STANDARDS RELATED DOCUMENT

SRD 4 to AJMedP-4

FIELD HYGIENE AND SANITATION

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31 July 2020

1. The enclosed Standards Related Document, SRD-4 to AJMedP-4, Edition A, Version 1, FIELD HYGIENE AND SANITATION, which has been approved in conjunction with AJMedP-4 by the nations in the Military Committee Medical Standardization Board, is promulgated herewith.

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TC 4-02.3

FIELD HYGIENE AND SANITATION

May 2015

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Headquarters, Department of the Army

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***TC 4-02.3**

Training Circular (TC)
No. 4-02.3

Headquarters
Department of the Army
Washington, DC, 6 May 2015

Field Hygiene and Sanitation

Contents

Distribution Restriction: Approved for public release; distribution is unlimited.

***This publication supersedes FM 21-10/MCRP 4-11.1D dated 21 June 2000.**

Tables

Preface

Training Circular (TC) 4-02.3 provides hygiene and sanitation guidance for Soldiers in the field and while deployed. The publication outlines individual and leader responsibilities and describes individual and leader preventive medicine measures and guidance for Soldiers. Implementation of the techniques presented in this publication enable individual Soldiers to remain healthy in the field and enable commanders to maintain a fit and healthy force capable of accomplishing the mission in any environment.

The principal audience for TC 4-02.3 is commanders, subordinate leaders, individual Soldiers, Department of Defense (DOD) civilians and contractors.

Commanders, staffs, and subordinates ensure their decisions and actions comply with applicable United States (U.S.), international, and, in some cases, host-nation laws and regulations. Commanders at all levels ensure their Soldiers operate in accordance with the law of war and the rules of engagement. (See Field Manual [FM] 27-10.)

This publication is in consonance with the following North Atlantic Treaty Organization Standardization Agreements:

Title	North Atlantic Treaty Organization Standardization Agreements
Requirement for Training in First-Aid, Emergency Care in Combat Situations and Basic Hygiene for All Military Personnel	2122
Requirements for Water Potability During Field Operations and in Emergency Situations—Allied Medical Publication-4.9	2136
Emergency Supply of Water in Operations	2885
Protection of Hearing	2899
Essential Field Sanitary Requirements	2982

This publication uses joint terms where applicable. Selected joint and Army terms and definitions appear in both the glossary and the text. This publication is not the proponent for any Army terms.

Unless otherwise stated in this publication, the use of masculine nouns and pronouns does not refer exclusively to men.

Training Circular 4-02.3 applies to the Active Army, Army National Guard/Army National Guard of the United States, and United States Army Reserve unless otherwise stated.

The proponent and the preparing agency of this publication is the United States Army Medical Department Center and School, United States Army Health Readiness Center of Excellence. Send comments and recommendations on a DA Form 2028 (Recommended Changes to Publications and Blank Forms) to Commander, United States Army Medical Department Center and School, United States Army Health Readiness Center of Excellence, ATTN: MCCS-FC-DL (TC 4-02.3), 2377 Greeley Road, Building 4011, Suite D, JBSA Fort Sam Houston, Texas 78234-7731; by e-mail to usarmy.jbsa.medcom-ameddcs.mbx.ameddcs-medical-doctrine@mail.mil; or submit an electronic DA Form 2028. Recommended changes should be keyed to the specific page, paragraph, and line number. A rationale for each proposed change is required to aid in the evaluation and adjudication of each comment.

Introduction

Training Circular 4-02.3 remains generally consistent with FM 21-10/MCRP 4-11.1D on key topics while adopting updated terminology and concepts as necessary. It is designed to be used in conjunction with Army Techniques Publication (ATP) 4-25.12.

The material presented in this publication reflects enduring practices of field hygiene, sanitation, and preventive medicine measures. Implementation of these techniques and procedures enable commanders to preserve the health of their Soldiers in order for them to accomplish the units' mission. Additionally the discussion contained in this text is designed as a quick reference and ready resource for the individual Soldiers to employ appropriate preventive medicine measures to protect themselves from health threats commonly encountered while in the field or deployed.

Summary of changes include—

The revision of FM 21-10/MCRP 4-11.1D includes designating this publication as a TC and renumbering it as TC 4-02.3 in compliance with the Army's Doctrine 2015 Initiative.

Training Circular 4-02.3 consists of three chapters and one appendix as follows:

Chapter 1 provides a brief history of disease in military operations, identifies health threats confronted by Soldiers while in the field or deployed, and introduces preventive medicine measures.

Chapter 2 identifies individual preventive medicine measures and responsibilities.

Chapter 3 identifies leader responsibilities and collective preventive medicine measures.

Appendix A provides information on water purification techniques for individual water storage systems.

Chapter 1
Health Threats in Military Operations

DISEASE AND NONBATTLE INJURIES

1-1. Disease and nonbattle injuries (DNBIs) have been a costly consequence of military operations for as long as there have been armies. Historically around 80 percent of reported casualties among U.S. military personnel have been attributed to DNBI. The result has been tens of thousands of U.S. military personnel who have died, were severely disabled, or temporarily rendered incapable of performing their duties. High numbers of DNBI casualties has had a significant impact on unit readiness and severely jeopardized the ability of some units to accomplish their mission.

Note. Disease and nonbattle injury casualties are defined as Soldiers who are lost to their organization by reason of disease or injury and who are not battle casualties.

1-2. To reduce the high rates of DNBI, the armed forces of the U.S. implemented fundamental changes in the way that they address field hygiene and sanitation and health threats endemic to an area of operations. Although incidences of DNBI have declined since the end of the Vietnam War there is no doubt that they still adversely affect U.S. military forces. Table 1-1 depicts percentages of DNBI recorded in U.S. military operations from 1991 to 2003.

Table 1-1. Percentage of disease and nonbattle injury rates in contemporary operations

Percentage of casualties attributed to disease and nonbattle injury by operation and date	
Operation Desert Shield/Desert Storm, 1991	6.5 percent
Operation Joint Endeavor, 1995	7.1 percent
Operation Joint Guardian, 1999	8.1 percent
Operation Enduring Freedom, 2001	5 percent
Operation Iraqi Freedom, 2003	4 percent

1-3. The reduction in DNBI casualty rates can be attributed to—

- Command emphasis.
- Proactive leaders and unit field sanitation teams.
- Awareness of the threat.
- Education and training.
- Ready access to safe rations, potable water, laundry, shower, and latrine facilities.
- Improved preventive medicine measures, personal protection equipment, and chemoprophylaxis and medical treatment protocols.

HEALTH THREATS

1-4. The environments in which U.S. military forces routinely operate present significant health threats to Soldiers in the field and when deployed. Health threats most commonly encountered by U.S. military personnel include—

- Endemic diseases.
- Food- and waterborne diseases.
- Hazardous plants and animals.
- Entomological hazards (nuisance pests and disease-carrying vectors).
- Toxic industrial materials (industrial and agricultural).
- Deployment-related stress.
- Sleep deprivation.
- Hazardous noise.
- Climatic or environmental extremes (heat, cold, high altitudes).

PREDISPOSING FACTORS

1-5. Predisposing factors are things which make a Soldier more susceptible to becoming a DNBI casualty. These include—

- Breakdown in basic hygiene and sanitation practices.
- Weakening of the natural defenses of the human body.
- Harshness of the environment.

BREAKDOWN IN BASIC HYGIENE AND SANITATION PRACTICES

1-6. Basic hygiene and sanitation practices may begin to breakdown when Soldiers are not able to readily and regularly access potable water, safe rations, showers, latrines, and laundry facilities. Soldiers may become apathetic and begin neglecting their personal hygiene and fail to properly dispose of potentially hazardous solid and human waste products.

NATURAL DEFENSES OF THE HUMAN BODY

1-7. Extended periods of time in the field and prolonged deployments in austere environments place tremendous stress on the human body. These stresses can negatively impact the body's natural defense mechanisms and can weaken its ability to efficiently protect against disease. When Soldiers are placed in high-stress situations for extended periods of time coupled with significant climatic changes, interrupted sleep periods or sleep deprivation, and irregular meals they become more susceptible to illness and injury.

HARSHNESS OF THE ENVIRONMENT

1-8. Harsh environments are a reality of U.S. military operations. Conducting operations in these environments exposes Soldiers to extremes of heat or cold, high altitude environments, endemic diseases, food- and waterborne disease, hazardous pests and animals, entomological hazards, toxic industrial materials (industrial and agricultural), deployment-related stress, and hazardous noise.

PREVENTIVE MEDICINE MEASURES

1-9. Preventive medicine measures are simple, common sense actions that every Soldier can and must perform to preserve his health and avoid unnecessary injury while in the field or when deployed.

Note. In order to be effective, preventive medicine measures must be an item of command interest.

1-10. The principles of preventive medicine measures are—

- Soldiers perform individual techniques of preventive medicine measures.
- Field sanitation teams train Soldiers in preventive medicine measures and advise commanders and unit leaders on implementation of unit-level preventive medicine measures.
- Commanders and subordinate leaders provide for and enforce preventive medicine measures.

1-11. The key point to remember is that disciplined, well trained, physically fit, and appropriately supported Soldiers can avoid becoming DNBI casualties and remain healthy to successfully perform their mission while in the field and deployed. This is especially true when they are aware of the threats present in their area of operations and provided the information and resources necessary to counter the threat.

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Chapter 2

Individual Preventive Medicine Measures

SOLDIER RESPONSIBILITIES

2-1. Regulations state that individual Soldiers are responsible for their own well-being. For example, AR 40-5 states that every Soldier is responsible for his own well-being and that he will implement and employ all protective measures possible to preserve his health. Each Soldier, as a minimum, will protect against—

- Skin diseases by washing the body as often as practicable.
- Heat injury in hot and sunny climates by following work or rest and water consumption guidelines, by properly adhering to uniform wear policies, and by using sunscreen on exposed body parts.
- Cold injury in cold climates by wearing proper cold-weather clothing and frequently changing socks to keep feet dry, by careful handling of gasoline-type liquids, and by avoiding contact between skin and cold metal.
- Mosquito, fly, tick, and other arthropod-borne diseases by using insect repellents, netting, and insecticide aerosols; by taking approved chemoprophylaxis; and by wearing the uniform properly.
- Enteric (gastrointestinal) diseases by using water purification procedures whenever water quality is uncertain and by avoiding foods prepared by unapproved food vendors, and by properly disposing of bodily wastes. (Refer to Appendix A for water disinfection techniques and procedures).

PERSONAL HYGIENE

2-2. Personal hygiene refers to a set of practices intended to preserve the health of the individual Soldier and consequently the health of every Soldier who must work and live in close proximity to them.

2-3. To maintain an effective personal hygiene regimen, each Soldier must maintain a supply of personal hygiene items for use when they are going to the field or deploying.

Note. Soldiers being deployed for unspecified periods of time should consider packing a 90-day supply of prescription medications and standard toiletry articles until sustainment of these items can be assured.

2-4. Personal hygiene items may include, but is not limited to, the following items:

- Absorbent body powder.
- Alcohol-based hand sanitizer.
- Antiperspirant/deodorant.
- Comb.
- Dental floss.
- Department of Defense-approved insect repellent.
- Eye drops.
- Feminine hygiene products.
- Foot powder.
- Hairbrush.

- Lip balm.
- Prescription medications (for example, birth control, blood pressure, and so forth).
- Sanitizing wipes.
- Shampoo.
- Shaving kit.
- Soap.
- Sunscreen lotion.
- Toilet tissue.
- Toothbrush.
- Toothpaste.
- Towels.
- Washcloths.

Note. Alcohol-based hand sanitizer, sunscreen, and DOD-approved insect repellents are available through unit supply channels for issue to Soldiers as needed.

SKIN CARE

2-5. The skin is the largest organ of the human body and protects the body from disease-causing bacteria and viruses. The skin also provides protection from the direct rays of the sun, insulates the body from cold, and helps to regulate the temperature of the body in hot environments.

2-6. As the body's first line of defense it is essential that Soldiers protect their skin by keeping it as clean as possible. Showering regularly helps to reduce bacteria that are resident on the skin and can help to prevent infection from scrapes, cuts, punctures, and cracked skin. Soldiers can protect their skin by—

- Showering or bathing regularly to keep the skin clean.
- Using absorbent body powder to control moisture buildup. Pay particular attention to areas where wetness is a problem (such as underarms, between the thighs and buttocks, feet, and, for females, under the breasts).
- Wearing the uniform properly and modifying the wear of the uniform when directed. Utility uniforms are designed to fit loosely to allow for ventilation and provide protection from the sun.
- Wear moisture wicking undergarments designed to pull moisture away from the skin.
- Changing into clean dry socks and applying antifungal foot powder to protect the feet from prolonged periods of dampness.
- Applying DOD-approved insect repellent when needed.

Note. Use of insect repellents must always be in compliance with the manufacturer's instructions.

- Applying sunscreen to exposed skin.

SHOWERING

2-7. Under ideal conditions Soldiers should shower daily, or at least once every week to maintain good personal hygiene. Frequent showering prevents skin infections and helps to prevent potential parasite infestations. When showers are not available, washing daily with a washcloth and soap and water is advised. Particular attention should be given to sweaty areas or places that become wet—armpits, feet, genitals, between thighs and buttocks, and under breasts.

2-8. It is highly recommended that female Soldiers who are menstruating have daily access to shower facilities. This however does not mean that there must be a fixed facility with hot and cold running water on site. In situations where shower facilities are not available, female Soldiers can establish a private space

with adequate drainage and bathe using a washcloth and soap and water. A full canteen of water should be adequate for one Soldier and a five-gallon water container for multiple Soldiers. Provisions for heating water would be preferred, but may not always be possible. The site designated for Soldiers to wash themselves must provide privacy and security.

2-9. Female Soldiers who are not menstruating should be treated the same as male Soldiers with regard to accessing fixed shower facilities. Shower runs should be coordinated without gender preference influencing their frequency. Soldiers should avoid using perfume, cologne, or scented soaps, which can attract insects. However, unscented lotion can be used to keep the skin from drying, cracking, and becoming infected. Cosmetics are not authorized in the field. Frequent showering also helps to prevent genital and urinary tract infections.

LAUNDERING CLOTHING REGULARLY

2-10. Laundering of uniforms is critically important for preventing parasite infestation since head and body lice are generally spread by direct contact with infested Soldiers, their uniforms, or bedding.

2-11. The following are steps that can be taken to help prevent and control the spread of head and body lice:

- Shower and bathe regularly and change into properly laundered uniforms at least once a week.
- Do not share clothing, beds, bedding, and towels used by a Soldier known to harbor parasites.
- Fumigation or dusting with DOD-approved insecticides may be necessary to control and prevent the spread of body lice.

HAND WASHING AND SANITIZING

2-12. One of the most effective practices that Soldiers can perform to protect themselves and others from the spread of disease is to thoroughly wash or sanitize their hands frequently. Regular washing or sanitizing of the hands denies disease-causing bacteria and viruses from gaining easy entry into the body. Soldiers who fail to wash their hands frequently increase the risk of spreading germs picked up from other sources and possibly infecting themselves when touching their eyes, nose, or mouth. One of the most common ways Soldiers catch a cold is by rubbing their nose or their eyes with an unwashed hand which has been contaminated with a cold-causing virus.

2-13. Germs can be spread directly to others or onto surfaces that others might touch which may cause other Soldiers around you to become sick. The important thing to remember is that, in addition to colds, serious diseases like infectious diarrhea and meningitis can easily be prevented when Soldiers make a habit of frequently washing their hands.

2-14. When to wash and or sanitize the hands (at a minimum)—

- Before eating or snacking.
- After eating or snacking.
- Before handling or preparing food.
- After using the latrine.
- After handling anything that could potentially transfer germs.
- Frequently during the work day to keep your hands free of germs.
- After coming into contact with any local flora or fauna.
- After physical contact with local nationals.

Note. Maintain cultural awareness to ensure that no insult is conveyed when this is done.

2-15. Ways to clean or sanitize the hands is through the use of—

- Soap and potable water.

Note. Nonpotable water should only be used as a last resort. Nonpotable water may be contaminated which would negate the benefits of hand washing.

- Alcohol-based hand sanitizing solutions when soap and water are not available.

Note. Alcohol-based hand sanitizers are not effective if the Soldier's hands are caked with dirt or grease.

- Alcohol wipes (included in the accessory packet of every meal, ready-to-eat, individual) to clean hands.
- Commercial cleansing wipes if available.

ORAL HYGIENE

2-16. The issue of oral hygiene is a readiness issue. Soldiers who fail to maintain a vigorous oral hygiene regimen can quickly become nondeployable. When neglected bacteria in the mouth use starches and sugar to produce acids that can quickly result in gingivitis and tooth decay. Not brushing for just a few days can cause inflammation of the gums and result in irritated and bleeding gums. If gum disease already exists, it can quickly become worse. To prevent tooth decay and gum disease Soldiers must maintain good oral hygiene practices at all times by—

- Flossing their teeth.
- Brushing their teeth.

FLOSSING

2-17. Flossing is important because it removes food particles from between the teeth and under the gums where brushing cannot reach. Soldiers should floss at least once per day.

BRUSHING

2-18. Soldiers should brush at least twice a day, especially before sleeping. Brushing should include the use of fluoride toothpaste to brush all the surfaces of the teeth using a circular motion. Soldiers should not rinse, eat, or drink anything for at least 30 minutes after brushing to allow the fluoride to stay on the teeth longer and protect them better. If toothpaste is not available, Soldiers should brush their teeth anyway. Brushing should include the tongue and the roof of the mouth. Soldiers can also enhance their oral hygiene by chewing the gum contained in the accessory packet of every field ration. The gum is made with a sweetener that helps control the buildup of oral bacteria and reduces tooth decay when used regularly.

2-19. Soldiers must brush regularly even when running water is not available. While in the field this can be accomplished by keeping a small toothbrush in a ventilated toothbrush cover or case and kept in a convenient pocket.

Note. After brushing, rinse the toothbrush by pouring a small amount of water over the bristles.

2-20. If a toothbrush is not available, Soldiers can rinse their mouths with water after eating then wrap a piece of cloth around a finger and wipe the surfaces of the teeth and gums.

SANITATION

2-21. Sanitation involves the appropriate and hygienic disposal and treatment of all solid waste and unhealthy human waste, such as sewerage and drainage. Refer to ATP 4-25.12 for detailed discussion on waste management in the field.

2-22. Proper management of waste materials generated in the field is critical in protecting the health of Soldiers and the environment. Handling these materials improperly can create dangerous working conditions, damage vital natural resources, impede mission accomplishment, and cause irreparable harm to training areas. Poor waste management practices can also lead to criminal and civil penalties, substantial cleanup costs, and detract from the military's relationships with local communities and host nations. As a result, the DOD demands integration of environmental considerations into all military planning and decision making.

WASTE MANAGEMENT IN THE FIELD

2-23. Individual Soldier waste management responsibilities include the following:

- Proper collection, handling, and disposal of liquid and solid human waste.
- Collection and disposal of trash.
- Cleanliness of individual living and work spaces.

COLLECTION, HANDLING , AND DISPOSAL OF LIQUID AND SOLID HUMAN WASTE

2-24. Failure to properly dispose of human waste provides a fertile environment for filth flies, rats, mice, and other disease-carrying pests.

2-25. Prevention of disease is relatively simple when basic sanitation practices are established and enforced. When Soldiers use latrine facilities, the problem of pests is minimized or eliminated.

Portable Latrines

2-26. Portable latrine systems enable Soldiers to relieve themselves in highly mobile and fluid environments by providing a rapidly accessible, clean, and private environment for both men and women. These systems can easily be carried on vehicles and quickly set up by untrained personnel. These systems have long shelf lives and require no external support. Collection bags can be conveniently disposed of along with trash.

Improvised Latrines

2-27. The types of improvised latrines listed below can be used for field use. Generally, the use of improvised latrines in the U.S. is prohibited. The use of improvised latrines such as cat holes and slit trenches has become less common due to ecological and statutory restrictions.

COLLECTION AND DISPOSAL OF TRASH

2-28. The primary options for disposal of nonhazardous solid waste in the field are burning, burial, or backhauling. Within the U.S. all solid waste generated during field exercises must be backhauled to garrison or picked up by contractors. During overseas training exercises, host-nation requirements must be followed which normally require the same policies of backhauling or contract disposal. If incineration, burning, or landfilling is used during contingency operations, additional security measures must be taken to deter scavenging by local populations. For detailed discussion regarding the methods for the collection and disposal of nonhazardous solid waste refer to ATP 4-25.12.

2-29. Methods for the collection and disposal of nonhazardous solid waste include—

- Incineration.
- Burn pits.
- Burial.
- Landfilling.
- Tactical burial.

MAINTENANCE OF INDIVIDUAL LIVING AND WORK SPACES

2-30. Routine maintenance and regular cleaning of living and work spaces is vitally important for maintaining the health of the individual Soldier and for those Soldiers who must live and work in close proximity to each other.

2-31. For example, bringing food into these areas and then leaving uneaten food items or failing to remove trash associated with meals can quickly attract disease carrying arthropods, rodents, and other potentially dangerous pests.

2-32. Eating in designated areas and keeping trash to a minimum reduces the likelihood that pests will be attracted to these areas and thus reduce the potential for infestation and the spread of disease.

PHYSICAL FITNESS

2-33. Physical fitness plays a large part in a Soldier's ability to cope with combat and operational stress, fight infection and disease, and avoid common musculoskeletal injuries. In cases where injuries do occur well-conditioned Soldiers generally recover more quickly. Physical training also helps Soldiers acclimatize more quickly and effectively in hot weather environments.

2-34. Leaders must be aware of the positive morale benefits associated with vigorous physical training opportunities and should consider deploying with physical fitness and sports equipment to provide variety in their physical training programs.

WATER- AND FOODBORNE ILLNESS

2-35. Soldiers must be aware of the disease potential associated with the consumption of water and foods from unapproved sources. Avoiding water- and or foodborne illness is relatively simple when Soldiers adhere to a few basic rules, these include—

- Do not consume foods, drinks, ice, or dairy products from civilian vendors unless approved by veterinary personnel.
- Washing or disinfecting the hands.
- Soldiers should consider every source of water to be unpotable and foods to be contaminated unless specifically authorized by leaders. In situations where there is a suspicion of contamination, the Soldier should disinfect all water using the information contained in Appendix A of this publication.

ARTHROPODS, RODENTS, AND OTHER ANIMAL THREATS

2-36. Of the 80 diseases said to be of military importance, over two-thirds are caused by pathogens transmitted by arthropods, rodents, and other animals. In addition to disease, these pests can inflict severe physical, psychological, and economic stresses that threaten the military mission. For example, arthropod bites can be painfully distracting and can lead to secondary infections, dermatitis, or allergic reactions.

2-37. Soldiers can avoid the incidence of vector-borne diseases and the associated discomfort caused by stinging and biting arthropods by adhering to established preventive medicine measures. For other animal threats, refer to ATP 4-25.12.

DEPARTMENT OF DEFENSE INSECT REPELLENT SYSTEM

2-38. Insect repellents are one commonly used form of preventive medicine measures. They provide commanders with a quick and inexpensive measure to protect Soldiers. They can be applied quickly and effectively to prevent arthropod-borne disease. Repellents are often the only means of protection against arthropod-borne diseases in environments when vector control measures are not possible or when the speed of military developments prevents the use of chemoprophylaxis or vaccines.

2-39. The frequent application of DOD-approved insect repellents is so important because many of the disease-causing pathogens of military importance are carried (vectored) and transmitted by ticks, chigger mites, fleas, and body lice. In order to transmit the disease all of these vectors must come into close contact with Soldiers' uniforms before they bite.

2-40. When used properly, the DOD Insect Repellent System will prevent disease, pain associated with the annoyance caused by bites of arthropods such as mosquitoes, sand flies, ticks and chiggers. The system consists of three components—

- Permethrin on uniforms and mosquito nets.

Note. Current issue Army Combat Uniforms and pop-up bed nets are factory treated with the insect repellent permethrin to ward off stinging and biting arthropods.

