

Medical Force Protection: Venezuela

Medical Force Protection countermeasures required before, during, and after deployment to Ecuador are as follows:

Major Threats

Diarrheal disease, viral hepatitis A, typhoid and paratyphoid fever, malaria, dengue fever, Venezuelan Equine Encephalitis, leishmaniasis, sexually transmitted diseases, rabies (primarily from stray dogs), heat injury, industrial pollution, and altitude sickness (central region).

Presume local water sources are not safe for drinking.

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, 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:** Malaria risk exist in rural areas of the following states: Apure, Amazonas, Barinas, Bolivar, Sucre, Tachira, and Delta Amacuro. Drug resistant strains are present in some locales (chloroquine and possibly Fansidar). Increased risk for malaria occurs countrywide between February and August at elevations below 2,000 meters, primarily in rural areas. Overall risk for malaria is higher in the northern lowlands on both sides of the Andes, and risk for Plasmodium falciparum is increased in areas west of the Andes.

Recommended regimen: Mefloquine 250mg per week begun 2 weeks prior to entering country and continued weekly until 4 weeks after return from country.

Personnel in flight status: Doxycycline 100mg per day begun 2 days before entering country. Continue daily while in country and until 28 days after return.

Terminal prophylaxis (for both chemoprophylaxis regimens): **Primaquine 15 mg per day** for 14 days starting on day of departure from country of risk. **G6PD status must be determined prior to starting Primaquine.**
3. **Get HIV testing if not done in the past 12 months.**
4. **Complete attached Pre-Deployment Screening form and turn into your Medical Section.**
5. **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. Continue malaria chemoprophylaxis.
7. Minimize non-battle injuries by ensuring safety measures are followed. Precautions include hearing and eye protection, enough water consumption, suitable work/rest cycles, and acclimatization to environment and stress management.
8. Eliminate food/waste sources that attract pests in living areas.
9. Avoid contact with animals and hazardous plants.
10. Consider **Acetazolamide (Diamox) 250 mg every 6 – 12 hours** for 1 – 2 days before ascent and continued for 48 hours **if traveling to elevations >2,500 meters**.

Requirements after Deployment

1. Continue malaria chemoprophylaxis.
2. Begin terminal malaria prophylaxis as described above.
3. Receive preventive medicine debriefing after deployment.
4. Seek medical care immediately if ill, especially with fever.
5. Get HIV and PPD testing as required by your medical department or Task Force Surgeon.

VENEZUELA
VECTOR RISK ASSESSMENT PROFILE
(VECTRAP)

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1. **GEOGRAPHY:** **Area** - 912,050 sq km (352,143 sq mi) or about the size of Texas and Oklahoma combined. Capital is **Caracas** (Pop. 4.5 million). **Terrain varied**. **Climate** varies from tropical to temperate, depending on elevation.

2. **VECTOR-BORNE DISEASES:**

a. **Malaria:** Incidence may increase with the onset of the rainy season in late May. Risk is highest in the interior, particularly near the western, southern, and eastern borders. Cities and resorts of northern Venezuela are risk-free, but limited risk may exist in northern rural areas below 600 meters elevation. Incidence has increased since the early 1980s, with annual case totals reaching 40,000 by 1988 (among an at-risk population estimated at 14,000,000) nationwide.

Approximately 10,000 cases were reported for the period 01 Jan 97 through 15 Mar 97. Case totals were particularly high for this period in Bolivar and Sucre states.

Plasmodium falciparum accounts for about 40 percent of cases, but actual percentage varies geographically from 60 percent of all cases in Bolivar State to 1 percent in Sucre State. *P. vivax* accounts for nearly all of the remaining cases, but a few cases caused by *P. malariae* occur. Nearly all Amerindian adults in the upper Amazon basin exhibit high titers to *P. falciparum*.

