THE SOLDIER AND THE DESERT

Sustaining Soldiers' Health and Performance During Deployment to the Southwestern American Desert

Guidance for Small Unit Leaders, Commanders, and Medical Planners Training in the Chihuahuan Desert

June 1996

PREFACE

This health threat and countermeasure information is from the most current data available from U.S. Department of Defense Medical agencies at the time of publication.

This guide is produced in an effort to provide information to the soldier training in the desert to help them prepare for travel to Fort Bliss and/or the Chihuahuan Desert, assist in handling desert emergencies, and minimize occurrences of disease and non-battle injuries (DNBI) in the desert.

This guide is a companion to the pamphlet "The Soldier and the Desert; A Leader's Guide to Staying Healthy in the American Desert," and "A Soldier's Guide to Staying Healthy in the American Desert." Limited copies of this guide in printed, hard copy format, are available to unit leaders, commanders, and medical planners. Order these guides from:

Commander
U.S. Army Center for Health Promotion & Preventive Medicine (USACHPPM)
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FOREWORD

U.S. Forces must be prepared to operate in desert environments, which can be harsh and unforgiving -- dangerous and even lethal to soldiers who are unprepared for fighting, training, or recreating in it. To successfully operate in the desert, it is essential that soldiers understand it.

This guide will assist in preparing soldiers for deployment, and maintaining health and performance during deployment, thereby increasing the likelihood of mission accomplishment. Information about issues specific to female soldiers and other guidance regarding deployments to specific regions is available from other sources, including USACHPPM.

This document does not replace policy or doctrine established by Department of Defense or Department of Army or their subordinates, contained in Technical Bulletins and other official publications, but attempts to provide solutions or guidance based on lessons-learned and current trends.

Users are encouraged to provide recommended changes to this guide using DA Form 2028. We also welcome comments describing personal observations or techniques during field operations. Comments and suggestions may be forwarded to:

Commander, USACHPPM
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BIGGEST RISKS TO U.S. FORCES AND HOW TO AVOID THEM

INJURIES	Can hurt or kill you	Safety first; be alert and cautious
HEAT	Can knock you down without much warning, and may cause coma or death	Drink fluids frequently; take frequent rest breaks; utilize available shade; use the buddy system; be aware of soldiers with previous heat injuries; be physically fit; dress appropriately
MENTAL STRESS	Can affect you before, during, and long after the operation	Talk openly and regularly with a buddy or unit leader; seek help from chaplains or social workers
LOCAL WATER	Can cause serious illness and may contain parasites	Do not drink or use untreated water or ice; wash hands before eating and after using the latrine
INSECTS & TICKS	Transmit life-threatening diseases	Use DEET repellent on exposed skin; treat bed nets and clothing with permethrin; sleep under a bed net
ANIMALS	May transmit *rabies, hantavirus, plague,* and other life-threatening diseases	Avoid contact with all animals; if bitten or scratched, seek immediate medical attention; avoid breathing dust contaminated with rodent urine or feces
PLANTS & CACTI	May cause serious injury, skin irritation or infection, or shelter dangerous wildlife	Avoid contact with desert plants and cacti
RIVERS, LAKES, CANALS	May contain parasites that penetrate unprotected skin and cause serious illness	Avoid unnecessary bathing, swimming, or wading in fresh water; if tactical situations require entering fresh water, cover exposed skin, dry vigorously, and change clothing after exposure

INTRODUCTION

There are four deserts in the United States: the Mojave, Sonoran, Great Basin, and the Chihuahuan, which is the largest of the four deserts, with two-thirds of its area in Mexico, and the remaining one-third in western Texas and southern New Mexico. The total area covers 175,000 square miles and contains areas of high mountains, plains, desert basins, and mesas.

The Fort Bliss area of the Chihuahuan Desert ranges in elevation from 3,800 feet to more than 8,000 feet. The terrain consists of:

A flat desert basin known as the Tularosa Valley, an inter-mountain basin with 1-12 foot semi-stabilized sand dunes that are moderately covered with mesquite bushes.

The Otero Mesa east of the desert basin, has a broad, relatively flat, grass-covered surface. On the east, the Mesa gently slopes down to the plain; however, to the west, the sides of the Mesa form a sharp cliff that rises sharply from the desert basin.

Mountain ranges around the Fort Bliss area include portions of the Organ, Franklin, Hueco (way-co), and Sacramento Mountains. Pinyon pines and junipers can be found in these mountainous areas.

A smooth alluvial plain, in the southwestern flank of the Sacramento Mountains, formed by the deposit of fine gravel and silts carried out of the mountains by water runoff. Creosote bushes dot the alluvial plains.

Rainfall in the Chihuahuan Desert varies from 2.5 to 18 inches per year. Fort Bliss receives about eight to nine inches per year with some areas receiving more than twelve inches.

Deserts are not just merely empty stretches of sand -- most deserts, like the Chihuahuan, sustain an intriguing variety of life (trees, cacti, other plants, animals, and insects), and is a place of beautiful sunrises and sunsets, wild storms, and dust devils.

HOT AND COLD WEATHER INJURIES
HOT WEATHER CONDITIONS

High temperatures, overexposure to the sun, inadequate water consumption, and over-exertion may result in one of the following:

1. Dehydration.

a. The human body is highly dependent on water to cool itself in a hot environment. A safe and adequate supply of water must be available at all times to every soldier. SOLDIERS MUST ONLY DRINK WATER FROM APPROVED SOURCES. Fresh water may be contaminated by minerals through which the water flows, or contain bacteria or parasites that may cause DNBI.

b. Countermeasures to Problems with Water Consumption or Dehydration:

(1) Ensure all soldiers drink adequate quantities of (preferably cool) water.

(2) Drink water regularly -- even when not thirsty. Thirst is not an accurate indication of the body's need for water. Drink about one quart each hour (or more depending on extreme conditions and workload) or enough to maintain urine the color of weak lemonade (dark urine indicates the body's need for water).

(3) Ensure water supplies have been processed by Reverse Osmosis Water Purification Units (ROWPU) and properly chlorinated to 2.0 ppm. The chlorine residual for ROWPU treated water must be maintained at 1.0 ppm in the unit area unless otherwise designated by the medical authority.

