SUSTAINING SOLDIER HEALTH AND PERFORMANCE IN SOMALIA: GUIDANCE FOR SMALL UNIT LEADERS

Prepared by the Staff of the

U.S. Army Research Institute of Environmental Medicine
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Washington, DC 20307-5100

December 1992

U.S. ARMY MEDICAL RESEARCH AND DEVELOPMENT COMMAND
FORT DETRICK, MARYLAND 21702-5012

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SUSTAINING SOLDIER HEALTH AND PERFORMANCE IN SOMALIA

FOREWORD

U.S. military forces are deploying to Somalia, an alien and formidable environment along the northeastern African coast. Deploying soldiers, sailors, and airmen will confront a very harsh climate, exposure to disease risks, military stresses associated with peacekeeping duties, and the psychological burdens of witnessing an unfolding human tragedy.

Members of the U.S. Army Medical Research and Development Command (USAMRDC) prepared this handbook of preventive medicine guidance to assist unit leaders in Somalia.

This handbook is intended as a guide and reference for unit Commanders and NCOs. It includes pointers for sustainment of health and performance throughout predeployment, deployment, operations, and redeployment. It addresses a broad range of important health issues including: nutrition, hydration, managing work and environmental exposure, avoiding

disease hazards, and maintaining morale in the face of human suffering.

This guidance draws heavily upon knowledge gained by USAMRDC medical researchers over the past fifty years in laboratory and field observations made by personnel accompanying troops deployed around the world in training, peacekeeping, and combat operations.

This document is not intended to replace policy and doctrine established by Headquarters, Department of the Army, Training and Doctrine Command, Forces Command, Central Command, or contained in Technical Bulletins and other official publications, but to make this Command's "lessons-learned" available expeditiously.

We encourage users to provide critical comments and examples of their own "lessons-learned" during operations in Somalia to:

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Key Preventive Medicine Measures

Predeployment:

-Start taking malaria prevention pills
-Get required immunizations
-Pack 6-month supply of prescription medication
-Pack individual skin and eye protection (such as insect repellent, sunglasses, sunscreen and lip balm)
-Treat uniforms and mosquito netting with insect repellent
-Maintain physical fitness
-Review SOP for water discipline, work/rest cycles, sleep discipline, field sanitation, and buddy aid/first aid
-Pack 6-months supply of personal hygiene products (women)
-Provide education on Somali culture and current disaster situation
-Establish buddy system for health maintenance
-Bring 2 pairs of glasses; do not plan to wear contact lens

Deployment:

-Continue taking malaria prevention pills
-Minimize jet lag and sleep loss

-Avoid alcohol, caffeine, nicotine, and carbonated beverages
-Schedule and eat regular meals
-Drink plenty of fluids
-Apply insect repellent and sunscreen before landing
-Exercise caution; accidents and heat injury are common during early phases
-After landing, pace work, seek shade, and immediately rehydrate

Operations:

-Continue taking malaria prevention pills
-Assume all water, beverages and food from non-US military sources are contaminated
-Enforce mandatory drinking schedules and carry water at all times
-Do heavy work and physical fitness training during the cooler parts of the day
-Increase work and physical fitness training gradually for 7 to 14 days to improve heat acclimatization
-Schedule and eat regular meals
-Enforce sleep discipline
-Use insect repellent and sunscreen
-Defecate only in constructed latrines or designated areas
-Take a sponge bath or shower once per day
-Sleep under a mosquito net
-Avoid contact with wild and domestic animals
-Don’t bathe, swim, or wade in unapproved water sources
-Keep soldiers informed
-Schedule recreation
-Schedule regular stress debriefings
-Stress safety to prevent accidents

Redeployment:

-Continue taking malaria prevention pills for four weeks

-Report any illness to medical professionals
-Prepare for reunion with family members

INTRODUCTION

Somalia has a harsh environment unfamiliar to many U.S. military personnel who have trained in more temperate climates with better public health. The environmental and socioeconomic conditions in Somalia today, including large numbers of malnourished people living and dying in impoverished conditions, create a vast array of health hazards. Mission requirements will interact with these conditions causing more health hazards. The risks encountered will vary with the mission, but all deployed personnel will be exposed to serious health hazards during service in Somalia. If these hazards are allowed to affect unit personnel, they will seriously degrade the unit's ability to perform its mission.

The success of a unit depends upon keeping its members fit and healthy.

This guide is designed to help unit leaders accomplish the mission by sustaining health and fitness while in Somalia. It provides an aid to identify the health hazards found in Somalia, many of which are different from those seen in other recent operations, including Desert Storm. The guide describes actions that can be taken to control these health hazards. Because it is designed specifically to meet the needs of non-medical units, the guide does not provide detailed medical information.

The guide is organized to be both a pre-deployment resource and a reference during operations. It groups health hazards into broad categories that are operationally relevant and easy to remember. It provides enough background information to understand and identify the

hazards. It also provides suggestions to prevent or control those hazards. The guide is best used by reading it in its entirety to facilitate planning and then using it as a reference during operations.

CLIMATE OF SOMALIA

Somalia, a country along the northeast African coast, is not quite as big as Texas. It straddles the equator with the Indian Ocean on the east, the Gulf of Aden on the north, Ethiopia and Djibouti on the west and Kenya on the southwest border. The only hilly terrain in the country is the OGO HIGHLANDS in the north. The highlands give way to the HAUD PLATEAU marked by dry watercourses. Further south, the land becomes flat, consisting mainly of the MUDUG PLAIN and the SOMALIA PLATEAU. The only two significant rivers, the JUBA and the WABI SHABELLE, flow south through the Somalia Plateau into the Indian Ocean. The area between the rivers is the richest part of the country agriculturally. Vegetation outside this area is mainly sparse savannah grass and thorn trees. MOGADISHU, the capital, is the largest city and commercial center. Somalia has almost no transportation facilities, no railroads and few paved roads. Major airports are at Mogadishu, in the south, and at Hargeysa, in the north. Deep water ports are at Mogadishu, Chisimayu, Marka, and Berbera.

The climate is hot, ranging from dry desert to wet tropics. The average daily high temperature ranges from 85°F (29°C) in the winter months to more than 100°F (38°C) during the summer months. Along the coasts, compounding the high temperatures is an average relative humidity in excess of 70% creating an exceedingly hot humid environment. Inland areas are generally dry with extended periods of no rainfall.

The weather can be divided into two dry seasons (Northeast Monsoon and Southwest Monsoon) and two wet seasons (Spring transition and Autumn transition). In Somalia, the Monsoon seasons are windy but dry. The Northeast Monsoon is December through March and produces some precipitation in the highlands. During this season, high temperatures range from 80°F (27°C) in the highlands to 110°F (43°C) in the southern interior. Conditions during the Spring Transition (April through May) are at their worst, with low clouds, showers and thunderstorms seen primarily in the south. Temperatures range from the upper 80s° F (27°C) in the south to near 100°F (38°C) along the northern coast. If rains are heavy, flooding can occur in areas along and between the two rivers. The Southwest Monsoon (May through October) brings a return to infrequent showers over the southern part of the country with sustained strong winds, blowing sand, and dust. Temperatures range from the 80s° F (27°C) in the south to well over 100°F (38°C) along the Gulf of Aden. The Fall Transition (October through November) includes the second and shorter rainy season. However, climatic conditions are not as bad, nor as long lasting, as during the Spring Transition.

ENVIRONMENTAL RISK FACTORS

Somalia has a harsh and unfamiliar environment. Even those personnel who deployed to Southwest Asia (SWA) will not be familiar with the conditions in Somalia. A number of environmental and disease risks will be encountered on a daily basis. Soldiers will be at risk for a multitude of diseases not found in CONUS. The threat from the environment and diseases are interrelated. The combination of conditions in Somalia, including large numbers of refugees, causes a vast array of health threats.

A. HEAT

The extreme heat of Somalia degrades physical performance and places each soldier at risk for heat illness. For optimum performance, body temperatures must be maintained within normal limits. Thus, it is important that the body loses the heat it gains from physical work or from the environment. Heat stress depends on physical activity, hydration, heat acclimatization, clothing, load carried, terrain, and climatic conditions. Leaders must watch their soldiers carefully for signs of distress in the heat and adjust work/rest schedules, work rates and water consumption according to conditions.

Normally, excess body heat is reduced by numerous physiological mechanisms. But when air temperature is above skin temperature, evaporation of sweat is the only mechanism for heat

loss. Following the loss of sweat, water must be consumed to replace the body's loss of fluids. If the body fluid lost through sweating is not replaced, dehydration will follow. Dehydration will lead to heat illness. High relative humidity limits sweat evaporation and increases heat stress.