- Application of DOD-approved insect repellent to exposed skin.
- Proper wear of the uniform.

MOSQUITO BED NETS

2-41. When operating in areas where stinging and biting arthropods are present mosquito bed nets regardless of configuration must always be used to protect Soldiers when resting or sleeping. Standard issue permethrin and insecticide spray can be applied to the mesh or sprayed on insects that may be trapped inside the netting. Detailed instructions for the use of bed nets can be found in the Armed Forces Pest Management Board Technical Guide Number 36.

IMMUNIZATIONS AND CHEMOPROPHYLAXIS

2-42. Although immunizations and chemoprophylactic measures are considered individual preventive medicine measures the time and place of their administration is usually not controlled by the individual Soldier but rather by the direction of the commander and medical professionals administering or observing their administration.

2-43. Various vaccines are available for some viral pathogens (yellow fever virus, Japanese encephalitis virus). Even when appropriate chemoprophylaxis or vaccination is available for the disease of greatest concern, their use entails considerable medical management. When risk is unknown or considered to be low, personal protection measures may be the appropriate strategy for prevention. Therefore, the proper use of other preventive medicine measures described earlier offer the most practical means of interrupting and preventing arthropod-borne disease transmission.

2-44. In summary, there are three required components for effective personal protection—

- First, the measure itself must be effective when properly used.
- Second, the development and continual maintenance of a well-defined education program is a must.
- Third, every Soldier must be informed about the importance of preventive medicine measures for reducing the occurrence of disease caused by pest- or arthropod-borne pathogens.

HEAT INJURY

2-45. To avoid heat injury—

- Soldiers must become acclimatized. Significant heat acclimatization requires at least three to five days and full acclimatization can take up to two weeks.
- Use sunscreen on all exposed body parts.
- Drink plenty of water, depending on the heat and activity level, Soldiers may need to drink from ½ to 1½ quarts of water per hour. Three gallons or 12-quarts per day in hot, dry climates. Drinking water is a must in order to prevent heat Illness.
- Use work or rest cycles, as leaders direct. A rest period helps prevent dangerous increases in body temperatures by minimizing heat production.
- Eat all meals to replace salts; eating all meals in the field will usually provide the body's requirements for salts. Field rations are designed to meet the daily requirements for minerals and electrolytes (sodium).
- Modify the uniform, when directed/authorized by the commander to reduce heat stress and to protect against ultraviolet radiation.

COLD INJURY

2-46. To avoid cold injury—

- Wear clothing as directed by commanders and leaders.
- Wear clothing in loose layers (top and bottom). Avoid tight clothing, including tight underwear.
- Keep clothing clean and dry.
- Remove or loosen excess clothing when working or in heated areas to prevent sweating.
- Wear headgear to prevent body heat loss. The body loses large amounts of heat through the head.
- Change wet or damp clothes as soon as possible.
- Keep the body warm by continuing to move, if possible.
- Exercise large muscle groups (arms, shoulders, trunk, and legs) frequently to keep warm.
- If Soldiers must remain in a small area, exercise the toes, feet, fingers, and hands.
- Avoid the use of alcohol as it makes the body lose heat faster.
- Avoid standing directly on cold, wet ground, when possible.
- Avoid tobacco products. Using tobacco products decreases blood flow to the skin.
- Eat all meals to maintain energy.
- Drink plenty of water or warm nonalcoholic fluids. Dark yellow urine indicates that Soldiers are not drinking enough fluids.

Note. Dehydration can occur in cold climates.

- Buddies should monitor each other for cold-weather injury.

Note. Soldiers must not attempt to rewarm frozen body parts unless under medical supervision.

2-47. Protect the feet—

- Have several pairs of issue boot socks. Keep socks clean and dry. Change wet or damp socks as soon as possible.
- Wash feet daily, if possible.
- Apply foot powder on feet and in boots when changing socks.

- Avoid tight-fitting socks and boots (fully lace boots up, as loose as possible).
- Wear overshoes to keep boots dry.

2-48. Protect the hands—

- Wear gloves with inserts or mittens with inserts.
- Warm hands under clothing if they become numb.
- Avoid skin contact with snow, fuel, or bare metal.
- Waterproof gloves by treating with waterproofing compounds.

2-49. Protect the face and ears—

- Cover face and ears with a scarf or other material, if available.
- Wear insulated cap with flaps down or wear a balaclava and secure under chin.
- Warm face and ears by covering them with hands. Do not rub face and ears.
- Do not use face camouflage when windchill is minus 10 degrees Fahrenheit or below. The dark colors of the camouflage make detection of cold-weather injury difficult (frostbite).

2-50. Protect eyes by—

- Wearing sunglasses.
- Wearing issued eye protection.

2-51. Protect fellow Soldiers by watching for signs of frostbite on the Soldier's exposed skin.

Note. The affected skin will appear as pale, gray, or waxy areas. Refer to ATTP 3-97.11/MCRP 3-35.1D.

TOXIC INDUSTRIAL MATERIALS

2-52. Recognize and prepare for toxic industrial material threats in the following areas:

- Occupational hazards—
  - Exhaust from engines and fuel space heaters.
  - Gases from weapons firing, such as rockets and M8 smoke.
  - Solvents used to clean weapons.
  - Greases and oil from vehicle maintenance repair.
  - Detergents used to clean equipment.
- Industrial hazards—
  - Compressed gases.
  - Industrial solvents.
  - Hazardous chemical waste.
  - Materials and water used at waste sewage and water treatment plants.
- Biological and radiological hazards include—
  - Medical waste.
  - Materials used at medical research facilities.
  - Radioactive isotopes.
  - Substances at nuclear power plants.
  - Depleted uranium.
- If necessary request preventive medicine assistance in identifying sources.

2-53. Recognize the injury as follows:

- Carbon monoxide is a colorless, odorless, and tasteless gas that causes headache, sleepiness, coma, and death.
- Smoke used for obscuration and signaling is extremely irritating and can cause severe coughing, wheezing, and lung damage, if inhaled.
- Bore/gun gases are extremely irritating and react with body fluids to produce hydrochloric acid in the throat, lungs, and eyes. It causes coughing, acid burns to tissues, and flu-like lung disease.
- Fuel, solvents, grease, and oils cause skin rashes, burns, drying, and infections. They also cause damage to the liver, blood, and brain.

Note. Many toxic industrial materials are known carcinogens.

PROTECT SELF AND MISSION FROM TOXIC INDUSTRIAL MATERIALS

2-54. To avoid carbon monoxide poisoning from petroleum or fossil fueled space heaters or vehicle engine exhaust—

- Ensure that living spaces are well ventilated when using petroleum or fossil fueled space heaters.
- Run engines outdoors or with vehicle bay or shop exhaust ventilation systems as the primary system with the secondary system being shop doors and windows open.
- Keep sleeping area windows open slightly for ventilation and air movement.
- DO NOT sleep in vehicles with the engine running or use engine exhaust for heat.
- DO NOT park vehicles with the engines running near air intakes to tents, trailers, or environmental control units.

2-55. To avoid inhaling bore or gun gases—

- Use onboard vehicle ventilation systems.
- Keep bore evacuator well maintained.
- Try to keep some air movement in gun emplacements.

2-56. When using solvents, grease, and oils—

- Only use authorized safety solvent.
- Never substitute an unauthorized solvent to clean equipment. For example, do not use a degreasing agent like denatured alcohol instead of an authorized nontoxic, nonhazardous solvent preservative cleaning agent.
- Wear coveralls, if available, and rubber gloves.
- Wash or change clothing often, especially when soiled by chemicals or fuel.
- Always follow label instructions for use and safety precautions.
- Use ventilation systems in areas where fumes are present or when conditions and materials dictate.

2-57. When required to handle biological waste—

- Always use disposable rubber gloves when working with biological materials.
- Wear coveralls or rubberized aprons, as necessary.
- Wear goggles or safety glasses, as necessary.
- Wear facemasks and air-filtered breathing masks approved for specific tasks, when removing or working with biological waste.
- Dispose of biological waste materials according to unit standard operating procedures and product label instructions.

NOISE HAZARDS

2-58. There are several personal protective devices available to lessen the risk of hearing loss. These devices primarily consist of various types of earplugs and earmuffs. An important consideration in selecting these devices is their ability to be worn comfortably and consistently when hearing protection is required.

2-59. When Soldiers are subjected to extremely high, steady-state noise levels (greater than 103 decibel, A-weighting time-weighted average or greater than 165 decibel, A-weighting), earplugs and earmuffs must be worn together to prevent hearing loss.

2-60. Soldiers protect themselves from noise hazards by—

- Wearing properly fitted earplugs and or earmuffs.
- Keeping earplugs and earmuffs clean to prevent ear infections.
- Avoiding high intensity noise areas or limiting the time spent in hazardous noise environments only to the time required to perform critical tasks.

SLEEP DEPRIVATION

2-61. Sleep deprivation degrades performance and leads to errors in judgment. Quality sleep is essential to sustain performance, and performance is critical to the successful outcome of operations.

2-62. Seven to eight hours of sleep in each 24-hour period will sustain performance indefinitely. Sleep periods do not need to be taken all at one time, they can be divided into two or more sleep periods (including naps) per 24-hour time period as long as seven or more hours of sleep is obtained.

2-63. Naps also add to recuperative sleep time. A nap boosts both immediate and long-term performance. The benefits of a short nap are evident for up to two days after the nap.

2-64. Performance will be degraded with less than eight hours of sleep every 24-hours. Less than seven hours of sleep within every 24-hour period will result in stabilizing performance at a lower level, and less than four hours of sleep in every 24 hours will degrade performance continuously and rapidly with no stabilization.

2-65. To the extent possible, sleep in a quiet, undisturbed environment away from other activity and protected from *wake up and wait* intrusions. Sleeping in noisy active environments with frequent awakenings is far less restorative.

2-66. When working on limited or no sleep, caffeine in doses of 200 to 300 milligrams (the equivalent of two to three cups of coffee) every three to four hours will improve performance. Sleep, like fuel, ammunition, food, and water is necessary to sustain performance. It is a command responsibility to ensure all personnel get adequate restorative sleep. Refer to FM 6-22.5.

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Chapter 3
Unit-Level Preventive Medicine Measures

LEADER RESPONSIBILITIES

3-1. Commanders are standard bearers for their units. As such they must set the example for personnel assigned or attached to their unit. They must always maintain high standards and remember that the most effective preventive medicine measures are the ones which they employ and demonstrate in the presence of their subordinates. Additional resources available to the commander include subordinate leaders, unit field sanitation teams, and supporting preventive medicine assets.

3-2. For leaders to ensure that Soldiers are adhering to established preventive medicine measures, they must diligently monitor their Soldiers for compliance and strictly enforce unit policies regarding implementation and adherence to preventive medicine measures and standards of personal hygiene.

PLAN FOR FIELD HYGIENE AND SANITATION FACILITIES

3-3. When occupying a new or unimproved area, commanders must plan for and procure field hygiene and sanitation facilities and equipment. These facilities and equipment include latrine, shower, hand washing, and laundry facilities. Planning considerations should include the type and number of facilities needed to meet the male to female requirements of the organization. For detailed discussion on this topic refer to ATP 4-25.12.

PLAN FOR PERSONAL HYGIENE

3-4. Provide shower facilities in the field. All Soldiers should shower at least once a week and have a clean change of uniform to reduce the health hazard associated with body lice and other health hazards.

3-5. Inspect Soldiers' personal equipment to ensure that—

- They have sufficient personal hygiene supplies—soap, washcloths, towels, a toothbrush, dental floss, fluoride toothpaste, and razor and razor blades (females should have sanitary napkins or tampons).
- Undergarments are cotton (not silk, nylon, or polyester).
- Uniforms fit properly.
- Soldiers have several pairs of issue boot socks; the number will depend on the type and length of the mission.
- Soldiers receive annual dental examinations and needed oral health care. Make sure all oral health appointments are kept. Use lulls in operational intensity to ensure that Soldiers maintain good oral health status.

PLAN FOR PHYSICAL TRAINING

3-6. Ensure that leaders at all levels recognize the benefits of physical fitness. Leaders must be role models, leading by example.

3-7. Take a positive approach to physical fitness with Soldiers. A physically fit Soldier is less likely to be an operational loss from disease or injury. Refer to FM 7-22 for information on physical readiness training.

PLAN FOR SAFE WATER

3-8. Leaders plan for and provide safe water by—

- Knowing the location of approved water distribution points.
- Making sure his unit has an adequate supply of—
  - Iodine water purification tablets (1 bottle for each individual).
  - Field chlorination kits.
  - Bulk chlorine.
  - Chlorination kits (water purification).
- Ensuring water trailers and tankers (400 gallons and above) are inspected by preventive medicine personnel semiannually.
- Inspecting water containers before use.
- Checking the residual chlorine of bulk water supplies (five-gallon cans, water pillows, water trailers) before drinking and at least daily thereafter.

PLAN FOR SAFE FOOD

3-9. Leaders plan for and provide safe food by ensuring that—

- Foods are maintained at appropriate temperatures and served within specified time periods to ensure that the foods are safe to consume.
- Food service personnel are inspected daily and those who are ill or have skin infections are referred for medical evaluation.
- Make sure foods, drinks, and ice are purchased from civilian vendors approved by preventive medicine personnel.
- Food service personnel and Soldiers use hand washing devices as appropriate.
- All food waste is transported to an approved disposal site, buried, or burned daily (at least 30 meters from food preparation area and water sources).

PLAN FOR ARTHROPOD, RODENT, AND ANIMAL THREATS

3-10. Leaders plan for arthropod, rodent, and animal threats by—

- Obtaining information on biting and stinging arthropods, reptiles, and animals from supporting preventive medicine personnel.
- Using his field sanitation teams to—
  - Train Soldiers in preventive medicine measures.
  - Control insects and other medically important arthropods.
  - Control rodents and other medically important animals.
  - Remind Soldiers to avoid handling insects, arthropods, snakes, and animals to prevent bites or injury.
  - Keep Soldiers from eating in sleeping or work areas to avoid attracting insects, rodents, and animals.
- Ensuring that—
  - Animal mascots are not kept.
  - Each Soldier has a bed net in good repair and treated with permethrin repellent.
  - Immunizations are current. Prophylaxis (for example, antimalarial tablets) is available for issue as required.
  - Laundry and shower facilities are available.
  - Field sanitation team supplies and equipment are available and replenished as necessary.
  - Assistance from a preventive medicine unit (through medical or command channels) when control of biting arthropods, rodents, or animals is beyond the capabilities of the unit.

Enforce Individual Preventive Medicine Measures

3-11. Leaders enforce individual preventive medicine measures by ensuring that—

- Uniforms are impregnated with permethrin before field training or deployment. Each Soldier has DOD skin and clothing insect repellent and uses them.

Note. Food handlers must not use insect repellent on their hands when preparing and serving food or when cleaning food service equipment.

- Soldiers keep their shirts buttoned, sleeves rolled down, and pants bloused inside boots.
- Soldiers shower regularly (field expedients will do); a field shower with a clean change of uniform should be accomplished once each week to control body lice.
- The use of aftershave lotions, colognes, perfumes, and scented soaps are discontinued to prevent attraction of insects.
- Permethrin-treated bed nets and the DOD-approved aerosol insecticide are used as necessary.
- Soldiers take antimalarial tablets or other prophylaxis (when directed by the commander).
- The field sanitation team inspects regularly to identify suspected lice infestations and to refer affected Soldiers for medical treatment.

Minimize Exposure to Arthropod, Rodent, and Animal Threats

3-12. Leaders can minimize exposure to arthropod, rodent, and animal threats if the mission permits by—

- Using their field sanitation teams to assist in selecting areas to establish base camp sites.
- Occupying areas away from insect and arthropod breeding areas such as natural bodies of water.
- Avoiding areas with high grass or dense vegetation.
- Using field sanitation team recommendations and assistance in applying pesticides for area control around living areas. Treatment of natural bodies of water is beyond the scope of the field sanitation team.
- Draining or filling in temporary standing water sites in occupied area (empty cans, used tires, or wheel ruts after rains).
- Clearing vegetation in and around occupied area.
- Maintaining area sanitation by enforcing good sanitation practices.
- Properly disposing of all waste.
- Protecting all food supplies.
- Ensuring that the company area is regularly policed.
- Removing, controlling, or killing pests (feral dogs, feral cats, wild animals, snakes, rats, mice, lice, and flies).

Minimize Exposure to Poisonous Plants and Toxic Fruits

3-13. Leaders can minimize exposure to poisonous plants and toxic fruits by—

- Obtaining information on indigenous poisonous plants and toxic fruits through unit medical channels or from the commands' preventive medicine representative.
- Providing information on the kinds of poisonous plants and fruits that may be found in the unit area.
- Using unit field sanitation teams to train Soldiers in preventive medicine measures for indigenous poisonous plants and toxic fruits.

- Have leaders monitoring and enforcing individual preventive medicine measures by ensuring that Soldiers properly wear the uniform and avoid—
  - Poisonous plants where possible.
  - Consuming potentially dangerous vegetation and fruits.
  - Putting grasses and twigs in the mouth.

PLAN AND PREPARE FOR HOT WEATHER OPERATIONS

3-14. Leaders plan for hot weather operations by—

- Maximizing physical fitness and heat acclimatization opportunities before deployment.
- Using field sanitation teams to train individuals and their leaders in preventive medicine measures against heat illness.
- Acclimatizing personnel to high temperatures as gradually as the mission will allow.
- Briefing Soldiers on the danger of sunburn and skin rashes and the importance of using sunscreen and maintaining good personal hygiene.
- Obtaining weather forecasts for time, area of training, and mission.
- Ensuring that Soldiers have adequate supplies of potable water available (up to three gallons per day per Soldier just for drinking).
- Knowing the location of water distribution points.
- Reinforcing the buddy system to maximize rehydration and minimize heat injuries.
- Ensuring medical support is available for treatment of heat injuries.
- Placing leaders to observe for and react to heat injury during dispersed training (road marches) or real-world operations.
- Training during the cooler hours of the morning if the mission permits.
- Serving heavy meals in the evening, rather than at noon.

OBTAINING AND USING HEAT CONDITION INFORMATION

3-15. Leaders must obtain and use heat condition information to plan for training and conducting operations.

3-16. Leaders must obtain heat condition information per unit standard operating procedure measures or contact the local supporting preventive medicine detachment or section. Heat condition information may be reported as—

- Category: one, two, three, four, or five. Refer to ATP 4-25.12 for information on heat categories.
- Wet bulb-globe temperature index.
- Use heat condition information to determine required water intake and work or rest cycles.

ENFORCE INDIVIDUAL PREVENTIVE MEDICINE MEASURES

3-17. Leaders must enforce individual preventive medicine measures by—

- Enforcing water intake by observing Soldiers and ensuring that they are drinking adequate amounts of water before, during, and after periods of exertion and when at rest. Encourage frequent drinking of water in small amounts.

Note. Beverage powders should not be mixed and stored in personal hydration systems.

- Ensuring that Soldiers consume meals to replace electrolytes.
- Ensuring that Soldiers practice good field hygiene.
- Ensuring that Soldiers use the buddy system to monitor each other for signs of heat illness.

- Checking Soldiers' canteens for water; not beverages.
- Making sure Soldiers have adequate time to eat and drink as mission permits. Permit personnel to consume carbohydrate and/or electrolyte beverages (sports drinks) as supplemental nutrients under conditions of extreme calorie and water requirements; such as extremely vigorous activities.

3-18. Prevent heat injuries by—

- Enforcing work or rest cycles when the mission permits. Permitting personnel to work or rest in the shade, if possible.
- Encouraging Soldiers to eat all meals for needed salts.
- Adjusting workload to size of individuals, when possible.
- Ensuring Soldiers have access to and use sunscreen.
- Prepare for heat casualties and decreased performance when water and work or rest cycle recommendations cannot be met.

MODIFY WEAR OF THE UNIFORM

3-19. When the situation requires and the tactical situation permits, commanders and leaders must modify the wear of the uniform to ensure that—

- Soldier's skin is covered and protected while in the sun.
- Uniforms are worn loose at neck, wrists, and lower legs (unblouse pants based on the heat category).

Note. If the health threat from biting arthropods is high, keep sleeves rolled down and pants bloused in boots.

IDENTIFY SPECIAL CONSIDERATIONS

3-20. Leaders must identify special considerations to prevent heat illness. For example, they must identify and modify training or physical activity for Soldiers with high-risk conditions of heat injuries, such as—

- Diseases or injuries, especially fevers, vomiting, diarrhea, heat rash, or sunburn.
- Use of alcohol within the last 24 hours.
- Overweight or unfit.
- Over 40 years old.
- Fatigue or lack of sleep.
- Taking medication (especially for high blood pressure, colds, or diarrhea).
- Previous heat stroke or severe heat exhaustion.
- Lack of recent experience in hot environments.

PLAN AND PREPARE FOR COLD WEATHER OPERATIONS

3-21. Leaders can effectively plan for the cold by—

- Using their field sanitation teams to train individuals and their leaders in preventive medicine measures against cold. Obtain weather forecast for time, area of training, and mission.
- Ensuring that the following are available as the tactical situation permits—
  - Covered vehicles for troop transport.
  - Cold-weather clothing.
  - Laundry services.
- Providing—
  - Warming tents or areas.

- Hot rations and hot beverages.
- Plenty of fresh drinking water.

- Inspecting Soldiers (before starting training or mission) to ensure that each Soldier has—
  - Availability, proper fit, and wear of cold-weather gear.
  - Clean, dry, proper-fitting clothing.
  - Several pairs of socks, depending on the nature and duration of the mission.
- Leaders must also ensure that—
  - Soldiers pulling guard duty or other sedentary duties are rotated frequently.
  - Medical support is available for treatment should cold-weather injuries occur.

OBTAIN AND USE WINDCHILL INFORMATION

3-22. Leaders can obtain temperature and windchill information (as directed by unit standard operating procedures or contact the local supporting preventive medicine detachment or section) to plan for training and operations.

3-23. These guidelines are generalized for worldwide use. Commanders of units with extensive extreme cold-weather training and specialized equipment may opt to use less conservative guidelines.

Note. Any dry clothing (mittens, scarves, or masks) or material which reduces wind exposure will help protect the covered skin.

3-24. Leaders must understand that—

- Cold injuries can and do occur in nonfreezing temperatures. Hypothermia can occur in mildly cool weather.
- Immersion syndrome (trench foot) injuries can occur at any point on the windchill chart and—
  - Are much more likely to occur than frostbite at *LITTLE DANGER* windchill temperatures, especially on extended exercises or missions and in wet environments.
  - Can lead to permanent disability, just like frostbite.

IDENTIFY SPECIAL CONSIDERATIONS

3-25. Leaders must identify special conditions that place Soldiers at high risk of cold injuries. These special considerations include—

- Previous trench foot or frostbite.
- Fatigue.
- Use of alcohol.
- Significant injuries.
- Poor nutrition.
- Use of medications that cause drowsiness.
- Little previous experience in cold weather.
- Immobilized or subject to greatly reduced activity.
- Soldiers wearing wet clothing.
- Sleep deprivation.

PLAN FOR AND ENFORCE PREVENTIVE MEASURES FOR CARBON MONOXIDE POISONING AND FIRE PREVENTION

3-26. Leaders must identify the special hazards of carbon monoxide poisoning and fire that may affect cold-weather operations and enforce preventive medicine measures to prevent carbon monoxide poisoning and fire-related injuries.

3-27. Leaders must enforce individual preventive medicine measures which include Soldiers—

- Repairing engines outside or vent engine exhaust to outside.
- Keeping sleeping areas well ventilated.
- Not using vehicle engines as heaters.
- Using and maintaining onboard ventilation systems.

PLAN FOR AND ENFORCE PREVENTIVE MEASURES FOR TOXIC INDUSTRIAL MATERIALS

3-28. Leaders must identify sources of toxic industrial materials that may be encountered in their unit area of operations. It may be necessary to request preventive medicine assistance in identifying sources.

