

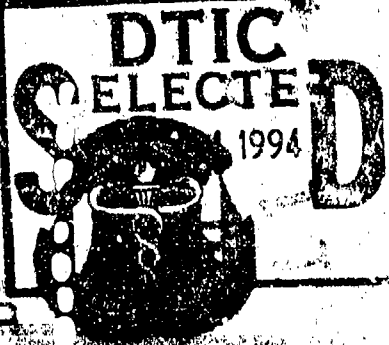
**SUSTAINING SOLDIER HEALTH AND PERFORMANCE IN
SOUTHWEST ASIA:**

GUIDANCE FOR SMALL UNIT LEADERS

AD-A286 145



RESEARCH FOR THE SOLDIER



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OCTOBER 1994**

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USARIEM TECHNICAL NOTE 95-1

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

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October 1994

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

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SUSTAINING SOLDIER HEALTH AND PERFORMANCE IN SOUTHWEST ASIA

FOREWORD

U.S. military forces are deploying to Southwest Asia (SWA) to support peacekeeping operations within the area of Saudi Arabia and Kuwait. Deploying soldiers, sailors, and airmen will confront a very harsh climate, exposure to diseases, military and psychological stresses.

Members of the U.S. Army Medical Research and Materiel Command (USAMRMC) prepared this handbook of preventive medicine guidance to assist unit leaders in Southwest Asia. 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: environmental exposure, avoiding disease hazards, hydration and nutrition, managing work and stress, NBC protection, concerns for women soldiers and maintaining morale.

This guidance draws heavily upon knowledge gained by USAMRMC 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; Special Operation Command; Central Command; or that contained in other official publications. Rather, it is intended as supplementary information, making this Command's lessons learned available to unit commanders.

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

Commanding General
U.S. Army Medical Research and Materiel Command
ATTN: MCMR-SGS-OP
Fort Detrick, Frederick, MD 21702-5012

Telephone: DSN: 343-7137; FAX Number 343-2982
Commercial: (301) 619-7137

KEY PREVENTIVE MEDICINE MEASURES

PREDEPLOYMENT PHASE:

- Start taking malaria prevention pills (if directed by unit medical officer).
- Get required immunizations.
- Arrange for a pregnancy test (women).
- Review SOPs for field sanitation, water treatment and sleep discipline.
- Review SOPs for heat, cold, work/rest cycles, water discipline and buddy-aid/first-aid.
- Pack gear for hot and cold weather.
- Pack individual skin & eye protection (insect repellent, sunglasses, sunscreen, lip balm).
- Treat uniforms and mosquito netting with insect repellent (permethrin).
- Review Southwest Asian culture.
- Bring 2 pairs of prescription eye glasses.
- Pack 6-month supply of prescription medication.
- Pack 6-month supply of feminine hygiene products.
- Maintain physical fitness.

DEPLOYMENT PHASE:

- Emphasize safety (injuries are common during early phases).
- Minimize jet lag and sleep loss.
- Drink plenty of fluids and eat regular meals.

OPERATIONAL PHASE:

- Assume all water, beverages and food from non-U.S. military sources are contaminated.
- Enforce appropriate heat, cold, work, and water discipline SOPs.
- Schedule and eat regular meals.
- Enforce sleep discipline.
- Bathe or shower daily if possible.
- Defecate only in constructed latrines or designated areas.
- Enforce use of DEET and permethrin insect repellent.
- Avoid wild and domestic animals.
- Keep soldiers informed and updated.
- Schedule regular recreation and stress alleviation debriefings.
- Emphasize safety at all times.

REDEPLOYMENT PHASE:

- Prepare for reunion with family.
- Schedule stress reduction debriefings.
- Report any illness to medical professionals.
- Schedule OB/GYN medical examination (women).
- Continue taking malaria medicine (if prescribed) following return.

INTRODUCTION

Southwest Asia (SWA) is a harsh and unfamiliar environment to American soldiers. SWA poses hazards unfamiliar to most soldiers who have trained in the temperate and hygienically advanced environments of CONUS or Europe. U.S. military forces were able to successfully operate in SWA during Operation Desert Shield/Storm. An important reason for that successful deployment was that leaders had a positive approach to maintaining their unit capability. Leaders must foster in their soldiers a confidence that they can master the environment. Leaders should emphasize pride from previous successes in adapting to the extraordinary circumstances of SWA.

This guide is designed to help unit leaders accomplish the mission by providing information on how to sustain soldier's health and fitness while deployed to SWA. It provides an aid to identify anticipated health hazards and describes some actions that can be taken to minimize the effects of these hazards. Because it is designed to meet the needs of non-medical units, it does not provide detailed medical information. The guide is organized to be both a predeployment planning resource and a reference to use during operations.

ENVIRONMENTAL HEALTH HAZARDS

SWA is one of the hottest places on earth during the summer months. Temperature and humidity are high enough to require changes in unit work schedules and rates.

Soldiers will need protection from the heat and sun. Soldiers must prepare to keep cool in the day as well as warm at night. The desert can be dangerously cold in winter, especially at night when wind-chill can fall well below freezing. Although most of the SWA theater is dry, coastal areas of the Persian Gulf are marshy and can be cold in winter. Soldiers operating in these conditions need to protect themselves against cold-wet injuries.

A. HOT WEATHER

Heat stress can occur anywhere in SWA (see Appendix A) depending on physical activity (work rate), clothing and climatic conditions. Normally, excess body heat is lost through several physiological mechanisms; however, when air temperature is above skin temperature, evaporation of sweat is the only mechanism for heat loss. High relative humidity, however, limits sweat evaporation and increases heat strain. Following sweat loss, water must be consumed. If body fluid lost through sweat is not replaced, dehydration will follow. Dehydration leads to added heat strain, increased susceptibility to heat injury, reduced work performance and degraded mission capability.

Heat stress also degrades mental performance. Rested, well-trained soldiers performing sedentary tasks should be able to work normally for up to four hours in the heat before intellectual performance deteriorates. Tasks requiring sustained attention (e.g., watching radarscopes, sentry duty) will be more quickly affected. In addition, decision times are slower in the heat.

1. Problems in Hot Weather

Heat Stress. Heat, high humidity and exposure to the sun make it difficult for the body to regulate its temperature. Hot weather increases water requirements, because body water is lost as sweat. Sweating can be high even when the skin looks and feels dry, since sweat evaporates quickly in dry and windy conditions. Dehydration reduces the benefits of heat acclimatization and physical fitness, increases the risk of heat illness, and reduces work capacity, appetite and alertness. The greater the dehydration, the more severe the effects.

Soldiers usually do not replace body water losses, even when water is readily available. **Thirst is a poor indicator of dehydration.** Soldiers under stress in a hot environment will exhibit "voluntary dehydration." They will maintain themselves about 1.5 quarts below their ideal hydration status with little sense of thirst. Also, the high chlorine levels often required to sanitize water may cause soldiers to drink less than they need until they get used to the taste. Soldiers must constantly remind themselves, or be reminded, to drink to replace lost sweat. Ensuring adequate water consumption is the responsibility of the unit leader and NCOs.

Heat Injury/Illness. One heat casualty is usually followed by more. The occurrence of a heat casualty is a warning that the entire unit may be at immediate risk. There are several heat illnesses/injuries of varying degrees of severity including heat rash, sunburn, heat cramps, heat exhaustion and heat stroke.

Heat Rash is 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 its disappearance. Avoid heat rash by practicing good hygiene.

Sunburn is a skin burn due to over-exposure to the sun. Sunburn can impair body heat loss and degrade performance. Avoid sunburn by covering skin with clothing and sunscreen.

Heat Cramps are due to excessive salt and water losses, which cause muscle cramps in the abdomen, legs, and arms. Heat cramps most often occur in soldiers who are not heat acclimatized. Avoid heat cramps by maintaining proper nutrition and hydration.

Heat Exhaustion includes symptoms of fatigue, nausea, dizziness, fainting, vomiting, mild changes in mental function (e.g., disorientation, irritability), and elevated temperature. Avoid heat exhaustion by employing appropriate work/rest cycles and consuming adequate amounts of fluid (see Appendix B).

