HEAT EMERGENCIES

- Heat-induced illnesses include a range of disorders, some of which can be fatal without treatment.

- Normally, the body removes excessive heat by radiation off the body and evaporation of sweat (Evaporative Heat Loss).

- In warm and humid weather, these cooling mechanisms do not work as well, so the body's core temperature will increase.

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Heat Cramps.

- Main cause of Heat Cramps – Heavy sweating during strenuous physical activity in hot environments, which leads to significant fluid loss and an electrolyte depletion—specifically low levels of **sodium** and other minerals.
- Symptoms – Painful cramps/spasms in abdominal muscles, thighs or extremities after exertion.
- What to do:
  - Rest in a cool place
  - Give Electrolytes – Do not give salt tablets.
  - Massage & Ice the cramped muscles

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Heat Syncope

- Main Cause – Strenuous activity in a hot environment. Can be caused by light activity in a hot environment for elderly. People usually recover quickly.
- Symptoms – Dizziness / Fainting
- What to do:
  - If the person is unresponsive check breathing (CPR if not breathing)
  - If the person fell, check for injuries
  - Lie down and rest in a cool area
  - Wet down the skin (a spray bottle works well)
  - Give Electrolytes – Do not give salt tablets.

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Heat Exhaustion

- Main Cause – Strenuous activity in a hot environment.
- Symptoms – Pale or Ashen Skin / Clammy, Sweaty (not hot) Skin, Severe Thirst / Dizziness / Fatigue / Rapid HR / Shortness of Breath
- What to do:
  - Move the person to a cool environment
  - Remove excess clothing
  - Spray the person down with cool water & fan the person
  - Give Electrolytes – Do not give salt tablets.
  - Call 911 if no improvement within 15-20 minutes

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Heatstroke

Classic heatstroke

- Older, chronically ill, or and/or sedentary people, and people taking certain medications or abusing drugs/alcohol
- Common during heat waves
- Affected people do not sweat

Exertional heatstroke

- Young, healthy people who are not acclimatized to the heat during strenuous activity
- Sweating occurs in about 50% of affected people

The skin can be wet or dry with Heatstroke!
Do not use this as a determining factor, look for:
Altered Mental Status

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Heatstroke

- Compared with heat exhaustion, people with heatstroke have:
  - **Altered mental status**
  - Skin that is hot to the touch
  - Body temperature of 104°F or higher (this is “core body temperature)
- Heatstroke is life threatening and must be treated immediately

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Heatstroke

- Symptoms – Hot Skin (dry or wet) / Altered Mental Status / Flushed Skin / Possible Seizures / Headache / Nausea / Vomiting
- What to do:
  - Call 911 (Heat Stroke is a Medical Emergency)
  - Move the person to a cooler environment
  - Whole body cold-water immersion or
  - Place the person on plastic sheeting and move cold water around them
  - Ice Packs around the whole body

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Hyponatremia (Water Intoxication) (1 of 2)

- Level of sodium in body much lower than normal
  - Can be fatal
- Causes
  - Drinking too much water without replenishing electrolytes
  - Excessive sweating during endurance sports (longer than 2 hours)

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Hyponatremia (Water Intoxication) (2 of 2)

- Symptoms – Person drinking excessive amounts of fluid / Vomiting clear fluid / Clear Urine / Dizziness / Weakness / Nausea / Headache / Possible Seizures or Unresponsiveness
- What to do:
  - Move the person to a cooler environment
  - If the person is able to swallow, give salty snacks (no salt tablets)
  - Call 911 For: No Improvement / Altered Mental Status / Seizures / Vomiting / Shortness of Breath / Collapse

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Cold EMERGENCIES

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Cold Emergencies

- For all cold related emergencies:
  - Get the person out of the cold
  - Treat Hypothermia before treating Frostbite
  - Handle the person gently
  - Remove wet clothing
  - Add extra insulation to the person (jackets / blankets)
  - Cover the person with a vapor barrier to prevent heat loss (tarps / trash bags) (do not cover the mouth).
  - If possible…one vapor barrier against the skin and one over the insulation.