1. Problems with Heat Stress.

a. Hot temperatures, high relative humidity and exposure to the sun make it difficult for the soldier to regulate body temperature.

b. Heat, wind and dry air increase water requirements, primarily through loss of body water as sweat. Sweat rates can be high even when the skin looks and feels dry, since sweat evaporates very quickly in dry air.

c. Dehydration cancels the benefits of heat acclimatization, increases the risk of heat illness, and reduces work capacity, appetite, and alertness. The greater the dehydration the more severe the effects.

d. **Thirst is a poor indicator of dehydration.** Soldiers do not sense when they are dehydrated and usually do not replace body water losses, even when drinking water is readily available. Soldiers under stress in hot environments will exhibit "voluntary dehydration." They maintain themselves about 1.5 quarts (qts) below their ideal hydration status without any sense of thirst.

Soldiers must consciously remind themselves, or be reminded, to replace water lost to sweat. Ensuring regular consumption of fluids is the responsibility of the unit leader. ***Guidelines for water replacement are provided at Appendix A.***

e. The key to preventing heat illness and sustaining performance is knowledge of the environmental conditions. Leaders must have accurate weather information for the location. Heat illness prevention guidance is based on Wet Bulb Globe Temperature (WBGT) readings (TB MED 507, FM 21-10, and GTA 8-5-45). Guidance is **approximate**. It was developed assuming that soldiers would be fully acclimatized, physically fit, fully hydrated and rested. If soldiers are not fully acclimatized and hydrated, the work-rest guidance must be moderated.

f. In very hot and humid conditions, reducing physical activity may be the only way to prevent dangerous rises in body temperature. Reduced work rates, longer rest periods and shaded, cooler work areas are effective countermeasures.

g. One heat casualty is usually followed by others. The occurrence of a heat casualty should be considered a warning that the entire unit may be at immediate risk - this is the Weak Link Rule: AS SOON AS THE FIRST HEAT CASUALTY OCCURS, ASSESS THE STATUS OF THE WHOLE UNIT.

h. At the first evidence of heat illness, have the soldiers stop work, get into the shade, and rehydrate. Early intervention is important. Sick soldiers who are not taken care of early become more serious casualties.

2. Heat Illness.

The following heat illnesses will be a constant risk in Somalia.

a. Heat Rash: a skin rash most commonly found on clothed areas of the body. Heat Rash can impair body heat loss and degrade performance for many days after it's disappearance. Heat rash can be avoided by practicing good hygiene.

b. Sunburn: a skin burn due to exposure to sun. Sunburn can impair body heat loss and degrade performance. Sunburn can be avoided by covering skin with clothing and sunscreen.

c. Heat Cramps: muscle cramps, involving less than the whole muscle mass, primarily abdomen, legs, and arms, due to excessive salt and water losses. Heat cramps most often occur in soldiers who are not acclimatized to the heat. Heat cramps can be avoided by maintaining proper nutrition and hydration.

d. Heat Exhaustion: fatigue, nausea, dizziness, fainting, vomiting, mild changes in mental function (e.g., disorientation, irritability), elevated temperature. Heat exhaustion can be avoided by employing appropriate work-rest cycles and maintaining full hydration (see Appendix A).

e. Heat Stroke: Can include all of the above signs and symptoms but is more severe and can be fatal. The victim will be hot and disoriented or unconscious. Heat stroke can be avoided by employing work/rest cycles and maintaining full hydration.

3. Control Measures for Heat Stress.

a. Acclimatization/Physical Fitness:

1) Attain the best possible physical fitness and heat acclimatization prior to deployment. Maintain adequate levels of physical fitness after deployment with maintenance programs tailored to the environment. Physically fit troops acclimatize to heat more rapidly than those less fit.

2) Units on alert, or identified for future deployment, should emphasize their physical training program and state of heat acclimatization (e.g., spend more time exercising in the heat where possible).

3) Significant acclimatization to heat can be attained in 4-5 days. Full heat acclimatization takes 7-14 days with 2-3 hours per day of carefully supervised exercise in the heat. Increase physical activity each day until full acclimatization is achieved.

Acclimatization requires that progressively more physical activity be performed each day. During the first two days of heat exposure, light activities such as recreation activities (e.g., softball) would be appropriate. By the third day of heat exposure, 2-mile unit runs at the pace of the slowest participants are feasible. Leaders should gradually increase the intensity of exercise each day, working up to an appropriate physical training schedule adapted for the environment.

4) **Acclimatization does NOT reduce, and may actually increase, water requirements.** Heat acclimatization increases sweating to enhance the evaporative cooling capacity of the body. Increased sweating requires additional water consumption. **IT IS DANGEROUS AND INAPPROPRIATE TO TRY TO REDUCE WATER CONSUMPTION**.

5) Soldiers may have a few days of increased salt requirements upon initial deployment because sweat is salty prior to acclimatization. Complete consumption of rations with use of salt packets is essential to provide an adequate salt intake. **Salt supplementation is not appropriate** unless medically indicated and supervised by medical personnel.

6) Maintenance-level PT programs should be conducted in the evening or at night when WBGT readings for your location do not exceed accepted guidelines.

WBGT guidelines do not accurately forecast illness rates under conditions of high humidity.

Humidity levels over 75% contribute to an increased risk of heat injury.

7) **Heat degrades mental performance as well as physical performance.** Rested, well-trained soldiers working on sedentary tasks should be able to work normally in the heat for up to four hours; after that intellectual performance will steadily deteriorate. Tasks which require

sustained attention (e.g., watching radarscopes, sentry duty) will be affected more quickly. Performance in the following jobs will be affected by heat stress: monotonous, repetitive, or boring tasks; tasks which require attention to detail and short-term memory (e.g., calculations, map plotting, coding messages, etc.); tasks which must be done quickly or according to a fixed schedule; tasks which require arm-hand steadiness; command and control tasks where confusion and misinformation are common. Reaction times and decision times are slower in the heat.

b. Hydration:

1) Leaders must understand the critical importance of maintaining hydration. Almost any contingency of military operations will act to interfere with the maintenance of hydration.

2) Establish mandatory drinking schedules which replace water lost by sweating. Use the tables provided in Appendix A to match the environmental and operational demands to the water requirement.

The body normally absorbs water at the rate of 1.2 to 1.5 quarts per hour. A reasonable upper limit for a total consumption estimate for a 12 hour work day is 12-15 quarts. Since sweat rates during work in the heat can often exceed 1 quart per hour, it is obvious that a rigorously enforced drinking schedule must be followed to ensure maintenance of hydration.

3) Plan operations to provide water resupply points at a maximum interval of every three hours. One-hour intervals are more desirable. Carry as much water as possible when separated from approved sources of drinking water. Assure soldiers always have at least one full canteen in reserve; know when and where water resupply will be available. Soldiers can live longer without food than without water.

4) Minimize voluntary dehydration by removing barriers to drinking. Make flavored, cool water accessible in a comfortable place, and provide enough time to drink and eat.

Provide cool water (60^{o}-70^{o}F, 16^{o}-21^{o}C) by shading, insulating, and camouflaging water buffaloes or by using small mobile chillers. Water bags will keep water as cool as the prevailing wet bulb temperature, although part of the bag's water will be lost to the process of evaporative cooling.

5) Carbohydrate\electrolyte beverages (sports drinks) are not required, and if used should not be the only source of liquid. For healthy soldiers, these beverages generally provide no advantage over water; however, they can promote greater drinking because of their flavor.

6) Drinking water does more good than splashing it on the skin. Water splashed on the skin is wasted water; it might briefly improve comfort, but does little to sustain performance and avoid heat illness.

7) Additional useful information can be found in FM 10-52, Water Supply in Theaters of Operations, 11 JUL 90.

c. Work/Rest Cycles:

1) Leaders must review procedures for the management of work/rest cycles and the critical need for maintaining adequate water consumption. **Establish mandatory work/rest schedules using the Tables in Appendix A.**

2) Body temperatures can rise very rapidly due of the combination of excessive heat and sustained activity. To prevent a dangerous increase in body temperature, minimize heat production by reducing work pace and increasing rest periods.

d. Reduce Exposure to Heat:

1) Whenever possible, plan to perform heavy work in the early morning or evening. Avoid the heat of the day.

2) Provide shade whenever possible; use canvas, ponchos, or parachutes, and allow for free air circulation.

3) Declining mental performance may not be noticed by soldiers; plan shorter work shifts, double check work products, and slow work pace.

4) Resting on hot ground increases heat stress; the more body surface in contact with the ground, the greater the heat stress. The ground heated by the sun is hot, usually 30-45 degrees hotter than air, and may reach 150^{o}F (66^{o}C) when air temperature is 120^{o}F (49^{o}C).

Cooler ground is just inches down; a shaded, shallow trench will provide a cool resting spot.

5) Soldiers often become dehydrated while traveling, especially if the trip is long. Water discipline is as important during travel as any other time. **Soldiers must be provided fresh drinking water immediately upon arrival in country.**

e. Clothing, Equipment and Supplies:

1) Uniforms should be worn to protect against sun, wind, sand and insects. Wear the uniform properly, tuck in the trousers and roll down sleeves. Use hats, head cloths, goggles and sunscreen.

