

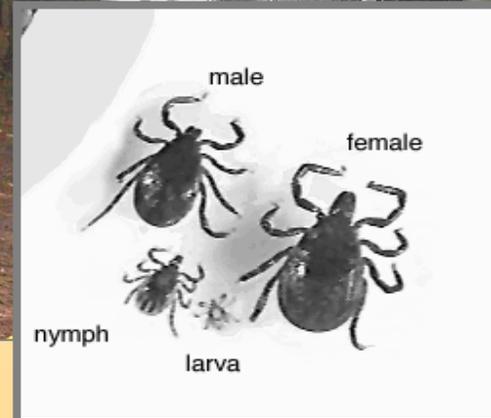


General Preventive Medicine Topics

**Understanding the Medical Threat
Field Sanitation Teams
Field Water Chlorination
Determine the Heat Index**



The Medical Threat & Preventive Medicine Principles





FST Concept: [AR 40-5, Chpt. 14]

- ◆ **Company Level**
- ◆ **1 NCO & 1 Enlisted Member** (*Highly motivated with time to perform duties*)
 - ➔ Must have 6 months remaining in unit
- ◆ **Formal training**
 - ➔ (40 hrs) by Preventive Medicine
 - ➔ Completion of correspondence course
 - ➔ Annual refresher

Responsibilities:
[FM 21-10, FM 4-25.12]

Advise Commander:
disinfecting water; food sanitation; personal hygiene; waste management; arthropod/rodent control; injury prevention; soldier training on PMM



What is the Medical Threat?

Environment

Disease & Non-Battle Injuries

- ◆ Heat
- ◆ Cold
- ◆ Humidity
- ◆ High Elevations above Sea Level
- ◆ Insects & Arthropods
- ◆ Diarrheal Diseases
- ◆ Communicable Diseases
- ◆ Poisonous Plants & Animals
- ◆ High OPTEMPO (*tax physical & emotional endurance of soldiers*)



HEAT

US Peacekeeping Forces, Sinai (1982): 35 members of an airborne company incapacitated by heat need IV fluids to recover.

Role of the Environment

Wind: air warmer than skin cools through evaporation;

Windburn = damaged skin (reduces heat loss, increases heat stress on body)

Humidity: high humidity = less moisture evaporation from skin (results in heat stress on body)

Radiant Energy: metal objects radiate heat to body; body cannot lose heat by radiation during hot & sunny climate.



Countermeasures for Heat Injuries

- ◆ Water consumption IAW heat index
→ Hyponatremia/Overhydration Caution
- ◆ Eat all meals (most effective means of replenishing salt)
- ◆ Work/rest cycles (METT-T dependent)

WBGT Kit: NSN 6665-00-159-2218

WBGT Kit with Tripod: NSN 6665-01-381-3023

NSN Source: FM 4-25.12



COLD



Types of Injuries

- chilblains
- immersion foot
- trench foot
- frostbite
- hypothermia

World War II: 90 thousand U.S. service members suffered from cold injuries; 54 thousand of these occurred during the winter of 1944-45 alone.



Countermeasures for Cold Injuries

◆ Plan for Weather

Desert Shield/Storm: daytime temperatures exceeded 100°F; at night temps dropped below 40°F.

- ◆ Proper Uniform Wear (*loose layers*)
- ◆ Change Wet Clothing (*powder feet between sock changes*)
- ◆ Provide Warming Areas
- ◆ Avoid Alcohol, Caffeine, & Tobacco (*stay hydrated*)

