

be supplemented by appropriate access to the scientific information generated both in the country itself and abroad, and the strategies for training in epidemiology and related disciplines should pay special attention to the training in and for the health services.

All these efforts, as they are integrated into current processes aiming at the review of the organization and operation of the health services systems in general and the

local health systems in particular, will have to contribute not only to strengthen the role of epidemiology, but also to rebuild a comprehensive conception of public health, whose practice will translate into benefits for the people of the Region of the Americas.

(Source: Health Situation and Trend Assessment Program, PAHO.)

403 Vector-Transmitted Diseases in Central America, Belize and Panama

Dengue

Aedes aegypti infestation is widespread in the Subregion, with the exception of Costa Rica where it is localized. Dengue virus infection is endemic and periodically epidemic in all the Subregion, except Costa Rica and Panama. After a long period of absence of the disease, the dengue virus was introduced to Central America (CA) at the end of the 1970's. During this period, explosive epidemics of classic dengue associated with serotype 1 of the virus were registered in El Salvador, Guatemala and Honduras. At the beginning of the 1980's dengue-4 was introduced in Central America and, shortly thereafter, dengue-2 was detected. Presently, all three dengue serotypes are circulating in CA. During the 1980's, almost 70,000 cases of dengue were reported in El Salvador, Guatemala, Honduras and Nicaragua. However, this figure may represent a marked underestimation, due to the lack of adequate dengue epidemiological surveillance in Central America.

A great cause of concern in recent years has been the reporting of cases of dengue hemorrhagic fever (DHF) in some Central American countries. Nicaragua reported seven cases of DHF in 1985, all of them fatal, while El Salvador reported 153 cases during 1987-1988. It is important to remember that epidemics of DHF in Southeast Asia were preceded by the occurrence of sporadic cases of DHF. Also, the recent occurrence of a major epidemic of

DHF in Venezuela underscores the great potential of DHF dissemination in the subregion.

This situation led El Salvador, Guatemala and Honduras to establish a three-party agreement to combat *Ae. aegypti* in bordering areas, and thus control the spread of dengue. Currently, these three countries are preparing their respective plans of action for combating the vector, reinforcing systems of epidemiological surveillance, and improving laboratory diagnosis of the disease.

Leishmaniasis

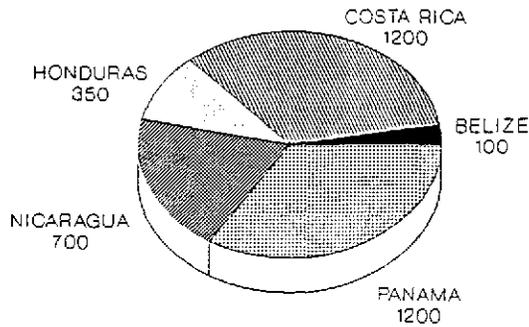
The total prevalence and precise geographical distribution of all forms of leishmaniasis (cutaneous, mucocutaneous and visceral) in this Sub-region, as for the rest of the Americas, is still unknown.

It occurs mainly in sylvatic foci in all the countries of the area, but in the last decade, it also occurred in domiciliary and peri-domiciliary environments, particularly in Costa Rica.

Cutaneous and Mucocutaneous Leishmaniasis

Cutaneous and mucocutaneous forms are the most frequently reported clinical cases, especially in Costa Rica, Nicaragua and Panama. Recently an increasing number of cases of both cutaneous and visceral cases have been reported in Honduras (See Figure 1).

Figure 1. Cutaneous leishmaniasis cases reported by year in selected countries of the Central American Subregion, around 1986.



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Strategies for Leishmaniasis

Leishmaniasis caused by *L. mexicana* occurs mainly in Belize, Guatemala, and Panama. A small percentage of the patients develop diffuse cutaneous leishmaniasis in the absence of cell mediated immunity. The lesions cure spontaneously if located in the trunk and limbs, but the ulcers located in the ears remain active many years, producing severe and extensive mutilations (Chiclero's ulcer). Three sub-species of *Lutzomia olmeca* are involved in the transmission and *Lu. flaviscutellata* has been also incriminated. The reservoirs are a variety of forest rodents and marsupials.

Leishmaniasis caused by *L. amazonensis* is found mainly in South America, but it has also been isolated in Costa Rica and Panama. Its presence is also being suspected in Guatemala.

Leishmaniasis caused by *L. brasiliensis* occurs in Costa Rica, Guatemala, Honduras, and Panama. Infection is associated with jungle activities, and although transmission occurs throughout the year, there are seasonal fluctuations. Several jungle mammals have been incriminated as reservoirs, particularly the opossum and many rodents. The vector involved in the transmission has yet to be identified.

