

Status of Chagas' Disease in the Region of the Americas

17739

Current Status

Chagas' disease or American trypanosomiasis is a disease exclusive to the Region of the Americas that is transmitted to man mainly through contact with the feces of triatomid insects. Although vectors and infected wild reservoirs exist even in the southern United States and vectors may be found as far north as the State of Illinois, human infection is distributed almost exclusively from Mexico to Argentina and Chile (Figure 1). The majority of cases originate in the rural and periurban areas, where the disease persists because of the unstable socioeconomic conditions of the population combined with the domestic nature of the vector. However, the increasing migration from rural areas into the cities has made transmission through blood transfusion a possibility that must be taken into account. Studies made over the past 10 years also show that transplacental transmission is more frequent than had been assumed, since

between 0.5% and 2% of the children of mothers with the disease are apparently born infected.

Calculations based on seroepidemiological studies suggest that there are between 10 and 20 million infected individuals in the Region and that 65 million persons are exposed to risk. There is evidence in South America that roughly 10% of the individuals infected develop the clinical symptoms and signs characteristic of chronic Chagas' disease.

This brief report summarizes the present status of Chagas' disease in the countries of the Region by compiling data available from various sources.

Argentina

The area of transmission of infection by *Trypanosoma cruzi* includes the zones of the country located above Latitude 44° 45' South, totaling approximately 1,946,000 km². The high-transmission zone comprises eight provinces where the exposed population is estimated at 6,900,000.

In 1980 a total of 5,562 cases of Chagas' disease were notified.

The prevalence of infection among the male population of 18 years of age prior to entry into military service was 5.8% for the entire country in 1981, but in the high-transmission provinces this figure may go as high as 30%. That same year, in 13 provinces where there is a Chagas' disease control program, 8.7% of blood donors were found to have positive serology for *T. cruzi*.

In 1982 control activities reached more than 50% of homes in the critical areas, resulting in a distinct reduction in infestation percentages in the treated homes. These activities are currently being carried out in the 19 provinces affected.

Bolivia

The endemic area covers some 80% of the country's territory, which amounts to 1,099,581 km². Infected vectors have been found in seven of the nine departments into which Bolivia is divided. Based on data obtained by means of serology in different population groups, it is estimated that in the Cochabamba, Sucre, Tarija, and Santa Cruz areas, there could be more than 500,000 infected persons.

Figure 1. Distribution of Chagas' disease in the Region of the Americas.



Brazil

Based on a serologic survey made from 1975-1981 in States of Acre, Alagoas, Amapá, Amazonas, Bahia, Ceará, Espírito Santo, Federal District, Goiás, Maranhão, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Pará, Paraíba, Paraná, Pernambuco, Piauí, Rio de Janeiro, Rio Grande do Norte, Rio Grande do Sul, Rondônia, Roraima, Santa Catarina, and Sergipe, it is estimated that 4.2% of a population of 40 million could be infected. The percentage of infected individuals who develop pathology is variable: in Minas Gerais, cardiopathy affects up to 40% of the infected adults, while this percentage is much smaller in Rio Grande do Sul. The majority of megaviscera were registered in the states of São Paulo, Minas Gerais, Goiás, and Bahia. The control activities have succeeded in interrupting domiciliary transmission in large areas of the State of São Paulo and in the more localized zones of Minas Gerais. The prospects are good for similar success in the short or medium term in the States of Rio Grande do Sul and Paraná and in part of Goiás and Mato Grosso do Sul. As of 1983 a sizable expansion in control activities has taken place.

Chile

The area of endemic transmission is in the rural and suburban areas of the northern half of the country between Latitudes 18°30' and 34°36' South. There are approximately 1.8 million persons living in the endemic area and it is estimated that 17% of them could be infected. A study is currently underway of 0.6% to 1% of the population at risk and preliminary data indicate that from 13% to 59% of the houses studied had triatomids. The percentage of human infection was 20.3%, and 19% of those infected presented electrocardiographic changes. The serologic positivity rate for *T. cruzi* in blood banks ranged from 1.9% to 6.5%.