Chloroquine-resistant falciparum malaria has been documented from Bolivar State in the southeast, and is suspected to occur in most malarious areas. Some evidence of amodiaquine resistance also has been reported from northern Bolivar State. The risk of acquiring malaria is considered high in endemic areas without the proper chemoprophylaxis and would result in a serious loss of combat effectiveness.

b. **Dengue:** Dengue Fever (including Dengue Hemorrhagic Fever and Dengue Shock Syndrome-DHS/DSS), experienced a resurgence in 1995 (principally Den-4) with 15,252 reported cases, including 2,934 with hemorrhagic manifestations and 14 reported deaths. The incidence was highest in the states of Amazonas, Caracas, Aragua, Lara, Miranda, Tachira, Trujillo and Zulia - several of these states are along the border with Columbia. At least 1 case of dengue fever had been diagnosed in a U.S. serviceman on TDY in Venezuela (locality of TDY is unclear). Current serological data are unavailable; dengue viral serotypes 1, 2, and 4 circulate regionally, and all likely occur in Venezuela. As of January, 2000, a total of 545 dengue fever cases have been reported in Zulia and 292 cases in Falcon.

A Venezuelan newspaper reported that during the last week of January 1997, 91 cases of dengue were reported (44 classic dengue and 47 hemorrhagic dengue). Most cases (39) were reported in the parish of El Valle of the Federal District with others in Coche, Santa Rosalia and San Agustin. An epidemiological alert was declared in the Caracas metropolitan area. Because of prolonged rainfall, a resurgence of dengue is predicted in Caracas for 1997. From June to August 1998 there have been 18,598 cases with 85.7% (15,939) corresponding to DF and 14.3% (2,659) to DHF/DSS with 10 (0.05%) fatalities. Venezuela suffered another outbreak early in 1999. As of the end of February 1999, 5,000 cases were reported by the Ministry of Health with 612 hemorrhagic cases. The most affected areas were in western Venezuela, in Zulia, Falcon and Lara regions, and the capital Caracas.

c. Other Mosquito-borne Arboviruses: Foci of **Venezuelan Equine Encephalitis (VEE)**, usually characterized by proximity to permanent water and the presence of *Culex (Melanoconion)* spp. mosquitoes, exist in the west between the Guajira peninsula and the Catatumbo River. Between December 1992 and January 1993, the sanitary officers of Venezuela reported an outbreak of VEE in the state of Trujillo. From the beginning of the epidemic to October 31, 1995, national authorities reported 11,390 human febrile cases compatible to VEE and 16 deaths. The disease has been confirmed in 185 human cases through viral isolation. VEE was most striking in the state of Zulia, causing more than 10,000 human cases including a few cases in the city of Maracaibo, and 272 equine cases were reported.

Serological evidence indicates that **Eastern equine and St. Louis encephalitis** also occur. Several other mosquito and sand fly-vectored viral agents occur, but incidence data are scanty. Agents associated with human illness that probably occur (based on serological evidence) include Caraparu and Mayaro viruses.

d. **Leishmaniasis**: Reported cases tend to peak in November through January; correlation with risk of infection is undetermined. Foci are widely distributed in rural areas and reportedly most intense in west central areas. Most leishmaniasis transmission is found at relatively low elevations, but one member of the *Leishmania mexicana* complex (*L. garnhami*) occurs at elevations of 800 to 1,800 meters in the western mountains. Estimated annual case totals have varied from 2,500 to 5,000, mostly CL, but presumably including some mucocutaneous and diffuse cutaneous leishmaniasis cases as well. All forms (and most cases) are caused by members of the *L. braziliensis* and *L. mexicana* complexes, but other species including *L. amazonensis* and *L. venezuelensis* also have been associated with human infections. Infection rates of up to 13 percent in humans have been reported from some foci. The zoonotic reservoir for *L. braziliensis* includes both ground level (rodents) and arboreal (edentates and marsupials) components, whereas *L. mexicana* is maintained almost entirely by ground dwelling rodent hosts. Domestic animals, including dogs and donkeys, also may constitute a significant zoonotic reservoir in some foci. During the early 1980s, an annual average of 13 cases of VL (caused by *L. chagasi*) was reported; more recent data are not available.

e. **American trypanosomiasis**: More commonly known as **Chagas' Disease**, this disease is endemic to rural areas in the northern half of the country. During the early 1980s, seroprevalence among the at-risk population was estimated at 11 percent, with rates approaching 50 percent reported from some highly endemic foci. An outbreak reportedly occurred in Guarico State in 1986.

f. **Onchocerciasis**: Riverine foci occur at elevations up to 1,000 meters in the north central, northeast, and south. Infection rates up to 90 percent are reported from some southern foci.

g. **Kyasanur Forest Disease (KFD)**: A "rare virus transmitted by ticks" had resulted in at least 13 human deaths in Guanarito, about 325 kilometers southwest of Caracas during 1990. Researchers have isolated and identified a viral agent identical to the causative agent for KFD, a tick-borne hemorrhagic fever endemic to India.

h. **Schistosomiasis**: Risk areas are limited to the central part of northern Venezuela, including the Federal District (but not Caracas) and the surrounding states of Aragua, Carabobo, Guarico, and Miranda. Although infection rates for *Schistosoma mansoni* up to 8.4 percent were reported from a focus near Caracas in 1988, only about 0.6 percent of the at-risk population (estimated at 4.5 million) is believed infected. Incidence reportedly was decreasing during the late 1980s, and relatively few clinical cases were being reported.

