

Current situation of Chagas disease in Central America

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*Chagas disease in Central America is known since 1913 when the first human case was reported in El Salvador. The other Central American countries reported their first cases between 1933 and 1967. On October 1997 was launched the Central American Initiative for Chagas Disease Control (IPCA). The objectives of this sub-regional Initiative are: (1) the elimination of *Rhodnius prolixus* in Central America; (2) the reduction of the domiciliary infestation of *Triatoma dimidiata*; and (3) the elimination of the transfusion transmission of *Trypanosoma cruzi*. Significant advancements being close to the elimination of *R. prolixus* in Central America and the control of the transfusion transmission has been a transcendent achievement for the sub-region. The main challenges that the IPCA will have in the close future are: developing effective strategies for control and surveillance of *T. dimidiata*; and surveillance of other emerging triatominae species like *R. pallenscens*, *T. nitida*, and *T. ryckmani*.*

Key words: Chagas disease - *Trypanosoma cruzi* - *Rhodnius* - *Triatoma* - Central America - transmission control - prevention

The Central American sub-region is located between South America, North America, The Pacific Ocean, and the Caribbean Sea. It is conformed by seven countries: Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama, with a territorial extension of 521,500 km² and a population of 36 million. It characterizes by having a broad biodiversity, with different ecological and climate patterns, and by being vulnerable to natural disasters like earthquakes, hurricanes, and the effects of underwater earthquakes.

The destruction of the natural resources, mainly the forest, and the human population migration within each country and within the countries, influences the epidemiology of all transmissible diseases including Chagas disease. Chagas disease in Central America is known since 1913 when the first human case was reported in El Salvador, constituting the second country in the continent of registering the disease (Segovia 1913). The other Central American countries then reported their first cases: Panama (Miller 1931); Guatemala (Reichenow 1933); Costa Rica (Bullow 1941); Nicaragua (Alvarez-Montalbán & Gutiérrez 1949); Honduras, (León-Gómez et al. 1960); and Belize (Coura & Petana 1967). Since these reports, and until the 1980s, all Central American countries carried out investigation work, mainly of the clinical, epidemiological, and entomological aspects of the disease. In the 1990s, the successful of the transfusion transmission control of the disease done in Hondu-

ras has been and carried out in other Central American countries, strengthening the motivation to justify the political decisions for the control of vectorial transmission (Ponce 1999).

CENTRAL AMERICAN INITIATIVE FOR CHAGAS DISEASE CONTROL (IPCA)

In 1997, in the XIII Meeting of the Central American Health Sector held in the city of Belize, Resolution No. 13 was approved, establishing that "The control of Chagas disease is a priority activity for the Central American countries". It was agreed to implement a multi-national program to achieve the interruption of the vector transmission and transfusion transmission of the disease. This program is known as the Central American Initiative for Chagas Disease Control (IPCA), and was launched on October 1997 in the city of Tegucigalpa, creating a Inter-governmental Technical Commission with the Pan-American Health Organization (PAHO), acting as the Technical Secretariat. This Commission has as main objectives, to follow up and evaluate the programmed activities for the countries, maintain the international cooperation support, and the participation of Now Governmental Organizations (NGOs) in the process, fomenting the knowledge and experience exchange between the member countries to strengthen the prevention and control interventions. The objectives of this sub-regional initiative are: (1) the elimination of *Rhodnius prolixus* in Central America; (2) the reduction of the domiciliary infestation of *Triatoma dimidiata*; and (3) the elimination of the transfusion transmission of *Trypanosoma cruzi*. *R. prolixus* is a vector species introduced into the sub-region of Central America, found only in the intradomiciliary condition, which makes it susceptible for elimination by the systematic application of residual action insecticides. Morphometric and genetic studies of the *R. prolixus* specimens from Honduras and Colombia show that the vector in Central America derives from the South American populations (Dujardin et al. 1998). El Salvador was the first Central American country to report the presence of *R. prolixus* (Neiva 1915), and

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it is assumed that it was the first country in the sub-region where the vector arrived, dispersing in different ways into the neighbor countries, reaching the Province of Guanacaste, North of Costa Rica, and the Chiapas and Oaxaca states in the South of Mexico (Zeledón 2004). *T. dimidiata*, on the contrary, is a native species found in all of Central American countries, in the intra-domiciliary condition, peridomiciliary condition, in the wild and even in urban areas. Its elimination is not possible; the control strategy is the reduction of the domiciliary colonization (Schofield & Dujardin 1997).

