Irvine: 949-724-6738

Fleet Services (garage): 949-824-5586

Katie Suding

- **Office:** 949-824-7495
- **Home:** 949 854-7714

Lab: 949-824-1559

David Meitz (Environmental Health and Safety Coordinator)

- **Office:** 949-824-2221
- **Cell:** 949-337-2334

[Top](#)

How to obtain medical care if injured on the job

Summary: If you are injured or become ill as a result of your UCI employment and need medical attention, please follow these procedures.

What to do

Obtain medical authorization

1. Contact one of the following:
 - o Workers' Compensation Unit, (949) 824-7008
 - o Supervisor or Department Administrator - have them contact one of the clinics noted below

In the event a Supervisor or Department Administrator is not available go directly to the clinic.

If necessary, obtain immediate medical attention

1. If you have **previously designated a physician** of choice, obtain treatment through your designated physician.
2. If you **have not** designated a physician of choice **prior to injury or illness**, you must obtain medical attention at one of the following clinics:
 - o Newport Urgent Care, (949) 752-6300 (located off campus, [map](#))
 - o Occupational Health Clinic, (714) 456-8300 (at UCI Medical Center, [map](#))
 - o Occupational Services, (562) 933-0085 (located near Long Beach Memorial Hospital, [map](#))

If you **are unable to seek medical attention at one of these clinics**, please contact the Workers' Compensation Unit, at (949) 824-7008, for **clinic referral**.

Need an expert? If you have any questions, please contact an expert in the [Workers' Compensation & Disability Management](#) Unit, (949) 824-7008, Fax (949) 824-9299.

Information accessed from UCI at:

<http://snap.uci.edu/viewXmlFile.jsp?resourceID=320>

[Top](#)

Items that should be taken to the field

- First aid kit
- Protective clothing
 - o Warm Weather (hat, boots, snake gaiters)
 - o Cold Weather (rain gear, extra warm clothes, gloves, warm hat)
- Water (**at least 2 liters**)
- Extra Food
- Sun glasses and Sunscreen
- Research permits

Tell someone where you are going
Always try to travel in pairs

[Top](#)

First aid kit supplies

At the very least:

- **Gauze sterile pads, assorted sizes** to stop bleeding.
- **Cleansing agent/soap** and antibiotic towelettes to disinfect.
- **Antibiotic ointment** to prevent infection.
- **Antihistamine** to treat allergic reactions
- **Adhesive bandages** in a variety of sizes.
- **Eye wash solution** to flush the eyes or as general decontaminant.
- **Tape-1" first aid tape** to attach gauze pads
- **Aspirin or nonaspirin pain reliever**
- **Safety pins**
- **Tweezers**

Things it may be good to have:

- Cell Phone

Information accessed from Department of Homeland Security at:
<http://www.ready.gov/america/getakit/firstaidkit.html>

[Top](#)

Heat Injuries (Dehydration and Heat Stroke)

What causes dehydration?

Under normal conditions, we all lose body water daily through sweat, tears, urine and stool. In a healthy person, this water is replaced by drinking fluids and eating foods that contain water. When a person becomes so sick with fever, diarrhea, or vomiting or if an individual is overexposed to the sun, dehydration occurs. This is caused when the body loses water content and essential body salts such as sodium, potassium, calcium bicarbonate and phosphate.

Occasionally, dehydration can be caused by drugs, such as diuretics, which deplete body fluids and electrolytes. Whatever the cause, dehydration should be treated as soon as possible.

What are the symptoms of dehydration?

The following are the most common symptoms of dehydration, although each individual may experience symptoms differently. Symptoms may include:

- thirst
- less-frequent urination and very yellow urine
- dry skin
- fatigue
- light-headedness
- dizziness
- confusion
- dry mouth and mucous membranes
- increased heart rate and breathing

Treatment for dehydration:

In cases of mild dehydration, simple rehydration is recommended by drinking fluids. Many sports drinks on the market effectively restore body fluids, electrolytes, and salt balance.

For moderate dehydration, intravenous fluids may be required, although if caught early enough, simple rehydration may be effective. Cases of serious dehydration should be treated as a medical emergency, and hospitalization, along with intravenous fluids, is necessary. Immediate action should be taken.

How can dehydration be prevented?

Take precautionary measures to avoid the harmful effects of dehydration, including:

- Drink plenty of fluids the day before you are going to be in the sun
- Drink plenty of fluids, especially when working or playing in the sun.
- Make sure you are taking in more fluid than you are losing.
- Drink appropriate sports drinks to help maintain electrolyte balance.

What is heat stroke?

Heat stroke is the most severe form of heat illness and is a life-threatening emergency. It is the result of long, extreme exposure to the sun, in which a person does not sweat enough to lower body temperature. It is a condition that develops rapidly and requires immediate medical treatment.

What causes heat stroke?

Our bodies produce a tremendous amount of internal heat and we normally cool ourselves by sweating and radiating heat through the skin. However, in certain circumstances, such as extreme heat, high humidity or vigorous activity in the hot sun, this cooling system may begin to fail, allowing heat to build up to dangerous levels.

If a person becomes dehydrated and can not sweat enough to cool their body, their internal temperature may rise to dangerously high levels, causing heat stroke.

What are the symptoms of heat stroke?

The following are the most common symptoms of heat stroke, although each individual may experience symptoms differently. Symptoms may include:

- headache
- dizziness
- disorientation, agitation or confusion
- sluggishness or fatigue
- seizure
- hot, dry skin that is flushed but not sweaty
- a high body temperature
- loss of consciousness
- rapid heart beat
- hallucinations

How is heat stroke treated?

It is important for the person to be treated immediately as heat stroke can cause permanent damage or death. There are some immediate first aid measures you can take while waiting for help to arrive.

- Get the person indoors.
- Remove clothing and gently apply cool water to the skin followed by fanning to stimulate sweating.
- Apply ice packs to the groin and armpits.
- Have the person lie down in a cool area with their feet slightly elevated

Intravenous fluids are often necessary to compensate for fluid or electrolyte loss. Bed rest is generally advised and body temperature may fluctuate abnormally for weeks after heat stroke.

How can heat stroke be prevented?