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Mild Hypothermia

Mild Hypothermia

What to Look For	What to Do
Signs of mild hypothermia ▪ Vigorous, uncontrollable shivering ▪ Awake and alert ▪ Complains of feeling cold—painful hands and feet ▪ Can answer questions intelligently ▪ The "umbles" begin to appear: • Grumbles • Mumbles • Fumbles • Stumbles • Tumbles	1. Have the person sit or lie down for at least 30 minutes. 2. Warm the arms up to the elbows and the lower legs up to the knees in 107°F to 113°F (42°C to 45°C) water. 3. If alert and able to swallow, give high-calorie (sugary) food or drinks. Shivering rewarms a person who is mildly hypothermic. High-calorie food/drinks provide calories needed to maintain the shivering. Liquids and food may be warmed but should not be hot enough to burn the person's mouth or throat. 4. Apply heat to the chest, armpits, and back (in this order). Upper torso rewarming is more effective than extremity rewarming. Use large electric pads, electric blankets, or warm water bottles. Place thin insulation between the skin and heat source to prevent burning the skin. Check the skin every 20 to 30 minutes for signs of burning. 5. Monitor for at least 30 minutes. 6. Call 9-1-1 if no improvement. **DO NOT** use warm showers or baths for rewarming. It causes too many medical complications. **DO NOT** use small chemical heat packs for rewarming. These packs (eg, used for hand and foot warming) do not provide sufficient heat to affect core body temperature and they can cause burns.

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Moderate Hypothermia

Moderate Hypothermia

What to Look For	What to Do
Signs of moderate hypothermia ▪ Shivering stops ▪ The "umbles" worsen ▪ Does not want to move much; may be sleepy ▪ Confused and indifferent to surroundings ▪ Skin is pale or blue and cold when touched	**1.** Call 9-1-1, then follow Steps 1–4 for mild hypothermia. **2.** Keep the person flat (horizontal). **DO NOT** raise the legs. **DO NOT** allow standing or walking. **DO NOT** massage the person's body. **DO NOT** give any drink or food.

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Hypothermia

Severe Hypothermia

What to Look For	What to Do
Signs of severe hypothermia ▪ Barely responsive or unresponsive ▪ Rigid and stiff muscles ▪ Skin feels ice cold and appears blue ▪ Slow, shallow, or absent breathing ▪ Appears dead. The signs of life, such as breathing, may be very difficult to detect.	1. Call 9-1-1. 2. Treat as moderate hypothermia. 3. If the person is not breathing, begin CPR (chest compressions and rescue breathing; see pp. 122–134). An AED can be used (see pp. 134–137). **DO NOT** start CPR if the person: • Has obvious fatal injuries • Is frozen (eg, ice in mouth and throat) • Has a chest that is stiff and cannot be compressed

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Cold Stress

- Body temperature dropped, but symptoms not as severe as hypothermia
  - Requires care to prevent progression to hypothermia

What to Look For	What to Do
Signs of cold stress ▪ Alert and shivering ▪ Can move and care for themselves	Suspect cold stress, but not hypothermia. 1. Allow the person to remove their own wet clothing and to put on dry clothing. 2. Give high-calorie food or drink. 3. Move around; exercise to warm up. 4. Consider using a warm shower or bath.

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Frostbite (1 of 4)

- Occurs when skin and underlying tissues freeze
  - Can lead to permanent tissue damage
  - Mainly affects hands, feet, and nose
  - Severity is judged after thawing; may require amputation
  - Check for Hypothermia in any person with frostbite. Treat Hypothermia first!



Figure 6-3

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Frostbite (2 of 4)



