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**UNITED STATES MARINE CORPS**  
THE BASIC SCHOOL  
MARINE CORPS TRAINING COMMAND  
CAMP BARRETT, VIRGINIA 22134-5019

**PREVENTION AND  
TREATMENT OF FIELD  
RELATED INJURIES  
B140121XQ  
STUDENT HANDOUT**

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## Prevention and Treatment of Field Related Injuries

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### Introduction

A wide variety of threats to your health and that of the Marines you will be charged to lead can be prevented or treated successfully.

### Importance

The information provided here will prepare you for dealing with field-related injuries at Quantico and throughout the world.

### In This Lesson

This lesson covers the following topics:

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### Learning Objectives

#### Terminal Learning Objectives

TBS-MED-1002 Given and Individual First Aid Kit (IFAK) and references, inventory an IFAK to ensure it is complete and serviceable.

TBS-MED-1013 Given a simulated casualty, determine how to treat a heat injury to prevent further injury or death.

TBS-MED-1014 Given a simulated casualty, determine how to treat a cold injury to prevent further injury or death.

TBS-MED-1015 Given a simulated casualty, determine how to treat insect or animal bites to reduce the risk of further injury or death.

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## Prevention and Treatment of Field Related Injuries

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### Learning Objectives (Continued)

#### Enabling Learning Objectives

(TBS-COND-2101g) Given individual field equipment, field expedient weight materials, and while serving as a unit leader, supervise combat conditioning to ensure Marines know proper nutrition, injury prevention, and are prepared for the rigors of combat.

(TBS-MED-1002a) Given an Individual First Aid Kit (IFAK) and references, identify components of IFAK to ensure it is complete and serviceable.

(TBS-MED-1013a) Given a casualty, identify types of heat injuries to determine treatment.

(TBS-MED-1013b) Given a simulated casualty, perform treatment measures for the different types of heat injuries to prevent further injury or death.

(TBS-MED-1014a) Given a casualty, identify types of cold injury to determine treatment.

(TBS-MED-1014b) Given a simulated casualty, perform treatment measures for the different types of cold injuries to prevent further injury or death.

(TBS-MED-1015a) Given an evaluation, identify resources on local indigenous hazards to prepare Marines to operate within an area of operation.

(TBS-MED-1015b) Given a casualty with an unknown bite, identify signs and symptoms of the bite to determine treatment.

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## **Insects**

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There are a variety of insects located in the Quantico area that can cause disease or illness, specifically:

- Ticks.
- Chiggers.
- Bees.

### **Ticks**

Ticks can spread infectious diseases. The problem with a tick bite is not from the bite itself, but from the organisms that the tick can carry. Rocky Mountain spotted fever and Lyme disease are two diseases that can be spread by means of a tick bite.

### **Rocky Mountain Spotted Fever**

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Rocky Mountain spotted fever occurs within seven to ten days after a bite by an infected tick. Before the advent of antibiotics, this was a particularly devastating disease. Symptoms of Rocky Mountain spotted fever include:

- Nausea.
- Vomiting.
- Headache.
- Weakness.
- Paralysis.
- In extreme cases, cardio-respiratory collapse.

### **Lyme Disease**

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Lyme disease has received much publicity recently. After AIDS, it is the second most rapidly growing infectious disease in the United States. Lyme disease is caused by a bacterium that is carried by a tick. Signs will begin to show about ten days after being bitten by an infected tick and can include:

- A progressive red rash develops and may spread to several parts of the body. It may resemble a “bulls-eye”, with rings of discoloration.
- Painful swelling of the joints, particularly the knees.

Lyme disease may be confused with arthritis and may result in permanent disability. However, if it is recognized and treated promptly with antibiotics, the patient may recover completely.

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## Insects (Continued)

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### Lyme Disease (Continued)

People who are bitten by ticks may not be aware they have been bitten—the bite is painless. The tick attaches itself to the skin, sucks blood from the host, and becomes swollen.

To prevent chances of a tick bite,

- Use insect repellent on target areas such as under the arms or the area near the top of the boot.
- Make sure sleeves are rolled down and boots are bloused.