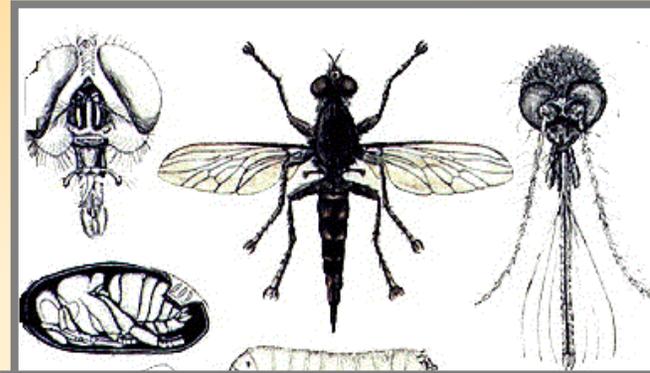


Arthropod-Borne Diseases

Mosquito

Malaria, Dengue,
Yellow Fever

U.S. Forces, World War II: 16 million man-days lost due to malaria.

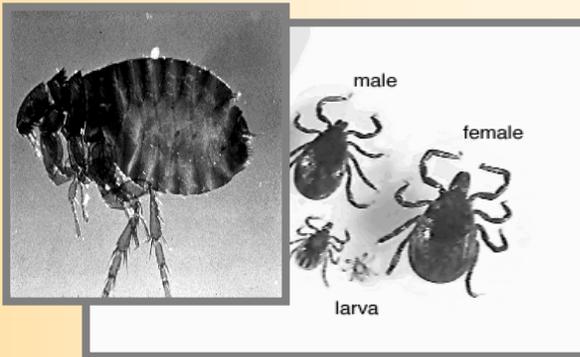


Sand Flies

Leishmaniasis

Fleas

Plague

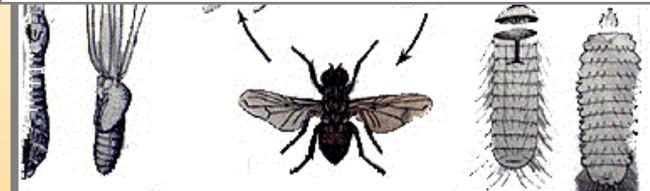


Ticks

Lyme Disease

Flies

Dysentery



Body Louse



Napoleon's Grand Army (1812): 430 thousand deaths due to louse-borne typhus & the cold.



Countermeasures to Prevent Arthropod-Borne Diseases

- ◆ Immunizations (Yellow Fever; Typhoid)
- ◆ Chemoprophylaxis (Malaria pills)
- ◆ Insect Repellent (DEET; Permethrin)
- ◆ Personal Hygiene (change clothing; wash key areas of body; handwashing)
- ◆ Protective Equipment (bed & head nets; sleeves down on BDUs; tuck pant leg into boots)



Diarrheal Diseases

Operation Bright Star (1980): exercise ends miserably for 30% of U.S. soldiers who suffer from diarrhea, dysentery, & vomiting after eating in civilian restaurant [*Shigellosis*]

◆ Food and Waterborne Diseases

- Amoebic Dysentery
- Cryptosporidiosis
- Cholera
- Hepatitis A & E
- Schistosomiasis

- ➔ Shigellosis
- ➔ Salmonellosis
- ➔ Tularemia
- ➔ Giardiasis



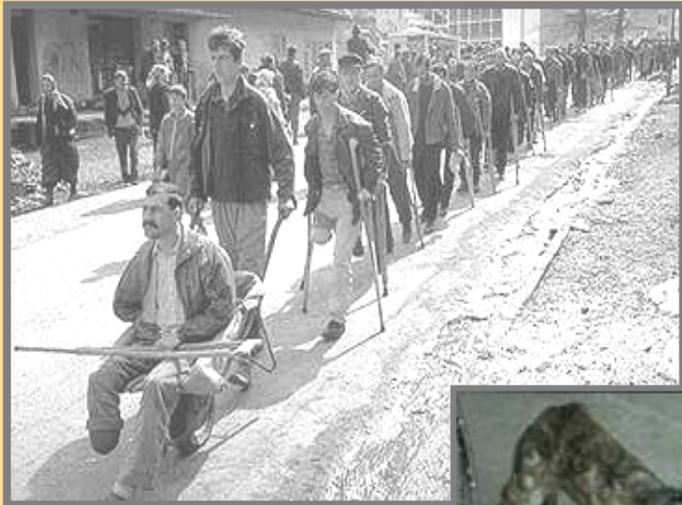
Countermeasures for Diarrheal Diseases

- ◆ Obtain food/water from approved sources
- ◆ Employ Proper Hygiene (*handwashing*) and Sanitation Practices
- ◆ Insect Control (*roaches & flies*) Through Proper Waste Management