Heat Stroke includes all of the above signs and symptoms, but is more severe and can be fatal. The victim will be hot and disoriented or unconscious. Avoid heat stroke by employing work/rest cycles and consuming adequate amounts of fluid.

WEAK LINK RULE:
When the first heat casualty occurs,
assess the status of the whole unit.

2. Countermeasures for Problems in Hot Weather

The key to preventing heat illness and sustaining performance is knowledge of the environmental conditions. Leaders must have accurate weather information. Heat illness prevention guidance is based on Wet Bulb Globe Temperature (WBGT) readings (TB MED 507, FM 21-11, and GTA 8-5-45, see References). Guidance is approximate.

WBGT guidelines do not accurately forecast heat illness rates under conditions of high humidity. Measures to prevent heat illness fall into several categories: acclimatization/physical fitness, hydration/nutrition, work/rest cycles/reduced heat exposure, and clothing/equipment/supplies. Observe soldiers carefully for signs of distress in the heat and adjust work/rest schedules, work rates and water consumption according to conditions. Heat strain and dehydration can accumulate over several days before causing heat illness; therefore, during recovery periods, emphasize rest, rehydration and eating.

a. **Acclimatization/Physical Fitness**

1. Maximize physical fitness and heat acclimatization prior to deployment. Maintain physical fitness after deployment with maintenance programs tailored to the environment. Physically fit soldiers acclimatize to heat faster than less fit soldiers.
2. Significant heat acclimatization requires at least three to five days. Full heat acclimatization takes seven to fourteen days. Heat acclimatization requires at least two hours per day of carefully supervised exercise in the heat.
3. Gradually increase the exercise intensity each day, working up to an appropriate physical training schedule adapted to the environment. During the first two days of heat exposure, light recreational activities (e.g., softball, volleyball) are appropriate. By the third day of heat exposure, 2-mile unit runs at the pace of the slowest participants are feasible. Remember, the least fit soldiers will suffer the greatest heat strain.
4. **Heat acclimatization does NOT reduce, and may actually increase, water requirements.** Acclimatization increases sweating, which enhances evaporative cooling. Increased sweating requires additional water consumption.

It is dangerous to reduce water consumption.
--

b. Hydration/Nutrition

1. Emphasize the importance of drinking. Military operations will interfere with maintaining hydration.
2. Establish mandatory drinking schedules from the tables provided in Appendix B. Water required to replace sweating may exceed the body's ability to absorb fluid, which is about 1.5 quarts per hour. Soldiers should not be expected to drink more than this amount per hour, and the rest must be consumed later.
3. Assure adequate hydration of all soldiers before any exercise or work. Carry water in your belly; don't "save" it in your canteen.
4. Plan operations to include water resupply points no less than every three hours. One-hour intervals are better. Carry as much water as possible when separated from approved sources of drinking water. Assure that 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.
5. Complete consumption of rations including salt packets will provide an adequate salt intake. Soldiers may have a few days of increased salt requirements upon initial deployment because sweat is salty before heat acclimatization. Additional salt supplementation is not appropriate unless directed by medical personnel. Women

soldiers are smaller than men, and, therefore, might not need to consume all salt packets in their rations.

6. Monitor hydration status by noting the color and volume of a soldier's urine. Teach soldiers that **dark yellow urine and infrequent urination indicate that fluid consumption should be increased.**

7. Remove barriers to drinking. Make flavored, cool water accessible and provide enough time to drink and eat. Soldiers drink most of their water with meals, and improving water availability increases food consumption.

8. Carbohydrate and 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 enhance fluid consumption because of their flavor.

9. Cool water by shading and insulating water buffaloes or by using small mobile chillers. Lyster 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.

10. Drink water instead of splashing it on skin. Water splashed on the skin is wasted water: it might briefly improve comfort, but does little to sustain performance and avoid heat illness.

**Water supply is the
most critical need in the desert.**

c. Work/Rest Cycles/Reduced Heat Exposure

1. Review management of work/rest cycles. Establish mandatory work/rest schedules using the Tables in Appendix B.
2. Prevent a dangerous increase in body temperature by minimizing heat production through reducing work pace and increasing rest periods. Body temperatures can rise rapidly due to the combination of excessive heat, clothing and equipment worn and sustained activity.
3. Plan to perform heavy work (including PT) in early morning or cool evening hours whenever possible. Avoid the heat of the day.
4. Provide shade to reduce solar load. When possible, make shade with canvas, ponchos, or parachutes. Ensure that shaded areas have good air circulation.
5. Resting on hot ground increases heat stress: the more body surface in contact with the ground, the greater the heat strain. The ground heated by the sun is hot, usually 30-45 degrees hotter than air, and may reach 150°F when air temperature is

120°F. Cooler ground is just inches down; a shaded, shallow trench will provide a cool resting spot.

d. Clothing/Equipment/Supplies

1. Wear appropriate uniforms to protect against sun, wind and other hazards. Use hats, head cloths, goggles and sunscreen as necessary.

2. Wearing the BDU will reduce heat strain by protecting soldiers from solar load. Restrain the desire to loosen and take off clothing to improve ventilation, because of the hazards from sun, wind and insect exposure.

3. Keep clothing clean, since clean clothes protect better and help prevent skin rashes. Whenever possible, wash clothing and air-dry or sun-dry.

4. Change socks at least twice a day. Prolonged wear of wet socks can lead to foot injury (e.g., 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 3440-00-153-6717). Wearing a thin polypropylene sock next to the skin under your sock can also help prevent blisters.

5. Wearing the Battle Dress Overgarment (BDO) decreases evaporative cooling and increases sweating and heat strain. Wearing underwear and the complete

DBDU, with the sleeves rolled down, under the BDO, provides additional protection against chemical agents. However, this clothing combination will also substantially increase the risk of heat illness.

e. First Aid for Heat Illness

1. Signs of overheating include the inability to work, red or flushed face, confusion or disorientation and fainting. It is always better to take care of a problem early. When in doubt, treat as a heat illness.

2. Immediately get heat-stricken soldiers into the 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 over the next two hours. The water should be cool but not cold.

3. Seek medical evaluation for heat casualties even though mild signs and symptoms may be controlled by rest, shade, ventilation and water. Give the highest priority for medical evacuation to soldiers who are incoherent or unconscious; they may have heat stroke or other serious illness.

4. Wet the skin or T-shirt (with uncontaminated water) and fan the casualty. If available, immersion in cool water is the best way of reducing body temperature. A field expedient immersion device can be built from tent canvas mounted in a frame off the

ground. If an above ground frame cannot be constructed, a shallow pit lined with canvas can be used.

5. Drink liquids that contain some added salt or electrolytes for heat cramps. If the victim can drink, give slowly, no more than 1.5 quarts per hour, either salted water (one or two teaspoons or MRE packets of table salt per quart), or oral rehydration solution (described in Appendix D) or commercial glucose/electrolyte beverages (sports drinks).

B. COLD WEATHER

The desert can be cold, especially on winter nights. The dry air, wind and clear sky can produce bone-chilling discomfort and even injury. Cold weather can lower body temperature, resulting in impaired performance and cold injuries. When body heat loss exceeds the body's ability to produce and retain heat, body temperature decreases. When body temperature falls below 95°F, hypothermia, a life-threatening condition, follows. To slow body heat loss, the body has responses that decrease blood flow to the arms, legs and skin. Although these responses protect the internal organs, the decreased blood flow increases susceptibility of the hands, feet, ears, etc., to cold injuries. For dismounted soldiers operating in the coastal marshes of the Persian Gulf during the winter, cold-wet injuries can be a problem.

1. Problems with Cold Weather

Cold Stress. The temperature during the day is no guide to nighttime temperatures; 90°F days can turn to 30°F nights. For any given air temperature, the potential for body heat loss and decreased body temperature is increased by wind and wetness. Wind-chill charts (FM 21-10) demonstrate the combined cooling power of air temperature and wind speed expressed as an equally cooling still-air temperature. Wind-chill estimates the danger to exposed flesh. Wearing windproof clothes reduces this danger.