Heat strain will be reduced by shielding the body from the sun and hot sand. Wearing the full Desert or Hot Weather Battle Dress Uniform reduces water requirements by limiting heat gain.

2) Change socks when they become soaked with sweat.

Prolonged wear of wet socks can lead to foot injury (e.g., increased risk of blisters). Sweat accumulation in the boot can be reduced by wearing a sock that is absorptive and thick enough to "wick" moisture away from the foot and toward the top of the boot where evaporation can occur (e.g., use a sock equivalent to the tan, ski-mountain sock, NSN 8440-00-153-6717).

3) Because clean clothing protects better and prevents skin rashes, whenever possible, wash clothing and air-dry or sun-dry. Carefully check for insects, snakes and scorpions and shake out boots, clothing and bedding which have been left unattended.

4. First Aid for Heat Illness.

a. Watch for signs of overheating which are: inability to work, red or flushed face, confusion or disorientation, fainting or collapse. It is always better to take care of a problem early. When in doubt, treat as a heat illness.

b. Immediately get heat-stricken soldiers into shade and remove any heavy clothing. If they are alert and not vomiting, have them slowly drink water. They will probably need at least 3 quarts. The water should be cool but not cold.

c. If enough disinfected water is available, wet the skin or T-shirt and fan the casualty for cooling.

d. If incoherent or unconscious and hot, the soldier may have heat stroke or some other serious illness and must be given the highest priority for medical evacuation. Immersion in cool or iced water is the quickest way of reducing body temperature. A field expedient immersion device can be built from tent canvas mounted in a frame off the ground. The water can then evaporate from the canvas and help to cool the bath. If an above-ground frame cannot be constructed, a shallow pit lined with canvas can be used.

e. For heat cramps, rehydration should be done with liquids that contain some added salt or electrolytes. If the victim can drink, give slowly, no more than 1.5 quarts per hour using either salted water (1-2 teaspoons or packets of table salt per quart) or the oral rehydration solution (described in the section on Control Measures for Food and Waterborne Illness) or commercial glucose/electrolyte beverages (sports drinks).

f. Although mild signs and symptoms may be controlled by rest, shade and water, **leaders should always seek medical evaluation for heat casualties.**

B. DUST, SAND & WIND

1. Problems with Dust, Sand and Wind.

a. Dust and sand cause health problems, particularly to skin and eyes. Soldiers must be alert to take care of problems early to avoid infection. Dry air, dust and wind dry out the nose and throat, and cause nosebleeds, coughing and wheezing. Cracked, chapped lips can make eating difficult and cause problems in communication. Cracked, chapped fingers can reduce manual dexterity. Body areas that collect dust and sand are susceptible to chafing, abrasion and infection. Likely areas for problems are ears, armpits, groin, elbows, knees, and feet. Clean these areas as often as possible using field expedient means (wet cloth, commercial wet-wipes, etc.).

b. Enclosed work areas protected from dust and sand will likely be very hot. Work/rest cycles and enforced drinking will be required. High wind can turn tent pegs and loose objects into flying missiles (which may be invisible in blowing sand).

2. Control Measures for Dust, Sand & Wind.

a. Units should provide each soldier with 2.7 gallons of water daily for personal hygiene (TRADOC Pam 525-11); at a minimum each soldier should take a daily "sponge bath".

In addition to promoting good hygiene, daily cleansing will facilitate optimal sweating and evaporative cooling.

b. The face and eyelids should be washed several times per day.

c. Contact lenses are very difficult to manage in the dry dusty environment of Somalia.

Great care must be taken to assure adequate cleanliness of contact washing and rinsing solutions. Contact-wearing soldiers who develop eye irritation should discontinue wearing them immediately and be examined by medical personnel for corneal infection or abrasion.

d. Drying of mucous membranes can be reduced by breathing through a wet face cloth or coating the nostrils with a small amount of petroleum jelly. Lips can be protected with "lip balm."

e. Neckerchiefs and bandannas can be used to protect the head and face in the field. Goggles (sun, wind and dust) should always be worn for eye protection when exposed to winds, dust and sand.

f. Moving vehicles create their own sandstorm, so soldiers traveling in open vehicles should wear protection, especially for the eyes.

g. Tents can be noisy in the wind and sleeping may become difficult; plan routes for air circulation to minimize "flapping."

INFECTIOUS DISEASE RISKS

Many more serious infectious diseases exist in Somalia than in the United States. Not only are many infectious diseases present, but the insects and other means of transmitting them are also present. Large numbers of displaced, malnourished, sick and dying people living in crowded unsanitary conditions increase the risk of epidemics. U.S. soldiers are particularly vulnerable because they have not been exposed to many of these diseases and have no immunity to them. In all major military conflicts involving U.S. troops in this century the leading cause of hospitalization has been infectious disease. Fortunately, leaders and soldiers can control the risk of infection.

Many of the diseases encountered in Somalia, even some of the potentially life threatening ones, begin with flu-like symptoms, headache, muscle aches, and fever. Therefore, flu-like symptoms should be treated seriously.

A. DISEASES FROM FOOD AND WATER CONSUMPTION

1. Problems with Food and Waterborne Illness.

Infectious diarrhea results from contamination of water and food by bacteria, viruses and parasites. Contamination occurs because of improper purification of water, inadequate cooking, handling or storage of food and water, and breakdowns in field sanitation. Water and food borne diarrheal disease are of particular concern to the military because they can be spread to large numbers of soldiers simultaneously with disastrous consequences for combat readiness. Diarrhea is the principal symptom, but nausea, vomiting, fever and other symptoms can be caused by these diseases. The most common condition is simple diarrhea with frequent, watery stools and abdominal cramping for 3 to 5 days. Other diseases, like typhoid, can be severe, even life-threatening. Parasites (amoebas, giardia, tapeworms, etc.) consumed in water or undercooked food, especially meat and fish, can cause prolonged diarrhea. Diarrhea, especially when vomiting or fever are present, can cause dehydration.

2. Control Measures for Food and Waterborne Illness.

These measures are the key to preventing illnesses from consumption of food and water. Units that do not follow strict guidelines and procedures will develop diarrheal illnesses.

a. Soldiers should drink water or beverages only from approved U.S. military water points, which are properly treated and tested sources. Be aware that even bottled water from unknown or unapproved sources can be contaminated. If in doubt, soldiers should treat water in their canteens with iodine tablets. **Assume all ice is contaminated.**

b. **Only food from approved U.S. military sources should be consumed.** Perishable food must be refrigerated, adequately cooked and served steaming hot. This includes milk, butter, cheese or yogurt that does not come from an approved source.

c. Proper field sanitation procedures should be followed for disposal of waste and maintenance of latrines.

d. Good personal hygiene is critical, in particular hand washing, to protect yourself and others from infectious disease.

3. Care and First Aid for Diarrheal Disease.

a. Individuals with severe or prolonged diarrhea or vomiting should be medically evaluated.

b. Dehydration is a primary concern with all diseases causing diarrhea and vomiting. To prevent dehydration, special efforts should be made to assure adequate fluids and salts are consumed. If A rations are available, the ingredients can be obtained from field kitchens. See box for fluid replacement recipe.

Recipes for Replacement Fluid

Field Expedient Recipes

a) Fluid replacement: Add to a 1 quart canteen of water: 1 MRE table salt packet (4.0 gms of NaCl) and 1 MRE packet of beverage base powder (28 gms of sugar).

b) Potassium replacement: After prolonged vomiting and diarrhea have occurred, potassium (KCl) replacements may be beneficial. The MRE cocoa beverage powder is a good source of potassium. Add to a 1 quart canteen of water: 2 MRE cocoa beverage packets (60 gms of sugar, 1.7 gms of KCl equivalent).

Garrison Recipe

One cup (8 ounces) of fruit juice (orange or apple) with one half teaspoon of sugar
or honey and a pinch of salt, followed by one cup of water with a quarter teaspoon of baking soda added. Drink this combination until thirst is quenched.

Medic Recipe (Prepared by Medical Personnel)

Add to 1 liter (1 quart) of water 3.5 gm table salt (NaCl), 2.5 gm baking soda ($NaHCO_3$), 1.5 gm potassium salt (KCl), and 20.0 gm sugar (glucose) and drink as needed.

