

## **Medical Force Protection: Belize**

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Medical Force Protection countermeasures required before, during, and after deployment to the “area” are as follows:

### **Major Threats**

Diarrhea, respiratory diseases, injuries, hepatitis A, dengue fever, leptospirosis, rabies, brucellosis, malaria, other arthropod-borne infections, sexually transmitted diseases, heat injury, and Chaga’s disease. Water may be contaminated by raw sewage, industrial wastes, agrochemicals, and salt water intrusion.

### **Requirements before Deployment**

#### **1. Before Deploying report to Medical to:**

- a. Ensure your Immunizations are up to date, specific immunizations needed for area: **Hepatitis A, MMR, Polio, Typhoid, Yellow fever, Tetanus (Td), and Influenza.**
- b. If you have not been immunized against Hepatitis A (two dose series over 6 months) get an injection of Immunoglobulin with the initial Hepatitis A dose.

#### **2. Malaria Chemoprophylaxis:**

**Must include Primaquine terminal prophylaxis** (see “Requirements after deployment”)

- a. **Chloroquine 500 mg/week 2 weeks prior to entering Belize, and until 4 weeks after departure.**
  - b. **Mefloquine 250 mg/week 2 weeks prior to entering Belize, until 4 weeks after departure**
  - c. **Doxycycline 100 mg/day 2 days prior to entering country, until 4 weeks after departure.**
3. **Get HIV testing if not done in the past 12 months.**
  4. **Make sure you have or are issued from unit supply: DEET, permethrin, bednets/poles, sunscreen and lip balm. Treat utility uniform and bednet with permethrin.**

### **Requirements during Deployment**

1. Consume food, water, and ice only from US-approved sources; **"Boil it, cook it, peel it, or forget it"**.
2. Involve preventive medicine personnel with troop campsite selection.
3. Practice good personal hygiene, hand-washing, and waste disposal.
4. Avoid sexual contact. If sexually active, use condoms.
5. Use DEET and other personal protective measures against insects and other arthropod-borne diseases. Personal protective measures include but are not limited to proper wear of uniform, use of bed nets, and daily “buddy checks” in tick and mite infested areas.
6. Minimize non-battle injuries by ensuring safety measures are followed. Precautions include hearing and eye protection, enough water consumption, suitable work/rest cycles, acclimatization to environment and stress management.
7. Eliminate food/waste sources that attract pests in living areas.
8. Avoid contact with animals and hazardous plants.

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### **Requirements after Deployment**

1. Receive preventive medicine debriefing after deployment.
2. Seek medical care immediately if ill, especially with fever.
3. Get HIV and PPD testing as required by your medical department or Task Force Surgeon.
4. **Malaria terminal prophylaxis: Primaquine 15 mg/day beginning on day of departure from Belize for 14 days unless G-6 PD deficient**

**BELIZE**  
**VECTOR RISK ASSESSMENT PROFILE**  
(VECTRAP)

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1. GEOGRAPHY: **Area** - 22,963 sq. km. (8866 sq. mi.); slightly larger than Massachusetts. **Cities - Capital** - Belmopan (pop. 5300). **Other Major City** - Belize City (60,000). **Towns** - Danggriga, Orange Walk, Corozal, Punta Gorda, San Ignacio, and Santa Elena. **Terrain** - Flat and swampy coastline, low mountains in interior. **Climate** - Hot and humid.

2. VECTOR-BORNE DISEASES:

a. **MALARIA:** Risk is elevated year-round. Presumably countrywide in all areas under 400 meters elevation, except for Belize City. Risk may be elevated in the north. Endemic at moderate levels; officially reported annual case totals (**vivax predominates**) during the late 1980s and early 1990s have varied from about 2,600 to about 4,000 cases. According to official data, the percentage of cases attributed to falciparum infection declined steadily from 16 percent during 1984 to 1.5 percent during 1990. However, unofficial reports indicate that the percentage of cases attributed to falciparum malaria were increasing during the early 1990s. Cases attributed to infection with *Plasmodium malariae* also have been reported (a total of 19 cases during 1988-1990). No drug-resistant strains of malaria have been documented from Belize. In 1993 8,586 cases were reported, 9,957 in 1994 and 9,414 cases in 1995.