Soldiers use clothing and shelter to protect themselves from cold weather. They will be tempted to leave behind clothing and equipment that seems unnecessary (and burdensome) during the heat of the day. When protection from clothing and shelter is inadequate, the body protects its temperature by reducing skin blood flow and by shivering. When the soldier notices these responses, it's a signal that clothing and shelter are inadequate. Shivering and physical activity cause the body to produce more heat. The more vigorous the activity, the more heat is produced. However, intense physical activity is fatiguing and cannot be sustained indefinitely. Also, sweating during heavy exercise can wet the clothing making it less effective in protecting from cold. Inactivity for long periods increases the risk of cold injury.

Heavy physical work and sweating in cold weather leads to dehydration, which increases susceptibility to cold injury. Poorly conditioned soldiers are more susceptible to cold injury. They tire more quickly and are unable to stay active to keep warm as long as fit soldiers. Lean soldiers are more susceptible to cold injury because they lack body fat,

which is an excellent insulator. Illness, poor nutrition, and injury limit the soldier's ability to protect against cold injury. In addition, soldiers with small body size, such as women, may be more susceptible to heat loss.

Alcohol consumption increases susceptibility to cold injury by blunting shivering and accelerating heat loss. Alcohol use leads to dehydration. Alcohol numbs the senses and impairs judgement, so the soldier might not feel the signs and symptoms of developing cold injury.

Cold Injuries. The cool to mildly cold temperatures likely to be encountered by soldiers deployed to SWA are not severe enough for freezing cold injuries (frostnip, frostbite) to be of serious concern. However, temperatures at night in the winter will fall low enough to cause chilblain and hypothermia. Trenchfoot or Immersion Foot may also be a problem for soldiers operating in cool wet areas.

Chilblain is a nonfreezing cold injury, which while painful, causes little or no permanent impairment. The affected skin becomes tender, red, swollen, and hot to the touch and may itch, ache and become numb. Chilblain can develop in only a few hours in skin exposed to cold.

Trenchfoot and Immersion Foot (paddyfoot) are serious injuries that develop when skin of the feet remains wet for prolonged periods (12 hours or longer). Cold exposure accelerates the injury. Moisture and cold softens skin, causing sores and infection. Untreated, trenchfoot can require amputation. Often, the first symptoms are itching,

numbness or tingling pain. Later the feet may appear swollen, and the skin mildly red, blue or black. Commonly, trenchfoot shows a distinct "water-line" coinciding with the area of injury. Soldiers wearing rubberized or tight-fitting boots are at risk for trenchfoot regardless of weather conditions, since sweat accumulates inside these boots and keeps the feet wet.

Hypothermia is a life threatening condition in which body temperature falls below 95°F. Body temperature can fall even when air temperatures are above freezing if conditions are windy and clothing is wet. The first signs of developing hypothermia might include confusion, bizarre behavior and withdrawal from group interaction. Victims of hypothermia may be unconscious, with nearly undetectable breathing and pulse.

2. Countermeasures for Problems in Cold Weather

- a. Conduct essential training for cold weather operations before deployment.
- b. Maintain peak physical fitness. High levels of fitness are beneficial during cold weather operations.
- c. Reduce periods of inactivity in cold conditions.
- d. Maintain proper hydration and nutrition. During cold-weather operations, consume half a quart (half a canteen) of water with each meal and before going to sleep.

An additional half quart should be consumed every half hour during the workday (more, if the work is strenuous enough to cause the soldier to sweat).

e. Monitor hydration by noting the color and volume of a soldier's urine. **Dark yellow urine indicates that fluid consumption should be increased.** Squad leaders should attempt to monitor urine color of squad members.

f. Avoid alcohol, caffeine and tobacco.

g. Keep hands, feet and skin dry. Change socks whenever they become wet or sweaty. Feet should be washed, dried and dusted with a dry, antifungal powder (NSN 6505-01-008-3054) daily. Extra socks can be air-dried and then carried under BDU's to warm.

h. Keep clothing clean and dry. Dirty clothing packs down, loses insulation, and prevents evaporation of sweat. Wet clothing increases heat loss and reduces protection.

i. Windproof clothing reduces windchill effects.

j. Wear clothes in layers. Layered clothing allows the soldier to adjust to changes in temperature or workload. Wearing layered clothing is especially important for soldiers whose duties require them to move in and out of heated spaces, or to periodically undertake vigorous physical activity.

k. Wear clothing that allows ventilation and sweat evaporation. Physically active people sweat even in cold weather. If sweat cannot evaporate, it will accumulate.

l. Maintain warmth while sleeping. Soldiers can stuff dry, clean clothing in the foot of the sleeping bag to fill air space. Use poncho liner or wool blanket under the sleeping bag for added warmth.

3. First Aid for Cold Injuries

a. For **Chilblain** and **Trenchfoot**, prevent further cold exposure. Remove wet or constrictive clothing. Gently wash and dry injured area and elevate it. Cover the injury with layers of loose, warm clothing and allow to rewarm. Pain and blisters may develop. **Do not** pop blisters, **do not** apply lotions or creams, **do not** massage, **do not** expose to extreme heat, **do not** allow victim to walk on the injury. Seek medical attention.

b. For **Hypothermia**, prevent further cold exposure and remove wet clothing. Rewarm the victim by wrapping with blankets, sleeping bags and by body-to-body contact. Handle gently during treatment and evacuation because hypothermic victims can experience irregular heartbeat and are susceptible to heart attacks.

C. DUST, SAND & WIND

1. Problems with Dust, Sand & Wind

Dust, sand and wind cause health problems, particularly to skin, eyes and respiratory tract. 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 make eating difficult and cause communication problems. Cracked, chapped fingers reduce manual dexterity. Body areas (such as ears, armpits, groin, elbows, knees, and feet) that collect dust and sand are susceptible to chafing, abrasion and infection. High wind can turn tent pegs and loose objects into flying missiles (which may be invisible in blowing sand).

2. Countermeasures for Problems with Dust, Sand & Wind

- a. 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.
- b. Wash the face and eyelids several times per day.
- c. Contact lenses are very difficult to manage in the dry dusty environment of SWA. Great care must be taken to assure adequate cleanliness of contact lens washing and rinsing solutions. Contact lens-wearing soldiers who develop eye irritation should

discontinue wearing them immediately and be examined by medical personnel for corneal infection or abrasion.

d. Breathe through a wet face cloth or coat the nostrils with a small amount of petroleum jelly to minimize drying of mucous membranes. Lips can be protected with lip balm.

e. Use moisturizing skin lotion.

f. Wear neckerchiefs and bandannas to protect the head and face.

g. Wear goggles for eye protection from winds, dust and sand. Moving vehicles create their own sandstorm, so soldiers traveling in open vehicles should wear goggles.

INFECTIOUS DISEASE HAZARDS & HYGIENE

Many serious infectious diseases exist in SWA. Not only are many infectious diseases present, but the insects and other means of transmitting them are also present. Soldiers may be in close contact with local populations; as such, they are vulnerable to contagious diseases. Many diseases seriously affect individual soldiers and rapidly degrade the mission capability of entire units. For these reasons great care is needed to prevent infectious diseases before epidemics occur. 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 SWA, 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 & WATER CONSUMPTION

1. Problems with Food & Water Consumption

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. During Operation Desert Shield, almost 60% of soldiers experienced diarrhea! Although diarrhea is the most common symptom caused by these diseases, nausea, vomiting, fever and other symptoms can also occur. Some of these diseases, like **cholera**, **typhoid**, and **dysentery**, can be severe and 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.

