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Training
PREVENTION OF HEAT AND COLD CASUALTIES

Summary. This regulation prescribes policy and provides guidance to commanders in preventing environmental (heat or cold) casualties.

Applicability. This regulation applies to all Active Component and Reserve Component training conducted at service schools, Army training centers, or other training activities under Headquarters, U.S. Army Training and Doctrine Command (TRADOC) control.

Supplementation. Supplementation of this regulation is permitted. However, proposed supplements must be submitted to Commander TRADOC, ATTN: ATMD, 60 Ingalls Road, Fort Monroe, VA 23651-1048, for approval.

Suggested improvements. The proponent of this regulation is the TRADOC Surgeon. Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) through channels to Commander, TRADOC, ATTN: ATMD, 60 Ingalls Road, Fort Monroe, VA 23651-1048. Suggested improvements may also be submitted using DA Form 1045 (Army Ideas for Excellence Program (AIEP) Proposal).

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Chapter 1
Introduction

- 1-1. Purpose.** This regulation prescribes policy and provides guidance to commanders in preventing environmental (heat or cold) casualties.
- 1-2. References.** Appendix A contains required and related publications and referenced forms.
- 1-3. Explanation of abbreviations.** The glossary contains abbreviations used in this regulation.
- 1-4. Responsibilities.** Commanders and supervisors at all levels are responsible for protecting soldiers and civilian personnel from becoming a heat or cold casualty that may advance to a heat or cold injury. **Heat and cold casualty prevention is a command responsibility.**
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Chapter 2
Implementation Guidance

- 2-1. General.** Extremes in weather conditions pose additional problems to training efforts and increase the risk of heat and cold casualties. Prevention of both heat and cold casualties depends on educating personnel, and reducing exposure whenever possible.
- a. **Environmental casualty**—Presumptive classification of an individual that has experienced a change in their health status due to environmental conditions (heat or cold) and/or activity.
 - b. **Environmental injury**—Soldiers with these conditions may have incurred a permanent physiological condition and will be referred to a medical evaluation board.

(1) **Cold injury**—Cold casualty that has been medically validated with frostbite, hypothermia, or trench foot.

(2) **Heat injury**—Heat casualty that has been medically validated with heat stroke or multiple episodes of heat exhaustion (three or more in less than 24 months).

2-2. Recognition and treatment. Commanders and supervisors must ensure every individual that may be exposed to unaccustomed environmental conditions (heat stress or cold stress (wind chill)) is informed of potentially serious results of heat or cold casualties, and how to recognize and treat those casualties if they occur. The U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), in collaboration with The U.S. Army Research Institute for Environmental Medicine and the TRADOC Surgeon, have guides available for use in identification, first aid treatment, and risk management for heat and cold injury prevention (see the TRADOC Surgeon’s [Heat Risk Manual](#) and [Cold Risk Manual](#) (also included in app B) and USACHPPM’s [Heat Injury Prevention](#) and [Cold Injury Prevention](#) information).

2-3. Heat casualty and injury prevention.

a. Heat casualties are preventable, but remain a significant health problem for the U.S. Army. Heat casualties can be minor (heat cramps) or major, which can progress to heat injuries (heat exhaustion and heat stroke). Heat conditions are classified by color (green, yellow, red, and black) in increasing order of heat stress, according to Wet Bulb Globe Temperature (WBGT) readings (see app B). Commanders must adapt training/physical activity and uniform requirements to conform to the precautions for each heat condition.

b. The five steps of heat casualty risk management are 1) Identify Hazards, 2) Assess Hazards, 3) Develop Controls, 4) Implement Controls, and 5) Supervise and Evaluate.

(1) Identify Hazards.

(a) Consider any past experience with heat casualties at the installation. Heat casualty hazards are cumulative. Commanders need to consider the following:

- **H** - Heat category the past 3 days.
- **E** - Exertion level of training the past 3 days.
- **A** - Acclimatization/other individual risk factors.
- **T** - Time of exposure, to include nights, and recovery time.

(b) Clusters of heat casualties on prior days mean high risk for today.

(c) Obtain WBGT when ambient temperature exceeds 75°F (Fahrenheit).

(d) Recognize factors for increased risk of incurring heat casualties in individual soldiers:

- Not acclimatized to heat (need 10-14 days to get trainees adequately acclimated.) Refer to appendix C for guidance to the individual soldier on

acclimatizing prior to undergoing specialized training, e.g., Ranger, Airborne (ABN) School, Reserve Officers' Training Corps (ROTC), etc.

- Exposure to cumulative stressors (2-3 days of any of the following):
 - Increased heat exposure.
 - Increased exertion levels.
 - Lack of quality sleep.
- Overweight.
- Minor illness (cold symptoms, sore throat, low grade fever, nausea, or vomiting).
- Taking medications (either prescribed or over the counter (OTC), e.g., allergy or cold remedies).
- Dietary supplements/dietary aids (e.g., Ephedra).
- Use of alcohol in the last 24 hours.
- Prior history of heat injury (any heat stroke, or 3 or more episodes of heat exhaustion).
- Skin disorders such as heat rash and sunburn, which prevent effective sweating.
- Age over 40 years.
- Overly motivated soldiers (e.g., overly motivated soldiers may not comply with heat casualty prevention measures).

(e) Ill soldiers, and those that have consumed alcohol within the last 24 hours, are probably already dehydrated. Seriously consider taking these soldiers out of training, and having ill soldiers seen on sick call.

(2) Assess Hazards.

(a) When ambient temperature is over 75°F, constantly assess the **heat category**, using WBGT in the immediate vicinity of the activity site, on an hourly basis. (Refer to app D on WBGT setup.)

(b) Know your soldiers! Identify early those at increased risk based on **individual risk factors**.

(c) Check **hydration status** at the end of each training day. Give extra fluid at night, and in the morning, if hydration is inadequate.

- Review Riley (water) Card or Ogden Cards (refer to app B).
- Ask about urine color. Urine is clear if well hydrated.

(d) Daily **assess the overall risk** for developing a heat casualty (suggest using the **Heat Injury Risk Management Matrix** in appendix B, under para B-1, step 2 of risk management).

(e) Adjust workload to size of individuals (for example, do not allow smallest individual to carry the heaviest loads). Share workload among soldiers.

(3) Develop Controls.

(a) **Educate.**

- Establish standard operating procedures (SOPs). Ensure all personnel are trained and follow SOPs for heat casualty prevention.
- Ensure all bulletin boards have heat casualty prevention posters and all leaders have heat casualty prevention aids.

(b) **Plan.**

- Adjust the training schedule to minimize consecutive days of heavy physical training (PT), especially if other heat stressors exist (e.g., heat exposure and lack of quality sleep).
- Plan communications, medical, and evacuation support.
- Plan and provide adequate hydration for *all* personnel (including cadre and drill instructors).
- When planning training events, keep in mind:
 - Time of day the training is conducted (morning is cooler).
 - Location of training.
 - Sun versus shade.
 - Open versus protection from wind (wind has cooling effect).
 - Clothing (heavy, restrictive versus loose, lightweight).
- Where in training cycle.
 - Most heat casualties occur in the second or third week of recruit training.
 - Acclimatization can take 10-14 days, depending on the physical condition of the trainee.

(c) **Identify high-risk soldiers by marking visibly on uniform with tape or cord.**

- Identify previous heat exhaustion or heat stroke soldiers.
- Identify overweight soldiers.
- Identify soldiers on medications.
- Seriously consider taking soldiers out of training that have consumed alcohol within the last 24 hours.
- Seriously consider having ill soldiers seen on sick call.

(d) **Note and document heat category hourly when ambient temperature is 75°F or greater. Position WBGT at site of training.**

- Reevaluate training mission if two or more heat casualties occur.
- Ensure heat casualty prevention posters are on display in barracks, dining facility, etc. (Available on [USACHPPM](#) and [TRADOC Surgeon](#) web sites, as stated earlier.)

(e) **Develop a Hydration Monitoring System**, using either the Riley Table or the Ogden Cord as shown in appendix B, paragraph B-1, step 3 of risk management.

(4) **Implement Controls.**

(a) **Decision to accept risk is made in accordance with (IAW) TRADOC Reg 385-2, paragraph 1-5c(4).** (Refer to app B, para B-1, under step 2 of risk management (“Example of a Heat Injury Risk Management Matrix”) for stratification of risk categories.)

(b) **Ensure identified controls are in place.**

- Update WBGT hourly.
- Adhere to work/rest cycle in high heat categories. Rest in shade.
- Space out soldiers in formations during runs. (This is very effective to allow individual heat dissipation during runs.)
- For tasks requiring continuous effort, adhere to guideline and allow extended rest afterwards.
- Training event incorporates good prior planning.

(c) **Monitor and enforce hydration standard.**

- Encourage frequent drinking, but not to exceed 1½ quarts (qts) per hour, or 12 qts per day. Make water more palatable, if possible, by cooling.
- Do not allow soldiers or trainees to empty canteens to lighten load (consider imposing a penalty in timed events).
- Ensure soldiers are well hydrated before training. Ask about urine; urine is clear if well hydrated.
- Check Riley (water) Card or Ogden Cord frequently.

(d) **Monitor and enforce eating of meals.**

- Ensure all meals are eaten during the meal break.
- Ensure adequate time to eat meals and drink.
- Table salt may be added to food when the heat category is high. Salt tablets are not recommended.

(e) **Execute random checks.**

- Spot checks by cadre, senior noncommissioned officers (NCOs), and drill instructors.
- Enforce battle buddy checks—need to be aware of each other’s eating, drinking, and frequency of urination.
- Plan placement of leaders to observe and react to heat casualties in dispersed training.

(f) **Follow clothing recommendations.**

- Heat category 1-2: no restrictions.
- Heat category 3: Unblouse trouser legs and unbuckle web belt.
- Heat category 4-5:
 - Unblouse trouser legs and unbuckle web belt.
 - Remove t-shirt from under Battle Dress Uniform (BDU) top, or remove BDU top down to t-shirt (depends on whether biting insects are present).
 - Remove helmets, unless there are specific safety reasons to keep helmet on.
 - Mission-Oriented Protective Posture (MOPP) 4: Add 10°F to WBGT.

- Body Armor: Add 5°F to WBGT.

(g) **Have soldiers take cold showers, after moderate and heavy work, during category 3 or above, at the end of the day.** (This will minimize cumulative thermal heat load. For definitions of moderate/heavy work and heat category 3, refer to app B, under para B-1.)

(5) **Supervise and Evaluate.**

(a) **Enforce SOPs.**

(b) Delegate responsibilities to **ensure control measures have been implemented.**

(c) **Monitor adequacy/progress** of implementation of control measures.

(d) **Conduct spot checks of cadre.**

- Do cadre have current WBGT?
- Is cadre implementing work/rest/drink cycles?
- Make on-the-spot corrections. Lead by example.

(e) **Conduct spot checks of trainees.**

- Ask trainees questions, while observing their mental status and physical capabilities.
- Look out for common signs and symptoms, which can rapidly progress to serious signs and symptoms.

