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Medical Services

Prevention, Recognition and Treatment of Climatic Injuries

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This regulation supersedes CAM Regulation 40-4 dated 29 October 2008

Chapter 1

General

1-1. Purpose

This regulation establishes the policies and procedures for implementation of the heat and cold injury prevention programs.

1-2. Applicability

This regulation applies to all units, organizations, activities and individuals (both civilian and military) assigned or attached to this installation.

1-3. References

- a. Army Regulation 40-5, Preventive Medicine, 25 May 2007.
- b. Army Regulation 40-400, Patient Administration, 27 January 2010.
- c. Army Regulation 385-10, The Army Safety Program, RAR 14 June 2010.
- d. Department of the Army Pamphlet 385-40, Accident Reporting and Records, RAR 25 February 2010.
- e. Department of the Army Pamphlet 40-11, Preventive Medicine, RAR 19 October 2009.
- f. Technical Bulletin Medical 507, Heat Stress Control and Heat Casualty Management, 7 March 2003.
- g. Technical Bulletin Medical 508, Prevention and Management of Cold Weather Injuries, 1 April 2005.
- h. Field Manual 4-25.12, Unit Field Sanitation Team, 25 January 2002.
- i. CAM Regulation 115-1, Weather Support for Fort Campbell, 20 May 2011.
- j. MEDDAC Regulation 40-1, Infection Control Manual (Appendix A – Reportable Conditions and Communicable Diseases), 1 March 2007.
- k. Army Regulation 40-501, Standards of Army Fitness, RAR 23 August 2010

1-4. General

Successful prevention of adverse weather effects depends largely on education of personnel, especially those charged with supervisory control. Specifically, prevention of heat and cold weather injuries involves development of procedures to alert personnel to the existence of dangerous weather conditions, the application of any practical measures to reduce both the severity and duration of the exposure and adoption of techniques to increase the resistance of exposed persons. This regulation sets forth guidance in developing a program to prevent both heat and cold weather injuries.

1-5. Proponent

The proponent of this regulation is Department of Preventive Medicine, Attn: (MCXD-PM).

Chapter 2

Heat Injuries

2-1. Heat injuries

a. Humans (if heat acclimated, given adequate shade and water, and able to limit physical activity) can tolerate extended exposure to any naturally occurring climatic heat stress. However, military situations, such as operating certain combat vehicles, firefighting and wearing protective clothing in hot environments, can involve heat stress conditions so severe they cannot be tolerated for extended periods. In addition, mission requirements that demand intense physical activity can lead to dehydration and make successful heat stress management very difficult.

b. Military training exercises, whether special badge qualification training, or military operations training, often occur during hot weather seasons and can present significant heat stress. Individuals in these situations often are not fully heat acclimatized requiring unit commanders and trainers to actively plan for heat injury prevention. These training environments provide an opportunity to train personnel in using appropriate work-rest cycles and fluid replacement guidelines.

c. Leadership is key for training in hot weather environments and for successful hot weather military operations. Soldiers should have confidence that they can master the environment through the use of preventive measures. Lessons learned from previous hot weather deployments must be emphasized. Leaders must learn their unit's capabilities and manage heat exposure relative to the provided guidance. Guidance is based on the "average" Soldier, and there is significant individual variability. Supporting medical officers must ensure that the principles of this document are incorporated into the commander's plans and play an active role in all phases of training and operations: pre, during, and post. The best way to ensure this is to take an active role in the planning process for all operations or training.

d. There are four basic factors that determine the degree of heat stress exerted by the environment. These are air temperature, air movement, relative humidity, and heat radiation. Readings of these factors taken alone may not be significant and cannot be used as a measure of the degree of environmental stress. The Wet Bulb Globe Temperature (WBGT) Index is used to relate these various factors. The dissemination of WBGT information is covered in paragraph

e. This system (Figure 1) serves as the indication of the degree of environmental stress and will be used in the heat injury prevention program. Certain conditions increase an individual's susceptibility to heat injury. These include previous heat injury, poor health, excessive consumption of alcohol, dehydration, lack of sleep, poor physical condition, overweight, lack of acclimatization, reaction to immunizations, imbalance in the body sodium and water content, fatigue, vomiting and diarrhea.

2-2. Responsibilities

a. GARRISON COMMANDER. Final authority rests with the Garrison Commander, in coordination with the Chief of Staff, for modification/curtailment of work schedules for installation civilian employees.

b. UNIT COMMANDERS/SUPERVISORS will:

- (1) Ensure sufficient drinking water is provided.
- (2) Ensure annual training classes are scheduled and all assigned personnel participate.
- (3) Employ the Unit Field Sanitation Team or assigned medical personnel to monitor the WBGT Index at the training site.

(4) Modify work/training schedule in accordance with WBGT guidelines.

(5) Ensure the Heat Injury Investigation Reports are submitted as required (see Para. 18).

(6) Ensure the heat category is incorporated into leader checklists as part of risk management procedures.

c. THE CHIEF, DEPARTMENT OF PREVENTIVE MEDICINE, U.S. ARMY MEDICAL DEPARTMENT ACTIVITY (USAMEDDAC) will:

(1) Provide assistance to installation departments and units without an organizational Surgeon on establishing training programs.

(2) Ensure WBGT readings are recorded at appropriate intervals to provide unit commanders the information required to tailor training.

(3) Report all case defined heat injuries (see Para. 10) to the Medical Surveillance System as required in accordance with MEDDAC Regulation 40-1, Section III.

(4) Provide assistance to deployable units assigned to the installation with no supporting preventive medicine personnel on establishing training programs in the absence of the 61st Medical Detachment (PM).

d. UNIT HEALTHCARE PROVIDERS will:

(1) Provide assistance to assigned unit commanders on establishing training programs.

(2) Ensure all suspected heat injury casualties are interviewed to determine cause.

(3) Provide completed interviews to Chief, Department of Preventive Medicine, USAMEDDAC.

e. THE COMMANDER, 61st MEDICAL DETACHMENT (PREVENTIVE MEDICINE) will:

(1) Provide assistance to deployable units assigned to the installation with no assigned supporting preventive medicine personnel on establishing training programs.

(2) Provide assistance to deployable units assigned to the installation in the absence of assigned supporting preventive medicine personnel on establishing training programs.

f. INDIVIDUALS will:

(1) Drink sufficient quantities of water, even if not thirsty.

(2) Eat all meals to replace salt loss.

(3) Follow the correct work/rest cycle.

