



UNITED STATES MARINE CORPS  
 2D MARINE DIVISION (REIN), FLEET MARINE FORCE  
 CAMP LEJEUNE, NORTH CAROLINA 28542

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DivO 6200.1A  
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DIVISION ORDER 6200.1A

From: Commanding General  
 To: Distribution List

Subj: Cold Injury

Ref: (a) NAVMED P-5052-29 (NOTAL)

Encl: (1) Wind Chill Conversion Factors

1. Purpose. To promulgate information regarding cold injury and its prevention and management.
2. Cancellation. DivO 6200.1.
3. Discussion. Cold injury, as defined by the reference, is "... tissue trauma produced by exposure to cold." Other definitions pertaining to cold injury are contained therein, but are of interest primarily to medical personnel and are not included in this Order. The following factors affect the individual during cold weather operations:

a. Host Factors

(1) Age. Within the usual age range of combat personnel, age is not a significant factor.

(2) Previous Cold Injury. A previous episode of cold injury definitely increases the individual's susceptibility to subsequent cold injury not necessarily involving the part previously affected.

(3) Fatigue. Fatigue is a factor contributory to cold injury. Mental weariness may cause apathy leading to neglect in acts vital to survival.

(4) Discipline, Training, and Experience. Cold injury is a preventable injury. Proper use of simple preventive measures, enforced by officers and NCO's, will markedly reduce the incidence of cold injury. Individual and unit discipline, training, and experience are closely related in their influence upon the incidence of cold injury. Well

trained and disciplined personnel suffer less than others from the cold as they have the ability to care for themselves better than those personnel that have little discipline or supervision in regard to personal hygiene, care of the feet, changes of clothing, exercise of the extremities when the individual is required by the tactical situation to remain relatively motionless (pinned down), and similar effective preventive measures.

(5) Psychosocial Factors. Cold injury tends to occur with greater frequency within the class of passive, negativistic individuals who tend to display little muscular activity, and who are prone to be negligent in carrying extra footwear, and changing socks when needed to reduce the incidence of cold injury.

(6) Race. In terms of numbers at risk, and independent of geographic origin, the Negro appears to be more vulnerable to frostbite than the Caucasian.

(7) Geographic Origin. Caucasian personnel from warmer climates in the United States (where the mean minimum January temperature is above 20°F) appear to be predisposed to cold injury. The basic factor involved; however, may well be psychosocial and educational rather than geographic.

(8) Nutrition. Starvation or semistarvation contributes to cold injury.

(9) Activity. Too great or too little activity may contribute to cold injury. Overactivity can cause the loss of large amounts of body heat by perspiration, which becomes trapped in the clothing, markedly reducing the clothing's insulation quality. Conversely, immobility causes decreased body heat production with the resultant danger of excessive cooling, especially of the extremities and pressure areas of the body.

(10) Drugs and Medication. Physicians should advise patients of any adverse effects on peripheral circulation or sweating when prescribing drugs and medications in cold climates.

(11) Alcohol. Because of its questionable vascular effects, coupled with its influence on judgement, alcohol should be avoided under conditions of extreme cold.

b. Environmental Factors

(1) Weather. Weather is a predominant influence in causing cold injury. Temperature, humidity, precipitation, and wind modify the rate of body heat loss. Low temperatures and low relative humidity favor frostbite, whereas higher temperatures combined with moisture are usually associated with trench foot. The wind chill effect is shown in the enclosure and must be thoroughly understood by all personnel in areas where cold injury is possible.

(2) Type of Combat Action. The incidence of cold injury varies greatly according to the type of combat action. Units in reserve or in rest areas have few cases; on holding missions or on static defense, exposure is greater and a moderate increase in incidence is expected; on active defense or offense, lack of opportunity to rewarm and change clothing or carry out personal hygienic measures, fatigue, and the state of nutrition may all be involved.

(3) Clothing. The importance of adequate clothing, properly fitted and warm, cannot be overemphasized as this is the primary factor essential to survival in cold weather. Utilizing the layering principle, cold weather clothing is designed to be worn as an assembly for protection of the head, torso, and extremities. Failure to wear the total assembly, and inadequate supplies of proper sizes of clothing are important factors in cold injury. Loose layers of clothing with air space between them, under an outer wind-and-water resistant garment provide maximum protection. It is flexible in that inner layers may be removed for comfort and efficiency by permitting escape of perspiration in higher ambient temperatures or during strenuous physical exertion. Clothing, wet by perspiration, loses much of its insulating value, and care must be taken to prevent perspiration from accumulating in the clothing. In all forms of cold injury, prevention of loss of body heat is important. All articles of clothing must be worn loosely to avoid constriction and tightness.