There are precautions that can help protect you against the adverse effects of heat stroke. These include:

- Drink plenty of fluids during outdoor activities, especially on hot days. Water and sports drinks are the drinks of choice; avoid tea, coffee, soda and alcohol as these can lead to dehydration.
- Wear lightweight, tightly woven, loose-fitting clothing in light colors.
- Protect yourself from the sun by wearing a hat, sunglasses and using an umbrella.

Information was acquired from the University of Maryland Medical Center at:

http://www.umm.edu/non_trauma/dehyrat.htm

[Top](#)

Cold weather injuries (Hypothermia and frost bite)

Hypothermia

1. Hypothermia - "a decrease in the core body temperature to a level at which normal muscular and cerebral functions are impaired." - [Medicine for Mountaineering](#)

2. Conditions Leading to Hypothermia

- Cold temperatures
- Improper clothing and equipment
- Wetness
- Fatigue, exhaustion
- Dehydration
- Poor food intake
- No knowledge of hypothermia
- Alcohol intake - causes vasodilation leading to increased heat loss

5. How to assess if someone is Hypothermic

- 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. [Note: there are also other conditions such as altitude sickness that can also cause the same condition.]
- 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.

Stage	Core Temperature	Signs & Symptoms
Mild Hypothermia	99° - 97°F	Normal, shivering can begin
	97° - 95°F	Cold sensation, goose bumps, unable to perform complex tasks with hands, shiver can be mild to severe, hands numb
Moderate Hypothermia	95° - 93°F	Shivering, intense, muscle incoordination becomes apparent, movements slow and labored, stumbling pace, mild confusion, may appear alert. Use sobriety test, if unable to walk a 30 foot straight line, the person is hypothermic.
	93° - 90°F	Violent shivering persists, difficulty speaking, sluggish thinking, amnesia starts to appear, gross muscle movements sluggish, unable to use hands, stumbles frequently, difficulty speaking, signs of depression, withdrawn.
Severe Hypothermia	90° - 86°F	Shivering stops, exposed skin blue or puffy, muscle coordination very poor, inability to walk, confusion, incoherent/irrational behavior, but may be able to maintain posture and appearance of awareness
	86° - 82°F	Muscle rigidity, semiconscious, stupor, loss of awareness of others, pulse and respiration rate decrease, possible heart fibrillation
	82° - 78°F	Unconscious, heart beat and respiration erratic, pulse may not be palpable
	78° - 75°F	Pulmonary edema, cardiac and respiratory failure, death. Death may occur before this temperature is reached.

Treating Hypothermia

The basic principles of rewarming a hypothermic victim are to conserve the heat they have and replace the body fuel they are burning up to generate that heat. If a person is shivering, they have the ability to rewarm themselves at a rate of 2 degrees C per hour.

Mild - Moderate Hypothermia

1. Reduce Heat Loss

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

2. Add Fuel & Fluids

3. Add Heat

[Top](#)

Altitude Sickness

What Causes Altitude Illnesses

The concentration of oxygen at sea level is about 21% and the barometric pressure averages 760 mmHg. As altitude increases, the concentration remains the same but the number of oxygen molecules per breath is reduced. At 12,000 feet (3,658 meters) the barometric pressure is only 483 mmHg, so there are roughly 40% fewer oxygen molecules per breath. In order to properly oxygenate the body, your breathing rate (even while at rest) has to increase. This extra ventilation increases the oxygen content in the blood, but not to sea level concentrations. Since the amount of oxygen required for activity is the same, the body must adjust to having less oxygen. In addition, for reasons not entirely understood, high altitude and lower air pressure causes fluid to leak from the capillaries which can cause fluid build-up in both the lungs and the brain. Continuing to higher altitudes without proper acclimatization can lead to potentially serious, even life-threatening illnesses.

Acclimatization

The major cause of altitude illnesses is going too high too fast. Given time, your body can adapt to the decrease in oxygen molecules at a specific altitude. This process is known as acclimatization and generally takes 1-3 days at that altitude. For example, if you hike to 10,000 feet (3,048 meters), and spend several days at that altitude, your body acclimatizes to 10,000 feet (3,048 meters). If you climb to 12,000 feet (3,658 meters),

your body has to acclimatize once again. A number of changes take place in the body to allow it to operate with decreased oxygen.

- The depth of respiration increases.
- Pressure in pulmonary arteries is increased, "forcing" blood into portions of the lung which are normally not used during sea level breathing.
- The body produces more red blood cells to carry oxygen,
- The body produces more of a particular enzyme that facilitates
- the release of oxygen from hemoglobin to the body tissues.

Moderate AMS

Moderate AMS includes severe headache that is *not* relieved by medication, nausea and vomiting, increasing weakness and fatigue, shortness of breath, and decreased coordination (ataxia). Normal activity is difficult, although the person may still be able to walk on their own. At this stage, only advanced medications or descent can reverse the problem. Descending even a few hundred feet (70-100 meters) may help and definite improvement will be seen in descents of 1,000-2,000 feet (305-610 meters). Twenty-four hours at the lower altitude will result in significant improvements. The person should remain at lower altitude until symptoms have subsided (up to 3 days). At this point, the person has become acclimatized to that altitude and can begin ascending again. The best test for moderate AMS is to have the person "walk a straight line" heel to toe. Just like a sobriety test, a person with ataxia will be unable to walk a straight line. This is a clear indication that *immediate* descent is required. It is important to get the person to descend *before* the ataxia reaches the point where they cannot walk on their own (which would necessitate a litter evacuation).

Severe AMS

Severe AMS presents as an increase in the severity of the aforementioned symptoms, including shortness of breath *at rest*, inability to walk, decreasing mental status, and fluid buildup in the lungs. Severe AMS requires *immediate* descent to lower altitudes (2,000 - 4,000 feet [610-1,220 meters]).

[Top](#)

Encountering a wild animal

What to do if you run into a moose

Give Moose plenty of room!

If you do find yourself close to a moose:

- If it hasn't detected you yet, keep it that way.
- If it knows you're there, talk to it softly and move away slowly.
- Don't be aggressive – you want to convince the moose that you aren't a threat.
- If you think the moose is going to charge you, take cover or run away.
- **Watch for signs that the moose is upset**
If its ears are laid back and hackles are up it is likely to charge. Most of the time, when a moose charges it is a 'bluff', or warning for you to get back – a warning you should take very seriously! Once a moose bluff charges it is already agitated. If possible, get behind something solid (*like a tree or a car*).
- **Unlike with bears, it is okay to run from a moose.** They usually won't chase you and if they do, it's unlikely that they'll chase you very far. If a moose knocks you down, curl up in a ball and protect your head with your arms and keep still. Fighting back will only convince the moose that you may still be a threat. Only move once the moose has backed off to a safe distance or it may renew its attack.