(f) **Reevaluate training mission if two or more heat casualties occur. When controls fail, heat injuries occur.**

- The ability to recognize heat injury is paramount.
- Take immediate action if any heat injuries are observed or suspected.
- Stop-rest-cool, then evaluate IAW warning signs and symptoms.
- If in doubt, evacuate.

c. See table 2-1 for an outline of the warning signs and symptoms of heat casualties and injuries.

d. An important sign that the soldier is in a serious life-threatening condition is the presence of mental confusion (with or without increased temperature). Conduct a Mental Status Assessment by asking the following questions, and call for medical evacuation (MEDEVAC) or ambulance if any of the conditions in parenthesis exist:

(1) **What is your name?** (Does not know own name.)

(2) **What month is it? What year is it?** (Does not know month or year.)

(3) **Where are you/we?** (Does not know the place where they are.)

(4) **What were you doing before you became ill?** (Does not know events that led to the present situation.)

Table 2-1
Warning signs and symptoms of heat casualties and injuries

<u>Early Signs/Symptoms</u>	<u>Actions</u>
<ul style="list-style-type: none"> • Dizziness. • Headache, nausea. • Unsteady walk. • Weakness. • Muscle cramps. 	<ul style="list-style-type: none"> • Remove from training. • Allow casualty to rest in shade. • Take sips of water, 1 qt/30 min. for 1 hour. • While performing the above, call for medic evaluation of the soldier. (Medic will monitor temperature and check for mental confusion.) <p>If no medic is available, call ambulance or MEDEVAC. Ensure same trainer keeps monitoring the casualty.</p>
<u>Later Signs/Symptoms</u>	<u>Immediate Actions</u>
<ul style="list-style-type: none"> • Hot body, high temperature. • Confusion/disorientation (Mental Status Assessment) unresponsiveness, coma. • Vomiting. • Involuntary bowel movement. • Convulsions. • Weak or rapid pulse. • Hyperventilating. 	<p>Immediately call for MEDEVAC or ambulance for emergency transport while performing the following:</p> <ul style="list-style-type: none"> • Lay person down in shade, with feet elevated, until ambulance arrives. • Give <i>sips</i> of water while awaiting ambulance (if conscious). • Undress as much as possible. • Aggressively apply ice packs or ice sheets. • Pour cold water over casualty and fan. • Massage extremities and skin to increase blood flow to skin (aids in cooling process). • Monitor airway and breathing until ambulance or MEDEVAC arrives. • Continue cooling during transport or until body temperature reaches 100°F.

2-4. Types of heat casualties and injuries.

a. Heat cramps. Heat cramps are brief, recurrent, and often agonizing cramps in skeletal muscles of the limbs and trunk. Heat cramps result primarily from excessive loss of salt from the body. This condition occurs when individuals, that have been actively sweating, do not replace the salt lost in their sweat. The immediate goal of treatment is relief of the cramps, not replacement of salt losses, which takes longer, and is best accomplished by ingestion of salted foods or fluids over days, before resuming work in the heat.

b. Heat exhaustion. Heat exhaustion, the most common form of heat casualty, occurs as a result of excessive loss of water and salt from the body. There may be weakness, dizziness,

headache, nausea, vomiting, fatigue, fast heart rate, muscle cramps, and warm body temperature. Sweating persists and may even be profuse. Move victims of heat exhaustion to a shaded area, loosen clothing, and elevate their feet to promote the return of blood to the heart. Make them drink at least one canteen of water over 15-30 minutes. Call for medic (91W)—if none are available, call for ambulance or MEDEVAC.

c. Heat stroke. HEAT STROKE IS A MEDICAL EMERGENCY WITH A HIGH MORTALITY RATE—CALL FOR AMBULANCE OR MEDEVAC IMMEDIATELY. This condition, caused by overexposure to the sun or heat, results from a breakdown of the body's ability to control its temperature. Symptoms include high body temperature; sudden loss of consciousness; collapse; low blood pressure; hyperventilation; convulsions; delirium; headache; dizziness; slow movements; confusion; drowsiness; irrational or aggressive behavior; weakness; and nausea/vomiting or diarrhea. Sweating may or may not be present. Heart rate and breathing are rapid. Remove clothes (to underwear), and, if any source of cool or cold water is nearby, immerse the victim in it. (NOTE: Do not immerse victim in ice, this will not provide adequate cooling.) Alternatively, towels, t-shirts, or sheets may be immersed in cold water and placed on the victim's neck, armpits, groin and trunk. In addition, pour cold water over the patient and fan the patient, to hasten the water evaporation. While awaiting transportation, keep the patient in the shade with the feet elevated. If the victim is conscious, make them drink at least one canteen of water. Continue efforts to reduce body temperature while transporting the victim.

d. Overhydration. THIS IS A MEDICAL EMERGENCY WITH A HIGH MORTALITY RATE—CALL FOR AMBULANCE OR MEDEVAC IMMEDIATELY. This illness occurs primarily in the setting of forced water drinking (more than 15 qts per day) for prevention of early symptoms of heat casualty. Symptoms of overhydration are very similar to the symptoms of mild heat-induced dehydration: weakness and fatigue, vomiting, and confusion. For this reason, it is imperative that hydration status is monitored through battle buddy and cadre checks. Soldiers should drink no more than 1½ qts per hour and no more than 12 qts per day. However, excessive emphasis should not be placed on this such that soldiers are fearful of drinking water. Overhydration is much more rare than other heat casualties, and can be controlled with good cadre and leadership supervision. The duration of field treatment of casualties, even with mild heat illness, should never exceed 1 hour, with a maximum of 2 qts of fluid. PRIMARY PREVENTION OF OVERHYDRATION IS MEAL CONSUMPTION, AND ADHERENCE TO THE FLUID REPLACEMENT GUIDELINES AS ILLUSTRATED IN APPENDIX B. Table 2-2 provides signs and symptoms of overhydration and actions to take.

2-5. Cold casualty and injury prevention.

a. Prior planning and adequate training are essential to minimize cold casualties. Commanders must establish appropriate guidelines on training/physical activity, uniform wear, and troop support requirements, to conform to the precautions for each wind chill level, which are classified as green, yellow or red. Cold injuries include nonfreezing injuries (trench/immersion foot), freezing injuries (frostbite) and hypothermia. Most cold injuries are preventable with proper cold weather protection. Awareness of the magnitude of cold stress (temperature, wind chill, rain/water exposure/immersion) is important for making decisions on how to appropriately use clothing systems and conduct training.

Table 2-2
Indications of possible water intoxication (overhydration)

<u>Signs & symptoms</u>	<u>What to do:</u>
<ul style="list-style-type: none"> • Confusion • Weakness • Vomiting 	<p>Ask these questions to the soldier or battle buddy:</p> <ol style="list-style-type: none"> 1. Has the soldier been eating? Check ruck for number of meals, ready to eat (MREs) remaining. (Suspect water intoxication if soldier has not been eating.) 2. Has soldier been drinking a lot? (Suspect water intoxication if soldier has been drinking constantly.) 3. How often has the soldier urinated? (Frequent urination seen with water intoxication; little urination with heat injury.) 4. What color is the urine? (Clear urine with the above symptoms may indicate overhydration.) <p>If soldier has been drinking and urinating a lot, yet has these symptoms, IMMEDIATELY call MEDEVAC or ambulance for emergency transport.</p>

b. The five steps of cold casualty risk management are 1) Identify Hazards, 2) Assess Hazards, 3) Develop Controls, 4) Implement Controls, and 5) Supervise and Evaluate.

(1) Identify Hazards.

- (a) Cold (temperature 40°F and below).
- (b) Wet (rain, snow, ice, humidity) or wet clothes.
- (c) Wind (wind speed 5 miles per hour (mph) and higher).
- (d) Lack of adequate shelter/clothes.
- (e) Lack of provisions/water.
- (f) Other risk factors:
 - Previous cold casualties (clusters of cold casualties on prior days mean high risk for today).
 - Use of tobacco/nicotine or alcohol in the last 24 hours.
 - Skipping meals.
 - Low activity.
 - Fatigue/sleep deprivation.
 - Little experience in cold weather.
 - Dehydration.
 - Minor illness (cold symptoms, sore throat, low grade fever, nausea, vomiting), injuries, or wounds.
 - Taking drugs (prescription, OTC, herbal, or dietary supplements).

- Prior history of cold injury.
- Overly motivated soldiers (e.g., overly motivated soldiers may not comply with cold casualty prevention measures).

(g) *Seriously consider taking ill soldiers, and soldiers who have consumed alcohol within 24 hours, out of training and having ill soldiers seen on sick call.*

(2) Assess Hazards.

(a) Commanders, cadre, and other responsible officers and NCOs must be familiar with environmental conditions that influence the risk of cold casualties and cold injuries (such as temperature, wind, humidity, and ground surface conditions). The wind chill chart is found in appendix B. Find the wind speed in the left-hand column, and then read across to the column under the actual temperature. This number is the equivalent temperature that would be acting on any exposed skin. Any movement has the same cooling effect as the wind. Running, skiing, or riding in an open vehicle must be considered when using the wind chill chart.

(b) Other questions to ask:

- Do individuals have adequate shelter/clothing? Is clothing clean, without holes or blemishes (which could decrease function)? Is clothing without stains (which could decrease heat retaining function of material)?
- Have meals been consumed? Are meals warm?
- Are there other circumstances?
- Contact with bare metal?
- Contact with petroleum, oil, or lubricants (POL)?
- Contact with wet materials or wet ground?
- Can soldiers move around to keep warm?
- Are feet dry and warm?
- Is the soldier with a buddy who can assist/watch over to prevent cold casualties?

(3) Develop Controls.

(a) Ensure that soldiers are issued serviceable, properly fitting clothing and footgear for cold weather. Multiple layers are designed to allow insulation to be adjusted to both the environment and activity level, so that only insulation should be used to maintain body temperature, but not sweating.

(b) Sweating degrades insulation and exacerbates heating loss.

(c) Gortex outer garments protect from wind/rain/snow, but do not allow adequate evaporation of sweat, so should not be worn during physical activity.

(d) Hand wear should be sufficient to protect from wind chill and contact cooling, while allowing dexterity to perform tasks.

(e) Use approved gloves to handle all fuel and POL.