CURRENT SITUATION IN THE COUNTRIES

Belize

The only epidemiologically important vector is *T. dimidiata*, eminently wild, but more frequently visiting human dwellings. The country has population settlements originally from El Salvador, and temporal worker migration from Guatemala, El Salvador, Honduras, and Mexico. The Ministry of Health has developed an action plan to approach Chagas disease through five components. (1) Epidemiological surveillance incorporated into the National Information System; (2) Education by developing educational materials about Chagas disease and *T. dimidiata* as the vector; (3) Entomological surveillance by creating recollection posts for suspected insects, for identification; (4) Transfusion Transmission Control, maintaining 100% coverage of the serological screening of blood donors; (5) Training of all the personnel from the Vector Control Department from the Ministry of Health.

Costa Rica

The most important vector in Costa Rica is *T. dimidiata*. The dispersion of *R. prolixus* in Central America during the previous century reached the North of Costa Rica, where it was eliminated with the application of insecticides (Ruiz 1953). Recent findings of *R. pallescens* in the country, calls for the consideration of surveillance for this vector. The country has elaborated an epidemiological surveillance proposal for Chagas disease, to be incorporated within the National Health Surveillance System, with operative definitions and surveillance procedures in rural areas and marginal urban areas, where the presence of *T. dimidiata* is usually reported; and the development of educational material to be used in health services and schools. The country has achieved 100% coverage of the serological screening for *T. cruzi* in blood donors.

El Salvador

The dispersion of *R. prolixus* in the country since 1915 was broad in rural areas and around cities up to the 1980s. During 2003 and 2004 there has a broad entomological survey revealing only the presence of *T. dimidiata* with high indexes of dispersion and infestation. A specific search for *R. prolixus* took place in localities of 43 border municipalities of Guatemala and Honduras, without finding the vector, which has disappeared from the country, explaining the situation due to socioeconomic changes which occurred after the armed

conflicts, as consequence of the 1994 Peace Accords, which changes the tenancy schematic for rural property, and due to the currency remittance received by the families of the population who has migrated to the United States and other developed countries, having facilitated the improvement of dwellings causing the complete disappearance of the thatch roof. Even then, the current situation of *T. dimidiata* presents high dispersion, infestation, and colonization indexes, with an active vector transmission, registering an annual average of 60 acute cases diagnosed mostly in the western departments of the country. This is the greatest record of acute cases in Central America. The National Chagas Disease Program has an Strategic Plan for the 2005-2009 period, and has the support of the Japanese International Cooperation Agency (JICA), which carries out vector control interventions with insecticide spraying in localities with infestation indexes equal or above 40%. The transfusion transmission control maintains 100% coverage of the serological screening in blood donors.

Guatemala

The two important vectors in Guatemala are *R. prolixus* and *T. dimidiata*. The vector control interventions with insecticide spraying, with support by the JICA, have been carried out since the year 2000, and are near the elimination of *R. prolixus*. Currently there is work being done in the entomological and serological evaluation process supporting this elimination, and which allow for the International Certification. The control of *T. dimidiata*, the installation of entomological surveillance with community participation, and the education activities in intervened areas are important achievements. Also the etiologic treatment has begun for young people infected with *T. cruzi* in areas where the vector transmission has been interrupted and are under surveillance by a collaboration project with Doctors Without Borders/Spain. The country has elaborated a National Strategic Plan for the 2004-2010 period, with the objective to assure the achievements. In 2005, 100% coverage of the serological screening for *T. cruzi* was achieved in blood donors for the transfusion transmission control.