(4) Avoid direct sun exposure when possible and use sunscreen lotion to lessen the effect of exposure.

(5) Attend heat injury prevention education classes.

2-3. Prevention

Prevention of adverse heat effects depends mainly upon the education of personnel exposed to heat and those charged with their supervision. Specific measures include increasing the resistance of individuals and reducing the exposure. Resistance is increased by acclimatization, replacement of salt and water losses, and maintenance of optimum physical condition. Exposure is reduced by decreasing the workload and by introducing protective measures.

a. Education. Prior to the onset of hot weather each year, all military and civilian personnel working in the high heat stress areas will attend a heat injury prevention briefing given by supervisors at the local level.

(1) Commanders and supervisors should participate in a briefing that includes the following topics:

a. Past experience with heat injury at this installation.

- b. The causes of heat injury.
 - c. The roles of acclimatization and scheduling of strenuous physical activity.
 - d. The important role of water and sodium consumption in prevention.
 - e. The recognition of personnel who are at increased risk of heat injury; e.g., those with prior heat injury, current illness, obesity, intake of alcohol or medication.
 - f. The use of the WBGT Index.
 - g. The use of the buddy system during training.
 - h. The early recognition of the signs and symptoms of heat injury.
 - i. The principles of initial first-aid treatment of heat injuries.
 - j. Liberal policy of evacuation of the injured to the nearest medical treatment facility.
- (2) Individuals are required to participate in a briefing that includes the following topics:
- a. The causes of heat injury.
 - b. The important role of water and salt consumption in prevention.
 - c. The use of the buddy system during training.
 - d. The early recognition of the signs and symptoms of heat injury.
 - e. The principles of initial first-aid treatment of heat injuries.
 - b. Methods for increasing resistance to effects of heat.

(1) Replacement of water loss. Adequate water intake is the single most important factor in avoidance of heat injury.

An individual subjected to high heat stress may, by sweating, lose water in excess of one quart per hour. Water loss must be replaced, preferably by periodic intake of small amounts of water, throughout the work period. Thirst is not an adequate stimulus for water intake, and dehydration will frequently occur unless drinking is encouraged or required by command control. Command directed drinking should be a part of training activities in high temperature environments. The chart in Figure 1 may be used as a guide to estimate the drinking water requirements for personnel exposed to heat.

(2) Acclimatization. Training programs for personnel who are climatically unseasoned to the heat should be limited in intensity and time. A schedule should be established which provides for increasingly longer work periods alternating with rest periods. If it is necessary that work be performed during the period of acclimatization, advantage should be taken of the cooler hours of the day.

(3) Replacement of salt loss. In addition to water, sodium chloride (table salt) is also lost in sweating and normally indicates a need for additional salt consumption. The method of choice for salt replacement is through the use of additional table salt at meal time. This, along with salt in cooking and bread, will meet most requirements. Excessive intake of salt should be avoided; it may cause increased thirst and intestinal disturbances. Taking salt tablets is prohibited.

(4) Physical condition. The general physical condition of the individual has a significant bearing on the reaction to heat stress. The risk of heat injury is much higher in overweight persons than in those of normal weight, and special care should be exercised when such persons are exposed to high temperatures. One attack of either heat stroke or severe heat exhaustion may predispose to a second attack, or at least identify those with a propensity for difficulty in adjusting to heat. Therefore, caution should be exercised when exposing a previously affected individual to subsequent heat stress.

c. Methods for Reducing Exposure to Heat.

(1) Modification of work schedules. Work schedules must be tailored to fit the climate, the physical condition of personnel and the military situation. While decisions to modify work schedules must be governed by the particular local situation, heavy work should be scheduled for the cooler hours of the day such as early morning or late evening. Special consideration must be given also to protection of workers involved in industrial operations where heat is a factor, such as laundries, dry cleaning plants, and motor maintenance facilities.

(2) Modification of training schedules.

a. Formations, parades and reviews should be held to a minimum during hot periods and scheduled so as to avoid exposure to direct rays of the sun during the warmer hours of the day. When possible, troops should be marched over grass rather than pavement.

b. Field lectures and rest periods should be carried out in open shade and not in the direct heat of the sun, or in enclosed spaces lacking adequate ventilation.

c. During road marches, a system of communication between the trail vehicle and the leader of the road march should be established and maintained throughout all marches so that the leader can be apprised of the problems that are encountered at the end of the column.

d. All speed marches, running and calisthenics that are part of the physical readiness training should be conducted during the cooler hours of the day to reduce the possibility of incurring heat injuries.

e. Immunizations should be scheduled so that possible severe reactions will occur during non-training periods, and recovery will be complete before exposure to a heat stress.

f. The heavy meal of the day should be scheduled for evening rather than at noon on hot days. Water and cool beverages should be freely available at each meal. The recommended temperature for drinking water is between 10 and 15.5 degrees Centigrade (50 and 60 degrees Fahrenheit). Flavoring the water lightly with citrus fruit flavoring enhances its palatability.

(3) Clothing. To protect troop health and maintain efficiency, exceptions to the prescribed wear of uniforms may be authorized at the discretion of major unit commanders. Clothing and equipment should be worn so as to permit free circulation of air between the uniform and the body surface; i.e., loose fitting, especially at the neck, wrists and ankles. Permissible modifications include rolling up the sleeves, unblousing the trousers, and unbuttoning or removing the jacket. When exposed to full sunlight, the body should be covered fully by clothing to reduce the potential for sunburn. Reduction in layers of clothing assists in reducing body temperature. The use of starch for uniforms should be avoided. Wearing of body armor or the NBC warfare protective clothing has the effect of adding 10-20 degrees to the measured WBGT. Limits should be adjusted appropriately.

(4) WBGT. Modifications in work and training activities will be made using the guidance listed in Figure 1.

FIGURE 1

Work/Rest and Water Consumption Table

Applies to average sized, heat-acclimated soldier wearing BDU, hot weather. (See TB MED 507 for further guidance.)

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 • Manual of Arms 	<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 or High Crawl • Defensive Position Construction 	<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

- The work/rest times and fluid replacement volumes will sustain performance and hydration for at least 4 hrs of work in the specified heat category. Fluid needs can vary based on individual differences (\pm ¼ qt/hr) and exposure to full sun or full shade (\pm ¼ qt/hr).

- **NL** = no limit to work time per hr.

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

- **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 index in humid climates.

- If doing Easy Work and wearing NBC (MOPP 4) clothing, add 10°F to WBGT index.