- (f) Physical Fitness Uniform:
- Wind chill greater than 60°F: T-shirts and trunks.
 - Wind chill 51°-60°F: Add jacket.
 - Wind chill less than 50°F: Add pants, cap, and gloves.
- (g) Schedule training to fit weather conditions.
- **Main Points to Stress to Soldiers:**
 - C—keep clothing **Clean**.
 - O—avoid **Overheating**.
 - L—wear clothing **Loose** and in **Layers**.
 - D—keep clothing **Dry** as possible.
 - **Main Points to Stress to Leaders:** Follow these WIND CHILL PREVENTIVE MEDICINE MEASURES, based on wind chill temperature:
 - 30°F and below, alert personnel to the potential for cold injuries.
 - 25°F and below, leaders inspect personnel for wear of cold weather clothing. Provide warm-up tents/areas and hot beverages.
 - 0°F and below, leaders inspect personnel for cold injuries. Increase the frequency of guard rotations to warming areas. Discourage smoking.
 - -10°F and below, postpone nonessential outdoor training. For mission essential operations initiate the buddy system; have personnel check each other for cold injuries.
 - -20°F and below, modify or curtail all but mission-essential field operations.
 - **General Guidance for all Cold-Weather Training:**
 - **Skin:** Exposed skin is more likely to develop frostbite, therefore cover skin. Avoid wet skin (common around the nose and mouth). Inspect hands, feet, face, and ears frequently for signs of frostbite.
 - **Clothing:** Soldiers must change into dry clothing at least daily, and whenever clothing becomes wet, and must wash and dry feet and put on dry socks at least twice daily.
 - **Nutrition:** 4,500 calories a day per soldier, which is equivalent to 3 meal packets in meal, cold weather (MCW) or 3-4 MREs.
 - **Hydration:** 3-6 liters (canteens) a day per soldier. Warm, sweet drinks are useful for rewarming.
 - **Camouflage:** Obscures detection of cold injuries; not recommended below wind chill of 10°F.
 - **Responsibilities:** Soldiers are responsible for preventing individual cold injuries. Unit NCOs are responsible for the health and safety of their troops.
- (h) Ensure appropriate clothes and proper wearing of clothes.
- Loose and in layers.
 - Clean.
 - Ensure proper boots are worn.
 - Ensure boots are dry.

- Clothes do not have holes, broken zippers, etc.
 - Hands, fingers, and head are covered and protected.
 - Avoid spilling liquids on skin or clothes; liquid stains will reduce clothing's protective efforts.
 - Change wet/damp clothes as soon as possible (ASAP).
- (i) Keep body warm.
- Keep moving.
 - Exercise big muscles (arms, shoulders, trunk, and legs) to keep warm.
 - Avoid alcohol use (your body loses heat faster).
 - Avoid standing on cold, wet ground.
 - Avoid all tobacco products. They decrease blood flow to skin.
 - Eat all meals, to maintain energy.
 - Drink water/and or warm nonalcoholic fluids, to prevent dehydration.
- (j) Protect feet.
- Keep socks clean and dry.
 - Wash feet daily, if possible.
 - Carry extra pairs of socks.
 - Change wet or damp socks ASAP; use foot powder on feet and boots.
 - Avoid tight socks and boots; do not over tighten boots or shoes.
 - Wear overshoes to keep boots dry.
- (NOTE: TRENCH FOOT CAN OCCUR AT ANY TEMPERATURE – Always Keep Feet Warm and Dry.)
- (k) Protect hands.
- Wear gloves with inserts, or mittens with inserts.
 - Warm hands under clothes, if they become numb.
 - Avoid skin contact with snow, fuel, oil, grease, or bare metal.
 - Waterproof gloves by treating with waterproofing compounds.
- (l) Protect face and ears.
- Cover face and ears with scarf.
 - Wear insulated cap with flaps over ears or balaclava.
 - Cover face and ears with hands to warm. Do NOT rub face or ears.
 - Do not use face camouflage when wind chill is 10°F or below.
 - Wear sunscreen.
 - Exercise facial muscles.
- (m) Protect each other.
- Watch for signs of frostbite in your buddy.
 - Ask about, and assist, with rewarming of feet, hand, ears, or face.
- (n) Protect your eyes.
- Wear sunglasses to prevent snow blindness.

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- If sunglasses are not available, improvise sunglasses (slit goggles). Eye protection can be made from cutting slits in cardboard (e.g., MRE cardboard box).
- (o) Prevent carbon monoxide poisoning.
 - Post stove watch guard in tent while sleeping (fire guard).
 - Do not sleep near exhaust of a vehicle while vehicle is running.

Do not sleep in enclosed area where an open fire is burning.

(4) Implement Controls.

- (a) Identified controls are in place.
- (b) Controls are integrated into SOPs.
 - Educate soldiers of hazards and controls.
 - Use buddy system to check clothes and personal protection.
- (c) Decision to accept risk is made at appropriate level.
- (d) Maintain buddy system, to watch each other for warning signs of becoming a cold casualty.
- (e) Use lip balm (for high altitude training).
- (f) Leadership controls:
 - Discontinue or limit activities/exercise during extreme cold weather.
 - Use covered vehicles for troop transport.
 - Have warming tents available (with fire guards).
 - Have warm food and drink on hand.
- (g) Facility controls:
 - Use only Army authorized heaters (i.e., no kerosene or propane heaters).
 - Ensure heaters are in working order and adequately ventilated (post fire guards).
 - Ensure integrity of shelters, for maximum protection from the cold.

(5) Supervise and Evaluate.

- (a) Ensure all soldiers are educated about cold injuries.
- (b) Delegate responsibilities to ensure control measures have been implemented.
- (c) Monitor adequacy/progress of implementation of control measures.
- (d) Do spot checks of clothes and personal protection.
- (e) Record and monitor indicators of increasing cold risks, for example:

- Increasing number of cold injuries.
- Increased complaints/comments about cold.
- Observations of shivering, signs of frostbite.

(f) Evaluate current control measures and strategize new/more efficient ways to keep warm and avoid cold injuries.

(g) Figure 2-1 provides an overview of preventive measures, using the letters C-O-L-D. Table 2-3 shows early warning signs and symptoms of cold casualties and cold injuries.

2-6. Types of cold casualties and injuries.

a. Chilblains are localized skin changes such as redness, swelling, and itching. The skin may feel tender and burning. The most common areas to be affected are the backs of hands, toes and feet, the nose, and ears. This occurs in cold temperatures from 20° to 60°F where there is very high humidity. Treatment involves rewarming the affected areas with warm air. Keep exposed areas, such as hands and feet, covered and dry, to prevent chilblains. The face, especially around the mouth and nose, which has a tendency to become wet, should be kept as dry as possible, and covered.

<p>TO KEEP WARM, REMEMBER THE WORD C-O-L-D</p>
<p>C—Cleanliness and Care – Socks and clothing work more effectively when clean. Socks should be changed 2-3 times daily.</p>
<p>O—Overheating – Wearing too much clothing can cause overheating and excessive sweating, which makes clothes wet, and decreases insulation.</p>
<p>L—Layers and Looseness – Loose layers of clothing assure air spaces to prevent heat loss. Adjust the number of layers to both the environment and activity. Loose-fitting clothing insures circulation and insulation.</p>
<p>D—Dry – A wet garment is a cold garment. Wear the field jacket as a windbreaker, and to repel water.</p>

Figure 2-1. Preventive measures to keep warm

b. Trench/immersion foot. Immersion foot or trench foot is an injury that results from fairly long exposure of the feet to wet conditions at temperatures from approximately 32° to 50°F. Inactive feet in wet socks and boots, or tightly laced boots, impair circulation and are even more susceptible to injury. Prolonged exposure can cause the feet to swell. Feet are cold and reddish in color and have swelling, blistering, bleeding, and numbness. Signs of trench foot can include not only reddish colored feet, but can also be pale, blue, or black (depending on degree of injury). Individuals with immersion injury should elevate and rewarm their feet gradually by exposing them to warm air. Trench foot treatment can also include direct body-to-body contact. If trench foot is diagnosed early, maintaining warm, dry feet is an effective treatment. Do not moisten, massage, or apply heat or ice to feet with immersion injuries. Covering the patient with

several layers of warm coverings is preferable to using extreme heat. Evacuate patients as soon as possible.

c. Frostbite. Frostbite is injury to tissue caused from exposure to below freezing temperatures. Severe frostbite can result in loss of affected body parts such as fingers, toes, hands, or feet. Frostbite starts with a discoloration of the skin of the nose, ears, cheeks, fingers, or toes. This is followed by a tingling sensation for a short time and then numbness. The skin may briefly appear red for light skinned individuals, or grayish for dark skinned individuals, and then become pale or waxy white. Upon thawing, the signs vary with the degree of injury. Mild to moderate frostbite injury appears red and swollen, has blisters, and is painful. Severe frostbite injuries have blue-black discoloration, blood-filled blisters, and an absence of pain. Remove tight clothing or boots from the injured area. Warm the frozen body part by placing it next to the skin of another person. Keep the victim warm and covered to prevent further injury. Do not massage, expose to open fire, rub with snow, or soak injuries in cold water. Frozen tissue should only be thawed if there is no chance that it will refreeze. Thaw and refreezing cycles cause significantly greater damage. Evacuate the victim to a medical treatment facility ASAP.

Table 2-3
Warning signs and symptoms of cold casualties and cold injuries

<p style="text-align: center;"><u>Early Signs/Symptoms</u></p>	<p style="text-align: center;"><u>Actions</u></p>
<ul style="list-style-type: none"> • Itching, tender skin (chilblain). • Swollen, red, or darkened skin (chilblain). • Tingling, burning, blistered, swollen areas (early frostbite). • Cold numb feet with swelling and redness (immersion foot). • Weakness and dizziness (dehydration). 	<ul style="list-style-type: none"> • Remove from training. • Prevent further exposure. • Remove wet or constrictive clothing. • Rewarm slowly and provide warm, sweet drinks. • Elevate feet, cover, dry, and rewarm. • Do not allow victim to walk on injured feet. • While doing the above, call for medic evaluation of the soldier. • If no Medic is available, call ambulance or MEDEVAC.
<p style="text-align: center;"><u>Later Signs/Symptoms</u></p> <ul style="list-style-type: none"> • Vigorous shivering, slurred speech and poor memory (hypothermia). • No shivering with drowsiness, confusion, disorientation, and amnesia (severe hypothermia). • Numb, gray, or waxy skin (advanced frostbite). • Frozen tissue that feels wooden to touch (advanced frostbite). • Swollen, red, and bleeding feet (trench foot). • Unconscious. 	<p style="text-align: center;"><u>Immediate Actions</u></p> <p>Hypothermia is the most serious of cold exposure emergency. Immediately call for MEDEVAC or ambulance for emergency transport while doing the following:</p> <ul style="list-style-type: none"> • Strip off wet or constrictive clothing, and wrap victim in warm blankets. • Evacuate frostbite; do not rewarm if evacuation is not possible. • Rewarm frostbite gradually by direct skin-to-skin contact; rewarm trench foot with warm air. • Do not allow injury to refreeze during evacuation. • Monitor airway and breathing until MEDEVAC or ambulance has arrived.

d. Hypothermia. Hypothermia is a state in which core temperature is below normal because an individual is losing heat faster than they can produce it. The body cools to a temperature below 95°F during continued exposure to low or rapidly dropping temperatures, rain, snow, or ice. Hypothermia can also occur in seemingly mild conditions (e.g., 60°F air with heavily falling rain, as the rain degrades the clothing insulation and increases cooling). As the body cools, the following progressive stages of discomfort and impairment occur: shivering; faint pulse; mental confusion; slurred speech; glossy eyes; slow, shallow breathing; uncoordinated movements; unconsciousness; and irregular heart beat. HYPOTHERMIA IS A MEDICAL EMERGENCY AND PROMPT MEDICAL TREATMENT IS NECESSARY. Shivering is an effective means of raising body temperature. Heating just the skin with an external heat device can blunt both shivering and rewarming, so heating should be applied to armpits and groin. Immediate treatment for all casualties must include calling for MEDEVAC or ambulance, rapidly removing wet garments, applying blankets and available insulating equipment, maintaining the horizontal position, and avoiding rough movement and excess activity. Responsiveness, breathing, and pulse must be assessed. Pulse and breathing can be difficult to detect. However, if casualty is not breathing, rescue breathing must be started immediately without hesitation.