Control activities are being carried out in the area located between Latitudes 29°12' and 32°10' South, measuring 170 km across and 340 km in length; the exposed population numbers approximately 110,000.

Colombia

Of Colombia's natural regions, that of the Catatumbo River basin, the eastern region (mainly in the Piedemonte, Macarena, and Meta Cercano subregions) and the Magdalena River Valley region are those with the highest transmission. Studies conducted in the Norte de Santander Department showed that

around 30% of the individuals studied had positive serology and 9% of them displayed electrocardiographic changes. In the same area, 15.6% of the houses studied had the vector and 2.25% of the triatomids captured were infected with *T. cruzi*.

Costa Rica

The vector is found in the country's central plain and adjoining zones, extending primarily to the northwest and southwest regions. Research in the center of this area, in Alajuela Province, has revealed 34.6% of the houses surveyed to be infested, with 30% of the insects captured carrying *T. cruzi*. Serology was positive in 11.7% of the individuals studied and 24.3% of the infected persons had electrocardiographic changes.

Ecuador

Transmission is considered to be highest in the coastal region, which includes the Provinces of Manabí and Guayas. The greater part of the human cases are from the city of Guayaquil, the capital of Guayas Province. In 1980 a control program was carried out in Guayaquil and in Manabí Province.

El Salvador

The data accumulated to date suggest that American trypanosomiasis is endemic in a large part of the country. The vector is present in 30-80% of the rural dwellings and small or medium urban nuclei that account for 70-80% of the homes in the country. Around 25% of the triatomids are infested with *T. cruzi*. The positive serology observed among the populations concerned was over 20%.

Guatemala

Data covering more than 20 years indicate that 6% of the human sera examined were positive for *T. cruzi*. The infection is most frequent in the Departments of Chiquimula, Jalapa, El Progreso, Santa Rosa, and Zacapa. More recent data show 15% of the sera to be reactive.

Honduras

The vector has been found to be present in the Departments of Choluteca, Comayagua, Copán, Francisco Morazán, Intibuca, Lempira, Ocotepeque, Olancho, El Paraíso, La Paz, Santa Barbara, and Yoro. Depending on the species, between 32.2% and 34.7% of the insects captured were infected. Limited serologic surveys among the population of the Departments of Choluteca, Comayagua, Francisco Morazán, El Paraíso, and Valle showed that 36.8% of the individuals studied had *T. cruzi* antibodies.

Mexico

Human cases of infection by *T. cruzi* have been described in the States of Chiapas, Guerrero, Mexico, Michoacán, Oaxaca, Tabasco, and Zacatecas. Prevalence is considered greatest in the Pacific Coast States from Chiapas to Nayarit, in the Yucatan Peninsula, and in certain places in the Altiplano. Serologic surveys made in 60 communities in Oaxaca State showed 16.3% of those studied to have positive serology. The fact that a very low percentage of children was found to be infected suggests that transmission has been virtually interrupted. In the locality of Nopala, Oaxaca State, it was found that between 8% and 20% of the population with positive serology for *T. cruzi* had electrocardiographic changes. In another two serologic surveys conducted in communities in Chiapas State, positive sera percentages of 0.3% and 3.6%, respectively, were found. In five of the communities studied, the positive serologies among children under 12 suggests the existence of active transmission of the infection.

Nicaragua

While no recent data are available, earlier studies indicate that individuals infected with *T. cruzi* have been found from Chinandega, Estelí, Jinotega, Madrid, Managua, Masaya, Matagalpa, and Rivas. The main area where the domestic triatomids are apparently found is the mountainous part of the northwest and of the central region and parts of the Pacific coast.

Panama

The vectors of *T. cruzi* are found in seven of Panama's provinces and in the Canal Zone. In certain areas up to 16% of homes were found to be infested, and 30% of the triatomids captured were infected. The prevalence of individuals with positive serology ranged from 3% to 22%.

Paraguay

Practically all the country's rural areas can be considered endemic *T. cruzi* infection zones. Isolated studies suggest that the prevalence of human infection may vary from 10% in the Misiones region, to 53% in the Cordillera, and 72% in the Paraguayan Chaco. In general, in the Departments of Itapúa, Alto Paraná, Canendiyú, and part of Amambay the prevalence of infection is less than in the other Departments. Control activities were carried out in the Yacireta program area and in localities of the Departments of Boquerón and Nueva Asunción. In these Departments, triatomids were caught in

31.3% of the houses surveyed; 18.2% of these were found to be infected.