4. Prevention of Cold Injury. In order to prevent cold injury, the following personal measures must be enforced:

a. 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. Avoid tight fitting uniforms and articles of clothing. They are dangerous in cold climates.

b. Keep the hands well protected. Mittens are more protective than gloves. Avoid lengthy exposure of bare hands and wrists which will cause stiffening and reduce circulation as

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a lengthy period of time is required to recondition the hands to normal usage after extended exposure to the cold. DO NOT TOUCH METAL, SNOW, OR OTHER COLD OBJECTS WITH BARE HANDS. DO NOT SPILL GASOLINE OR OTHER FUELS ON SKIN OR CLOTHING.

c. Remove excess clothing when in a warm enclosure or in front of a fire to avoid sweating and undue dilation of skin blood vessels.

5. Treatment of Cold Injury. The treatment of a cold injury depends upon the time elapsed after the injury, the severity of the injury, the presence of complications, and the area of the body affected. In military operations, treatment will be influenced by the tactical situation as well as the facilities available for the evacuation of casualties. Most cold injuries appear en masse, during periods of intense combat, and at the time that large numbers of other casualties occur. The examination and treatment of life-endangering wounds must take precedence over cold injuries. Individualized treatment of patients is difficult during military operations because of the large numbers requiring simultaneous treatment. The treatment of cold injury is divided into the buddy system or first aid, initial or emergency medical treatment in forward areas, and definitive treatment after the patient has reached a hospital. The following procedures are applicable:

a. First Aid

(1) Restrict the patient from his 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, and/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.

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

(4) If the lower extremity is involved, treat as a litter patient with the part level or slightly elevated. In unusual circumstances where travel on foot is the only means of evacuation for frostbite of the feet, thawing the injured area is not indicated until the patient reaches an aid station and medical help.

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b. Initial or Emergency Treatment

(1) In many ways, cold injury is not unlike a burn. It should never be treated lightly as the tissue loss and the nerve damage associated with cold injury frequently result in permanent disability. The two most important tenets in the treatment of cold injury are conservative surgical treatment and prevention of infection. If a diagnosis of cold injury is made, the patient should be restricted from his usual activities or duties until the severity of the injury can be determined.

(2) All constricting items of clothing, such as boots, gloves, and socks should be carefully removed from the site of injury.

(3) If freezing has occurred and the affected tissue is still frozen, it should be rapidly thawed in a water bath carefully controlled at 40°C (104°F) not to exceed 42°C (109°F). Thawing is determined by return of sensation (usually pain), return of color (frequently deep red or even purple), and the observation that the tissue is soft and no longer brittle or hard. If warm water and a thermometer are not available, the frozen part may be warmed with body heat from another portion of the body (e.g., armpit) or another person. Under no circumstances should snow, ice, water, grease, massage, walking, or dry heat be used.

(4) Smoking is prohibited in all types of cold injuries. Nicotine causes vasoconstriction and may further decrease the blood supply to the injured tissue. Mild stimulants such as tea or coffee are useful, especially if the patient is generally cold. Alcohol is not recommended because of its variable effect on peripheral blood flow.

(5) All patients with cold injuries of the lower extremities should be treated as litter patients. The affected part should be level or elevated slightly. Extreme care must be taken to prevent further trauma and infection.

(6) Blisters should not be ruptured. Salves, ointments, and greases are not recommended. If transport is necessary, the affected part should be loosely wrapped with fluff bandages of sterile gauze, care being taken to prevent chaffing.

(7) Tetanus toxoid (0.5cc I.M.) booster should be administered.

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(8) Prophylactic antibiotics for the cold injury are not advised at this time. If infection is apparent, suitable antibiotics should be started, preferably after a culture is taken.

(9) All victims of cold injury should be evaluated by a medical officer at the earliest possible time.

c. Definitive Treatment

(1) Absolute bed rest is mandatory for those patients with cold injury of the feet. Bed rest should be maintained in first and second degree cold injuries until subsidence of edema and/or complete drying of blisters have occurred. Patients with third degree injuries should remain at bed rest until the area of ulceration is epithelialized or definitive surgery has been completed.

6. Action. Commanders at all echelons shall establish an effective cold injury prevention program that includes the following:

a. A thorough appreciation and understanding of the potential troop losses as a result of cold injury by command, staff, technical personnel, and all combat components alike.

b. Full command support of a comprehensive and positive cold injury prevention and control program.

c. Training of all personnel in the early recognition of cold injury.

d. Indoctrination of all personnel in individual and unit cold injury prevention, and control in the utilization of clothing and equipment to avoid exposure to cold.

e. An effective clothing supply program that provides for daily resupply of the most remote forward combat personnel.

f. The establishing of facilities to ensure appropriate sizing and fitting of clothing and footwear for cold weather, and the correct utilization of the clothing and proper assembly by all combat personnel.

g. The establishing of a thorough training program to ensure a high level of foot and clothing discipline for individual and unit alike.

h. The establishing of a personnel replacement system under which all combat units rotate individuals and units according to the degree of exposure, whenever possible.