2-7. Evacuation. Commanders must establish a liberal policy of evacuation of injured personnel to the nearest medical treatment facility. Ensure medical support is available for treatment of heat and cold casualties.

a. Consider establishing means for emergency communication with medical facilities at all training sites (e.g., phone, cell phone, etc.).

b. Consider ambulance at training site for rapid evacuation to medical facility.

2-8. Reporting injuries. All heat and cold casualties and injuries of heat exhaustion, heat stroke, trench foot/immersion foot, frostbite, or hypothermia must be reported to Installation Safety. The report may be submitted on DA Form 285, or on a form specified by local Installation Safety policy. The Safety Office is responsible for ensuring that the Preventive Medicine Division receives a copy of the report for entering into the DoD Reportable Medical Events System. Commanders must furnish a copy of the injury report to Commander, TRADOC, ATTN: ATMD, 11 Bernard Road, Fort Monroe, VA 23651-1001.

Appendix A References

Section I Required Publications

Army Regulation 40-25
Nutrition Standards and Education

TRADOC Regulation 385-2

TRADOC Reg 350-29

TRADOC Safety Program

Section II Related Publications

Army Regulation 40-5
Preventive Medicine

Field Manual 4-02.17
Preventive Medicine Services

Field Manual 4-25.11
First Aid

Field Manual 4-25.12
Unit Field Sanitation Team

Field Manual 21-10
Field Hygiene and Sanitation

Field Manual 31-70
Basic Cold Weather Manual

GTA 05-08-012
Individual Safety Card

TB Med 81
Cold Injury (under revision, to be released as TB Med 508)

TB Med 507
Heat Stress Control and Heat Casualty Management

US Army Research Institute of Environmental Medicine Technical Note 02-2
Sustaining Health and Performance In Cold Weather Operations

TRADOC Regulation 350-6
Initial Entry Training (IET) Policies and Administration

Part III Referenced Form

DA Form 285
U.S. Army Accident Report

Appendix B Leadership Handouts

B-1. TRADOC Surgeon's Heat Risk Manual.

Commanders', Senior NCOs', and Instructors' Guide to Risk Management of Heat Casualties

Risk Management is the process of identifying and controlling hazards to protect the force.

Possible Outcomes of Inadequate Climatic Heat Management:

Casualty	Risk Severity
Heat Cramps	Marginal
Heat Exhaustion	Critical
Heat Stroke	Critical-Catastrophic
Water Intoxication (Overhydration)	Critical-Catastrophic

The five steps of risk management are:

1. Identify Hazards.

High heat category, especially on several sequential days (measure WBGT when ambient temperature is over 75° F).

Exertional level of training, especially on several sequential days.

Acclimatization (and other individual risk factors – see below)

Time of exposure - to include nights - and recovery time.

Individual Risks for Heat Casualties

(The more factors, the higher the risk)

- Not acclimatized to heat (need 10-14 days to get trainees adequately acclimated).
- Exposure to cumulative days (2-3 days) of any of the following:
 - Increased heat exposure.
 - Increased exertional levels.
 - Lack of quality sleep.
- Overweight.
- Minor illness (cold symptoms, sore throat, low grade fever, nausea, vomiting).
- Taking medications (either prescribed or OTC, e.g., allergy or cold remedies).
- Supplements/dietary aids (e.g., Ephedra).
- Use of alcohol in the last 24 hours.
- Prior history of heat illness (any heat stroke, or >2 episodes of heat exhaustion).
- Skin disorders, such as heat rash and sunburn, which prevent effective sweating.
- Age > 40 years.
- Overly motivated soldiers.

2. Assess Hazards.

- When ambient temperature is over 75°F, constantly assess the **heat category** using WBGT in the immediate vicinity, on an hourly basis.
- Know your soldiers! Identify early who will be at increased risk based on **individual risk factors**.
- Check **hydration status** at the end of each training day. Give extra fluid at night and in the morning, if hydration is inadequate.
- Review Riley (water) Card or Ogden Cards.
- Ask about urine color. Urine is clear if well hydrated.
- Daily **assess the overall risk** for developing a heat casualty (may use a risk matrix).

Example of a Heat Injury Risk Management Matrix

Risk Factors	Level of Risk (For each factor, circle the appropriate condition)			
	0	1	2	3
Risk Management Worksheet	All control measures implemented			Not all control measures implemented
Heat (WBGT at site)	Less than Category 1	Category 1	Category 2 - 3	Category 4 - 5
Number of Sequential Days Heat Category 5	0	1	2-3	>4
Any Heat Injuries in the Past Two Days	None	Heat Cramps	Heat Exhaustion	Heat Stroke
Work in Past Two Days (see below)	Easy	Easy or Moderate	Moderate or Hard	Hard
Projected Work for the Present	Easy	Easy or Moderate	Moderate or Hard	Hard
Heat Acclimatization Days	>13	7-13	3-6	<3
Leader/Cadre Presence	Full Time	Substantial	Minimal	None
Length of Duty Time of Cadre	18 Months	7-18 Months	1-6 Months	< 1 Month
Communication System	Radio and Phone	Phone Only	Radio Only	None
Rest in Previous 24 Hours	> 7 Hours	5-7 Hours	2-4 Hours	< 2 Hours

Scores assigned to different conditions based on risk for developing a heat injury (0= Low risk; 1=Medium risk, 2=High risk; 3=Extreme risk). A cumulative score of 25-33 means extreme risk, 16-24 means high risk, 7-15 means medium risk, and 0-7 means low risk. For cumulative scores of 11 or higher, need 91W support.

Easy Work	Moderate Work	Hard Work
<ul style="list-style-type: none"> • Weapon maintenance. • Walking hard surface at 2.5 mph, > 30 lb load. • Marksmanship training. • Drill and Ceremony. 	<ul style="list-style-type: none"> • Walking loose sand at 2.5 mph, no load. • Walking hard surface at 3.5 mph, > 40 lb load. • Calisthenics. • Patrolling. • Individual movement techniques, i.e., low crawl, high crawl, etc. 	<ul style="list-style-type: none"> • Walking hard surface at 3.5 mph, > 40 lb load. • Walking loose sand at 2.5 mph, with load. • Field assaults.

3. Develop Controls.

--Educate.

- Establish SOPs. Ensure all personnel are trained and follow SOPs for heat casualty prevention.
- Ensure all bulletin boards have heat casualty prevention posters, and all leaders have heat casualty prevention aids.

--Plan.

- Adjust the training schedule to minimize consecutive days of heavy PT, especially if other heat stressors exist (e.g., heat exposure and lack of quality sleep).
- Plan communications, medical, and evacuation support.
- Plan and provide adequate hydration for *all* personnel (including cadre and drill instructors).
- When planning training events, keep in mind:
 - [Time of day the training is conducted](#) - morning is cooler.
 - [Location of training](#).
 - Sun vs. shade.
 - Open vs. protection from wind - wind has cooling effect.
 - [Clothing](#) (heavy, restrictive vs. loose, lightweight).
 - [Where in training cycle](#).
 - Most Heat Casualties occur in the 2nd or 3rd week of recruit training.
 - Acclimatization can take 10-14 days, depending on the physical condition of the trainee.

--Identify high-risk soldiers by marking visibly on uniform with tape or chord.

- Identify previous heat exhaustion or heat stroke soldiers.
- Identify overweight soldiers.
- Identify soldiers on medications.
- Seriously consider taking soldiers out of training who have had alcohol within the last 24 hours. Seriously consider having ill soldiers seen on sick call.

--Note and document heat category hourly when ambient temperature is 75°F or above. Position WBGT at site of training.

--Develop a Hydration Monitoring System. Examples of monitoring methods:

- [Riley \(water\) card](#) (Note: Only for use during training with work/rest cycles. Not for use during continuous training without work/rest cycles.)
- [Ogden Cord](#) is 550 cord, parachute cord, or shoestring that is tied to a uniform buttonhole or ear protection case. Soldiers tie a knot in the cord each time they finish a canteen (1 qt) of water.

WATER CONSUMPTION TABLE			
Heat Category	Easy Work	Moderate Work	Hard Work
	Amount to Drink Qt/Hr (one canteen = 1QT)		
1	½	¾	¾
2	½	¾	1
3	¾	¾	1
4	¾	¾	1
5	1	1	1

Do not drink more than 1½ qts per hour or 12 qts per day.
Eat meals! Important for sodium and other electrolytes.

Name:							
Time	Mon	Tue	Wed	Thur	Fri	Sat	Sun
0500-0600							
0600-0700							
0700-0800							
0800-1000							
1000-1100							
1100-1200							
1200-1300							
1300-1400							
1400-1500							
1500-1600							
1600-1700							
1700-1800							
1800-1900							
1900-2000							
2000-2100							
2100-2200							



On the back of card: (Battle buddy is to write the amount of water the soldier has drunk).

Riley (water) card

Ogden Cord

Know Standardized Guidelines for Warm Weather Training Conditions
Work/Rest/Water Consumption Guide (IAW GTA 05-08-012)

Acclimatized (after approx two weeks training) Wearing BDU, Hot Weather

Heat Category	WBGT Index, (F°)	Easy Work		Moderate Work		Hard Work	
		Work/Rest	Water Intake (Qt/h)	Work/Rest	Water Intake (Qt/h)	Work/Rest	Water Intake (Qt/h)
1	78-81.9	NL	½	NL	¾	40/20 min	¾
2 (Green)	82-84.9	NL	½	50/10 min	¾	30/30 min	1
3 (Yellow)	85-87.9	NL	¾	40/20 min	¾	30/30 min	1
4 (Red)	88-89.9	NL	¾	30/30 min	¾	20/40 min	1
5 (Black)	> 90	50/10 min	1	20/40 min	1	10/50 min	1

Easy Work = Walking hard surface 2.5 mph <30 lb load, weapon maintenance, marksmanship training.

Moderate Work = Patrolling, walking sand 2.5 mph, no load, calisthenics.

Hard Work = Walking sand 2.5 mph with load, field assaults.

NL= no limit to work time per hour.

Rest = minimal physical activity (sitting or standing), accomplished in shade, if possible.

NOTE: The work/rest times and fluid replacement volumes will sustain performance and hydration for at least 4 hours of work in the specified heat category. Fluid needs can vary based on individual differences (± ¼ qt/hour) and exposure to full sun or full shade (±¼ qt/hour). **CAUTION:**

- Hourly fluid intake should not exceed 1½ qts.
- Daily fluid intake **should not exceed 12 qts.**
- If wearing body armor, add **5°F** to WBGT in humid climates.
- If wearing NBC clothing (MOPP 4) add **10°F** to WBGT.

Continuous Work/Water Consumption Guide (without rest)

Acclimatized (after approx two weeks training) Wearing BDU, Hot Weather

It is assumed the trainees performing these continuous effort tasks have not had heat stress or dehydration prior to this activity, and will have extended rest afterwards!