Peru

The greatest prevalence of human infection (approximately 12%) has been found in the Departments of Arequipa, Moquegua, and Tacna. The house infestation index in Arequipa Department was 13.1% with a tripano-triatomid index of 27.6%. In Moquegua Department these figures were 19.1% and 27.5%, and in Tacna Department 3.6% and 7.1%, respectively. The control program is carrying out its activities in the southwest of the country, covering an area of 119,500 km².

Uruguay

The endemic area covers approximately 125,000 km² of the country's total area of 187,000 km², and includes the Departments of Artigas, Cerro Largo, Colonia, Durazno, Flores, Florida, Paysandú, Río Negro, Rivera, Salto, San José, Soriano, and Tacuarembó. It is estimated that 132,000 of the 950,000 persons living in this area are infected. Partial serologic surveys indicate that the prevalence of human infection in the Departments of Artigas, Paysandú, Rivera, Río Negro, and Salto, is from 4.5% to 15.7%. The percentage of homes in which the vector was captured was from 1% to 6% and between 4.8% and 12.4% of the insects captured were infected. This area, considered to be the one of highest endemicity, covers about 76,000 km² and has a population of around 470,000. Control program activities covered these Departments and the Cerro Largo Department.

Venezuela

Data from the beginning of the 1970s showed that almost 50% of a sample of rural area residents were infected with *T. cruzi*. It was accordingly possible to estimate at 1,200,000 the number of persons in the country who might be infected. The number of cases with cardiopathy due to Chagas' disease was put at 270,000. The aim of the control program was to eliminate domiciliary transmission in the infested area, which comprises 591 municipalities covering 697,049 km² with a population estimated at 11,392,894 in 1982. Serologic surveys of the population aged from 0 to 9 years showed that the prevalence of infection, some 20.5% between 1959 and 1968, decreased to 1.3% in 1980-1981. Thus, the control program has brought about a substantial drop in domiciliary transmission of Chagas' disease.

Other Countries

Vectors and infected wild reservoirs or only wild triatomids have appeared in: Antigua, Aruba, Bahamas, Cuba, Curaçao, Grenada, Guadeloupe, French Guiana, Haiti, Virgin Islands, Jamaica, Martinique, Dominican Republic, St. Croix, St. Vincent and the Grenadines, and Trinidad and Tobago. In the latter, as in Belize, cases of human infection have been found. In Guyana three cases were confirmed in 1981. In 1982 the first autochthonous case was noted in the State of California; this was the third registered in the United States of America.

Diagnosis and Treatment

Direct microscopic observation and xenodiagnosis are still the most commonly used methods for detecting parasitemia in cases of acute and chronic infection, respectively. As the latter is not a technique within the reach of all the services and is moreover of low sensitivity, other methods are being devised to take its place. Serologic diagnostic techniques such as complement fixation, indirect hemagglutination and immunofluorescence, direct agglutination, or immunoenzymatic methods have been simplified and the reagents can be supplied by laboratories in the Region. Using at least two of these techniques simultaneously in conjunction with adequate quality control minimizes the possibility of false positives or negatives. In general, their use is fairly widespread, even in laboratories of medium complexity. Unfortunately, many laboratories still do not routinely perform serologic diagnosis of Chagas' disease or are not connected with a referral system through which this service could be obtained. It is imperative that quick and simple screening techniques be developed to facilitate serologic diagnosis.

Two drugs, nifurtimox and benznidazole, are effective in treating 75% to 95% of recent *T. cruzi* infection cases. However, only a small proportion of recent infections are diagnosed and treated. Health workers need to be trained to take *T. cruzi* into consideration as an etiologic agent in cases where the symptoms displayed (including febrile syndromes normally attributable to other etiologies) are not those characteristic of Chagas' disease; the primary and secondary care system must be provided with appropriate means at each level so that the diagnosis can be verified and effective treatment promptly instituted. Once the infection is chronic and the symptoms and signs such as cardiopathy and/or megavisceras are present, it is unlikely that the drugs men-

tioned above will be able to modify the progressive development of the disease.