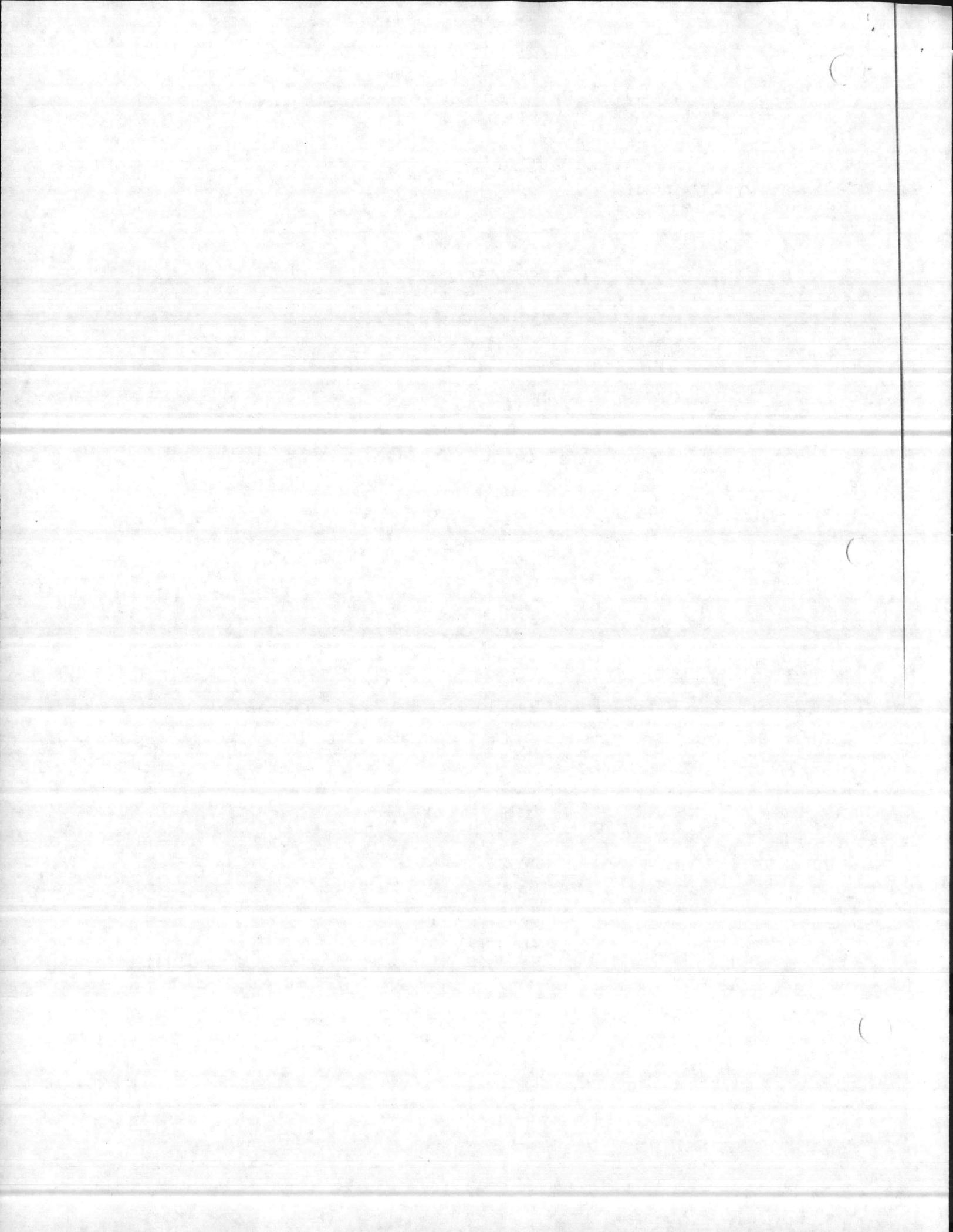
i. The establishing of effective and sound triage policies and practices in forward areas, plus provisions for early evacuation and treatment of patients actually suffering from cold trauma.

*W. H. Rice*  
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Chief of Staff

DISTRIBUTION: A

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WIND COLD CONVERSION FACTORS

Estimated wind speed (in mph)	Actual Thermometer Reading ( F.)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	EQUIVALENT TEMPERATURE ( F.)											
calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-124
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-21	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
(wind speeds greater than 40 mph have little additional effect.)	LITTLE DANGER (for properly clothed person) Maximum danger of false sense of security.			INCREASING DANGER Danger from freezing of exposed flesh.				GREAT DANGER				
Trenchfoot and immersion foot may occur at any point on this chart.												

ENCLOSURE (1)

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