



# **Unit V – Wellness, Fitness and First Aid**

## **Chapter 10 - First Aid for Emergency and Nonemergency Situations**

### **Section 5 – Heat and Cold Weather Injuries**



# What You Will Learn to Do

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Determine first aid procedures and apply them as needed

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# Objectives

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1. Give first aid treatment for heat- and cold-related injuries.
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# Key Terms

- Dehydration -** The condition that results when fluids are lost from the body and are not replaced; symptoms can include thirst, weakness, exhaustion, and confusion, and may result in death
- Ventilation -** Circulation of air; a system or means of providing fresh air



# Key Terms

**Heat cramps -** A condition that is marked by the sudden development of cramps in the skeletal muscles that results from prolonged work in high temperatures accompanied by profuse perspiration with loss of sodium chloride from the body



# Key Terms

- Heat Exhaustion -** A condition that occurs when a person is exposed to excessive heat over a period of time, caused by the loss of water and salt from the body through excessive perspiration
- Heatstroke -** A life-threatening condition caused by prolonged exposure to high heat
- Frostbite -** An injury caused to body tissue by frost or extreme cold



# Key Terms

<b>Hypothermia -</b>	Too little body heat with abnormally low internal body temperature
<b>Superficial -</b>	Not serious; on the surface; shallow
<b>Subcutaneous -</b>	Beneath the top layer of skin
<b>Insulate -</b>	To use materials to protect or isolate from the elements of weather



# Heat Injuries



Participation in any vigorous outdoor exercise or activity on an extremely hot day can lead to serious injuries if you are not **prepared**.

Knowing how to recognize the signs and symptoms of heat related injuries can help you prevent a life-threatening accident.



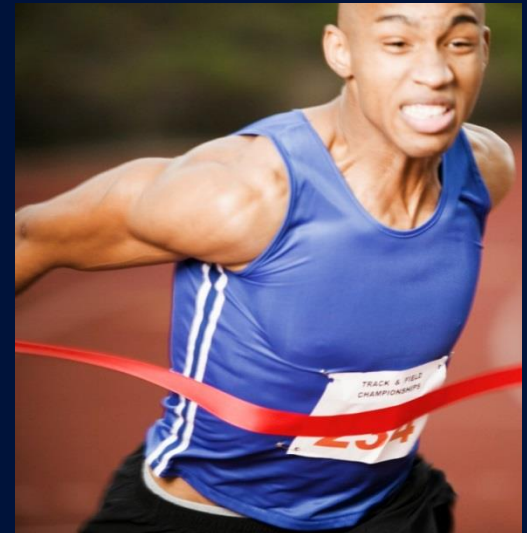


# Causes of Heat Injuries

For your body to work properly, its temperature must be normal, around 98°F. You risk health problems, even death, if your body gets too cold or too hot.

Heat injuries can occur when people are exposed to **high temperatures** and/or **high humidity**.

Your body cools itself with **sweat**, which evaporates and carries heat away from your body.

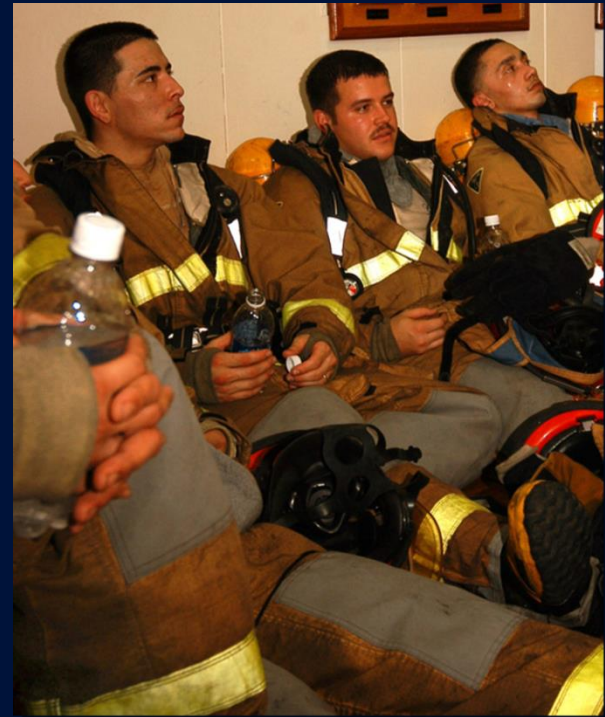




# Causes of Heat Injuries

However, you risk heat injuries anytime you lose large amounts of water, salt or both through perspiring - and do not replace the lost fluid.