- If doing Moderate or Hard Work and wearing NBC (MOPP 4) clothing, add 20°F to WBGT index.

Heat Category	WBGT Index, F°	Easy Work		Moderate Work		Hard Work	
		Work/Rest (min)	Water Intake (qt/hr)	Work/Rest (min)	Water Intake (qt/hr)	Work/Rest (min)	Water Intake (qt/hr)
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

For additional copies contact: U.S. Army Center for Health Promotion and Preventive Medicine Health Information Operations Division at (800) 223-9699 or CHPPM - Health Information Operations@agc.medd.army.mil
For electronic versions, see <http://chppm-www.agc.army.mil/heat/>. Local reproduction is authorized June 2004



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2-4. Dissemination of WBGT information

a. The Environmental Health Section, Department of Preventive Medicine, U.S. Army MEDDAC will:

(1) Take the WBGT Index reading and record same on automatic telephone answering device 798-4328 (798-HEAT).

(2) Update the recordings hourly between 0730 and 1630, Monday through Friday, from 15 April to 15 October.

b. Range Control will monitor the WBGT during nonduty hours and on weekends, 798-3001.

c. The ACoFS, G3/Director of Plans, Training, and Mobilization will inform appropriate on-post military schools when the WBGT changes from one category to another.

d. The Garrison Commander, in coordination with the Chief of Staff, will curtail work schedules as appropriate for installation civilian employees when the WBGT category warrants. Notification of work curtailment will be disseminated down through appropriate command/supervisory channel with particular emphasis on civilian employees working outdoors and in high stress areas (e.g. boiler plants).

2-5. Recognition and Treatment of Heat Injuries

a. General. Heat injuries include sunburn, heat rash (prickly heat), dehydration, over hydration (hyponatremia), heat cramps, heat exhaustion, and heat stroke. These conditions should be recognized at once, not only by medical personnel, but also by supervisory personnel. All Fort Campbell personnel involved in supervision of individuals in hot climates must be familiar with the symptoms of heat injury and first-aid treatment.

b. It is vital that upon recognition of heat injury symptoms that immediate first-aid treatment be given. Should evaluation of symptoms warrant evacuation of the casualty all effort must be given to expedite this action. Diagnosis of heat injuries should only be conducted by physicians, physician assistants and other trained medical personnel. Symptoms of heat injuries and appropriate first-aid treatment measures are identified in Figure 2.

FIGURE 2

Heat Injury Symptoms and First-aid Treatment

Indications of Possible Sunburn			
Cause	Symptoms	First-Aid	Prevention
<ul style="list-style-type: none"> Exposure of skin to direct sun Can occur on overcast days 	<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 cold 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
Indications of Heat Rash (Prickly Heat)			
<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 effected dry Control itching and infection with prescribed medications 	<ul style="list-style-type: none"> Proper wear of clothing Shower (nude) after excessive sweating
Indications of Dehydration			
<ul style="list-style-type: none"> 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 quarts of fluid per day Follow fluid replacement guidelines Consume full meals and drink at mealtime Do not take dietary supplements
Indications of Over Hydration (Hyponatremia)			
<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, evacuate immediately 	<ul style="list-style-type: none"> Follow fluid replacement guidelines Replace lost salt by consuming meals and sports drinks, as directed Provide snacks and electrolyte beverage during long training events Do not take dietary supplements
Indications of Heat Cramps			
<ul style="list-style-type: none"> Excessive loss of salt from body due to excessive sweating 	<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 	<ul style="list-style-type: none"> Eat all meals to replace salt Consume salt-supplemented beverages if adequate meals

<ul style="list-style-type: none"> ● Not acclimatized to hot weather 		<ul style="list-style-type: none"> ● 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 quart canteen) ● Get medical evaluation if cramps persist 	<p>have not been consumed prior to prolonged periods of heavy sweating</p> <ul style="list-style-type: none"> ● Ensure adequate heat acclimatization
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Indications of Heat Exhaustion

<ul style="list-style-type: none"> ● Body fatigue and strain on heart due to overwhelming heat stress ● Dehydration (see above) ● 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 ● Spray/pour water on Soldier and fan for cooling effect or use ice sheets around neck, arm pits and groin, if available ● Monitor with the same (one) instructor or supervisor ● Assess Soldier's mental status every few minutes ● Have Soldier slowly drink one full canteen (quart) of cool water every 30 minutes with a maximum of 2 canteens ● If not improved in 30 to 60 minutes should return to light duty on a profile for the remainder of the day 	<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
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Indications of Heat Stroke

<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, 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 ● Apply ice packs or iced sheets ● Assess Soldier's mental status every few minutes ● 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 CLS is present, start intravenous (IV) fluids but limit to 500 ml NS or LR ● Continue cooling process during transport (until body temperature reaches 100°F) 	<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
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2-6. Heat Injury Definitions for Diagnostic Reporting Purposes – For Medical Personnel Only (OTSG/MEDCOM Memo 09-039 June 2009).

a. Clinical Description

(1) Heat Exhaustion (HE): syndrome of hypothermia (core temperature at time of event usually equal to or less than 40 degrees C or 104 degrees F) with physical collapse or debilitation occurring during or immediately following exertion in the heat, with no more than minor central nervous system dysfunction (e.g. headache, dizziness). HE resolves rapidly with minimal cooling intervention.

(2) Heat Injury (HI): Characterized by clinically significant tissue damage – especially hepatic injury, renal damage, DIC, rhabdomyolysis and encephalopathy. Altered mental status, caused by heat injury to the brain, is common.

(3) Heat Stroke (HS): syndrome of hypothermia (core temperature at time of event usually equal to or less than 40 degrees C or 104 degrees F) with physical collapse or debilitation, and encephalopathy as evidenced by delirium, stupor, or coma, occurring during or immediately following exertion or significant heat exposure.

Note: All heat exhaustion, heat injury, or heat stroke cases that require medical intervention or result in lost duty time are reportable.

b. Required Comments: Note if duty-related.

c. Additional Considerations: Document the patient's core body temperature and the precipitating activity.

d. Soldiers diagnosed with HE, or HI will be individually profiled as determined by the treating privileged provider. Soldiers experiencing multiple episodes of HE, or HI will be referred for Medical Evaluation Board (MEB) as appropriate and IAW OTSG/MEDCOM Memo 09-039 (Reference 1-3, k). Soldiers experiencing a single episode of HS will be placed on a temporary profile, numerical designator 4 in the PULHES physical capacity factor P [T4 (P)], for a period of one week and re-evaluated and individually profiled as determined by the treating privileged provider. Providers must follow the guidance set forth in Reference 1-3, k in regards to profiling and submission for MEB (See Figure 7).