It takes at least 24 hours for the infection to be transmitted from the tick to the person it has bitten. If a person is bitten by a tick,

- Carefully and slowly remove the tick physically. Use fine tweezers to grasp the tick by the body and pull it slowly, and steadily, straight out of the skin. The tick should release its hold on the bite area, so the whole tick is removed. Even if the tick's mandible portion is left embedded in the skin, the source of the infecting organisms has been removed.
- Do *not* try to suffocate the tick with gasoline or Vaseline or to burn it with a lighted match as you can possibly injure yourself. These remedies, once thought to be effective to make the tick back out of the skin on its own, do not work. In fact, some evidence indicates that by irritating the tick, you cause it to put more infecting bacteria into the skin.
- Avoid handling the tick with your hands. The bacteria can be transmitted directly through your skin. If you must use your hands, shield yourself with a piece of tissue paper. Wash your hands immediately.
- Once the tick is removed, use disinfectant on the area.

Normally, a physician should see anyone bitten by a tick. The training regimen at TBS and the large number of bites incurred by students and staff preclude this. Remember that the symptoms of Rocky Mountain spotted fever and Lyme disease do not occur until a few days after being bitten. If you feel the onset of symptoms, report to the clinic *at once*.

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## Insects (Continued)

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### Chiggers

Chiggers are extremely small insects, not visible to the human eye. They are found in grassy, wooded areas and are more abundant in the summer months, particularly from April through September.

Symptoms of chigger bites include:

- Small welts on the skin.
- Intense itching.

To prevent chigger bites,

- Use insect repellent on target areas, especially the lower legs.
- Keep sleeves rolled down and boots bloused.

The best care for chigger bites is to wash the area with hot soapy water to prevent infection.

Do *not* apply clear fingernail polish (and other such folk remedies) to relieve the itching. Doing so can result in secondary infections worsening the situation.

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### Bee Stings

Bees, wasps, and yellow jackets are common in the Quantico area during the summer months. Unless you are allergic to a specific species, the sting is usually more of a nuisance than an emergency.

Local pain at the site of the sting followed by swelling are the usual indicators of a sting.

If someone has been stung,

- If the stinger remains embedded, scrape it off without injecting additional venom.
- Wash the sting site with soap and water; use ice to reduce pain.
- If extremities are bitten, remove rings or watches to allow for swelling.
- Any serious reactions indicate a possible allergic reaction; individuals so affected should seek medical attention.

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## Human and Animal Bites

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Human bites should not be taken lightly. The wound resulting from a bite may be nothing more than a seemingly minor puncture wound, but it may also involve badly lacerated tissue. The human mouth is extremely dirty, and contact with an open wound may cause massive contamination.

The primary concern in all animal bites is the possibility of the development of rabies, which is fatal. If the biting animal can be captured, it should be impounded for observation.

If someone is bitten by a human or animal,

- Wash the wound with water and soap.
- Cover the wound with a sterile, dry dressing or bandage.
- Immobilize the area with a splint or bandage if necessary.
- Get the casualty to a medical facility as soon as possible.

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## Spiders

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Spiders are relatively abundant in the local area. The two most commonly seen species are the black widow and the brown recluse.

### **Black Widow**

The black widow spider is small (one inch in length) and has a small black body with a yellow/orange "hourglass mark" on its underside.

Symptoms of a black widow spider bite are:

- No apparent mark.
- Neurotoxin poison resulting in muscle cramps (especially the abdomen).
- Tightness in the chest or difficulty breathing.
- Nausea.
- Vomiting.
- Sweating.

Although painful symptoms following the bites are severe, death is not common (63 recorded fatalities from 1950 to 1960). A specific antivenin is available, but its use is accompanied by a high incidence of side effects. Consequently, the antivenin is used only for very severe bites, the aged or very feeble, and children under the age of five.