Heat Category	WBGT Index, (F°)	Easy Work		Moderate Work		Hard Work	
		Work (min)	Water Intake (Qt/h)	Work (min)	Water Intake (Qt/h)	Work (min)	Water Intake (Qt/h)
1	78-81.9	NL	½	NL	¾	70	1
2 (Green)	82-84.9	NL	½	150	1	65	1 ¼
3 (Yellow)	85-87.9	NL	¾	100	1	55	1 ¼
4 (Red)	88-89.9	NL	¾	80	1 ¼	50	1 ¼
5 (Black)	> 90	180	1	70	1 ½	45	1 ½

4. Implement Controls.

--Decision to accept risk is made IAW TRADOC Reg 385-2, para 1-5c(4).

--Identified controls are in place.

- Update WBGT hourly.
- Adhere to work/rest cycle in high heat categories. Rest in shade.
- Space out soldiers in formations during runs. (This is very effective to allow individual heat dissipation during runs.)
- For tasks requiring continuous effort, adhere to guideline and allow extended rest afterwards.
- Training event incorporates good prior planning.

--Monitor and enforce hydration standard.

- Encourage frequent drinking, but not to exceed 1½ qt per hour or 12 qts per day. Make water more palatable, if possible, by cooling.
- Do not allow soldiers or trainees to empty canteens to lighten load (consider imposing a penalty in timed events).
- Ensure soldiers are well hydrated before training. Ask about urine; urine is clear if well hydrated.
- Check Riley (water) card or Ogden Cord frequently.

--Monitor and enforce eating of meals.

- Ensure all meals are eaten during the meal break.
- Ensure adequate time to eat and drink meals.
- Table salt may be added to food when the heat category is high. Salt tablets are not recommended.

--Execute random checks.

- Spot checks by cadre, senior NCOs, and drill instructors.
- Enforce battle buddy checks – need to be aware of each other’s eating, drinking, and frequency of urination.
- Plan placement of leaders to observe and react to heat casualties in dispersed training.

--Follow clothing recommendations:

- Heat category 1-2: no restrictions.
- Heat category 3: Unblouse trouser legs, unbuckle web belt.
- Heat category 4-5: Unblouse trouser legs, unbuckle web belt.

TRADOC Reg 350-29

- Remove t-shirt from under BDU top or remove BDU top down to t-shirt (depends whether biting insects are present).
- Remove helmets unless there are specific safety reasons to keep them on.
- MOPP 4: add 10°F to WBGT.
- Body Armor: add 5°F to WBGT.

Have soldiers take cold showers after moderate and heavy work, with category 3 and above, at the end of the day. (This will minimize cumulative thermal load.)

5. Supervise & Evaluate.

- Enforce SOPs.
- Delegate responsibilities to ensure control measures have been implemented.
- Monitor adequacy/progress of implementation of control measures.
- Conduct spot checks of cadre. Do cadre have current WBGT? Are cadres implementing work/rest/drink cycles? Make on-the-spot corrections. Lead by example.
- Conduct spot checks of recruits. Ask recruits questions while observing their mental status and physical capabilities. Look out for common signs and symptoms, which can rapidly progress to serious signs and symptoms.
- Reevaluate training mission if two or more heat casualties occur.
- When controls fail, heat injuries occur. The ability to recognize heat injury is paramount. Take immediate action if any heat injuries are observed or suspected. Stop-rest-cool, then evaluate in accordance with warning signs and symptoms. If in doubt, evacuate.

Warning Signs and Symptoms of Heat Casualty and Water Intoxication

Indications of Possible Heat Casualty	
<p>More Common Signs/Symptoms:</p> <ul style="list-style-type: none"> • Dizziness. • Headache. • Nausea. • Unsteady walk. • Weakness. • Muscle cramps. 	<p>Immediate Actions:</p> <ul style="list-style-type: none"> • Remove from training. • Allow casualty to rest in shade. • Take sips of water. • While doing the above, call for medic evaluation of the soldier (Medic will monitor temperature and check for mental confusion). • If no medic is available, call for ambulance or MEDEVAC. Ensure same trainer keeps monitoring the casualty.
<p>Serious Signs/Symptoms:</p> <ul style="list-style-type: none"> • Hot body, high temperature. • Confusion (Mental Status Assessment). • Vomiting. • Involuntary bowel movement. • Convulsions. • Weak or rapid pulse. • Unresponsiveness, coma. • Hyperventilating. 	<p>Immediately call MEDEVAC or ambulance for emergency transport while doing the following:</p> <ul style="list-style-type: none"> • Lay person down in shade, with feet elevated, until MEDEVAC or ambulance arrives. • Undress as much as possible. • Aggressively apply ice packs or ice sheets. • Pour cold water on casualty and fan. • Give <u>sips</u> of water while awaiting ambulance (if conscious). • Monitor airway and breathing until ambulance or MEDEVAC arrives. • Continue cooling during transport, or until body reaches 100°F.

Indications of possible Water Intoxication (Overhydration)

Signs and Symptoms: Confusion, Weakness, Vomiting.

What to do:

Ask these questions to the soldier or battle buddy:

- Has soldier been eating? Check rucksack for # of MREs left. (Suspect water intoxication if soldier had not been eating.)
- Has soldier been drinking a lot? (Suspect water intoxication if soldier has been drinking constantly.)
- How often has soldier urinated? (Frequent urination seen with water intoxication; infrequent urination with heat illness.)
- What color is urine? (Clear urine may indicate overhydration.)

If soldier has been drinking and urinating a lot, yet has these symptoms, **immediately call MEDEVAC or ambulance for emergency transport.**

Mental Status Assessment:

An important sign that the soldier is in a **serious life-threatening** condition is the presence of mental confusion (with or without increased temperature). Anyone can do a mental status assessment by asking some simple questions.

Call for emergency MEDEVAC or ambulance if *any* of the following exist:

What is your name?

(Does not know their name.)

What month is it? What year is it?

(Does not know the month or year.)

Where are we/you?

(Does not know where they are.)

What were you doing before you became ill?

(Does not know the events that led to the present situation.)

Hot Weather Casualties and Injuries Chart

- Train commanders and soldiers on heat injury prevention and heat risk assessment.
- Remember the acronym **H-E-A-T** when training in hot weather (**H**: heat category; **E**: exertion level; **A**: acclimatization; **T**: time of exposure-to include nights-and recovery time).
- Follow recommended fluid replacement guidelines and ensure nutritional requirements are met.

Hot Weather Injuries and Casualties			
Sunburn			
Cause:	Symptoms:	First-Aid:	Prevention:
<ul style="list-style-type: none"> • Excessive loss of salt from body due to excessive sweating. • Not acclimatized to hot weather. 	<ul style="list-style-type: none"> • Red, hot skin. • May blister. • Moderate to severe pain. • Can result in fever. 	<ul style="list-style-type: none"> • Move to shade; loosen clothing if necessary. • Apply cold compress or immerse in cool water. • Apply moisturizing lotion to affected areas. • Hydrate with fluids. • Administer analgesics for pain or fever. • Do not break blisters. 	<ul style="list-style-type: none"> • Adequate sun protection. • Use sunscreen liberally and apply often, especially when sweating excessively. • Select SPF 15 or higher. • Proper wear of clothing, cap.
Heat Rash (Prickly Heat)			
Cause:	Symptoms:	First-Aid:	Prevention:
<ul style="list-style-type: none"> • Restrictive clothing. • Excessive sweating. • Inadequate hygiene. • Causes heat intolerance if 20% of skin affected. 	<ul style="list-style-type: none"> • Red, itchy skin. • Bumpy skin due to blocked pores. • Moderate to severe itching. • Can result in infection. 	<ul style="list-style-type: none"> • Apply cold compress, or immerse in cool water. • Keep area affected dry. • Control itching and infection with prescribed medications. 	<ul style="list-style-type: none"> • Proper wear of clothing. • Shower (nude) after excessive sweating.
Heat Cramps			
Cause:	Symptoms:	First-Aid:	Prevention:
<ul style="list-style-type: none"> • Excessive loss of salt from body due to excessive sweating. • Not acclimatized to hot weather. 	<ul style="list-style-type: none"> • Painful skeletal muscle cramps or spasms. • Mostly affects legs and arms. 	<ul style="list-style-type: none"> • Replace salts. • Sit quietly in the shade or cool area. • Massage affected muscle. • Drink oral rehydration package or sports drink. • Drink 0.05 to 0.1% salt solution (add ¼ of MRE salt packet to 1 qt canteen). • Get medical evaluation if cramps persist. 	<ul style="list-style-type: none"> • Eat all meals to replace salt. • Consume salt-supplemented beverages if adequate meals have not been consumed prior to prolonged periods of heavy sweating. • Ensure adequate heat acclimatization.

<u>Heat Exhaustion</u>			
Cause:	Symptoms:	First-Aid:	Prevention:
<ul style="list-style-type: none"> • Body fatigue and strain on heart due to overwhelming heat stress. • Dehydration (see below). • Inadequate acclimatization. • Inadequate physical fitness for the work task. • Most common exertional heat illness. 	<ul style="list-style-type: none"> • Dizziness. • Fatigue. • Weakness. • Headache, nausea. • Unsteady walk. • Rapid pulse. • Shortness of breath. 	<ul style="list-style-type: none"> • Initiate active cooling by best means available. • Move to shade and loosen clothing. • Lay flat and elevate feet. • Pour cold water over casualty and fan for cooling effect, or use ice sheets around neck, axilla, and groin, if available. • Monitor with the same (one) instructor or supervisor. • Assess soldier's mental status several times. • Have soldier slowly drink one full canteen (qt) of cool water every 30 minutes with a maximum of 2 canteens. • Call for medic evaluation of the casualty. • If no medic available, call for ambulance or MEDEVAC. 	<ul style="list-style-type: none"> • Allow for acclimatization. • Monitor WBGT. • Keep soldiers in shade whenever possible. • Follow water replacement guides. • Observe work-rest cycles. • Identify high-risk individuals. • Maintain buddy system. • Eat all meals in garrison and field. • Do not take dietary supplements. • Modify uniform accordingly. • Teach early recognition of symptoms. • Recognize cumulative effect of sequential hot days. • Reevaluate training mission if several mild heat injuries occur.

Heat Stroke			
Cause:	Symptoms:	First-Aid:	Prevention:
<ul style="list-style-type: none"> • Prolonged exposure to high temperatures. • Cumulative heat stress due to repetitive activity in hot environment. • Failure of body's cooling mechanisms. • Prolonged and overwhelming heat stress. • Predisposing factors such as sickness, poor health, or certain medications. 	<ul style="list-style-type: none"> • Any of above symptoms, but more severe. • Nausea, vomiting. • Altered mental status with agitation, confusion, delirium, and disorientation. • Elevated temperature, usually above 104°F. Can progress to loss of consciousness, coma, and seizures. 	<ul style="list-style-type: none"> • This is a medical emergency and can lead to death! • Evacuate soldier to a medical facility immediately! • Begin cooling aggressively. Body temperature that does not go below 100°F with active cooling or ANY mental status changes calls for immediate evacuation. • Initiate measures for heat exhaustion. • Aggressively apply ice packs or iced sheets. • Pour cold water over casualty and fan. • Assess soldier's mental status several times. • If conscious, give sips of cool water while waiting for evacuation or ambulance. • Do not give water to unconscious soldier. • If possible, measure body temperature. • Monitor airway and breathing. If medic or combat lifesaver is present, start intravenous fluids but limit to 500 milliliters normal saline or lactated ringer's. • Continue cooling process during transport (until body temperature reaches 100°F or shivering starts). 	<ul style="list-style-type: none"> • Follow measures for heat exhaustion. • Plan medical support for heat intensive operations. • Ensure appropriate evacuation capabilities available. • Ensure preventive medicine personnel and measures are in place.