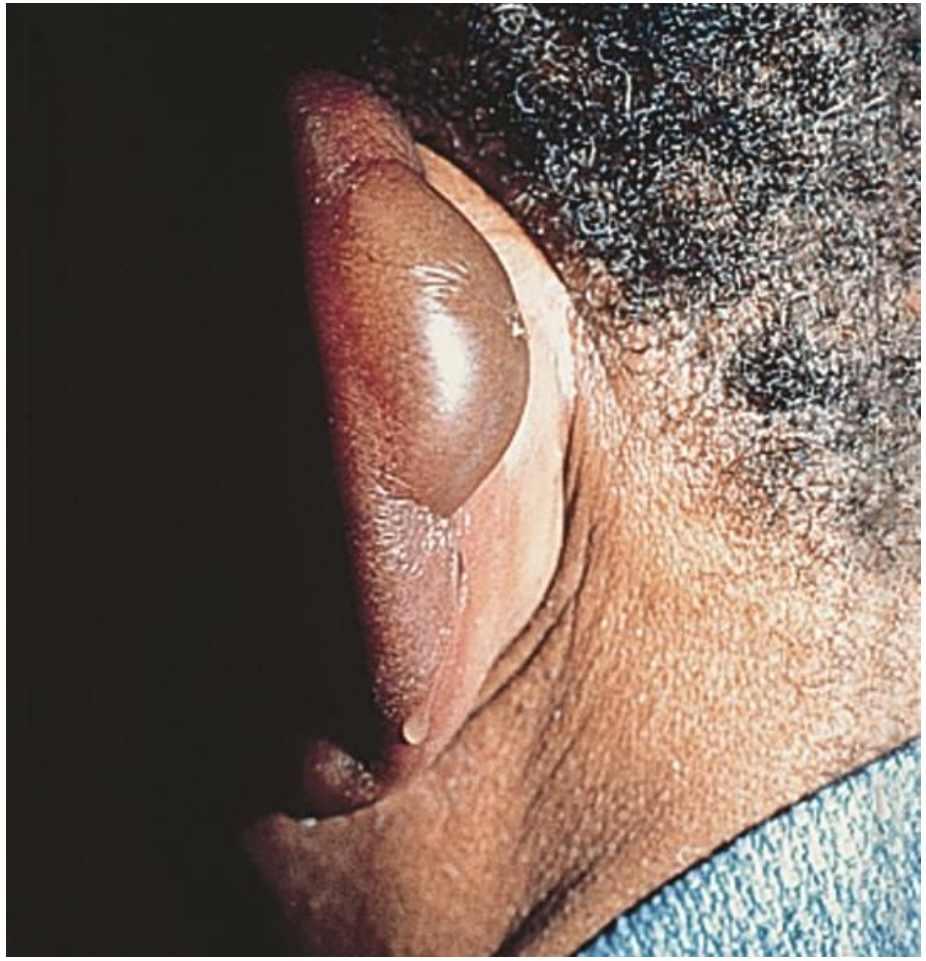


Figure 6-4

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Frostbite (3 of 4)

What to Look For

Before thawing, frostbite can be classified as superficial or deep:

- Superficial frostbite
  - White, waxy, or gray-yellow skin
  - The affected part feels very cold and numb. There might be tingling, stinging, or an aching sensation.
  - The skin surface feels stiff or crusty and the underlying tissue feels soft when depressed gently and firmly.
- Deep frostbite (**FIGURE 6-4**)
  - The affected part feels cold, hard, and solid and cannot be depressed; it feels like a piece of frozen meat.
  - Skin in the affected body part is pale and waxy.
  - A painfully cold part suddenly stops hurting.

What to Do

1. Get the person out of the cold and to a warm place. If possible, do not let the person use a frozen extremity until professional medical care is reached.
2. Call 9-1-1.
3. Remove any wet clothing and constricting items, such as rings, that could impair blood circulation. **DO NOT** attempt to thaw the part.

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Frostbite (4 of 4)

CAUTION

DO NOT rub or massage an area affected by frostbite.
DO NOT apply ice, snow, or cold water to the affected area.
DO NOT break blisters.
DO NOT allow the person to smoke or drink alcohol.

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Frostbite (Alternative Information – Wilderness Medicine) (1 of 3)

Treatment:

- If you must walk out - do not thaw - **walking on thawed tissue causes more damage than walking on frozen tissue.**

- Get the person out of the cold into a warm place, do not let them use the frozen extremity.
- Remove wet clothing and constricting items.
- DO NOT attempt to thaw the part if:
  - Medical care is less than 2-hours away - **in this case, get them to medical care.**
  - The affected area has thawed
  - Shelter, warm water, and a container are not available
  - There is a risk of re-freezing of the affected part. There is more tissue damage if a body part has thawed and re-frozen and thawed again.

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Frostbite (Alternative Information – Wilderness Medicine) (2 of 3)

Use the "Wet, Rapid, Re-Warming Method

- Give pain medication if possible - Thawing is painful (pins & needles pain)
- Place the affected part in warm water (100º to 104º)
- Do not use other heat sources
- If no thermometer available - test the water with your hand "warm, not hot enough to burn" 100º to 104º is "Hot Tub" temperature.
- Maintain the water temperature by adding warm water as needed
- Once the part is soft and pliable to touch (20-40 minutes) Air dry the part - do not rub
- For an ears or nose, it's best to use warm moist cloths, changing frequently.

- **DO NOT**: Rub or massage (this can cause cell damage due to the ice crystals inside the skin), **Do Not:** apply ice or snow, re-warm over a stove or fire, break blisters, or allow the person to smoke or drink alcohol, **Do not re-warm if re-freezing is possible**.