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## Spiders (Continued)

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### Black Widow (Continued)

If someone is bitten by a black widow spider,

- Render basic life support for the victim if in respiratory distress. Much more commonly, the victim will require relief from pain.
- If the site of the bite can be identified, putting a cold compress against it may slow the absorption of toxin.
- Transport the victim to a medical facility as soon as possible. If possible, bring the spider to the facility with you.

### Brown Recluse

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The brown recluse spider is smaller than the black widow; it is only 1/4 to 1/2 inch long. The brown recluse spider is dull brown in color with a violin-shaped mark on the back of the body.

Symptoms of a brown recluse spider bite are:

- Red, swollen bite site.
- Blister forming on the bite site.
- Fever.
- After a few days, a scab forms on the bite site and later leaves an ulcer or possibly gangrene.

The venom of the brown recluse is a collection of enzymes that is toxic to cells and tissues. One of these enzymes once released into the victim's skin, destroys local cell membranes and disrupts the integrity of tissues leading to local breakdown of skin, fat, and blood vessels. This process leads to eventual tissue death, called necrosis, in areas immediately surrounding the bite site.

To treat a brown recluse spider bite,

- Render basic life support for the victim if in respiratory distress. Much more commonly, the victim will require relief from pain.
- If the site of the bite can be identified, putting a cold compress against it may slow the absorption of toxin.
- Transport the victim to a medical facility as soon as possible. If possible, bring the spider to the facility with you.



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## Scorpions

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The common scorpion, as found in American and Asian deserts, is two to four inches in length and features a stinger in its tail. Symptom of a scorpion sting is localized pain at the sting site. For a scorpion sting, follow the same procedures you use to treat spider bites:

- Render basic life support for the victim if in respiratory distress. Much more commonly, the victim will require relief from pain.
- If the site of the bite can be identified, putting a cold compress against it may slow the absorption of toxin.
- Transport the victim to a medical facility as soon as possible. If possible, bring the scorpion to the facility with you.

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## Snakes

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The two families of poisonous snakes in the United States are the *crotalidae* and the *elapidae*. The *Crotalidae* family includes:

- Rattlesnakes.
- Pygmy rattlers.
- Copperheads.
- Water moccasins.
- Cottonmouths.

The family of the *Elapidae* has only one representative: the coral snake.

The venom of the *Crotalidae* is hemotoxic; it acts on the lining of the small blood vessels, enabling blood to escape into the tissues. The venom of the coral snake is neurotoxic; it attacks the body's nervous system. Most snakebites occur between April and October, when the animals are active.

When you encounter a snakebite, it is extremely important to identify whether envenoming (deposit of venom into the wound) has occurred. In one report of all snakebites throughout the United States, 27 percent were found to have had no envenoming at all, and an additional 37 percent had only minimal envenoming. Thus, only one-third of snakebites in general result in significant local or systemic injuries. There are several reasons why envenoming does not occur; most commonly, the snake recently has struck another animal and has exhausted its supply of venom.

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## Snakes (Continued)

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### Identifying the Snake

When possible, identify the type of biting reptile. Sometimes recognition is not easy because identifying characteristics vary with locality, especially color identification. When identifying the reptile, check these points:

- Arrangement of teeth. The presence of fangs immediately labels the reptile as poisonous.
- Rattle. The presence of rattles immediately identifies the rattlesnake. However, rattles are frequently lost, so their absence does not rule out this family of vipers.
- Sensory pits. Certain groups have a sensory organ between the nostrils and eyes placed on each side of the head. Snakes that have this organ are known as "pit vipers."
- Color and pattern of coloration. Since color and pattern change with locale, age, and species, they are not always reliable but do help in identification; so note them in all cases.
- The shape of the head, as well as the subcaudal plates, will generally characterize harmless snakes from poisonous.
- The shape of the eyes also tells a harmless snake from a poisonous snake.

Despite knowing these indicators, *do not handle or approach snakes in a non-controlled environment*. Positive identification of venomous versus non-venomous snakes is only for trained personnel.