B. DISEASES FROM INSECTS

1. Problems with Insects.

a. Many insects thrive in the desert areas of Somalia. They are capable of spreading diseases to soldiers. Several of these diseases are serious and some, such as malaria, can be fatal if not treated. Examples of insects and types of disease they transmit include:

Mosquitoes - Malaria, Break-bone Fever (Dengue), Chikungunya Fever, Rift Valley Fever, Yellow Fever
Sand Flies - Sand Fly Fever, Baghdad Sore (Cutaneous Leishmaniasis), Kala Azar (Visceral Leishmaniasis)
Ticks - Congo Crimean Hemorrhagic Fever, African Tick Typhus, Relapsing Fever
Lice and Fleas - Typhus, Plague, Relapsing Fever

b. Biting flies and insects must be considered as carriers of disease and steps should be taken to control their numbers and prevent biting.

c. Almost all these illnesses cause severe flu-like symptoms with fever, muscle aches, weakness and headaches. Other signs or symptoms may include rashes, swollen lymph nodes, joint pain, shaking chills, sweats, nausea or vomiting.

d. Malaria, one of the most common diseases in this area, causes recurrent fever, shaking chills and sweats alternating with fever-free periods. Malaria is always a serious illness and can be fatal. Malaria prevention measures will be essential to maintaining the health of soldiers in Somalia.

2. Control Measures for Diseases from Insects.

a. Prevention of diseases transmitted by biting insects depends on personal protective measures and area insect control. If used rigorously, these measures should provide protection against biting insects.

b. Clothing should be protected before deployment. Clothing repellant, permethrin aerosol (NSN 6840-01-278-1336) should be applied to the BDU until the uniform appears wet and reapplied after every 5 washings. Bed netting should be treated pre-deployment with permethrin in the same fashion as the BDU. Treating the bed netting is crucial because sand flies are small enough to penetrate the untreated webbing.

c. Repellent skin lotion, DEET, extended duration (NSN 6840-01-284-3982), should be applied to exposed skin and to the first 3 inches of skin covered by the uniform. The skin repellant is effective up to 12 hours, so it should be applied at least 2 times per day and more often if needed.

d. Clothing and bedding should be shaken out and checked before use.

e. Sleeping surfaces should be off the ground and bed netting should be used.

f. Periodic buddy checks for ticks and other biting insects are extremely important, especially when moving cross country in brush or grass. Ticks should be removed from the skin by firmly grasping the head of the tick with a pair of tweezers and removing the tick with a gentle steady pull.

g. Insect breeding areas such as pools of water in old tires, cans, buckets and ditches should be drained. Additional measures to control insects include good personal hygiene, proper disposal of garbage and human waste, and keeping food and water covered.

Malaria Prevention

Because of the common occurrence of Malaria in Somalia and because of its potentially life-threatening effects, all personnel will be required to take one of the following medicines to prevent Malaria:

Mefloquine will be taken once a week while in country and for 4 weeks after returning. This applies to all personnel who can tolerate the medicine and are not on flight status.

For those on flight status or who cannot tolerate mefloquine, **Doxycycline** will be taken once daily while in country and for four weeks after returning.

The most effective prevention of Malaria includes taking preventive medicine, using insect repellent on the skin, treating uniforms and bed netting, and sleeping under bed netting.

C. DISEASES FROM ANIMALS

1. Problems of Diseases from Animals.

Animals in Somalia have a number of diseases they can transmit directly or indirectly to soldiers. Dogs, cats, other domestic and wild animals may transmit **Rabies** through bites and scratches. Animal bites or scratches must be evaluated by medical personnel. If a soldier is infected with Rabies and does not receive anti-Rabies shots immediately, the disease is always fatal.

Several other diseases that can be indirectly spread to humans are relatively common in Somalia. Diseases such as **Brucellosis**, **"Q" fever**, and **Anthrax** are found in goats, sheep and cattle. Infection may result from consumption of local milk and other dairy products, from breathing dust-like particles from infected animals or their feces, and direct contact with animal tissues, urine or blood. These diseases cause headache, fever, chills, sweating, and body aches plus other more specific symptoms.

2. Control Measures.

All unnecessary contact with domestic or wild animals should be avoided. **Camp pets should be forbidden.** Contact with meat, hides, carcasses of dead animals, blood, urine or wastes should be avoided. Soldiers should not work or live in sheds, huts, pens or other areas where livestock have been housed.

3. Care of Diseases from Animals.

As with other infectious diseases, a medical evaluation should be obtained as soon as possible after the onset of symptoms. If timely medical attention is received, most animal diseases that can be spread to man, even Rabies, are preventable or treatable.

D. DISEASES FROM OTHER PEOPLE

1. Respiratory tract infections. such as colds, flu, strep throat and sinusitis, are common even in warm climates, especially in crowded living conditions. Although these infections are relatively mild, they affect many soldiers at once and can have a serious impact on military readiness. Respiratory diseases are second only to diarrheal diseases as a cause of lost duty time. To control respiratory disease transmission, crowding in living spaces should be minimized, soldiers should sleep head to foot and good ventilation should be maintained. These measures should also help prevent the spread of more serious diseases such as **tuberculosis** which is common in Somalia.

2. Meningitis is spread through direct contact with droplets from the nose and throat of infected people. It can be rapidly fatal. The meningococcal vaccine given to U.S. soldiers protects against the types of meningitis that most often cause epidemics in Somalia. The same personal protective measures that prevent respiratory infections also prevent the spread of meningitis.

3. Sexually transmitted diseases, including gonorrhea, syphilis, genital warts, herpes, hepatitis B infection, and infection with the AIDS virus (HIV), all occur frequently in Somalia. Abstinence is the best way of preventing sexually transmitted diseases, but prophylactics (condoms) are another effective method if sexual relations occur. Since many of these diseases are potentially serious, a physician should be consulted if genital discomfort, sores (painful or painless), or unusual discharge develop.

4. Hepatitis, a liver disease, can be caused by several types of viruses. Serum hepatitis (due to either type B or type C) is spread by sexual contact, blood transfusion, or contaminated needles and medical instruments. Epidemic hepatitis (due to either type A or type E) is spread from person to person through contaminated water or food. Both forms of hepatitis cause fever, intestinal symptoms and jaundice (yellow skin). When a person is infected with one of these viruses, many weeks may pass before any symptoms emerge. Hepatitis B vaccine is protective and is required for Army medical personnel. Other measures to protect against Hepatitis B include wearing gloves and other protective cover when exposed to blood or body fluids, avoiding sexual contact and immediate washing of hands and other body parts that have come in contact with body fluids. Immune serum globulin (ISG) protects only against hepatitis A but does not protect against the other forms of hepatitis (hepatitis B, C or E). Booster doses of ISG are needed every three months to maintain protection. Since Hepatitis A and E are acquired from contaminated food and water, they can be prevented by the same measures used to prevent any of the other food and waterborne diseases (see Section A in this part of the guide). **Hepatitis prevention is critical** since none of the kinds of Hepatitis are treatable.

E. DISEASES FROM CONTACT WITH SOIL AND WATER

1. **Hookworms** enter the body from the soil by penetrating bare skin (such as bare feet). **Roundworms** and **whipworms** enter through the mouth when a soldier swallows small bits of soil containing worm eggs. All of these worms can cause intestinal (gut) disease and other symptoms, such as coughing or red snake-like trails under the skin. To prevent these diseases, soldiers should be cautioned not to walk bare foot and not to lie down and expose skin to the soil. They should not eat local food and must carefully wash hands and eating utensils.

2. Tetanus (Lockjaw) is a global threat; therefore all soldiers should have a tetanus booster at least every 10 years. It enters the body through puncture wounds, all of which should be medically evaluated and thoroughly cleaned.

3. Snail fever (schistosomiasis) is caused by microscopic worms found in fresh water and can affect many organ systems. Worms enter the body by penetrating skin exposed to infested water. To avoid snail fever, soldiers should not bathe, swim or wade in streams, rivers, ponds, canals, stock tanks or any body of freshwater, unless it is known to be adequately treated chemically. When military operations require fording any body of freshwater, some protection is provided by tucking trousers tightly into the boots and by covering as much skin as possible. The burrowing parasites may also be rubbed from the skin by immediately drying exposed areas with a towel or cloth.

4. Mud fever (Leptospirosis) is contracted primarily by skin contact with water, mud or surfaces contaminated with infected urine of a variety of wild and domestic animals. The disease can cause sudden headache, chills, severe muscle aches, and bloodshot eyes. This disease can be prevented by avoiding contaminated water. If water must be entered, boots and clothing provide some element of protection.

F. SKIN DISEASES AND OTHER CONDITIONS

1. The climate of Somalia can predispose soldiers to skin disease. The heat, wind and dust may cause the skin to become dry, chapped, scaly, and cracked. Exposed skin is particularly vulnerable to drying conditions. The humidity combined with sweating and chafing can result in irritation, breakdown, and erosion of the skin, especially in the groin, abdominal folds, armpits, under breasts and where the backpack or load bearing equipment (LBE) rubs. Skin conditions predispose soldiers to bacterial and fungal infections.

2. Accumulation of sweat in socks and friction from boots may cause blisters which leave the feet particularly vulnerable to infection. Special attention should be given to keeping the feet clean and dry. Frequent changes to dry socks are especially important.