b. **DENGUE FEVER:** Risk of this mosquito-borne virus exists year-round and country wide. Risk may be elevated in urban areas.

c. OTHER ARBOVIRAL FEVERS: **St. Louis encephalitis (SLE), Western equine encephalitis (WEE), and Venezuelan equine encephalomyelitis (VEE):** Vectored by several species of mosquitoes, these zoonotic agents usually circulate erratically, with only occasional incidental human infections. An enzootic focus of VEE reportedly exists; regional data indicate that SLE and WEE could occur. Several mosquito-borne viral agents, including Ilheus virus, Nepuyo virus, and Patois group virus (all presumably vectored by *Culex* spp. mosquitoes), are enzootic at low levels.

d. **Rabies** is ostensibly spread from Vampire Bats to dogs and has ultimately been the cause of 3 human deaths on the border with Guatemala in the past 10 years. Rabies vaccine is free and an active program is pursued, but rabid dogs from Guatemala move freely across the border. Offers by the Belizean MOH to vaccinate animals on the Guatemalan side have been refused.

e. **Cutaneous leishmaniasis** caused by (*L. braziliensis*) and **Chagas' Disease** are present, but MOH is unsure of prevalence.

f. **Leptospirosis** is found countrywide.

3. OTHER ARTHROPOD THREATS: **Africanized bees** are now found countrywide and are considered a major problem throughout the coastal region. A number of domestic animals have reportedly been killed by these bees and a hotline to the Department of Agriculture has been established for reporting swarms.

#### 4. DISEASE VECTOR INFORMATION:

a. Malaria: Transmitted by the bite of an infective mosquito (*Anopheles spp.*). The primary vector is *An. albimanus*, an outdoor feeder which is active primarily from dusk to midnight. Larval sites include unshaded pools, lakes, and lagoons. *An. albimanus* is known to be resistant to dieldrin, and is not always affected by repellents.

b. Dengue Fever: Transmitted by *Aedes aegypti*. This is a peridomestic mosquito that prefers to breed in artificial containers near human habitations. It is diurnally (i.e., daytime) active and feeds indoors or out, often biting around the neck or ankles. It typically rests indoors after feeding.

c. The sand flies, *Lutzomyia spp.*, are vectors of Leishmaniasis. The primary vector is *Lu. olmeca* with a rodent, *Oryzomys capito*, as reservoir. *Lu. olmeca* inhabits forest floor litter. Larvae are found in soil or leaf litter. Breed throughout the year. Adults are crepuscular and not strong fliers. Lesions occur mainly on the ears and hands.

d. The main vectors of Chagas' disease are the reduviid bugs, *Rhodnius prolixus* and *Triatoma dimidiata*. Found in earthen floored/thatched roof huts. Associated with stored clothing.

e. The flea, *Xenopsylla cheopis*, is the vector of Murine Typhus.

f. *Culex* mosquitoes are primarily responsible for transmission of the encephalitides.

g. Cutaneous leishmaniasis, known locally as "bay sore", is found principally in northwestern Cayo District. *Lutzomyia olmeca* and *L. cruciata* are the principal vectors with a rodent (*Oryzomys capito*) reservoir. *L. olmeca* inhabits forest-floor litter. Lesions occur mainly on the ears and hands. Belizeans prefer Mexican or Guatemalan physicians due to lower rates and increased prestige. Therefore, statistics do not reflect true incidence.