(4) If non-approved fresh water (from lakes, rivers, streams) must be used IN A LIFE OR DEATH SITUATION, disinfect the water using one of the following methods:

- Calcium hypochlorite at 5.0 ppm for 30 minutes
- Chlor-Floc™ or iodine tablets per label instructions
- Boil water at a rolling boil for 5-10 minutes
- Add two to four drops of ordinary chlorine bleach per quart of water and wait 30 minutes

(5) Avoid storing bottled water in direct sunlight (due to possible bacterial growth)

(6) Soldiers in armored vehicles, MOPP, and body armor need to increase water intake.

(7) Monitor local weather conditions closely, especially the rapidly changing WBGT.

2. Sunburn.

a. Caused by overexposure of skin to ultraviolet (UV) radiation of the sun -- occurs rapidly in the desert. Sand, rocks, and other desert surfaces reflect sunlight from the ground, and may result in sunburn to the nostrils or chin. Severe sunburns are disabling and may make soldiers more susceptible to other types of heat injuries.

b. Countermeasures:

(1) Use unscented sun block for skin (applying to all exposed face, skin, and neck) and lip balm with SPF 15 or higher, and sunglasses will protect soldier's skin and eyes from UV radiation

(2) Wear uniforms properly

(3) While on guard duty, avoid standing in direct sunlight; regularly rotate soldiers with duties requiring exposure to extreme temperatures for long periods (i.e., guard mount, POL point, observation posts, and maintenance personnel)

3. Heat Cramps.

a. Heat cramps are characterized by painful cramps of the muscles, usually the legs and abdomen, caused by an imbalance (too much or too little) of electrolytes in the body as a result of excessive sweating. Soldiers suffering from heat cramps may complain of muscle cramps, heavy sweating, and extreme thirst.

b. Countermeasures:

(1) Seek immediate medical attention for all heat injuries

(2) Move the soldier to a cool, shady area or air conditioned building or vehicle and loosen clothing*

(3) Slowly give large amounts of water (cool water if available)

(4) Watch the soldier; continue to provide water if the soldier accepts it

* When in a chemical environment, DO NOT loosen/remove clothing

4. Heat Exhaustion.

a. Heat exhaustion is a preventable condition caused by loss of water through sweating without adequate fluid replacement. Soldiers suffering from heat exhaustion may experience heavy sweating with pale, moist, cool skin; headache, weakness, dizziness; and/or loss of appetite.

b. Countermeasures:

(1) Seek immediate medical attention for all heat injuries
(2) Move the soldier to a cool, shady area or air conditioned vehicle or building and loosen clothing*
(3) Pour water on soldier and fan to permit cooling effect; if available, apply ice or ice packs
(4) Have the soldier slowly drink at least one full canteen of water
(5) Elevate soldiers legs
(6) If possible, soldier should not participate in strenuous activity for the remainder of the day

ABOUT SALT...

In addition to water, the body's supply of sodium chloride (or salt) is also lost in sweat. Salt lost through sweat should be replaced only by consuming prescribed amounts of rations. Soldiers should NOT take salt tablets, or consume additional salt with meals, unless strictly controlled according to medical advice. Field rations usually contain very high salt concentrations, therefore, soldiers should maintain a high water intake when consuming these meals. Excess intake of salt should be avoided as it may cause increased thirst and/or nausea.

* When in a chemical environment, DO NOT loosen/remove clothing

5. Heatstroke.

a. Heatstroke is a MEDICAL EMERGENCY that may result in death if treatment is delayed. Soldiers suffering from heatstroke should be evacuated immediately to a medical facility. Soldiers who have worked in a very hot, humid environment for a prolonged time, and have not consumed an adequate amount of water are susceptible to heatstroke that is caused by failure of the body's cooling systems. Soldiers suffering from heatstroke may experience no sweating (flushed, red, hot, dry skin) [NOTE: sweating **is not** an indication of a less serious heat injury -- soldiers who are sweating may still be experiencing heatstroke], weakness, dizziness, confusion, headaches, seizures, nausea, rapid respiration, and weak pulse. Irritable, combative or irrational behavior sometimes precedes heatstroke. Unconsciousness and collapse may occur suddenly.

b. Countermeasures to prevent heatstroke.

(1) HEATSTROKE IS A MEDICAL EMERGENCY -- seek immediate medical attention

(2) Move the soldier to a shady area or air conditioned vehicle or building and loosen clothing (remove outer and/or protective clothing if the situation permits)*

(3) Start cooling the soldier IMMEDIATELY; immerse in cool water (or pour water on the soldier)

(4) Fan to cool

(5) Massage extremities and skin to increase blood flow to body areas (aiding the cooling processes)

(6) Elevate soldiers' legs

(7) If conscious, have the soldier slowly drink one full canteen of cool water

(8) Monitor soldier for development of conditions that may require performance of necessary basic lifesaving measures such as clearing the airway, mouth-to-mouth resuscitation, and/or treatment for shock

(9) Evacuate **ASAP** to a medical facility continuing emergency procedures during transport

* When in a chemical environment, DO NOT loosen/remove clothing

ACCLIMATIZATION

Acclimatization to heat is necessary to permit the body to reach and maintain maximum efficiency in its cooling process. Ideally, a period of about two weeks should be allowed for acclimatization, with progressive degrees of heat exposure and physical exertion. Soldiers and unit leaders should note that although acclimatization strengthens heat resistance, there is no such thing as total protection against the effect of heat. The table on the following page presents guidelines for unit leaders, medical planners, and soldiers to follow. Pre-acclimatization may be achieved by gradually increasing physical activity in a hot environment.

Unit leaders, commanders, and soldiers should note these very basic guidelines for preventing heat injuries:

Consider water a tactical weapon.
Drink water frequently -- even if not thirsty. Drinking should be required and monitored by command.
Find shade -- get out of the sun.
Use unscented sunscreen and lip balm (SPF 15 or higher), and sunglasses
Place something between soldiers and the hot ground.
Limit movements.
Wear uniform properly: wear T-shirt; roll sleeves down; cover head; and protect the neck with a scarf or similar item to protect the body from hot, blowing winds and sunlight.
Resting in the shade, quietly, fully clothed, not talking, keeping mouth closed, and breathing through the nose will decrease the body's water requirement.
Perform heavy work in the cooler hours of the day, such as early morning or late evening, if possible. If working or traveling during these periods, watch for increased activity of wildlife (i.e, snakes and insects) during cooler hours and in the evenings.
Identify soldiers with previous heat injuries.
If in an emergency situation and water is scarce, do not eat. Find water by looking for animal trails that may lead to water holes, flocks of circling birds, or look (or dig) for water in areas supporting plants or grasses. Disinfect water as stated previously.