3. Personal hygiene to protect the skin is important. Handwashing and bathing or showering are important and should be done as often as practical. If bathing is not possible, areas that sweat should be cleaned with a wash cloth at least daily. Uniforms, including underwear, should be kept as clean and dry as possible. If skin becomes dry or cracked, a

non-irritating moisturizing cream can be used. Areas of skin that become moist, irritated or sore should be dried and treated with powders such as talc.

4. If persistent rashes occur in moist areas such as the groin, under breasts or on the feet, medical evaluation should be obtained. Women who develop persistent vaginitis should consult a physician. Anyone who develops a persistent sore especially with red streaks or swollen lymph nodes should seek medical attention.

G. VACCINES AND OTHER PREVENTIVE MEASURES

1. Many vaccines are available to prevent infectious diseases. The U.S. military requires certain vaccinations (immunizations) routinely and others for specific deployments or operations. At the time of this writing (December 1992), U.S. CENTCOM guidance on the immunizations required for Somalia is as follows:

Immune Serum Globulin (ISG) - first dose predeployment and a booster dose every 3 months to prevent Hepatitis A
Tetanus-Diphtheria - last dose within 10 years
Oral Polio - primary 3 dose series, plus one adult booster
Influenza (1992-1993)
Typhoid - 2 dose basic series plus booster in last three years
Yellow fever - last dose within 10 years
Meningococcal - quadrivalent with last dose in past 3 years
Measles - record of at least one shot or be born before 1957

All of these vaccines are approved by the FDA and none are experimental. Medical personnel are responsible for screening shot records and administering vaccinations. Soldiers must take responsibility for making sure shot records are up to date and that they receive the required immunizations.

2. It is particularly important to screen every soldier for Tuberculosis (TB) by skin testing before and after deployment if possible.

3. Prophylactic (Preventive) Medications. The only preventive medications recommended for Somalia are for Malaria - these are either **mefloquine** for most soldiers or **doxycycline** for those on flight status or having special reasons not to take mefloquine. See the Text Box in Section B (Diseases From Insects).

PLANTS, INSECTS, SNAKES AND ANIMALS

A great many native plants and animals in Somalia can cause humans significant harm, ranging from minor wounds and rashes to rapidly fatal poisoning. The threat is magnified for U.S. military personnel who may be unfamiliar with native species and unaware of their potential danger.

Soldiers should avoid contact with unfamiliar plants and animals.

A. PLANTS

1. Problems With Plants. Many plants in Somalia have thorns which can puncture the skin, introduce poison into the skin or cause infection. Other plants can cause rashes just by touching the skin. **Contact with smoke from the burning of some Somali plants can cause skin rashes and damage to the lungs.** Many plants will cause poisoning if chewed or swallowed. The leaves of the Khat plant contain a drug which can cause abnormal, uncontrolled behavior.

2. Control Measures. The best way to prevent injury from harmful plants is to avoid being exposed to them. Clothing can serve as a protective barrier for the skin. Clothing can also be a source of exposure if it is not properly cleaned after contact with poisonous plants. Clothing can be adequately decontaminated with careful soap and hot water washing. Unfamiliar plants should never be placed on the skin. If injury or poisoning from plants occurs, the soldier should report for medical evaluation immediately.

B. INSECTS, SPIDERS AND SCORPIONS

1. Problems With Insects, Spiders & Scorpions. There are numerous poisonous centipedes, scorpions and spiders, including black widow spiders and tarantulas in Somalia. The effect of their poisons can range from severe pain and ulceration of skin and muscle to rapid death. These small and inconspicuous creatures are likely to be encountered around buildings, tents and bunkers. In addition, the coastal waters contain poisonous jellyfish and sea urchins.

2. Control Measures. Prevention of injury from poisonous insects, scorpions and spiders is achieved by avoiding contact. This means extra vigilance in areas where these creatures live. Military personnel should avoid sleeping on the ground and should carefully shake out their boots, uniforms and bedding before use to eliminate any animals that may have crawled in.

3. Care for Insect, Spider & Scorpion Bites. Any soldier receiving a bite or sting should see medical personnel immediately. First aid measures that should be taken while seeking medical care include icing the wound (only if uncontaminated ice and water are available). If the injury is on an extremity, it should be immobilized and the individual should be kept at rest. Tourniquets or cutting the wound to suck out the poison are not helpful and may cause harm.

C. SNAKES

1. Problems with Snakes. Somalia has many very poisonous snakes including the boomslang, the twig snake, cobras (including a cobra that spits venom at the eyes), puff adders, mambas, vipers and Anhtinou's blacksnake. Without treatment, a snake bite can be rapidly fatal. Many snakes are well camouflaged and few give "warning signals." The ocean along the Somali coast has highly poisonous sea snakes which will bite swimmers.

ALL SNAKES IN SOMALIA SHOULD BE CONSIDERED VERY POISONOUS.

2. Control Measures. Soldiers should not handle or play with snakes. Avoid areas where snakes may be found.

3. Care of Snake Bites. If bitten by a snake, the individual should get medical care immediately! First aid consists of immobilizing the arm or leg that has been bitten and keeping the soldier at rest. Local application of ice to the bite may slow the spread of the venom and will reduce pain. Tourniquets and attempts to suck the venom out of the wound can cause more harm than good and should not be attempted.

D. WILD AND DOMESTIC ANIMALS

1. Problems with Wild & Domestic Animals. Wild and domestic animals represent a serious health risk through bites, scratches, goring or other trauma, or by transmitting diseases. Rats and mice attracted to human shelters and waste dumps may carry plague and other serious diseases. Dogs and cats may carry Rabies, and livestock can carry anthrax and other serious diseases. Veterinary care is almost non-existent in Somalia, so all animals, wild or domestic, should be considered diseased and dangerous.

2. Control Measures. Because of the possibility of acquiring serious disease or receiving traumatic injury from animals in Somalia, soldiers should avoid contact with both wild and domestic animals. Sanitary disposal of food and other waste material will help to avoid attracting animals and insects. It is also important to protect water supplies from animals in this dry country. Although U.S. military personnel are known for making pets of various animals while deployed, the magnitude of the health threat requires that this practice must be forbidden.

3. Care of Animal Bites & Scratches. First aid for bites and scratches from animals should include cleaning the wound with soap and uncontaminated water. Because of the possibility of rabies, **immediate medical care should be obtained for even seemingly**

insignificant bites or scratch wounds.

OPERATIONAL HAZARDS

Operations in Somalia will include many of the hazards found in intense combat. Leaders should anticipate hazards and help soldiers improve coping skills to maintain soldier health and performance.

Physically fit, well-trained, and well-led soldiers can succeed under the harshest circumstances.

A. OPERATIONAL STRESS

1. Problems of Operational Stress.

a. Mission-related stress:

1) The current situation in Somalia of civil unrest, starvation, disease, and death will not get better immediately. Even with U.S. and international humanitarian assistance, restoration of civil order and quality of life will take time. Improvements will be measured in

inches, not yards or miles. This fact has the potential to be frustrating and demoralizing for soldiers and leaders who expect to reverse the human suffering quickly.

2) The most common source of stress among soldiers is ambiguity concerning the mission and length of deployment. Soldiers in Somalia, where the possible missions include peacemaking, peacekeeping and humanitarian operations, may be required to perform several different kinds of missions within a short period of time. Each mission can involve unique stressors.

3) Conditions in Somalia are characterized by poverty, misery, and tragedy. Soldiers will have strong emotional reactions and will need help in channeling their emotions into constructive behaviors.

4) Peacemaking may involve combat. Killing an armed enemy often causes the soldier to feel guilty. Conversely, after being involved in several such incidents, the soldier may feel guilty about the fact that he/she no longer feels distressed. Individual soldiers will react strongly to the death of a unit member, especially when it is the result of sudden attacks, friendly fire incidents or accidents.

b. Critical Incident Stress: The Somali situation will provide numerous exposures to incidents that will produce strong emotions. Soldiers can experience a single critical incident that produces a reaction so strong that the event will be persistently relived through recurrent intrusive memories, daydreams, nightmares, or flashbacks (the sudden feeling that the event is reoccurring).

c. Separation from Family: Soldiers will be distracted from their duties if they have unresolved domestic problems. This will be especially true of those who are new to the unit or are single parents. Soldiers will be concerned about the adequacy of the resources available to their families in their absence. Women may feel additional social pressure to defend their decision to leave their families and serve in the Army. Recent mothers may experience extended post-partum stress.

2. Characteristics of Operational Stress.

a. While the majority of soldiers will respond to the Somalian tragedy appropriately, others will react to it by belittling Somali citizens. Some may feel helpless and withdraw, while others will feel they should work 24 hours a day. Soldiers may feel guilty about the fact they are eating regularly.

b. Soldiers will not be able to explain emotions caused by mission-related or family-related stress. They will be irritable, nervous and inattentive and have difficulty sleeping. Soldiers who are not coping well with stress will appear confused, withdrawn and emotionally exhausted.

c. Soldiers who have endured a critical incident will have difficulty sleeping, be hyperalert, will startle easily, and may try to avoid places, sights, smells, and people associated with the episode. They may not be able to express emotions easily or may feel detached from others.