**Non-U.S. military approved water sources
must be considered contaminated.**

2. Countermeasures for Disease from Food and Water Consumption

a. **Drink water or beverages only from approved U.S. military water sources,** which are properly treated and routinely tested. 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, because the disinfectant will be frozen out of solution.

b. Disinfect water in canteens with iodine tablets (NSN 6850-00-985-7166). Disinfect water in Lyster bags or 5 gallon cans with Chlorine Ampules (Chlorine Kit, Water Purification, Type 1, (NSN 6850-00-270-6225). Disinfect water in 400 gallon water trailers with Calcium Hypochlorite Powder (Calcium Hypochlorite, 6 ounce jar, NSN 6810-00-255-0471).

c. Do not add beverage flavoring directly to bulk water storage containers. Beverage flavoring reduces the effectiveness of water disinfectants.

d. Safeguard water from contamination or theft. Animals will attempt to lick the spouts of Lyster bags. This will contaminate the spout. Hang Lyster bags well above the ground or take other protective steps.

e. **Consume food from only approved U.S. military sources.** Perishable food must be refrigerated, adequately cooked and served steaming hot. Soldiers eating only standard military rations (MREs and tray packs) are at low risk of diarrheal disease.

f. Do not eat or store any MRE components if the packet has been opened.

g. Protect food from sand and dust during preparation.

h. Follow proper field sanitation for disposal of waste and maintenance of latrines.

i. Practice good personal hygiene. Wash your hands to protect yourself and others from infectious disease. Do not bathe, swim or wash clothes in local water such as lakes, rivers and ponds.

3. Care & First Aid for Diarrheal Disease

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

b. Diseases causing diarrhea and vomiting will cause dehydration. Assure that adequate fluids and salts are consumed. If A rations are available, the ingredients for replacements can be obtained from field kitchens. See Appendix D for fluid replacement recipes, which can be used to treat fluid loss due to dehydration. Commercial sport-drinks (U.S.) are also acceptable.

B. DISEASES FROM INSECTS

1. Problems with Insect-borne Diseases

Many insects in SWA can spread diseases to soldiers. For example, mosquitoes are common during spring and summer months in wet areas. Several of these diseases are serious and some, such as malaria, can be fatal if not treated. Examples of other insects and types of disease they transmit include:

Mosquitoes - Malaria, Dengue (Break-bone) Fever, Rift Valley Fever, West Nile Fever, Sindbis Fever

Sand Flies - Sand Fly Fever, Baghdad Sore (Cutaneous Leishmaniasis), Kala Azar (Visceral Leishmaniasis)

Ticks - Crimean-Congo Hemorrhagic Fever, Boutonneuse Fever, Tick-Borne Relapsing Fever

Lice and Fleas - Typhus, Plague, Relapsing Fever, Onchocerciasis

Biting flies and insects carry disease. Actions should be taken to control their numbers and prevent biting. 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 (glands), joint pain, shaking chills, sweats, nausea or vomiting. These symptoms must be treated seriously.

2. Countermeasures for Diseases from Insects

a. **Take anti-malarial medication as prescribed if deployed to a region where malaria is known to be present!** Malaria is serious and can be fatal. Malaria causes fever, shaking chills and sweats alternating with fever-free periods. Malaria is not a problem in all of SWA, but it is present in the southwestern and western part of Saudi Arabia. Malaria prevention is essential. Consult the unit medical officer for guidance regarding whether or not taking anti-malarial medication is necessary.

b. Apply insect repellent, skin lotion, DEET extended duration (NSN 6840-01-284-3982) to exposed skin and to the first three inches of skin covered by the uniform. The skin repellent is effective up to 12 hours so apply it at least 2 times per day.

c. Treat clothing with permethrin (also known as Permanone) insect repellent. Spray permethrin aerosol (NSN 6840-01-278-1336) on the outside of the BDU until it looks wet. Allow the uniform to dry completely before putting it on. Reapply after every 6 washings or 6 weeks, whichever comes first. Treat bed netting 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.

d. Conduct periodic personal and buddy checks for ticks and other biting insects, especially when moving in brush or grass. Remove ticks by firmly grasping the head of the tick with a pair of tweezers and gently pulling.

e. Wear trousers and shirts properly to prevent tick bites. Tuck trouser legs inside socks and boots for added protection against ticks.

f. Control insects by good personal hygiene, proper disposal of garbage and human waste, and keeping food and water covered. Drain insect breeding areas such as pools of water in old tires, cans, buckets and ditches.

C. DISEASES FROM ANIMALS

1. Problems of Diseases from Animals

Animals can transmit many diseases 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. Coastal waters of the Persian Gulf contain hazardous marine animals including sea snakes, poisonous jellyfish, and sea urchins.

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 as well as other more specific symptoms.

2. Countermeasures for Diseases from Animals

- a. Avoid contact with domestic or wild animals. **Camp pets should be forbidden.**
- b. Avoid contact with meat, hides, carcasses, blood, urine, and wastes.
- c. Do not work or live in sheds or other areas where livestock have been housed or slaughtered.
- d. Practice proper sanitary disposal of food and other waste material.

3. Care of Diseases from Animals

Clean bites and scratches from animals with soap and uncontaminated water. Because of the possibility of rabies, immediate medical care should be obtained for all bites and scratches.

D. DISEASES FROM 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, minimize crowding in living spaces. Maintain good ventilation and alternate sleeping positions (head to foot) to reduce the spread of respiratory diseases including **tuberculosis**.

2. **Meningitis** (an infection of the brain lining) 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 SWA. 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 in SWA. Abstinence is the best way to prevent sexually transmitted diseases. Prophylactics (condoms) are only partially effective in preventing disease. These diseases are serious, so a physician should be consulted if genital discomfort, sores (painful or painless), or a discharge develop.

4. Hepatitis, a liver disease, can be caused by several types of viruses. Epidemic hepatitis (due to either type A or type E) is spread from person to person through contaminated water or food. Serum hepatitis (due to either type B or type C) is spread by sexual contact, blood transfusion, or contaminated needles and medical instruments. 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.

Immune serum globulin (ISG) shots protect against the most common type of hepatitis (type A) but not against other forms of hepatitis (types 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 above).

Hepatitis B vaccine is protective and is required for Army medical personnel. To protect against Hepatitis B, 1) wear gloves and other protective cover when exposed to blood or body fluids, 2) avoid sexual contact, 3) avoid sharing razors, and 4) wash hands and other body parts immediately that have come in contact with body fluids. **Hepatitis prevention is critical, since viral hepatitis IS NOT curable.**

E. DISEASES FROM CONTACT WITH SOIL & 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 not walk bare foot, lie down or 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. It enters the body through puncture wounds. All puncture wounds should be cleaned and medically evaluated. All soldiers should have a tetanus booster at least every 10 years.

3. **Snail fever (schistosomiasis)** is caused by microscopic worms 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 blousing (tucking) trousers tightly into the socks and 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 protection.

F. DISEASES & IRRITATION OF THE SKIN

1. Problems with Skin Diseases & Irritations

Exposed skin is vulnerable to drying, cracking or scaling. Conversely, sweating and chafing in humid conditions can cause irritation, breakdown, and erosion of the skin, especially in the feet, groin, abdominal folds, armpits, under breasts and where the backpack or load carriage equipment (LCE) rubs. Skin irritations predispose soldiers to bacterial and fungal infections.

2. Countermeasures for Skin Diseases & Irritations

a. Practice good personal hygiene to protect the skin. Handwash and bath as often as practical. If bathing is not possible, clean areas where sweat accumulates with a wash cloth at least daily (sponge bath).

b. Women soldiers can wear panty-liners (mini-pads) when clean underwear are not available.

- c. Keep uniforms clean and dry.
- d. Keep feet clean and dry. Frequently change to dry socks.

3. Treatment and Care of Skin Problems

- a. Use moisturizing cream if skin becomes dry or cracked.
- b. Dry areas of skin if irritation develops and apply powders such as talc.
- c. Persistent rashes in moist areas such as the groin, under breasts or on the feet require medical evaluation. Women soldiers who develop persistent vaginitis should seek medical attention. Soldiers who develop a persistent sore, especially with red streaks or swollen lymph nodes, should also seek medical attention.

G. VACCINES & OTHER PREVENTIVE MEASURES

1. Vaccines are available to prevent many infectious diseases. The U.S. military requires certain vaccinations (immunizations) routinely and others for specific deployments. Vaccines recommended by U.S. MEDCOM guidance prior to deployment at the time of this writing (October 1994) include:

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 (current year)
Typhoid - 2 dose basic series plus booster in last three years
Meningococcal - quadrivalent with last dose in past 3 years
Measles - record of at least one shot or be born before 1957

These vaccines are approved by the U.S. Food and Drug Administration (FDA). 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. Screen soldiers for Tuberculosis (TB) by skin testing before and after deployment.