TABLE 1 - ACCLIMATIZATION ACTIVITY TABLE

Heat Condition/ Category	* WBGT Index °F	Water Intake Quart/Hour	** Acclimatized Work / Rest	Unacclimatized
1	78 - 81.9	At least ½	Continuous	Extremely intense physical exertion may cause heat injury
2	82 - 84.9	At least ½	50 / 10 minutes	Use discretion in planning heavy exercises
3	85 - 87.9	At least 1	45 / 15 minutes	Suspend strenuous exercise during first three weeks of training; activities may be continued on a reduced scale after second week of training; avoid activity in direct sun
4	88 - 89.9	At least 1½	30 / 30 minutes	Curtail strenuous exercise for all personnel with less than 12 weeks of hot weather training
5	90 and up	More than 2	20 / 40 minutes	Physical training and strenuous exercise is suspended; essential operational commitments not for training, where risk of heat casualties may be warranted is excluded from suspension; enforce water intake to minimize heat injuries

* MOPP gear or body armor adds 10°F to the WBGT index.

** An acclimatized soldier is one who has worked in the given heat condition for 10 to 14 days.

NOTE: "Rest" means minimal physical activity, accomplished in the shade if possible. Any activity requiring only minimal physical activity can be performed during "rest" periods. Examples: Training by lecture or demonstration, minor maintenance procedures on vehicles or weapons, personal hygiene activities such as foot and skin care.

COLD WEATHER CONDITIONS

1. Although winter temperatures in the desert area around Fort Bliss are mild, temperatures can drop to below 0 degrees Fahrenheit.

a. Throughout the year, desert temperatures can drop significantly at nighttime. Soldiers should be prepared for cold weather conditions, particularly during November through March, as well as cooler nighttime temperatures during Spring and Summer months.

b. Hypothermia can occur when temperatures are at or below freezing. Soldier's are at increased risk if cold exposure is compounded by lack of shelter, wind exposure, sleeping on cold ground, or wearing clothing that is wet from sweat or rain.

2. Simple Steps to Avoid Cold Weather Injuries:

a. Minimize effects of exposure to cold weather, wind, and rain by dressing in layers (to avoid overheating). Monitor temperatures as nighttime approaches -- add layers of clothing as temperatures drop.

b. Change socks and underwear frequently.

c. Increase food intake and drink plenty of fluids.

d. Do not sleep or rest in vehicles or tents with heaters unless adequately ventilated.

e. Use sunglasses, scarf, lip balm, sunscreen, and skin moisturizers.

f. Use the buddy system and be aware of soldiers with previous cold injuries.

g. While on guard duty, insulate soldiers from the ground (i.e., with sleeping mats) and stay out of the wind or construct wind screens to avoid unnecessary heat loss.

OTHER ENVIRONMENTAL CONSIDERATIONS

1. Sunlight.

a. Long term, unprotected exposure to sunlight is known to increase the risk of skin cancer. Soldiers who do not use protective measures against the effects of sunlight may experience sunburn, which is disabling and can make soldiers more susceptible to other type of heat injury; or impaired vision or headaches resulting from the sun's glare.

b. Countermeasures to minimize injuries caused by sunlight:

(1) Use unscented sunscreen with a sun protection factor (SPF) 15 or higher. Use of unscented products is advised since scented products may cause skin irritation and attract biting insects; use unscented lip balm and skin moisturizers to prevent chapping.

(2) Properly wear uniforms with sleeves down and loose fitting around the neck, wrists, and lower legs to allow circulation of air; use wide-brimmed hats and neckerchief to protect the face, ears, and neck.

(3) Wear sunglasses to cut down on glare and protect the eyes.

(4) Operate in the shade as much as possible; select grassy areas rather than concrete, if possible, when marching.

2. Precipitation.

a. The climate of the Fort Bliss region typically has high daytime summer temperatures, very low humidity, and scanty rainfall. Almost half the precipitation in this area occurs during July through September occurring from brief and, at times, heavy thunderstorms.

(1) Thunderstorms often drop, sometimes very quickly, two or more inches of rain in localized areas. Despite sand and dryness, abundant runoff may occur rapidly.

(2) Soldiers should not camp or linger too close to streambeds -- even if no clouds are seen -- as a wall of water from a distant rainfall could come unexpectedly.

(3) Do not drive across a flooded streambed as the water may be deeper than it appears to be; more water could be coming; the streambed could be soft with pockets of quicksand; or hidden boulders could be present. If stalled in a streambed, stay near the vehicle on higher ground.

(4) Clay, deposited on roads by floods, present a slick surface subject to skidding or loss of traction.

b. Intense lightning accompanies desert thunderstorms. Soldiers must avoid being struck by lightning by avoiding high ground, trees, or other isolated high objects. Stay several hundred feet away from wire fences as electrical current can travel down wires that are not grounded and cause adverse effects some distance away from the strike. If thunder can be heard, lightning poses a danger, even if no storm clouds are visible. Soldiers should seek safety within a vehicle, building, or ditch.

(1) Baseball-size hail may accompany storms. Soldiers should seek shelter from hail in a building, tent, vehicle, or cliff overhang to avoid injury from hail.

(2) Tornadoes have never been recorded in El Paso, but have been seen in the area. If a tornado approaches, lie down in a ditch or in a road culvert -- do not remain in vehicles.

3. Sand and Dust. During windy months (February - April), blowing sand and dust may make breathing and visibility difficult. Wearing goggles for the eyes, and a neckerchief to cover the nose and mouth will help reduce itchy eyes, runny nose, sore throat, and sneezing.

4. Rocks. Falls from rocks or cliffs commonly occur to individuals who have not had proper training in rock climbing techniques or who do not use proper equipment. Slick-soled shoes or boots should not be worn when climbing in rocky terrain or through heavy, dry grass. Soldiers should also be watchful for falling rocks when around cliffs or other high rocky terrain.

