

Chagas: A Disease That Can No Longer Be Neglected

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Chagas disease,¹ also known as American trypanosomiasis, is one of the **17 neglected tropical diseases (NTDs)**² listed by the World Health Organization (WHO). They are called *neglected* or *forgotten* because they affect vulnerable populations who have little say in matters that affect their lives. Poverty-related diseases affect one in six of the planet's inhabitants, but historically very few resources have been invested in studying these diseases or in providing care to the millions of people affected.

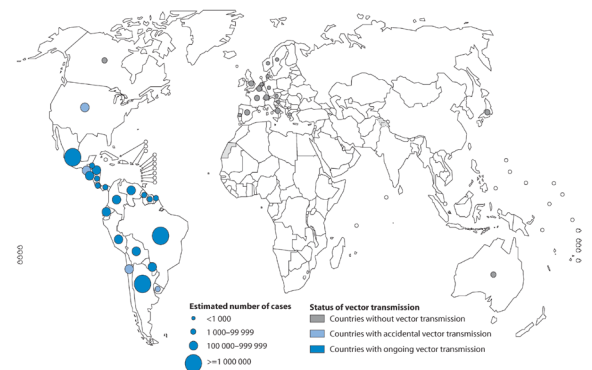
Chagas disease is caused by the **parasite** *Trypanosoma cruzi*. It is transmitted to animals and peoples in the feces of the insect vector, the triatomine bug (*Triatoma infestans*), but it can also be transmitted from mother to child during pregnancy or delivery (congenital transmission), through blood transfusions or organ transplantation, or through the consumption of food contaminated with the parasite.

Chagas disease is found throughout the Americas, from southern United States to Argentina, but it is particularly prevalent in poor, rural areas of Central and South America. The increase in migration and population movements has changed the epidemiology and geographic distribution of this disease, which is now found in places such as Australia, Canada, Japan, and Europe. Because vector-borne infection (infection caused by direct contact with the bug) only occurs in endemic areas, control strategies in non-endemic countries need to focus on preventing congenital transmission and infections transmitted through blood transfusions.

Chagas disease has two phases in humans: an acute phase, which occurs shortly after infection, and a chronic phase. It is estimated that approximately 30% of chronically infected individuals will develop heart complications years or even decades after

infection and that up to 10% will develop intestinal and/or neurological complications. These complications can be serious and even fatal, particularly when they involve the heart.

Distribution of cases of *Trypanosoma cruzi* and status of vector transmission worldwide, 2006-2009



Source: First WHO report on neglected tropical diseases 2010

Chagas Disease in Figures³

10 million people living with the disease
75-90 million at-risk population⁴
10,000 annual deaths

There are only **2 drugs available to treat** Chagas disease: nifurtimox and benznidazole. Both were developed through veterinary research in the 1960s and they are not very effective against chronic disease. Furthermore, they have to be administered for long periods (two months) and under medical supervision as they are associated with serious adverse effects. An additional problem is that the current shortage of benznidazole has left thousands of patients without treatment.

¹ Discovered by Brazilian physician Carlos Chagas in 1909.

² Buruli ulcer (Mycobacterium ulcerans infection), Chagas disease (American trypanosomiasis), cysticercosis, dengue/severe dengue, dracunculiasis (guinea-worm disease), echinococcosis, Yaws, fascioliasis, human African trypanosomiasis (sleeping sickness), leishmaniasis, leprosy, lymphatic filariasis (elephantiasis), onchocerciasis (river blindness), rabies, schistosomiasis (bilharzia), trachoma, soil-transmitted helminthiasis.

³ WHO 2008.

⁴ Coura JR and Dias JC. Epidemiology, control and surveillance of Chagas Diseases: 100 years after its discovery. Mem Inst Oswaldo Cruz, 2009; 104 (S1):31-40.