3-29. Identify sources as follows:

- Obtain safer chemicals for unit operations, if available.
- Observe cautions and warnings posted in technical manuals dealing with solvents, corrosives, and other hazardous materials. Refer to the safety data sheets that accompany toxic materials.

3-30. Leaders ensure that Soldiers—

- Are trained and drilled to protect themselves around hydrogen chloride and M8 smoke.
- Maintain bore/gun gas evacuation systems.
- Use approved *safety* solvents.
- Have adequate clean gloves, coveralls, and other protective gear.
- Follow label instructions on chemical containers.

PLAN FOR AND ENFORCE PROTECTIVE MEASURES FOR NOISE HAZARDS

3-31. Leaders must identify noise hazards in the unit area and plan for avoidance of or protection from hazardous noise levels. If necessary, request preventive medicine assistance in identifying sources. Identify hazards as follows:

- Ensure that hearing conservation is part of the unit standard operating procedures.
- Ensure all Soldiers are medically fitted for hearing protectors and are issued multiple sets.
- Ensure all Soldiers have annual hearing test or screening.
- Control noise sources.
- Isolate by distance; that is, keep troops away from noise, if possible.
- Isolate by barrier; for example, use sandbags.
- Use organic equipment controls; for example, keep mufflers and engine covers in good repair.
- Train Soldiers to accomplish their mission while wearing hearing protectors.
- Post noise-hazard signs in noise-hazardous areas and on noise-hazardous equipment.

3-32. Leaders ensure that Soldiers—

- Wear earplugs or other hearing protective devices.
- Do not remove inserts from aircraft or tracked vehicle helmets.
- Avoid unnecessary exposure.
- Limit necessary exposure to short, infrequent, and mission-essential times.
- Clean their hearing protectors.

PLAN FOR AND ENFORCE SLEEP DISCIPLINE

3-33. Sleep is a biological need, critical for sustaining the mental abilities needed for success on the battlefield. Soldiers require seven to eight hours of good quality sleep every 24-hour period to sustain

operational readiness. Soldiers who lose sleep will accumulate a sleep debt over time that will seriously impair their performance. The only way to pay off this debt is by obtaining the needed sleep. The demanding nature of military operations often creates situations where obtaining sleep may be difficult or even impossible for more than short periods. While essential for many aspects of operational success, sheer determination or willpower cannot offset the mounting effects of inadequate sleep. This concept is applicable for all levels of military operations including basic training and in all operational environments. For this reason, sleep should be viewed as being as critical as any logistical item of resupply, like water, food, fuel, and ammunition. Commanders need to plan proactively for the allocation of adequate sleep for themselves and their subordinates.

Note. Unit sleep plans should be based on guidance provided in FM 6-22.5.

3-34. Ways to overcome performance degradation include—

- Find time for Soldiers to nap, change routines, or rotate jobs (if cross-trained) upon signs of diminished performance.
- Have those Soldiers most affected by sleep loss execute a self-paced task.
- Have the Soldiers to execute a task as a team, using the buddy system.
- Do not allow Soldiers to be awakened for meals while in flight to a new location, especially if the time zone of the destination is several hours different than that of point of departure.
- Encourage Soldiers to empty their bladder before going to bed. Awakening to urinate interrupts sleep and getting in and out of bed may disturb others and interrupt their sleep.
- Allocate sleep by priority. Leaders, on whose decisions mission success and unit survival depend, must get the highest priority and largest allocation of sleep. Second priority is given to Soldiers that have guard duty and to those whose jobs require them to perform calculations, make judgments, sustain attention, evaluate information, and perform tasks that require a degree of precision and alertness.

ENSURE WELFARE, SAFETY, AND HEALTH OF THE UNIT

3-35. Leaders can ensure the welfare, safety, and health of their Soldiers by—

- Ensuring that the best and safest water, food, equipment, shelter, sanitation, and sleep possible are provided.
- Educating Soldiers to maintain professional pride and personal caring for themselves, each other, and their equipment.
- Knowing the personal backgrounds and the military skills of your Soldiers. Chat with them informally about themselves. Be attentive and understanding while listening to Soldiers.
- Utilizing group support and counseling for Soldiers who may have problems at home.
- Assigning jobs to maintain a balance between having qualified Soldiers in key positions while sharing the load, hardship, and risks fairly.
- Using challenging and difficult environments during training to increase the unit's coping skills and confidence.

REDUCE UNCERTAINTY

3-36. Leaders can reduce uncertainty by—

- Briefing unit personnel on the situation, objectives, and conditions that the mission or environment may involve.
- Explaining reasons for hardships, delays, and changes.
- Preparing Soldiers for the worst and putting unexpected challenges or reversals in a positive perspective.

- Dealing with rumors firmly and honestly and preventing the spread of rumors.
- Making contingency plans and following standard operating procedures to reduce the effects of surprise.

PROMOTE UNIT COHESION

3-37. Leaders can promote unit cohesion by—

- Using equipment drills, physical fitness training, team sports, and field stress training to stimulate mutual reliance and closeness.
- Bringing unit members together for meals, award ceremonies, and other special occasions.
- Integrating new members by assigning sponsors and ensuring rapid familiarization.

IMPART UNIT PRIDE

3-38. Leaders can impart unit cohesion by—

- Educating Soldiers in the history and tradition of the small unit and its parent units.
- Honoring the historical examples of initiative, endurance, and resilience, of overcoming heavy odds, and of self-sacrifice.

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Appendix A

Techniques and Procedures for Disinfecting Water

WATER DISINFECTANTS USED AT UNIT LEVEL

A-1. Individual Soldiers in the field rely on the following methods to disinfect nonpotable water:

- Calcium hypochlorite.
- Water purification tablets or sachets, chlorine.
- Water purification tablets, iodine.
- Boiling.

CALCIUM HYPOCHLORITE

A-2. Calcium hypochlorite is a white granular or powdered chemical. It is supplied in six-ounce jars as a component part of the field sanitation kit. When fresh, it typically contains 68 to 70 percent by weight of available chlorine. It is commonly referred to as high-test hypochlorite. The active component in calcium hypochlorite is chlorine. The chlorine content of calcium hypochlorite is the component that attacks the cell walls of bacteria which then interrupts and prevents the cells vital functions subsequently killing the organism.

CAUTION

Calcium hypochlorite is a strong oxidizing agent. When not properly stored it can cause irritation of mucus membranes and the respiratory tract, and corrode metal. Store calcium hypochlorite according to information found on the products safety data sheet.

CHLORINATION KIT (WATER PURIFICATION)

A-3. Contents of the chlorination kit (water purification) include an emergency disinfectant mixed with a settling aid. The settling aid helps remove dirt and other suspended particles from water by flocculation and sedimentation. When available it should be used when the water being treated is cloudy or discolored and the operational situation is such that the treatment bag can remain motionless for the required settling period and can then be filtered. The treatment kit includes three packages of ten tablets each, a treatment bag, and a cloth filter. Each tablet adds eight milligrams per liter of chlorine to one quart of water. Some kits contain three packages of 10 powders, other components, and the treatment steps remain the same.

IODINE TABLETS

A-4. Iodine water purification tablets are used to disinfect water contained in small containers such as canteens, personal hydration systems, and five-gallon water cans. The tablets are composed of an iodine compound, come in bottles of 50 tablets, and are available through military supply channels. The tablets are subject to deterioration in storage. They must be inspected for signs of physical change before they are used; otherwise, they may not disinfect the water. Iodine tablets that are completely yellow or brown, that stick together, or crumble easily are no longer effective and must not be used. Iodine tablets in good condition will be steel gray in color.

BOILING

A-5. When calcium hypochlorite, water purification tablets or sachets chlorine, or iodine tablets are not available boiling the water can render it safe for drinking after bringing the water to a rolling boil for five minutes. In an emergency, boiling water for just 15 seconds will help. Boiled water must be protected from recontamination.

INDIVIDUAL WATER STORAGE SYSTEMS

A-6. Water storage containers used by small groups and individual Soldiers include—

- Five-gallon water cans, although five-gallon water cans are considered bulk storage containers they are frequently employed in a manner which will require individuals and small groups of Soldiers to be directly responsible for maintaining the quality of water contained within them.
- Canteens—come in a variety of configurations and capacities ranging from one- to two- quarts.
- Personal hydration systems—capacities range from 40- to 100-ounces.

USE CALCIUM HYPOCHLORITE TO DISINFECT WATER IN FIVE-GALLON WATER CANS

A-7. To disinfect bulk water supplies add and dissolve one heaping teaspoon of high-test hypochlorite (approximately ¼ ounce) for each two gallons of water, or five milliliters (approximately seven grams) per 7.5 liters of water. The mixture will produce a stock chlorine solution of approximately 500 milligrams per liter, since the high-test hypochlorite has available chlorine equal to 70 percent of its weight.

A-8. To disinfect water, add the chlorine solution in the ratio of one part of chlorine solution to each 100 parts of water to be treated. This is roughly equal to adding one pint (16 ounces) of stock chlorine to each 12.5 gallons of water or (approximately ½ liter to 50 liters of water) to be disinfected. To remove any objectionable chlorine odor, aerate the disinfected water by pouring it back and forth from one clean container to another.

A-9. Table A-1 contains information for use by Soldiers when determining how much chlorine is necessary to produce potable drinking water.

Table A-1. Chlorine dose calculator using five percent unscented household bleach and 70 percent high-test hypochlorite

For 5 Gallons of Water	***Chlorine dose using 5 percent liquid (unscented household) bleach***				
	1 mg/L	***2 mg/L***	***5 mg/L***	***10 mg/L***	***100 mg/L***
	6 dp	0.75 mL	1.9 mL	3.8 mL	8 tsp
	Chlorine dose using 70 percent high-test hypochlorite or solution concentrate				
	1 mg/L	***2 mg/L***	***5 mg/L***	***10 mg/L***	***100 mg/L***
	0.9 mL	1.7 mL	4.1 mL	8.3 mL	0.25 tsp

Legend:
dp drops
mg/L milligrams per liter
mL milliliters
tsp teaspoons

A-10. Table A-2 identifies equivalent volumes for use by Soldiers when determining how much disinfectant is needed to produce potable water.

Table A-2. Equivalent volumes chart

	dp	***mL***	***tsp***	***tbsp***	***oz***	***cp***	***pt***	***qt***	***L***	***gal***
dp	1	0.067	0.013	0.004	0.002					
mL	15	1	0.200	0.067	0.033	0.0042	0.0021	0.0011	0.0010	
tsp	74	5	1	0.333	0.167	0.021	0.010	0.005	0.005	0.001
tbsp	222	15	3	1	0.500	0.063	0.031	0.016	0.015	0.004
oz	444	30	6	2	1	0.125	0.063	0.031	0.030	0.008
cp	3550	237	48	16	8	1	0.500	0.250	0.240	0.063
pt	7100	473	96	32	16	2	1	0.500	0.480	0.125
qt	14200	946	192	64	32	4	2	1	0.960	0.25
L	15000	1000	203	68	34	4.2	2.1	1.06	1	0.26
gal	56775	3785	768	256	128	16	8	4	3.785	1

Legend:
cp cups
dp drops
gal gallon
L liter
mL milliliter
oz ounce
pt pint
qt quart
tbsp tablespoon
tsp teaspoon

USE CALCIUM HYPOCHLORITE TO DISINFECT WATER IN CANTEENS

A-11. The following procedures are used to purify water in a one-quart and two-quart canteen with calcium hypochlorite:

- Fill the canteen with the cleanest, clearest water available, leaving an air space of an inch or more below the neck of the canteen.
- Fill a canteen cup half full of water and add the calcium hypochlorite from one ampule, stirring with a clean utensil until this powder is dissolved.
- Fill the cap of a plastic canteen half full of the solution in the cup and add it to the water in the canteen. Then place the cap on the canteen and shake it thoroughly.
- Loosen the cap slightly and invert the canteen, letting the treated water leak onto the threads around the neck of the canteen.
- Tighten the cap on the canteen and wait at least 30 minutes before using the water for any purpose.

Note. When disinfecting two-quart canteens double the calcium hypochlorite used to disinfect a one-quart canteen.

USE THE CHLORINATION KIT (WATER PURIFICATION) TO DISINFECT WATER

A-12. The chlorination kit (water purification) contains an emergency disinfectant mixed with a settling aid that helps remove dirt and other suspended particles from water by flocculation and sedimentation. If it is available, it should be used when the water to be treated is cloudy or discolored and the operational situation is such that the treatment bag can remain motionless for the required settling period and can then be filtered. The treatment kit includes three packages of ten tablets each, a treatment bag, and a cloth filter. Each tablet adds eight milligrams per liter of chlorine to one quart of water. Some kits contain three packages of 10 powder sachets in place of the packages of tablets. All other components and the treatment steps remain the same.

A-13. When using the chlorination kit (water purification) to disinfect an individual water supply use the kit in accordance with the manufacturer's instructions to effectively treat the water. To use the chlorination (water purification) with the provided water treatment bags follow the instructions in Table A-3.

Table A-3. Instructions for using the chlorination kit (water purification)

Instructions for using the chlorination kit (water purification) for bulk water container systems	
Step 1	Add one quart of water to the water treatment bag (provided in the kit). The bag will be about half full. A different clean container can be used if the water treatment bag is not available.
Step 2	Using the guide provided in the instructions and shown in the legend below, add one or two tablets/powder sachets to the water in the bag.
Step 3	Fold the bag top tightly three times and fold the tabs in.
Step 4	Shake the bag for about 1 minute or until the tablet(s) or powder dissolves completely.
Step 5	Let the bag sit for 3 minutes.
Step 6	Swirl the water in the bag for 30 seconds.
Step 7	Let the bag sit for either 7 or 15 minutes based on the water temperature, as described in the instructions and shown in the legend below.
Step 8	If the water is still cloudy, add an additional half tablet or one-half powder sachet and repeat beginning with Step 4.
Step 9	Being careful not to disturb the settled material, pour the clear water above the settled material through the cloth filter (provided in the kit) into a clean canteen or other container. Avoid pouring settled material onto the filter cloth. Do not drink the water from the treatment bag without filtering it. If the filter cloth from the kit is unavailable, a clean cotton T-shirt can be used.
Step 10	Rinse the filter and treatment bag with treated water so they can be reused. Always filter the water through the same side of the filter cloth.
Instructions for using the chlorination kit (water purification) for hydration system reservoirs	
Step 1	Personal hydration systems require additional tablets/powder sachets based on the volume of water they hold. When using 70- and 72-ounce (two liter) reservoirs double the number of tablets described in the instructions, and when using 100- and 102-ounce (three liter) reservoirs triple the number of tablets/sachets.
Step 2	Fill a separate clean container with the amount of water to be treated.
Step 3	Follow directions outlined in Steps 2 through 9 (above), and add the treated water to the hydration system.
Note: The chlorination kit (water purification) should not be used in the reservoir itself, skipping the filtration step, because of the location of the drinking tube at the bottom of the reservoir. This is where all the flocculent will settle which greatly affects the quality of the water drawn into the straw during consumption.	

A-14. Table A-4 identifies the number of tablets or powder sachets that are required to purify a specific volume of water within a given temperature range.

Table A-4. Chlorination kit (water purification) tablet or powder sachet addition instructions

Water temperature	*Number of tablets/powder sachets per volume*			*Waiting period time for Step 7*
	1 quart (1 liter)	*70 ounces (2 liter) bladder*	*100 ounces (3 liter)*	
77°F (25°C)	1	2	3	7
58°F (15°C)	1	2	3	15
50°F (10°C)	1	2	3	15
41°F (5°C)	2	4	6	15

Legend:
°C degrees Celsius
°F degrees Fahrenheit

USE IODINE TABLETS TO DISINFECT WATER

A-15. Iodine water purification tablets are intended to disinfect water contained in small containers such as canteens, personal hydration systems, and five-gallon water cans. The tablets are composed of an iodine compound and are available through the Army supply system in bottles of 50 tablets. The tablets are subject to deterioration in storage. They must be inspected for signs of physical change before they are used; otherwise, they may not disinfect the water. Iodine tablets that are completely yellow or brown, that stick together, or crumble easily are no longer effective and must not be used. Iodine tablets in good condition will be steel gray in color.

A-16. The information contained in paragraphs A-18 through A-20 provides specific instructions for Soldiers using iodine tablets to purify water contained in five-gallon cans, personal hydration systems, and one- and two-quart canteens.

USE IODINE TABLETS TO DISINFECT WATER IN FIVE-GALLON WATER CANS

A-17. Steps used to disinfect water in a five-gallon water can using iodine tablets are as follows:

- Fill a five-gallon container with the cleanest, clearest water available.
- Dissolve 40 iodine tablets in a canteen cup full of water to disinfect any type of water.
- Add this solution to the five-gallon container of water and agitate the solution.
- Place the cap on the container loosely. Wait five minutes and then agitate the container vigorously to allow leakage to rinse the threads around the neck of the can.
- Tighten the cap and wait an additional 25 minutes before using the water for any purpose.

USE IODINE TABLETS TO DISINFECT WATER IN PERSONAL HYDRATION SYSTEMS

A-18. Steps used to disinfect water in a personal hydration system using iodine tablets are as follows:

- Use two iodine tablets for 40-ounce water reservoirs, four iodine tablets for 70- or 72-ounce water reservoirs, and six tablets for 100- or 102-ounce reservoirs.
- Allow 30 minutes of contact time before consuming the water.
- If the water to be treated is cloudy or discolored, double the iodine dosage or use the chlorination kit (water purification) in a separate container.

USE IODINE TABLETS TO DISINFECT WATER IN CANTEENS

A-19. Steps used to disinfect water in a canteen using iodine tablets are as follows:

- Fill the canteen with the cleanest, clearest water available.
- Add two iodine tablets to each one-quart canteen full of water, or four tablets to each two-quart canteen. A two percent solution of tincture of iodine may be used in place of iodine tablets.

Note. Five drops of two percent iodine liquid are equivalent to one iodine tablet.

- Put the cap on the canteen. Shake the canteen to dissolve tablets.
- Wait five minutes, then loosen the cap and tip the canteen over to allow leakage around the canteen threads.
- Tighten the cap and wait an additional 25 minutes before drinking.

CLEANING AND SANITIZING INDIVIDUAL WATER STORAGE SYSTEMS

A-20. Regular maintenance of individual water storage systems is necessary to maintain the equipment and prevent illness from water that may have become contaminated by being stored in unclean individual water storage systems.

A-21. The first step to clean five-gallon water cans is to refer to TM 10-7200-200-13, then follow this preventive maintenance plan—

- Visually inspect the can and the cap frequently while in use. After coming out of the field, look them over again. Look for leaks, scratches, or other damage. Check inside the can and cap to make sure they are clean.
- Clean the cans when they are dirty by washing them inside and out to include the cap. Use one ounce of an approved detergent for each gallon of hot water. Keep the water temperature below 180 degrees Fahrenheit. Water that is hotter will warp the plastic can. Wash with a clean cloth, sponge, or fiber brush.

Note. Do not use abrasives like scouring powder, steel wool, and metal sponges. They will scratch the can's surface and make it harder to clean in the future.

- Add one-gallon of the soap solution. Shake the can vigorously for one minute and then drain the solution. Drain some of the cleaning solution through the spigot to clean it.
- Rinse the can at least twice with warm water to remove the soap solution. Rinse clean water through the spigot to remove residual detergent.
- Sanitize the can prior to filling it with potable water.

CLEANING AND SANITIZING PERSONAL HYDRATION SYSTEMS

A-22. The best way to care for the personal hydration system reservoir is to thoroughly clean and dry it after each use, especially if it has been filled with anything other than water. Failure to routinely clean the hydration system may result in mold or discoloration of the components. If this happens the system can be thoroughly cleaned and put back into service.

CLEANING AND SANITIZING THE HYDRATION SYSTEM RESERVOIR

A-23. The hydration system reservoir should be cleaned by—

- Removing the reservoir (water bladder) from the pack.
- Cleaning the reservoir with mild soap and hot water by scrubbing the inside with a bottlebrush.
- Air drying the reservoir by leaving the top opened.

- Filling the reservoir with water and adding two teaspoons of baking soda to remove odors. Let it sit overnight. Rinse thoroughly and air dry.
- Sanitizing the reservoir with water and two teaspoons of liquid (unscented) bleach. Let it sit for 30 minutes.
- Rinse thoroughly and air dry. Run the water and bleach cleaning solution through the tube and scrub it with a long pipe cleaner, a flexible wire covered with cloth, or one of the specially made brushes. Be careful not to puncture the tube.
- Machine washing the pack in cold water with a mild detergent, and letting it air dry. Soldiers may also hand wash the pack in a field environment.
- Drying the pack thoroughly and completely before storing. This is the safest way to store the pack.

CLEANING AND SANITIZING THE RESERVOIR BITE VALVE

A-24. Another source of potential contamination if not properly cleaned is the delivery tube and bite valve. To properly clean the tube and valve follow these steps:

- First, pull the valve off of the tube end. Alternatively, if Soldiers just want to clean debris out of the diaphragm core, the valve body may be left on the tube's end.
- Second, grasp the rib at the valve's face and roll it backwards. This exposes the core piece with the slit opening.
- Third, pull the core off of the ribbed post. Then clean the valve parts with a cotton swab or toothbrush and some soapy water.
- Finish by rinsing all parts thoroughly and repositioning the valve core on the center post of the valve body. Then roll the outer sleeve forward again to complete the job.

Glossary

The glossary lists acronyms and terms with Army or joint definitions. This publication is not the proponent for any terms.

SECTION I – ACRONYMS AND ABBREVIATIONS

ATP	Army techniques publication
ATTP	Army tactics, techniques, and procedures
DNBI	disease and nonbattle injury
DOD	Department of Defense
FM	field manual
JBSA	Joint Base San Antonio
MCRP	Marine Corps reference publication
TC	training circular
U.S.	United States

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None.

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TC 4-02.3
6 May 2015

By Order of the Secretary of the Army

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General, United States Army
Chief of Staff

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FM 21-10
MCRP 4-11.1D

FIELD HYGIENE AND SANITATION

HEADQUARTERS, DEPARTMENT OF THE ARMY
AND COMMANDANT, MARINE CORPS

DISTRIBUTION RESTRICTION: Approved for public release; distribution is unlimited.

FM 21-10*
MCRP 4-11.1D

HEADQUARTERS
DEPARTMENT OF THE ARMY
AND COMMANDANT, MARINE CORPS
Washington, DC, 21 June 2000

FIELD HYGIENE AND SANITATION

TABLE OF CONTENTS

*This publication supersedes FM 21-10, 22 November 1988.

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PREFACE

The purpose of this publication is to assist individual service members, unit commanders, unit leaders, and field sanitation teams (FSTs) in preventing disease and nonbattle injury (DNBI). The publication provides information on preventive medicine measures (PMM)

for the individual service member as well as essential information for the unit commander, unit leaders, and the FST on applying unit-level PMM.

When a problem exists beyond unit capabilities, the brigade or division preventive medicine (PVNTMED) section or corps PVNTMED detachments should be called upon to assist in countering the threat.

The use of trade names or trademarks does not constitute endorsement by the Department of Defense (DOD).

Unless this publication states otherwise, masculine nouns and pronouns do not refer exclusively to men.

The proponent of this publication is the United States (US) Army Medical Department Center and School. Submit changes for improving this publication on Department of the Army (DA) Form 2028 and forward it directly to **Commander, US Army Medical Department Center and School, ATTN: MCCS-FCD-L, 1400 East Grayson Street, Fort Sam Houston, Texas 78234-6175.**

CHAPTER 1

INTRODUCTION TO THE MEDICAL THREAT

Section I. MESSAGE TO THE UNIT COMMANDER

DISEASE AND NONBATTLE INJURY

A DNBI casualty can be defined as a military person who is lost to an organization by reason of disease or injury, and who is not a battle casualty. This definition includes persons who are dying of disease or injury due to accidents directly related to the operation or mission to which they were deployed. The acronym, DNBI, does not include service members missing involuntarily because of enemy action or being interned by the enemy (as a prisoner of war). The total number of DNBI casualties is evaluated to identify DNBI rates per number of service members in an operation. The DNBI rates are critical in evaluating the effectiveness of PVNTMED missions within the area of operations (AO) and in determining the health of a force within an operation.