3. Control Measures for Operational Stress.

a. Keep soldiers informed:

1) Clear statements of the unit's mission along with assignment of individual tasks and responsibilities will help soldiers maintain their perspective and provide them with a sense of purpose. Realistic information about the human suffering in Somalia should be provided.

2) Transmission of information from the chain of command should be scheduled on a routine basis so that soldiers will learn to rely on official sources, rather than rumor.

3) The rules of engagement should be discussed at all levels. Scenarios in which it might be difficult to apply the rules of engagement should be discussed and appropriate courses of action defined.

b. Continue training:

1) Preparation for current and future missions should not stop in-country. Training should be meaningful and relevant to the situation. Realistic training builds confidence, improves cohesion, and prevents boredom. Tasks that have been well-learned and repeatedly practiced are less disrupted by stress.

2) Maintaining military discipline is critical to preventing hostile behavior toward those who appear to be exploiting or perpetuating the situation. The temptation to use excessive force should be strongly discouraged by leaders.

c. Maintain unit cohesion:

1) Cohesive, well-disciplined units have fewer severe stress reactions. Methods used in these units to improve teamwork and unit effectiveness are the same methods used to prevent stress reactions.

2) Soldiers should routinely debrief each other after an operation, discussing what they saw and how they felt about it.

3) Soldiers who have strong emotional reactions to traumatic events should be treated as soldiers (not as casualties) and kept with the unit.

d. Manage contacts with the dead and dying: Soldiers who will handle the dead should insulate themselves from the task. They should not look at faces and not learn names or other personal information about the victims. Soldiers should put mental and physical barriers between themselves and the dead, take frequent breaks, and finish the job quickly. Soldiers who say they cannot handle such duty should be excused. Soldiers should work in pairs; experienced soldiers should be paired with inexperienced ones.

e. Schedule recreation:

1) Leaders must encourage soldiers to take regular breaks. Maintaining physical fitness and engaging in recreational activities reduces stress.

2) Recreational activities which include units of multinational forces will serve to introduce soldiers to each other, prevent friction and reduce hostility.

f. Deliver mail: Leaders should insure mail is delivered and distributed as fast as possible.

g. Maintain family support:

1) Soldiers should do a personal POR, which insures that families have the information and skills they need to manage their own and the soldier's personal affairs.

2) Soldiers should make sure that their family members are aware of the family support group (parents of soldiers, spouses of both genders and children should be included). Assure that families understand the need to provide support to those who need it most, regardless of rank, shyness, or distance from post.

3) Support networks should not dissolve when soldiers come home. Family members will need information before soldiers get home about reunion stress and support to deal with reunion stress after soldiers return.

h. Plan the return home:

1) Soldiers should discuss how they will talk with family members about what they have seen and felt. They should discuss how family members may have changed while they have been apart. They should discuss the likelihood families will not understand what the soldiers have experienced.

2) Units which establish relationships with relief workers, local nationals, etc. should plan ways to reestablish communication with them once the unit has returned home.

B. FATIGUE

1. Problems with Fatigue.

a. Jet lag: When soldiers are rapidly deployed across time zones, their biological clocks will not be synchronized with the local time. Upon arrival, soldiers will be trying to sleep when they are biologically prepared to be awake. They will have jet lag: drowsiness during the day, degraded mental performance, and difficulty sleeping at night. The biological clocks will return to normal in response to local sunrise and sunset. This process takes 4 to 7 days.

b. Sleep loss: Soldiers who are sleep deprived do not think clearly, plan effectively, or follow procedures correctly. Symptoms of sleep deprivation include extreme sleepiness, lapses in attention, irritability, susceptibility to accidents and decreased attention to self-care.

1) Sleep loss affects performance in most jobs. Monotonous, repetitive, or boring tasks will increase the perceived need for sleep. There is a 25% decline in effectiveness for every 24 hours without sleep. Unit effectiveness is degraded far more by the poor quality work of fatigued soldiers, than by the reduced quantity of work that soldiers do when they rest.

2) All soldiers are affected by sleep loss; leaders are most vulnerable.

3) Soldiers' perceived need for sleep will increase between the hours of 0200 to 0600 and again from 1500 to 1800. Negative changes in mood and attitude will occur from 0200 to 0600, along with decrements in attention and reasoning.

2. Control Measures.

a. Soldiers should prepare for the new time zone by changing work and sleep periods to match Somalia time. Once on board the aircraft, soldiers should set their watches to Somalia time. Lights and meals on the aircraft should be coordinated with the local time in Somalia. Soldiers should begin working, eating and sleeping on local time as soon as they arrive; for example, eating breakfast and going to work at 0600 local time even if soldiers feel as though it is 2300 at home.

b. Soldiers should sleep at times and under conditions that maximize the amount of rest they get. Sleep will be improved by providing as many of the following conditions as possible: sleep between 2400 - 0600 hours, familiar surroundings, mild temperatures, darkness, quiet, space to lie down, a padded surface and places separate from the work site.

c. Enforce sleep discipline, especially among leaders. Six to eight hours sleep is optimal. Productivity can be maintained for 2 to 4 days with four to five hours sleep.

d. Sleep discipline SOPs should include provisions for recovery from sleep loss. Twelve hours of sleep/rest (at least 8-10 hours of sleep) are required after 36-48 hours of sleep loss. Two to three days of sleep/rest (8-10 hours per day of sleep coupled with light duty) are required to restore optimum performance after 72-96 hours sleep loss.

C. ACCIDENTS AND INJURIES

1. Problems with Accidents and Injuries.

Accidents and Non-Combat injuries result in many fatalities and many days of limited duty. These accidents are all largely preventable. Previously identified causes of accidents in desert operations include (U.S. Army Safety Center, Ft. Rucker, AL):

a. Abandonment of safety practices during the early phases of deployment result in a higher frequency of accidents and non-combat injuries.

b. Poor visibility and depth perception in desert terrain and weather contributes to both ground and aviation accidents.

c. Primitive roads and total lack of traffic control increase the likelihood of motor vehicle

accidents.

d. Athletic injuries resulting from both physical training and recreation are a large source of preventable injury.

e. Improper grounding procedures in hot, dry environments may result in electrocution.

f. Improper handling of weapons and ordnance (both U.S. and leftover ordnance from previous conflicts) causes injuries.

g. Failure to wear proper eye protection against the sun and against operational hazards increase the rates of eye injury.

2. Control Measures.

a. Plan unit missions and work with safety in mind.

b. Train unit personnel in proper use of equipment and safety procedures.

c. Establish system to identify potential sources of accidents.

d. Stress adherence to safety standards and procedures. **Emphasizing safety will enhance unit readiness and efficiency.**

e. Designate safety personnel.

f. Emphasize motor vehicle safety: i.e, safety belts and restraints, horseplay, speed limits.

g. Avoid overtraining and minimize aggressiveness in sports.

h. Enforce weapon safety procedures. Establish and enforce ordnance handling and disposal policies.

i. Remind soldiers of the extra care necessary for electrical grounding in a hot, dry environment. (IAW FM 20-31)

j. Make appropriate eye protection available and ensure proper usage.

NUTRITION

Food and water are important in sustaining health, performance, and morale in any military setting. In Somalia, food and water of adequate quantity and quality, is critical to mission accomplishment. The heat, lack of safe water, humidity, and dust storms in Somalia present special nutritional problems to soldiers.

A. FOOD

1. Problems with Food.

a. Although appetite decreases in hot weather, the number of calories required to function can increase. Additionally, soldiers often voluntarily reduce food intake when deployed to the field due to poor ration palatability, menu boredom, lack of water, lack of designated meal periods, lack of time to prepare meals, anxiety, and other factors. Lack of appetite is particularly a problem during the first few days of hot weather operations.

b. Almost half of the daily fluid intake is consumed during mealtimes. Food can also be a significant source of water, and decreased food intake is usually accompanied by decreased water intake. There is also an increased water loss associated with using body tissue to make up for low food intake. **Decreased food intake will contribute to dehydration.**

c. Inadequate food intake and weight loss will impair physical and mental performance.

d. Inadequate food intake may result in salt deficiency and increases the risk of **heat illness**.