#### 5. DISEASE AND VECTOR CONTROL PROGRAMS:

a. The vector/pest control infrastructure in Belize is poorly established. Some studies on the Phlebotomines of the area have been carried out, but by and large, the bionomics of other vectors are poorly known. Therefore, standard survey and control procedures should be provided beforehand. In-country sources of material are scarce and poorly stocked. Dengue-1 has been reported from Belize since 1977, but MOH is unsure of its origin. Nonetheless, an extensive community education campaign has been waged against open water containers and cisterns, and the MOH, while still vigilant, appears to be confident of control.

b. Malaria chemoprophylaxis should be mandatory. Consult the Navy Environmental Preventive Medicine Unit #2 in Norfolk, VA (COMM: 757-444-7671; DSN: 564-7671; FAX: 757-444-1191; PLAD: NAVENPVNTMEDU TWO NORFOLK VA) for the current chemoprophylaxis recommendations.

c. The most important element of an *Aedes aegypti* control program is SOURCE REDUCTION. Eliminating or covering all water holding containers in areas close to human habitation will greatly

reduce *A. aegypti* populations. Alternatively, containers may be emptied of water at least once a week to interrupt mosquito breeding. Sand or mortar can be used to fill tree holes and rock holes near encampments.

d. The conscientious use of personal protective measures will help to reduce the risk of many vector-borne diseases. The most important personal protection measures include the use of DEET insect repellent on exposed skin, wearing permethrin-treated uniforms, and wearing these uniforms properly. The use of DEET 33% lotion (2 oz. tubes: NSN 6840-01-284-3982) during daylight and evening/night hours is recommended for protection against a variety of arthropods including mosquitoes, sand flies, other biting flies, fleas, ticks and mites. Uniforms should be treated with 0.5% permethrin aerosol clothing repellent (NSN 6840-01-278-1336), per label instructions. NOTE: This spray is only to be applied to trousers and blouse, not to socks, undergarments or covers. Reducing exposed skin (e.g., rolling shirt sleeves down, buttoning collar of blouse, blousing trousers) will provide fewer opportunities for blood-feeding insects and other arthropods. Additional protection from mosquitoes and other biting flies can be accomplished by the use of screened eating and sleeping quarters, and by limiting the amount of outside activity during the evening/night hours when possible. Bednets (insect bar [netting]: NSN 7210-00-266-9736) may be treated with permethrin for additional protection.

e. Expanded Vector Control Recommendations are available upon request.

## 6. IMPORTANT REFERENCES:

Contingency Pest Management Pocket Guide - Fourth Edition. Technical Information Memorandum (TIM) 24. Available from the Defense Pest Management Information Analysis Center (DPMIAC) (DSN: 295-7479 COMM: (301) 295-7479). Best source for information on vector control equipment, supplies, and use in contingency situations.

Control of Communicable Diseases Manual - Sixteenth Edition. 1995. Edited by A. S. Benenson. Available to government agencies through the Government Printing Office. Published by the American Public Health Association. Excellent source of information on communicable diseases.

Medical Environmental Disease Intelligence and Countermeasures - (MEDIC). September 1997. Available on CD-ROM from Armed Forces Medical Intelligence Center, Fort Detrick, Frederick, MD 21702-5004. A comprehensive medical intelligence product that includes portions of the references listed above and a wealth of additional preventive medicine information.

Internet Sites- Additional information regarding the current status of vector-borne diseases in this and other countries may be found by subscribing to various medical information sites on the internet. At the Centers of Disease Control and Prevention home page subscriptions can be made to the Morbidity and Mortality Weekly Report(MMWR)and the Journal of Emerging Infectious Diseases. The address is [www.cdc.gov](http://www.cdc.gov). The World Health Organization Weekly Epidemiology Report (WHO-WER) can be subscribed to at [www.who.int/wer](http://www.who.int/wer). The web site for PROMED is [www.promedmail.org:8080/promed/promed.folder.home](http://www.promedmail.org:8080/promed/promed.folder.home).

Although PROMED is not peer reviewed, it is timely and contains potentially useful information. The CDC and WHO reports are peer reviewed. Information on venomous arthropods such as scorpions and spiders as well as snakes, fish and other land animals can be found at the International Venom and Toxin Database website at [www.uq.edu.au/~ddbfr/](http://www.uq.edu.au/~ddbfr/). Information on anti-venom sources can also be found at that site. Information on Poisonings, Bites and Envenomization as well as poison control resources can be found at [www.invivo.net/bg/poison2.html](http://www.invivo.net/bg/poison2.html).