Historically, in every conflict the US has been involved in, only 20 percent of all hospital admissions have been from combat injuries. The other 80 percent have been from DNBI. Excluded from these figures are vast numbers of service members with decreased combat effectiveness due to DNBI not serious enough for hospital admission.

Preventive medicine measures are simple, common sense actions that any service member can perform and every leader must know. The application of PMM can significantly reduce time loss due to DNBI.

How Much Time Does Your Unit Spend Training Service Members on—
Disease and Nonbattle Injury Prevention?
Combat Injury Prevention?

YOUR RESPONSIBILITY

You are responsible for all aspects of health and sanitation of your command. Only you can make command decisions concerning the health of your unit in consideration of the—

- Mission.
- Medical threat.
- Condition of troops.

DO NOT LET THIS HAPPEN TO YOU

Togatabu Island, 1942: The 134th Artillery and the 404th Engineer Battalions were part of a task force preparing to attack Guadalcanal. Fifty-five percent of the engineers and sixty-five

percent of the artillerymen contracted a disease called *filariasis* transmitted by mosquitoes. Both units had to be replaced (medically evacuated) without seeing any enemy action because they were not combat ready. The use of insect repellents and insecticides and the elimination of standing water would have prevented this.

Merrill's Marauders: Disease was an important detractor to this famous unit. The medical threat faced by the Marauders in the jungles of Burma was great. Everyone was sick, but some had to stay and fight. Evacuation was limited to those with high fever and severe illness. One entire platoon cut the seats from their pants because severe diarrhea had to be relieved during gunfights. After a bold and successful attack on a major airfield, Merrill's Marauders were so decimated by disease that they were disbanded.

Section II. THE MEDICAL THREAT AND PRINCIPLES OF PREVENTIVE MEDICINE MEASURES

The medical threat is—

- Heat.
- Cold.
- Arthropods and other animals.

- Food- and waterborne diseases.
- Toxic industrial chemicals/materials.
- Noise.
- Nonbattle injury.
- The unfit service member.

PRINCIPLES OF PREVENTIVE MEDICINE MEASURES

- Service members perform individual techniques of PMM.
- Chain of command plans for and enforces PMM.
- Field sanitation teams train service members in PMM and advise the commander and unit leaders on implementation of unit-level PMM.

Failure to Apply the Principles of PMM Can Result in Mission Failure.

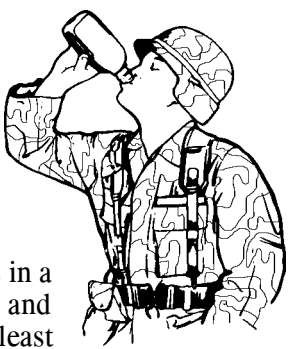
CHAPTER 2

INDIVIDUAL PREVENTIVE MEDICINE MEASURES

Section I. HEAT INJURIES

OVERVIEW

Heat injuries can occur anywhere, depending on physical activity (work rate) and clothing worn. However, they occur most frequently during warm-weather training, exposure to high climatic temperatures, high humidity, and bright sunlight. These conditions make it difficult for the body to regulate its temperature. Hot weather also increases daily water requirements, because body water is lost as sweat. Dehydration leads to added heat stress, increased susceptibility to heat injury, reduced work performance, and degraded mission capability.



ACCLIMATIZATION

When the mission permits, all personnel should work and exercise in a manner so that they gradually become acclimatized to the heat and humidity in the AO. Significant heat acclimatization requires at least

3 to 5 days and full acclimatization can take up to 2 weeks. Exercising in the heat and humidity for 1 to 2 hours daily, gradually increasing the workload each day, can produce acclimatization. (Refer to Table 3-1 in Chapter 3.) When the mission does not permit time for gradual increases in workload, then leaders and buddies must observe each other and ensure that everyone drinks plenty of water during each work period. Individuals leaving a cold or cool climate will require additional time to become acclimatized to a hot climate.

DRINK PLENTY OF WATER

Depending on the heat and activity level, you may need to drink from 1/2 to 1 1/4 quarts of water per hour—*3 gallons/12 liters per day in hot, dry climates*. **Drinking water is a must in order to prevent heat injury.** If desired, individuals may add flavoring to the water to enhance consumption. Field rations/meal(s), ready to eat (MRE) have flavoring for water in each meal. It the flavoring is used, add it to water in your canteen cup. **Do not** add flavoring to the water in your canteen; it increases the risk of contamination and illness. Never flavor the bulk source water supply. (Flavoring the bulk source water supply will reduce the action of water disinfectants.) See Table 3-1 for water intake requirements.

- Drink extra water **before** starting any mission or hard work. Cool water (60° to 70° Fahrenheit [F]) is absorbed faster than cold water.
- Drink small quantities of cool fluids frequently. Carbohydrate/electrolyte beverages (sport drinks) may provide supplemental nutrients under conditions of extreme calorie and water requirements; such as extremely vigorous activity. However, they cannot replace and must not be used to meet all water requirements.

- Drink "non-caffeinated" fluids even if you are not thirsty. (Caffeine increases water requirements in all environments.)

- Refill your canteens at every opportunity, using only treated water, if possible.

NOTE

The color and volume of the urine steam are good indicators of a service member's hydration status. If your urine stream is **dark yellow** and the volume is small, or if you are constipated and experience hard stools, you may not be drinking enough water. Maintain a urine stream that is **clear or light yellow**. Thirst is not a good indicator of dehydration during physical activity.

USE WORK/REST CYCLES

- Work and rest as your leader directs. (See Table 3-1.) A rest period helps prevent dangerous increases in body temperatures by minimizing heat production.

- Work and rest in the shade, if possible.

EAT ALL MEALS TO REPLACE SALTS

Eating all meals in the field will usually provide the body's requirements for salts. Field rations/MRE meet the daily requirements for minerals and electrolytes (sodium). **DO NOT take extra salt in meals** unless medically indicated.

NOTE

DO NOT TAKE SALT TABLETS. One salt tablet increases your water requirement by at least a pint. Salt draws water from muscles to dilute your blood. Salt tablets can cause vomiting.

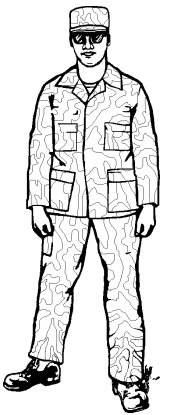
RECOGNIZE THE RISK OF MISSION-ORIENTED PROTECTIVE POSTURE/BODY ARMOR/ARMORED VEHICLES

- Mission-oriented protective posture (MOPP)/body armor increases your heat stress. (See Table 3-1.) You must—
  - Drink more water. **DO NOT** EXCEED 1¼ QUARTS PER HOUR.
  - Work and rest as your leader directs.

- You may be at a greater risk of heat injuries when in armored vehicles—you may need to drink more water.

MODIFY YOUR UNIFORM

When directed/authorized by your commander to reduce heat stress and to protect against ultraviolet (UV) radiation, you should—



- Unblouse pants from boots.
- Cover all skin exposed to sun; wear sunscreen and lip balm with a sun protection factor of 15 or higher.
- Protect the eyes from UV with UV-protective sunglasses, especially wraparound sunglasses.
- Seek shade when resting outdoors.
- Keep clothing loose at the neck, wrists, and lower legs.

NOTE

When the threat from biting arthropods is high, keep your shirtsleeves rolled down and pants bloused in boots.

NOTE

See Graphic Training Aid (GTA) 8-5-50 and FM 21-11, for information on heat injury prevention and first aid.

Section II. COLD INJURIES

OVERVIEW

Cold injuries are most likely to occur when an unprepared individual is exposed to winter temperatures. They can even occur with the proper planning and equipment. The cold weather and the type of operation in which the individual is involved impact on whether a service member is likely to be injured and to what extent. The service member's clothing, physical condition, and mental makeup are also determining factors. Well-disciplined and well-trained service members can be protected, even in the most adverse conditions. Service members and their leaders must know the hazards of exposure to the cold. They must know the importance of personal hygiene, exercise, care of the feet and hands, and the use of protective clothing. Cold injuries may be divided into "freezing and nonfreezing" types. A freezing type is frostbite. The nonfreezing types are chilblains, trench foot, and immersion foot. (See FM 21-11.)

- Frostbite can occur when the temperature is at or near freezing or colder. Frostbite can also occur when the skin is exposed to winds of less than five miles per hour and actual temperature readings of 30° F.

- Trench foot (and immersion foot) results from prolonged exposure to a wet, cold condition, or the outright immersion of the feet in water with a temperature usually below 50° F.
- At the upper range of temperatures, exposure of 12 hours or more will cause injury. Shorter duration at or near 32° F will cause the same injury.
- A trench foot injury is usually associated with immobilization of the feet.

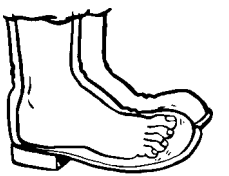
WEAR UNIFORM PROPERLY

- Wear the clothing your commander and leaders direct.
- Wear clothing in loose layers (top and bottom). Avoid tight clothing, including tight underwear.
- Keep clothing clean and dry. Remove or loosen excess clothing when working or in heated areas to prevent sweating.
- Wear headgear to prevent body heat loss. The body loses large amounts of heat through the head.
- Avoid spilling fuel or other liquids on clothing or skin. Evaporating liquids increase heat loss and cool the skin. Also, liquid stains on clothing will reduce the clothing's protective effects.

- Change wet/damp clothes as soon as possible. Wet/damp clothing pulls heat from body.

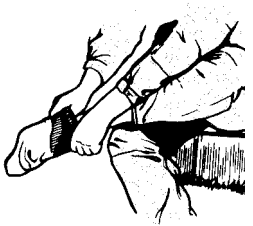
KEEP YOUR BODY WARM

- Keep moving, if possible.
- Exercise your big muscles (arms, shoulders, trunk, and legs) frequently to keep warm.
- If you must remain in a small area, exercise your toes, feet, fingers, and hands.



- Avoid the use of alcohol as it makes your body lose heat faster.
- Avoid standing directly on cold, wet ground, when possible.
- Avoid tobacco products. The use of tobacco products decreases blood flow to your skin.
- Eat all meals to maintain energy.
- Drink plenty of water and/or warm nonalcoholic fluids. Dark yellow urine means you are not drinking enough fluids! You can dehydrate in cold climates too!
- Buddies should monitor each other for cold weather injury.

PROTECT YOUR FEET



- Bring several pairs of issue boot socks with you.
- Keep socks clean and dry. Change wet or damp socks as soon as possible. Socks can become wet from sweating. Apply foot powder on feet and in boots when changing socks.
- Wash your feet daily, if possible.
- Avoid tight socks and boots (completely lace boots up as loosely as possible).
- Wear overshoes to keep boots dry.

NOTE

A decrease in physical activity reduces the exposure **time necessary to produce injury.** In all types of footgear, feet perspire more and are generally less well ventilated than other parts of the body. Moisture accumulates in socks, decreasing their insulating quality. The feet are susceptible to cold injury and are less frequently observed than the remainder of the body.

PROTECT YOUR HANDS

- Wear gloves with inserts, or mittens with inserts.

- Warm hands under clothing if they become numb.
- Avoid skin contact with snow, fuel, or bare metal.
- Waterproof gloves by treating with waterproofing compounds, such as snow seal.

PROTECT YOUR FACE AND EARS

- Cover your face and ears with a scarf or other material, if available.
- Wear your insulated cap with flaps down or wear a balaclava and secure under your chin.
- Warm your face and ears by covering them with your hands. **Do not rub face** and ears.
- Do not use face camouflage when windchill is -10° F or below; prevents detection of cold weather injury (frostbite).

NOTE

Rubbing cold extremities can be potentially harmful. Frostbitten areas that are rubbed can cause additional injury to the affected areas.

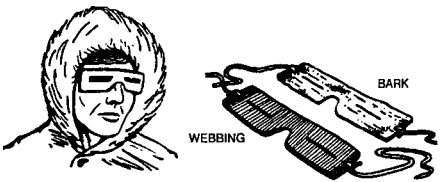
- Wear sunscreen. Solar UV exposure is doubled when you are surrounded by snow.
- Exercise facial muscles.

PROTECT YOUR EYES

- Wear sunglasses (or goggles) (Sun, Wind, and Dust, National Stock Number [NSN] 8465-01-004-2893) to prevent snow blindness (gray lens insert for above system is NSN 8465-01-004-2891).

- Wear Spectacles, Protective, Laser-Ballistic, NSN 8465-01-416-4626, or Special Protective Eyewear, Cylindrical System, NSN 8465-01-416-4626.

- Improvised sunglasses (slit goggles), if actual sunglasses are not available, can be made from the field rations/MRE cardboard box or other opaque material.



PROTECT YOUR BUDDY

- Watch for signs of frostbite on the service member's exposed skin. The affected skin will appear as pale/ gray/waxy areas (it may be hard to see these changes in poor lighting or on service members with dark skin).

- Ask the service member if his feet, hands, ears, or face are numb and need rewarming.

- **DO NOT** allow the service member to sleep directly on the ground.
- To prevent carbon monoxide poisoning—
  - **DO NOT** let the service member sleep in or near the exhaust of a vehicle with the engine running.
  - **DO NOT** let the service member sleep in an enclosed area where an open fire is burning

NOTE

Service members may check circulation in the fingers and the toes by pinching the nail beds and checking how fast the color returns in the beds under the nails. The slower the return to a natural color, the more serious the potential for frostbite on the fingers and the toes.

NOTE

See GTA 8-6-12 and FM 21-11 for information on cold injury first aid procedures. During extended activities in a cold environment, warming areas should be provided; for example, a service member performing guard duty.

Section III. ARTHROPODS AND OTHER ANIMALS OF MEDICAL IMPORTANCE

OVERVIEW

Poor sanitation and improper waste disposal under wartime conditions greatly increase the disease vector potential of such common pests as filth flies and rodents. Even in mobile field situations these "camp followers" have historically amplified sanitation problems, often resulting in epidemics of diarrheal diseases that have caused many casualties. This threat is even greater in urban areas converted to temporary or semipermanent military use. A dangerous temptation in field training or in deployment operations is to ignore the field sanitation standards. Some people think, "The rules don't apply here." Yielding to that temptation can cost your health and the health of those around you. There is no excuse for forgetting to bring protective equipment or failing to use it. Be sure to follow all safety precautions on all labels of the pesticides that you use. They are there for a reason—to protect your health.

USE THE DEPARTMENT OF DEFENSE INSECT/ARTHROPOD REPELLENTS

The concurrent use of a skin insect repellent (N, N-diethyl-M-toluamide [DEET], NSN 6840-01-284-3982) and a clothing insect repellent (permethrin [NSN 6840-01-278-1336 and 6840-01-345-0237]) is necessary to obtain maximum protection against insects/arthropods.

APPLY N, N-DIETHYL-M-TOLUAMIDE

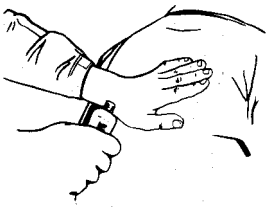
- Apply DEET insect repellent to all exposed skin.
- Follow label directions.
- Apply a light, even coating to exposed skin, not under clothing.
- **DO NOT** apply to the eyes and lips, or to damaged skin.
- One application may last 8 to 12 hours; if you receive bites, reapply a light uniform coating of repellent.
- Application of DEET can be safely used with camouflage face paint. Apply a thin layer of DEET first, then apply face paint.

NOTE

Reapplication of DEET may be necessary (check container label) due to heavy sweating, or after river-crossing operations, exposure to rain, or in locations where arthropod density is very high.

APPLY PERMETHRIN CLOTHING REPELLENTS TO FIELD UNIFORMS/ SLEEPING EQUIPMENT

- Permethrin is the most effective clothing repellent available.
- Treat military field uniforms, including Nomex®/Kevlar uniforms, tent liners, ground cloths, and bed nets with permethrin. This should be done before wearing in field training or military operations. **Follow label instructions when applying to clothing**.



- Permethrin will remain in the material after repeated washings.
- Treated uniforms can be safely worn in the rain or when crossing rivers or streams.

NOTE

Permethrin does not rinse out in cold water (or rain or streams).

- **DO NOT** apply directly to skin, to underwear, or to cap.
- **DO NOT** wear treated uniforms unless they are first thoroughly dried after treating.
- **Apply permethrin outdoors or in well-ventilated areas only.**

- Wear uniform as your commander directs.
- Wear a loose fitting uniform, not tightly tailored, to prevent arthropods from biting through the fabric; repair tears/holes.
- When the arthropod threat is high—
  - Blouse pants in boots and completely lace boots.
  - Tuck undershirt in at waist.
  - Wear sleeves down.
  - Button blouse/shirt at the neck and wrist.
  - Do not use aftershave lotion, cologne, or perfumed deodorants or soaps in the field; they attract arthropods.
  - Wear headgear (cap, helmet, arthropod head net) when necessary to protect your head.

KEEP YOUR BODY AND UNIFORM CLEAN

- Bathe every day if possible, or at least once a week. Good personal hygiene practices reduce infestation of insects such as body lice and mites.

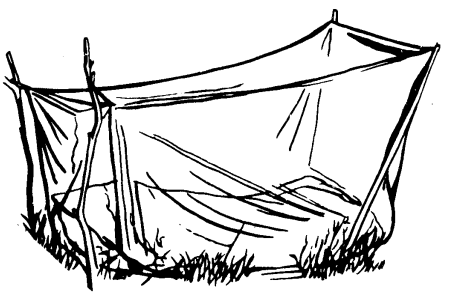
- Wash your uniform frequently (a minimum of every 7 days) to remove arthropods and their eggs which may be attached to the uniform. If the situation permits, use the quartermaster laundry; otherwise, use a stream, lake, or washbasin. Air-dry uniforms, especially underwear and socks, if possible.

FOLLOW MEDICAL ADVICE

- Take medications that help prevent diseases (such as anti-malaria pills) when directed by your commander.
- Use medications, such as cream/shampoo, when prescribed by medical personnel for treatment of lice, chiggers, poison ivy, and so forth.

PROTECT YOURSELF AT NIGHT

- Ensure your bed net is in good repair.
- Use your bed net when sleeping.
- Tuck net under sleeping pad or sleeping bag so there are no openings.



- Follow the label directions and precautions when using DOD-approved insect spray (for example, Insecticide, Aerosol d-PHENOTHRIN, 2%) if insects are present inside the bed net (and inside closed tent). Allow vapors to disperse for 10 minutes before entering the enclosure.

- Treat bed net with permethrin for added protection.

- Repair holes in your bed net. Generously apply DEET skin repellent to those areas likely to touch the insect net during sleep (knees, hands, elbows, and feet) to prevent bites through holes in the fabric.

PROTECT YOURSELF FROM OTHER MEDICALLY IMPORTANT ARTHROPODS AND ANIMALS

Spiders, Scorpions, and Centipedes—

- Remove spiders from tents or buildings.

- Shake out and inspect clothing, shoes, and bedding before use.

- Eliminate collections of papers, unused boxes, scrap lumber, and metal.

- Thoroughly clean beneath and behind large items; spiders and scorpions may be resting in these areas.

- Check field latrines before use; run a small stick under the rim of the latrine hole to dislodge any spiders or scorpions there. Spiders and scorpions may rest under toilet seat or inside latrine box.
- Wear gloves when handling paper, cloth, lumber, or other items that have been stored for long periods.
- Check around rocks and logs before resting against them.
- Use a long-handled tool or stick to turn over debris before removing it.
- Remove accumulations of boards, rocks, and other debris to eliminate the resting/ hiding areas of spiders and scorpions.
- Wear leather gloves to remove rocks, lumber, and such from the ground.

NOTE

In many locations worldwide, centipedes are more of a problem than scorpions, but the PMM are the same for both pests.

Snakes—

- Do not handle, play with, or disturb snakes or other wildlife.

- Avoid swimming in areas where snakes abound.
- Keep hands off rock ledges where snakes may be hiding or sunning.
- Look over the area before sitting down, especially if in deep grass or among rocks.
- If snakes are known to inhabit the area, sleep off the ground, if possible.
- If military situation permits, avoid walking about an area during the period from dusk to complete daylight, as many snakes are active during this period.
- Avoid camping near piles of brush, rocks, or other debris.
- Never step over large rocks or logs without first checking to see what is on the other side.
- Turn rocks and logs toward you when they have to be removed so you will be shielded should snakes be beneath them.
- Handle freshly killed snakes only with a long-handled tool or stick; snakes can inflict fatal bites by reflex action after their death.

NOTE

If bitten, try to kill the snake and bring its head with you to the medical treatment facility. If you cannot bring the snake's head with you, get an accurate description of the snake to assist medical personnel in treating you. **DO NOT panic**!

DOMESTIC AND WILD ANIMALS OR BIRDS

- **Do not** handle or approach so-called "pets."
- Exclude such animals from your work and living areas, unless cleared by veterinary personnel.
- **Do not** collect or support (feed or shelter) stray or domestic animals/birds in the unit area, unless cleared by veterinary personnel.

Section IV. POISONOUS PLANTS AND TOXIC FRUITS

OVERVIEW

Many poisonous plants have thorns that can puncture the skin, introduce poison into the skin, or cause infection. (See FM 21-76.) Clothing can serve as a protective barrier for

the skin. Clothing can also be a source of exposure if it is not properly cleaned after contact with poisonous plants. Toxic fruits can also cause significant harm to service members, ranging from minor wounds to rapidly fatal poisoning. The threat is magnified for US military personnel who may be unfamiliar with native species and unaware of these poisonous plants and toxic fruits.

- Avoid contact with poisonous plants by properly wearing the uniform.
- Avoid areas where poisonous plants grow.
- Only eat plants or parts of plants that have been approved. If you do not know, **DO NOT** eat it.
- **DO NOT** put grasses or woody twigs or stems in your mouth; they may be poisonous.

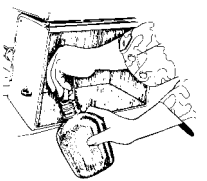
Section V. FOOD-/WATER-/WASTEBORNE DISEASE/ILLNESS

OVERVIEW

Prior to deployment, the key to preventing illnesses and diseases from consumption of food and water is following the strict guidelines and procedures established by PVNTMED. During deployments, apply individual PMM. Infectious diarrhea results from contamination of water and food by bacteria, viruses, and parasites. Water- and foodborne

diarrheal diseases are of particular concern to the military because they can be spread to large numbers of service members simultaneously with disastrous consequences for combat readiness. Parasites (amoebas, Giardia, and tapeworms) consumed in water or undercooked food, especially meat and fish, can cause prolonged illness. Diarrhea, especially when vomiting or fever is present, can cause dehydration.

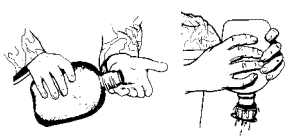
WATER



Fill your canteen with treated water at every chance. When treated water is not available, you must disinfect the water in your canteen using one of the following methods.

Preferred method—iodine tablets:

- Fill your canteen with the cleanest water available.
- Put two iodine tablets in the canteen of water. Double these amounts in the 2-quart canteen.
- Place cap on canteen. Shake canteen to dissolve tablets. Wait 5 minutes. Loosen the cap and tip the canteen over to allow leakage around the canteen threads. Tighten the cap and wait an additional 25 minutes before drinking.



Alternate methods—

Chlorine Ampules:

- Fill your canteen with the cleanest water available.
- Mix one ampule of chlorine with one-half canteen cup of water; stir the mixture with a clean device until contents are fully dissolved.
- Pour one canteen capful of the above solution into your canteen of water.
- Place the cap on your canteen and shake. Slightly loosen the cap and tip the canteen over to allow leakage around threads. Tighten cap and wait 30 minutes before drinking.
- If the nuclear, biological, and chemical (NBC) canteen cap is used, then use two caps of the solution.