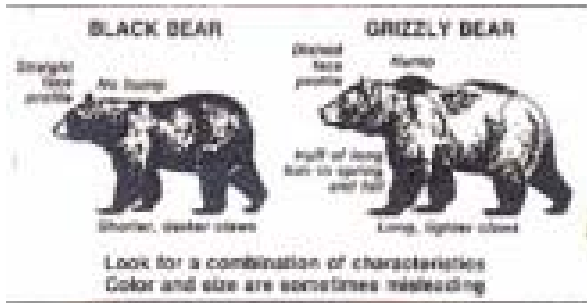
What to do if you run into a mountain lion

- **STOP!** Do not run from a lion. Back away from it slowly, but only if you can do so safely. Running may stimulate a lion's instinct to chase and attack. Face the lion and stand upright. Make eye contact. If you have small children with you, pick them up so they won't panic and run. Although it may seem awkward, pick them up without bending over or turning away from the lion.
- **DO NOT BEND OR CROUCH OVER; DO ALL YOU CAN TO APPEAR LARGER.** A person squatting or bending over looks a lot like a four-legged prey animal. Raise your arms. Open your jacket, if you're wearing one. Throw stones, branches, or whatever you can grab without crouching down or turning your back. Wave your arms slowly and speak firmly in a large voice.
- **DO NOT APPROACH A LION**, especially one that is feeding or with kittens. Most mountain lions will try to avoid confrontation. Give them a way to escape.
- **FIGHT BACK IF ATTACKED.** Try to stay on your feet if a lion attacks you. Lions have been driven off by prey that fights back. Some hikers have fought back successfully with sticks, caps, jackets, garden tools, and their bare hands. Since lions usually try to bite the head or neck, try to remain standing and face the attacking animal.

What to do if you run into a bear (brown and black)

Even though bear attacks at the national parks are extremely rare, here are some tips that will help you to minimize risk if you are traveling in bear country.

How to tell a Black Bear from a Grizzly Bear



There are some obvious physical differences between the American Black Bear (*Ursus americanus*) and the Grizzly Bear (*Ursus arctos horribilis*). Color, however, is not a reliable identifying characteristic for either species. Not all black bears are black in color; they come in a various shades of brown and may even be blonde. Grizzly bears range from yellowish-brown to black. When looking from the side, a black bear has a straight facial profile (from the forehead to the nose). The same profile of a grizzly bear will have a dished out appearance. Also, a black bear will have a straighter shoulder-rump line, while the grizzly will have a characteristically large hump on its back above the shoulders. The black bear has claws which are shorter and more curved than those of the grizzly bear.

If you Encounter a Bear:

- Remain calm and avoid sudden movements.
- Give the bear plenty of room, allowing it to continue its activities undisturbed. Every bear has a zone of danger or personal space -- that is, the distance within which a bear feels threatened. If it changes its natural behavior (feeding, foraging or movement) because of your presence, you are too close. If you stray within that comfort zone, a bear may react aggressively in the form of a bluff charge, bodily contact, or even an outright attack.
- If you spot a bear and the bear is unaware of you, detour quickly and quietly away.
- If spotted by a bear, try to get its attention while it is a good distance away. Help the bear to recognize that you are human, by talking to it in a normal voice or waving your arms. If a bear cannot tell what you are, it may come closer or stand on its hind legs to get a better look or smell. A standing bear is usually curious, not threatening.
- Some bears will bluff their way out of a threatening situation by charging, then veering off or stopping abruptly at the last second. Bear experts generally recommend standing still until the bear stops and then slowly backing away.
- Never run from a bear. Running may elicit a chase from an otherwise non-aggressive bear, and since they can run faster than 30 mph, you have no chance of outrunning them.
- Never feed or toss food to a bear.

- Climbing a tree to avoid bears is popular advice but not very practical in many circumstances. All black bears, all grizzly cubs, and some adult grizzlies can climb trees. Running to a tree may provoke an otherwise uncertain bear to chase you.
- Throw something onto the ground (like a camera) if the bear pursues you, as it may be distracted by this and allow you to escape.
- If you carry pepper spray, be sure that you have trained with it before trusting it during an attack.

If a Bear Attacks:

- Black bears and grizzly bears are very different animals, with grizzlies being responsible for most bear-attack fatalities.
- In the extreme case that a **grizzly bear makes contact with you, play dead. Lie face down on the ground and place your hands around the back of your neck. Stay silent and don't move. Try to keep your legs spread apart to prevent the bear from rolling you over. If possible, leave your pack on to protect your back.** Typically a grizzly bear will break off its attack once it feels the threat has been eliminated. Remain quiet and motionless for as long as possible. Bears will often watch from a distance and return at the first sign of movement.
- Black bears attack very rarely, but when they do it is most likely a predatory attack (i.e. looking for a meal). Even though a normal black bear does not view people as food, a starving or injured bear might. Playing dead or climbing a tree will not stop these kinds of attacks, so your best recourse is to **act aggressively and try to intimidate the bear by yelling and waving your arms and if necessary, fight back using any object available.**
- When the bear no longer feels threatened, it will usually leave the area. Do not move or make noise until you are sure the bear is gone.

[Top](#)

Animal Bites

Care for animal bites:

For deeper bites or puncture wounds from any animal, or for any bite from a strange animal:

- If the bite or scratch is bleeding, apply pressure to it with a clean bandage or towel to stop the bleeding.
- Wash the wound with soap and water under pressure from a faucet for at least five minutes, but do not scrub, as this may bruise the tissue.
- Dry the wound and cover it with a sterile dressing, but do not use tape or butterfly bandages to close the wound, as this could trap harmful bacteria in the wound.
- Call your physician or healthcare professional for guidance in reporting the attack and to determine whether additional treatment, such as antibiotics, a tetanus booster, or rabies vaccination is needed. This is especially important for bites on the face, or for bites that cause deeper puncture wounds of the skin.
- If possible, locate the animal that inflicted the wound. Some animals need to be captured, confined, and observed for rabies. Do not try to capture the animal yourself; instead contact the nearest animal warden or animal control office in your area.
- If the animal cannot be found, or if the animal was a high-risk species (skunk or bat), or the animal attack was unprovoked, the victim may need a series of rabies shots.
- Call your physician or healthcare provider for any flu-like symptoms such as a fever, headache, malaise, decreased appetite, or swollen glands following an animal bite.