Control Measures

Control of infection by *T. cruzi* depends primarily on elimination of the vector from rural housing. Although more than 50 species of triatomids with natural *T. cruzi* infection have been described, only 12 are of epidemiological importance and three (*Triatoma infestans*, *Rhodnius prolixus*, and *Triatoma dimidiata*) are well adapted to human dwellings and are the main vectors. However, and by way of example only, in parts of Bolivia, Brazil, Panama, and Venezuela other species such as *T. sordida*, *Panstrongylus megistus*, *R. pallescens*, and *T. maculata* can cause problems. Vector control is effected by means of residual insecticides. Problems with insecticiding arise from its cost, residual power, availability, and the fact that the houses are scattered and often reinfested. Although the resistance of *R. prolixus* and *T. maculata* to insecticides such as dieldrin and hexachlorohexane has been documented, there is no evidence to date that this problem affects the operation of the control program against these and other species. However, it will be necessary to implement a system for monitoring vector susceptibility to the insecticides used.

Improvement or change of housing offers a more permanent solution. Relatively simple steps such as changing a roof or flooring or plastering walls significantly reduce the population of *R. prolixus*, *T. dimidiata*, and *T. infestans*, respectively. The technical difficulties connected with the design of the dwellings, sociocultural factors which lessen the people's desire for change, and, of course, the financial cost are all problems that can be solved. There are eight countries with control programs based on health education and on interior and exterior domiciliary spraying with residual insecticides. Limited housing modification schemes have also been carried out in 12 of the 19 provinces in which Argentina's program operates, in the northeast of Brazil, and in certain areas of Venezuela.

The migration of rural dwellers into the cities has led to the frequent observation of Chagas' disease in urban areas. This adds to the work of the already overburdened health services and means that the risk of using infected blood in transfusions is increased. Since the use of crystal violet for eliminating *T. cruzi* from blood was not accepted and as long as there is no drug to take its place, serology must be

employed in identifying and rejecting as blood donors persons infected with *T. cruzi*.

The total and permanent elimination of transmission in rural areas cannot be achieved by the health sector alone. The integrated cooperation of the different sectors will be needed in a context of active community participation and sustained support from the policy-making level that will approach the problem from several different angles.

The end purpose is economic development of rural areas in order to increase their productivity and facilitate the marketing of agricultural production, thus raising the living standard of the rural population and breaking the vicious cycle of poverty, ignorance, and disease.

Until this is achieved, it should be ascertained that the basic tools are available for implementing a con-

trol program. These will have to be used in a coherent and sustained fashion in the areas of highest transmission, constantly evaluating the actions carried out and giving the community greater responsibility for epidemiological surveillance activities in the program which should itself be integrated in the health services' general network. Success in interrupting transmission will depend on proper and appropriate use of all available resources.

Clearly, rural development projects should consider introducing a housing improvement component. Malaria prevention and control programs which exist in various countries are a resource that should also be used in the control of Chagas' disease.

(Source: Tropical Diseases Program, Health Programs Development, PAHO.)

Diseases Subject to the International Health Regulations

17740

Cholera, yellow fever, and plague cases and deaths reported in the Region of the Americas up to 30 April 1984.

Country and administrative subdivision	Cholera Cases	Yellow fever		Plague Cases
		Cases	Deaths	
BRAZIL	—	16	15	5
Amazonas	—	6	5	—
Bahia	—	—	—	1
Ceará	—	—	—	2
Minas Gerais	—	—	—	2
Pará	—	9	9	—
Rondonia	—	1	1	—
COLOMBIA	—	3	3	—
Cesar	—	1	1	—
Cundinamarca	—	1	1	—
Santander	—	1	1	—
ECUADOR	—	—	—	6
Chimborazo	—	—	—	6
PERU	—	—	—	16
Cajamarca	—	—	—	16
UNITED STATES	—	—	—	4
California	—	—	—	1
New Mexico	—	—	—	1
Texas	—	—	—	1
Washington	—	—	—	1