NOTE

By wearing gloves or wrapping the ampule in paper or cloth, you can avoid cutting your hands when breaking open the glass ampule.

Emergency Water Treatment Kit (CHLOR-FLOC® Tablets):

- Tear off the top of the plastic water treatment bag at the perforation (first time use).

- Fill the treatment bag one-half full with the cleanest water available; add 1 tablet.
- Fold bag tightly three times and fold tabs in.
- Hold bag firmly and shake until tablet dissolves. Swirl 10 seconds. Let the bag sit for 4 minutes. Swirl again for 10 seconds.
- Let bag sit for an additional 15 minutes.
- Insert filter pouch in neck of canteen. Pour water from bag through the filter into the canteen. Avoid pouring sediment into the filter.
- Rinse the filter with treated water after use. Always filter through the same side of the filter.
- Rinse sediment from treatment bag. Save bag for water treatment only.

CAUTION

Do not drink from the treatment bag! The water is still contaminated and must be filtered before drinking. Not filtering may cause stomach and intestinal disorders.

Household Bleach:

NOTE

Ensure bleach is unscented. (To check for chlorine residual, see Tasks 7 and 8, Appendix A.)

- Fill your canteen with the cleanest water possible.
- Read the label on the bleach bottle to determine amount of available chlorine. Liquid chlorine laundry bleach usually has about 5 to 6 percent available chlorine. Based upon the strength of the household bleach, add the chlorine to the canteen as directed in Table 2-1.

Table 2-1. Drops of Household Bleach to be Added to a One-Quart Canteen

AVAILABLE CHLORINE	CLEAR WATER	COLD OR CLOUDY WATER
1 PERCENT	10	20
4—6 PERCENT	2	4
7—10 PERCENT	1	2

- Place the cap on your canteen and shake. Slightly loosen the cap and tip the canteen over to allow leakage around threads. Tighten the cap and wait 30 minutes before drinking the water.

BOILING

- When chlorine or iodine is not available, bring water to a rolling boil for 5 minutes.
- In an emergency, boiling water for just 15 seconds will help. Boiled water must be protected from recontamination.

> **CAUTION**
>
> If water is suspected of NBC contamination, do not attempt to treat. Seek a quartermaster water supply.

FOOD

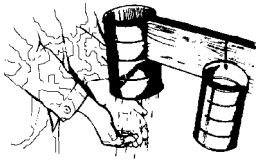
- Do not buy foods, drinks, or ice from civilian vendors unless approved by veterinary personnel or PVNTMED personnel.

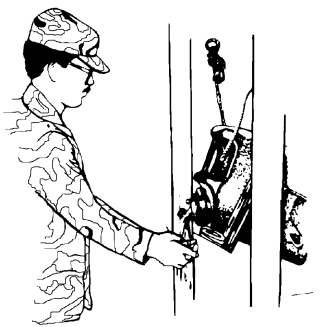
CAUTION

Obtain food from approved sources ONLY.

- In emergency situations, choose low-risk foods such as baked goods (breads) and thick-skinned fruits that you can peel before eating. Eat only fruits and vegetables that grow above the ground.
- When eating in local establishments or from approved vendors, only eat hot food entrees or raw foods that you can wash and peel prior to eating.
- Inspect all cans and food packets prior to use. Discard all cans with leaks or bulges. Discard food packets with visible holes or obvious signs of deterioration.
- Do not eat foods or drink beverages that have been prepared in galvanized containers (*zinc poisoning*). Canned, bottled, or vacuum-packed products should draw in air when opened (suction/hissing sound). If no sound is heard, or if there are any off-odors, colors, or foaming (except for carbonated beverages), discard the product. Do not taste.
- Do not eat or drink local (unapproved) ice, snow cones, open drinks with ice, or similar products; such food can cause foodborne illness/disease.

WASH YOUR HANDS





Use soap and drinking (potable) water—

- After using the latrine.
- Before touching eating utensils or food.
- After eating.
- After handling any item that can potentially transfer germs.
- Frequently during the work day to keep your hands free of germs.

WASH YOUR MESS KIT/EATING UTENSILS

A sure way to get diarrhea is to use a dirty mess kit or eating utensils. Protect yourself by washing your mess kit/eating utensils—

- In a mess kit laundry/sanitation center.
- With treated water or disinfectant solution.

DISPOSE OF YOUR WASTE IN AN APPROVED MANNER

On a march, personal disposal bags should be used first, if available. If not available, personal cat holes can be used only if your unit is on the move! Always dispose of your waste immediately if your unit is on the move to prevent flies from spreading germs from waste to your food. Disposing of your waste also helps keep unwanted animals out of your bivouac area. Chemical toilets or burnouts are to be used in bivouac area. (See Chapter 3, Section V.)

Section VI. PERSONAL HYGIENE AND PHYSICAL AND MENTAL FITNESS

OVERVIEW

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

KEEP PHYSICALLY FIT

- Physically fit service members are less likely to get sick or injured.

- Use caution when exercising in extremely hot or cold weather; heat/cold injuries can occur. Actively participating in physical fitness training assists you in becoming acclimatized to the field environment.

NOTE

See FM 21-20 for more information on physical fitness training.

PREVENT SKIN INFECTIONS

Bathe frequently; if showers or baths are not available, use a washcloth daily to wash—

- Your genital area.
- Your armpits.
- Your feet.

- Other areas where you sweat or that become wet, such as between thighs, (or for females, under the breasts) and between buttocks.

Keep skin dry.

- Use foot powder on your feet, especially if you have had fungal infections on your feet in the past.
- Use talcum powder in areas where wetness is a problem (such as between the thighs, and for females, under the breasts).

Wear proper clothing.

- Wear loose fitting uniforms; they allow for better ventilation. Tight fitting uniforms reduce blood circulation and ventilation.
- Do not wear nylon or silk-type undergarments in hot or humid environments.

PREPARE FOR THE FIELD

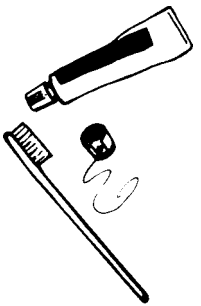
- All service members need to bring toilet articles such as soap, shampoo, washcloths, towels, toothbrush, dental floss and fluoride toothpaste, and talcum powder and foot powder, with them. **Do not share these items** to prevent the spreading of infections.
- Males need a razor and blades. Females need sanitary napkins or tampons.

Remember, during a deployment, you may not be able to easily obtain these items if you run out; bring at least a 2-month supply.

PREVENT DENTAL DISEASE

Tooth decay and gum infections can cause severe illness if not prevented or treated early.

- Brush teeth and gums after meals, or at least once a day. Use fluoride toothpaste. If toothpaste is not available, brush without it.
- Use dental floss at least once a day.
- Rinse your mouth with potable water after brushing and flossing; also, rinse frequently during the day when drinking water.
- Remember, consuming sugary food and drink requires more frequent cleaning of teeth and gums.



PREVENT GENITAL AND URINARY TRACT INFECTIONS

For males:

- Wash the head of your penis when washing your genitals. If uncircumcised, pull the foreskin back before washing.
- Protect yourself from sexually transmitted diseases (STD). Avoid sexual contact or use a condom; condoms reduce the chance of STD transmission.

For females:

- Wash your genital area daily.
- Do not use perfumed soaps or feminine deodorants in the field; they cause irritation and attract arthropods.
- Protect yourself from STD. Avoid sexual contact, or at least insist that your sex partner uses a condom—condoms help prevent STD transmission.
- **DO NOT** douche unless directed by medical personnel.
- **DO NOT** wear nylon or silk undergarments; cotton undergarments are more absorbent and allow the skin to dry.

NOTE

Some individuals do not drink enough fluids and tend to hold their urine due to a lack of privacy in the field. Urinary tract infections are one of the most frequent medical problems females face in the field. Drinking extra fluids and urinating more often will help prevent these infections.

SLEEP WHEN YOU CAN

- Follow your leaders' instructions and share tasks with buddies so everyone gets some time to sleep safely.
- Sleep whenever possible.
  - Take catnaps as the mission allows, but expect to need a few minutes to fully wake up.
  - Sleep as much as you can ***before*** going on a mission that may prevent sleep.
  - Learn and practice techniques to relax yourself quickly.

NOTE

Only sleep in safe and/or designated areas. Never sleep in parked vehicles while the motor is running.

MEASURES AGAINST THE EFFECTS OF SLEEP LOSS

Protect against the temporary effects of sleep loss on alertness, mood, and task performance.

- Take short stretch breaks or get light exercise in place.

- **Do not trust your memory; write things down.** Get into the habit of writing things down that you must remember (except crucial details that might compromise the mission if they were lost or captured). Double-check your communications and calculations.

- Watch out for your mind playing tricks (seeing things that are not there) when very tired; check strange observations before acting.

IMPROVE RESISTANCE TO STRESS

- Fear and physical signs or symptoms of stress are normal reactions before and during combat or other dangerous/life-threatening situations. You should not let fear or stress keep you from doing your job.

- Talk about what is happening with your buddies, especially during after-action debriefings.

- Learn ways to relax quickly.

- Integrate new replacements into your group and get to know them quickly.

- If you must join a new group, be active in establishing friendships.

- Give each other moral support.
- Care for your buddies and work together to provide everyone food, water, sleep, and shelter, and to protect against heat, cold, poor sanitation, and enemy action.

NOTE

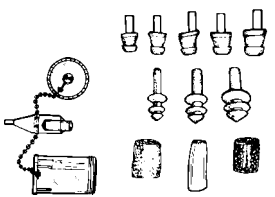
See FM 21-11 for first-aid procedures for stress reactions.

Section VII. NOISE

OVERVIEW

If you have to raise your voice to be understood, it is too noisy. Put on hearing protectors. The use of hearing protective devices will enhance hearing and comprehension in the presence of a hazardous noise.

PROTECT YOURSELF AND YOUR MISSION FROM NOISE



- Wear properly fitted earplugs. Different types include single flange, triple flange, and hand formed.

- Use vehicle headgear such as a helicopter crew helmet, an armor crew helmet, or earmuffs.
- Keep earplugs and earmuffs clean to prevent ear infections.
- Avoid noise or limit time around noise to only critical tasks.

Section VIII. TOXIC INDUSTRIAL CHEMICALS/MATERIALS

OVERVIEW

Consider risk management in planning all operations; identify potential sources of danger or mission hazards that can be anticipated in performing a mission. Always weigh the risks and benefits and establish controls to reduce unnecessary hazards.

RECOGNIZE AND PREPARE FOR TOXIC INDUSTRIAL CHEMICALS/ MATERIAL THREATS

Occupational hazards.

- Exhaust from engines and fuel space heaters.

- Gases from weapons firing, such as rockets and M8 smoke.

NOTE

When using M8 smoke in training or operations, follow unit standing operating procedures (SOPs) and leaders and controller's instructions for use of protective masks and for moving through smoky areas, especially in buildings and tunnels.

- Solvents used to clean weapons.
- Greases and oil from vehicle maintenance repair.
- Detergents used to clean equipment.

Industrial hazards.

- Compressed gases.
- Industrial solvents.
- Hazardous chemical waste.

- Materials used at water treatment plants.
- Materials and water used at waste sewage and water treatment plants.

Biological/radiological hazards.

- Medical waste.
- Materials used at medical research facilities.
- Radioactive isotopes.
- Substances at nuclear power plants.
- Depleted uranium.

RECOGNIZE THE INJURY

- Carbon monoxide is colorless, odorless, and tasteless. It causes headache, sleepiness, coma, and death.
- Hydrogen chloride is a very irritating gas that reacts with water (body fluids) to produce hydrochloric acid in the throat, lungs, and eyes. It causes coughing, tissue acid burns, and flu-like lung disease.

- M8 smoke is a very irritating gas. It can cause severe coughing, wheezing, and lung damage, if inhaled.
- Bore/gun gases cause the same effects as carbon monoxide and hydrogen chloride.
- Solvents, greases, and oils cause skin rashes, burns, drying, and infections. They cause damage to the liver, blood, and brain. Also, many are poisons that may cause cancer.
- Medical waste causes disease.
- Radioactive materials cause radiation illness.

PROTECT YOURSELF AND YOUR MISSION FROM TOXIC INDUSTRIAL CHEMICALS/ MATERIALS

NOTE

Service members should always be aware that material safety data sheets (MSDS) accompany stores of toxic chemicals when units are deployed, and they serve as an immediate reference in cases of exposure or injury. Once a unit is deployed and set up, these MSDS should be kept as part of the unit's SOP when handling the specified chemicals/materials.

Carbon monoxide.

- Run engines outdoors or with shop doors/windows open.
- Keep sleeping area windows slightly open where you sleep for ventilation and air movement.
- **DO NOT** sleep in vehicles with the engine running or use engine exhaust for heat.
- **DO NOT** park vehicles near air intakes to tents, trailers, or environmental control units.

Bore/gun gases.

- Use onboard vehicle ventilation systems.
- Keep bore evacuator well maintained.
- Try to keep some air movement in gun emplacements or in protected batteries.

Solvents, greases, and oils.

- Use "safety" Stoddard solvent.
- Never substitute one solvent for a "better" one; for example, never use benzene or fuel in place of Stoddard.

- Wear coveralls, if available, and rubber gloves.
- Wash or change clothing often, especially when soiled by chemicals or fuel.
- Always follow label instructions for use and safety precautions.
- Use ventilation systems in areas where fumes are present or when conditions and materials dictate.

Biological waste.

- Always use disposable rubber gloves when working with biological materials.
- Wear coveralls/rubberized aprons, as necessary.
- Wear goggles or safety glasses, as necessary.
- Wear facemasks and air-filtered breathing masks approved for specific tasks, as necessary, when removing/working with biological waste.
- Dispose of biological waste materials according to unit SOPs and product label instructions.

CHAPTER 3

LEADERS' PREVENTIVE MEDICINE MEASURES

NOTE

In addition to the specific measures that follow, leaders must remember and apply the principle that the most effective PMM they can apply is to visibly set the example in the use of all the individual PMM that are discussed throughout this FM.

Section I. HEAT INJURIES

PLAN FOR THE HEAT

- Maximize physical fitness and heat acclimatization before deployment.
- Use your FST to train individuals and their leaders in PMM against heat.
- Acclimatize personnel to high temperatures as gradually as the mission will allow.

- Brief service members on dangers of sunburn and skin rashes and the importance of good personal field hygiene.

- Obtain weather forecast for time/area of training/mission.

- Ensure adequate supplies of potable water are available (up to 3 gallons per day per service member just for drinking) (See Table 3-1). Issue a second canteen to service members in hot weather operations. In the desert, additional canteens may be required.

- Know the location of water distribution points.

- Set up a buddy system to maximize rehydration and minimize heat injuries.

- Ensure medical support is available for treatment of heat injuries.

- Plan the placement of leaders to observe for and react to heat injuries in dispersed training (road marches), or operational missions.

- If the mission permits, plan to—

    - Train during the cooler morning hours.

- Serve heavy meals in the evening, rather than at noon.

OBTAIN AND USE HEAT CONDITION INFORMATION

- Obtain heat condition information per your unit's SOP or contact the local supporting PVNTMED detachment or section. Heat condition may be reported as--
  - Category: 1, 2, 3, 4, and/or 5.
  - Wet bulb globe temperature (WBGT) index.
- Use heat condition information to determine required water intake and work/rest cycles (Table 3-1).

NOTE

Training by lecture or demonstration, maintenance procedures on equipment, or personal hygiene activities (such as skin and foot care) can be performed during rest periods.

Table 3-1. Fluid Replacement Guidelines for Warm Weather Training (Applies to Average Acclimated Service Member Wearing Hot Weather Uniform)

HEAT CATEGORY	WBGT INDEX DEGREES F	EASY WORK		MODERATE WORK		HARD WORK	
		WORK/ REST MIN	WATER INTAKE QT/HR	WORK/ REST MIN	WATER INTAKE QT/HR	WORK/ REST MIN	WATER INTAKE QT/HR
1	78-81.9	NL	1/2	NL	3/4	40/20	3/4
2 (GREEN)	82-84.9	NL	1/2	50/10	3/4	30/30	1
3 (YELLOW)	85-87.9	NL	3/4	40/20	3/4	30/30	1
4 (RED)	88-89.9	NL	3/4	30/30	3/4	20/40	1
5 (BLACK)	> 90	50/10	1	20/40	1	10/50	1

The work/rest times and fluid replacement volumes will sustain performance and hydration for at least 4 hours of work in the specified heat category. Individual water needs will vary ± 1/4 quart/hour.
NL= no limit to work time per hour.
Rest means minimal physical activity (sitting or standing) accomplished in shade, if possible.
CAUTION: Hourly fluid intake should not exceed 1 1/4 quarts.
Daily fluid intake **should not exceed 12 liters.**
Wearing body armor adds **5° F** to WBGT Index.
Wearing all MOPP overgarments adds **10° F** to WBGT Index.

Table 3-1. Fluid Replacement Guidelines for Warm Weather Training (Continued)
(Applies to Average Acclimated Service Member Wearing Hot Weather Uniform)

EASY WORK	MODERATE WORK	HARD WORK
WEAPON MAINTENANCE WALKING HARD SURFACE AT 2.5 MPH, ≤ 30 LB LOAD GUARD DUTY MARKSMANSHIP TRAINING DRILL AND CEREMONY	WALKING LOOSE SAND AT 2.5 MPH, NO LOAD WALKING HARD SURFACE AT 3.5 MPH, ≤ 40 LB LOAD CALISTHENICS PATROLLING INDIVIDUAL MOVEMENT TECHNIQUES, SUCH AS LOW CRAWL, HIGH CRAWL DEFENSIVE POSITION CONSTRUCTION	WALKING HARD SURFACE AT 3.5 MPH, ≥ 40 LB LOAD WALKING ON LOOSE SAND AT 2.5 MPH WITH LOAD FIELD ASSAULTS

WARNING

Hourly fluid intake should not exceed 1 1/4 quarts. Daily fluid intake should not exceed 12 liters.

ENFORCE INDIVIDUAL PREVENTIVE MEDICINE MEASURES

Leaders must—

- Enforce water intake by—
  - Observing service members drinking required amounts. Encourage frequent drinking of water in small amounts.
  - Ensuring that service members practice good field hygiene.
  - Providing cool water; if desired, you can add flavoring after disinfection to enhance consumption. Personnel should use their canteen cup for consumption of flavored water. **DO NOT add flavoring to canteen water; use only plain water in canteen.**
  - Ensuring troops drink water before starting any hard work or mission (in the morning, with/after meals).
  - Ensuring buddy system is being used.
  - Frequently checking service members' canteens for water; not beverages.

- Making sure service members have adequate time to eat and drink as mission permits. Permit personnel to consume carbohydrate/electrolyte beverages (sports drinks) as supplemental nutrients under conditions of extreme calorie and water requirements; such as extremely vigorous activities.

- Reduce heat injuries by—

  - Enforcing work/rest cycles when the mission permits. Permitting personnel to work/rest in the shade, if possible.

  - Encouraging service members to eat all meals for needed salts.

  - Adjusting workload to size of individuals, when possible.

  - Be prepared for heat casualties and decreased performance when water and work/rest cycle recommendations cannot be met.

MODIFY WEAR OF THE UNIFORM

Direct/authorize service members to—

- Keep skin covered while in sun.

- Keep uniform loose at neck, wrists, and lower legs (unblouse pants).

NOTE

If the medical threat from biting arthropods is high, keep sleeves rolled down and pants bloused in boots.

IDENTIFY SPECIAL CONSIDERATIONS

Identify and modify training/physical activity for service members with high-risk conditions of heat injuries, such as—

- Diseases/injuries, especially fevers, vomiting, diarrhea, heat rash, or sunburn.
- Use of alcohol within the last 24 hours.
- Overweight/unfit.
- Over 40 years old.
- Fatigue/lack of sleep.
- Taking medication (especially for high blood pressure, colds, or diarrhea).
- Previous heatstroke/severe heat exhaustion.
- Lack of recent experience in a hot environment.

Section II. COLD INJURIES

PLAN FOR THE COLD

- Use your FST to train individuals and their leaders in PMM against cold.
- Obtain weather forecast for time/area of training/mission.
- Ensure the following are available as the tactical situation permits:
  - Covered vehicles for troop transport, if tactical situation permits.
  - Cold weather clothing.
  - Laundry services.
  - Warming tents/areas.
  - Hot rations/hot beverages.
  - Drinking water.
- Inspect service members (before starting training/mission) to ensure—
  - Availability, proper fit, and wear of cold weather gear.

  - Clean, dry, proper-fitting clothing.
  - Each service member has several pairs of socks, depending on the nature and duration of the mission.
- Frequently rotate guards or other service members performing inactive duties.
- Ensure medical support is available for treatment should cold weather injuries occur.

DETERMINE AND USE WINDCHILL FACTOR

- Obtain temperature and wind speed information as directed by your unit's SOP or contact the local supporting PVNTMED detachment or section.
- Calculate windchill from Table 3-2.

NOTE

Cold injuries can and do occur in nonfreezing temperatures. Hypothermia can occur in mildly cool weather.

Table 3-2. Windchill Chart

ESTIMATED WIND SPEED (IN MPH)	ACTUAL TEMPERATURE READING (°F)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	EQUIVALENT CHILL TEMPERATURE (°F)											
CALM	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
(WIND SPEEDS GREATER THAN 40 MPH HAVE LITTLE ADDITIONAL EFFECT.)	**LITTLE DANGER** IN LESS THAN ONE HOUR WITH DRY SKIN. MAXIMUM DANGER OF FALSE SENSE OF SECURITY.						**INCREASING DANGER** DANGER FROM FREEZING OF EXPOSED FLESH WITHIN ONE MINUTE.		**GREAT DANGER** FLESH MAY FREEZE WITHIN 30 SECONDS.			

NOTE: 1. TRENCH FOOT AND IMMERSION FOOT MAY OCCUR AT ANY POINT ON THIS CHART.
2. F = 9/5 C + 32.

Table 3-3. Windchill Categories (See Windchill Table)

WORK INTENSITY	LITTLE DANGER	INCREASED DANGER	GREAT DANGER
HIGH DIGGING FOXHOLE, RUNNING, MARCHING WITH RUCKSACK, MAKING OR BREAKING BIVOUAC	INDIVIDUALS OR SMALL UNIT LEADERS: BLACK GLOVES OPTIONAL; MANDATORY BELOW 0 DEGREES F; INCREASED HYDRATION.	INCREASED SURVEILLANCE BY EXTREME COLD WEATHER SYSTEM OR EQUIVALENT; MITTENS WITH LINERS; NO FACIAL CAMOUFLAGE; EXPOSED SKIN COVERED AND KEPT DRY; REST IN WARM, DRY, SHELTERED AREA; COLD WEATHER, VAPOR BARRIER BOOTS BELOW 0 DEGREES F.	POSTPONE NON-ESSENTIAL ACTIVITY; ESSENTIAL TASKS ONLY WITH LESS THAN 15 MINUTES EXPOSURE; COVER ALL SKIN.
LOW WALKING, MARCHING WITHOUT RUCKSACK, DRILL AND CEREMONY	INCREASED SURVEILLANCE; COVER EXPOSED FLESH WHEN POSSIBLE; MITTENS WITH LINERS AND NO FACIAL CAMOUFLAGE BELOW 10 DEGREES F; FULL HEAD COVER BELOW 0 DEGREES F; KEEP SKIN DRY, ESPECIALLY AROUND NOSE AND MOUTH.	RESTRICT NONESSENTIAL ACTIVITY; 30-40 MINUTE WORK CYCLES WITH FREQUENT SUPERVISORY SURVEILLANCE FOR ESSENTIAL TASKS (SEE ABOVE).	CANCEL OUTDOOR ACTIVITY, IF POSSIBLE.
SEDENTARY SENTRY DUTY, EATING, RESTING, SLEEPING, CLERICAL WORK	SEE ABOVE; FULL HEAD COVER AND NO FACIAL CAMOUFLAGE BELOW 10 DEGREES F; COLD WEATHER, VAPOR BARRIER BOOTS BELOW 0 DEGREES F; SHORTEN DUTY CYCLES; PROVIDE WARMING.	POSTPONE NONESSENTIAL ACTIVITY; 15-20 MINUTE WORK CYCLES FOR ESSENTIAL TASKS; WORK GROUPS OF NO LESS THAN 2 PERSONNEL; NO EXPOSED SKIN.	CANCEL OUTDOOR ACTIVITY, IF POSSIBLE.