Information was acquired from the University of Maryland Medical Center at:
http://www.umm.edu/non_trauma/bites.htm

[Top](#)

Snake bites

In the event of an actual or probable bite from a U.S. or Canadian rattlesnake, execute the following first aid measures without delay.

1. Keep the victim calm and reassured. Allow him or her to lie flat and avoid as much movement as possible. If possible, allow the bitten limb to rest at a level lower than the victim's heart.
2. Identify the bite site, looking for fang marks, and apply the Sawyer Pump extractor with the largest cup possible over the bite site. If there are two or more fang marks noted on the limb, apply the pump extractor over at least one fang mark. If more than one pump extractor is available, they may be applied to the additional fang marks.
3. Immediately wrap a large constricting band snugly about the bitten limb at a level just above the bite site, ie. between the bite site and the heart. The constricting band should be as tight as one might bind a sprained ankle, but not so tight as to constrict blood flow.
4. DO NOT remove the constricting band until the victim has reached the hospital and is receiving Antivenom.
5. Have the Wyeth Crotalidae Polyvalent Antivenom ready for the emergency crew to take with the victim to the hospital. Give them the following:
 1. the available antivenom (at least 10 vials)
 2. the accompanying instruction (Protocol) packet
 3. the victim's medical packet (if available)

DO NOT cut or incise the bite site.
DO NOT apply ice to the bite site.

Information was acquired from:

<http://drdavidson.ucsd.edu/Portals/0/snake/Crotalus.htm>

[Top](#)

Spider Bites

The danger of spider bites:

Most spiders found in the United States are harmless, with the exception of the black widow and the brown recluse spiders (sometimes called the violin spider). Both of these spiders are found in warm climates.

What is a brown recluse spider?



The brown recluse spider, or violin spider, is about 1 inch long and has a violin shaped mark on its upper back. It is often found in warm, dry climates and prefers to stay in undisturbed areas such as basements, closets, and attics. It is not an aggressive spider, but will attack if trapped or held against the skin.

What are the symptoms of a brown recluse spider bite?

Venom from the brown recluse spider usually causes local tissue damage. The following are the most common symptoms of a bite from a brown recluse spider bite. However, each individual may experience symptoms differently. Symptoms may include:

- burning, pain, itching, or redness at the site which is usually delayed and may develop within several hours or days of the bite
- a deep blue or purple area around the bite, surrounded by a whitish ring and large red outer ring similar to a "bull's eye"

- an ulcer or blister that turns black
- headache, body aches
- rash
- fever
- nausea or vomiting

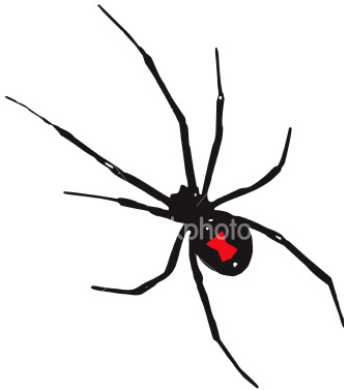
These symptoms of a brown recluse spider bite may resemble other conditions or medical problems. Always consult your physician for a diagnosis.

Treatment for a brown recluse spider bite:

Specific treatment for a brown recluse spider bite will be determined by your physician. Treatment may include:

- Wash the area well with soap and water.
- Apply a cold or ice pack wrapped in a cloth, or a cold, wet washcloth to the site.
- To protect against infection, particularly in children, apply an antibiotic lotion or cream.
- Give acetaminophen (Tylenol) for pain.
- Elevate the site if the bite occurred on an arm or leg (to help prevent swelling).
- Seek immediate emergency care for further treatment. Depending on the severity of the bite, treatment can range from administering corticosteroids and other medications to surgery of the ulcerated area. Hospitalization may be needed.
- Prompt treatment is essential to avoid more serious complications, especially in children.

What is a black widow spider?



A black widow spider is a small, shiny, black, button-shaped spider with a red hourglass mark on its abdomen, and prefers warm climates. Black widow spider bites release a toxin that can cause damage to the nervous system, thus emergency medical treatment is necessary.

What are the symptoms of a black widow spider bite?

The following are the most common symptoms of a black widow spider bite. However, each individual may experience symptoms differently. Symptoms may include:

- immediate pain, burning, swelling, and redness at the site (double fang marks may be seen) cramping pain and muscle rigidity in the stomach, chest, shoulders, and back
- headache
- dizziness
- rash and itching
- restlessness and anxiety
- sweating
- eyelid swelling
- nausea or vomiting
- salivation, tearing of the eyes
- weakness, tremors, or paralysis, especially in the legs

These symptoms of a black widow spider bite may resemble other conditions or medical problems. Always consult your physician for a diagnosis.

Treatment for a black widow spider bite:

Specific treatment for a black widow spider bite will be determined by your physician. Treatment may include:

- Wash the area well with soap and water.
- Apply a cold or ice pack wrapped in a cloth, or a cold, wet washcloth to the site.
- To protect against infection, particularly in children, apply an antibiotic lotion or cream.
- Give acetaminophen for pain.
- Seek immediate emergency care for further treatment. Depending on the severity of the bite, treatment may include muscle relaxants, pain relievers and other medications, and supportive care. Antivenin may be needed, although it is usually not required. Hospitalization may be needed.
- Prompt treatment is essential to avoid more serious complications, especially in children.

Information was acquired from the University of Maryland Medical Center at:
http://www.umm.edu/non_trauma/spider.htm

[Top](#)

Ticks

What to do if you find a tick:

- Do not touch the tick with your bare hand.
- Use a pair of tweezers to remove the tick. Grab the tick firmly by its mouth or head as close to your skin as possible.
- Pull up slowly and steadily without twisting until it lets go. Do not squeeze the tick, use petroleum jelly, solvents, knives, or a lit match to kill the tick.
- Save the tick and place it in a plastic container or bag so it can be tested for disease, if necessary.
- Wash the area of the bite well with soap and water and apply an antiseptic lotion or cream.
- Call your physician to find out about follow-up care and testing of the tick for spirochetes (organisms that may be carried by the tick).