Additional Medical Considerations in the Hot Weather Environment:			
Dehydration			
Cause:	Symptoms:	First-Aid:	Prevention:
Depletion of body fluids and possibly salt.	<ul style="list-style-type: none"> • Dizziness. • Weakness and fatigue. • Rapid pulse. 	<ul style="list-style-type: none"> • Replace lost water and salt. • Water should be sipped, not gulped. • Get medical treatment. 	<ul style="list-style-type: none"> • Drink 3-6 qts of fluid per day. • Follow fluid replacement guidelines. • Consume full meals and drink at mealtime. • Do not take dietary supplements.
Overhydration (Hyponatremia)			
Cause:	Symptoms:	First-Aid:	Prevention:
<ul style="list-style-type: none"> • Over hydration or water intoxication. • Decreased meals or dieting. • Loss of body salt. • Misdiagnosis and treatment for dehydration. 	<ul style="list-style-type: none"> • Confusion. • Weakness. • Nausea, vomiting. 	<ul style="list-style-type: none"> • Replace salt loss. • Follow measures for heat exhaustion. • If symptoms persist, or become more severe with rehydration, immediate evacuation. 	<ul style="list-style-type: none"> • Follow fluid replacement guidelines. • Replace lost salt by consuming meals and sports drinks, as directed. • Provide snacks or carbohydrate electrolyte beverage during long training events. • Do not take dietary supplements.

B-2. TRADOC Surgeon’s Cold Risk Manual.

Unit Leaders' and Instructors' Risk Management Steps for Preventing Cold Casualties

Risk Management is the process of identifying and controlling hazards to protect the force.

Possible Outcomes of Inadequate Climatic Cold

- **Chilblain** (due to bare skin exposed to cold, humid air).
- **Immersion Foot (Trench Foot)** (due to wet feet).
- **Frostbite.**
- **Hypothermia** (whole body temperature dangerously low).
- **Dehydration.**
- **Snow Blindness.**
- **Carbon Monoxide Poisoning.**

The five steps of risk management are:

1. Identify Hazards.

- Cold (temperature 40°F and below).
- Wet (rain, snow, ice, humidity) or wet clothes.
- Wind (wind speed 5 mph and higher).
- Lack of adequate shelter/clothing.
- Lack of provisions/water.

Other risk factors include:

- Previous cold injuries or other significant injuries.
- Use of tobacco/nicotine or alcohol.
- Skipping meals/poor nutrition.
- Low activity.
- Fatigue/sleep deprivation.
- Little experience/training in cold weather.
- Cold casualties in the previous 2-3 days.
- Overly motivated soldiers.

2. Assess Hazards.

Follow the Wind Chill Temperature Table to determine the danger level.

Do individuals have adequate shelter/clothing?

Are clothes clean without stains, holes, or blemishes (which could decrease heat-retaining function)?

Have meals been consumed?

Are meals warm?

Are there other circumstances?

- Is there contact with bare metal or fuel, petroleum, oils, or lubricants?
- Is the environment wet? Is there contact with wet materials or wet ground?
- Can soldier move around to keep warm?
- Are feet dry and warm?
- Is the soldier with a buddy who can assist/watch over to prevent cold injuries?

Using the Wind Chill Temperature Table.

The wind chill index (see table below) gives the equivalent temperature of the cooling power of wind on exposed flesh.

- Any movement of air has the same effect as wind (running, riding in open vehicles, or helicopter downwash).
- Any dry clothing (mittens, scarves, masks) or material that reduces wind exposure will help protect the covered skin.

Trench foot injuries can occur at any point on the wind chill chart and—

- Are much more likely to occur than frostbite at “LITTLE DANGER” wind chill temperatures, especially on extended exercises/missions and/or in wet environments.
- Can lead to permanent disability, just like frostbite.

Wind Chill Temperature Table

Wind Speed (mph) ↓	Air Temperature (°F)																	
	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
0	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95

GREEN LITTLE DANGER (frostbite occurs in >2 hours in dry, exposed skin)
YELLOW INCREASED DANGER (frostbite could occur in 45 minutes or less in dry exposed skin)
RED GREAT DANGER (frostbite could occur in 5 minutes or less in dry, exposed skin)

Wind Chill Category (see Wind Chill Temperature Table above)

Work Intensity	Little Danger	Increased Danger	Great Danger
High Digging foxhole, running, marching with rucksack, making or breaking bivouac.	Increased surveillance by small unit leaders; Black gloves optional - mandatory below 0°F (-18°C).	ECWCS* or equivalent; mittens with liners; no facial camouflage; exposed skin covered and kept dry; rest in warm, sheltered area; vapor barrier boots below 0°F (-18°C); provide warming facilities.	Postpone nonessential training; essential tasks only with <15 minute exposure; work groups of no less than 2; cover all exposed skin, provide warming facilities.
Low Walking, marching without rucksack, drill and ceremony.	Increased surveillance; cover exposed flesh, when possible; mittens with liner and no facial camouflage below 10°F (-12°C); full head cover below 0°F (-18°C). Keep skin dry, especially around nose and mouth.	Restrict nonessential training; 30-40 minute work cycles with frequent supervisory surveillance for essential tasks. See above.	Cancel outdoor training.
Sedentary Sentry duty, eating, resting, sleeping, clerical work.	See above; full head cover and no facial camouflage below 10°F (-12°C); cold-weather boots (vapor barrier) below 0°F (-18°C); shorten duty cycles; provide warming facilities.	Postpone nonessential training; 15-20 minute work cycles for essential tasks; work groups of no less than 2 personnel; no exposed skin.	Cancel outdoor training.

*ECWCS – Extended Cold Weather Clothing System

Note: These guidelines are generalized for worldwide use. Commanders of units with extensive extreme cold-weather training and specialized equipment may opt to use less conservative guidelines.

3. Develop Controls.

Main Points to Stress to Soldiers:

C-O-L-D

When using Cold-Weather Clothing, Remember . . .

Keep it.....	C lean
Avoid.....	O verheating
Wear it.....	L oose in layers
Keep it	D ry

Main Points to Stress to Leaders:

Follow these Wind Chill Preventive Medicine Measures Based on Wind Chill Temperature:

- 30°F and below** Alert personnel to the potential for cold injuries.
- 25°F and below** Leaders inspect personnel for wear of cold weather clothing. Provide warm-up tents/areas/hot beverages.
- 0°F and below** Leaders inspect personnel for cold injuries. Increase the frequency of guard rotations to warming areas. Discourage smoking.
- 10°F and below** Postpone nonessential outdoor training. For mission essential operations, initiate the buddy system. Have personnel check each other for cold injuries.
- 20°F and below** Consider modifying or curtailing all but mission-essential field operations.

NOTE: Trench Foot can occur at any temperature - Always Keep Feet Warm.

General Guidance for all Cold-Weather Training:

Skin: Exposed skin is more likely to develop frostbite, therefore, cover skin. Avoid wet skin (common around the nose and mouth). Inspect hands, feet, face, and ears frequently for signs of frostbite.

Clothing: Soldiers must change into dry clothing at least daily and whenever clothing becomes wet. Soldiers must wash and dry feet, and put on dry socks, at least twice daily.

Nutrition: 4500 calories/day/soldier. (Equivalent to 3 meal packets in meal, cold weather (MCW) or 3-4 MREs.)

Hydration: 3-6 liters (canteens)/day/soldier. Warm, sweet drinks are useful for rewarming.

Camouflage: Obscures detection of cold injuries; consider not using below wind chill of 32° F; not recommended below wind chill of 10°F.

Responsibilities: Soldiers are responsible for preventing individual cold injuries. Unit NCOs are responsible for the health and safety of their troops.

Cold injury prevention is a command responsibility.

Personal Protection

Ensure Appropriate Clothes and Proper Wearing of Clothes:

- Wear clothing loose and in layers.
- Ensure all clothing is clean.
- Ensure proper boots are worn and are dry.
- Ensure clothes do not have holes, broken zippers, etc.
- Ensure hands, fingers, and head are covered and protected.
- Avoid spilling liquids on skin or clothes. Liquid stains will reduce clothing's protective efforts.
- Change wet, damp clothes ASAP.

Keep Body Warm:

- Keep moving.
- Exercise big muscles (arms, shoulders, trunk, and legs) to keep warm.
- Avoid alcohol use (alcohol impairs the body's ability to shiver).
- Avoid standing on cold, wet ground.
- Avoid all tobacco products (they decrease blood flow to skin).
- Eat all meals to maintain energy.
- Drink water or warm nonalcoholic fluids to prevent dehydration.

Protect Feet:

- Keep socks clean and dry.
- Wash feet daily, if possible.
- Carry extra pairs of socks.
- Change wet or damp socks ASAP; use foot powder on feet and boots.
- Avoid tight socks and boots; do not over-tighten boots or shoes.
- Wear overshoes to keep boots dry.

Protect Hands:

- Wear gloves, mittens, or gloves/mittens with inserts.
- Warm hands under clothes if they become numb.
- Avoid skin contact with snow, fuel, or bare metal. Wear proper gloves when handling fuel or bare metal.
- Waterproof gloves by treating with waterproofing compounds.

Physical Fitness Uniform:

- Wind Chill >60°F: T-shirt and trunks.
- Wind Chill 51°-60°F: Add jacket.
- Wind Chill <50°F: Add pants, cap, and gloves.

Personal Protection (continued)

Protect Face and Ears:

- Cover face and ears with scarf. Wear insulated cap with flaps over ears or balaclava.
- Warm face and ears by covering them with your hands. Do NOT rub face or ears.
- Consider not using face camouflage when wind chill is 32° F or below. Also not recommended below 10° F.
- Wear sunscreen.
- Exercise facial muscles.

Protect Your Eyes:

- Wear sunglasses to prevent snow blindness.
- If sunglasses are not available, protective slit goggles can be made from cutting slits in cardboard (e.g., MRE cardboard box).

Protect Each Other:

- Watch for signs of frostbite and other cold weather injuries in your buddy.
- Ask about and assist with rewarming of feet, hand, ears, or face.

Prevent Carbon Monoxide Poisoning:

- Use only Army-approved heaters in sleeping areas. (Post fire guards.)
- Do not sleep near exhaust of a vehicle while vehicle is running.
- Do not sleep in enclosed area where an open fire is burning.

Leadership Controls

- Discontinue/limit activities/exercise during very cold weather (see Wind Chill Category chart).
- Use covered vehicles for troop transport.
- Have warming tents available (with fire guards).
- Have warm food and drink on hand.

Facility Controls

- Use only Army-authorized heaters (i.e., no kerosene or propane heaters).
- Ensure heaters are in working order and adequately ventilated.
- Ensure integrity of shelters for maximum protection from the cold.