2. Control Measures for Food.

a. Accentuate the positive aspects of the rations; food and water are tactical weapons. Attempt to schedule meal times, even when MREs are the only food. Soldiers tend to eat

more when eating in small groups. Leaders need to make sure that the entire meal is consumed but not in view of malnourished refugees. Hot meals will improve morale and increase food consumption. If possible, schedule at least one hot meal per day.

b. MREs and other military rations will provide all the salt required in the heat. Soldiers can add some salt to their food to insure adequate salt intake during the initial 7 days of heat acclimatization. Do not allow the use of salt tablets unless recommended and supervised by medical personnel.

c. Do not allow non-issue food to replace more nutritious rations.

d. It is important to provide protection from sand and dust during meal preparation. This will avoid many diarrheal diseases.

e. **Do NOT allow service members to store any MRE component if the component's packet has been opened.**

B. WATER

1. Problems with Water.

a. Water requirements are increased in hot environments due to high sweat rates. Thirst is not a good indicator of adequate fluid intake. Even mild dehydration can affect physical performance, mood and appetite, and will increase the risk of heat illness.

b. All water must be considered contaminated and must be adequately treated before consumption to prevent water-borne illnesses.

c. Failure to replace fluid lost through sweating can lead to dehydration. Dehydration symptoms include decreased urination, dark urine, lethargy and apathy. Dehydration also increases the risk of heat illness.

2. Control Measures.

a. Maintain adequate hydration. Plain, cool (60-70°F, 16-21°C) water is an ideal beverage for maintaining adequate hydration. Flavored cool water is voluntarily consumed in larger amounts than plain water. Any type of beverage consumed will help soldiers meet their water requirements (e.g., Koolaid, sports drinks, juice, decaffeinated coffee, tea or soft drinks, lemonade, soup, milk).

b. **Do not** add beverage flavoring directly to bulk water storage containers. They reduce the effectiveness of water disinfectants.

c. Alcohol or caffeine beverages will increase urination and dehydration. Carbonated beverages may reduce fluid intake due to the feeling of fullness.

d. Maintain and enforce water discipline; an upper limit of approximately 12-15 quarts of water per day is recommended for military personnel working in hot environments. The best way to do this is to establish a regular drinking schedule.

DO NOT ALLOW CONSUMPTION OF LOCAL WATER OR ICE.

C. WATER SUPPLY

1. Problems with Water Supply.

a. Many problems surround the production, delivery and maintenance of drinkable water. All of the problems can be avoided by proper planning and strict adherence to established procedures.

b. During initial deployment phases, the adequate chlorination of in-country water will likely cause more voluntary dehydration until soldiers get used to the taste. Added to this will be the increased requirements for water due to the heat. As may be seen in Appendix A, personnel will require as much as 15 quarts of water per day just to replace water lost through sweat.

c. **None of the water in Somalia can be considered safe.** All local water supplies are likely to be infected with bacteria, viruses, and parasites which will cause numerous diseases, especially diarrhea. Epidemics of diarrhea can overwhelm the limited resources of field medical units. A surprisingly small amount of animal or human fecal material or urine can contaminate thousands of gallons of water.

d. Flooding, poor hygienic and waste disposal practices and blowing dust will increase the contamination. Mere contact with contaminated water can cause disease (i.e., Schistosomiasis)

through penetration of the skin by waterborne parasites. Washing, wading, or swimming in local water is a high risk behavior and will only be permitted in U.S. military approved areas.

DO NOT USE LOCAL WATER FOR ANYTHING.

Consider all local, non-U.S. military water supplies to be contaminated. This means that even water for washing, shaving and all other purposes must be disinfected prior to use.

2. Control Measures for Water Supply.

a. Use only water from approved U.S. military water points. Even this water should be checked by the individual unit for contamination.

b. Leaders must know who will check their water. When water is found to have insufficient chlorine, it must be considered contaminated and be redisinfected. Disinfection of water in canteens is done with iodine tablets (NSN 6850-00-985-7166). Disinfection of water in Lyster Bags or 5 gallon cans is done with Chlorine Ampules (Chlorine Kit, Water Purification, Type I,

NSN 6850-00-270-6225). Disinfection of water in 400 gallon water trailers is done with Calcium Hypochlorite Powder (Calcium Hypochlorite, 6 ounce jar, NSN 6810-00-255-0471).

SECURE ALL WATER SOURCES; TREAT WATER AND WATER SUPPLIES AS YOU WOULD ANY CRITICAL TACTICAL RESOURCE. BE SURE OF YOUR WATER SUPPLY: IT IS THE MOST BASIC NEED IN HOT CLIMATES.

c. Safe, drinkable water is necessary for survival in Somalia.

d. Water, like a weapon, must be safeguarded and protected from contamination or theft.

e. Animals will attempt to lick the spouts of unprotected Lyster bags. This may contaminate the spout and infect the next person drinking from it. Lyster bags should be elevated higher than normal or protected.

f. Ice made in Somalia should be considered contaminated because the disinfectant will be frozen out of the solution during the freezing process. Field ice and local ice should be considered dangerous and not consumed or used to cool water.

THE PROBLEM OF STARVATION

Starvation is a shocking thing to see. The emotional effect can be devastating if a soldier is not prepared to deal with what will be possibly daily scenes of sickness and death. To moderate the effect on morale and unit effectiveness, emotional preparation is critical.

There are two types of starvation, and their appearance is startling. In the type most likely to be seen in Somalia, called energy deficiency or marasmus, the victim is *extremely* lean; the bones will be prominent, with a disproportionately large head and abdomen. The limbs will be bony and the rib cage show clearly. The eyes and cheeks will be sunken. There is almost no body fat, and the person may be literally described as "skin and bones."

In the other type of starvation, called protein deficiency or kwashiorkor, the person seems bloated, almost fat. This is caused by retention of water. The skin may be scaly, dry, and discolored. Hair discoloration may also be present. Usually, the victim is listless; physical activity is reduced to a bare minimum.

A premature introduction of a high energy or high protein diet to a starving person can be fatal. Refeeding must begin gradually to protect the body systems from overload.

Soldiers can help. Leftover MREs or other food items should be donated to a local food collection agency for appropriate distribution by the relief organizations.

It is extremely important not to provide food (such as left over MRE items) to severely malnourished people.

APPENDIX A

Use of Work-Rest and Water Consumption Tables

a. In contrast to the guidance provided in FM 21-10, the tables provided here contain guidance tailored for dry environments. The tables also contain guidance for a wider variety of work intensities (very light to heavy) and clothing ensembles than is normally provided.
Remember that these are average guidelines derived from a mathematical model which was developed from actual measurements in a large population of test subjects. Individual requirements and capabilities may vary widely. It is more important that leaders understand the trends (and underlying principles) presented in the tables than that they follow the guidance exactly. THE TABLES ARE NOT INTENDED TO BE A SUBSTITUTE FOR COMMON SENSE.

b. Be aware that the charts sometimes recommend hourly drinking of larger amounts of water than can possibly be absorbed during an hour. The maximum sweating rate (approx. 2.1 qts/hr), which is closely related to the maximum water requirement, is higher than the rate of water absorption from the gut (approx. 1.5 qts/hr). Whenever input of water fails to keep up with output of sweat the body will become progressively dehydrated. This can be tolerated for limited periods of time (at a penalty in health and performance), but eventually the deficit must be made up. LEADERS SHOULD PLAN FOR AN EXTENDED REST AND REHYDRATION PERIOD WHENEVER THE TABLES ADVISE DRINKING MORE THAN 1.5 QUARTS PER HOUR.

The following recommended work/rest cycle and water consumption tables are applicable only to soldiers who are:

(1) Adequately hydrated to begin with (not dehydrated by more than 2% of body weight).

(2) Fully acclimatized (7-12 days working in the heat).

(3) Adequately rested (6 hours sleep the previous sleep period).

Table A-1: Work Intensities of Military Tasks

WORK INTENSITY	ACTIVITY
VERY LIGHT	Lying On Ground Standing In Foxhole Sitting In Truck Guard Duty Driving Truck
LIGHT	Cleaning Rifle Walking Hard Surface/ 1 m/s No Load Walking Hard Surface/ 1 m/s 20 kg Load Manual Of Arms Walking Hard Surface/ 1 m/s 30 kg load
MODERATE	Walking Loose Sand/ 1 m/s No Load Walking Hard Surface/ 1.56 m/s No Load Calisthenics Walking Hard Surface/ 1.56 m/s 20 kg Load Scouting Patrol Pick And Shovel Crawling Full Pack Foxhole Digging Field Assaults
HEAVY	Walking Hard Surface/ 1.56 m/s 30 kg Load Walking Hard Surface/ 2.0 m/s No Load Emplacement Digging

Table A-2
Number of Minutes of Work per Hour in Sustained Work/Rest Cycle

			Desert BDU				DBDU + Flak Vest				Aircrew Flight Suit			
WBGT	T_a	RH	VL	L	M	H	VL	L	M	H	VL	L	M	H
82	82.9	75	NL	NL	NL	25	NL	NL	NL	29	NL	NL	NL	31
86	87.1	75	NL	NL	33	21	NL	NL	NL	25	NL	NL	NL	27
88	89.2	75	NL	NL	29	18	NL	NL	37	23	NL	NL	39	24
90	91.3	75	NL	NL	25	16	NL	NL	32	20	NL	NL	34	21
98	99.7	75	NL	NF	NF	NF	NL	16	6	NF	NL	17	6	NF
100	109.	50	NL	NF	NF	NF	NL	23	10	5	NL	20	9	5