3. Prophylactic (Preventive) Medications. The only preventive medications recommended for SWA are for malaria (if in a region that malaria is known to be present): these are either **mefloquine** (once a week) for most soldiers or **doxycycline** (once a day) for those on flight status or having special reasons not to take mefloquine. **In addition, after leaving the malarious area, all soldiers should take primaquine one tablet once a day for 14 days and mefloquine once a week for four weeks.** Until more information is available, women should avoid becoming pregnant while taking these medications.

PLANT, INSECT & SNAKE HAZARDS

Many plants, insects and snakes in SWA can harm soldiers. The threat ranges 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.

A. PLANTS

1. Problems With Plants

Some plants in SWA have thorns that can puncture the skin and cause infection or introduce poison into the skin. Other plants can cause rashes by touching the skin, just like poison ivy. Contact with smoke from the burning of these plants can cause skin rashes and damage to the lungs. Many plants will cause poisoning if chewed or swallowed.

2. Countermeasures for Problems with Plants

- a. Avoid skin contact with harmful plants. Use clothing for protection.
- b. Clean clothing after contact with harmful plants by washing with soap and hot water.

- c. Seek medical evaluation if injury or poisoning from plants occurs.

B. INSECTS, SPIDERS, CENTIPEDES & SCORPIONS

1. Problems With Insects, Spiders, Centipedes & Scorpions

There are many poisonous insects, centipedes, scorpions and spiders, including black widow spiders, in SWA. 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 and tents.

2. Countermeasures for Insects, Spiders, Centipedes & Scorpions

- a. Avoid poisonous insects, spiders, centipedes and scorpions. This means extra vigilance in areas where these creatures live.
- b. Avoid sleeping on the ground.
- c. Shake out boots, uniforms and bedding before use to eliminate any creatures or animals that may have crawled in.

3. Care for Insect, Spider, Centipede & Scorpion Problems

Seek medical attention if bitten or stung. First aid includes icing the wound (with uncontaminated ice) and immobilizing the body part involved. Tourniquets or cutting the wound to suck out the poison are not helpful and may cause harm.

C. SNAKES

1. Problems with Snakes

SWA has many very poisonous snakes, to include vipers such as the puff adder, cobras and the desert black snake. Without treatment, a snake bite can be rapidly fatal. Many snakes are well camouflaged and few give warning signals.

All snakes should be considered poisonous.

2. Countermeasures for Problems with Snakes

- a. Do not handle or play with snakes.
- b. Avoid areas where snakes may be found.

3. First Aid for Snake Bites

Get medical attention immediately if bitten by a snake! First aid consists of immobilizing the bitten arm or leg and keeping the soldier at rest. Apply uncontaminated ice to the bite to slow the spread of the venom and reduce pain. Tourniquets and attempts to suck the venom out of the wound can cause more harm than good.

OCCUPATIONAL & OPERATIONAL HAZARDS

Frustration and stress reactions are normal, expected behavior experienced by soldiers placed in unusual or catastrophic situations. Adverse reactions can be reduced by providing soldiers with accurate mission information and preparing them for cultural differences and for exposure to traumatic events.

**Well-trained and well-led soldiers can
succeed under the harshest circumstances.**

A. OPERATIONAL STRESS

1. Problems of Operational Stress

Soldiers asked to perform several missions, including combat, peace-keeping, and humanitarian missions, face unique stressors. The mission and uncertainty about deployment length are common sources of stress among soldiers.

Combat and peacemaking missions may require soldiers to kill. This can cause a soldier to feel guilty. Conversely, after several missions or fire fights, the soldier may feel guilty about not feeling distressed. Expect soldiers to react strongly to the sudden violent deaths of other unit members. Stress reactions may appear as confusion, withdrawal, and emotional exhaustion.

When soldiers deploy, they leave behind their families and social groups (such as church groups, athletic clubs, etc.) that normally provide emotional support. Lack of emotional support can lead to withdrawal, belligerence, or other combat stress behaviors.

Deployment interrupts daily routines, puts individuals in unfamiliar surroundings, and discourages normal precautions for preventing injuries. Stress is increased by living in close quarters with other personnel. In addition, boredom can increase stress.

Soldiers might experience a traumatic event that produces a reaction so strong that it is persistently relived through recurrent memories, daydreams, nightmares, or flashbacks.

Soldiers who have experienced a critical incident may have difficulty sleeping, be hyperalert, startle easily, and try to avoid places, smells, sights and people associated with the incident. They may have difficulty expressing their emotions and may feel detached and apart from other members of their unit.

After returning home, soldiers are often expected to return to duty as though nothing has changed. Until they talk to nondeploying personnel, soldiers may not recognize how much they have changed. Other nondeploying soldiers may not understand how the deploying soldier feels upon returning. This can leave the soldier feeling isolated and alienated.

2. Countermeasures for Operational Stress

a. Educate soldiers. Psychologically prepare soldiers for stress during deployment. Transmit information through the chain of command so that soldiers will rely on official sources. Information about mission background, rules of engagement, probable length of deployment, culture of the host country and enemy, and the disease threat will give soldiers a concrete focus for plans and actions.

b. Continue Training. Training should not stop in country. Well-learned and practiced skills are less disrupted by stress. Realistic training builds confidence, improves unit cohesion, and prevents boredom.

c. Live as a Team. Encourage soldiers to handle stress openly and as a team. A simple self-check and buddy-check system can identify stress and increase overall unit effectiveness. House and shelter soldiers according to unit and duty, not according to gender. Women soldiers should not be segregated from their unit.

d. Maintain unit cohesion. Cohesive, well-disciplined units have fewer severe stress reactions. Soldiers should routinely debrief each other after an operation and discuss what they saw and how they felt. Soldiers who have strong emotional reactions to traumatic events should be kept with the unit and treated as soldiers, not as casualties.

e. Schedule recreation. Physical training and recreational activities reduce stress. Recreational activities which include foreign units will serve to introduce soldiers to each other and prevent friction.

f. Deliver mail. Ensure that the system for distributing mail is quick, efficient and effective. In particular, distribute pay vouchers in a timely manner.

g. Allow decompression time. Soldiers need time to relax and return to normal routines upon redeployment to their home base. Units should encourage soldiers to take leave as soon as possible after return.

B. SEPARATION STRESS

1. Problems with Separation Stress

Deployment is a time of anxiety for many families. Families should plan for disruptions during the deployment. Families who know that special events, such as the birth of a child or the death of a parent are imminent, need individual support.

Unresolved problems at home distract the soldier. Soldiers will be concerned about the adequacy of the resources available to their families during their absence. Women soldiers may feel additional pressure to defend their decision to serve in the Army. Recent mothers may experience extended post-partum depression. Because of family problems, soldiers may be irritable, nervous, inattentive and have difficulty sleeping.

Soldiers returning from deployment often expect their families and friends to be just like they were when the soldier left. Families and friends change as they adjust to the absence of the soldier. They may become more self-reliant or begin to depend on another person for support.

2. Countermeasures for Separation Stress

a. Make family members self-sufficient. Ensure families have the information and skills they need to manage their personal affairs. Discuss routine responsibilities and how to handle emergencies. Build confidence by practicing these skills.

b. Contact family support groups. Introduce families to support groups (parents, spouses of both genders, and children of all ages should be included). Ensure that support is provided to those who need it most, regardless of rank, shyness or distance from post.

c. Keep families and friends informed. Establish effective lines of communication with the home base detachment. Encourage soldiers to write home. Unofficial communication, such as a unit newsletter written by deployed soldiers, can reduce rumors back home.

d. Plan reunions. Have soldiers discuss how they will talk with family members about what they have been through, how family members have changed during the deployment and the likelihood that the families will not understand what they have experienced. Units that establish relationships with local nationals or foreign personnel should plan ways to reestablish communication when they return home.

e. Maintain networks. Family support groups should not break up when soldiers return home. They will help families deal with reunion stress.

C. FATIGUE

1. Problems Causing Fatigue

Jet Lag. When soldiers move quickly from one part of the world to another, several days are required to readjust to the new time zone. Soldiers with jet lag will be irritable, sleepy during the day, and have difficulty sleeping at night. They will show lowered mental performance. Jet lag will also disrupt the menstrual cycles of women soldiers. Biological clocks will gradually adjust to local time, although it may take four to seven days.