Chapter 3

Cold Injuries

3-1. Cold injuries

a. "Cold injury" is a term which includes all types of injury produced by exposure to cold; i.e., nonfreezing injuries, chilblains, trench foot/immersion foot, "freezing injuries" (frostbite) and hypothermia. The type of injury produced depends upon the degree of cold to which the body is exposed, the duration of the exposure, and those environmental and individual factors which modify the effect of low temperature. Certain factors increase an individual's susceptibility to cold injury. These include smoking or other tobacco use, fatigue, concomitant injury, poor nutrition, race (blacks are more susceptible), too much or too little activity, certain medications, and consumption of alcohol. The more severe types of cold injury produce permanent damage, and even milder forms often result in prolonged disability and loss of duty time. From a practical standpoint, all cold injuries can be considered as a single disease which can be prevented; therefore, it is vital that all personnel be trained in the recognition and prevention of these injuries and that proper treatment be initiated immediately when such injuries occur.

b. The prevention of cold injury is a command responsibility. Commanders and troop leaders at all levels must take vigorous and continuous action to ensure that a sound preventive program is instituted and maintained within their units. Individual and unit discipline, training and experience are closely related in their influence upon the incidence of cold injury. Well-trained and disciplined troops suffer less than others from the cold, as they are better able to care for themselves through personal hygiene, care of feet, change of clothing, exercise of the extremities in pinned down positions, and similar effective measure.

3-2. Responsibilities

a. MAJOR UNIT COMMANDERS will:

(1) Obtain and issue to individual soldiers all mandatory and discretionary items of winter clothing and equipment as authorized by CTA 50-900, suitable for the local climate, with emphasis on fitting each individual properly, and proper wear.

(2) Ensure the daily official weather forecasts of wind and temperature during the cold season are used in planning daily operations. The official cold season is October through April. The dissemination of cold weather information is covered in paragraph 14. Wind chill information is provided at Figures 3 and 4.

(3) Delegate authority to subordinate unit commanders to modify or discontinue physical readiness training and tactical training in cold weather.

b. SUBORDINATE UNIT COMMANDERS will:

- (1) Appoint a Cold Injury Control Officer or Noncommissioned Officer.
 - (2) Establish warm-up tents, rooms, or dug-outs in locations accessible to personnel exposed to cold.
 - (3) Rotate troops as often as possible when they are exposed to cold and dampness and are assigned relatively stationary duties, such as guard duty in defensive positions or at check points.
 - (4) Schedule ten-minute breaks for exercise at least once an hour when riding in unheated vehicles during troop movements in cold weather.
 - (5) Institute and ensure that all personnel participate in a formal cold injury prevention training program, to include recognition and treatment of cold injury and proper wear of cold weather clothing.
 - (6) Plan and supervise the wear of appropriate clothing for weather conditions and activities scheduled.
 - (7) Obtain current weather conditions by dialing 798-5989 during the time troops are involved in outdoor activities. During extended outdoor activity, weather conditions should be obtained every hour.
- c. THE STAFF DUTY OFFICER will obtain current weather information and disseminate it to major units in accordance with paragraph 14.
- d. THE COMMANDER, 19th AIR SUPPORT OPERATIONS SQUADRON (USAF) will provide weather information at 798-5989.
- e. THE CHIEF, DEPARTMENT OF PREVENTIVE MEDICINE, U.S. ARMY MEDDAC will:
- (1) Provide assistance to installation departments and units without an organizational Surgeon on establishing training programs.
 - (2) Report all case defined cold injuries (see Para. 17) to the Medical Surveillance System as required in accordance with MEDDAC Regulation 40-1, Section III.
 - (3) Provide assistance to deployable units assigned to the installation with no supporting preventive medicine personnel on establishing training programs in the absence of the 61st Medical Detachment (PM).
- f. UNIT HEALTHCARE PROVIDERS will:
- (1) Provide assistance to assigned unit commanders on establishing training programs.
 - (2) Ensure all suspected cold injury casualties are interviewed to determine cause.
 - (3) Provide completed interviews to Chief, Preventive Medicine Service, U.S. Army MEDDAC.
- g. THE COMMANDER, 61st MEDICAL DETACHMENT (PM) will:
- (1) Provide assistance to deployable units assigned to the installation with no assigned supporting preventive medicine personnel on establishing training programs.
 - (2) Provide assistance to deployable units assigned to the installation in the absence of assigned supporting preventive medicine personnel on establishing training programs.
- h. INDIVIDUALS will:
- (1). Wear adequate clothing while outdoors.
 - (2) Remove excess clothing when in a warm enclosure.
 - (3) Practice proper care of the feet.
 - (4) Utilize the buddy system to detect the symptoms of cold injuries.
 - (5) Attend cold injury prevention education classes.

3-3. Prevention

Cold injuries are preventable. Successful prevention requires vigorous command leadership and prior planning in such activities as cold weather training and the provision of proper clothing and equipment. Specific preventive measures are directed toward conservation of total body heat and avoidance of unnecessary, prolonged exposure of personnel to cold, moisture, and activities or factors favoring cold injury.

a. Prior to the onset of cold weather each year, all personnel will attend a cold injury prevention class that includes the following topics:

- (1) The causes and prevention of cold injuries.
- (2) Proper wearing of winter clothing.
- (3) The fact that cold injury prevention is an individual responsibility and that cold injuries can occur during both on-duty and off-duty activities.

b. Prevention measures. General guidance for cold injury prevention is summarized in Figure 3. More detailed instructions for cold injury prevention may be found in TB MED 508. The following major points are listed here for emphasis only and should not be considered as completely covering the subject.

- (1) Wear and carry adequate clothing for the weather to be encountered.
- (2) Wear clothing and footgear loose enough to permit layers of air to provide good insulation and to permit good circulation of blood to all parts of the body.
- (3) Keep hands, ears, and feet well protected.

- (4) Avoid immobilization in the cold when possible.
- (5) Avoid overheating. Remove excessive clothing when in front of a fire or in a warm enclosure.
- (6) Carry extra socks. Change when wet, or, if not wet, at least once daily.