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### Snakebite Symptoms: Hemotoxic

The bite from the *Crotalidae* (rattlesnakes, copperheads, etc.) is hemotoxic. Symptoms include tissue swelling at the site of the bite and gradually spreading to surrounding areas. The swelling may be so severe as to burst the skin. Other symptoms include:

- Excruciating pain at the site of the bite.
- Severe headache and thirst caused by internal bleeding.
- Puncture marks.
- Shock.
- Respiratory distress.

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## Snakes (Continued)

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### Snakebite Symptoms: Neurotoxic

The bite from the *Elapidae* (cobra, coral, krait, sea-snake, etc.) is primarily neurotoxic and affects the nervous system. Symptoms include:

- Irregular heartbeat, followed by generalized weakness and exhaustion, terminating in shock.
- Severe headache, dizziness, blurred vision or blindness, hearing difficulty, mental disturbances such as incoherent speech, stupor, and mental confusion.
- Lack of muscular coordination (e.g., the inability to reach out and pick up an object), muscle spasms, and twitching.
- Difficult or labored breathing.
- Numbness and tingling of the skin (particularly of the lips and the soles of the feet).
- Excessive perspiration.
- Chills and fever.
- Nausea, vomiting, and diarrhea.

Note: Extreme pain is not characteristic of neurotoxic venoms.

### Emergency Treatment for Hemotoxic or Neurotoxic Snakebites

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Follow these instructions to treat snakebites:

- Calm and reassure the patient. Get the patient to lie down and keep quiet to decrease the spread of any venom through the system. Patients will often vomit, from anxiety as well as from systemic effects of the poison. Never give the patient alcohol.
- Locate the bite area; clean it gently with soap and water or a mild antiseptic.
- Wrap soft rubber tubes or bands two to four inches above and below the fang marks; tighten them just enough to occlude the venous circulation, not the arterial circulation. The pulse should not disappear. Doing this limits the spread of the venom.
- Remove constrictive clothing and jewelry to allow for swelling. Loosen the constricting bands as necessary to allow for swelling.
- Do not wrap the limb in ice or put ice directly on the skin. Cool the bite area, but do not freeze it.
- Immobilize the extremity with a splint.

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## Snakes (Continued)

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### Emergency Treatment for Hemotoxic or Neurotoxic Snakebites (Continued)

- If the snake has been killed, as it often has, bring it with you. Identification of the snake is extremely important in administering the correct antivenin.
- Transport the patient promptly to the hospital. Notify the hospital that you have a snakebite patient, and, if possible, describe the snake.
- If the patient shows no signs of envenoming, the only treatment necessary is:
  - Basic life support.
  - Putting a clean dressing over the suspected bite area.
  - Using venous constricting bands above and below the bite, approximately two to four inches.
  - Do *not* "cut and suck" poison from a bite; the stress and shock from this usually results in more complications than the bite alone would have caused.
- Bring all suspected snakebite victims to a hospital, whether they show immediate signs of envenoming or not. If you work in an area where poisonous snakes are known to exist, you should always know the location of the nearest facility where antivenin is available.

### Local Snakes

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The following poisonous snakes are found within the Quantico training area:

- Copperhead: Most commonly found, typically three to five feet long.
- Timber rattlesnake: Infrequently seen, three to five feet long.
- Water moccasin: Found in southern Virginia, infrequently spotted around Quantico.

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## Heat Related Injuries

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### Heat Casualties

The six types of heat injuries are:

- Sunburn. A bad case of sunburn can be incapacitating. Be sure to wear protective clothing even if you think it is "too hot" to do so.
- Prickly heat rash. Rashes take a long time to heal, particularly in the tropics. The itching and consequent scratching can lead to infection.
- Fungus infections. Fungus infections will leave open sores on your feet and groin. The scratching will lead to open ulcers, infection, and disease. While they can occur in nearly every environment, they are more typically found in a hot weather or humid setting.
- Heat cramps. Heat cramps will result in painful cramps in the muscles. Heat cramps are also considered to produce a "heat casualty."
- Heat exhaustion. More serious than heat cramps, heat exhaustion is also considered to produce a "heat casualty."
- Heat stroke. The most serious of the heat-related problems, heat stroke is the total collapse of the body's heat regulatory mechanism. It is the most serious of the "heat casualties" and is a life-threatening injury.