The relatively recent identification of *L.b.brasiliensis* in cases of cutaneous leishmaniasis in British soldiers trained in Southern Belize, is a very important epidemiological finding. Both the vector and reservoir of *L.b.brasiliensis* are still unknown.

L. brasiliensis panamensis is primarily associated with deep jungle activities, but is also occurring in areas where

the jungle has disappeared. It occurs in Honduras, Nicaragua, Costa Rica, and Panama. The phlebotomine species involved in the transmission has not yet been determined, neither has the reservoir; nevertheless, the two-toed sloth and the three-toed sloth have been incriminated in Costa Rica and Panama.

Leishmaniasis by *L. chagasi* with assumed canine reservoir occurs in El Salvador, Guatemala, and Honduras. In the latter country the same parasite is producing both, cutaneous and visceral cases. The cutaneous lesions are atypical, with nodular, not ulcerated lesions, frequently misdiagnosed as lepromatous leprosy. These lesions are not concurrent with visceral involvement, and are not post-therapeutic manifestations of visceral leishmaniasis. Visceral leishmaniasis occurs mainly in young children (less than two years old) and is commonly associated with severe malnutrition. The characteristics of a number of foci in Central America have yet to be determined.

Malaria

Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama together number 19.7 million inhabitants in malarious areas that represent 6.7% of the total of the malarious area in the Hemisphere.

The 148,373 cases of malaria reported in 1989 were 13.5% of the total number of cases notified in the Americas. A total of 91% of the cases is concentrated, in diminishing proportions, in Guatemala, Nicaragua, and Honduras. The predominant species in the Subregion is *P. vivax* (97.6%). The overall trend of the disease in the Subregion diminished between 1985 and 1987, and in 1988 showed an increase of 15.4% with respect to 1987, led by the increase in Nicaragua (94.3%) and followed by Honduras (55.7%) and Costa Rica (15.0%). In 1989 the occurrence continued to increase with respect to 1988--an increase of 19.9%--led by the increase in Honduras (54%), and followed by Nicaragua (39%) and Belize (21%).

Panama and Costa Rica are the two countries with the lowest number of cases in the last four years. Deterioration of the situation began for Costa Rica in 1983, and in Panama in 1986, because of epidemic outbreaks as a result of imported cases in areas already free from transmission. In El Salvador there were almost 96,000 cases of malaria in 1980; however, since then the figure has constantly declined up to 1989, when barely 9,605 cases were recorded.

Based on stratification of the malarious area, El Salvador uses an integrated control approach in the coastal region

of the country, where the most intense transmission of malaria is responsible for the great majority of cases. These activities are supported by decentralization of diagnosis and timely treatment of cases through the health services and a network of 2,500 voluntary collaborators. Actions aimed at the reduction of mosquitoes in breeding places are carried out through engineering works in swamps, lagoons, and canals in the areas of greatest transmission in an attempt to secure permanent control with less dependency on the application of insecticides, which is also carried out, but only in selected localities.

Belize

The program continued making efforts to improve the information and epidemiological surveillance system and knowledge of the vectors. The number of infections produced in 1989 by *P. vivax* was 2,617 and 95 for *P. falciparum*.

Costa Rica

By the end of 1988 success had been obtained in interrupting transmission in 79% of the malarious area, in which approximately 680,000 persons live. Thanks to the efforts made for surveillance and control of endemic disease, only 699 cases of malaria have been recorded among the 108,614 blood slides examined. The cases are scattered among 217 of the 7,321 localities in the country. The program has epidemiological information on 589 localities in the attack phase and 2,890 in the consolidation phase.

El Salvador

The number of recorded cases continued to decline from 44,473 in 1985 to 9,605 in 1989. The drop in the number of cases of *P. falciparum* is even more marked, from 4,373 in 1985 to only 40 in 1989. Emphasis continues to be placed on the reduction/elimination of breeding places, without neglecting other integrated control measures, among which are the mass distribution of antimalarial drugs to a population of 92,378 persons, selective distribution of such drugs to 4.5 million inhabitants, and the application of larvicides in an area of 530 square Km.

Guatemala

In 1989, 331,675 blood specimens were taken (10%) out of a total of 3,4 million persons at risk. Of the 42,453 cases recorded, 1,155 cases had infections from *P. falciparum*. As a vector control measure household spraying with deltamethrin and fenitrothion is used in the localities with the most severe problems in accordance with epidemiological stratification. In addition, focal treatments are carried

out and larvicides in powder form are applied with sprayers for more efficient performance.