Other Medical Threat Considerations

Communicable Diseases



Poisonous Plants & Animals

Environmental Contamination



Bombing Devastation in: Kuwait/Iraq, Bosnia & Kosovo



Medical Intelligence



Sources:

Preventive Medicine
Command Surgeon
S-2 (MEDIC CD ROM)

Medical Threat Briefs: *(Operations & Exercises)*

Enduring Freedom; Noble Eagle; Cobra Gold

<http://chppm-www.apgea.army.mil/mtb/>

Deployment Resources: *(RE: Staying Healthy Guides)*

<http://chppm-www.apgea.army.mil/deployment/deploymentlinks.asp>



Principles of...

Preventive Medicine Measures (PMM)

- ◆ Recognize the Medical Threat & Implement PMM
- ◆ Soldiers Perform Individual PMM
- ◆ Field Sanitation Teams (FST) Support Unit PMM
 - Train soldiers in PMM
 - Advise the Commander on Field Sanitation issues
- ◆ Chain of Command Plans for and Enforces PMM

Leaders MUST Emphasize PMM!



Bottom Line.....

- ◆ The underlying principle of Preventive Medicine = reduce combat ineffectiveness due to DNBI.

Achieved through:

- understanding the Medical Threat
- an effective FST
- enforcement of PMM



Guidance for Managing the Unit's Potable Water

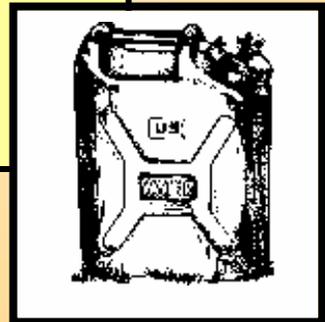


POTABLE WATER



- Obtain water from approved source or fill point
- Chlorinate to 1 ppm
- Protect from contamination

Platoon suffers from bloody diarrhea after drinking water from 5-gallon cans filled from hose stored on latrine floor.





Inspect Water Trailer

- ◆ Every 6 months in garrison (*when in use*)
- ◆ Before deployment or field exercise
- ◆ Quarterly
 - manhole cover
 - drain plug
 - interior
 - spigots

- ◆ **Before Filling:**
 - interior
 - hose at fill point
- ◆ **After Filling:**
 - manhole cover



Steps to Chlorinate Water

- ◆ Follow Table A-1, FM 21-10 (*only add 1/3 of concentration listed in Table A-1 to achieve 1-ppm; Table A-1 amounts will raise residual to 5-ppm*)
- ◆ Add contents of ampoules, bulk calcium hypochlorite (HTH), or bleach to water
- ◆ Stir & Wait 10 minutes
- ◆ Check Chlorine Residual
 - ✓ If > 1-ppm - Wait 20 more minutes before releasing for consumption
 - ✓ If < 1-ppm - add more chlorine solution to water and follow steps 3-5 until 1-ppm is reached.



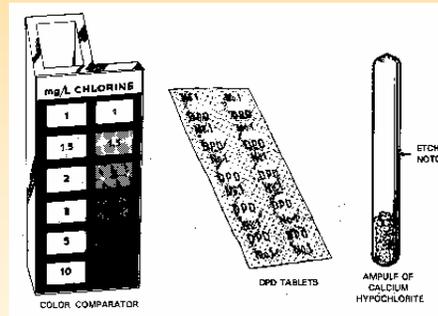
5-ppm residual indicated by color match on right.