Sleep Loss. Soldiers do more work and perform better when they are rested. Sleep loss affects mental performance before physical performance. Sleepy soldiers do not always think clearly, plan effectively or follow SOPs. Performance on monotonous or repetitive tasks is affected first. A 25% decline in effectiveness can be expected for every 24 hours without sleep. Symptoms of sleep loss include extreme sleepiness, lapses in attention, irritability, lack of initiative, and susceptibility to accidents. Leaders and command/control personnel dealing with many mental tasks and decision making are very vulnerable to these effects.

2. Countermeasures for Fatigue

a. Minimize Jet Lag. If possible, work and sleep time should be gradually shifted towards the destination time. A day or two before deployment, soldiers should set their

watches to Saudi time. Cabin lighting and meals on the aircraft should be coordinated with the destination time zone. As soon as they arrive in country, soldiers should work, eat, and sleep according to local time. They should participate in moderate physical training during daylight, avoid daytime naps and sleep at the normal bedtime for the local time.

b. Manage work/rest schedules. For soldiers who will work or fight at night, several days to a week of operating at night and sleeping during the day are recommended to adjust to the new schedule. The greatest disruption to night fighter performance is usually due to poor daytime sleep, which tends to be intermittent and restless. Command attention will ensure that night fighters have adequate time for daytime sleep and **provide the best conditions for restful sleep.**

c. Minimize sleep loss. Six to eight hours of sleep during each 24-hour day are optimal. Productivity can be maintained for two to five days with four to five hours sleep each night. Naps of one to two hours should be encouraged when the mission allows. Even 10 to 15 minute power naps are helpful. Twelve hours rest (including at least eight hours sleep) are needed after 36 to 48 hours of being continuously awake. Two to three days of rest or light duty (including at least 8 to 10 hours sleep per day) are required after 72 to 96 hours of sustained operations.

D. ACCIDENTS AND INJURIES

1. Problems with Accidents and Injuries

Military operations involve potentially hazardous exposures to a variety of chemicals and physical hazards. Accidents (particularly motor vehicle and aviation) cause many disabilities and fatalities, reducing unit readiness, degrading effectiveness, and disrupting operations. Consider risk management in planning all operations.

Factors contributing to serious injury include abandonment of safety practices, poor visibility, poor roads and poor traffic control, athletic injuries resulting from training and recreation, improper handling of weapons and ordinance, and improper eye protection. Fatigue caused by sleep deprivation and high stress will compound many of these problems.

2. Countermeasures to Avoid Accidents and Injuries

a. **Use a risk management approach to reduce unnecessary injuries.** Identify potential sources of danger or hazards that can be anticipated in performing a mission. Assess the hazards to determine their cumulative effect on the mission. Weigh the risks and benefits and establish controls to reduce unnecessary hazards.

b. Designate personnel to ensure soldiers follow established safety standards.

- c. Emphasize vehicle safety (safety belts, speed limits).
- d. Enforce safety procedures for weapon and ordinance handling, and ordinance disposal policies.
- e. Use petroleum (kerosene) heating equipment properly with adequate ventilation according to SOPs or manufacturers instructions.
- f. Minimize unnecessary exposure to engine exhaust.
- g. Ensure personnel know that desert soil requires special electrical grounding procedures (FM 20-31).

Avoid unnecessary risks.

E. CHEMICAL AGENTS

The primary protection against chemical weapons is the Mission-Oriented Protective Posture (MOPP) gear, which consists of the Battle Dress Overgarment (BDO), gas mask, hood, overboots and gloves. Soldiers are also issued nerve agent antidote kits (NAAK) and nerve agent pyridostigmine pretreatment kits (NAPP) to protect themselves in case of exposure to chemical warfare agents. The NAAK has one autoinjector containing atropine and a second autoinjector containing pralidoxime chloride (2-PAM). The NAPP

kit has 21 tablets of pyridostigmine bromide. Convulsant antidote for nerve agent (CANA) kits might be issued to some soldiers. CANA has a autoinjector containing diazepam that can be **administered by buddy aid only to soldiers incapacitated by nerve agent poisoning.**

Based on the results of studies conducted with animals exposed to nerve agents, the Department of Defense has concluded that **pyridostigmine bromide, when used in conjunction with atropine and 2-PAM, may save your life.** In order to be effective, pyridostigmine bromide must be taken prior to exposure to nerve agents. It is effective only when used with the atropine and 2-PAM in the NAAK kit. Many years of use in humans for non-military purposes has shown that pyridostigmine bromide is safe and free from significant side effects if used as directed. **Do not exceed the stated dose (one tablet every 8 hours).** Pyridostigmine bromide can cause stomach cramps, diarrhea, nausea, frequent urination and headaches in a few people. Seek medical attention if these symptoms persist. Remember, the health risks associated with taking nerve agent pretreatment pills are minimal compared to the risks presented by exposure to nerve agent.

If you have asthma, are pregnant or are taking blood pressure medication, seek medical attention before starting to take pyridostigmine.

1. Problems with Chemical Protective Clothing

MOPP gear substantially increases protection against chemical agents; however, performance is degraded. MOPP decreases the soldier's ability to identify and communicate and increases anxiety. This intensifies feelings of isolation and confusion. Soldiers performing mental tasks make more errors. Soldiers performing physical work become more fatigued in MOPP. MOPP increases heat strain and the risk for heat illness. Soldiers sweat more in MOPP so they need to increase their water consumption. Appendix B provides guidance for work/rest and water consumption while wearing MOPP. Use judgement to compare the risk of chemical attack to the likelihood of degraded performance. This is more fully addressed in FM 3-4, NBC Protection.

2. Countermeasures to Problems with Chemical Protective Clothing

- a. **Train as you expect to fight.** Prepare to fight effectively in MOPP by engaging in realistic training that builds confidence and cohesion. Soldiers who have trained often and realistically in MOPP are able to compensate for the constraints it places on communication, vision and movement.
- b. **Enforce MOPP discipline.** Wear the lowest level of MOPP required by the threat.
- c. **Mark chemical protective gear.** Put name, rank, and duty position on BDO, mask and other gear so that personnel can easily be recognized while in MOPP.

d. **Check all work for errors.** Many errors can be detected and corrected before they become life-threatening if SOPs for double-checking coding, communications, map coordinates, etc., are enforced.

NUTRITION

Appetite decreases and soldiers often eat less 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. Almost half of the daily fluid intake is consumed during mealtimes. In addition, food is a significant source of water and decreased food intake is usually accompanied by decreased water intake.

Decreased food intake will contribute to dehydration.

Set the example for soldiers by practicing sound eating habits. Observe what your personnel are eating or failing to eat. **Military rations are designed to provide balanced nutrition when consumed in their entirety.** Women soldiers may eat less (about 2/3 of each ration component), because they are smaller-sized. Do not assume that a meal issued is a meal fully consumed. Overconsumption of non-issue food items often prevents soldiers from eating adequate military rations that ensure balanced nutrition. Do not allow non-issue food to replace more nutritious rations.

Meals affect motivation and morale. Food intake is almost always higher at scheduled meals compared to unplanned meals. Schedule meal times, even when MREs are the only food. Soldiers tend to eat more when eating in small groups. Hot meals will improve morale and increase food intake. Try to schedule at least one hot meal per day. Establish regular mealtime schedules, even when MREs are the only food.

CONCERNS FOR WOMEN SOLDIERS

Women comprise approximately 12% of the U.S. Army and constitute a substantial part of units deployed for peace-keeping and humanitarian aid missions. During Operation Desert Shield/Storm there were forty thousand female service members deployed.