Information was acquired from the University of Maryland Medical Center at:

http://www.umm.edu/non_trauma/lyme.htm

[Top](#)

Bee Stings

The danger of bee stings:

The two greatest risks from most insect stings are allergic reaction (which occasionally, in some individuals could be fatal) and infection (more common and less serious).

What to do if you are stung:

If you have been stung by a bee, wasp, hornet, or yellow jacket, follow these instructions closely:

- Bees leave behind a stinger attached to a venom sac. Do not try to pull it out as this may release more venom; instead gently scrape it out with a blunt-edged object, such as a credit card or dull knife.
- Wash the area carefully with soap and water. This should be continued several times a day until the skin is healed.
- Apply a cold or ice pack, wrapped in cloth for a few minutes.
- Apply a paste of baking soda and water and leave it on for 15 to 20 minutes.
- Take acetaminophen (Tylenol) for pain.

When to seek medical attention:

Seek immediate medical attention if you are stung in the mouth or nose as swelling may block airways. Also seek emergency care if any of the following symptoms are present, as these could indicate an allergic reaction:

- large areas of swelling
- abnormal breathing
- tightness in throat or chest
- dizziness
- hives
- fainting
- nausea or vomiting
- persistent pain or swelling

Information was acquired from the University of Maryland Medical Center at:

http://www.umm.edu/non_trauma/bee.htm

[Top](#)

Chest Pain / Heart Attack Symptoms

What is a heart attack?

A heart attack, or myocardial infarction, results from heart disease -- a condition in which one of the coronary arteries that supplies blood to the heart becomes blocked, ultimately damaging the heart muscle. The blockage is often a result of atherosclerosis -- a buildup of plaque, known as cholesterol, and other fatty substances. Plaque inhibits and obstructs the flow of blood and oxygen to the heart, thus, reducing the flow to the rest of the body.

If the blood and oxygen supply is cut off severely or for a long period of time, muscle cells of the heart suffer severe and devastating damage and die. The result is damage or death to the area of the heart that became affected by reduced blood supply.

The danger of chest pain:

It is important to know that restricted blood flow to the heart:

- usually occurs before the heart attack happens.
- may happen days, weeks, or even months before the heart attack occurs.
- may be mild and easy to ignore.
- may be confused with indigestion.

- may be confused with sore muscles.

Warning signs of a heart attack:

In some, but not all, cases, the body will send warning signs that indicate a heart attack. These include:

- uncomfortable pressure, fullness, squeezing, pain, or discomfort in the center of the chest that lasts for more than two minutes. This pain may be persistent, or may go away and return.
- pain or discomfort that spreads to the shoulders, neck, or arms
- pain, sweating, nausea, or shortness of breath.
- any chest discomfort that causes anxiety or concern
- any chest discomfort that is accompanied by lightheadedness, fainting, or dizziness
- any of the above symptoms that disappear with rest, then return with exertion
- unexplained weakness or fatigue
- palpitations, cold sweat, or paleness

Pain that lasts for 10 to 15 minutes while you are resting should also be evaluated immediately.

Responding to heart attack warning signs:

If you, or someone you know exhibits any of the above warning signs, act immediately. Call 911, or your local emergency number. If necessary, give CPR if you are trained, or ask someone who is. Also, help the victim get into a relaxed sitting position, with the legs up and bent at the knees, to ease strain on the heart. In addition, loosen tight clothing around the neck and waist, and be calm and reassuring that medical help is on the way. Give the victim an adult aspirin with water if they are conscious and able to swallow.

Information was acquired from the University of Maryland Medical Center at:
http://www.umm.edu/non_trauma/chestpain.htm

[Top](#)

Head Injuries

Emergency First Aid for Head Injuries

If you suspect serious head injury, you need to take care of three things right from the start:

- *Observe* for signs of shock, a concussion, or a skull fracture.
- *Position* the victim so he or she is immobile, in order to prevent further damage to both the brain and the spinal cord.
- *Treat* scalp cuts and wounds for bleeding to avoid infection.

Do not give a person who has suffered a head injury any food or water. Both can induce vomiting—which can create breathing problems in a semiconscious or unconscious person. Note that ice packs won't help either. The best medicine is to get the person to a hospital—fast.

If you're in a situation where you need to provide help to a person who has experienced a severe head injury, take care to lend the following first aid:

1. Immediately call for help.
2. See if the injured person is unconscious. Note the length of time the unconsciousness lasts.
3. Look for bleeding from the eyes, nose, or ears. This doesn't have to be bright red blood; it can be something like brown discoloration around the rims of the eyes. This bleeding can be a sign of internal hemorrhaging. Keep the injured person in a prone position, face up.
4. If the injured person is conscious and does not appear to have a neck injury, place a pillow under his head and turn his face to the side.
5. While you are waiting for help, treat any scalp wounds. Clean cuts thoroughly, cover them with gauze, and apply tape that's firm but not constricting.
6. Look for outwardly physical signs of brain injury. These can include:

Severe headaches

Convulsions

Slurred words

Vomiting

Loss of vision or double vision

Loss of short-term memory

Bruising behind the ear or around the eyes

Clear or bloody fluid seeping from the ear, nose, or mouth

Unequal pupils

Weakness or paralysis in limbs

7. If any of the signs described in step 6 appears before an emergency medical team shows up, immobilize the injured person (see Bandaging Wounds). This is crucial for preventing any more damage to the brain, spinal cord, or neck.
8. After the injured person has been released from medical care, he or she should be watched for the symptoms described in step 6 for at least 48 hours. If the symptoms recur, the victim should again seek emergency medical care as quickly as possible.

If the person you're helping has been knocked unconscious by the head injury, do not be surprised if she is in a highly agitated state when she becomes conscious. People who have been unconscious don't just open their eyes and yawn—contrary to what you see in Hollywood movies. They usually shake their heads and kick their feet, and they might pull at tubes that are hooked up to them. And, more than likely, they won't have a clue as to where they are or what happened—or even who you are sitting in the corner with tears in your eyes.