### Heat Cramps

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Heat cramps are caused by a lack of electrolytes (salt) in the system. They can be brought on when you have been sweating profusely and suddenly drink a large quantity of cold water. Heat cramps symptoms are:

- Muscle cramps, particularly in the legs and abdomen.
- Profuse sweating and faintness.

To treat heat cramps,

- Give the victim small sips of cool water.
- Remove the victim to a cool or shaded area.
- Massage cramped muscles.
- If indications of a more serious condition are present, transport the victim to medical attention.

## Heat Related Injuries (Continued)

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### Heat Exhaustion

Heat exhaustion is caused by the pooling of blood in the capillaries close to the surface of the skin. Exposure to high temperatures and humidity, heat directly from the sun, and excessive activity by unacclimatized individuals are primary contributors to heat exhaustion. Heat exhaustion symptoms are:

- Rapid, shallow breathing.
- Dizziness.
- Blurred vision.
- Pale, clammy skin.
- Profuse sweating, normally accompanies this condition.

To treat heat exhaustion,

- Remove excessive clothing.
- Place the victim in a cool, shaded area.
- Fan or sprinkle victim with water to keep cool.
- If conscious, give victim small sips of water.
- Treat victim also for shock,.
- Seek medical attention should indications of a more serious problem exist.

### Heat Stroke

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Heat stroke is a serious malfunction of the body's heat regulatory mechanism. Heat stroke may be brought on by the same environmental conditions that cause heat cramps or heat exhaustion. Symptoms of heat stroke are:

- Shortness of breath.
- Weakness.
- Headache.
- Dizziness.
- Loss of appetite.
- Nausea.

The victim will also experience:

- Muscle-twitching leading to convulsions.
- Dilated pupils.
- Lack of sweating.
- Full, fast pulse; delirium and eventual loss of consciousness.

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## Heat Related Injuries (Continued)

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**Heat Stroke (Continued)** The major difference in symptoms between heat exhaustion and heat stroke is that during *heat stroke* the victim will *not sweat* and *will have hot, dry, flushed skin*. Body temperatures may range from 104 to 108 degrees F; *death will occur if the body temperature is not lowered*.

To treat heat stroke,

- Send for medical assistance.
- Move the victim to a cool, shaded area.
- Loosen victim's clothing and equipment.
- Apply water or ice to the victim's entire body, fanning the victim as much as possible.
- Do not attempt to force the victim to drink.
- Ensure that the airway remains open and that the victim continues to breathe.

Treatment for heat stroke consists primarily of lowering the body temperature as quickly as possible. *Time is of the essence!* Heat stroke is a true medical emergency with a 20 percent mortality rate.

### Prevention of Heat Related Injuries

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The following measures should reduce the potential for, and severity of, heat casualties:

- Clothing. Even in very hot weather, clothing must be worn to avoid the absorption of solar energy. Loose-fitting, light-colored clothing is preferable. Marines should loosen their equipment whenever possible to allow for air circulation.
- Water. Water should always be available, and personnel should take small sips frequently. "Water rationing" or "water discipline" should never be practiced if possible. Since the thirst urge only identifies two-thirds of the body's needs, personnel should drink more than they feel is necessary. If possible, perform strenuous tasks during the morning or evening. The average diet provides more than enough salt; therefore, salt tablets should not normally be taken.

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## Heat Related Injuries (Continued)

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### Prevention of Heat Related Injuries (Continued)

- Command attention. Personnel must be supervised and instructed as to hot weather considerations. Enforced drinking of that extra one-third of the body's requirement may be utilized. Teach your Marines to store water in their bodies, not in their canteens.

### Wet-Bulb Globe Temperature (WBGT) Index

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The "wet-bulb" is our source for determining heat conditions and an important means in controlling heat-related injuries. The various heat conditions are normally associated with flag colors. It is important to have a standardized system to help a commander determine appropriate training.