FIGURE 3

COLD WEATHER TRAINING GUIDELINES

Windchill Category

(see Windchill chart, Figure 4)

<u>Work Intensity</u>	<u>Little Danger</u>	<u>Increased Danger</u>	<u>Great Danger</u>
High Digging foxhole, running, marching with rucksack, making or breaking bivouac	Increased surveillance by small unit leaders; black gloves optional – mandatory below 0° F; increased hydration	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	Postpone non-essential training; essential tasks only with <15 minute exposure; work groups of no less than 2; cover all exposed skin
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; full head cover below 0° F. Keep skin dry – especially around nose and mouth.	Restrict Non-essential 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; cold-weather boots (VB) below 0° F; shorten duty cycles; provide warming facilities	Postpone non-essential training; 15-20 minute work cycles for essential tasks; work groups of no less than 2 personnel; no exposed skin	Cancel outdoor training

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.

GENERAL GUIDANCE FOR ALL COLD WEATHER TRAINING

SKIN: Exposed skin is more likely to develop frostbite. Covering skin lessens risk, provided that skin is kept dry.

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: 4500 calories/day/soldier. Equivalent to 1 ration-cold weather (RCW) or 4 MREs.

HYDRATION: 3-6 Liters (canteens)/day/soldier. Warm, sweet, non-caffeinated drinks preferable.

CAMOUFLAGE: Prevents detection of cold injuries; not recommended below 32° 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.

FIGURE 4

WIND CHILL CHART*

Wind Speed (mph)		Air Temperature (°F)																
		40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40
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		
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61			
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58				
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53					
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48						
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50						
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44							
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45							

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)

*To determine the wind chill temperature, enter the chart at the row corresponding to the wind speed and read right until reaching the column corresponding to the actual air temperature.

3-4. Dissemination of cold weather information

- a. Installation Base Operations, located at Campbell Army Airfield, will advise Installation G3 and Staff Duty of all severe cold weather and/or wind chill advisories.
- b. Individual units will refer to Wind Chill Chart to determine cold weather category.

3-5. Considerations of cold weather conditions which affect training

a. Continue/Discontinue Training. Battalion-level commanders have the authority to continue/discontinue training. The considerations listed below should be reviewed prior to a decision to continue/discontinue training. All commanders will be alert to determine when severe weather conditions cause unacceptable risk of injury or destroy the intended value of training. In that event, permission to cancel training will be requested by the company commander through channels to the battalion-level commander. Cancellations in training will be forwarded telephonically to the Training Division, ACofS, G3/Directorate of Plans, Training, and Mobilization.

b. Wind Intensified Cold. Each two knots of wind speed decreases the equivalent air temperature to exposed skin by approximately one degree. Wind speed should be considered by commanders primarily in Categories II and II in overnight training for selection of protective clothing. Keep in mind that moving vehicles generate wind chill. Refer to Cold Weather Training Guidelines (Figure 3).

3-6. Recognition and treatment

- a. Symptoms and signs during exposure.
 - (1) The lack of warning symptoms emphasizes the insidious nature of cold injury which, unfortunately, is overlooked by many troops and commanders temporarily subjected to cold climatic conditions. The only warning symptom may be tingling, stinging, or at most a dull aching sensation to the affected part, followed by numbness. The skin briefly may appear red and then become pale or waxy white. At this state, the affected part may feel like a block of wood. If freezing has occurred, the tissue appears dead white and is hard or even brittle with complete lack of sensation and movement.

(2) Hypothermia may be defined as a state in which the internal or core temperature is below normal. The military significance evolves from those cases of individuals inadequately protected or otherwise injured and exposed to cold for prolonged periods and following immersion in cold water. A classification of hypothermia is as follows: mild hypothermia, 95-89 degrees Fahrenheit; moderate hypothermia, 88-82 degrees Fahrenheit; deep hypothermia, 81-77 degrees Fahrenheit; profound hypothermia, below 77 degrees Fahrenheit. The symptoms of accidental hypothermia may frequently be confused with symptoms of cardiac or respiratory problems or apparent clinical death. In severe cases, the patient is cold, pale and comatose, with only faint pulse and respirations. The tissue is semi-rigid and passive movement is difficult.

(3) The buddy system. Members of squads and patrols should be trained to observe their companions for evidence of cold injury. If sudden blanching of the skin is noted, immediate care usually will prevent the development of a cold injury.

b. First-Aid treatment.

(1) If cold injury occurs, the patient should be restricted from his/her usual duties or activities until the severity of the injury can be evaluated. A medical officer should see the injury as soon as possible.

(2) All constricting items of clothing, such as boots, socks, or gloves, should be removed from the site of injury. The injured area must then be protected from further cold injury by blankets or any available clothing which is not constricting. Refreezing of previously thawed areas greatly increases the damage to the injured area.

(3) Smoking, drinking alcohol, and the application of medications, salves, or ointments are prohibited. Blisters must not be opened. Drinking hot liquids is encouraged.

(4) If the lower extremity is involved, treat as a litter patient with the injured part level or slightly elevated. In unusual circumstances where travel on foot is the only means of evacuation for frostbite of the feet, thawing of the injured area should not be attempted until the patient reaches a medical treatment facility. Do not massage the affected area.

(5) Because of the severity and the unreliability of the usual clinical signs of "death" due to hypothermia, it is imperative that resuscitative measures be undertaken at once. Cardiopulmonary resuscitation should be started immediately. Rewarming should be delayed until at a medical facility with cardiac monitoring capability. The primary intent in the initial treatment is to raise the body temperature to normal levels. The adage that a hypothermia victim is never cold and dead, only warm and dead, should be remembered. The continuing threat of fatal alterations in the rhythm of the heart makes accidental hypothermia a medical emergency demanding immediate medical attention.

3-7. Cold injury definitions for diagnostic reporting purposes– For Medical Personnel Only (Tri-Service Reportable Events Guidelines & Case Definitions – May 04, Pg 26-27)

a. Clinical Description

(1) Cold/Wet Injuries: Localized non-freezing injuries, usually of extremities (e.g. trench foot). May occur in temperatures as high as 60°F with prolonged exposure.

(2). Cold/Dry Injuries: Frostbite is the most common of these injuries. It results from the actual crystallization of tissue fluids in the skin or subcutaneous tissues after exposure to temperatures below freezing.

(3) Hypothermia. The result of generalized lowering of core body temperature to below 95°F. It can result from either dry land whole body exposure or immersion in cold water. Freezing temperatures are not required to produce hypothermia.

b. Clinical Case Definition

(1) Frostbite:

(a) 1st Degree: Superficial epidermal injury. Mobility unaffected, no blistering. Complete healing in 7-10 days; Residual cold sensitivity may occur.