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Frostbite (Alternative Information – Wilderness Medicine) (3 of 3)

After Thawing - Treaatment:

- If feet are affected, do not allow the person to walk as walking on thawed tissue can cause additional damage.
- Protect area from contact with clothing and bedding
- Place bulky, dry, clean gauze on the affected part (between toes and fingers) to absorb moisture and keep them from sticking together.
- Elevate the affected part
- Apply Aloe Vera gel to promote skin healing
- Give pain medication
- Give fluids
- Seek medical care

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Frostnip

- Superficial cold injury; top layers of skin freeze temporarily
  - Mainly affects cheeks, ears, and nose
  - Fully reversible and does not cause tissue loss with treatment

What to Look For	What to Do
▪ Yellow to gray skin color ▪ Frost (ice crystals) on the skin ▪ Initial tingling or numbness that may become painful	1. Get the person out of the cold and to a warm place. 2. Gently warm the affected area by placing it against a warm body part (eg, have the person put bare hands under the armpits) or by applying a warm chemical heat pack covered by a cloth. For the nose, breathe with cupped hands over the nose. 3. **DO NOT** rub the area.

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Poison Ivy, Poison Oak, and Poison Sumac Reactions (1 of 4)

- Poison ivy: every state except Hawaii and Alaska
- Poison oak: some eastern states and along West Coast
- Poison sumac: swampy areas of East Coast, especially Southeast



Figure 6-5

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Figure 6-6

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Figure 6-7

Courtesy of U.S. Fish & Wildlife Service

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Poison Ivy, Poison Oak, and Poison Sumac Reactions (2 of 4)

- Exposure symptoms and treatment same for all plants
  - Rash is not contagious
  - Usually runs its course (about 2 weeks) without specialized medical treatment.
  - Prescription medication may be needed for severe symptom relief



Figure 6-8

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Poison Ivy, Poison Oak, and Poison Sumac Reactions (3 of 4)

What to Look For	What to Do
Known contact within 5 minutes for people with sensitive skin and up to 1 hour for people with moderately sensitive skin	If within 5 minutes of an exposure: 1. Gently wipe skin with rubbing alcohol. **DO NOT** rub it in. **DO NOT** use packaged alcohol wipes, which can irritate the skin and contain too little alcohol to properly remove the irritant. 2. Next, or if rubbing alcohol is not available, wash the skin with lots of cold running water. Soap is not necessary, but if used, rinse with lots of cold running water. **DO NOT** scrub, rub, or scratch skin. **DO NOT** use gasoline.

Additional Treatment (Wilderness Medicine)

a. If available, wash in cool water with a specialized soap like Tecnu or…

b. Wash in cool water with a good dish soap like Dawn or any soap that helps get oil off your skin. It is the oil of the plant "**urushiol**" that is the irritant.

c. Cashews are in the same "Sumac" family, this is why they are never available in the shell (it is an irritant)

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Poison Ivy, Poison Oak, and Poison Sumac Reactions (4 of 4)

What to Look For	What to Do
Mild dermatitis: itching	1. Apply any of the following: • Colloidal oatmeal bath (eg, Aveeno Soothing Bath Treatments) • Baking soda paste (1 teaspoon [5 mL] water mixed with 3 teaspoons [15 mL] baking soda) • Calamine lotion • Aluminum acetate solution (eg, Burow's solution) • Over-the-counter hydrocortisone cream 2. Advise the person to avoid scratching the area. 3. Seek professional medical care if the discomfort is significant.
Moderate dermatitis: itching and swelling	▪ Treat the same as for mild signs and symptoms. Seek professional medical care if the discomfort is significant.
Severe dermatitis: itching, swelling, and blisters	▪ Seek professional medical care. ▪ Seek emergency care if the person inhales smoke from a burning plant or if the reaction involves the face, eyes, genitals, or large areas of the body.

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Arthropod Bites and Stings

- Arthropods include insects, scorpions, spiders, and ticks
  - Stings of bees, wasps, fire ants range from mild annoyance to life-threatening anaphylactic shock
  - All spiders are venomous, but black widow and brown recluse only species are dangerous to humans
  - Scorpion stings are very painful, but only the bark scorpion is dangerous
  - Ticks are not venomous, but can spread several diseases

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Arthropod Bites and Stings

Arthropod	What to Look for	What to Do
Stinging insects ▪ Honeybee ▪ Bumblebee ▪ Hornet ▪ Yellowjacket ▪ Wasp ▪ Fire ants	▪ Usual reactions: instant pain, redness, itching ▪ Worrisome reactions: hives, swollen lips/tongue, "tickle" in throat, wheezing ▪ Life-threatening reactions: blue/gray skin color, seizures, unresponsiveness, inability to breathe because of swollen vocal cords ▪ About 60% to 80% of anaphylactic deaths are caused by the victim's inability to breathe because of swollen airway passages.	1. Call 9-1-1 if signs of a life-threatening condition are found or if the person indicates they have a serious allergy. If the person has a prescribed epinephrine auto-injector or nasal spray, help them to administer it. 2. Look for a stinger and, if found, remove it as soon as possible (eg, brush off with your hand or scrape it with a fingernail). **DO NOT** use tweezers. Only honeybees leave their stinger embedded. 3. Wash with soap and water. 4. Apply cold to the area. Baking soda paste may help with pain (except for wasp stings). 5. Give pain medication. Apply hydrocortisone cream (1%) and give antihistamine (Benadryl). 6. A sting in the throat or mouth can cause swelling, blocking the airway even in a person without an allergy; have the person suck on ice or flush the area with cold water.