Fit women, acclimated to a specific environment, and otherwise suited by strength or body size, can readily participate in military tasks. There are no operationally significant gender differences in heat or cold tolerance between men and women of similar physical fitness. Healthy fit women are not at a greater risk for cold injuries than men in SWA. Cardiorespiratory fitness in women on average is about 70% that of men. Muscular strength in women is about 65% that of men. The incidence of lower extremity injury in women is approximately twice that of men primarily due to low muscular strength. **It is critical that women soldiers acquire and maintain a high level of physical fitness and muscular strength to maintain operational readiness.**

A recommendation for women soldiers prior to deployment is to undergo a OB/GYN medical examination that includes a pregnancy test. Information regarding the use of birth control pills to regulate menstrual cycle and prevent pregnancy should be disseminated. Information for prevention of sexually transmitted disease should be provided. These procedures will aid in the maintenance of female health during deployment and should decrease the incidence of pregnancy during deployment. Redeployment OB/GYN medical examinations are also recommended.

APPENDIX A

Average Temperature, Humidity, and Rainfall for Selected SWA Locations

Numbers indicate average monthly high (H) and low (L) temperatures in degrees fahrenheit, percent relative humidity (RH), and average total precipitation (P) in inches. The humidities listed below are midday values. Humidity increases in the evening and by sunrise may reach twice the midday value.

Month	Kuwait City, Kuwait (H/L/RH/P)	Dhahran, Saudi Arabia (H/L/RH/P)	Riyahd, Saudi Arabia (H/L/RH/P)	Bahrain (H/L/RH/P)	Basra, Iraq (H/L/RH/P)	Bagdad, Iraq (H/L/RH/P)
Jan	63/45/48/0.8	67/50/65/0.9	67/48/37/0.7	66/58/65/0.6	62/45/60/1.1	58/37/62/0.9
Feb	68/49/39/0.5	71/53/50/0.6	73/52/30/0.4	69/60/63/0.6	69/50/53/0.8	64/42/52/1.2
Mar	76/56/32/0.4	77/59/55/0.6	80/59/28/0.6	75/64/55/0.4	77/57/43/1.0	73/50/40/1.2
Apr	89/67/23/0.5	89/67/31/0.5	91/68/22/1.0	84/72/48/0.3	88/67/33/0.9	84/59/30/0.5
May	101/77/14/0.3	99/76/23/0.1	101/77/14/0.5	92/80/43/0.1	98/76/28/0.3	96/67/18/0.1
Jun	109/84/ 8/0.0	105/81/18/0.1	106/81/ 9/0.0	97/85/42/0.0	105/81/29/0.0	105/74/13/0.0
Jul	112/87/ 9/0.0	108/84/20/0.0	109/84/ 8/0.0	99/88/44/0.0	108/84/25/0.0	110/78/14/0.0
Aug	111/86/10/0.0	106/83/23/0.0	108/83/ 9/0.0	99/88/48/0.0	106/82/27/0.0	108/75/16/0.0
Sep	106/79/12/0.0	102/78/28/0.0	104/78/10/0.0	97/85/50/0.0	104/77/26/0.0	103/69/15/0.0
Oct	93/70/20/0.1	94/71/33/0.1	94/69/16/0.0	90/79/53/0.0	94/68/31/0.1	91/59/23/0.1
Nov	79/59/34/0.9	82/62/44/0.3	81/59/26/0.4	81/71/66/0.4	79/56/43/1.2	74/47/38/0.8
Dec	67/49/48/0.5	72/54/54/0.2	71/51/37/0.4	72/62/64/0.7	67/49/59/1.4	62/42/62/1.1

APPENDIX B
Work/Rest and Water Consumption Tables

Table B-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 at 1 m/s No Load
	Walking Hard Surface at 1 m/s 20-kg Load
	Manual Of Arms
	Walking Hard Surface at 1 m/s 30-kg load
MODERATE	Walking Loose Sand at 1 m/s No Load
	Walking Hard Surface at 1.56 m/s No Load
	Calisthenics
	Walking Hard Surface at 1.56 m/s 20-kg Load
	Scouting Patrol
	Pick And Shovel
	Crawling Full Pack
	Foxhole Digging
	Field Assaults
HEAVY	Walking Hard Surface at 1.56 m/s 30-kg Load
	Walking Hard Surface at 2.0 m/s No Load
	Emplacement Digging

TABLE B-2 : NUMBER OF MINUTES OF WORK PER HOUR IN WORK/REST CYCLE

			DBDU				DBDU & Flak				DBDU & BDO Flak (MOPP IV)				CVC & Armor				CVC & BDO & Armor (MOPP IV)			
WBGT	T _a	RH	VL	L	M	H	VL	L	M	H	VL	L	M	H	VL	L	M	H	VL	L	M	H
82	87	20	NL	NL	33	21	NL	NL	36	23	NL	NA	NA	NA	NL	NL	NL	25	NL	25	11	5
86	91	20	NL	NL	30	20	NL	NL	34	22	NL	NA	NA	NA	NL	NL	35	23	NL	19	7	NA
88	94	20	NL	NL	28	18	NL	NL	31	20	NL	NA	NA	NA	NL	NL	33	22	NL	13	NA	NA
90	96	20	NL	NL	26	17	NL	NL	30	19	NL	NA	NA	NA	NL	NL	32	21	NL	NA	NA	NA
98	120	20	NL	NA	NA	NA	NL	9	NA	NA	NA	NA	NA	NA	NL	12	5	NA	NA	NA	NA	NA
115	120	60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

WBGT - Wet Bulb Globe Temperature (°F)
 T_a - Ambient Temperature (dry bulb °F)
 RH - Relative Humidity
 VL - Very Light Work Intensity
 L - Light Work Intensity
 M - Moderate Work Intensity
 H - Heavy Work Intensity
 BDO - Battledress Overgarment
 CVC - Combat Vehicle Crewman Coverall
 DBDU - Desert Battle Dress Uniform
 Flak - Flak vest
 NL - No Limit (continuous work possible)
 NA - Work/rest cycle not feasible (see
 Maximum Work Time - Table B-4)

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 at rest. This table was prepared using the USARIEM Heat Strain Model. Assumptions used in generating this table include: 1) Troops fully hydrated, rested and acclimatized; 2) Windspeed = 2 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 B-3: WATER REQUIREMENTS TO SUPPORT WORK/REST CYCLES [qts/hr]

WBGT	T _a	RH	DBDU				DBDU & Flak				DBDU & BDO Flak (MOPP IV)				CVC & Armor				CVC & BDO & Armor (MOPP IV)			
			VL	L	M	H	VL	L	M	H	VL	L	M	H	VL	L	M	H	VL	L	M	H
82	87	20	0.7	1.0	1.1	1.0	0.7	1.0	1.1	1.0	1.1	NA	NA	NA	0.7	0.9	1.2	1.0	1.0	1.0	1.0	0.9
86	91	20	0.8	1.1	1.1	1.1	0.8	1.0	1.1	1.1	1.2	NA	NA	NA	0.8	1.0	1.1	1.0	1.1	1.1	1.0	NA
88	94	20	0.9	1.2	1.2	1.2	0.9	1.1	1.1	1.1	1.3	NA	NA	NA	0.9	1.1	1.1	1.1	1.1	1.1	NA	NA
90	96	20	1.0	1.2	1.2	1.2	0.9	1.1	1.2	1.1	1.3	NA	NA	NA	0.9	1.1	1.1	1.1	1.2	NA	NA	NA
98	120	20	1.7	NA	NA	NA	1.5	1.4	NA	NA	NA	NA	NA	NA	1.6	1.6	1.5	NA	NA	NA	NA	NA
115	120	60	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

WBGT - Wet Bulb Globe Temperature (°F)
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 BDO - Battledress Overgarment
 CVC - Combat Vehicle Crewman Coverall
 DBDU - Desert Battle Dress Uniform
 Flak - Flak vest
 NL - No Limit (continuous work possible)
 NA - Work/rest cycle not feasible (see
 Maximum Work Time - Table B-4)

Volumes 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. When water requirement exceeds 1.5, sweat loss exceeds the maximum hourly absorption rate of the gut. For these situations, soldiers should drink the extra water during periods of lower water requirements. This guidance was prepared using the USARIEM Heat Strain Model; assumptions used in generating estimates include: 1) Troops fully hydrated, rested & acclimatized; 2) Windspeed = 2 meters/sec; 3) Clear skies; 4) Heat casualties < 5%. This guidance is not a substitute for common sense or experience; appearance of heat casualties is evidence that the selected work-rest cycle is inappropriate for the conditions.