5. Earth Cracks. While severe earthquakes have not occurred recently in this region, the potential exists. Cracks, or fissures, in the ground surface that resembles those caused by earthquakes, are now occurring frequently in the Southwest. This is due to the loss of underground water and resulting ground settling or sinking. As the ground settles, fissures form, gradually enlarging causing collapse of the materials (soil, rock, sand) above. Finally, fissures may open completely at the surface, allowing surface water runoff to deepen and widen to form a deep gully. These cracks and fissures can and do cross roads and develop suddenly. Little traveled or unpaved roads should be traveled slowly and with care.

6. Animal Burrows. A number of rodents construct underground burrows that can be hazardous to soldiers. Burrows can be identified by the loose piles of earth thrown out to the surface by Western Pocket Gophers, or burrows encircled by a ridge of earth built by Black-Tailed Prairie Dogs. Soldiers should be alert for these burrows to prevent falls. Burrows may also harbor fleas that can transmit *plague*.

7. Munitions. Soldiers could potentially encounter munitions (bombs, shells, missiles) from previous military maneuvers or from military firing, bombing, and missile ranges. If munitions are encountered in the desert, leave them alone. Report anything suspicious to the military police.

PERSONAL HYGIENE AND SANITATION

Proper levels of personal hygiene and sanitation must be maintained while under field conditions since the risk of acquiring a disease or other disabling condition are multiplied in the field environment. For example, minor cuts or diarrhea, which may not be a significant problem in garrison, can become serious very quickly in the field environment. Hygiene and sanitation practices contribute to health in that they protect individuals against diseases and protect the unit by reducing the spread of disease-causing organisms.

1. Personal Hygiene.

a. Shower daily if possible. If shower facilities are not available, try sponge baths or use unscented disposable wipes.

b. Daily shaving is a requirement for male soldiers. Power shavers adapted to run from a vehicle source may be used instead of "wet razors" that consume precious water. To reduce skin infections, female soldiers should not shave underarms, legs, or bikini areas.

c. All soldiers should use non-perfumed personal hygiene supplies, as scented products may cause skin irritation or attract biting insects.

d. Soldiers should change underwear and socks frequently. All soldiers should wear loose fitting underwear made of natural fibers (e.g., cotton) to increase ventilation to the skin.

e. Soldiers should use unscented talc in areas where skin may rub resulting in skin irritations.

f. Excessive sweating can aggravate "prickly heat" and some forms of fungus infections of the skin. It is especially important to prevent prickly heat from becoming aggravated as this rash can upset the body's sweating mechanism, making the soldier prone to heat injury.

2. Sanitation. As in any other field environment, sanitation is of extreme importance in the desert. Proper mess sanitation and disposal of human waste and garbage are essential to minimize occurrence of DNBI from insect or rodent borne diseases and infestations.

a. Waste Disposal. Disposal of human waste, kitchen/field mess waste, and garbage or rubbish is strictly controlled in the Fort Bliss area.

(1) In the area of Fort Bliss that lies in New Mexico, any type of digging in the soil is forbidden, therefore, field latrines, soakage pits, and garbage pits are not allowed.

(2) The area of Fort Bliss that lies in Texas has different rules for disposing of all types of waste. In some areas burial of waste may be allowed, in other it may not. Units must coordinate with the Directorate of Environment, Fort Bliss, to ensure requirements are met for the areas being used.

b. Regardless of waste disposal requirements, soldiers must ensure they follow basic sanitation procedures:

(1) Use latrines -- wash hands prior to eating and after using the latrine.

(2) Ensure waste, rubbish, and garbage is disposed of properly. Ensure Field Sanitation Team (FST) members set up and monitor waste disposal sites for hazardous wastes (i.e., pesticide containers, batteries, used oil) and medical wastes.

(3) Avoid/minimize contact with animals, especially rodents, by eliminating food consumption and storage in living areas, not feeding leftover food to animals, and properly disposing garbage.

3. Water Supply. Water is supplied to units from designated water points. This water is treated with a chlorine residual of less than 1 ppm, however, when unit personnel obtain this water in water trailers to transport to their unit area, precautions must be taken:

a. Water must be transported in clean trailers, tank trucks, or water cans. To the maximum extent, they should be used for hauling potable water only. Interiors should be inspected periodically for rust and chips in the interior enamel, tightness of seals and seams, and cleanliness. All unit water trailers should be inspected and certified by PVNTMED personnel at least twice per year.

b. Once the water is at the unit area, unit personnel (FST members) are responsible for checking and maintaining an adequate chlorine residual. At Fort Bliss, the standard requirement for field water supplies is 5 ppm chlorine residual. Because of the high temperatures, chlorine residual should be checked every three hours and each time a new load of water is taken to the unit area.

c. If water is being produced in a fully operational ROWPU and is fully processed, the chlorine residual can be 2.0 ppm at the point of production. Consult exercise operational/logistical guidance for specifics.

d. Use and store water wisely and safely. Improperly stored water may attract desert wildlife, insects, and rodents.

MEDICAL THREATS AND PREVENTION

PRE-DEPLOYMENT

1. Prior to deployment to any area, unit leaders should schedule a medical threat briefing for soldiers from preventive medicine (PVNTMED) personnel and understand the preventive medicine countermeasures needed to minimize the operational impact of health threats in the area of operation (AO).

a. Leaders and planners should incorporate Preventive Medicine Measures (PMM) into the unit SOP.

b. Unit leaders should ensure their FST members are trained (40-hour course) and fully equipped IAW AR 40-5 and FM 21-10-1.

c. Unit leaders should ensure their soldiers receive DoD prescribed immunizations and medications (as modified by the OPLAN Medical Annex).

d. All uniforms should be treated with permethrin, using the Individual Dynamic Absorption (IDA) impregnation kit (NSN 6840-01-345-0237) and ensure DEET insect repellent (NSN 6840-01-284-3982) is available for soldiers.

e. Female soldiers should have an OB/GYN examination to:
   (1) Detect pregnancy if present
   (2) Receive counseling regarding contraceptive measures
   (3) Report types of prescription medications being used (including birth control pills)

f. All soldiers should ensure they pack ample personal hygiene supplies and medications; extra eyeglasses and sunglasses (due to sand/dust conditions, wearing contact lenses is discouraged); and ensure clothing and equipment fit.