The longer a person is unconscious, the more agitated he or she may be upon recovery. Believe it or not, this is a characteristic you want to see. Agitation implies brain activity. Because the injured person is moving, shaking, and acting up, you know that she is alive and that the brain is functioning. Try to keep the person calm and still until medical help arrives. On the other hand, if the injured person doesn't move when she wakes up, or if her eyes stay focused in the distance, the head injury has probably caused damage to the brain.

[Top](#)

Puncture wounds

A puncture wound doesn't usually cause excessive bleeding. Often the wound seems to close almost instantly. But these features don't mean treatment isn't necessary.

A puncture wound — such as results from stepping on a nail or being stuck with a tack — can be dangerous because of the risk of infection. The object that caused the wound

may carry spores of tetanus or other bacteria, especially if the object has been exposed to the soil. Puncture wounds resulting from human or animal bites, including those of domestic dogs and cats, may be especially prone to infection. Puncture wounds on the foot are also more vulnerable to infection.

If the bite was deep enough to draw blood and the bleeding persists, seek medical attention. Otherwise, follow these steps:

1. **Stop the bleeding.** Minor cuts and scrapes usually stop bleeding on their own. If they don't, apply gentle pressure with a clean cloth or bandage. If bleeding persists — if the blood spurts or continues to flow after several minutes of pressure — seek emergency assistance.
2. **Clean the wound.** Rinse the wound well with clear water. A tweezers cleaned with alcohol may be used to remove small, superficial particles. If larger debris still remains more deeply embedded in the wound, see your doctor. Thorough wound cleaning reduces the risk of tetanus. To clean the area around the wound, use soap and a clean washcloth.
3. **Apply an antibiotic.** After you clean the wound, apply a thin layer of an antibiotic cream or ointment (Neosporin, Polysporin) to help keep the surface moist. These products don't make the wound heal faster, but they can discourage infection and allow your body to close the wound more efficiently. Certain ingredients in some ointments can cause a mild rash in some people. If a rash appears, stop using the ointment.
4. **Cover the wound.** Exposure to air speeds healing, but bandages can help keep the wound clean and keep harmful bacteria out.
5. **Change the dressing regularly.** Do so at least daily or whenever it becomes wet or dirty. If you're allergic to the adhesive used in most bandages, switch to adhesive-free dressings or sterile gauze and hypoallergenic paper tape, which doesn't cause allergic reactions. These supplies are generally available at pharmacies.
6. **Watch for signs of infection.** See your doctor if the wound doesn't heal or if you notice any redness, drainage, warmth or swelling.

If the puncture is deep, is in your foot, is contaminated or is the result of an animal or human bite, see your doctor. He or she will evaluate the wound, clean it and, if necessary, close it. If you haven't had a tetanus shot within five years, your doctor may recommend a booster within 48 hours of the injury.

If an animal — especially a stray dog or a wild animal — inflicted the wound, you may have been exposed to rabies. Your doctor may give you antibiotics and suggest initiation of a rabies vaccination series. Report such incidents to county public health officials. If possible, the animal should be confined for 10 days of observation by a veterinarian.

Information was acquired from the Mayo Clinic at:

<http://www.mayoclinic.com/health/first-aid-puncture-wounds/FA00014>

[Top](#)

Cuts and Abrasions

Overview

The skin is our contact with our environment, so it's frequently subject to injuries including minor cuts and abrasions. Serious trauma to the skin can result in damage to nerves, blood vessels, tendons, bones, and organs which may require immediate medical attention. This advice pertains only to injuries that can be managed safely with self-care.

Signs and Symptoms

- Symptoms vary depending upon the nature, location, and severity of the injury. Minor cuts and abrasions usually heal within 2 weeks.

Self-Care Measures

- Clean your wound thoroughly with mild soap and lots of water, especially for ground-in dirt as is common with "road burns." Continue to clean it with soap and water 1 to 2 times a day—more often if necessary.
- Over the counter (OTC) antiseptic solutions or antibacterial soaps are acceptable for cleaning the skin around the wound.
- Apply an OTC antibacterial ointment to your wound 1 to 2 times a day.
- Keep your wound covered with clean gauze or an adhesive bandage during waking hours. You can leave it uncovered while you sleep if it isn't oozing or painful.
- Don't soak your wound when bathing. Don't swim until it's healed. Brief contact with water from the shower is okay.

Seek Medical attention if any of the following occur:

- A wound that penetrates beneath the visible surface of the skin (especially if it has been contaminated with dirt, rust, etc.), and you haven't had a tetanus shot in the last five years or don't remember when you got your last one.
- A gaping wound where the edges of your skin don't touch (or almost touch) at the wound site or where underlying fat, tendons, bones, etc. are visible.
- Numbness at the wound site or numbness in another part of your body (e.g., a cut near your elbow that results in numbness in your forearm or fingers).
- Bleeding that can't be stopped with direct pressure on the wound or any wound that spurts blood.

- Weakness or loss of function in the area of the wound (e.g., inability to extend your fingers after a cut on your hand or wrist).
- A wound on your face or other area where optimal healing is desired for cosmetic reasons.
- Signs of infection such as a fever of 100.5 degrees F (38 degrees C) or higher; drainage; increased redness, swelling, or pain; or red streaks extending from the wound.

Information was acquired from the University of Texas at:

<http://healthyhorns.utexas.edu/guide/cuts.html>

[Top](#)

Burns

Overview

Burns can be caused by fire, hot surfaces, steam, scalding liquids, chemicals, electricity, or the sun. The severity of a burn depends upon the type of "heat" and the duration of exposure to it.

Signs and Symptoms

1st-degree burns (affect the outer layer of skin)

- Redness, pain, swelling, and sensitivity to touch of the burned area.
- Burned skin remains intact.

2nd-degree burns (affect both the outer and lower layers of skin)

- Symptoms of 1st-degree burns but more severe.
- Usually, blisters and/or shiny, weepy, or watery areas.

3rd-degree burns

- White, cooked, or charred-appearing skin.
- Often little or no pain initially, because nerves have been destroyed.
- More frequent, more severe complications than with 1st- or 2nd-degree burns.

Self-Care Measures

- Cleanse the area gently with mild soap and water.
- Soak the burned area in cold (not ice) water for 10 minutes to relieve tenderness.

- Don't use butter, ointments or grease-based products on the burn.
- Take an OTC analgesic as needed for pain. Ibuprofen is preferred.
- Don't break blisters. Cover blistered areas with a dry dressing that won't stick to your skin. Change it at least twice a day—more often, if needed.