The four environmental factors that make up the WBGT index are:

- Air movement.
- Air temperature.
- Relative humidity.
- Radiant heat.

The WBGT index is measured with a psychrometer—a device consisting of two thermometers. The bulb of one is kept wet, so that the cooling that results from evaporation makes it register a lower temperature than the dry one. The difference between the two readings constitutes a measure of the dryness of the atmosphere. The higher the humidity and the lower the air movement, the less effective sweating will be in cooling the body.

The WBGT index gives us a range of conditions that are commonly referred to as "flag" conditions. All training during the period 1 May through 30 September will be conducted in accordance with the following heat/flag indexes.



## Heat Related Injuries (Continued)

Condition	Flag Condition	Index	Physical Activity Restrictions
		Fahrenheit(F)	
Alpha	Green	80.0° to 84.9°	Heavy exercise for unacclimatized personnel conducted with caution and under constant supervision.
Bravo	Yellow	85.0° to 87.9°	Strenuous activities such as hikes, close order drill, and obstacle courses suspended for unacclimatized personnel.
Charlie	Red	88.0° to 89.9°	All physical training is halted. Outdoor classes in direct sunlight shall be avoided for personnel not thoroughly acclimatized. Those thoroughly acclimatized may perform limited activity not to exceed six hours per day.
Delta	Black	90.0° and above	All strenuous activity halted

## Cold Related Injuries

### Cold Weather and the Human Body

The human body is designed to maintain a core temperature of 98.6 ° Fahrenheit (F). If the environment is cooler than the body, heat leaves the body by seven means:

- Radiation: The loss of heat into still air. The head and neck are the body's most efficient radiators. Heat loss of the body's total heat production from an uncovered head can be up to:
  - 50 percent at 40° F.
  - 75 percent at 5° F.
- Conduction: The loss of heat due to contact with an object that is colder than the body. Conduction of heat from skin to metal is very rapid and can actually cause bonding of skin to the metal. Sitting on ice, snow, or a cold rock will cause conductive heat loss.
- Convection: The body continually warms (by radiation) a thin layer of air next to the skin to a temperature nearly equal to that of the skin. A cooling effect occurs when a brisk wind removes this layer.

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## Cold Related Injuries (Continued)

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### Cold Weather and the Human Body (Continued)

- Evaporation: The evaporation of sweat from the skin accounts for a substantial heat loss.
- Respiration: Inhaling cool air and exhaling warm air contribute to heat loss.
- Wind chill: Wind has an additional cooling effect; a mild temperature of 40° F with a wind blowing at 25 miles per hour produces an equivalent wind chill temperature of 15° F.
- Water chill: The thermal conductivity of water is 32 times as great as that of still air.

### Frostbite

Frostbite is the freezing of flesh. Frostbite is caused when the body restricts blood flow to the appendages to conserve core heat. The surface tissues actually freeze, and with continued chilling, the frozen area extends to deeper levels.

**Note:** Frost nip or superficial frostbite may affect the nose, cheeks and ears, and may appear as a white patch on the skin.

Frostbite symptoms are:

- Sensations of cold or pain.
- Complete loss of sensation in the affected area. The sensation is described as feeling "like a stump," "like a block of wood," or "cube-like."
- Tissue becomes hard and red, and then turns white, white-yellow or mottled blue-white, and cold.
- Swelling may occur, and blisters may form on the affected area.

Re-warming of the frostbitten extremity is rarely done in the field. You can cause a great damage by unsuccessful attempts re-warm the frostbitten area. To treat frostbite,

- Move the casualty to a heated area such as a warming tent or vehicle.
- Remove or loosen constrictive clothing to allow the blood to circulate freely to the affected area.
- For deep frostbite, which has penetrated below the upper layers of skin and into the muscles, transport the victim immediately to a medical facility. Do *not* attempt to thaw the affected area.