Honduras

The main vectors for *T. cruzi* in the country are *R. prolixus* with a focal dispersion and infesting strictly inside the dwelling, and *T. dimidiata* with a broad dispersion in different ecological and climate conditions. Within the IPCA framework, the country developed a National Strategic Plan for the Prevention and Control of Chagas disease 2003-2007, which expresses the national response to the problem, which transcends the Secretariat of Health framework, but strengthens the National Program, which leads and coordinates the process involving other state institutions, municipal governments, civil society, multi-lateral and bilateral International Cooperation Organizations and NGOs, forming jointly a broader and integral response. The National Program is being supported by the JICA, the Canadian International Development Agency, and various NGOs. The country has as a goal the elimination of *R. prolixus*

by 2007. The strategy to broaden the serological diagnosis in the endemic areas undergoing intervention combines a component named "Serological Exploration" which consists of obtaining seroprevalence data examining school children with a rapid test, at the school. The diagnosis value of the test and its application have been thoroughly evaluated (Luquetti et al. 2003, Ponce et al. 2005). The seroprevalence data by school allows stratifying and prioritizing other interventions. The other component is the Serological Survey, where a sample is taken in filter paper from 100% of the population over 6 months and under 15 years of age, in priority locations, with vector transmission interrupted and under surveillance, to carry out an ELISA IgG test with the purpose of administering etiological treatment to the seropositive. Two experiences of collective treatment with community participation and health personnel follow up were carried out successfully in 512 children, in 2005. The transfusion transmission control for *T. cruzi* maintains 100% coverage of the serological screening in blood donors.

Nicaragua

In Nicaragua, the two epidemiologically important vectors are *R. prolixus* and *T. dimidiata*. In the year 2000 the country identified a total of 13 municipalities in 8 departments, infested with *R. prolixus*. After the spraying interventions, the entomological surveillance installed has reported this vector only in one municipality of the department of Madriz, bordering Honduras. *T. dimidiata* on the other hand has been reported in all of the country's departments. The entomological surveillance along with community participation is working, and the health promotion activities and the education about prevention and entomological surveillance have increased. There has a serological survey held in children under 15 years of age, in locations of 12 municipalities of 8 departments having infestation by *R. prolixus*. The total of examined patients was of 3877 and 191 (4.9%) were found seropositive. The greatest number of seropositive patients was of 149 observed in the department of Madriz, with a seroprevalence of 10.8%. Etiological treatment in a joint task by the Ministry of Health and Doctors Without Borders/Belgium was administered to the population under 15 years of age in areas with interrupted vector transmission. The control of the transfusion transmission of *T. cruzi* has increased slightly, but 100% coverage has not been reached. Finding *R. pallescens* inside human dwellings in the southern municipalities bordering with Costa Rica, determines the need to initiate vector surveillance and the investigation of another species which in the future could be of epidemiological importance.

Panama

The main vector of *T. cruzi* in Panama is *R. pallescens*. Due to the particular characteristics of the vector transmission when visit the houses, there are no spraying interventions taking place. A part from the transmission by contamination with *T. cruzi*, the vector transmits by inoculation of *T. rangeli*. The second most important vector is *T. dimidiata* and a surveillance plan for this

vector is being developed. The transfusion transmission control has had significant progress reaching 100% coverage of the screening in 2005.

IPCA ACHIEVEMENTS AND CHALLENGES

The main achievements for the sub-region by the IPCA, since its creation in 1997 to date are: (1) significant advancements complying with the first IPCA objective, being close to the elimination of *R. prolixus*; (2) control of the transfusion transmission has been a transcendent achievement, reaching in 2005, 99% coverage for the sub-region, of the serological screening of blood to be transfused; (3) development of National Strategic Plans in Honduras, Guatemala, and El Salvador; (4) design of seroepidemiological diagnosis strategies for epidemiological surveillance, entomological surveillance, and collective treatment with community participation in areas with interrupted vector transmission and under surveillance.

The challenges that IPCA will have in the close future are: (1) developing effective strategies for control and surveillance of *T. dimidiata*; (2) surveillance of other emerging triatominae species like *R. pallescens*, *T. nitida*, and *T. ryckmani*; (3) maintain the transfusion transmission control with 100% coverage of the serological screening along with quality control programs; (4) bring medical care to all blood donors found to be seropositive, and administrate etiological treatment when appropriate; (5) maintain political will, and the support from the International Cooperation; (6) have the etiological treatment medications available for the young infected population in areas with interrupted vector transmission.

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