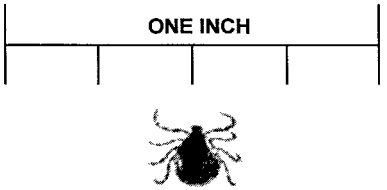
DISEASES & OTHER NON-BATTLE INJURIES

The following diseases should be considered a threat to military operations while in the Southwestern American Desert:

1.Tick-Borne Diseases. Several infectious diseases may be transmitted to humans by the bite of a tick.

a. *Rocky Mountain Spotted Fever* is characterized by sudden onset, with severe headache and high fever. Symptoms may appear flu-like and may be accompanied by a spotted rash that quickly spreads over much of the body. Prompt medical treatment is required -- this diseases can be fatal.

b. *Lyme Disease* causes flu-like symptoms (including severe headache, extreme fatigue, and joint and muscle pains) that are often accompanied by a red, ring-like rash at the site of the tick bite. Prompt treatment is important to prevent more severe symptoms or permanent nerve and joint damage.



c. Countermeasures to avoid contact with ticks.

(1) Use the DOD Insect Repellent System:

permethrin on uniform

NSN 6840-01-278-1336 (spray) *
NSN 6840-01-345-0237 (IDA Kit)

DEET on skin

NSN 6840-01-284-3982

properly worn uniform

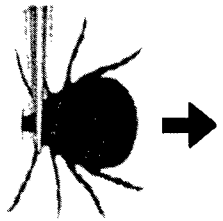
= ***Maximum Protection***

* Apply permethrin to uniforms laid out on the ground or other flat service

(2) Inspect scalp, skin, and clothing at least twice daily -- use the buddy system.
(3) Avoid areas that may have large tick populations (tall grass, weeds, shrubs).
(4) Discourage rodents and wild animals that may carry ticks into the unit area.

d. Removing attached ticks.

(1) **DO'S**



- REMOVE TICKS PROMPTLY. If possible, report to medical personnel to remove the tick.
- Grasp the ticks mouthparts against the skin with pointed tweezers.
- Pull back slowly and steadily with gentle force until the tick can be eased out of the skin.
- Be patient -- the ticks central mouthpart is covered with sharp barbs, sometimes making removal difficult.
- After removal, wash the wound site and apply antiseptic.
- Save the tick in a jar, vial, or "zip-lock" bag for identification should disease symptoms develop. Preserve the tick by adding some alcohol to the jar or keep it in a freezer.

(2) **DO NOT'S**

- DO NOT PULL BACK SHARPLY -- The mouthparts may be torn from the body of the tick, leaving them embedded in the skin.
- DO NOT PANIC -- If the mouthparts do break off, prevent secondary infections by removing the mouthparts as you would a splinter. The mouthparts alone cannot transmit *Lyme Disease* because the infective body of the tick is no longer attached.
- DO NOT SQUEEZE THE BODY OF THE TICK -- This may force infective fluid into the wound site.
- DO NOT APPLY SUBSTANCES -- Like Vaseline, fingernail polish, repellents, pesticides, or a lighted match to the tick while it is still attached. These materials might agitate the tick, causing it to regurgitate infective fluid into the wound site.

2. Hantavirus.

a. Hantavirus is an extremely serious, life-threatening illness that can quickly lead to pulmonary (lung) or renal (kidney) failure. Humans are usually infected by inhaling dust that has been contaminated by virus-containing rodent droppings and urine.

b. Countermeasures to prevent Hantavirus:

(1) Maintain a high state of sanitation throughout the unit area. Keep food tightly sealed. Frequently remove trash and eliminate unnecessary water sources.

(2) Avoid areas where rodents are present.

(3) Prevent entry of rodents into unit areas by sealing openings greater that 1/4-inch in exterior walls.

(4) AVOID INHALATION OF DUST WHEN CLEANING (particularly, when cleaning previously unoccupied areas). Mist these areas with water prior to sweeping or mopping. If possible, decontaminate the area with bleach solution (3 oz. liquid bleach diluted in one gallon of water).

(5) Promptly remove any dead rodents. Use disposable gloves, or plastic bags over the hands when handling dead rodents. Place all dead rodents into a plastic bag prior to disposal.

(6) NEVER feed, handle, or keep rodents, or other wild animals as pets or mascots.

(7) SEEK IMMEDIATE MEDICAL ATTENTION FOR DIFFICULTY BREATHING, OR FLU-LIKE SYMPTOMS (FEVER, CHILLS, OR BODY ACHES).

3. *Plague*.

a. *Plague* is an extremely serious, potentially fatal, bacterial infection that has a sudden onset and progresses quickly. Symptoms can include high fever; chills; headache; a very tender, swollen lymph node (bubo); exhaustion; mental confusion or delirium; difficulty breathing; chest pain; frothing, bloody sputum; seizures; or shock. MEDICAL ATTENTION SHOULD BE SOUGHT IMMEDIATELY IF *PLAGUE* IS SUSPECTED. Human infection with plague bacteria can occur through a variety of routes including:

(1) Flea bites -- plague bacteria directly enters the skin as the flea feeds on blood (most common means of plague transmission).

(2) Flea feces -- plague bacteria in flea feces are scratched into a flea bite wound.

(3) Direct contact with infected animals -- infected blood or other body fluids can enter scratches on skin; infected saliva can enter during a bite; eating infected animal tissue, infecting the lining of the mouth.

(4) Inhalation -- Infected saliva droplets from an infected person or animal are inhaled.

b. Countermeasures to prevent *Plague*:
   (1) Use the DOD Insect Repellent System (see the diagram in the section "Tick Borne Diseases").
   (2) Avoid contact with animals, prairie dogs, and their burrows.