4. Implement Controls.

- Identified controls are in place.
- Controls are integrated into SOPs.
- Educate soldiers of hazards and controls (including newly arrived soldiers).
- Implement buddy system to check clothes/personal protection.
- Decision to accept risk is made at appropriate level.

- Buddy system to check each other.
- Self checks.
- Lip balm (for high altitude training).

5. Supervise and Evaluate.

- Ensure all soldiers are educated about prevention, recognition, and treatment of cold weather injuries.
- Delegate responsibilities to ensure control measures have been implemented.
- Monitor adequacy/progress of implementation of control measures.
- Do frequent spot checks of clothes, personal protection, and hydration.
- Record and monitor indicators of increasing cold risks, for example:
 - Increasing number of cold weather injuries.
 - Increased complaints/comments about cold.
 - Observations of shivering, signs of cold weather injuries.
- Evaluate current control measures and strategize new or more efficient ways to keep warm and avoid cold injuries.

See <http://www.tradoc.army.mil/surgeon/index.htm> for electronic versions of this document and other resources.

Cold Weather Casualties and Injuries Chart

- Train soldiers on the proper use of cold weather clothing.
- Remember the acronym C-O-L-D when wearing clothing in cold weather (C: keep it Clean; O: avoid Overdressing; L: wear clothing Loose and in layers; D: keep clothing Dry).
- Maintain adequate hydration and ensure nutritional requirements are met.

Chilblain			
Cause:	Symptoms:	First-Aid:	Prevention:
Repeated exposure of bare skin for prolonged periods from 20°-60°F with high humidity (for those not acclimated to cold weather).	<ul style="list-style-type: none"> • Swollen, red skin (or darkening of the skin in dark-skinned soldiers). • Tender, hot skin, usually accompanied by itching. 	<ul style="list-style-type: none"> • Warm affected area with direct body heat. • Do not massage or rub affected areas. • Do not wet the area or rub it with snow or ice. • Do not expose affected area to open fire, stove, or any other intense heat source. 	<ul style="list-style-type: none"> • Use contact gloves to handle all equipment; never use bare hands to handle equipment, especially metal. • Use approved gloves to handle all fuel and POL products. • In the extreme cold environment, do not remove clothing immediately after heavy exertion (physical training); until you are in a warmer location. • Never wear cotton clothing in the cold weather environment.
Immersion foot (trench foot)			
Cause:	Symptoms:	First-Aid:	Prevention:
Prolonged exposure of feet to wet conditions 32°-60°F. Inactivity and damp socks and boots (or tightly laced boots that impair circulation) speed onset and severity.	<ul style="list-style-type: none"> • Cold, numb feet may progress to hot, with shooting pains. • Swelling, redness, and bleeding. 	<ul style="list-style-type: none"> • If you suspect trench foot, get medical help immediately! • Rewarm feet by exposing them to warm air. • Do not allow victim to walk on injury. • Evacuate victim to a medical facility. • Do not massage, rub, moisten, or expose affected area to extreme heat. 	<ul style="list-style-type: none"> • Keep feet clean and dry; change wet or damp socks as soon as possible. • Wet or damp socks should be dried as soon as possible to allow them to be reused. • The inside of vapor barrier boots should be wiped dry once per day, or more often as feet sweat. • Dry leather boots by stuffing with paper towels.
Frostbite			
Cause:	Symptoms:	First-Aid:	Prevention:
<ul style="list-style-type: none"> • Freezing of tissue e.g., fingers, toes, ears, and other facial parts. • Exposure to bare skin on metal, extremely cool fuel and POL, wind chill, and tight clothing - particularly boots - can make the problem worse. 	<ul style="list-style-type: none"> • Numbness in affected area. • Tingling, blistered, swollen, or tender areas. • Pale, yellowish, waxy-looking skin (grayish in dark-skinned soldiers). • Frozen tissue that feels wooden to the touch. 	<ul style="list-style-type: none"> • Frostbite can lead to amputation! Evacuate immediately! • Start first-aid immediately. Warm affected area with direct body heat. • Do not thaw frozen areas if treatment will be delayed. • Do not massage or rub affected areas. • Do not wet the area or rub it with snow or ice. • Do not expose affected area to open fire, stove, or any other intense heat source. 	<ul style="list-style-type: none"> • Use contact gloves to handle all equipment; never use bare hands to handle equipment. • Use approved gloves to handle fuel and POL. • Never wear cotton clothing in the cold weather environment. • Keep face and ears covered and dry. • Keep socks clean and dry. • Avoid tight socks and boots.
Hypothermia			
Cause:	Symptoms:	First-Aid:	Prevention:
Prolonged cold exposure and body-heat loss. May occur at temperatures well above freezing, especially when a person is wet.	<ul style="list-style-type: none"> • Shivering may or may not be present. • Drowsiness, mental slowness, or lack of coordination. Can progress to unconsciousness, irregular heartbeat, and death. 	<ul style="list-style-type: none"> • This is the most serious cold exposure medical emergency and can lead to death! Get the soldier to a medical facility as soon as possible! • Even if a victim is cold and is not breathing, never assume someone is dead until determined by medical authorities! • Strip off wet clothing and wrap victim in blankets or a sleeping bag. • Place another person in sleeping bag as an additional heat source. • For the person with unconsciousness and very low heartbeat, minimize handling of the victim so as to not induce a heart attack. 	<ul style="list-style-type: none"> • Never wear cotton clothing in the cold weather environment. • Anticipate the need for warming areas for soldiers exposed to cold, wet conditions.
Additional Medical Considerations in the Cold Weather Environment:			
Dehydration			
Cause:	Symptoms:	First-Aid:	Prevention:
Depletion of body fluids.	<ul style="list-style-type: none"> • Dizziness. • Weakness. • Blurred vision. 	<ul style="list-style-type: none"> • Replace lost water. Water should be sipped, not gulped. • Get medical treatment. 	At a minimum, drink 3-6 quarts of fluid per day.
Snow Blindness			
Cause:	Symptoms:	First-Aid:	Prevention:
Burning of the cornea of the eye by exposure to intense ultraviolet rays of the sun in a snow-covered environment.	Pain, red, watery, or gritty feeling in the eyes.	<ul style="list-style-type: none"> • Rest and total darkness; bandage eyes with gauze. • Evacuate if no improvement within 24 hours. 	<ul style="list-style-type: none"> • Use sunglasses with side protection in a snow-covered environment. • If sunglasses are not available, use improvised slit glasses.
Carbon Monoxide Poisoning			
Cause:	Symptoms:	First-Aid:	Prevention:
Replacement of oxygen with carbon monoxide in the blood stream caused by burning fuels without proper ventilation.	<ul style="list-style-type: none"> • Headache, confusion, dizziness, and excessive yawning. • Cherry red lips and mouth, grayish tint to lips and mouth (in dark-skinned individuals). • Unconsciousness. 	<ul style="list-style-type: none"> • Move to fresh air. • CPR if needed. • Administer oxygen if available. Evacuate. 	<ul style="list-style-type: none"> • Use only Army-approved heaters in sleeping areas and ensure that personnel are properly licensed to operate the heaters. • Never sleep in running vehicles. • Always post a fire guard when operating a heater in sleeping areas.

ARMY COLD INJURY PREVENTION PROGRAM

Avoid Cold Casualties!

When using Cold-Weather Clothing,
Remember **C-O-L-D**

C ~ Keep it... **Clean**

O ~ Avoid... **Overheating**

L ~ Wear it... **Loose and in layers**

D ~ Keep it... **Dry**

How to Spot Trouble

Notify an instructor if you or your buddy
experience:

- Dizziness, weakness or blurred vision
- Swollen red or darkened skin
- Painful, tender, hot or itchy skin
- Numbness or tingling
- Bleeding or blistered skin
- Numb, gray or waxy skin that feels "wooden" to the touch
- Vigorous shivering
- Lack of coordination and impaired judgment
- Painful, red, watery or gritty feeling in the eyes (snow blindness)

Enclosed areas where heaters are used:

- Excessive yawning, cherry red lips or grayish tint to lips and mouth
- Confusion, disorientation or mental slowness
- Drowsiness, lack of coordination or unconsciousness

Army Values:
Loyalty
Duty
Respect
Selfless - Service
Honor
Integrity
Personal Growth



See <http://www.army.mil> for electronic versions of this document and other resources.

**Appendix C
Individual Guidance for Heat Acclimatization**

C-1. Overview. This heat acclimatization guidance is for soldiers that will be attending strenuous advanced military training in hot weather, such as ABN/Ranger School or ROTC camp. It provides practical guidance to obtain optimal heat acclimatization, to both maximize performance, and minimize the risk of becoming a heat casualty.

C-2. Should there be concerns about hot weather? Soldiers used to working in cool or temperate climates, when exposure to hot weather, have more difficulty completing their advanced training course. Hot weather will make soldiers feel fatigued, make it more difficult to recover, and increase the soldier’s risk of being a heat casualty. Soldiers with the same abilities that are used to training in hot weather will outperform soldiers that are not used to hot weather.

C-3. What is heat acclimatization?

a. Heat acclimatization refers to biological adaptations that reduce physiologic strain (e.g., heart rate and body temperature), improve physical work capabilities, and improve comfort and protect vital organs (brain, liver, kidneys, muscles) from heat injury. The most important biological adaptation from heat acclimatization is an earlier and greater sweating response, and for this response to improve, it needs to be invoked.

b. Heat acclimatization is specific to the climate (desert or jungle) and physical activity level. However, acclimatization to desert or jungle climates markedly improves the ability to work in the other similar climates. Soldiers who only perform light or brief physical work will achieve the level of heat acclimatization needed to perform that task. If they attempt a more strenuous or prolonged task, additional acclimatization and improved physical fitness will be needed, to successfully perform that task in the heat. See table C-1 for benefits of heat acclimatization.

**Table C-1
Benefits of heat acclimatization**

Thermal Comfort – Improved	Exercise Performance - Improved
<ul style="list-style-type: none"> • Core temperature – reduced. • Sweating – earlier and greater. • Skin blood flow – earlier. • Body heat production – lower. 	<ul style="list-style-type: none"> • Heart rate – lowered. • Thirst – improved. • Salt losses (sweat and urine) – reduced. • Organ protection – improved.

C-4. How does a soldier become heat acclimatized?

a. Heat acclimatization occurs when repeated heat exposures are sufficiently stressful to elevate body temperature and provoke profuse sweating. Resting in the heat, with limited physical activity to that required for existence, results in only partial acclimatization. Physical exercise in the heat is required to achieve optimal heat acclimatization for that exercise intensity in a given hot environment.

b. Generally, about two weeks of daily heat exposure is needed to induce heat acclimatization. Heat acclimatization requires a minimum daily heat exposure of about 2 hours (can be broken into two 1-hour exposures) combined with physical exercise that requires cardiovascular endurance, (for example, marching or jogging) rather than strength training (pushups and resistance training). Gradually increase the exercise intensity or duration each day. Work up to an appropriate PT schedule adapted to the required physical activity level for the advanced military training and environment.

c. The benefits of heat acclimatization will be retained for approximately 1 week and then decay with about 75 percent lost by approximately 3 weeks, once heat exposure ends. A day or two of intervening cool weather will not interfere with acclimatization to hot weather.