Traditional advice warned against using tweezers out of fear that squeezing would pump more venom into the skin. However, modern clinical studies analyzed by organizations like the National Institutes of Health show that the venom sac continues to pump automatically, so removing it instantly via any tool, even using your fingers, prevents the most harm.

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Arthropod Bites and Stings



Bark Scorpion

Note the smaller pincers.
They use venom, not crushing
to kill prey.
Their venom is more toxic

Note the larger pincers.
They use crushing to kill prey,
Their venom is less toxic



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Arthropod Bites and Stings

Scorpion Stings:

In the United States, only the Arizona Bark Scorpion is potentially deadly. The Arizona Bark Scorpion is also found in South-West Utah

What to Look For:

- Immediate pain and burning around the sting site
- Numbness or tingling occurs later.

What to Do:

- Monitor breathing
- Wash with soap and water
- Apply cold to the area
- Give Pain Meds
- Rest and keep affected limb still

Worrisome Reactions:

- Trouble Breathing
- Muscle Spasms
- Rapid Heart Rate
- Drooling
- Double Vision

(Fatality rate for Bark Scorpion Stings is < 1% for adults, higher for infants, small children)

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Arthropod Bites and Stings

Arthropod	What to Look for	What to Do
Black widow spider bites Also known as the widow spider. Only adult females bite. Depending on the species, may appear black, brown, or gray. They have a shiny abdomen with a red or yellow spot that is often in shape of hourglass, or white spots or bands on the abdomen.	▪ May feel sharp pinprick followed by dull, numbing pain ▪ Two small fang marks seen as tiny red spots ▪ Severe abdominal pain (bites on arm can produce severe chest pain, thus mimicking a heart attack) ▪ Headache, chills, fever, heavy sweating, nausea, and vomiting	1. Clean with soap and water. 2. Apply cold to the area. 3. Seek professional medical care immediately. 

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(about 1-1/2 % **of Black Widow Spider bites are fatal)**

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Arthropod Bites and Stings

Arthropod	What to Look for	What to Do
Brown recluse spider bites Also known as fiddleback spider, violin spider, and brown spider.	▪ Mild to severe pain occurs within 2 to 8 hours. ▪ A blister develops within 48 to 72 hours, becomes red, and bursts. It takes on a "bull's-eye" appearance (**FIGURE 6-9**). ▪ Nausea, vomiting, headache, and fever	1. Same as for black widow spider. 2. Seek professional medical care immediately.



Courtesy of Kenneth Cramer, Monmouth College.



Figure 6-9

Courtesy of the Department of Entomology, University of Nebraska-Lincoln

(< 1% of Brown Recluse Spider bites are fatal)

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Arthropod Bites and Stings

Arthropod	What to Look for	What to Do
Tick bites	▪ No pain initially exists, and the tick can go unnoticed for days without detection. ▪ Red area around tick means it has punctured skin and is feeding on victim's blood. ▪ If engorged with blood, it means there is an increased risk of disease transmission. ▪ May cause rash, fever, and chills ▪ The bite varies from a small bump to extensive swelling and ulcer.	Ticks are difficult to remove. Partial removal can lead to infection. 1. Use tweezers or a tick removal tool. Grasp the tick close to the skin and pull up, gently tenting the skin. Hold tension until the tick releases. **DO NOT** jerk or twist the tick (**FIGURE 6-10**). **DO NOT** use a hot match, fingernail polish, alcohol, petroleum jelly, or gasoline. 2. Wash the area with soap and water. 3. Apply cold to the area. 4. If tick was engorged, you cannot remove it, or the head remained embedded after the body is removed, seek medical advice (**FIGURE 6-11**). 5. Watch for signs of infection such as headache, fever, or rash appearing 3 to 30 days after the tick bite. If symptoms appear, seek medical advice.