4. Snakebite. The most common type of snakebite in the Fort Bliss area is that of the rattlesnake. Approximately 98% of all bites are on the arms and legs, usually the legs.

a. Countermeasures to Prevent Snakebites:
   (1) Avoid areas that may shelter snakes (i.e., brush or rocks) or where snakes are "sunbathing"
   (2) Be alert to all wildlife when walking; do not put hands or feet in dark areas that you cannot see into.
   (3) Examine clothing, boots, sleeping bags, and latrines before use.
   (4) Do not try to pickup any wild life, especially snakes.

b. If soldiers encounter snakes:
   (1) Back away slowly and calmly from the snake.
   (2) If bitten, the following is the current U.S. Army recommended treatment for poisonous snake bites:
   - Move the casualty away from the snake.
   - Seek medical aid immediately.
   - Remove all rings, bracelets, watches from affected areas.
   - Reassure the casualty and remain calm -- hysteria can drastically hamper a speedy recovery.
   - Place ice or freeze pack over the area of the bite.
   - Apply a constricting band one to two finger widths from the bite -- one should be able to insert a finger between the band and skin; if the bite is on the arm or leg, place one band above and one band below the site; if the bite is on the hand or foot, place one band above the wrist or ankle.
   - Immobilize the affected part in a position below the level of the heart.
   - Kill the snake if possible, without damaging its head or endangering yourself and send it with the casualty.

Snakebite DON'TS:

- Don't panic
- Don't consume any alcohol
- Don't inject antivenin in the field
- Don't apply a complete tourniquet
- Don't suction or cut the wound
- Don't harass, tease, or handle snakes

OTHER DISEASES AND NON-BATTLE INJURIES OF OPERATIONAL IMPORTANCE

DISEASES TRANSMITTED PERSON-TO-PERSON

1. Flu and Colds. Countermeasures:

   a. Avoid overcrowding in living areas. Provide good ventilation in living areas; sleep head-to-toe.

   b. Avoid coughing or sneezing toward others.

2. Sexually Transmitted Diseases (STD), including the AIDS virus (HIV), can occur at any time. Risk factors include having sex with infected partners; frequent sexual exposures; having unprotected sex; having anal intercourse.

   a. PRACTICING ABSTINENCE IS 100% PROTECTION FROM STD's.

   b. Avoid anal intercourse which causes tissue damage and increases susceptibility to STD.

   c. Use condoms, although they are only partially effective in preventing disease.

   d. Care of STD's:
      (1) All STD's are serious.
      (2) Obtain medical care if genital discomfort, swelling of lymph nodes in groin, unusual discharge, painful or burning urination, rectal pain or discharge, lower abdominal pain, or fever develop.

OTHER DESERT HAZARDS

The following is a representation of what soldiers may encounter while in the Chihuahuan Desert. Soldiers should be alert and take appropriate precautions, avoiding wildlife or contact with plants, cacti, or other desert elements.

1. Mammals.

a. Desert inhabitants include Bats, Coyote, Mountain Lion, Pronghorn Antelope, Mule Deer, Bighorn Sheep, Oryx, Bobcat, Merriam's Kangaroo Rat, Rock Squirrel, Jack Rabbit (Black Tailed), Striped Skunk, Hog-Nosed Skunk, Badger, Porcupines, and Javelinas (pig-like animals).

b. Under no circumstances should soldiers attempt to approach, handle, or adopt desert wildlife. Some mammals, like coyotes, have grown accustomed to humans in the desert and may not be afraid to approach camps. Soldiers should not encourage any animals to come near camp areas by feeding, approaching, or adopting these animals. If dead animals are to be removed, soldiers should wear plastic or heavy gloves, taking appropriate precautions to remove the carcass according to command, unit, or FST recommendations. Soldiers who do not practice these protective measures increase the risk of:

(1) *Rabies*, a virus that affects the central nervous system, is transmitted by the bite of a rabid animal or through the saliva of a rabid animal introduced into a fresh scratch or similar break in the skin. Desert species most likely to carry rabies are bats, dogs, cats, skunks, coyotes, foxes, ground squirrels, and possibly badgers. If an animal shows no fear of man, it could possibly be suffering from rabies; however, not all animals that fail to run are rabid (i.e., skunks).

(2) *Tularemia*, also known as "Rabbit Disease," is an acute infectious disease caused by bacteria. The disease occurs naturally in at least 48 species of birds and mammals -- in the U.S., the rabbit is the most important source of human infection (90% of cases). Infection is primarily transmitted to humans by handling or consuming insufficiently cooked rabbit or hare meat; drinking contaminated water; or inhalation of dust from contaminated soil, grain, or hay.

2. Reptiles. Reptiles are abundant in number and diversity in the Chihuahuan Desert. Lizards and snakes have adapted very well to the harsh desert life. Most reptiles found in the Fort Bliss area are nonpoisonous, but several venomous snakes, like the Western Diamondback Rattlesnake, can be found.

3. Arthropods -- Insects, Spiders, and Scorpions. In recent years, hospital admissions of personnel due to bites and stings of poisonous arthropods have exceeded the admissions due to snake bites.

a. Biting or "piercing" arthropods include the Black Widow Spider and Brown Recluse Spider, both of which are extremely poisonous; centipedes; millipedes; tarantula; ticks; and fleas.

b. Stinging arthropods include California Harvester Ants, Bees, Wasps, Velvet Ants, and Scorpions.

(1) Although all scorpions are poisonous, most stings are no more dangerous than a wasp sting. Highly venomous scorpions are not found in the Fort Bliss area.

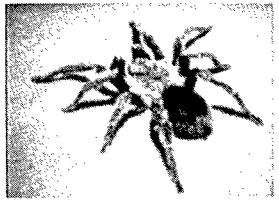
(2) Harvester ants can easily be located by their distinctive mounds, usually flat or slightly elevated surrounded by defoliated area (all vegetation removed) up to 10 feet or more in diameter. Bees, wasps, and velvet ants will generally only attack if they are annoyed or caught in clothing or bedding.

(3) Soldier's should take great care not to disturb hives or nests. Large swarms of bees should be reported to installation authorities.

CAUTION

Insect bites/stings may cause anaphylactic shock (a shock caused by severe allergic reaction). This is a life-threatening event and a MEDICAL EMERGENCY! Be prepared to immediately transport the casualty to a medical facility.

BLACK WIDOW



TARANTULA

SCORPION

c. The following measures should be taken immediately if stung or bitten by an arthropod:

(1) Seek medical assistance.