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## Cold Related Injuries (Continued)

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### Frostbite (Continued)

**Caution:** *Never try to heat a frostbitten part with open heat source, e.g. vehicle exhaust, boiling water or open flame; you will only further damage the fragile tissues. Re-warming is best accomplished under controlled circumstances in the emergency department. If prompt hospital care is not available and you feel re-warming must be done in the field, the best way is to use body heat.*

**Caution:** *Do not attempt re-warming if there is any chance that the affected part may freeze again. Use either the individual's own body heat or that of a buddy to slowly warm the affected area. The armpits and groin area are good places to gradually warm a frostbitten extremity.*

- Do *not* rub snow on a frostbitten area nor immerse it in boiling water.

### Trench Foot or Immersion Foot

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Trench foot (also called immersion foot) is caused by moisture trapped against the skin for an extended period (e.g. inside a boot) which waterlogs the tissues. When these boots are worn for long periods without changing socks, the feet become moist and sweaty. Trench foot is commonly found when wearing waterproof or vapor barrier-type boots ("Mickey Mouse" boots) for too long.

Symptoms of immersion foot are:

- Pale, wrinkled, loose, spongy, cold, swollen, and waxy skin on the feet.
- Discoloration develops as the transition to gangrene occurs.

To treat and prevent trench foot,

- Keep the feet dry.
- Change socks often and air-dry or blot the moisture off.
- Keep the feet warm.
- Change socks often and use foot powder to absorb excess moisture.
- Only wear vapor barrier boots when necessary, and once afflicted, walk only as much as necessary.

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## Cold Related Injuries (Continued)

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### Hypothermia

The body's first response to cold is the constriction of the blood vessels of the skin, causing a decrease in the amount of heat transported by the blood to the skin. The body does this to keep what heat is being generated for the body core, which houses the vital organs.

Hypothermia is commonly brought on when an individual falls into an ice-cold stream or river or is exposed to the elements without adequate clothing. If the body cannot produce enough heat to overcome what is lost through evaporation of the moisture in the wet clothing, it will begin to reduce its core temperature.

Hypothermia is defined as a core body temperature of less than 95° F. It may be classified as:

- Mild (93.2° F to 95° F).
- Moderate (86° F to 93.2° F).
- Severe (less than 86° F).

Symptoms of hypothermia by core body temperature are:

- Temp 99° to 96° F: Shivering becomes intense and uncontrollable. The ability to perform complex tasks is impaired.
- Temp 95° F to 91° F: Violent shivering persists. Victims have difficulty speaking and are sluggish in their thinking. Furthermore, victims may be stubborn, hallucinating, and extremely fatigued. Apathy may begin to set in.
- Temp 90° to 86° F: Shivering decreases and is replaced by strong muscular rigidity. Exposed skin may become blue or puffy.
- Temp 85° to 81° F: Victims become irrational, lose contact with reality, and drift into a stupor. Pulse and respiration are slowed.
- Temp 80° to 78° F: Victims lose consciousness; reflexes cease to function. The heartbeat becomes erratic.
- Temp < 78° F: Failure of the cardiac and respiratory control centers in the brain. Death.

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## Cold Related Injuries (Continued)

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### Hypothermia (Continued)

To treat hypothermia,

- Evacuate the individual to a medical facility as soon as possible. If transportation is not immediately available, move the individual to a warming shelter or at least out of the elements.
- Remove all wet clothing and replace with dry items.
- As with frostbite, gradually warm the body. The body is not producing enough heat, so an external source must be provided. Place as much insulation between the individual and the ground as possible to avoid conductive heat loss. If there is no other shelter, use a sleeping bag.
- Continuously monitor the victim's respiration and heartbeat; administer CPR, if required, to maintain circulation.
- Warm liquids in small sips may be given if the victim is conscious.

### Hypothermia in a Tactical Environment

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Hypothermia in a wounded patient is accelerated by the body's own survival processes. When subjected to a trauma, the body constricts the flow of blood to the extremities. It concentrates the blood in the torso and brain areas—the very areas where a significant amount of body heat is exchanged through blood vessels—making a wounded individual more susceptible to hypothermia.