These guidelines are generalized for worldwide use. Commanders of units with extensive extreme cold weather training and specialized equipment may opt to use less conservative guidelines.

- Then use Table 3-4 to apply PMM guidance:

Table 3-4. Windchill Preventive Medicine Measures

WINDCHILL	PREVENTIVE MEDICINE MEASURES
30° F AND BELOW	ALERT PERSONNEL TO THE POTENTIAL FOR COLD INJURIES.
25° F AND BELOW	LEADERS INSPECT PERSONNEL FOR WEAR OF COLD WEATHER CLOTHING. PROVIDE WARM-UP TENTS/AREAS/HOT BEVERAGES.
0° F AND BELOW	LEADERS INSPECT PERSONNEL FOR COLD INJURIES. INCREASE THE FREQUENCY OF GUARD ROTATIONS TO WARMING AREAS. DISCOURAGE SMOKING.
-10° F AND BELOW	INITIATE THE BUDDY SYSTEM—HAVE PERSONNEL CHECK EACH OTHER FOR COLD INJURIES.
-20° F AND BELOW	MODIFY OR CURTAIL ALL BUT MISSION-ESSENTIAL FIELD OPERATIONS.

- The windchill index gives the equivalent temperature of the cooling power of wind on exposed flesh.
    - Any movement of air has the same effect as wind (running, riding in open vehicles, or helicopter downwash).
    - Any dry clothing (mittens, scarves, masks) or material which reduces wind exposure will help protect the covered skin.
- Trench foot injuries can occur at any point on the windchill chart and—
    - Are much more likely to occur than frostbite at "LITTLE DANGER" windchill temperatures, especially on extended exercises/missions and/or in wet environments.
    - Can lead to permanent disability, just like frostbite.

IDENTIFY SPECIAL CONSIDERATIONS

- Conditions that place service members at high risk of cold injuries include—
    - Previous trench foot or frostbite.

- Fatigue.
- Use of alcohol.
- Significant injuries.
- Poor nutrition.
- Use of medications that cause drowsiness.
- Little previous experience in cold weather.
- Immobilized or subject to greatly reduced activity.
- Service members wearing wet clothing.
- Sleep deprivation.

- Identify the special hazards of carbon monoxide poisoning and fire that may affect your cold weather operations.

ENFORCE INDIVIDUAL PREVENTIVE MEDICINE MEASURES

- Ensure service members wear clean and dry uniforms in loose layers.

- Ensure service members remove outer layer(s) before starting hard work or when in heated areas (before sweating).
- Have service members inspect their socks and feet at least daily when operating in cold and/or wet environments.
- Ensure service members to—
  - Wash their feet daily.
  - Wear clean and dry socks.
  - Use warming areas when available.
  - Eat all meals to ensure sufficient calories are consumed to maintain body heat.
  - Drink plenty of water and/or nonalcoholic fluids. In cold weather, fluid intake is often neglected, leading to dehydration.
  - Exercise their big muscles or at least their toes, feet, fingers, and hands to keep warm.
- Institute the buddy system in cold weather operations. Service members taking care of each other decrease cold injuries.

Section III. ARTHROPODS AND OTHER ANIMALS OF MEDICAL IMPORTANCE

PLAN FOR THE ARTHROPOD, RODENT, AND OTHER ANIMAL THREAT

- Obtain information on biting and stinging arthropods and other animals (such as snakes, domestic and wild animals, or birds) which could be a threat—
  - Through unit medical channels from the command PVNTMED representative.
  - From the health service support (HSS) annex to operation plan/order.
- Use your FST—
  - Train your service members in PMM.
  - Control insects and other medically important arthropods in your AO.
  - Control rodents and other medically important animals in your AO.
  - Remind service members to avoid handling insects, arthropods, snakes, and other animals to prevent bites or injury. Animals that appear to be healthy may transmit rabies and other zoonotic diseases.

- Keep personnel from eating in sleeping/work areas; prevent attracting insects, rodents, and other animals.
- Animal mascots should not be kept or maintained unless cleared by veterinary personnel.

- Ensure that—
  - Each service member has a bed net in good repair and treated with permethrin repellent.
  - Immunizations are current. Prophylaxis (for example, anti-malaria tablets) is available for issue as required.
  - Laundry and bathing facilities are available.
  - Field sanitation team supplies and equipment are available and can be replenished.
- Request assistance from a PVNTMED unit (through medical or command channels) when control of biting arthropods, rodents, or other animals is beyond the capabilities of your unit.

ENFORCE INDIVIDUAL PREVENTIVE MEDICINE MEASURES

- Ensure all uniforms are impregnated with permethrin before field training or deployment.

- Ensure each service member has DOD skin (DEET) and clothing (permethrin) insect repellent and uses them. However, cooks, other food handlers, and kitchen police personnel must not use repellent on their hands when preparing and serving food, or when cleaning food service utensils, dishes, and food serving areas.

- Direct service members to keep—

  - Shirts buttoned.

  - Sleeves rolled down.

  - Pants bloused inside boots.

- Ensure service members—

  - Bathe/shower regularly (field expedients will do); a field shower or bath with a clean change of uniform should be accomplished once each week to control body lice.

  - Discontinue the use of aftershave lotions, colognes, perfumes, and scented soaps; they attract insects.

  - Use permethrin treated bed nets and the DOD-approved aerosol insect (Insecticide, d-Phenothrin, 2%, Aerosol, NSN 6840-01-412-4634); spray inside the net if necessary.

- Observe service members taking anti-malaria pills or other prophylaxis (when prescribed by the medics).
- Use your FST to identify suspected lice infestations and refer for medical treatment.

MINIMIZE EXPOSURE TO ARTHROPOD, RODENT, AND ANIMAL THREAT

- If the mission permits—
  - Use your FST to assist you in selecting bivouac sites.
  - Occupy areas distant from insect/arthropod breeding areas such as natural bodies of water.
  - Avoid areas with high grass or dense vegetation.
  - Use FST recommendations and assistance in applying pesticides for area control around living areas and in natural bodies of water.
  - Drain or fill in temporary standing water sites in occupied area (empty cans, used tires, or wheel ruts after rains).
  - Clear vegetation in and around occupied area.

- Maintain area sanitation by enforcing good sanitation practices.
  - Properly dispose of all waste.
  - Protect all food supplies.
  - Police area regularly.
  - Exclude pests (rats, mice, lice, and flies).

NOTE

See Appendix A for performance of tasks relating to PMM against arthropods and rodents.

Section IV. POISONOUS PLANTS AND TOXIC FRUITS

- Obtain information on poisonous plants and toxic fruits that could be a threat—
  - Through unit medical channels from the command PVNTMED representative.
  - From the HSS annex to operation plan/order.

- Use your FST to—
  - Train your service members in PMM.
  - Display and provide information on the kinds of dangerous plants and fruits in the unit area.
- Enforce individual PMM by—
  - Proper wearing of the uniform.
  - Avoidance of poisonous plants where possible.
  - Avoidance of consuming potentially dangerous vegetation and fruits.
  - Avoidance of putting grasses and twigs in the mouth.

Section V. FOOD-/WATER-/WASTEBORNE DISEASE/ILLNESS

PLAN FOR SAFE WATER

- Know the location of approved water distribution points.

- Make sure your unit has an adequate supply of—
  - Iodine water purification tablets (1 bottle for each individual).
  - Field chlorination kits.
  - Bulk chlorine.
  - Chlor-Floc® kits.
- Ensure water trailers and tankers (400 gallon and above) are inspected by PVNTMED personnel semiannually.
- Inspect water containers before use.
- Check the residual chlorine of bulk water supplies (5-gallon cans, water pillows, water trailer) before drinking and at least daily thereafter. (See Tasks 7 and 8, Appendix A.)

PLAN FOR SAFE FOOD

- Ensure food service personnel maintain foods at safe temperatures.
- Inspect food service personnel daily and refer for medical evaluation those with illness and/or skin infections.

- Make sure foods, drinks, and ice purchased from civilian vendors are approved by the command medical authority.

- Supervise the use of the mess kit laundry/sanitation center.

- Ensure food service personnel and service members use handwashing devices.

- Ensure all food waste is transported to an approved disposal site, buried, or burned daily (at least 30 meters from food preparation area and water source).

PLAN FOR THE CONSTRUCTION AND MAINTENANCE OF FIELD SANITATION DEVICES

- Determine type of field waste disposal devices required.

    - The primary type of human waste disposal devices in bivouac areas are the chemical toilets. Individual waste collection bags are the primary type used when on the march.

    - The type of improvised waste disposal used will depend on the mission, length of stay in the area, terrain, and weather conditions. When chemical toilets are not available, the burn-out latrine is the preferred improvised waste disposal device.

NOTE

Always check local, state, federal, or host-nation regulations for restrictions or prohibitions on using standard or improvised field devices and waste disposal in the field.

- Select locations for field latrines.
  - As far from food operations as possible (100 meters or more). Downwind and down slope, if possible.
  - Down slope from wells, springs, streams, and other water sources (30 meters or more).
- Set up, construct, and maintain latrines (see Task 9, Appendix A, for requirements).
  - As soon as the unit moves into a new area, detail service members to set up chemical toilets or dig latrines. (See previous **NOTE**.)
  - Detail service members to clean latrines daily.
  - Instruct the FST to spray the latrines with insecticide as necessary (not the pit contents).
  - Always provide handwashing facilities at the food service facilities and the latrines. Make use of handwashing devices at latrines mandatory.

- Cover, transport, burn, or bury waste daily.
- Use the FST to train service members and unit leaders in PMM against food-/water-/wasteborne diseases.

NOTE

See Appendix A for performance of tasks relating to PMM against food-/water-/wasteborne diseases.

Section VI. PERSONAL HYGIENE AND PHYSICAL AND MENTAL FITNESS

KEEP YOUR UNIT PHYSICALLY FIT

- Ensure that leaders at all levels recognize the benefits of physical fitness. Leaders must be role models, leading by example.
- Take a positive approach to physical fitness with service members. A physically fit service member is less likely to be a combat loss from disease or injury.

NOTE

See FM 21-20 for more information.

PLAN FOR PERSONAL HYGIENE

- Provide shower/bathing facilities in the field. All personnel must bathe at least once a week and have a clean change of clothing to reduce the health hazard associated with body lice.

- Inspect service members' personal equipment to ensure they have sufficient personal hygiene supplies—soap, washcloths, towels, a toothbrush, dental floss, fluoride toothpaste, and razor and razor blades (females should have sanitary napkins or tampons).

  - Ensure undergarments are cotton (not silk, nylon, or polyester).

  - Ensure uniforms fit properly (not tight).

  - Ensure service members have several pairs of issue boot socks; the number will depend on the type and length of the mission.

- Use your FST to train your service members in personal hygiene.

- Ensure service members receive annual dental examinations and needed oral health care. Make sure all oral health appointments are kept. Use low operational requirement periods to ensure all personnel maintain a good oral health status.

ENFORCE SLEEP DISCIPLINE

- The mission, unit readiness, and individual security must come first, but never miss a chance to give everyone in the unit time to sleep.

- When feasible, set work/rest shifts.

- Do not allow service members to sleep in areas where they may be run over by vehicles, or in other unsafe areas.

- During *continuous operations*, set shifts and rotate jobs to allow everyone at least 3 to 4 hours uninterrupted sleep per 24-hour period.

- During brief (up to 48 hours) sustained operations when shifts are impossible, rotate jobs so all individuals catnap as safely and comfortably as possible. The loss of sleep will reduce the service member's ability to perform his duties and the leader's ability to make decisions.

NOTE

Ensure that sleeping individuals observe safety precautions. Use ground guides for vehicles in bivouac areas.

ENFORCE PREVENTIVE MEDICINE MEASURES FOR THE EFFECTS OF SLEEP LOSS

- Those individuals with the most complex mental or decision-making jobs need the most sleep. This means you and your most critical leaders and operators!

- Cross train individuals to perform the critical tasks and delegate limited authority among leaders, thus enabling all to get necessary rest.

ENSURE WELFARE, SAFETY, AND HEALTH OF UNIT

- Ensure the best and safest water, food, equipment, shelter, sanitation, and sleep possible are provided.

- Educate service members to maintain professional pride and personal caring for themselves, each other, and their equipment.

- Know the personal backgrounds and the military skills of your service members. Chat with them informally about themselves. Be attentive and understanding while listening to service members.
- Utilize group support and counsel for service members with *home front* problems.
- Assign jobs to maintain a balance between having qualified people in key positions while sharing the load, hardship, and risks fairly.
- Use challenging and difficult environments during training to increase your own and the unit's coping skills and confidence.

REDUCE UNCERTAINTY BY KEEPING EVERYONE INFORMED

- Brief unit personnel on the situation, objectives, and conditions that the mission or environment may involve.
- Explain reasons for hardships, delays, and changes.
- Do not give false reassurances. Prepare your service members for the worst and put any unexpected challenges or reversals in a positive perspective.
- Deal with rumors firmly and honestly. Prevent the spread of rumors.
- Make contingency plans and follow SOP to reduce the effects of surprise.

PROMOTE COHESION WITHIN THE UNIT

- Use equipment drills, physical fitness training, team sports, and field *stress training* to stimulate mutual reliance and closeness.
- Bring unit members together for meals, award ceremonies, and other special occasions.
- Integrate new members by assigning sponsors and ensuring rapid familiarization.

IMPART UNIT PRIDE

- Educate service members in the history and tradition of the small unit, its parent units, and the branch of Service.
- Honor the historical examples of initiative, endurance, and resilience, of overcoming heavy odds, and of self-sacrifice.

Section VII. NOISE

PLAN FOR NOISE

- Identify existing noise in your unit. If necessary, request PVNTMED assistance in identifying sources.

- Ensure that hearing conservation is part of the unit SOP.
- Ensure all service members are medically fitted for hearing protectors and are issued multiple sets.
- Ensure all service members have annual hearing test/screening.
- Control noise sources.
  - Isolate by distance; that is, keep troops away from noise, if possible.
  - Isolate by barrier; for example, use sandbags.
  - Use organic equipment controls; for example, keep mufflers and engine covers in good repair.
- Train unit to do mission while wearing hearing protectors.
- Post **Noise Hazard** signs in noise hazardous areas and on noise hazardous equipment.

ENFORCE INDIVIDUAL PROTECTIVE MEASURES

Ensure that service members—

- Wear earplugs or other hearing protective devices.

- Do not remove inserts from aircraft or tracked vehicle helmets.
- Avoid unnecessary exposure.
- Limit necessary exposure to short, infrequent, mission-essential times.
- Clean their hearing protectors.

PROTECT MISSION

- Be aware of short-term noise effects on the service member's ability to hear combat significant noise.
- Assign listening post (LP)/observation post (OP) to troops least affected by noise,augment LP/OP with night vision devices and/or increase the number of audible alarms around your position.

Section VIII. TOXIC INDUSTRIAL CHEMICALS/MATERIALS

PLAN FOR CHEMICALS

- Identify sources of toxic industrial chemicals/materials in your unit. If necessary, request PVNTMED assistance in identifying sources.

- Obtain safer chemicals for unit operations, if available.
- Observe cautions/warnings posted in technical manuals dealing with solvents corrosives, and other hazardous materials. (Refer to MSDS that accompany stores of toxic chemicals/materials.)

ENFORCE INDIVIDUAL PREVENTIVE MEDICINE MEASURES

Ensure that service members—

- Repair engines outside or vent engine exhaust to outside.
- Keep their sleeping quarters ventilated.
- Do not use vehicle engines as heaters.
- Use/maintain onboard ventilation systems.
- Are trained and drilled to self-protect themselves around hydrogen chloride and M8 smoke.
- Maintain bore/gun gas evacuation systems.
- Use “safety” Stoddard solvent.

- Have adequate clean gloves, coveralls, and other protective gear.
- Follow label instructions on chemical containers.

CHAPTER 4

UNIT FIELD SANITATION TEAM

FIELD SANITATION TEAM CONCEPT

- During World War II, it became apparent that more action was needed at the unit level to counter the medical threat. (Remember Togatabu Island and the jungles of Burma? [pages 1-2 and 1-3]) To answer this need, the FST concept was developed.

- Selected members from each company-sized unit were designated to receive special training in DNBI prevention so they could advise the commander in PMM for DNBIs. This training enabled the unit commander to provide arthropod control, individual and unit disinfection of water, and safe food supplies. This resulted in commanders being able to reduce DNBI losses.

SCOPE OF FIELD SANITATION TEAM OPERATIONS

The FST—

- Conducts arthropod and rodent control operations in the field as directed by the commander. In garrison, the FST is in a training status. During mobilization, the FST performs its field sanitation duties.

- Ensures that unit leaders are supervising the disinfection of unit water supplies. Instructs the troops in methods of individual water purification.

- Assists the commander by inspecting food service operations.

- Monitors the waste disposal procedures and the construction of garbage and soakage pits; and then inspects these devices for proper waste disposal procedures use.

- Ensures personnel have individual waste collection bags and the unit's chemical toilets are set up and operated correctly. Monitors disposal methods of individual bags and chemical toilet contents. Monitors the construction of field latrines and urinals when chemical toilets are not available. Inspects these devices for proper sanitation.

- Provides unit training in the use of individual PMM.

- Applies pesticides as required/necessary for the control of arthropods.

FIELD SANITATION TEAM TASKS

Unit FSTs serve as advisors to the commander on individual and unit PMM that prevent DNBI. To assess the medical threat (disease/illness risk), the team members must be able to perform the following tasks:

- Inspect water containers and trailers.

- Disinfect unit water supplies.
- Check unit water supply for chlorine.
- Inspect unit field food service operations.
- Inspect unit waste disposal operations.
- Control arthropods, rodents, and other animals in unit area.
- Train unit personnel in use of individual PMM.
- Monitor status of PMM in unit.
- Assist in selection of a unit bivouac site.
- Supervise the construction of field sanitation devices.
- Monitor unit personnel in the application of individual PPM.

NOTE

All unit leaders should be able to perform these tasks.

SELECTION OF PERSONNEL

Selection of personnel for the unit FST should be based on the following:

- Units having organic medical personnel (combat medics) ***WILL*** use them as the FST.
- When organic medical personnel are not available, selected team members should be personnel whose normal field duties allow them to devote time to field sanitation activities.
- At least one member must be a noncommissioned officer when organic medical personnel are not available.

TRAINING

Members of the FST are required to receive training in basic sanitation techniques, disease control, and individual PMM. Training includes—

- Use of insect repellents, uniform impregnants, and protective clothing.
- Use and repair of screening and bed nets.
- Use of residual and space insecticide sprays.
- Rodent control measures.

- Food service sanitation.
- Unit waste disposal procedures.
- Water purification procedures, to include determination of chlorine residual.
- Personal hygiene.
- Heat/cold injury prevention, to include WBGT determination and use of the windchill chart.
- Other subjects as they relate to the medical threat in the unit's AO, to include noise hazards and hearing protection.

HOW TO MAKE YOUR FIELD SANITATION TEAM THE BEST IN THE COMMAND

- Select soldiers you can rely on.
- After they are trained, use them during—
  - Service training and evaluation programs.
  - Field training exercises.

- Unit training on PMM.
- Predeployment training on the medical threat in the deployment AO.

- Ensure your unit has a functional FST SOP.

NOTE

Do not let your FST just be an Inspector General requirement. Make it an asset you can use. Your FST has a critical role and can assist you in protecting the health of unit personnel.

APPENDIX A

UNIT-LEVEL PREVENTIVE MEDICINE MEASURES TASKS

TASK 1: Control biting insects.

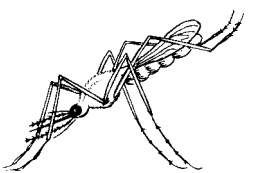
EQUIPMENT NEEDED: 1-gallon or 2-gallon sprayer, ready-to-use insecticide, and individual repellents (DEET and permethrin).

STEPS OF PERFORMANCE:

MOSQUITOES:

STEP 1: Identify common mosquito-breeding areas:

- Mosquito landing counts and trapping.
- Standing water.
- Artificial water containers.



STEP 2: Control:

- If possible, drain standing water.

- Empty artificial water containers.
- Avoid setting up bivouac sites near mosquito-breeding areas.
- Enforce individual use of DOD insect repellent systems (DEET on skin and permethrin on uniforms and bed nets).
- Have FST spray pesticide on adult mosquito-resting areas using 1-gallon or 2-gallon sprayer (see Task 2), if necessary.

FLEAS:

STEP 1: Identify rodent infestations or the presence of wild or domestic cats and dogs in the unit area (rodents, cats, and dogs carry fleas).

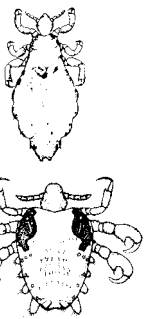
STEP 2: Control:

- Have service members in unit use individual DOD insect repellents.
- Exclude rodents and other wild animals from camps and buildings.
- Have FST spray pesticide, using 1-gallon or 2-gallon sprayer (see Task 2) around rodent burrows and harborage.

- **DO NOT** allow service members to keep "pet" animals.

LICE:

STEP 1: Identify lice infestation:



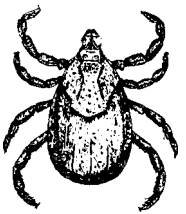
- Head lice—look for lice and eggs attached to the hair, close to the scalp. Eggs are attached directly to the hairs.
- Crab lice—usually associated with the pubic area (groin), but can be found attached to other body hairs. The eggs are attached directly to the hair.
- Body lice—generally found in the seams of infested persons' clothing. The eggs are attached to the fibers of the garments. Body lice tend to move to the body of the host only during the actual feeding process.

STEP 2: Control:

- Refer individuals with lice infestation for medical treatment.
- Enforce high standards of personal hygiene. Require frequent showering and laundering of bedding and clothing (once a week at a minimum).

- To prevent body lice, enforce individual use of permethrin-treated battle dress uniform/cammies.
- Avoid sexual contact (for crab lice).

TICKS AND MITES:



STEP 1: Identify tick- or mite-infested areas—

- Grassy areas.
- Animal trails or resting areas.
- Rodent burrows.

STEP 2: Control:

- Avoid walking through tick-infested areas.
- Cut down vegetation in and around camps.
- Enforce individual use of DOD insect repellent.

- If necessary, have FST spray area with pesticide, using 1-gallon or 2-gallon sprayer to apply pesticide (see Task 2).

- Enforce a buddy system where troops perform checks not only on themselves but on their buddy as well. If ticks are found—

  - Remove any attached ticks promptly and carefully without crushing, using gentle steady traction with forceps (tweezers) close to the skin to avoid leaving mouthparts in the skin;

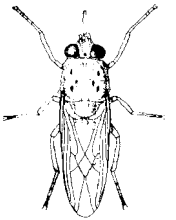
  - Protect hands with gloves, cloth or tissue when removing ticks from humans or animals;

  - Ensure that the body of the tick is not separated from its head.

NOTE

Lyme disease, Rocky Mountain spotted fever, ehrlichiosis, and encephalitis can be contracted through tick bites. Beware of ticks when passing through the thick vegetation they may cling to. When cleaning host animals for food, or when gathering natural materials to construct a shelter, you must be on the lookout for them. Buddy checks are important. If diagnosed early, the diseases mentioned above can be cured. If not, they can lead to death.