(2) If a stinger is present (i.e., bee), remove the stinger by scraping the skin's surface with a fingernail or knife; do not squeeze the sac attached to the stinger as it may inject more venom.

(3) Wash the area of the bite/sting with soap and water (alcohol or antiseptic may also be used) to reduce infection and remove traces of venom.

(4) Remove jewelry from bitten extremities since swelling may occur.

(5) Apply ice or cold compresses to the site of the bite/sting to help reduce swelling, ease pain, and slow absorption of venom. Meat tenderizer (to neutralize venom) or calamine lotion (to reduce itching) may also be applied.

(6) Monitor soldier for signs of allergic reaction.

e. Countermeasures to Prevent Injury from Biting, Piercing, or Stinging Arthropods.

(1) Avoid areas that may shelter arthropods (i.e., brush, rocks, dark places).

(2) Be alert when walking; do not put hands or feet in dark areas that you cannot see into.

(3) Examine clothing, boots, sleeping bags, and latrines before use.

(4) Do not disturb arthropod nests or dwellings.

5. Desert Plants. Most of the landscape in the Chihuahuan Desert is dominated by low-growing vegetation - shrubs, cacti, and grasses, though some plants do grow to the size of small trees. Commonly seen plants include:

a. Agave: Considered a pest, the agave grows in masses over arid mesas and hills; if brushed against, it jabs legs and ankles causing sharp lingering pain.

b. Yucca: Three species of yucca grow in the Chihuahuan Desert --

(1) Soaptree Yucca: Narrow-leafed species; leaves are flat, leathery, and flexible and end in a sharp spine.

(2) Torrey Yucca: Broad-leafed species; leaves are bayonet-like, rough, and stiff and end in a sharp spine.

(3) Banana Yucca: Broad-leafed species; leaves are rigid, spine-tipped, and edged with whitish fibers.

c. Sotol: A large plant often mistaken for a yucca; leaves are up to three-feet long and have teeth on the edges.

d. Ocotillo: Straight stems rise from a short root crown, reaching up to 30 feet in height; stems are armed with spines the entire length.

e. Tree Cholla: A bush-like cactus with a woody stem covered with raised spine-bearing knobs with 10 to 30 barbed spines per knob; brushing against a tree cholla can be painful and removing spines from the skin difficult as they are barbed; stems can penetrate all but the thickest soled shoes and can even pass through leather hides of boots.

f. Barrel Cactus: A cylindrical cactus that can reach up to 10 feet in height with spines reaching 2 feet in height. This cactus has been portrayed as being able to supply water by cutting it open and mashing the pulp; actually, the liquid is bitter and alkaline and would serve as a water source only in a dire emergency.

g. Tumbleweed/Russian Thistle: A ball-shaped weed associated with areas disturbed by man. Blowing tumbleweeds can be easily avoided when walking; when in the roads, drivers should hit them (since they crumble easily), instead of using evasive steering that may lead to collisions.

DESERT SURVIVAL

Soldiers can reduce the chance of being a desert casualty by practicing good personal preventive measures; working and recreating safely; and using the buddy system. Anyone traveling should ALWAYS leave a note or message with someone including when they leave, when they plan to return, where they are going, and how they are traveling.

1. If lost in the desert with the barest minimum of equipment and supplies, remembering a few basic rules can increase chances for survival:

a. First and foremost, a soldier who is lost needs to remain calm -- not panic -- and concentrate on the four survival requirements: water, shelter, food, travel.

b. Find safe shade and, if possible, wind protection (watch for wildlife, snakes, spiders); do not sit directly on the ground; stay put.

c. Remain quiet -- any unnecessary activity will waste energy -- this includes talking and smoking.

d. Avoid strong breezes that can cool skin too quickly.

e. Keep as much of the skin covered as possible; keep all clothing on in loose layers -- keep collar up to protect the neck, pants unbloused and over boots, shirt sleeves rolled down, and keep head protected.

f. Drink plenty of water -- do not drink urine or blood.

g. Do not eat dry food if a water supply is not available.

h. Do not drink alcohol.

2. Water. Although the human body can survive many days without food, it requires water to maintain vital organs. If soldiers' are lost in the desert, finding water is critical to survival.

a. If a rescue is forthcoming, do not eat -- eating requires water to digest food and salt content in food may increase thirst.

b. If the body needs water -- drink it. Saved water in canteens cannot help a soldier who is passed out due to dehydration. Avoid alcoholic (beer, etc.) or caffeinated beverages as they cause quicker dehydration.

c. Drink only until thirst has passed; drink water slowly (gulping water causes the body to sweat more and may lead to stomach cramps).

d. Soldiers should stay put if they have an ample water supply. If water is not readily available:

(1) Completely scan the land to determine the down slope of the land (indicating drainage).

(2) Look for streambeds that may flow into larger streambeds. Dry streambeds may provide water by digging to the outside and at the lowest points on the beds.

(3) Look for animal tracks that may lead to natural or manmade water points.

(4) Occasionally water can be found at the base of cliffs and mountains. Limestone caverns may also contain water pools, however, only enter caverns with a flashlight and mark a trail.

(5) Collect dew or moisture early in the morning by soaking up water with a cloth and squeezing into a container.

(6) Construct a solar still:

- Dig a round shallow hole
- Place a container in the hole
- Cover the hole with a small sheet of plastic (plastic should extend to all sides of the hole and be large enough to hand into the hold and form a "cone" when weighted by a small rock)
- Place a container beneath the 'plastic cone' to collect the water that evaporates from the ground and condenses on the underside of the plastic
- A straw may be used; each time the plastic is removed, it will take about three hours for the still to start collecting again

e. Once water has been found or collected, it should be purified as described previously in this guide. If chemical agents or fire is not available, water, at the very minimum, should be filtered through the cleanest piece of cloth available before drinking.

3. Shelter. With the threat of heat injuries in the desert area, shelter should be a priority.

a. Always stay with a vehicle -- it will provide shelter and a large target for aerial location rescue; it will provide shade in the daytime and protection from cooler temperatures at night; and it may have to provide protection against desert wildlife.

(1) If the vehicle has stopped or stalled in a wash or streambed, stay near the vehicle but not in it. Sudden thunderstorms, even at a distance could send a wall of water down the wash, sweeping away everything in its path.