Seek medical attention if any of the following occur:

- Any part of a burn appears to be a 3rd-degree burn.
- Any size 2nd degree burn if you haven't had a tetanus shot within the last 5 years or you're unsure about your tetanus status.
- Any burn to the head, face, or genital areas or any 2nd-degree or large burn to the hands, especially on the palms.
- Multiple burned areas or a 1st- or 2nd-degree burn that is larger than the palm of your hand.
- Signs of infection such as increased redness, pain, swelling, or a fever above 100.5 degrees F (38 degrees C).
- Yellow or persistent bloody discharge in the burned area.

CALL 911 OR GO DIRECTLY TO AN EMERGENCY ROOM IF ANY OF THE FOLLOWING OCCURS:

- Burns caused by electricity, especially if there was a loss of consciousness.
- Burns to your eyes, including those caused by chemicals.
- Burns that are obviously severe and/or over a significant part of your body.

Information was acquired from the University of Texas at:

<http://healthyhorns.utexas.edu/guide/burns.html>

[Top](#)

Sprains and Strains

Overview

Sprains are related to trauma that stretches or tears ligaments. Strains, or "pulled muscles," are related to overuse injuries that cause muscles to stretch or tear. It can be hard to tell a sprain from a strain, but for minor injuries, it usually isn't necessary to do so.

To help prevent strains and sprains, maintain a reasonable fitness level, warm up properly before exercise, wear appropriate shoes or protective gear for activities, back off if an activity hurts, and use proper lifting techniques. You can treat most minor injuries of these types yourself by applying the following self-care advice—whether you've sprained your ankle or strained a leg or back muscle.

Signs and Symptoms

- Sometimes a sensation of burning and/or a popping sound at the time of the injury.
- Pain and/or tenderness in the injured area.
- Swelling.
- Redness or bruising.
- Decreased mobility due to pain.

Self-Care Measures

- Use R-I-C-E therapy:

Rest: Rest the injured area as much as possible for at least the first 1 to 2 days. Then you can resume gentle movement and stretching of the injured muscle or joint, but not to the point of significant pain.

Ice: Apply ice to the injury as soon as possible and for 20 to 30 minutes out of every 2 waking hours. Do this for several days and as long as there is swelling. A purchased ice pack, ice put in a heavy plastic bag, or a package of frozen vegetables will work. Wrap the ice "pack" in a thin towel. Don't put it directly on your skin.

Compression: If possible, wrap the area with an ace (elastic) bandage to help decrease swelling. The bandage should be snug, but not so tight that it causes numbness or tingling of the affected areas or causes your toes or fingers to turn blue. If any of these things occur, loosen the bandage, and they should quickly go away.

Elevation: Elevate the injured area as much as possible to minimize swelling; ideally, above the level of your heart. If this isn't feasible with ankle or knee injuries during the day, prop your foot up in a chair as much as you can.

- Use OTC analgesics as needed for pain.

Seek medical attention if any of the following occur:

- An injured body part that looks crooked or out of place.
- Inability to move the injured part or an extremely limited range of motion.
- Pain that is unmanageable in spite of using self-care measures.
- Increased swelling after 48 hours despite using elevation and ice.
- Symptoms that don't improve with self-care after 4 days.

Put Your B-A-C-K into It!

To reduce the risk of back strains, remember the following when lifting:

- Balance: Create a wide base by balancing your body over your feet.
- Alignment: Keep your back straight.
- Contract: Contract your stomach and keep the weight of the object close to your body. Don't lift or move heavy objects over your head.
- Knees: Bend your knees, and use your legs—not your back—to lift.

Information was acquired from the University of Texas at:

<http://healthyhorns.utexas.edu/guide/sprains.html#back>

[Top](#)

Broken Bones

Broken or dislocated bones are serious medical conditions that require professional medical attention. The first aid procedures are similar for both emergencies.

A broken bone is also called a fracture, and is defined as an injury where the tissue of a bone is disrupted. Fractures are classified into two types. Simple, also known as closed, fractures are when the skin is not punctured as a result of the break. Compound, or open, fractures are when the break is severe enough to displace and break the skin. A compound fracture can become infected more easily than a simple fracture, and extra precautions, such as not breathing or coughing on the wound, should be taken when giving first aid to a victim of a compound fracture.

A dislocated bone is defined as the displacement of any body part from its normal location. It is often hard for a person without medical training to distinguish between a dislocated and broken bone.

The symptoms, which are similar for both broken and dislocated bones, include:

- A visibly misshapen or out of place limb or joint
- Intense pain
- Swelling and bruising in the wounded area
- Limitation of movement
- The sensation of grinding when the injured part is moved
- Paleness in the victim

First aid:

1. If the victim is found lying down unconscious, first check the airway, breathing and circulation to assess whether CPR is needed.
2. If they are awake, try to calm the victim verbally. Discourage movement of any kind.

3. Diagnose the problem. If it is determined that the victim has either a broken or dislocated bone, never attempt to either "test" or straighten the misshapen bone or joint. If the victim is a young child, assume it is a broken or dislocated bone if the child cannot move the broken part or if they continue to cry when the wounded area is touched.
4. Cover any open wounds with clean cloth or a sterile bandage and raise the injury above the level of the heart, if possible. Never try to close a wound by trying to replace the displaced bone.
5. Do not move the victim unless the injured part is completely immobilized. If the injury is to the hip, pelvis or upper leg, do not move the victim unless it is absolutely necessary.
6. Use a splint or sling to stabilize and immobilize the injured area. A splint can be made from boards or sticks, and a sling can be made from clothing. Make sure splints extend beyond the injured area to prevent movement. The injured part can also be immobilized by taping it to an uninjured body part. Secure the splint with ties such as belts, tape, cloth strips or a necktie.
7. Continue to monitor circulation until medical help arrives.
8. Ice can be applied to the injury to ease pain and swelling.
9. To help prevent shock, lay the victim flat and cover with a coat or blanket. Continue to calm the victim verbally.

[Top](#)

Lightning

Watch for Developing Thunderstorms: [Thunderstorms are most likely to develop](#) on spring or summer days but can occur year round. As the sun heats the air, pockets of warmer air start to rise and cumulus clouds form. Continued heating can cause these clouds to grow vertically into towering cumulus clouds, often the first sign of a developing thunderstorm.