3. DISEASE VECTOR INFORMATION:

a. Malaria vector species include *Anopheles albimanus*, *An. albitarsis*, *An. aquasalis*, *An. darlingi*, *An. nuneztovari*, and *An. pseudopunctipennis*. All but *An. nuneztovari* will feed on humans indoors. *An. pseudopunctipennis*, *An. aquasalis*, and *An. albitarsis* are reported to be resistant to the insecticides Dieldrin and Lindane. *An. albitarsis* is also reported to be resistant to DDT and malathion. *An. albimanus* typically breeds in sunlit or partially-shaded fresh or brackish water (pools, lakes, lagoons, irrigation canals, etc.) Marshes and swamps are of little significance. *An. albimanus* is often found in coastal areas; it will breed

freely in water of salt content of less than 13% and has been found breeding in water almost 40% saline. Diurnal resting sites are variable but favor man-made structures. It prefers to feed on ungulates, but will opportunistically feed on humans, preferring the ankle area.

b. Dengue fever is 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. *Ae. aegypti* is known to be resistant to DDT, Dieldrin and Lindane.

c. The principal vector for Chagas' Disease is the triatomid bug, *Rhodnius prolixus*. This bug also is commonly referred to as a kissing bug or cone-nose bug. It can be a highly domestic insect, often associated with poorly constructed habitations which provide numerous harborage sites. These insects remain hidden in cracks and crevices during the day and come out at night in search of a bloodmeal. The bug transmits Chagas' disease through its infected feces; the bug habitually defecates on the host's skin while feeding. This activity may lead to inoculation of the pathogen through the bite puncture, abrasions of the skin, mucous membranes or conjunctiva.

Rhodnius prolixus is reported to be resistant to Dieldrin and Lindane.

d. The principal vector of Onchocerciasis is the black fly, *Simulium metallicum*.

e. Sand flies, *Lutzomyia* spp., are the main vectors of leishmaniasis. Most sand flies are active between dusk and dawn, and have very limited flight ranges. Potential vectors of cutaneous leishmaniasis (CL) include *Lu. flaviscutellata*, *Lu. ovallesi*, *Lu. olmeca*, *Lu. panamensis*, *Lu. shannoni*, *Lu. trinidadensis*, *Lu. umbratilis*, and *Lu. youngi*. *Lu. longipalpus* is the vector for visceral leishmaniasis (VL).

4. DISEASE AND VECTOR CONTROL PROGRAMS:

a. 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 recommendations for chemoprophylaxis.

b. Yellow fever immunizations should be current.

c. 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.

d. 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.

e. Prevention of Chagas' disease primarily involves avoidance of triatomid bug habitats. Avoid sleeping in poorly constructed habitations that can provide harborage sites for these insects.

If in a suspect area, use bednets and avoid sleeping directly on the ground. Recent control programs in South America have had significant success in reducing house infestation rates by making structural improvements and applying residual insecticides to the walls of infested homes.

f. Because the breeding habitats of most sand fly species are not easily identified, not easily accessible, or unknown, control strategies focus mainly on adult sand flies. Peridomestic sand fly species can be controlled by spraying residual insecticides on buildings (including screening on portals of entry) animal shelters, and other adult resting sites. Area chemical control of sylvan sand fly species is impractical. Personal protective measures will reduce sand fly bites and environmental modification (e.g., clearing forests, eliminating rodent burrows/breeding sites, relocating domestic animals away from human dwellings) has been used to reduce local sand fly populations.

g. Expanded Vector Control Recommendations are available upon request.

5. 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. The World Health Organization Weekly Epidemiology Report (WHO-WER) can be subscribed to at www.who.int/wer. The web site for PROMED is 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/. 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.