(b) 2nd Degree: Involves the entire epidermis; forms bullae after thawing. Heals in 3-4 weeks; residual cold sensitivity may occur.

(c) 3rd Degree: Involves the dermis at least to the reticular layer. When frozen, mobility is limited. Characterized by hemorrhagic bullae and swelling. Permanent tissue loss may occur.

(d) 4th Degree: Full skin thickness and underlying tissue damage. No mobility of the frozen tissue; mobility not recovered with thawing. No bullae or edema, but necrotic changes occur rather early. Significant permanent damage is typical.

(2) Hypothermia: Body core temperature <95°F, unless the hypothermia is the result of immersion.

(3) Immersion Foot: trench foot

(4) Unspecified: Any cold weather injury (CWI) that does not fit the above categories.

(5) Laboratory Criteria For Diagnosis: None, cold injuries are diagnosed clinically.

d. Required Comments: Note if injury was duty related.

e. Additional Considerations: Document the anatomic location of the injury, degree of frostbite, core body temperature (for hypothermia), and any unusual circumstances.

3-8. Reporting

a. All single incidences of heat and cold injuries and cases involving hospitalization will be investigated and reported. Supporting Surgeons or Medical Officers will interview casualties and provide copies to the Chief, Department of Preventive Medicine, USAMEDDAC. Interviewing officers will use the Heat Injury Interviewer's Worksheet (Figure 5) or Cold Injury Interviewer's Worksheet (Figure 6) to assist in obtaining critical casualty information. For assistance, contact the Chief, Department of Preventive Medicine, USAMEDDAC at 956-0114.

b. In addition to the reports sent to the Medical Surveillance System, a DA Form 285 (U.S. Army Accident Investigation Report) will be completed by the Unit Safety Officer for military heat and cold injuries when applicable. A CA-1 Form (Federal Employee's Notice of Traumatic Injury and Claim for Continuation of Pay/Compensation) will be completed by supervisors for civilian heat and cold injuries in accordance with the provisions of AR 385-40.

c. Reports of heat and cold injuries are critical in identifying deficiencies in unit training and/or risk management. All efforts should be made to provide timely reports to the proper proponents. Supporting Preventive Medicine personnel should be incorporated into the report process whenever available.

JOHN F. CAMPBELL
Major General, USA
Commanding

Official:


JEFFREY W. YAEGER
Director, Mission Support Element

DISTRIBUTION:
INTRANET

FIGURE 5

HEAT INJURY INTERVIEWER'S WORKSHEET

PART I				
1. Patient's Name (Last, First MI)		2. Rank	3. SSN	4. Unit
5. Age	6. Race	7. Gender	8. Height	9. Weight
9. Diagnosis (Check Appropriate Blocks)				
a. Status of Diagnosis		b. Diagnosis		c. Rectal Body Temperature
Initial _____	Sunburn _____	Heat Cramps _____		d. Blood test Conducted?
Final _____	Heat Rash _____	Heat Exhaustion _____		Date _____
	Dehydration _____	Heat Stroke _____		Results _____
	Over Hydration _____			
Part II				
1. Activity engaged in at time of heat injury (e.g. 12 mile march, APFT Exam):				
2. At what phase of activity did heat injury occur (e.g. 3 mile mark of 12 mile march):				
3. History of previous heat injury:		Details of previous heat injury (when, where, activity engaged in):		
YES: _____ NO: _____				
Type of injury: _____				
4. WBGT Index Reading at time of heat injury (Contact PVNTMED, Env. Health at 798-8695):				
5. Control measures employed by casualty and/or unit (if none, so state):				
6. Action taken by person to whom patient first reported:				
7. List clothing and equipment patient was wearing at the time of heat injury (e.g. MOPP gear, body armor):				
8. Physical condition of the heat casualty at time of heat injury:				
Overweight: _____ Fatigue/lack of sleep: _____ Recent Immunizations: _____ Tobacco Use: _____				
Prescription or OTC Drugs taken: _____ Recent Illnesses (within 2 weeks): _____				
Special Diet (Atkins diet, vegetarian): _____				
9. Geographic location where heat injury occurred:				
10. Medical Treatment Given:				
No. of IV bags: _____		Amount of Duty Time Lost: _____		Quarters/Profile Given: _____
11. Remarks (Give description of event as it occurred including list and onsite time of symptoms displayed):				
INTERVIEWER'S NAME:				DATE:
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FIGURE 6

Cold Injury Interviewer's Worksheet

PART I				
1. Patient's Name (Last, First MI):		2. Rank:	3. SSN:	4. Unit
5. Age:	6. Race:	7. Gender:	8. Height	9. Weight:
PART II				
1. Date/Hour Patient Treated:		2. Date/Hour Patient Admitted:		
3. Diagnosis, Comments (Symptoms, etc.):				
4. Has patient had a previous cold injury? _____ If yes state type, date: _____				
5. Type of activity patient was involved in at the time symptoms were first noticed:				
6. Type of protective clothing worn at time of injury:				
7. Has patient received cold weather training in past six months? If yes, describe training:				
8. Were warming facilities available during training event? If yes, did patient use them?				
9. Previous duty station and date departed:				
10. Date assigned to present duty station:		Patient's Time in Service:		
PART III				
1. Ambient air temperature at time of injury:		2. Wind chill factor at time of injury:		
INTERVIEWER'S NAME:		DATE/TIME:		
<p>This document may contain information covered under the Privacy Act, 5 USC 552(a), and/or the Health Insurance Portability and Accountability Act (PL 104-191) and its various implementing regulations and must be protected in accordance with those provisions. Healthcare information is personal and sensitive and must be treated accordingly. If this correspondence contains healthcare information it is being provided to you after appropriate authorization from the patient or under circumstances that don't require patient authorization. You, the recipient, are obligated to maintain it in a safe, secure and confidential manner. Re-disclosure without additional patient consent or as permitted by law is prohibited. Unauthorized re-disclosure or failure to maintain confidentiality subjects you to application of appropriate sanction.</p>				

Commander's, Senior NCO's and Instructor's 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 (Over Hydration)	Critical-Catastrophic

The Five Steps of Risk Management are:

1 Identify Hazards

- H**igh heat category, especially on several sequential days
(Measure WBGT when ambient temperature is over 75° F)
- E**xertional level of training, especially on several sequential days
- A**cclimatization (and other individual risk factors – see table below)
- T**ime (length of heat exposure 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
- Poor fitness (Unable to run 2 miles in < 16 minutes)
- Overweight
- Minor illness (cold symptoms, sore throat, low grade fever, nausea, vomiting)
- Taking medications (either prescribed or over the counter)/ supplements/ dietary aids Ex: Allergy or cold remedies, Ephedra supplement
- 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 sun burn which prevent effective sweating
- Age > 40 years

2 Assess Hazards

- When ambient temperature is over 75° F, constantly assess the heat category using Wet Bulb Globe Temperature (WBGT)
- 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 cords
 - 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).