Monitoring Chlorine Residual

◆ Chlorination Test Kit

- ✓ Step comparator
- ✓ DPD #1 tablets
- ✓ Ampoules of calcium hypochlorite



◆ Heat Dissipates Chlorine

◆ Conduct periodic checks to ensure a 1-ppm Minimum Residual



Chlorinated water is your first barrier against contamination.



Actions for Storing Water Trailers

Residual water in tank promotes foul odors, bacterial growth, and rust during storage.

- ◆ **Remove drain plug**
- ◆ **Open spigots**
- ◆ **Prop manhole cover open (1/2 to 1 inch)**

Ventilation allows air circulation and drying.



Chlorination Test Kit

NSN 6850-00-270-6225

How reliable are your test tablets?



Examine DPD #1 Tablets

- ◆ Tablets should be white.
- ◆ Graying of tablet is indicator of aging/deterioration.
- ◆ Light gray tablets may give poor residual reading.
- ◆ **Dark gray/black tablets are ineffective.**



Do NOT use dark gray or black DPD tablets to check chlorine residual!



DPD Tablet Reliability

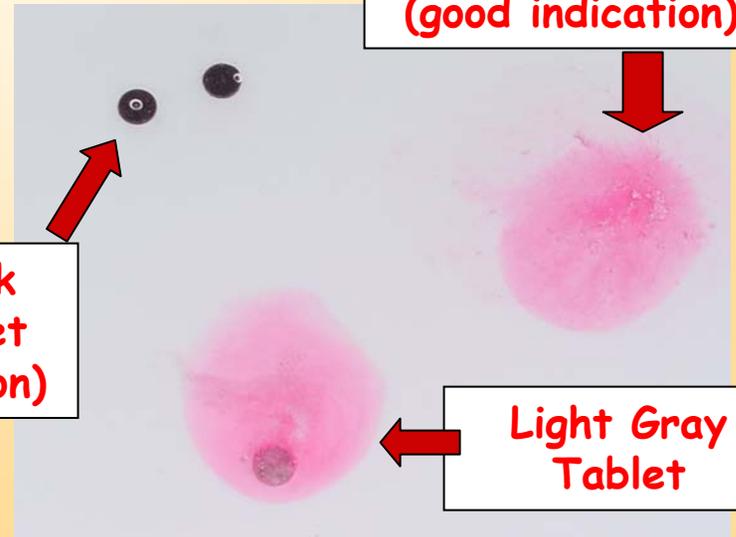
- ◆ White DPD #1 tablets will flash pink when chlorine is present in water.
- ◆ Light gray tablets will also provide a reasonably accurate reading.
- ◆ Dark gray or black tablets are aged beyond usability and yield no indication of residual.

Contact your supplier if the majority of the tablets in your chlorination kit are gray or black.

Black/Dark Gray Tablet (no indication)

White Tablet (good indication)

Light Gray Tablet





Ordering DPD#1 Tablets

- ◆ Reference: TB MED 577, Sanitary Control and Surveillance of Field Water Supplies, 1 May 1999.

- ◆ Appendix F, p. F-3
 - NSN 6810-01-044-0315
 - Chlorine Test Tablet, DPD Method
 - Provides 1 box of 100 foil-wrapped DPD No. 1 tablets.