Honduras

The number of cases increased from 19,095 in 1987 to 45,922 in 1989. Deterioration of the epidemiological situation was concentrated in Area 2 of Region III (El Progreso) and in Area 2 of Region IV (Marcovia). In the rest of the country endemicity remained stable. The increase in the search for patients in Region III produced a greater number of cases than in the previous year. Of the total population of 4.1 million in the original malarious area that occupies an area of 101,351 square Km, there are 2.5 million in an area of 46,546 square Km with transmission in which no control measures are applied owing to a lack of resources and in which migratory activities resulting from irrigation, urbanization, agricultural practices, hurricanes, floods, and sociopolitical conflicts increase the risk factors.

Nicaragua

During 1989 the epidemiological situation deteriorated, with 45,982 recorded cases. The present behavior of the dynamics of transmission depends on risk factors difficult to manage, such as the formation of innumerable natural breeding places and population migrations of combatants, producers, merchants, and repatriates, among others.

Panama

Malaria is confined to 241 of the 9,739 localities in the country, in which 427 cases of malaria were detected in 338,473 blood slides examined. The problem areas include almost 10,000 inhabitants in Jaqué-Darien, Puerto Piña, Puerto Obaldía, Alto Chucunaque, Alto Bayano, and Tucutí, where migration, nomadism, apathy, and precarious dwellings prevail.

The program faces serious economic difficulties that have prevented the acquisition of basic inputs and the financing of field operations. However, malariometric rates are maintained at acceptable levels in the country.

Trypanosomiasis Americana

Transmission as through the vector is highly prevalent in the Subregion is shown below with the exception of Belize, where only a few cases of human infection have been reported.

Taking into account the prevalence of positive serology in blood banks and the lack of mandatory serology to discard infected units (except in Honduras), it is suspected

that transfusional *T. cruzi* infection is also a problem. Table 1 shows the prevalence of positive serology in blood banks of the Subregion.

Table 1. Prevalence of positive tripanosomiasis serology in blood donors, from Central American countries.

Country	Year ¹	Sample ²	%
Costa Rica	1983-1985		
Alajuela		1,306	0.8
Heredia		666	0.9
San Jose		602	1.6
Guatemala	1987		
Different cities		1,260	5.0
Honduras	1987		
Different cities		1,225	11.6

¹ Only data reported after 1980.

² Date in which the data was collected or reported.

The situation in the different countries is as follows:

El Salvador

The vector is present in 30-80% of the dwellings in rural areas and in small or medium urban agglomerations that account for 70-80% of the homes in the country. The *T. cruzi* infection rate in vectors is 25%. It is estimated that 20% of the rural population has positive serology for *T. cruzi*.

Guatemala

Human infection is frequently found in the Departments of Chiquimula, Jalapa, El Progreso, Santa Rosa and Zacapa. The triatomine house infestation rate was 31.0% for *Triatoma dimidiata*; the *T. cruzi* infection rate was

34.1% in *T. dimidiata* and 31.0% in *Rhodnius prolixus*. Prevalence of the infection in some rural areas is up to 16% of the population.

Honduras

The vector is present in the Departments of Choluteca, Comayagua, Copan, Francisco Morazan, Intibuca, Lempira, Ocotepeque, Loancho, El Paraiso, La Paz, Santa Barbara and Yoro. In 1983, the highest prevalence of seropositivity was found in the western and eastern departments and in the southern region. According to an estimate, about two-thirds of the population is at risk of contracting the infection transmitted by the vector. Infection rates of the human population in the domiciliated vectors have been found to vary at 32.2% and above. Infection rates as shown by serology vary from 0.2 to 16.6%, depending on the area.

Nicaragua

Even though no recent data is available, individuals from Chinandega, Esteli, Jinotega, Madrid, Managua, Matagalpa and Rivas were found to be infected with *T. cruzi*. The mountain zones of the northwest and central regions, and parts of the Pacific coast are the principal areas of domiciliated triatomine concentrations.

Panama

Vectors of *T. cruzi* are found in seven provinces of Panama including the Canal Zone. *Triatoma dimidiata* has been detected in 16.4% of the houses; with a *T. cruzi* infection rate of 3.1% in the Gualaca District. *R. pallescens* has been found in only 3.2% of the houses in the Chorrera District; the *T. cruzi* vector infection rate was 10.6%. The overall prevalence of the infection was 2.7% in Western Panama and up to 22.3% in some areas of Central Panama.

(Source: Communicable Diseases Program, PAHO.)