BITING FLIES:



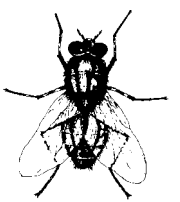
STEP 1: Identify problems with biting flies and their breading sites.

- Moist soil near ponds and stream banks.
- Decaying vegetation and animal manure.
- Rodent burrows, rock walls, and cracks in walls of buildings.

STEP 2: Control:

- Enforce use of DOD insect/arthropod repellents (DEET on the skin and permethrin on uniforms.
- Avoid areas with biting fly problems or breeding sites.

FILTH FLIES:



STEP 1: Identify infestations and breeding areas, such as—

- Open latrines.
- Uncovered food and waste.
- Ground soaked with liquid kitchen waste or food scraps on wet soil.

- Animal barnyards near AO.

STEP 2: Control:

- Remove, cover, or burn latrine waste.
- Keep food and waste covered.
- Use fly swatters for small to moderate numbers of filth flies. Only use the DOD-approved aerosol (Insecticide, d-Phenothrin, 2%, 12 ounce Aerosol, NSN 6840-01-412-4634) pesticide if large numbers of flies are in an enclosed area (do not use in food service operations).
- Ensure proper disposal of waste collection bags.
- Have FST use a 1-gallon or 2-gallon sprayer to spray pesticide on ground that is wet with kitchen waste, in field latrines, and on fly-resting sites (see Task 2).
- Use toxic fly baits.

COCKROACHES:

STEP 1: Identify cockroach infestations and breeding areas, such as—

- Food service areas.

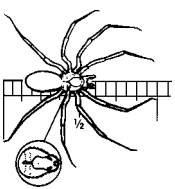
- Latrines/shower facilities.
- Trash collection points.

STEP 2: Control:

- Enforce good sanitation practices.
- Ensure proper collection and removal of food waste.
- Have FST use a 1-gallon or 2-gallon sprayer to spray pesticide as spot treatment in food service areas and as a residual spray to outside surfaces of buildings and trash collection points.

SPIDERS:

STEP 1: Identify infestations of medically important spiders (black widow, tarantula, and brown recluse spider).



NOTE

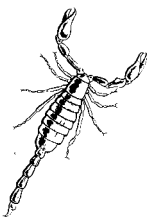
Use caution when entering into and clearing out of old, infrequently used buildings.

STEP 2: Control:

- Eliminate unnecessary rubbish and other debris in the bivouac area.
- Have FST use a 1-gallon or 2-gallon sprayer (see Task 2) to spray around tents, field latrines, or other spider habitats.

SCORPIONS and CENTIPEDES:

STEP 1: Identify places where scorpions and centipedes are a problem.



- Rocky areas.
- Inside of building.
- Tents.

STEP 2: Control:

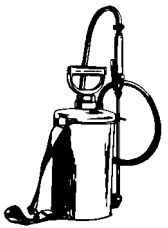
- Have FST use a 1-gallon or 2-gallon sprayer (see Task 2) on nesting sites around the entire tent or other structure, forming a band 2-feet high from the ground level.
- Saturate all cracks and crevices with insecticide.

BEES, WASPS, AND ANTS:

STEP 1: Identify places where these insects are a problem. Locate the nests.

STEP 2: Control:

- Educate troops to avoid nests.
- Have FST use a 1-gallon or 2-gallon sprayer (see Task 2) on the nesting sites. Use caution to avoid stings from disturbed insects. If the task is too great or too dangerous, contact PVNTMED personnel for assistance.



TASK 2: Use the 1-gallon or 2-gallon compressed air sprayer.

EQUIPMENT NEEDED: 1-gallon or 2-gallon sprayer and authorized insecticide, respirator, gloves, nonvented goggles, and other personal protective equipment, as appropriate.

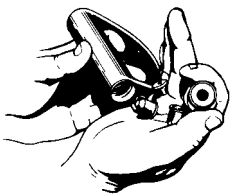
NOTE

Only personnel certified as DOD Pesticide Applicator may apply pesticides. Uncertified persons may apply pesticides if they are properly trained by and under the direct supervision of a certified pesticide applicator.

STEPS OF PERFORMANCE:

STEP 1: Determine the job to be done (pest, area to be treated, and pesticide type).

STEP 2: Assemble the compressed air sprayer. Select the correct nozzle and attach to the end of the wand, fill the tank half full of clean water, and pressurize the tank to ensure that the tank and nozzle are operational. Pressurize to approximately 40 to 60 pounds per square inch (psi) of pressure. If the sprayer does not have a gauge, approximately 30 to 35 pump strokes will usually be sufficient. Squeeze the handle on the wand to check nozzle performance. If the sprayer is operational, release pressure from tank. If the sprayer leaks, replace the gaskets or tighten the connections on the hose, wand, and nozzle.



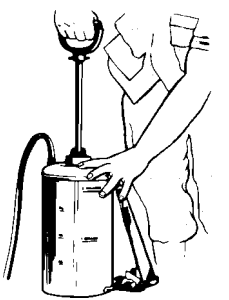
STEP 3: Read the insecticide label.

- Always read the label before doing anything.
- Always follow all instructions on the label. **The label is the law.**

CAUTION

Wear chemical resistant gloves during mixing and spraying. Gloves, Chemical and Oil Protective, NSN 8415-01-012-9294 (size 9) or NSN 8415-01-013-7832 (size 10) are recommended. Wear an approved pesticide respirator, if required by the label. DO NOT use the NBC protective mask when applying pesticides. Avoid skin contact with insecticide.

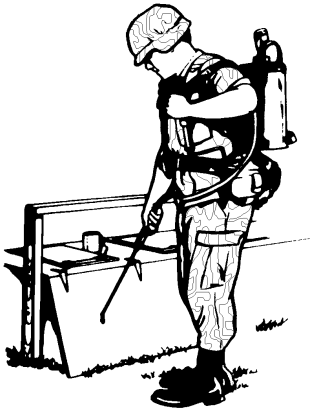
STEP 4: Add pesticide to the clean water in the sprayer tank. Finish filling the sprayer with clean water to the appropriate level. **DO NOT fill the sprayer to the top.** Leave space for pumping air pressure into the tank. Put the pump assembly into the sprayer and tighten.



STEP 5: Pump the sprayer.

- Pump the sprayer 30 to 35 times to achieve 40 to 60 psi pressure.
- There should be a slight resistance to pumping when this pressure is achieved. **DO NOT** over pump.

STEP 6: Spray insecticide.



- Point nozzle at area to be sprayed and squeeze the handle on the wand.
- Continue spraying until area is covered.

NOTE

Record all pesticide applications. The record should include location of application, name of pesticide used, and amount of pesticide used. Pesticide applications must be reported to higher echelon command, using **Department of Defense Form 1532-1** as required by **DOD Instruction 4150.7.**

STEP 7: Clean the sprayer.

- Clean the sprayer with soap and water, then flush the tank at least 3 times with clear water.
- Rinse all parts in clear water.

- Reassemble and spray clear water through nozzle. If the sprayer is not cleaned after use, vital parts will corrode.

STEP 8: Store cleaned sprayer.

- Turn the sprayer tank upside down with pump assembly separated to keep tank dry.

> **CAUTION**
>
> Always wash your hands and chemical resistant gloves, respirator, goggles, and other personal protective equipment with soap and water after spraying. Store personal protective equipment away from pesticides and applicator.

TASK 3: Control domestic rodents.

EQUIPMENT NEEDED: Tamper-proof rodent bait stations, rat snap trap (mechanical spring), mouse snap trap (mechanical spring), and rodenticides.

STEPS OF PERFORMANCE:

STEP 1: Identify rodent infestations and breeding and harborage areas, such as—

- Underground burrows.
- Around building foundations.
- Under rubbish piles.
- Near food sources.

STEP 2: Control:

- Enforce food sanitation practices, such as eliminating garbage and food waste in the bivouac area and keeping all food and waste covered.
- Locate trash dumps away from sleeping/berthing and food service areas.
- Clear all possible nesting areas by removing unnecessary rubbish and other debris.
- Modify buildings and structures to prevent rodents from having easy access.

- Use rodent snap traps and poison baits simultaneously for effective control. Poison baits must be placed in tamper/spill-proof containers with bilingual labels (English and local). Read the label and wear chemical resistant gloves when handling poison baits.

CAUTION

Wear chemical resistant gloves while handling rodenticides. Avoid skin contact with rodenticides. Wear plastic gloves when handling dead rodents. Place dead rodents in plastic bags; seal and dispose of the bags in landfills, or incinerate.

TASK 4: Prevent injuries due to venomous snakebite.

STEPS OF PERFORMANCE:

STEP 1: Be familiar with venomous snakes in the AO and with areas where snakes may be a problem.

- Rocky areas.
- Areas with rodent infestations.
- Heavy vegetation.

STEP 2: Control:

- Be familiar with field treatment of snakebites.
- Educate personnel on avoiding snakes and preventing snakebites.
- Prevent and control rodents (food sources for snakes) around camps and bivouac sites.
- Exclude snakes from buildings.

TASK 5: Inspect unit food service operations.

EQUIPMENT NEEDED: Thermometer, Self-Indicating Bimetallic, 0° F to 220° F, NSN 6685-00-444-6500. Clipboard with writing material.

BACKGROUND INFORMATION:

Some foods support the rapid growth of disease organisms that cause diarrhea; these foods are called:

POTENTIALLY HAZARDOUS FOODS

Examples of potentially hazardous foods include but are not limited to meats, fish, milk, creamed beef, gravies, soups, and chicken. Extra care and precautions must be taken with

these potentially hazardous foods. Five factors most often involved in outbreaks of diarrhea caused by contaminated foods are—

- Failing to keep potentially hazardous foods cold (below 40° F) or hot (above 140° F).
- Allowing potentially hazardous foods to remain at warm temperatures (41° F to 139° F).
- Preparing foods 3 hours or more before being served.
- Allowing sick employees to work.
- Permitting poor personal hygiene or sanitation practices by food handlers. Example: Not washing hands after using the latrine; improperly washing and sanitizing all cooking utensils.

STEPS OF PERFORMANCE:

IN GARRISON OR WHEN FOOD IS PREPARED IN A FIELD FOOD SERVICE FACILITY:

STEP 1: Have the supervisor check the temperature of potentially hazardous foods.

- If hot—food should be 140° F or above.
- If cold—food should be 40° F or below.

STEP 2: Check personnel for illness and skin infection.

STEP 3: Check food handling techniques and personal hygiene.

STEP 4: Have the supervisor check the food temperature in cold storage units.

STEP 5: Check handwashing facilities. Are they being used by food handlers?

STEP 6: Check doors and windows. Are they closed or screened to prevent flies from entering?

NOTE

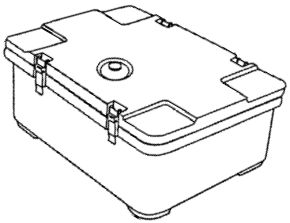
See FM 10-23 for the correct operating procedures for a field kitchen facility (mobile field kitchen [MKT-75] or kitchen tent [M-1948]).

WHEN FOOD IS BROUGHT TO YOUR UNIT IN THE FIELD:

STEP 1: Check the preparation of insulated containers.

- For hot foods, the container should be preheated by the use of boiling water. Foods should be placed in the container while they are hot (above 140° F).

- For cold foods, the container should be prechilled by the use of ice. Foods placed in the container should be cooler than 40° F. Always check the container and the insert seals to ensure that they are intact and in good condition to aid in keeping food at its required temperature.



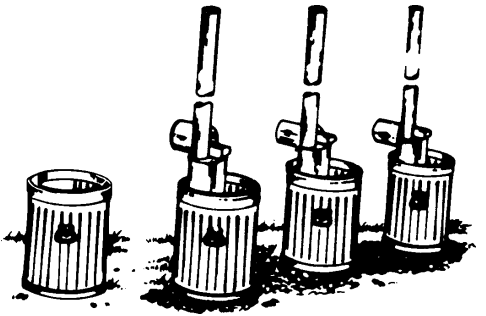
NOTE

See FM 8-34 and FM 10-23 for the correct procedures for preparing the insulated containers.

STEP 2: When the insulated container arrives, the supervisor must check the food temperature before serving. Make sure it is 140° F or above for hot foods and 40° F or below for cold foods. If the temperature is in the danger zone, contact the medical authority for instructions.

STEP 3: Check for handwashing devices for use by service members.

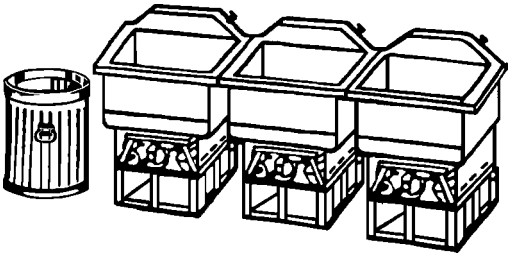
STEP 4: Check the mess kit laundry, if used. Make sure service members are using the mess kit laundry correctly. The food waste is placed in a scrap can. Wash the kit in warm, soapy water (120° F to 140° F) using a long-handled brush to scrub. Rinse the mess kit in clear, boiling water. Disinfect the mess kit by immersing it in clear, boiling water for 10 seconds. Each mess kit laundry setup of four cans will support 80 personnel. Air-dry mess kits.



NOTE

If a sanitation center or immersion heaters are not available, food service disinfectant may be used. Make sure the label directions are being followed. Each setup of four cans will support 100 personnel. The setup consists of one can for food scraps, one can with soapy water, a clear rinse can, and a final rinse can with food service disinfectant.

STEP 5: Check the sanitation center, if used. The sanitation center is a set of one garbage can and three sinks with the M2 field range burners, or the



modern burner unit, and thermometers. The first sink has warm, soapy water. The second sink has clear, 170° F water. The third sink has clear, 180° F water. If thermometers are not available, the third sink must have boiling water. Food is scraped into the garbage can. Scrub mess kit in the warm, soapy water by using a long-handled brush. Rinse the mess kit in the second sink of clear, 170° F water. Disinfect the mess kit by immersing it in the third sink of 180° F water for 10 seconds. Air-dry mess kits.

TASK 6: Inspect water containers.

EQUIPMENT NEEDED: None.

WHEN TO INSPECT WATER CONTAINERS:

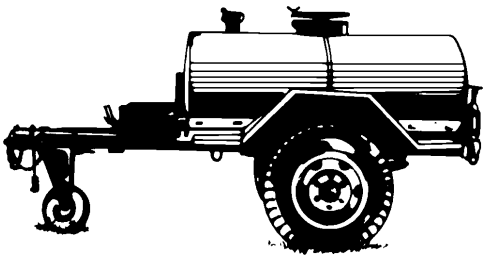
- Quarterly in garrison when not being used.
- Prior to deployment.

- Before filling at water distribution points.
- Upon completion of use to ensure that all water has been drained from the container before storage.

STEPS OF PERFORMANCE:

UNIT WATER TRAILER:

- Upon completion of use:



STEP 1: Drain plug and spigots: Make sure that the drain plug has been removed and that all spigots have been opened to drain all water from the tank. Foul odors, bacteria growth, and rust will accumulate during storage if the water is not completely drained.

STEP 2: Manhole cover: Place a thin piece of wood under the manhole cover to provide ventilation. With the manhole cover and spigots open, air circulation will be allowed, thus drying the inside of the water trailer.

NOTE

See the technical manual on your water trailer for additional guidance.

- Quarterly:

STEP 1: Manhole cover: Ensure the sealing gasket is in place, free of excessive cracks and dry rot. Cover should provide an effective seal.

STEP 2: Drain plug: Ensure it is operable; it should be removable without excessive effort.

STEP 3: Interior: Check surface for excessive cracks; check for signs of being used for storage of products other than water such as oil products, gasoline, or diesel fuel. Rust stains and other discoloration caused by common natural chemicals in water (iron or manganese) pose no health problem.

STEP 4: Spigots: Make sure spigots are clean and operable. Covers over spigots should open and close with ease. Spigot handles should operate freely.

NOTE

Questions concerning excessive interior cracks or chipping and use after storage of products other than water should be directed to PVNTMED personnel. Refer to the technical manual on your water trailer for maintenance instructions.

- Before filling at water distribution points:

  STEP 1: Check interior for gross contamination.

  STEP 2: Check hose used to fill trailer. Water point fill hose should not come in contact with the ground. If the hose is lying on the ground, wash the end before use.

  STEP 3: After filling, check manhole cover and drain plug to ensure that they are secure.

> **CAUTION**
>
> Personnel detailed to fill water trailers must be directed to fill the trailers only at approved water points.

COLLAPSIBLE FABRIC DRUMS/PILLOWS/ONION TANKS:

STEP 1: Interior: Check for dirt and other contamination; check for holes.

STEP 2: Fill holes: Check to ensure that fill holes are clean and covers are in place.

STEP 3: Exterior: Check to ensure the exterior is free of oils and other contaminants that may seep into the bag and contaminate the water.

LYSTER BAGS:

STEP 1: Interior: Check for dirt and other contamination; check for holes.

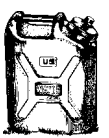
STEP 2: Cover: Check to make sure it fits. Check for holes.

STEP 3: Spigots: Make sure spigots are clean and in place.

STEP 4: Location: Elevate Lyster bags sufficiently to prevent contamination of spigots by wildlife.

NOTE

Always clean the Lyster bag prior to its first use and periodically thereafter with potable water.



WATER CANS: Check interior for contamination; if can has a fuel odor, such as gasoline, do not use it for drinking water.

TASK 7: Check unit water supply for chlorine residual.

EQUIPMENT NEEDED: Field chlorination kit containing chlorine ampules, color comparator, and chlorine test tablets.

Check the chlorine residual when—

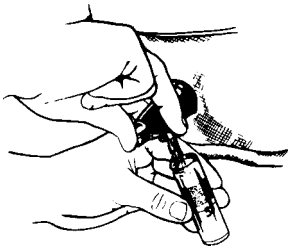
- Filling unit containers at water distribution points.
- Water containers arrive in unit area.
- Directed by command medical authority.
- Treating a raw water supply.

STEPS OF PERFORMANCE:

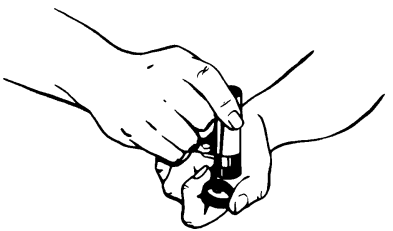
STEP 1: Determine the desired chlorine residual in milligrams per liter (mg/L).

- At the point of consumption, water obtained from an approved water distribution point should have at least a trace of chlorine residual.
- When the unit must obtain water from a raw water supply, or from another source such as a stream or pond, the finished product should have a 5-mg/L chlorine residual after 30 minutes. Under certain conditions, the local medical authority may direct a higher residual.

STEP 2: Flush the spigots of the water container being checked and fill the color comparator tube to a point just below the top of the tube.



STEP 3: Place one chlorine test tablet in the comparator and allow it to dissolve.



STEP 4: Hold the color comparator at eye level and toward a good light source.

STEP 5: Compare the color of the water with the color disc on the opposite side of the color comparator.

- The water is safe to use if the color of the water is the same shade or darker than the required color for the chlorine residual.
- The water must be chlorinated if the color is lighter than the required residual.

TASK 8: Chlorinate water supplies.

EQUIPMENT NEEDED: Field chlorination kit, a 6-ounce jar of calcium hypochlorite (HTH) (70 percent chlorine), or a container of 5- to 6-percent household bleach. Chlorinate the water when—

- The water supply has no chlorine residual.

- The chlorine residual is below required level.
- A raw (untreated) or unapproved water supply must be used.

STEPS OF PERFORMANCE:

STEP 1: Before adding chlorine, check the chlorine residual following the procedures in Task 7.

STEP 2: If the chlorine residual is less than the desired level, add enough chlorine to raise the residual to the required level. Use Table A-1 to determine the amount to add to untreated water. If a 10 mg/L chlorine residual is required, double these amounts. To increase the residual in treated water, smaller quantities of chlorine will be needed.

STEP 3: Wait 10 minutes, then check the chlorine residual.

STEP 4: If the residual is less than 5 mg/L, repeat steps 2 and 3 using a smaller amount of chlorine.

STEP 5: If the residual is at least 5 mg/L, wait an additional 20 minutes before drinking.

*Table A-1. Amounts of HTH and Bleach Equivalent to a 5 mg/L Dose in Various Volumes of Water Volume**

VOLUME	AMPULES	HTH		5% BLEACH	
		MRE SPOON	MESSKIT SPOON	MRE SPOON	MESSKIT SPOON
5 GAL	0.5			0.5	
10 GAL	1.0			1.0	
20 GAL	1.0			2.0	
32 GAL	2.0			2.0	1.0
36 GAL	2.0	0.5		3.0	1.0
50 GAL	3.0	0.5		3.0	1.0
55 GAL	3.0	0.5		4.0	1.0
100 GAL	6.0	1.0		7.0	2.0
150 GAL	8.0	1.0		10.0	3.0
160 GAL	9.0	1.0		11.0	3.0
250 GAL	14.0	2.0	0.5	17.0	5.0
400 GAL	22.0	3.0	1.0	26.0	7.0
500 GAL	27.0	3.0	1.0	33.0	9.0
1000 GAL	54.0	7.0	2.0	66.0	18.0
3000 GAL	162.0	20.0	6.0	196.0	54.0
5000 GAL	270.0	33.0	10.0	327.0	90.0

* THE QUANTITIES DEPICTED IN THIS TABLE ARE GENERAL GUIDELINES, ACTUAL AMOUNTS MAY VARY BASED ON WATER QUALITY.

TASK 9: Set up, construct, and maintain field waste disposal devices.

EQUIPMENT NEEDED:

- Set up required number of chemical toilets.
- Collect material for type of improvised facilities to be constructed, if required.
- Establish a detail to set up or construct the devices.

DISPOSAL METHODS THAT MAY BE USED IN THE FIELD:

NOTE

Local, state, federal, and host-nation regulations or laws may prohibit burning or burial of waste. The garbage, rubbish, and other such material may have to be transported to a waste disposal facility. Chemical toilets are the required human waste disposal devices for use during field exercises or missions. Improvised devices may be used under emergency conditions; the burn-out latrine is the preferred method for improvised devices.

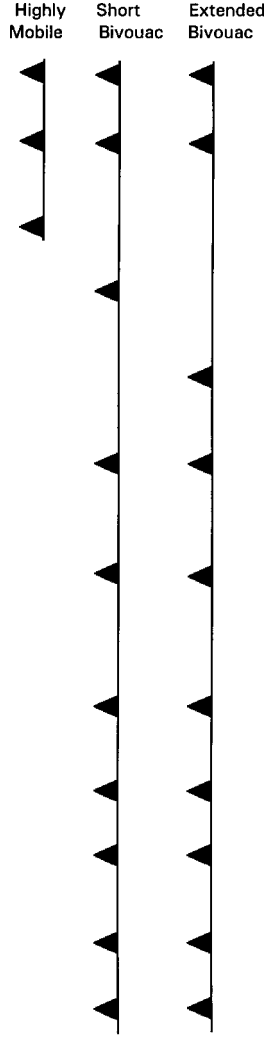
- Garbage/rubbish disposal.
  - Collect and transport to approved disposal facilities.

- Expedient devices.
  - Burial—Less than 1 week.
  - Incineration—Longer than a week.
- Liquid kitchen or bathing waste disposal.
  - Grease trap.
  - Soakage pits.
  - Evaporation beds.
- Human waste disposal.
- Chemical toilets. Urinals should be provided in these facilities to prevent soiling the toilet seats, if possible.
  - Individual waste collection bags on the march or for small groups in isolated areas.
  - Cat-hole latrine for marches if individual waste collection bags are not available.