Determining the Heat Index

WBGT

Wet Bulb (WB) = humidity

Black Globe (BG) = solar load

Dry Bulb (DB) = ambient temperature



Heat CAT & Water Consumption

Work/Rest/Water Consumption Table

Applies to average sized, heat acclimated soldier wearing BDU, hot weather

Easy Work	Moderate Work	Hard Work
<ul style="list-style-type: none"> • Weapon Maintenance • Walking Hard Surface at 2.5 mph, < 30 lb Load • Marksmanship Training • Drill and Ceremony 	<ul style="list-style-type: none"> • Walking Loose Sand at 2.5 mph, No Load • Walking Hard Surface at 3.5 mph, < 40 lb Load • Calisthenics • Patrolling • Individual Movement Techniques, i.e. Low Crawl, High Crawl, etc. 	<ul style="list-style-type: none"> • Walking Hard Surface at 3.5 mph, ≥ 40 lb Load • Walking Loose Sand at 2.5 mph with Load • Field Assaults

- 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. Fluid needs can vary based on individual differences (\pm ¼ qt/h) and exposure to full sun or full shade (\pm ¼ qt/h).

- 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 1½ quarts.

Daily fluid intake should not exceed 12 quarts.

- If wearing body armor add 5°F to WBGT in humid climates.

- If wearing NBC clothing (MOPP 4) add 10°F to WBGT.

Heat Category	WBGT Index, F°	Easy Work		Moderate Work		Hard Work	
		Work/Rest	Water Intake (Qt/H)	Work/Rest	Water Intake (Qt/H)	Work/Rest	Water Intake (Qt/H)
1	78° - 81.9°	NL	½	NL	½	40/20 min	½
2 (GREEN)	82° - 84.9°	NL	½	50/10 min	¾	30/30 min	1
3 (YELLOW)	85° - 87.9°	NL	¾	40/20 min	¾	30/30 min	1
4 (RED)	88° - 89.9°	NL	¾	30/30 min	¾	20/40 min	1
5 (BLACK)	> 90°	50/10 min	1	20/40 min	1	10/50 min	1





Taking WBGT Measurements

- ◆ Location of WBGT Device
 - same vicinity of training or mission, or similar environment (open field, wooded area, etc)
- ◆ Position of Device
 - 4 feet off ground (use tripod); away from metallic objects
- ◆ Calculating the WBGT Using the Slide Rule
 - Set WB Temp. at the DB Temp.
 - Read WBGT Index at the BG Temp.

*** Cannot calculate a “no solar” WBGT Index using slide rule.**



Calculating the WBGT Manually

With a Solar Load (Outdoors with partial to full sun)

WB Temp. X 0.7

BG Temp. X 0.1

DB Temp. X 0.2



Example

- ◆ If the wet bulb temperature reading is 82° F, the black globe temp. is 95° F, and the dry bulb is 90° F:

$$\text{WB } 82^{\circ} \text{ F} \times 0.7 = 57.4$$

$$\text{BG } 95^{\circ} \text{ F} \times 0.1 = 9.5$$

$$\text{DB } 90^{\circ} \text{ F} \times 0.2 = 18.0$$

$$\text{WBGT Index} = 84.9$$

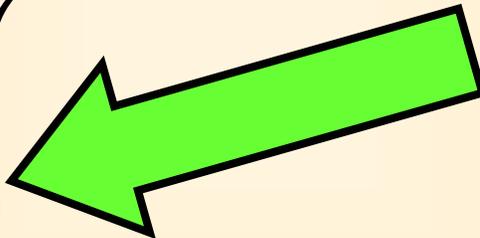


Calculating the WBGT Manually

- ◆ Without Solar Load (Indoors or complete overcast; no sun)

WB Temp. X 0.7

DB Temp. X 0.3



Black globe temperature is not used; DB value is multiplied by 0.3 Instead of 0.2.





Example

If the wet bulb temperature reading is 82° F and the dry bulb is 90° F:

$$\text{WB } 82^{\circ} \text{ F} \times 0.7 = 57.4$$

$$\text{DB } 90^{\circ} \text{ F} \times 0.3 = 27.0$$

$$\text{WBGT Index} = 84.4$$



Questions

General PM Topics

- ◆ The Medical Threat & Preventive Medicine Principles
- ◆ Field Sanitation Teams
- ◆ Water Chlorination
- ◆ Heat Index Calculation

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