This process results in **dehydration**.





# Factors to Consider

When perspiring, the body can lose more than a quart of water per hour.

Therefore, drink **plenty of water** when working or playing in hot weather.





# Factors to Consider

**Salt**, which helps the body to retain water, is also lost through perspiring.

In most cases, you do not need to consume more salt if you have a balanced diet.



In fact, consuming salt during hot weather activities may pull water away from muscles and other tissues where it is needed and into your digestive tract.



# Factors to Consider

In addition to water intake and diet, wear **natural fabrics**, like cotton, through which perspiration evaporates better.



Soldiers may have problems acclimating to hot weather because of the type and amount of clothing and equipment they must wear.







# Factors to Consider

Common to both athletes and soldiers, protective gear and equipment may reduce **ventilation** needed to cool the body.

Therefore, ensure clothing or uniforms fit well but are not **tight**, and remove extra pieces of clothing and equipment as soon as they are no longer needed.



# Types of Heat Injuries

Overheating the body progresses through stages...

- At first, a person may suffer **heat cramps** .
- If the person ignores the symptoms, **heat exhaustion** can occur.
- Finally, if heat exhaustion is left untreated, **heatstroke**, which can be fatal, may follow.





# Heat Cramps

**Heat cramps** are muscular pains and spasms caused by the loss of salt from the body through heavy perspiration. They can be treated by:



1. Move the victim to a shady area.
2. Loosen the victim's clothing.
3. Slowly give the victim large amounts of cool water.
4. Monitor the victim and give more water as needed.
5. Seek medical aid if cramps continue.





# Heat Exhaustion

When people work or exercise heavily in hot or humid places, the body loses fluids through heavy sweating.

When the body loses a lot of fluid, less blood flows to vital organs, resulting in a form of shock. **Symptoms** include:

- Heavy sweating
- Weakness or faintness
- Dizziness or drowsiness
- Cool, pale, moist skin
- Headaches
- Loss of appetite
- Heat cramps
- Nausea
- Confusion
- Chills
- Rapid breathing and pulse
- Body temperature above normal but below 102°F



# Heat Exhaustion

Treat heat exhaustion as follows:

1. Move the victim to a shady area.
2. Loosen the victim's clothing.
3. Pour water on or apply cold, wet cloth to the skin.
4. Have the victim slowly drink at least one quart of water.
5. Elevate the victim's legs.
6. Monitor the victim until symptoms are gone. If symptoms continue, seek medical aid.
7. If possible, keep the victim from participating in heavy activity for the rest of the day.





# Heatstroke

**Heatstroke**, also known as sunstroke, is a medical emergency that can be fatal if not treated as soon as possible.

Heatstroke stops the victim's cooling mechanism from working. The body perspires so much that **no fluids remain** to produce sweat.

If body temperature rises high enough, brain damage and death can occur. If you encounter a heatstroke victim, you must **cool the victim** as fast as possible.





# Symptoms of Heatstroke

- No sweating
- Hot, dry, red skin
- Headache, dizziness, nausea, and vomiting
- Fast, weak pulse and shallow respiration
- Seizures and mental confusion
- Unconsciousness or sudden collapse
- Very high body temperature



# Treatment for Heatstroke

1. Move the victim to a shady area.
2. Loosen the victim's clothing. Remove any outer garments and protective clothing.
3. Pour water on the victim or immerse in water, and fan the victim so the water can evaporate.
4. If the victim is conscious, have him or her slowly drink at least one quart of water.
5. Seek medical aid; transport the victim to a medical facility ASAP. Perform any necessary life-saving measures.