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Arthropod Bites and Stings

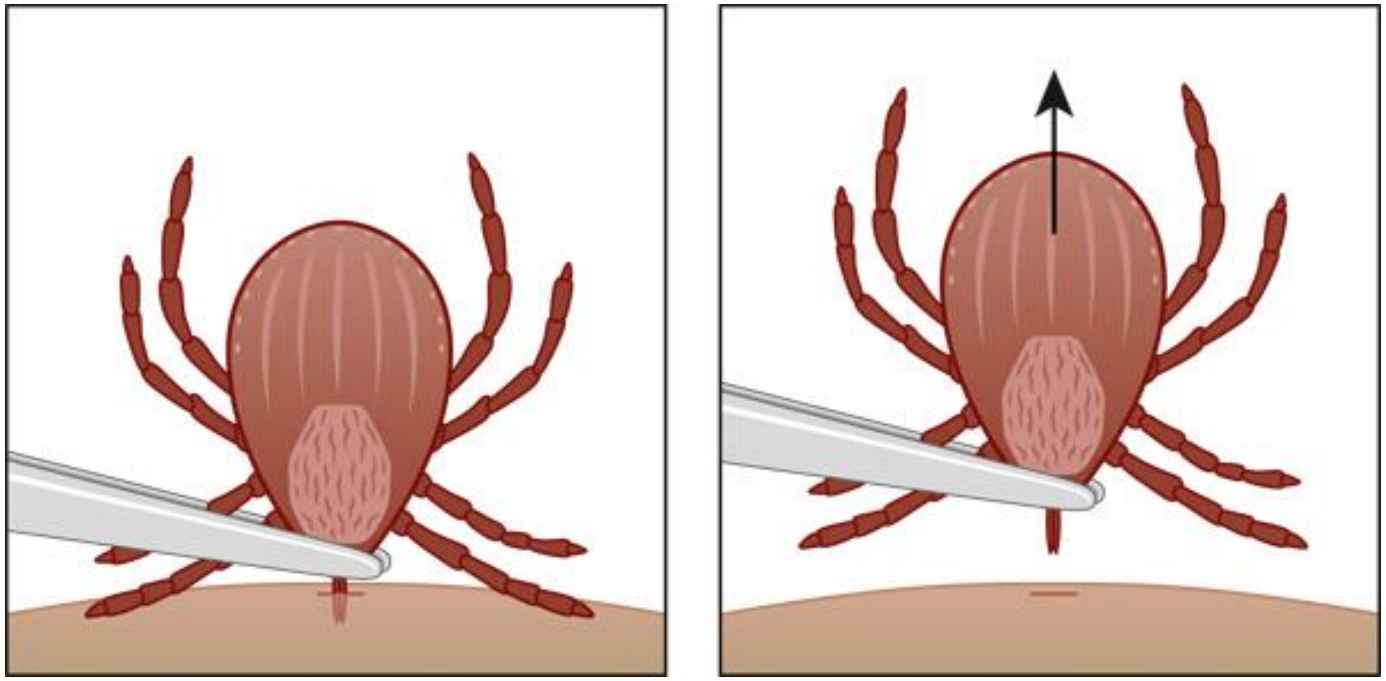


Figure 6-10

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Figure 6-11

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Snakebites: Overview

- Four species of venomous snake in the U.S.
- At least one species of venomous snake in all states except Alaska, Hawaii, and Rhode Island

