

## **Medical Force Protection: Colombia**

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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 exists in all rural areas below 1600 meters (5349 feet) No risk in Bogota and vicinity. 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.

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

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1. Geography: Area of 1.14 million sq. km. (440,000 sq. mi.); about the size of Texas, New Mexico, and Arkansas combined. Cities: Bogotá (Capital, pop. approx. 5 million), Medellín, Cali, Barranquilla, Cartagena. Terrain: flat coastal areas, central highlands, mountains and eastern plains. Climate: tropical on coast and eastern plains, cooler in the highlands.

2. VECTOR-BORNE DISEASES:

a. **Malaria**: *Plasmodium falciparum* and *P. vivax* malaria are primarily reported. *Plasmodium falciparum* accounts for about 34% of the malaria cases in Colombia, with most of the remainder being *P. vivax*. *Plasmodium malariae* accounts for about 0.13% of all cases. *P. falciparum* is the most prevalent form of malaria in Pacific coastal areas.

Malaria is highly endemic year-round below 800 meters elevation in rural areas of Uraba (Antioquía Department), Bajo Cauca-Nechi (Cauca and Antioquía Departments), Magdalena Medio, Caqueta (Caqueta Intendencia), Sarare (Arauca Intendencia), Catatumbo (Norte de Santander Department), Pacífico Central and Sur, Putumayo (Putumayo Intendencia), Ariari (Meta Department), Alto Vaupes (Vaupes Comisaria) and Amazonas. More than half of all reported cases occur in Antioquía Department. The cities of Bogotá, Cali Manizales, Medellín and others in the Andean highlands are risk free. The islands of San Andrés and Providencia are risk-free.

Chloroquine-resistant *P. falciparum* (CRPF) is reported in all areas at risk of malaria. Widespread Fansidar resistance reported in the Amazonia, Orinoquia, and Caribbean regions, and the Cauca River Valley. Unconfirmed mefloquine and amodiaquin resistance has been reported in the Amazon basin. Cases of vivax malaria in central Colombia allegedly resistant to treatment with either chloroquine or amodiaquine plus primaquine were reported. Fansidar-resistant *P. falciparum* malaria is also confirmed country-wide. The risk of acquiring malaria is considered high without the proper chemoprophylaxis and would result in a serious loss of combat effectiveness. From December 1997 to January 1998 there were 600 malaria cases with 10 deaths reported in the Pacific Littoral area of Buenaventura.

b. **Dengue and Yellow Fever**: Reports of an outbreak (approximately 18,000 cases), which occurred in Cali in early 1987, was attributed to dengue virus serotype 1. However, serotypes 2 and 4 appear to circulate in Colombia as well. In early 1990, health officials warned of an impending outbreak after a few cases were reported from interior areas near the border with Venezuela; 75 - 100% of households surveyed in Arauca Intendencia were found infested with *Ae. aegypti* larvae. A few cases of dengue hemorrhagic fever (DHF, a severe form of the disease associated with sequential infection by different dengue viral serotypes) were reported from the northeast from September 1990 through January 1991, and unconfirmed reports during March 1991 indicated that an outbreak of dengue fever could be occurring in that area.

During 1992-95, Colombia experienced extensive outbreaks of dengue and DHF, principally involving dengue virus serotype 1, 2, and 4. From December 1997 to January 1998 389 suspected cases of dengue were reported primarily from the Cali area with no deaths associated from the outbreak.

**Yellow Fever** is present at low levels of endemicity in rural and jungle areas. The risk of acquiring Yellow Fever is considered low. According to the WHO, the following areas of Colombia were considered to be "infected" with yellow

fever as of March 1991 -- Antioquía, Boyaca, Caqueta, César, Choco, Cundinamarca, Meta, Norte de Santander, Santander, and Vichada Departments; Arauca, Casanare, and Putumayo Intendencias; and Guaviare Commissariat. If acquired, Yellow Fever would seriously reduce combat effectiveness. As of late May 1999, the total number of confirmed sylvatic cases was two and both were fatal. The cases occurred in the Departments of Caqueta and Meta.