# Prevention of Heat Injuries



Heat injuries can be prevented by limiting your exposure to high temps and avoiding work or exercise outside in hot, humid weather.

During work or training periods, or in extremely hot climates, drink at least **one quart of water** every hour.

Also, remember to dress for hot weather and the activity being performed.





# Prevention of Heat Injuries



In the military or in the field, prevention of heat injuries is both an **individual** and **leadership** responsibility. Leaders should identify people who have a **high risk** of injury.



# Cold Weather Injuries



Prolonged exposure to low temperatures, wind, or moisture, whether on a ski slope or in a stranded car, can result in cold-related injuries such as **frostbite** and **hypothermia**.





# Factors to Consider

When thinking about cold weather injuries, you need to consider several factors...

- Weather
- Stress
- Clothing
- Physical makeup
- Psychological factors
- Other factors





# Weather



Low temperature, high humidity, precipitation, and high wind may affect the loss of body heat.

**Wind chill** is the temperature of both the wind speed and air temperature combined. It speeds up the loss of body heat and may aggravate cold injuries.



WIND CHILL CHART FOR FAHRENHEIT TEMPERATURES												
ESTIMATED WIND SPEED IN MPH	ACTUAL THERMOMETER READING (°F)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
CALM	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-124
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-21	-35	-51	-67	-82	-96	-113	-129	-145
40	26	10	-6	-24	-37	-53	-69	-85	-100	-116	-132	-148
WIND SPEEDS ABOVE 40 MPH HAVE LITTLE ADDITIONAL EFFECT.	LITTLE DANGER FOR THE PROPERLY CLOTHED PERSON, MAXIMUM DANGER OF FALSE SENSE OF SECURITY.				INCREASING DANGER OF FREEZING EXPOSED FLESH.				GREAT DANGER			
TRENCH FOOT AND IMMERSION FOOT MAY OCCUR AT ANY POINT ON THIS CHART												





# Stress



When in a stressful situation, people are more likely to experience **fear, fatigue, dehydration, and lack of nutrition.**

These factors increase the possibility of cold injury.



# Clothing



To reduce perspiration followed by chill during cold weather, you should wear **several layers** of loose-fitting clothing and dress as lightly as the weather permits.

It is better if the body is **slightly cold** and producing heat rather than overly warm and sweltering toward dehydration.

**Wet** clothing adds to the possibility of cold injury.





# Physical Makeup

Physical fatigue leads to:

- Inactivity
- Personal neglect
- Carelessness
- Less heat production



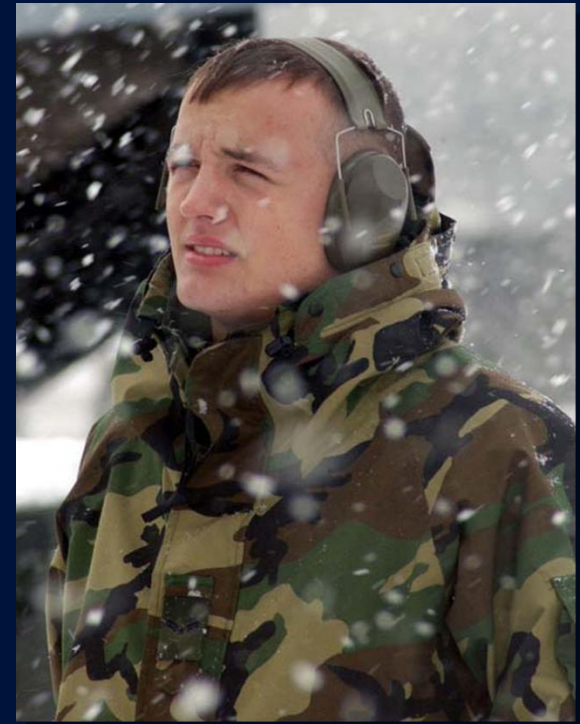
These, in turn, increase the risk of cold injury.



# Psychological Factors

Mental fatigue and fear lessen the body's ability to rewarm itself.