When blood temperature drops below approximately 96° F, the proteins in the blood are affected such that coagulation/clotting will not occur. Hypothermia following a wounding event can occur regardless of ambient temperature.

Hypothermia prevention and management must begin at or near the point of injury (POI) by the first responder.

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## Cold Related Injuries (Continued)

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### Cold Weather Injury Prevention

Use the acronym COLD when preparing for cold-weather operations or treating cold-weather injuries:

- **C: Keep it Clean.** The air-trapping capability of clothing is reduced if it is dirty or oily because the weave of the material, in which pockets of air are trapped, becomes clogged.
- **O: Avoid Overheating.** In cold weather, inexperienced personnel tend to wear every article of clothing available. This becomes a problem particularly during strenuous activity such as marches, offensive tactics, or even digging in. Overheating causes a chain reaction—sweating, rapid cooling because of wet clothing, and, inevitably, the onset of hypothermia. Before the body begins to perspire, loosen the layers of clothing at the closures. If this does not cool the body down, remove a layer. However, it is important to keep the windproof layer (field jacket or parka) on and adjust the layers underneath (long underwear, utility jacket, field jacket liner). Remember, it is better to be slightly cool than too warm.
- **L: Wear clothing Loosely and in Layers.** Clothing and footwear that are too tight restrict the blood circulation and increase the danger of frostbite. However, if they are worn too loosely they will lose their insulating ability. When clothes are layered, air is trapped and warmed. This provides excellent insulation for the body. Therefore, several layers of medium weight clothing are more effective than one heavy garment.
- **D: Keep it Dry.** Dry clothing ensures maximum effectiveness as an insulator. Small items of clothing (e.g. socks, gloves or mitten inserts, and headgear) can be dried by placing them next to the skin at the waist. Body heat will dry them in a matter of hours. Placing large items in a sleeping bag with the individual can dry larger items overnight.

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## Cold Related Injuries (Continued)

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### Cold Weather Injury Prevention (Continued)

Additional actions a small unit leader can take to prevent cold-weather injuries are:

- Closely observe personnel who have previously become cold casualties. There is a tendency for certain persons to succumb to the effects of the cold; these individuals, once they become cold weather casualties, may do so again.
- Diet is important. The body needs carbohydrates to fuel its heat generation mechanism. Hot meals, consisting of 4500 calories per day, are considered essential for severe cold weather.
- Water is also important. Ensure your people drink a minimum of 3 1/2 to five quarts per day. As much of this as possible should be hot liquids, such as hot chocolate, broth, or tea.
- Alcoholic beverages should be avoided. Alcohol dehydrates the body and reduces the body's core temperature. Although alcohol may initially make an individual feel "warm," this is only superficial and ultimately this warmth will be drawn from the core of the body, lowering overall temperature.
- The importance of individual skills should not be underestimated. Adopt a rigorous training and education program before a cold weather deployment.
- Detailed supervision is required at all echelons of command to ensure Marines adhere to standard practices when operating in cold weather. Preventing Marines from overdressing or standing around in the cold doing nothing while dressed lightly for movements are just two considerations.

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## Summary

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Teamwork, unit training, and thorough supervision can eliminate or greatly reduce the frequency of field-related injuries. Field-related injuries will diminish the combat effectiveness of a unit and result in an inability to accomplish the mission. When injuries do occur, make sure you and all your Marines know exactly what to do. This lesson will prepare you to render effective first aid for combat-related injuries and to teach your Marines the same skills.

Reference Number or Author	Reference Title
MCRP 3-02G	First Aid
PHTLS	Pre-Hospital Trauma Life Support: Mil. Edition, 6 <sup>th</sup> Ed. 2006

Term or Acronym	Definition or Identification
CPR	Cardio pulmonary resuscitation
F	Fahrenheit
POI	Point of injury
WBGT	Wet-bulb globe temperature

## This image shows a single page from a notebook or ledger. It features ten evenly spaced horizontal blue lines running across its width. The top margin between the first two lines is noticeably wider than the subsequent nine rows, providing space for headers or titles. The bottom-most row lacks a final closing line at the very edge of the page.