c. **Leishmaniasis** - Primarily occupationally associated; reportedly, 20 percent of males engaged in "rural operations" become infected. Most reported cases are cutaneous leishmaniasis (CL), but mucosal involvement may occur in up to 25 percent of the cases. Members of the *Leishmania braziliensis* complex (including *L. panamensis*) account for nearly 90 percent of all identified strains. At least 90 foci have been identified in the Pacific coastal region where 13 to 85 percent of the human population has evidence of infection with CL. The officially reported annual incidence in Antioquía Department is about 18 cases per 100,000 population. An outbreak of CL, due to *L. braziliensis*, occurred in 1985 in Dagua. Transmission was primarily intradomiliary due to *Lu. lichyi*. A few cases of disseminated CL associated with the *L. mexicana* complex have been reported from Pacific coast and Amazonian lowland areas.

Visceral leishmaniasis (caused by *L. chagasi*) appears uncommon, but at least 1 focus exists in the Magdalena River valley in southern Cundinamarca Department where the enzootic reservoirs include dogs and opossums.

#### d. OTHER VECTOR-BORNE DISEASES:

The risk of acquiring the following diseases is considered low:

**Bartonellosis** (Carrion's disease) is a disease caused by *Bartonella bacilliformis*. The disease manifests itself either in a mild cutaneous form (verruca peruana) or a highly fatal visceral form (oroya fever). Disease distribution is in southern Colombia, and limited to the range of the sand fly vectors (i.e., elevations between 800 and 3000 meters).

**Chagas' disease** (American trypanosomiasis) is vectored by reduviid bugs. It is widely distributed in rural areas below 2,500 meters in central Colombia where up to 33 percent of the population may be infected; however, the risk of infection to nonindigenous personnel is low.

A small focus of **Bancroftian filariasis** may exist near Cartegena.

Isolated foci of **Onchocerciasis** exist in the extreme southwestern area bordering Ecuador.

**Tickborne rickettsioses** may occur in the northwest.

**Mansonellosis** is apparently limited to riverine communities in the extreme southeast.

**Eastern equine encephalitis (EEE)** and **St. Louis encephalitis (SLE)** occur erratically and focally, primarily in jungle areas.

**Venezuelan Equine Encephalitis** also occurs focally and erratically. In October 1995, a total of 14,156 human cases compatible with VEE were reported. From that number, 1,258 required hospitalization and 26 were reported dead as a result of VEE.

### 3. DISEASE VECTOR INFORMATION:

a. Vectors for malaria include *Anopheles darlingi*, *An. punctimacula*, *An. nuñez-tovari*, *An. albimanus*, *An. pseudopunctipennis*, *An. neivae*, *An. rangeli*, and *An. albitarsis*.

*An. darlingi* is the primary vector in coastal regions. *An. nuñez-tovari* is more important in low-lying interior areas, and *An. pseudopunctipennis* is the principal vector in highland valley areas. Both *An. darlingi* and *An. pseudopunctipennis* feed on humans indoors. *An. albimanus* and *An. albitarsis* have been reported resistant to DDT. *An. albimanus* has also been reported resistant to Dieldrin and Lindane.

b. *Aedes aegypti* is the only significant vector of Dengue and Yellow Fever. *Aedes aegypti* is a peridomestic mosquito that prefers to breed in artificial containers near human habitations. It is diurnally 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 reduviid bug, *Rhodnius prolixus*, is the vector of Chagas' disease and has been reported resistant to DDT, Dieldrin and Lindane.

d. The sand fly, *Lutzomyia verrucarum*, is the main vector of Leishmaniasis and the only apparent vector of Bartonellosis. Bartonellosis is limited to elevations between 2400 and 9000 feet by the range of its vector(s).

#### 4. DISEASE VECTOR CONTROL PROGRAMS:

a. Malaria chemoprophylaxis should be mandatory. Consult the Navy Environmental Preventive Medicine Unit No. 2 in Norfolk, VA (COMM: 757-444-7671; DSN: 564-7671; FAX: 757-444-1191; PLAD: NAVENPVNTMEDU TWO NORFOLK VA) for the current recommendations.

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. **NOTE:** *An. albimanus* is not as affected by repellents as other anophelines. Nevertheless, DEET will help to reduce biting rates.

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. 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.

f. 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](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).