**Depressed** or **unresponsive** individuals may be less active and careless about protecting themselves, which increases their risk of cold injury.







# Other Factors

Individuals are also at risk of cold injury if they are:

- In contact with the ground for an extended period
- Immobile for long periods of time
- Standing in the water
- Out in the cold for days without being warmed
- Deprived of an adequate diet and rest
- Careless about personal hygiene





# Types of Cold Injuries

People exposed to severe cold can suffer from:

- Frostbite
- Immersion foot / trench foot
- Hypothermia
- Snow blindness
- Dehydration





# Frostbite

Frostbite is the most common injury resulting from exposure to the cold.

Ice crystals form in body tissues and restrict blood flow to the injured body parts.



The body parts most easily frostbitten are:

- Cheeks
- Nose
- Ears
- Chin
- Forehead
- Wrists
- Hands
- Feet



# Frostbite

There are different degrees of frostbite depending on the extent of tissue damage.

A superficial cold injury can usually be characterized by numbness and tingling or “pins and needles” sensations.





# Frostbite

Deep frostbite involves freezing of the **subcutaneous** tissue and possibly even muscle and bone.

Severe frostbite can cause infection or gangrene and may require surgical removal of the injured part.







# Signs of Frostbite

## Superficial Frostbite:

- Redness of the skin on light-skinned individuals; grayish coloring of the skin
- Blisters appearing in 24 to 36 hours
- Sloughing of the skin

## Deep Frostbite:

- Signs of superficial frostbite
- Painless or numb unthawed skin that is pale-yellowish and waxy looking
- Frozen, swollen tissue that is similar to wood to the touch
- Blisters in 12 to 36 hours







# Treatment of Superficial Frostbite

1. Move the victim out of the cold and wind.
2. Keep the victim warm; rewarm the affected parts gently and slowly.
3. Insulate injured parts by covering them with a blanket or dry clothing.
4. Loosen tight clothing and remove wet clothing.
5. Encourage the victim to exercise carefully, avoiding further injury.
6. Seek medical treatment.





# Treatment of Deep Frostbite

Deep frostbite is **very serious** and requires extra care to reduce or avoid losing all or parts of the fingers, toes, hands, or feet. Take care when rewarming body parts – this is best done under medical supervision.



**Get the victim  
emergency help  
as soon as  
possible.**



# The Don'ts of Treating Frostbite

- Do not attempt to thaw the affected part if you believe you cannot keep it warm until the victim receives medical treatment.
- Do not let the victim walk on frostbitten feet, especially if they thaw.
- Do not rub the injured part with snow or apply cold water packs.
- Do not warm the injured part by massage.
- Do not expose the injured part to open fire.
- Do not break any blisters.
- Do not use ointments or other medications.
- Do not let the victim use alcohol or tobacco.



# Immersion Foot / Trench Foot

**Immersion foot** and **trench foot** result from long exposure of the feet to wet conditions at temperatures between about 32-50°F.

**Immersion  
Foot**



**Trench Foot**

Keeping your feet in damp or wet socks and shoes, or in tightly laced boots for long periods of time may affect circulation and contribute to injury.



# Signs of Immersion Foot / Trench Foot

## Symptoms of immersion foot and trench foot:

**Primary stage:** Affected parts that are initially cold, numb, and painless, but may begin to feel hot with burning and shooting pains

**Advanced stage:** Pulse decreases, skin becomes pale with bluish cast. Redness, blistering, swelling, heat, hemorrhages and gangrene may follow.



# Treatment of Immersion Foot / Trench Foot

1. Gradually rewarm the affected foot by exposure to warm air. Tell the victim there may be pain when rewarming the foot.
2. Protect the affected foot from trauma or infection.
3. Elevate the foot to relieve swelling.
4. Dry the foot thoroughly; avoid walking.
5. Seek medical treatment.





# Hypothermia

**Hypothermia** is a general cooling of the body to a temperature below 95°F caused by continued exposure to low or rapidly dropping temperatures, cold moisture or wind, snow, or ice.