C-5. Time required for heat acclimatization.

a. For the average soldier, heat acclimatization requires about 2 weeks of heat exposure and progressive increases in physical work. By the second day of acclimatization, significant reductions in physiologic strain are observed. By the end of the first and second week, greater than 60 percent and approximately less than 80 percent of the physiologic adaptations are complete, respectively. Soldiers who are unable to run 2 miles in less than 15 minutes, or are unusually susceptible to heat, may require several days or weeks more to fully acclimatize.

b. Soldiers who are able to run 2 miles, in less than 14 minutes, should be able to achieve heat acclimatization in about 1 week. However, several weeks of living and working in the heat (seasoning) may be required to maximize tolerance to high body temperatures.

C-6. Heat acclimatization strategies.

a. Maximize physical fitness and heat acclimatization prior to arriving in hot weather. Maintain physical fitness after arrival with maintenance programs tailored to the environment, such as training runs in the cooler morning or evening hours.

b. Integrate training and heat acclimatization. Train in the coolest part of the day and acclimatize in the heat of the day. Start slowly by reducing training intensity and duration (compared to what you could achieve in temperate climates). Increase training and heat exposure volume as your heat tolerance permits. Use interval training (work/rest cycles) to modify your activity level.

c. If the new climate is much hotter than what you are accustomed to, recreational activities may be appropriate for the first 2 days with periods of run/walk. By the third day, you should be able to integrate PT runs (20 to 40 minutes) at a reduced pace.

d. Consume sufficient water to replace sweat losses. A sweating rate of greater than 1 qt per hour is common. Heat acclimatization increases the sweating rate, and therefore increases water requirements. As a result, heat acclimatized soldiers will dehydrate faster if they do not consume fluids. Dehydration negates many of the thermoregulatory advantages conferred by heat acclimatization and high physical fitness.

e. Do not skip meals. Food will replace the minerals lost in sweat, as well as provide the needed calories. Salt food to taste, and do NOT take salt tablets. Refer to table C-2, below, for suggestions on heat acclimatization. Consult [AR 40-25](#), table 2-1, for caloric requirements to meet training needs (available on http://www.usapa.army.mil/pdffiles/r40_25.pdf).

Table C-2
Heat acclimatization suggestions

Strategy	Suggestions for Implementation
Start early	<ul style="list-style-type: none"> • Start at least 1 month prior to school or training. • Be flexible and patient—performance benefits take longer than the physiological benefits.
Mimic the training environment climate	<ul style="list-style-type: none"> • In warm climates, acclimatize in the heat of day. • In temperate climates, work out in a warm room wearing sweats.
Ensure adequate heat stress	<ul style="list-style-type: none"> • Induce sweating. • Work up to 100 minutes of continuous physical exercise in the heat. Be patient. The first few days, you may not be able to go 100 minutes without resting. • Once you can comfortably exercise for 100 minutes in the heat, then continue for at least 7-14 days with added exercise intensity (loads, or training runs).
Teach yourself to drink and eat	<ul style="list-style-type: none"> • Your thirst mechanism will improve as you become heat acclimatized, but you will still under-drink if relying on thirst sensation. • Heat acclimatization will <u>increase</u> your water requirements. • Dehydration will negate most benefits of physical fitness and heat acclimatization. • You will sweat out more electrolytes when not acclimatized, so add salt to your food, or drink electrolyte solutions during the first week of heat acclimatization. • A convenient way to learn how much water your body needs to replace is to weigh yourself before and after the 100 minutes of exercise in the heat. For each pound lost, you should drink about one-half qt of fluid. • Do not skip meals, as this is when your body replaces most of its water and salt losses.

Appendix D
Instructions on use of the Wet Bulb Globe Thermometer

D-1. Background. The WBGT guidance provided in this appendix is for units in garrison, and in the field, that will conduct continuous activity in hot weather. It provides practical guidance to obtain optimal work and training productivity for acclimatized and unacclimatized personnel. Readings from the WBGT can differ at various locations throughout an installation. Depending on the wind speed, humidity, and cloud cover, the WBGT index can be different in a wooded area, as opposed to an open field. Because of these influencing factors, WBGT readings must be taken in the immediate vicinity of the activity site, and read every hour.

D-2. General instructions, Wet Bulb Globe Temperature Index (FSN 6665-159-2218).

a. The wet bulb-globe temperature kit is an instrument for providing information on hot weather risks affecting the health of troops undergoing training. The information is in the form of an index computed by the weighted readings obtained from three different thermometers (see figure D-1):

(1) The stationary wet bulb (WB) thermometer, with the bulb covered by a moistened, white absorbent wick, is exposed to the sun and prevailing wind.

(2) A similarly exposed "black globe" (BG) thermometer, with copper sheath painted black, that is enclosed in a perforated shield.

(3) A dry bulb (DB) thermometer, with bulb shielded from the direct rays of the sun by an aluminum shield.

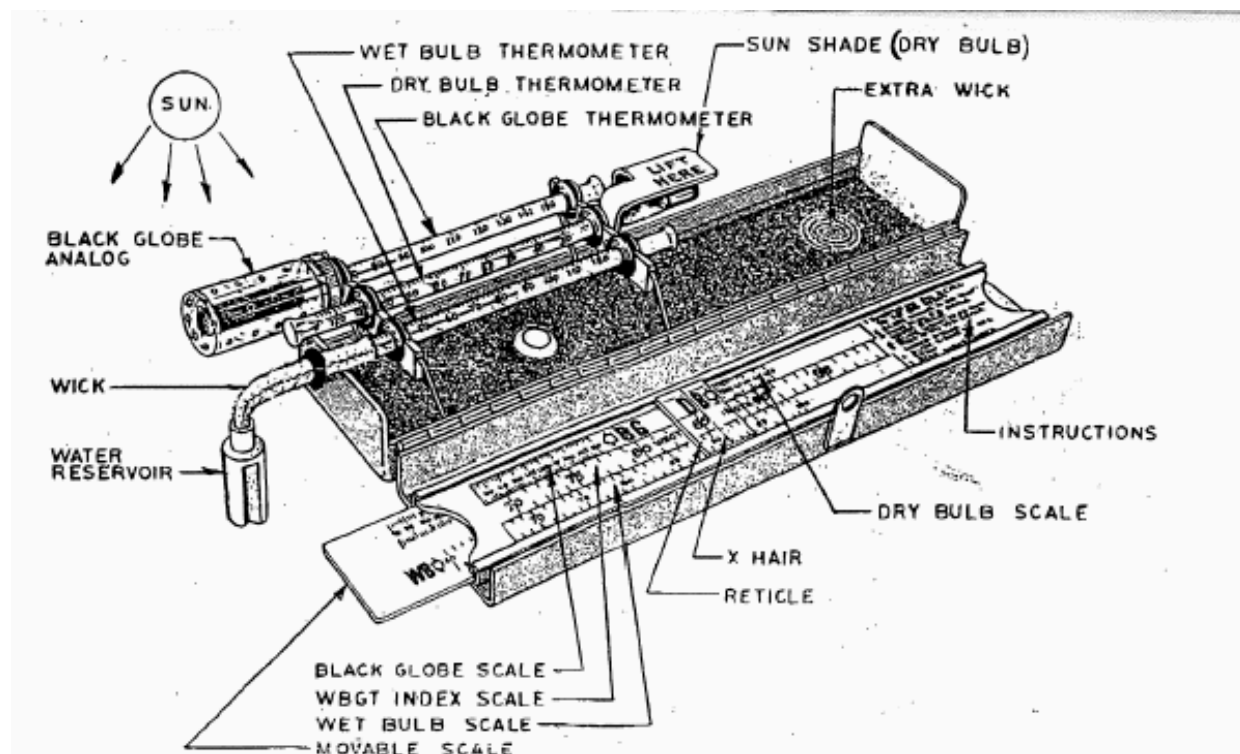


Figure D-1. Wet Bulb Globe Thermometer

b. The index is computed as follows:

$$\text{WBGT} = 0.7 \text{ WB temperature} + 0.2 \text{ BG temperature} + 0.1 \text{ DB temperature}$$

The three readings are added on the attached slide rule, with the weighting of each automatically achieved by the proportional scale sizes.

c. The thread in the bottom of the case is for attachment to a standard lightweight photographer's tripod (not supplied with this kit).

TRADOC Reg 350-29

- (1) Open kit by depressing box gently to disengage the latch.
- (2) Position thermometer assembly up and out (see figure D-1). NOTE: Examine the bore of each thermometer. If the liquid has separated, heat the thermometer bulb slowly and carefully until the liquid reunites.
- (3) Wet the bulb wick thoroughly. NOTE: The little bottle may be filled with clean, preferably deionized or distilled water, and utilized as indicated in figure D-1. The water should be changed daily and the wick washed with soap and water. To avoid erroneous readings, the water and wick must be free of salt and soap.
- (4) Hold the kit with thermometers toward the sun, with the "black globe" thermometer closest to the sun. Wait 10 minutes for stabilization of temperatures.
- (5) Review instructions on face of the slide ruler assembly. Assume for purposes of instruction that BG reading is 120, DB reading is 100, and WB reading is 80:
 - (a) Move 70 on BG scale to 70 on WBGT scale.
 - (b) Slide X-hair to 120 on BG scale.
 - (c) Move 70 on DB scale under X-hair.
 - (d) Slide X-hair to 100 on DB scale.
 - (e) Move 70 on WB scale under X-hair.
 - (f) Slide X-hair to 80 on WB scale.
 - (g) Read WBGT index. NOTE: If calculations have been performed correctly, the index should read 90.

D-3. Replacement parts. Replacement parts for WBGT are listed in table D-1.

Table D-1
Replacement parts

ITEM	WEKSLER PART NO.
Black Globe Thermometer	23-68
Web Bulb Thermometer	23-69
Dry Bulb Thermometer	23-70
Braided Wick	29-40
Water Reservoir	M27-562
Transparent Perforated Shield (Black Globe Analog)	M12-979
Receiver, Radiant Energy	M12-978

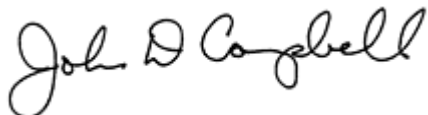
Glossary

ABN	airborne
ASAP	as soon as possible
BDU	Battle Dress Uniform
BG	black globe
DB	dry bulb
F	Fahrenheit
qt	quart
IAW	in accordance with
MCW	meal, cold weather
MEDEVAC	medical evacuation
MOPP	Mission-Oriented Protective Posture
mph	miles per hour
MRE	meal, ready to eat
NCO	noncommissioned officer
OTC	over the counter
POL	petroleum, oil, or lubricant
PT	physical training
ROTC	Reserve Officers' Training Corps
SOP	standard operating procedure
TRADOC	U.S. Army Training and Doctrine Command
USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
WB	wet bulb
WBGT	Wet Bulb Globe Thermometer

FOR THE COMMANDER:

OFFICIAL:

ANTHONY R. JONES
Lieutenant General, U.S. Army
Deputy Commanding General/
Chief of Staff



JOHN D. CAMPBELL
Acting Chief Information Officer