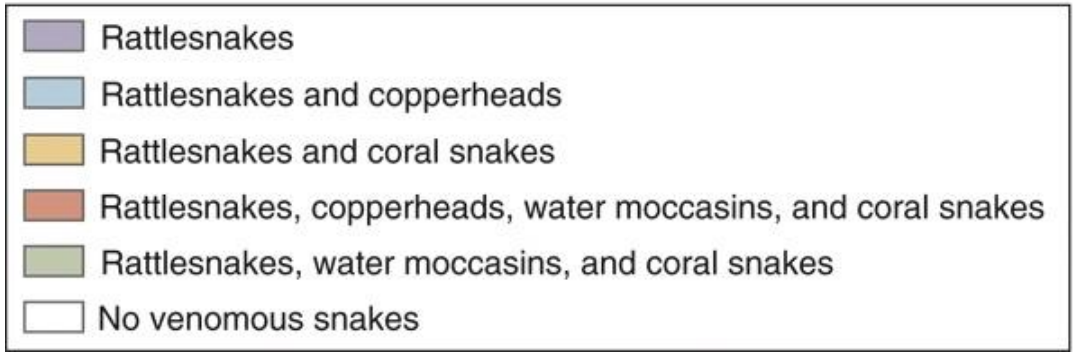
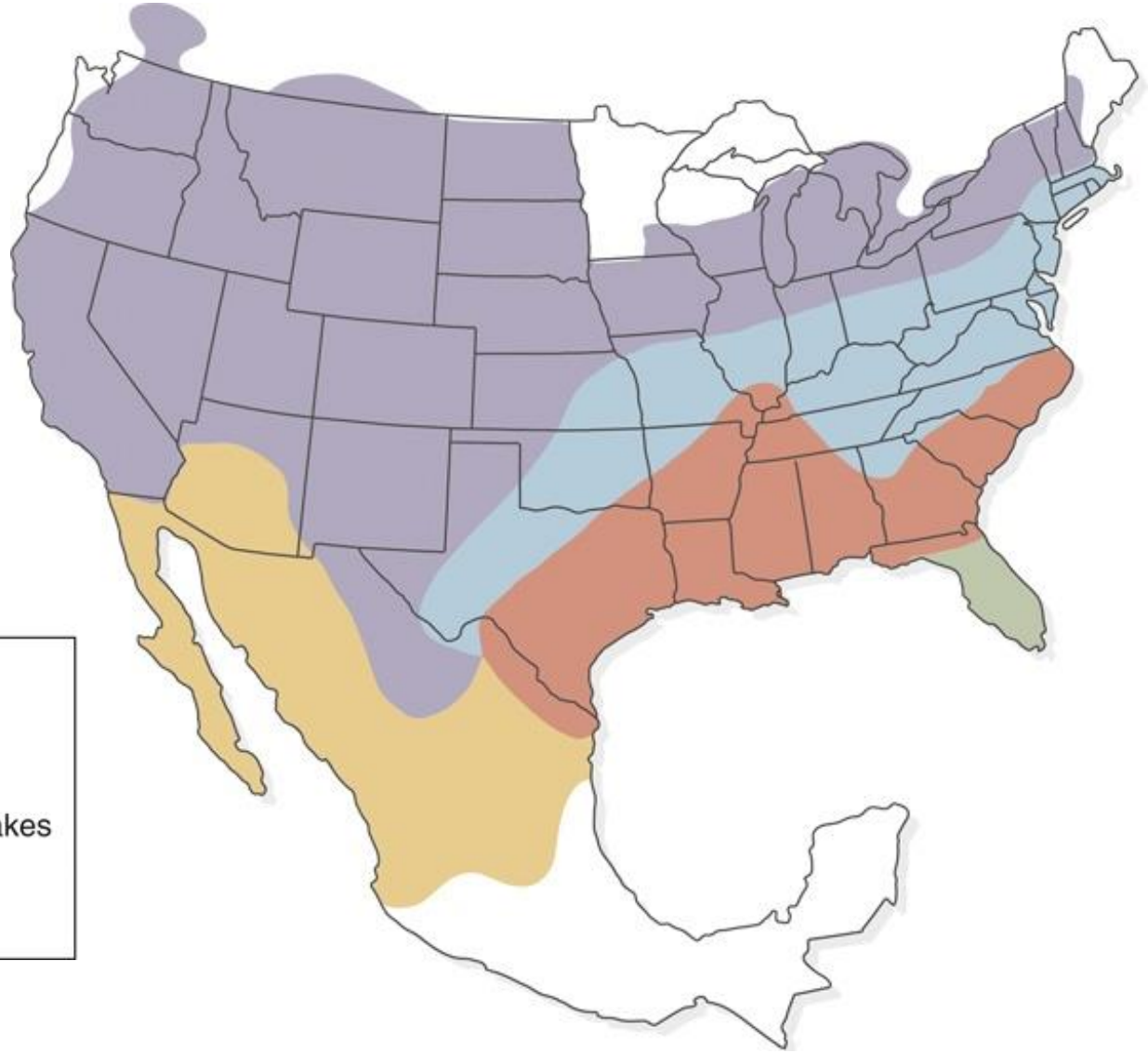


Figure 6-12

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Snakebites: Pit Vipers (1 of 2) (Viperidae Family)

- Top left: rattlesnake
- Top right: cottonmouth (water moccasin)

Both are Pit Vipers

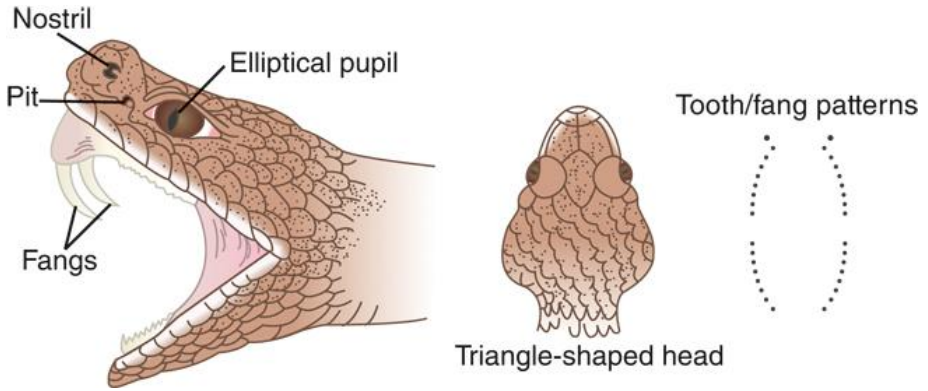
(primarily hemotoxic)

Best Treatment for Snake Bites!