Remember, cold weather affects the body slowly and almost without notice. Even when well-protected by clothing, a person may suffer cold injuries if exposed to low temperatures for long periods of time.



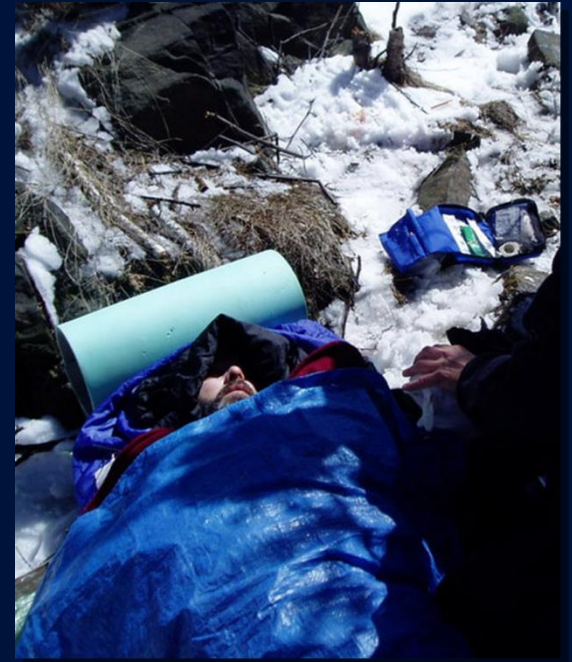
# Signs of Hypothermia

- Shivering or trembling, which will eventually stop as body temperature drops
- Cold skin
- Weakness
- Dizziness
- Drowsiness or mental slowness or confusion
- Uncoordinated movements and slurred speech
- Low body temperature; in severe hypothermia, 90°F or below
- Stiff or rigid muscles
- Decreasing pulse and breathing rate
- Unconsciousness
- Shock, coma and death, all of which may result as body temperature drops and the body freezes



# Treatment of Hypothermia

1. Rewarm the victim slowly
2. Keep the victim dry and protected
3. Keep the victim awake
4. Do not raise the victim's feet
5. Give the victim warm liquids gradually
6. Be prepared to start basic life-support measures
7. Seek medical treatment immediately





# Treatment of Hypothermia



Treating a person with severe hypothermia is extremely dangerous because of the possibility of shock and disturbances of the heartbeat while rewarming. If possible, when starting the rewarming process, call EMS immediately.



# Snow Blindness

**Snow blindness** is the effect the glare from an ice field or snowfield has on the eyes.

It is more likely to occur in hazy, cloudy weather because people tend to protect their eyes when the sun is shining and believe protection is unnecessary on cloudy days.

If one waits for eye discomfort or pain, a **deep burn** of the eyes may have already occurred.





# Snow Blindness

## Signs of Snow Blindness:

- A sensation of grit in the eyes
- Pain in and over the eyes made worse with eye movement
- Watery red eyes
- Headache
- Increased pain with exposure to light

## Treatment for Snow Blindness:

- Cover eyes with a dark cloth to discourage eye movement
- Give eyes complete rest without exposure to light or protect eyes with dark bandages or dark glasses
- Seek medical help; eyes will usually heal in a few days







# Dehydration

**Dehydration** occurs when the body loses too much fluid, salt, and minerals.

Can  
occur in  
both  
hot and  
cold  
climates



## Treatment for Dehydration:

- Move the victim out of the wind and cold; keep him or her warm.
- Loosen the victim's clothes to promote circulation.
- Ensure the victim receives proper fluid replacement, rest, and medical care.



# Prevention of Cold Injuries

You can prevent many cold weather injuries by taking proper care and precautions when participating in cold weather activities...

- Get adequate nutrition, hot meals, and warm fluids
- Wear the right clothing and protective gear
- Do not forget to protect your eyes, ears, and face
- Wear layers of clothing so you can remove outer layers if you begin to perspire





# Prevention of Cold Injuries



You may not feel cold injuries because of cold's numbing effect, so always try to go out in cold weather with a partner. That way you can check on each other for injury.





# Questions?