An Approaching Thunderstorm: When to Seek [Safe Shelter](#): Lightning can strike as far as 10 miles from area where it is raining. That's about the distance you can hear thunder. **If you can hear thunder, you are within striking distance. Seek safe shelter immediately.**

- **Flash-to-bang:**
 - When you see the **FLASH**
 - Count the seconds to the **BANG**
 - Every 5 seconds equals 1 mile. Divide by 5 to give the distance in miles from you to the lightning.

- **If you count 30 seconds** - suspend all outdoor activities (lightning strike was 6 miles away or less) and seek safe shelter
- If you count **15 seconds** or less, a lightning strike could occur where you are (3 miles away or less) **SEEK SAFE SHELTER IMMEDIATELY.**
- **30/30 Rule**
 - The first 30 means if, between flash and bang, you **count to 30 or less, you are in danger** and should go to safe shelter.
 - The second 30 means **wait 30 minutes** from the last flash or thunder to establish "all clear."
- **Safe Shelter in the field:**
 - **Get inside a hardtop vehicle** and keep the windows rolled up. Avoid touching any metal.
 - **Stay away from tall trees.** If there is no shelter crouch in the open, keeping twice as far away from a tree as it is tall.
 - **Avoid being the tallest object around.** Get as low as you can but do not lie prone on the ground. Squat on the balls of your feet to have minimum contact with the ground. Place your hands over your ears and your head between your knees.
 - **Get below tree line** if you are in the mountains and into a grove of SMALL trees.
 - **Toss metal** golf clubs, fishing rods, tennis rackets, tools, walking sticks, backpacks with metal or any other metal objects **away from you.** You can be burned by them.
 - **Get out of the water.** If caught in a boat, crouch down in the center of the boat away from metal hardware. Swimming, wading, snorkeling and scuba diving are NOT safe. Don't stand in puddles, even if wearing rubber boots.
 - **Move away from a group of people.** Stay several yards away from each other. Don't share a bleacher bench or huddle in a group.
 - **Avoid** open fields, high places, trees (especially isolated trees), water, unprotected gazebos or picnic shelters, baseball dugouts, communications towers, flag poles and light poles, metal or wood bleachers, metal fences, convertibles, golf carts, bicycles, and motorcycles
-
- **Helping a Lightning Strike Victim:** If a person is struck by lightning, call 911 and get [medical care](#) immediately. Cardiac arrest and irregularities, burns, and nerve damage are common in cases where people are struck by lightning. However, with proper treatment, including CPR if necessary, most victims survive a lightning strike. **You are in no danger helping a lightning victim. They carry no electrical charge.**

Information was acquired from the National Weather Service at:

<http://www.lightningsafety.noaa.gov/overview.htm>

[Top](#)

Poison ivy - oak - sumac rash

Definition:

Poison ivy, oak, and sumac are plants that commonly cause an allergic skin reaction. The result is typically an itching, red rash with bumps or blisters.

Considerations:

Poison ivy is one of the most frequent causes of [skin rash](#) among children and adults who spend time outdoors. The plant can be found throughout the United States, except in the Southwest, Alaska, and Hawaii. It has three shiny green leaves and a red stem. Poison ivy typically grows in the form of a vine, often along riverbanks.

Poison oak is primarily found on the West Coast. It grows in the form of a shrub and has three leaves similar to poison ivy.

Causes:

The rash is caused by skin contact with the oily sap (or resin) of these plants. Smoke from burning these plants can cause the same reaction. The oily resin usually enters the skin rapidly, and is seldom transferred from person to person. The rash is NOT caused by the fluid from the blisters. Thus, once the person has washed the oil off the skin, the rash is usually not contagious.

Keep in mind that the resin may last for long periods on contaminated clothing, pets, tools, shoes, and other surfaces. These contaminated items can cause future rashes long after the initial exposure.

Symptoms:

- A red rash and extreme itching.
- The rash erupts in streaks or patches where the plant touched the skin.
- The rash includes red bumps and may also form large, weeping [blisters](#) .
- The reaction can vary from mild to severe. Hospitalization is sometimes required.

The rash usually appears within a couple of days after contact with the plant's oils. The worst stage is often from days 4 to 7. The rash may last for 1 to 3 weeks.

First Aid:

- Wash the skin thoroughly with soap and warm water. Because the resin enters skin quickly, try to wash it off within 30 minutes. A product called Tecnu, available in camping stores and some pharmacies, is very effective at removing the oils.
- Scrub under the fingernails with a brush to prevent the resin from spreading to other parts of the body.
- Wash clothing and shoes with soap and hot water. Resin can linger on them.
- Promptly bathe animals to remove the oils from their fur.
- Body heat and sweating can aggravate the itching. Stay cool and apply cool compresses to your skin.
- Calamine lotion and hydrocortisone cream can be applied to the skin to reduce itching and blistering. Bathing in lukewarm water with an oatmeal bath product, available in drugstores, may soothe itchy skin. Aluminum acetate (Domeboro solution) soaks can also help to dry the rash and reduce itching.
- If creams, lotions, or bathing do not stop the itching, antihistamines may be helpful.
- In severe cases, especially rash around the face or genitals, your physician may prescribe oral or injected steroids.

Do Not:

- DO NOT touch skin or clothing that still have the resins.
- DO NOT burn poison ivy, oak, or sumac to get rid of it. The resins can be spread via smoke, and can cause severe reactions in people who are far downwind.

Call immediately for emergency medical assistance if:

Call 911 or go to an emergency room if:

- Someone is suffering a severe allergic reaction, such as swelling or difficulty breathing, or has had a severe reaction in the past.
- Someone has been exposed to the smoke of a burning plant.

Call your provider if:

- Itching is severe and cannot be controlled.
- The rash affects your face, lips, eyes, or genitals.
- The rash shows signs of infection, such as pus, yellow fluid leaking from blisters, odor, or increased tenderness.

Prevention:

- Wear long sleeves, long pants, and socks when walking in areas where these plants may grow.
- Skin products such as Ivy Block lotion can be applied beforehand to reduce the risk of a rash.

Information was acquired from the University of Maryland Medical Center at:
<http://www.umm.edu/ency/article/000027.htm>

[Top](#)