- Field expedients when individual waste collection bags are not available—
  - Burn-out latrine.
  - Pail latrine when chemical toilets are not available, the ground is too hard, or the water table is too high (soil is very wet).
  - Straddle trench for 1 to 3 day bivouac sites when burn-out or pail latrine are not available.
  - Deep pit latrine for temporary camps.
  - Soakage pits for urinals at temporary camps.
  - Trough urinal.
  - Pipe urinal.
  - Urinoil. (See page A-44 for further information on the urinoil.)

STEPS OF PERFORMANCE:

STEP 1: Use the following chart to determine disposal requirements.



INDIVIDUAL WASTE COLLECTION BAGS
Dispose of with regular waste.

CHEMICAL TOILETS
The preferred field device. Add urinals to protect seats in latrines.

CAT-HOLE
Cover with dirt after use.

STRADDLE TRENCH
Enough for 6 percent of the soldiers.
Cover with dirt after each use.

DEEP PIT
Enough for 6 percent of the soldiers.
Add urinals to protect seats in male latrines.

GARBAGE PIT
Locate near dining facility, but not closer than 100 feet.
One pit per 100 soldiers served per day.
Cover with dirt after each meal; close daily.

SOAKAGE PITS (FOOD SERVICE)
Locate near dining facility; need at least two.
Fill with loose rocks.
Add grease trap for dining facility waste.
Alternate daily use.

SOAKAGE PIT (OTHER)
Provide soakage pit for urinals, shower, Lyster bag, or other locations where water collects.

MESS KIT LAUNDRY/SANITATION CENTER
Dig soakage pit to provide good drainage.

HANDWASHING DEVICES
Dig shallow soakage pit.
Collocate with latrines and food facilities.

SHOWERS
Dig soakage pit.

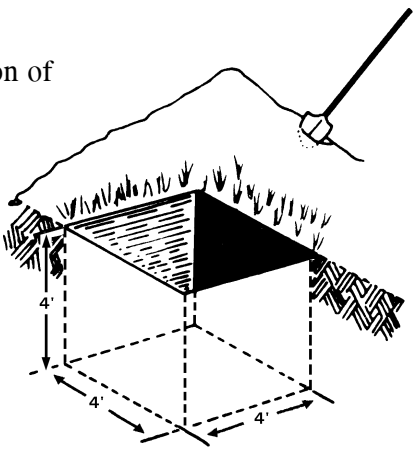
URINALS
Trough
Pipe
Urinoil

STEP 2: Select site of construction.

- Garbage and soakage pits should be at least 30 meters from food service.
- Latrine should be as far as possible from food service (100 meters or more is best).
- Latrine should be located on level ground. Never uphill from the campsite or water supplies.

STEP 3: Construct disposal facility.

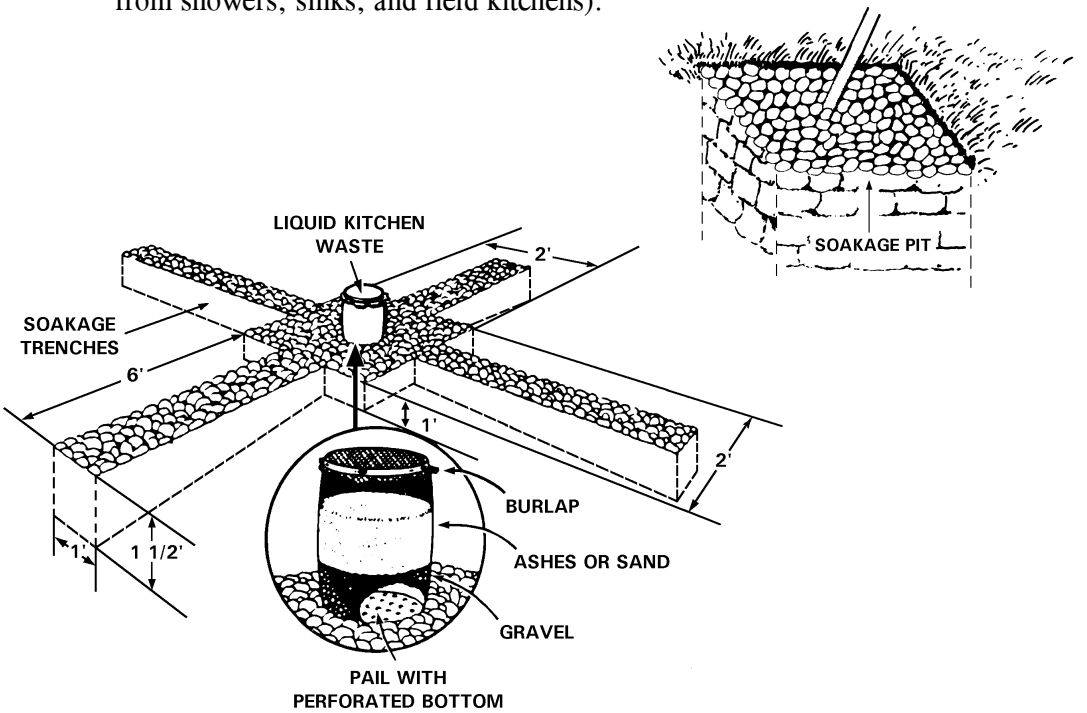
- **Garbage pit—**Used to prevent accumulation of garbage in the unit area.



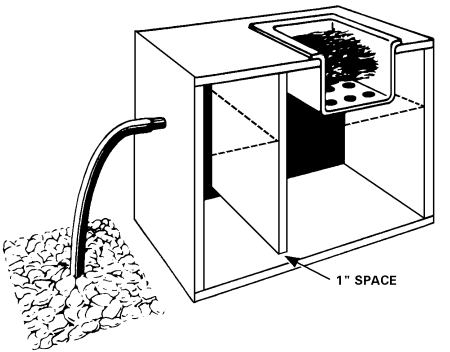
NOTE

Garbage and rubbish should be transported to an approved landfill or must be buried or burned. If buried for short stays, cover daily. For longer periods, garbage and rubbish may have to be burned; however, the ashes should be buried. (Reader should consult the note on page A-32.)

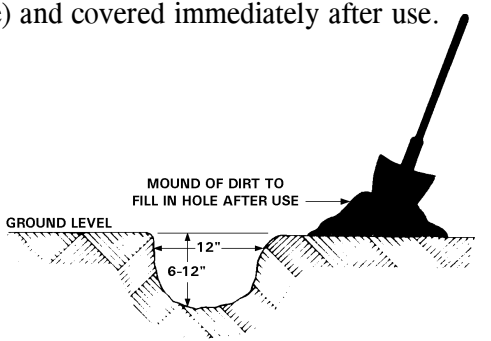
- **Soakage pit/trench**—Used to prevent accumulation of liquid waste (water from showers, sinks, and field kitchens).



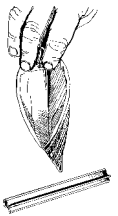
- **Grease trap**—Used with both soakage pit and trench to prevent clogging of soil.



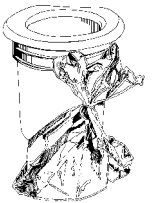
- **Cat-hole latrine**—Used only on the march (if individual waste collection bags are not available) and covered immediately after use.



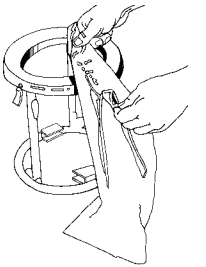
- **Chemical toilets**—Used as the standard field latrine.



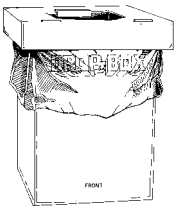
BRIEF RELIEF (INDIVIDUAL)



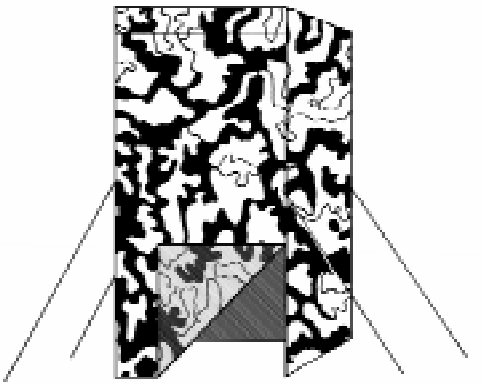
DISPOSA-JOHN



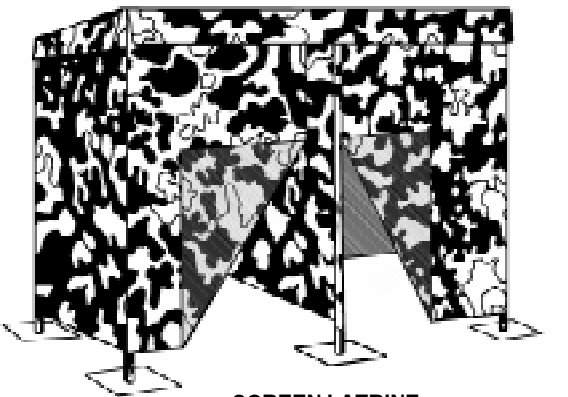
INDIVIDUAL SERVICE MEMBER FIELD TOILET



DROP-BOX TOILET

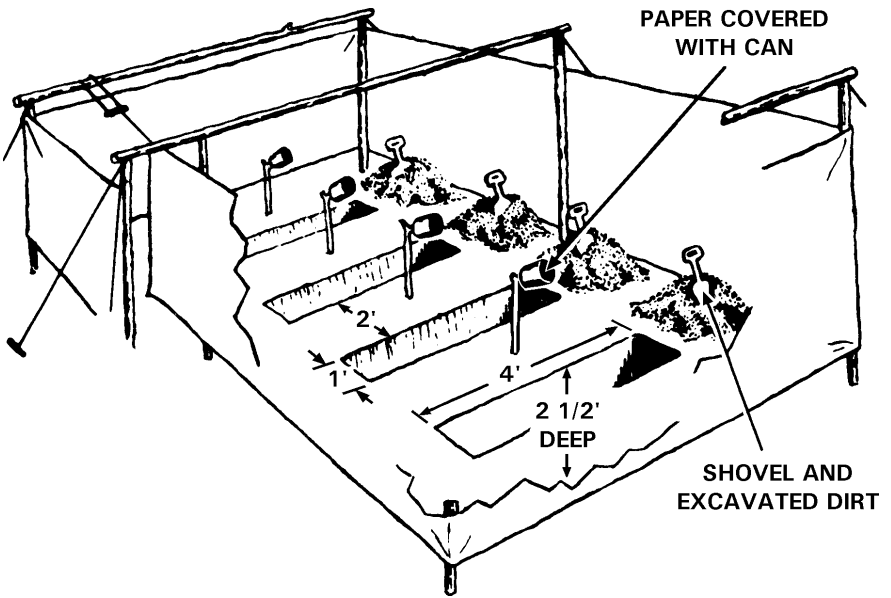


INDIVIDUAL TENT LATRINE

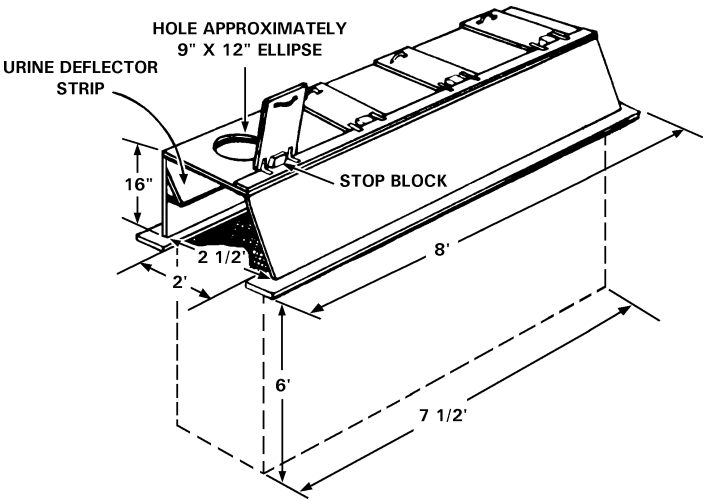


SCREEN LATRINE

- **Straddle trench latrine**—Used on short bivouacs and field training exercises. Two trenches per 100 males and three trenches per 100 females.



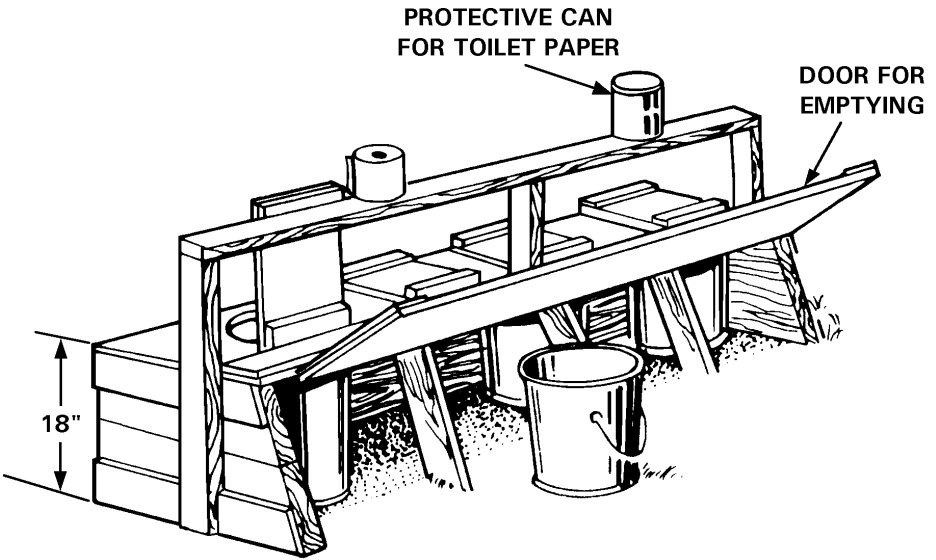
- **Deep pit latrine**—Used for longer periods of time and in built-up areas. Collapsible two-seat boxes are available in the supply system.



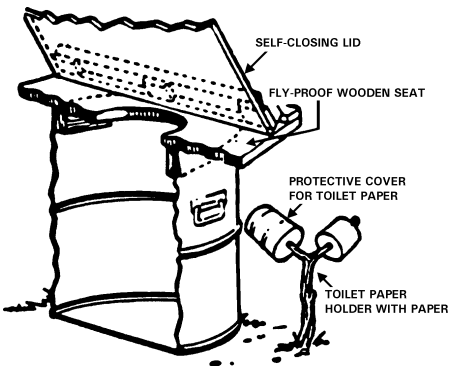
NOTE

If ground is too hard for digging, or if the water table is too high, use a pail latrine or a burn-out latrine.

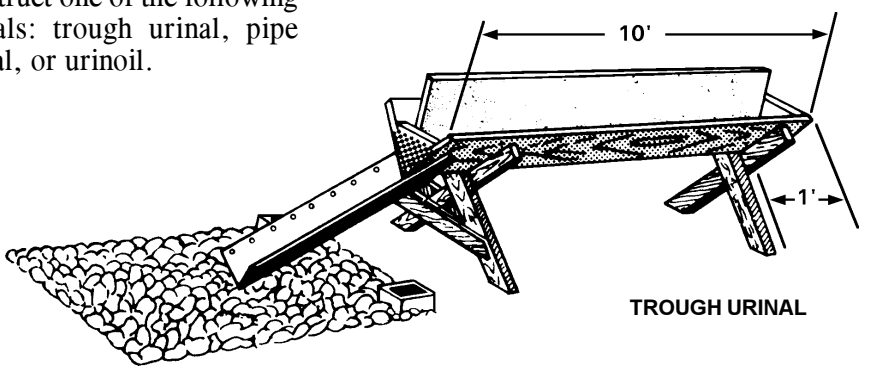
- **Pail latrine**—Use where water table is too close to the surface of the ground for digging a deep pit latrine.



- **Burn-out latrine**—Use where water table is too close to the surface of the ground for digging a pit latrine, or stay is for an extended period.

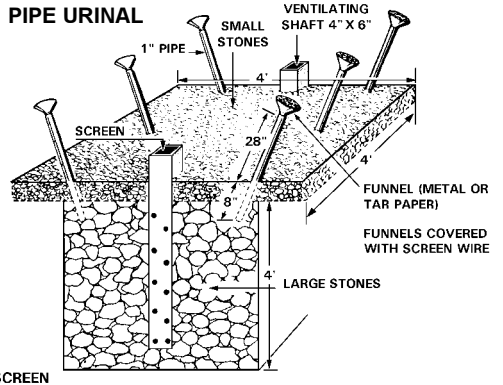


- **Urinals**—For male latrines, construct one of the following urinals: trough urinal, pipe urinal, or urinoil.

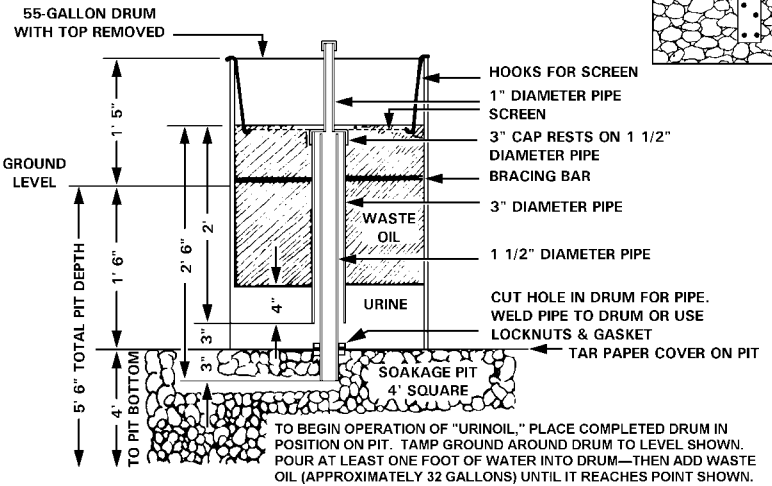


TROUGH URINAL

PIPE URINAL



URINOIL



TO BEGIN OPERATION OF "URINOIL," PLACE COMPLETED DRUM IN POSITION ON PIT. TAMP GROUND AROUND DRUM TO LEVEL SHOWN. POUR AT LEAST ONE FOOT OF WATER INTO DRUM—THEN ADD WASTE OIL (APPROXIMATELY 32 GALLONS) UNTIL IT REACHES POINT SHOWN.

STEP 4: Inspect daily to make sure that the following is done:

- Waste is collected and transported to an approved disposal facility.
- Straddle trench latrines and garbage pits are covered with dirt daily.
- Pail latrines are emptied and cleaned daily.
- Burn-out latrine containers are rotated and contents burned daily. · Facilities (not the contents) are sprayed with insecticide for fly control when other control techniques fail.

STEP 5: Close improvised latrines and garbage pits when filled to within 1 foot of the ground surface. Have chemical toilet contents removed daily.

Close out by—

- Spraying with residual insecticide.
- Packing earth in successive 3-inch layers until mounded 1 foot above ground level. Spraying again with residual insecticide.
- Posting a sign stating, "Closed latrine/garbage pit and date" (except in combat).

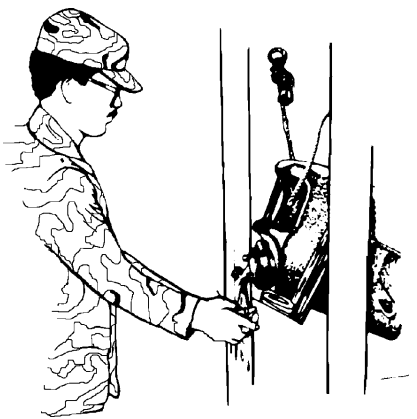
TASK 10: Construct and maintain field handwashing and shower devices.

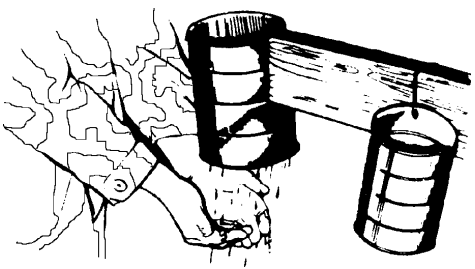
EQUIPMENT NEEDED: Personnel detailed to construct and maintain field handwashing and shower devices. Material as required for type of facilities to be constructed.

STEPS OF PERFORMANCE:

STEP 1: Select device to be constructed.

- Handwashing devices.





- Shower devices.

STEP 2: Construct devices.

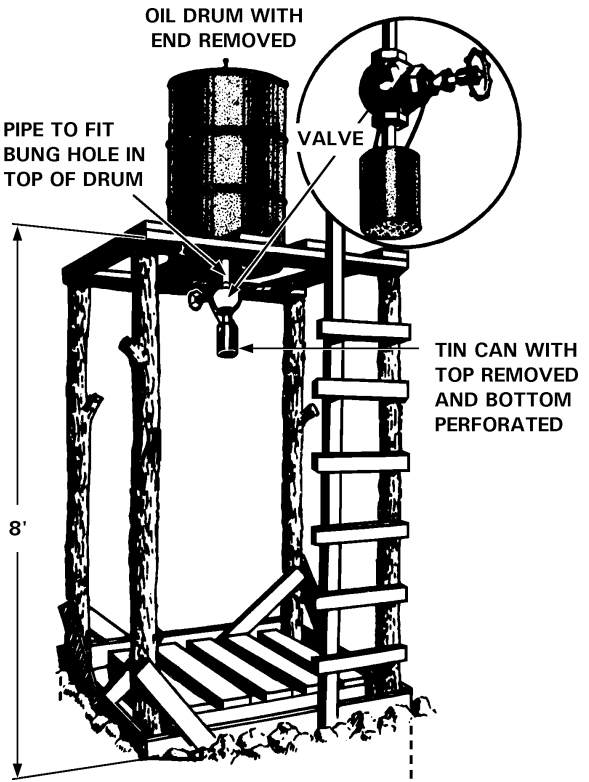
- Collocate handwashing devices at food service and latrine locations.

NOTE

A soakage pit should be provided for all handwashing and shower facilities.

STEP 3: Maintain devices. A supply of soap and water must be available at all times.

STEP 4: Close devices.



GLOSSARY

ABBREVIATIONS AND ACRONYMS

AO area of operations

attn attention

C centigrade

DA Department of the Army

DEET 75 percent N, N-diethyl-M-Toluamide

DNBI disease and nonbattle injury

DOD Department of Defense

F Fahrenheit

FM field manual

FST field sanitation team

gal gallon

GTA graphic training aid

hr hour

HSS health service support

HTH calcium hypochlorite, 70 percent available chlorine

lb pound

LP listening post

MCRP Marine Corps Reference Publication

mg/L milligrams per liter

min minute

MOPP mission-oriented protective posture

mph miles per hour

MRE meal(s), ready to eat

MSDS material safety data sheets

NBC nuclear, biological, and chemical

NL no limit

NSN National Stock Number

OP observation post

PMM preventive medicine measures

psi pounds per square inch

PVNTMED preventive medicine

qt quart

SOP standing operating procedure

STD sexually transmitted disease

US United States

UV ultraviolet

WBGT wet bulb globe temperature

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INDEX

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Fahrenheit to Celsius Conversion

The temperature *T* in degrees Celsius (°C) is equal to the temperature *T* in degrees Fahrenheit (°F) minus 32, times 5/9:

$T_{(°C)} = (T_{(°F)} - 32) \times 5/9$

Fahrenheit to Celsius Conversion Table

0 °F	-17.78 °C	
10 °F	-12.22 °C	
20 °F	-6.67 °C	
30 °F	-1.11 °C	
32 °F	0 °C	freezing/melting point of water
40 °F	4.44 °C	
50 °F	10.00 °C	
60 °F	15.56 °C	
70 °F	21.11 °C	room temperature
80 °F	26.67 °C	
90 °F	32.22 °C	
98.6 °F	37 °C	average body temperature
100 °F	37.78 °C	
110 °F	43.33 °C	
120 °F	48.89 °C	
130 °F	54.44 °C	
140 °F	60.00 °C	
150 °F	65.56 °C	

Reference: https://www.rapidtables.com/convert/temperature/fahrenheit-to-celsius.html

SRD-4 to AJMedP-4(A)(1)