TABLE B-4: MAXIMUM CONTINUOUS WORK TIMES [minutes]

			DBDU				DBDU & Flak				DBDU & BDO Flak (MOPP IV)				CVC & Armor				CVC & BDO & Armor (MOPP IV)			
WBGT	T _a	RH	VL	L	M	H	VL	L	M	H	VL	L	M	H	VL	L	M	H	VL	L	M	H
82	87	20	NL	NL	133	62	NL	NL	196	68	NL	89	43	29	NL	NL	NL	76	NL	161	52	35
86	91	20	NL	NL	110	58	NL	NL	139	64	NL	82	42	27	NL	NL	204	73	NL	121	49	34
88	94	20	NL	NL	97	55	NL	NL	119	61	NL	77	41	27	NL	NL	157	70	NL	106	48	33
90	96	20	NL	NL	91	53	NL	NL	109	59	NL	75	40	26	NL	NL	141	69	NL	98	47	32
98	120	20	NL	75	44	31	NL	94	50	36	91	54	33	19	NL	112	58	43	95	56	35	21
115	120	60	33	21	11	7	37	24	12	8	60	42	24	13	26	17	9	6	53	37	20	11

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 H - Heavy Work Intensity
 BDO - Battledress Overgarment
 CVC - Combat Vehicle Crewman Coverall
 DBDU - Desert Battle Dress Uniform
 Flak - Flak vest
 NL - No Limit (continuous work possible)
 NA - Work/rest cycle not feasible (see
 Maximum Work Time - Table B-4)

This table provides, for four levels of work intensity (see table B-1), the 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 USARIEM Heat Strain Model. Assumptions used in generating this table include: 1) Troops fully hydrated, rested and acclimatized; 2) Windspeed = 2 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 B-5: WATER REQUIREMENT FOR MAXIMUM CONTINUOUS WORK [qts/hr.]

WBGT	T _a	RH	DBDU				DBDU & Flak				DBDU & BDO Flak (MOPP IV)				CVC & Armor				CVC & BDO & Armor (MOPP IV)			
			VL	L	M	H	VL	L	M	H	VL	L	M	H	VL	L	M	H	VL	L	M	H
82	87	20	0.7	1.0	1.4	1.8	0.7	1.0	1.4	1.7	1.1	1.7	2.0	2.0	0.7	0.9	1.2	1.5	1.0	1.4	2.0	2.0
86	91	20	0.8	1.1	1.5	1.9	0.8	1.0	1.4	1.8	1.2	1.8	2.0	2.0	0.8	1.0	1.3	1.6	1.1	1.5	2.0	2.0
88	94	20	0.9	1.2	1.6	2.0	0.9	1.1	1.5	1.9	1.3	1.8	2.0	2.0	0.9	1.1	1.4	1.7	1.1	1.5	2.0	2.0
90	96	20	1.0	1.2	1.7	2.0	0.9	1.1	1.6	1.9	1.3	1.9	2.0	2.0	0.9	1.1	1.4	1.7	1.2	1.6	2.0	2.0
98	120	20	1.7	2.0	2.0	2.0	1.5	1.8	2.0	2.0	2.0	2.0	2.0	2.0	1.6	1.9	2.0	2.0	1.8	2.0	2.0	2.0
115	120	60	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0

WBGT - Wet Bulb Globe Temperature (°F)
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 NL - No Limit (continuous work possible)
 NA - Work/rest cycle not feasible (see Maximum Work Time - Table B-4)

Volumes listed are required to support continuous work times in Table B-4; drinking should be divided over the course of each hour. If the water requirement exceeds 1.5 qts/hr, sweat loss is greater than maximum water absorption during an hour. For these situations, soldiers should drink the extra water during periods of lower water requirements. This table was prepared using the USARIEM Heat Strain Model. Assumptions used in generating this table include: 1) Troops fully hydrated, rested, and acclimatized; 2) Windspeed = 2 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.

APPENDIX C
TIPS FOR MEASUREMENT OF WET BULB
GLOBE TEMPERATURE (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):

$$WBGT = 0.8 \times WGT + 0.2 \times \text{Dry Bulb}$$

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).

APPENDIX D FLUID REPLACEMENT RECIPES FOR DEHYDRATION

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.

Field Expedient Recipes

a) Rehydration 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).

Medic Recipe (Prepared by Medical Personnel)

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

Note: 5 grams equals 1 teaspoon

APPENDIX E

CULTURE AND CUSTOMS

Arabs are accomplished at making guests feel welcome and comfortable. Furthermore, Arabic people are quick to recognize and appreciate sincerity. No visitor can go wrong by observing traditional respect and consideration for the feelings, customs, and beliefs of others. The Arab world is governed by tribal traditions coupled with Islamic principles and precepts. Although many Arabs may be tolerant of your ways and beliefs, Islamic law must be adhered to and obeyed.

Life under Saudi Arabia's strict sect of Islam will sometimes require adjustments. Alcohol and pork are illegal. Tobacco is legal. Women are not allowed to drive and must be accompanied by their husband or a male relative to travel by bus or train. At prayer time, all shops must close and even television programs are interrupted. The only exceptions are the restaurants in the big hotels.

ISLAMIC LAW

The Islamic concept of divine manifestation cannot be amended to conform to changing human values or standards. It is an absolute norm to which all Moslem values and conduct must conform. Islamic law, known as the Shari'a, is perhaps the one aspect of the Arabic culture that arouses the most prejudices among individuals not of the Islamic faith. Because the basic source of the Shari'a is considered to be the word of God revealed to the prophet Mohammed, the Shari'a encompasses the total relationship between the Moslem and his God. The Moslem submits to Allah by following God's will and the guidance brought by the prophets as compiled in the Koran. The Shari'a is therefore considered to be the divinely ordained code of behavior and

the prescribed way of life for man. The Shari'a is not merely a collection of "do's and don'ts," nor is it just a set of criminal laws prescribing punishments for certain crimes, it is a way of life.

AVOIDING OFFENSE

When in Saudi Arabia and wearing civilian clothing, dress conservatively. Shorts are not allowed in public. Women should always cover their shoulders and should not wear clothing that is overly tight or revealing. Do not attempt to photograph people without their permission. The **left hand should not be used in every day transactions** with or among the indigenous population. In Saudi Arabia, the left hand is used in lieu of toilet paper. If one attempts to use it for anything else, it is considered a personal affront.

KUWAIT

Religion: Islam is the state religion. On the continuum, Kuwait's practice of Islam is not as strict as that practiced in Saudi Arabia, but is not as liberal as that of Bahrain. Non-muslims are allowed to enter mosques, even during prayer time, as long as proper dress is observed; both men and women should use long-sleeved clothing; women must also cover their heads. Most Kuwaitis are Sunni Moslems; however, there is a significant Shiite minority.

Language: Arabic is the official language of Kuwait, although English is widely understood.

Money: The Kuwaiti dinar is divided into 1000 fiils. Notes come in denominations of KD 1/4, 1/2, 1, 5, 10 and 20. Coins come in 5, 10, 20, 50, or 100 fiils. In 1991, all of the pre-

invasion notes were demonetized. All banks and most moneychangers display posters showing the old and new bills. Pre-invasion coins are still valid.

SAUDI ARABIA

Religion: Most Saudis are Sunni Moslems who follow the Wahhabi sect of Islam. The country also has a Shiite minority, which constitutes between five and ten percent of the population. Most of the Shiites live in the Eastern Province, where they may account for as much as a third of the population, though there are also small Shiite communities in the Asir region, near the Yemeni border. Wahhabism is an austere form of Islam.

Language: The official language of Saudi Arabia is Arabic. Classical Arabic, the language of the Koran, is the accepted standard for the written language. Although Arabic is the official language in Saudi Arabia, English is the universal language of commerce in the kingdom and soldiers will have no trouble getting by with it.

Money: The Saudi riyal (SR) is divided into 100 halalas. Notes come in SR 1, 5, 10, 50, 100 and 500 denominations. Coins come in, 10, 25 and 50 halala and SR 1 denominations.

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