The following matrix has been used successfully through experience by Commanders.

Example of a Heat Injury Risk Management Matrix

Scores assigned to different conditions based on risk for developing a heat injury.
This scoring system: 0= Low risk; 1=Medium risk; 2=High risk; 3=Extreme risk

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)	None (Less than Category 1)	Category 1	Category 2 and 3	Category 4 and 5
No. Sequential Days Heat Cat 5	0	1	2-3	≥4
Heat Injuries in the unit in Past 2 Days	None	Heat Cramps	Heat Exhaustion	Heat Stroke*
Work in Past Two Days (see below)	Easy	Easy	Moderate	Hard
Projected Work for the Present Day	Easy	Easy	Moderate	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	1-8 Month	< 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

Cumulative score: 25-33 = extreme risk, 16-24 = high risk, 7-15 = medium risk, 0-6 = low risk.

* If Heat Stroke has occurred in unit in past 2 days, risk level= extreme risk

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, < 40lb Load • Calisthenics • Patrolling • Individual Movement Techniques. i.e. low crawl, high crawl 	<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

Education

- 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.

Planning

- Adjust the training schedule to minimize consecutive days of heavy physical training, 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:
 1. Time of day the training is conducted – morning is cooler
 2. Location of training
 - Sun vs. shade. Rest in shade.
 - Open vs. protection from wind - wind has cooling effect
 - Open up the formation to decrease heat strain.
 3. Clothing
 - Heavy, restrictive vs. loose, lightweight
 4. Where in training cycle
 - Most Heat Casualties occur in the 2nd or 3rd week of Recruit training.
 - Acclimatization can take 7-14 days, depending on the physical condition of the trainee.
- After moderate to hard work in heat category ≥ 3 ; take cold, nude showers at the end of the day.

Identification

- Identify previous heat exhaustion or heat stroke soldiers and mark visibly on uniform (tape or cord).
- Identify overweight soldiers and soldiers who are unfit.
- Identify soldiers on medications and mark visibly on uniform (tape or cord).
- Seriously consider taking soldiers out of training who have had alcohol within the last 24h. Seriously consider having ill soldiers seen on sick call.
- Note and document heat category hourly. Position WBGT at site of training.

Develop a Hydration Monitoring System

- Examples of monitoring methods:

- Riley (water) card. On the card, Battle buddy is to write the amount of water the soldier has drunk.

Water Consumption Card							
Name:							
Time	Mon	Tue	Wed	Thu	Fri	Sat	Sun
0600-0800							
0800-1000							
1000-1200							
1200-1400							
1400-1600							
1600-1800							
1800-2000							
2000-2200							
2200-2400							
2400-0200							
0200-0400							
0400-0600							
0600-0800							
0800-1000							
1000-1200							
1200-1400							
1400-1600							
1600-1800							
1800-2000							
2000-2200							
2200-2400							
2400-0200							
0200-0400							
0400-0600							

- 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 quart) of water.



3

Develop Controls continued

Know Standardized Guidelines for Warm Weather Training Conditions

Fluid Replacement and Work/Rest Guide

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

- The work-rest times and fluid replacement volumes will sustain performance and hydration for at least 4 h of work in the specified heat category. Fluid needs can vary based on individual differences (\pm ¼ qt/h) and exposure to full sun or full shade (\pm ¼ qt/h).
- NL= no limit to work time per hour.
- Rest means minimal physical activity (sitting or standing), accomplished in shade if possible.
- **CAUTION:** Hourly fluid intake should not exceed 1½ quarts.
- Daily fluid intake should not exceed 12 quarts.
- If wearing body armor add 5°F to WBGT in humid climates
- If wearing NBC clothing (mission-oriented protective posture (MOPP 4)), add 10°F to WBGT index for easy work, and 20°F to WBGT index for moderate and hard work.

Easy Work = Walking hard surface 2.5 mph <30# load, Weapon maintenance, Marksmanship training
 Moderate Work = Patrolling, Walking sand 2.5 mph no load, Calisthenics
 Hard Work = Walking sand 2.5 mph w/load, Field assaults

Continuous Work Duration and Fluid Replacement Guide

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

It is assumed the trainees performing these continuous effort tasks have not yet had heat stress or dehydration prior to this activity and will have several hours of 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

- NL can sustain work for at least 4 hours in the specified heat category.
- Fluid needs can vary based on individual differences (\pm ¼ qt/hr) and exposure to full sun or full shade (\pm ¼ qt/hr).

4

Implement Controls



Decision to accept risk is made at the appropriate level

- Made in accordance with appropriate MACOM regulation



Identified controls are in place

- Update WBGT hourly when ambient temperature is $\geq 75^{\circ}\text{F}$.
- Adhere to work/rest cycle in high heat categories. Rest in shade.
- 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 1 ½ quarts per hour or 12 quarts 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 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 NCO's, 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 injuries 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
 - 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 (e.g.: range).
- MOPP 4: Add 10°F to WBGT index for easy work, and 20°F to WBGT index for moderate to hard work.