(2) Part of the vehicle can be used if stranded:

- Oil can be used as lip balm and under the eyes to deflect the sun's glare (never spread oil over large areas of the body as it will prevent sweating)
- Seat covers and floor mats can be removed to sit on protecting against the grounds surface temperature and insects and plants

b. If a vehicle is not available:

(1) Locate a shaded area -- inspect the area for insects, spiders, snakes, or hazardous plants.

(2) Be very cautious about seeking shelter in caves as these may be homes for dangerous desert mammals.

(3) Construct a wind shelter -- if the body cools down too quickly, more sweat is generated to replace what the wind has evaporated thereby increasing the loss of body moisture.

(4) Once adequate shelter has been located, stay put. During cooler periods (early morning and evening/nighttime) construct markers that can be seen by aerial rescue teams.

4. Food. If a quick rescue is anticipated, it may be better to do without food than to eat from the desert's food supply or waste energy searching for food. If rescue is prolonged, there are sources of food -- the key is finding it and knowing what can be eaten.

NOTE! THIS GUIDANCE IS ONLY FOR USE IN TRUE EMERGENCY SITUATIONS. DO NOT TRY TO EAT THE PLANTS OR KILL ANIMALS JUST TO EXPERIMENT. MANY PLANTS AND ANIMALS (i.e., ROCK RATTLESNAKE) ARE PROTECTED SPECIES AND CARRY FINES AND PENALTIES FOR DESTROYING THEM.

a. Many plants in the Chihuahuan Desert can be eaten.

(1) New, young pads of the Prickly Pear Cactus, which grows in clumps and are spread out over large areas, growing to a height of 10 feet. The fleshy pads are green to purple in color and have long sharp spines. It is safe to eat either raw or boiled, after peeling first. Because the prickly pear is abundant in this area and easily identified, it should be the first choice for food.

(2) The Barrel Cactus is also edible but not as readily available. To eat, cut the top off and scrape out the inside. This cactus can also be eaten raw or boiled; however, it may cause severe diarrhea in some persons. It is better to chew the fruit, if present, including the seeds.

b. Plants that are not safe to eat include those with a milky sap such as milkweed; plants with bright red seeds; wild potatoes; locoweed; and Jimpson weed. Since many poisonous and non-poisonous mushrooms look alike, it is better to avoid them altogether.

c. If plants cannot be identified:

(1) Boil plants being considered for food, then test the plant by placing a very small amount in the mouth and holding it there for at least one minute. If a burning, nauseating, or bitter taste does not develop, a small amount may be eaten.

(2) Wait for 30 minutes or more after eating a small amount of the plant. If no nausea, cramps, or other symptoms develop, the plant is probably safe to eat.

d. Though plants are easier to obtain than animals, there are a greater number of animals that can be safely eaten than plants. All birds, bird eggs, lizards, snakes, small mammals (such as rabbits), pack rats, Kangaroo rats, mice, ground squirrels, and larger mammals such as bobcats, foxes, coyotes, raccoons, deer, and antelope can be eaten.

NEVER CATCH OR HANDLE A SICK ANIMAL OR AN ANIMAL THAT IS ACTING STRANGELY. NEVER TRY TO CATCH A SNAKE UNLESS IT IS KNOWN NOT TO BE POISONOUS. MANY ANIMALS ARE PROTECTED SPECIES AND SHOULD NOT BE HARMED UNLESS IN A LIFE OR DEATH EMERGENCY.

(1) Catching animals can be accomplished with a noose, slingshot, or weapon (noting that if a weapon is available, ammunition should be saved to use for signaling or for protection from larger animals).

(2) Some animals are unsafe to eat including rabid animals, skins of frogs, and all toads. Caterpillars with hair should be avoided since hairs can cause skin reaction if handled and some are poisonous if eaten.

(3) If meat is obtained, it should be thoroughly cooked. If sticks or leaves are used to wrap or roast meat, the stick/leaves should come from non-poisonous plants.

(4) If no fire is available, meat that is fat free can be made into jerky by cutting it into thin strips and drying it in the sun for two to three days until completely dried. It can also be buried in six inches of sand for the same length. Remember that dangerous meat eating mammals will also be looking for food.

5. Travel. Survival often depends on how quickly a lost soldier is found. Soldiers should be reminded frequently to stay put if they do get lost in the desert. If soldier's must travel, the following guidelines should be followed:

a. Find and record a direction. During the day, south can be found with the aid of a stick placed vertically in the sand. Note the direction the shadow falls and compare to the time of day (remembering the sun rises in the east and sets in the west). Therefore, if the time is 1600, the shadow will indicate west -- the direction to the left of the shadow would be south.

b. While traveling, any direction initially chosen should be the only direction taken. Changing direction may lead in circles.

c. Walk downhill as much as possible as it will take less energy and chances of finding water will increase.

d. Navigating at night is more difficult that traveling during the day; however, to preserve body moisture, traveling at night is better. If traveling during the day, drink plenty of water and rest frequently. If traveling by vehicle, try to travel in the early morning or late evening to avoid overheating the engine.

e. If traveling at night, abrupt drop-offs, earth cracks, and burrows creates serious injury threats. There will also be a significant increase of desert wildlife activity (such as snakes and scorpions)

e. Before starting to travel, ensure a good supply of water is available. Drink until full, forcing the stomach to act as a canteen.

f. If available, carry a compass, watch, something to record your distance and direction (for returning with aid to others), sunglasses, and some type of signal device (mirror, flashlight, or weapon).

CONCLUSION

A final word on the Chihuahuan Desert and Fort Bliss. This portion of the desert is a large military training area; however, training can result in disturbance and destruction of this fragile and beautiful environment. Prehistoric man occupied the Fort Bliss are from about 8,000 B.C. to A.D. 1400. The remains of prehistoric camp sites, villages, and towns have been recorded throughout the installation. These sites are evidenced in pottery, stone tools, and other artifacts lying on the surface of the ground.

FEDERAL LAW MAKES IT A FELONY (UP TO A $1,000 FINE AND 30 DAYS FOR FIRST OFFENSE) TO COLLECT OR DIG FOR THE PURPOSE OF COLLECTING SUCH ARTIFACTS.

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NOTES

READINESS THRU HEALTH