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Snakebites: Pit Vipers (2 of 2)

What to Look for	What to Do
Severe, burning pain at the bite site ▪ Two small puncture wounds (victim may have only one; **FIGURE 6-14**) ▪ Swelling within 10 to 15 minutes; can involve entire extremity ▪ Discoloration and blood-filled blisters possible in 6 to 10 hours (**FIGURE 6-15**). ▪ Severe cases involve nausea, vomiting, sweating, and weakness.	1. Call 9-1-1. It is not necessary to capture or kill the snake. 2. Encourage the person to remain calm and still. If moving the person is necessary, carry them or have them walk slowly. 3. Remove any rings, jewelry, or tight clothing from the bitten body part to avoid constriction from swelling.



Figure 6-14

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Figure 6-15

© American Academy of Orthopaedic Surgeons

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Snakebites: Coral Snakes (Elapidae Family)

What to Look for	What to Do
▪ Few immediate signs ▪ Absence of immediate symptoms is not evidence of a harmless bite. ▪ Several hours may pass before the onset of: • Nausea • Vomiting • Sweating • Tremors • Drowsiness • Slurred speech • Blurred vision • Swallowing difficulty • Breathing difficulty	**1.** Call 9-1-1. **2.** For an arm or leg, apply snug—not tight—pressure by wrapping several wide elastic bandages (eg, Ace) over the bite site and entire extremity. Start near the hand or ankle and wrap up the extremity, past the bite site. The bandage should apply uniform pressure without cutting off circulation. Then, immobilize the limb with a splint (see Chapter 4).



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Coral Snake I.D.

"Red touches Black - Venom Lack"
"Red touches Yellow – Kill a Fellow"

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Snakebites: Pit Vipers and Coral Snakes

CAUTION

DO NOT apply cold or ice to a snakebite. It does not inactivate the venom and poses a danger of frostbite.

DO NOT use the cut-and-suck procedure—you could damage underlying structures (for example, blood vessels, nerves, or tendons). Cutting the skin may cause infection and poor wound healing.

DO NOT apply mouth suction. Your mouth is filled with bacteria, increasing the likelihood of wound infection.

DO NOT use any form of suction. It is ineffective in removing venom.

DO NOT apply electric shock. No medical studies support this method.

DO NOT apply a constriction band—its use remains controversial. If applied too tightly or if swelling occurs, it can act as a tourniquet, which pools the venom in a single location, resulting in tissue damage.

DO NOT apply a pressure bandage for a pit viper snakebite. A number of toxicology associations and the Wilderness Medical Society's practice guidelines do not recommend the application of pressure bandages for pit viper snakebites. This action has not been proven to be beneficial.

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Domestic Animal Bites (1 of 2)

- Most common source of bites in U.S. is domestic animals (dogs and cats)



Figure 6-16A

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Figure 6-16B

© Charles Stewart MD, EMDM MPH

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Domestic Animal Bites (2 of 2)

- Notify animal's owner and determine rabies vaccination status
  - DO NOT try to capture/kill animal
  - Contact local health department for advice

What to Look For	What to Do
Bite that has broken the skin ▪ Puncture wound from the animal's sharp, pointed teeth ▪ Crushed tissue and skin ▪ Open wound on fingers, knuckles, and/or hand	1. Take standard precautions (see pp. 14–20). 2. Stop the bleeding (see Chapter 4). If bleeding cannot be stopped, call 9-1-1. 3. Rinse and bandage the wound. 4. Seek medical attention, as all bites that break the skin should be cleaned in a medical facility. Antibiotics, tetanus vaccination/booster, and/or rabies prophylaxis may also be required. In many states, health care providers are required to report animal bites to the local health department.
Bite that did not break the skin	Apply an ice pack to the skin for up to 20 minutes, placing a thin cloth between the skin and ice pack.

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Human Bites (1 of 2)

- Can cause severe injury
- High risk of infection
- What to do –
  - Control Bleeding
  - Wash the wound with soap and water for 5-10 minutes
  - Avoid scrubbing (tissue damage)
  - Cover the wound with a sterile dressing.
  - Seek Medical Care



Figure 6-17

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