5

Supervise & Evaluate

- Enforce SOPs
- Delegate authority 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 cadre 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. Ask recruits when did they last urinate and was their urine clear?
- If 1-2 recruits become heat casualties, stop all training and evaluate each soldier for early signs and symptoms of becoming an impending heat casualty.
- 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

Indications of possible Heat Casualty	
<p>More Common Signs / Symptoms</p> <ul style="list-style-type: none"> • Dizziness • Headache • Nausea • Unsteady walk • Weakness or fatigue • Muscle cramps 	<p>Immediate Actions</p> <ul style="list-style-type: none"> • Remove from training • Allow casualty to rest in shade • Loosen clothing • Take sips of water • While doing the above, call for a Medic to evaluate the soldier (Medic will monitor temperature and check for mental confusion) <p>If no medic is available call for ambulance or Medevac</p>
<p>Serious Signs / Symptoms</p> <ul style="list-style-type: none"> • Hot body, high temperature • Confusion, agitation (Mental Status Assessment) • Vomiting • Involuntary bowel movement • Convulsions • Weak or rapid pulse • Unresponsiveness, coma 	<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 over casualty and fan. • Give <u>sips</u> of water while awaiting ambulance (if conscious) • Monitor airway and breathing until ambulance or Medevac arrive

5

Supervise & Evaluate continued

Indications of possible Water Intoxication (Over Hydration)

Signs and Symptoms

Confusion
Weakness
Nausea
Vomiting

What to do:

Ask these questions to the soldier or battle buddy:

1. Has soldier been eating? Check rucksack for # of MRE's left.
2. Has soldier been drinking a lot? (suspect water intoxication if soldier has been drinking constantly).
3. How often has soldier urinated? (frequent urination seen with water intoxication; infrequent urination with heat illness)
4. What color is urine (clear urine may indicate over hydration)

If soldier has been eating, 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 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?

(Is not aware of location or surroundings.)

What were you doing before you became ill?

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

Appendix B
Cold Injury Risk Management Guide

UNIT LEADER'S AND INSTRUCTOR'S 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 MANAGEMENT:

- | | |
|--|--|
| <input type="checkbox"/> Chills
(due to bare skin exposed to cold, humid air) | <input type="checkbox"/> Hypothermia
(whole body temperature dangerously low) |
| <input type="checkbox"/> Immersion Foot (Trench Foot)
(due to wet feet) | <input type="checkbox"/> Dehydration |
| <input type="checkbox"/> Frostbite (freezing of tissue and body parts) | <input type="checkbox"/> Snow Blindness |
| | <input type="checkbox"/> Carbon Monoxide Poisoning |

THE FIVE STEPS OF RISK MANAGEMENT ARE:

1

IDENTIFY HAZARDS

- | | |
|---|--|
| <input type="checkbox"/> Cold (temperature 40°F and below) | <input type="checkbox"/> Other Risk Factors include: |
| <input type="checkbox"/> Wet (rain, snow, ice, humidity) or wet clothes | • Previous cold injuries or other significant injuries |
| <input type="checkbox"/> Wind (wind speed 5 mph and higher) | • Use of tobacco/nicotine or alcohol |
| <input type="checkbox"/> Lack of adequate shelter/clothing | • Skipping meals/poor nutrition |
| <input type="checkbox"/> Lack of provisions/water | • Low activity |
| | • Fatigue/sleep deprivation |
| | • Little experience/training in cold weather |
| | • Cold casualties in the previous 2-3 days |

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/POL (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?

2

ASSESS HAZARDS CONTINUED

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 (running, riding in open vehicles, or helicopter downwash) has the same effect as wind.
- Any dry clothing (mittens, scarves, masks) or material which 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 higher wind chill temperatures, especially on extended exercises/missions and/or in wet environments.
- Can lead to permanent disability, just like frostbite.



Wind Chill Chart



		Temperature (°F)																	
		40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
Wind (mph)	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	-38	-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
	55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98	

Frostbite Times 30 minutes 10 minutes 5 minutes

Wind Chill (°F) = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})
 Where, T= Air Temperature (°F) V= Wind Speed (mph) Effective 11/01/01

3

CONTROL HAZARDS

MAIN POINTS TO STRESS TO SOLDIERS

When using Cold-Weather Clothing, Remember . . .

C-O-L-D 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 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 and Dry

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 MRE's.

Hydration: 3-6 Liters (canteens) / day / soldier. Warm, sweet drinks are useful for re-warming.

Camouflage: Obscures detection of cold injuries; not recommended below 32°F.

Responsibilities: Soldiers are responsible for preventing individual cold injuries. Unit NCO's are responsible for the health and safety of their troops. **Cold injury prevention is a command responsibility.**

3

CONTROL HAZARDS CONTINUED

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 tobacco products which decrease blood flow to skin.
- Eat all meals to maintain energy.
- Drink water or warm non-alcoholic 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-lighten boot 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.

3

CONTROL HAZARDS CONTINUED

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.
- ☐ Face camouflage paint should not be used when air temperature is below 32°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 re-warming of feet, hand, ears or face.

Prevent Carbon Monoxide Poisoning

- ☐ Use only Army-approved heaters in sleeping areas.
- ☐ 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 chart page 2).
- ☐ Use covered vehicles for troop transport.
- ☐ Have warming tents available.
- ☐ 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

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

FIGURE 7

Profile Progression Recommendations for the Soldier with Heat Stroke (HS) without or with Sequelae, or Complex HS or Heat Exhaustion (HE), Heat Injury (HI) Pending an MEB

Profile Code*	Restrictions**	HS without Sequelae	HS with Sequelae	Complex HS or HE/HI Pending MEB
T-4 (P)	Complete duty restrictions.	2 weeks	2 week minimum; advance when clinically resolved.	2 week minimum; advance when clinically resolved.
T-3 (P)	Physical Training and running/walking/swimming/bicycling at own pace and distance not to exceed 60 min per day. No maximal effort; no APFT; no wear of IBA; no MOPP gear; no ruck marching. No airborne operations (AO).	1 month minimum	2 months minimum	Pending MEB
T-3 (P)	Gradual acclimatization according to TB Med 507. No maximal effort; no APFT; no MOPP IV gear. IBA limited to static range participation. May march with a ruck sack at own pace/distance with no more than 30 lbs. Non-tactical Operational Environment (OE) permitted.	1 month minimum	2 months minimum***	N/A
T-2 (P)	Continue gradual acclimatization. May participate in unit PT; CBRN training with MOPP gear for up to 30 min; IBA on static and dynamic ranges for up to 45 min; no record APFT. Ruck march at own pace/distance with no more than 30 lbs up to 2 hrs. Non-tactical OE permitted.	N/A	Pending completion of 30 day heat exposure requirement, if not accomplished during prior profile***	N/A
<p>*Temporary Profile: Physical Category P (PULHES). **Soldiers manifesting no heat illness symptomatology or work intolerance after completion of profile restrictions can advance and return to duty without an MEB. Any evidence/manifestation of heat illness symptomatology during the period of the profile requires an MEB referral. ***HS with Sequelae return to full duty requires a minimum period of heat exposure during environmental stress (Heat Category 2 during the majority of included days).</p>				