KEY TO TABLE

WBGT - Wet Bulb Globe Temperature (°F)
T_a - Ambient Temperature (dry bulb - °F)
VL - Very Light Work Intensity
L - Light Work Intensity
M - Moderate Work Intensity
H - Heavy Work Intensity
DBDU - Desert Battle Dress Uniform
NL - No Limit (continuous work possible)
NF - Work/rest cycle not feasible (see Maximum Work Time - Table B-4)

INSTRUCTIONS & NOTES

This table provides, for four levels of work intensity (see table B-1), the number of minutes work per hour in work rest schedules tailored to the conditions specified. Spend the remainder of the hour in rest. This table was prepared using the prediction capability of the USARIEM Heat Strain Model. Assumptions used in generating this table include: 1) Troops fully hydrated, rested and acclimatized; 2) Windspeed = 5.5 meters/sec; 3) Clear skies (full solar load); 4) Heat casualties < 5%. This guidance should not be used as a substitute for common sense or experience. Individual requirements may vary greatly. Appearance of heat casualties is evidence that the selected work-rest cycle is inappropriate for the conditions.

Table A-3
Water Requirements to Support Sustained Work/Rest Cycles [Qts/Hr]

			Desert BDU				DBDU + Flak Vest				Aircrew Flight Suit			
WBGT	T_a	RH	VL	L	M	H	VL	L	M	H	VL	L	M	H
82	82.9	75	0.4	0.7	1.2	0.9	0.3	0.6	1.0	1.0	0.3	0.5	0.9	0.9
86	87.1	75	0.5	0.8	1.0	0.9	0.4	0.7	1.2	0.9	0.4	0.7	1.0	1.0
88	89.2	75	0.6	0.9	1.0	1.0	0.5	0.8	1.0	1.0	0.5	0.8	1.0	1.0
90	91.3	75	0.7	1.0	1.0	1.0	0.6	0.9	1.0	1.0	0.6	0.8	1.0	1.0
98	99.7	75	1.2	NF	NF	NF	1.0	1.1	1.1	NF	1.1	1.2	1.2	NF
100	109.	50	1.3	NF	NF	NF	1.1	1.3	1.3	1.3	1.2	1.3	1.3	1.3

KEY TO TABLE

WBGT - Wet Bulb Globe Temperature (°F)
T_a - Ambient Temperature (dry bulb - °F)
VL - Very Light Work Intensity
L - Light Work Intensity
M - Moderate Work Intensity
H - Heavy Work Intensity
DBDU - Desert Battle Dress Uniform
NL - No Limit (continuous work possible)
NF - Work/rest cycle not feasible (see Maximum Work Time - Table B-4)

INSTRUCTIONS & NOTES

Amounts listed are required to support work/rest schedules in Table B-2; drinking should be divided over the course of each hour. Use Table B-5 to determine water required to support maximum continuous work times shown in Table B-4. This guidance was prepared using the USARIEM Heat Strain Model; assumptions used in generating this table include: 1) Troops fully hydrated, rested and acclimatized; 2) Windspeed = 5.5 meters/sec; 3) Clear skies (full solar load); 4) Heat casualties < 5%. This guidance should not be used as a substitute for common sense or experience. Individual requirements may vary greatly. Appearance of heat casualties is evidence that the selected work-rest cycle is inappropriate

Table A-4: Maximum Continuous Work Times [minutes]

			Desert BDU				DBDU + Flak Vest				Aircrew Flight Suit			
WBGT	T_a	RH	VL	L	M	H	VL	L	M	H	VL	L	M	H
82	82.9	75	NL	NL	NL	61	NL	NL	NL	76	NL	NL	NL	83
86	87.1	75	NL	NL	104	51	NL	NL	NL	63	NL	NL	NL	69
88	89.2	75	NL	NL	85	46	NL	NL	135	57	NL	NL	209	62
90	91.3	75	NL	NL	71	42	NL	NL	99	51	NL	NL	116	55
98	99.7	75	NL	78	41	27	NL	105	46	31	NL	102	46	31
100	109.	50	NL	77	41	27	NL	125	50	34	NL	112	49	33

KEY TO TABLE

WBGT - Wet Bulb Globe Temperature (^{o}F)
T_a - Ambient Temperature (dry bulb - ^{o}F)
VL - Very Light Work Intensity
L - Light Work Intensity
M - Moderate Work Intensity
H - Heavy Work Intensity
DBDU - Desert Battle Dress Uniform
NL - No Limit to Continuous Work

INSTRUCTIONS & NOTES

This table provides, for four levels of work intensity (see Table B-1), the maximum number of minutes work that can be sustained in a single work period without exceeding a greater than 5% risk of heat casualties. This table was prepared using the prediction capability of the USARIEM Heat Strain Model. Assumptions used in generating this table include: 1) Troops fully hydrated, rested and acclimatized; 2) Windspeed=5.5 meters/sec; 3) Clear Skies; 4) Heat casualties < 5%. The guidance should not be used as a substitute for common sense or experience. Individual requirements may vary greatly. The appearance of heat casualties is evidence that the safe limits of work time have been reached.

Table A-5: Water Requirements for Maximum Continuous Work [Qts/Hr.]

			Desert BDU				DBDU with Flak Vest				Aircrew Flight Suit			
WBGT	T_a	RH	VL	L	M	H	VL	L	M	H	VL	L	M	H
82	82.9	75	0.4	0.7	1.2	1.7	0.4	0.6	1.1	1.6	0.3	0.6	1.0	1.4
86	87.1	75	0.5	0.9	1.4	2.0	0.5	0.8	1.3	1.8	0.5	0.7	1.2	1.7
88	89.2	75	0.6	1.0	1.5	2.0	0.6	0.9	1.4	1.9	0.5	0.8	1.3	1.8
90	91.3	75	0.7	1.1	1.7	2.0	0.6	1.0	1.5	2.0	0.6	0.9	1.4	1.9
98	99.7	75	1.3	1.8	2.0	2.0	1.1	1.6	2.0	2.0	1.2	1.6	2.0	2.0
100	109.	50	1.4	1.8	2.0	2.0	1.2	1.6	2.0	2.0	1.3	1.7	2.0	2.0

KEY TO TABLE

WBGT - Wet Bulb Globe Temperature (^{o}F)
T_a -Ambient Temperature (dry bulb - ^{o}F)
VL - Very Light Work Intensity
L - Light Work Intensity
M - Moderate Work Intensity
H - Heavy Work Intensity
DBDU -Desert Battle Dress Uniform

INSTRUCTIONS & NOTES

Amounts listed are required to support continuous work times in Table B-4; drinking should be divided over course of each hour. If water requirement is 2.0, sweat loss is greater than maximum water absorption during an hour, and troops will become increasingly dehydrated regardless of amount drunk; leaders should plan for an extended rest and rehydration period at work completion. The table was prepared using prediction capability of the USARIEM Heat Strain Model; assumptions used in generating estimates include: 1) Troops fully hydrated, rested & acclimatized; 2) Windspeed=5.5 meters/sec; 3) clear skies; 4) casualties < 5%. This guidance is not a substitute for common sense or experience; appearance of heat casualties is evidence that safe work limits (<5% casualties) have been exceeded.

APPENDIX B

Tips for measurement of Wet Bulb Globe Temperatures (WBGT).

a. WBGT measurements must be made at a point 4 ft. above ground level.

b. If the WBGT Kit (NSN 6665-01-109-3246) is used, care must be taken to ensure that the natural wet bulb is clean, as well as wet. Sand and grit can affect the measurements made with this instrument; be sure to clean and wash it regularly.

c. If the Wet Globe Temperature (WGT) Kit (i.e., "Botsball"; NSN 6665-01-103-8547) is used, a correction procedure is required (Ref. message SGPS-PSP, 23 May 1990):

WBGT = 0.8 X WGT + 0.2 X Dry Bulb

where Dry Bulb may be measured by removing the dial thermometer from the WGT Botsball and reading the air temperature after 3 minutes, (shading the sensor from direct sunlight).

References

FM 10-52, Water Supply in Theaters of Operations, 11 JUL 90

FM 20-31, Electric Power Generator in the Field, 9 OCT 87

FM 21-10, Field Hygiene and Sanitation, 22 NOV 88

TB MED 507, Occupational and Environmental Health Prevention, Treatment and Control of Heat Injury, 25 JUL 80

TRADOC PAM 525-11, Near Term Water Resources Management, 15 JUN 81

GTA 8-5-45, Heat Injury Prevention and First Aid, AUG 85