Initiatives implemented in the 1990s⁵ to interrupt vector-borne transmission of Chagas disease have proven successful in countries such as Brazil, Uruguay, Chile, and Guatemala. These initiatives, however, need to be continued and made sustainable to prevent the resurgence of disease in areas where important progress has already been made towards its elimination. Cost-effective methods such as the chemical control of vectors (fumigation) and screening measures in blood banks and pregnant women have already led to a considerable reduction in transmission rates. Nevertheless, millions of patients are still receiving inadequate care. In other words, despite the recommendations of the WHO for the control of Chagas disease,⁶ millions of patients have not yet been properly diagnosed or treated.

Main Challenges:

- Control of disease transmission from mother to child and through blood transfusions
- Control of house infestations in Latin America
- Development of biomarkers to evaluate treatment effectiveness and facilitate the early detection of heart damage
- Development of new drugs with enhanced safety and efficacy
- Reestablishment of the production and distribution of benznidazole

The World Bank⁷ has defined Chagas disease as one of the main public health problems in Latin America, where it is more common than malaria or dengue. Chagas disease hampers economic development and contributes to perpetuating the vicious cycle of poverty and disease in vulnerable communities. Because the disease takes years to develop, its most serious manifestations affect prime-aged adults, which, of course has major health and socioeconomic repercussions. According to a study conducted in Columbia,⁸ treatment of chronic Chagas disease costs the country \$267 million every year.

Recent initiatives such as the Uniting to Combat NTDs conference, where the WHO presented its roadmap for accelerating work in NTDs,⁹ have provided a springboard for pushing these diseases into the international agenda. The Spanish government is also an important actor in the fight against Chagas disease, particularly through its contribution to public-private product development partnerships, such as the Drug for Neglected Diseases initiative (DNDi), and, to a lesser extent, through its involvement in research and cooperation projects.

Chagas Disease in Spain

Spain has the highest number of patients with Chagas disease outside the United States and countries in Latin America where *T. cruzi* is endemic. There are approximately 2 million Latin American immigrants in Spain,¹⁰ 68,000 of whom are thought to be infected with *T. cruzi*.¹¹ The disease is most prevalent in the Bolivian community, which has 236,048 members, including 103,291 women of childbearing age.

Identifying ways to **prevent, control, and treat Chagas disease in Spain** is thus one of the latest challenges facing the Spanish public health system. Vector-borne transmission is not possible in Spain. This means that new cases of infection in our setting are due to congenital transmission or to transmission through blood transfusions or organ transplantation. The risk of new infections arising from blood transfusion has been practically eliminated thanks to screening measures implemented in blood banks that require blood samples from donors from risk areas or with a history of exposure to risk to be examined prior to use.¹²

Similar measures have been adopted by the National Transplant Organisation.¹³ Regarding efforts towards the elimination of mother-to-child transmission, **Catalonia**¹⁴ and the **Community of Valencia**¹⁵ are the only autonomous communities in Spain to have implemented protocols based on proven cost-effectiveness models to screen for and

⁵ Sub-regional initiatives: Andean Initiative to Control Vectoral and Transfusional Transmission of Chagas Disease (IPA), Initiative of the Amazon Countries for Surveillance and Control of Chagas Disease (AMCHA), Initiative of the Countries of Central America for Control of Vector-Borne and Transfusional Transmission and Medical Care for Chagas Disease (IPCA), Southern Cone Initiative to Control/Eliminate Chagas Disease (INCOSUR).

⁶ Control of Chagas disease: second report of the WHO Expert Committee. Geneva, World Health Organization, 2002 (WHO Technical Report Series, No. 905). <http://new.paho.org/hq/dmdocuments/2010/CD50.R17-s.pdf>

⁷ World development report 1993: investing in health.

⁸ Castillo-Riquelme M et al. The costs of preventing and treating Chagas disease in Colombia. *PLoS Neglected Tropical Diseases*, 2008, 2(11):e336.

⁹ Accelerating work to overcome the global impact of neglected tropical diseases – A roadmap for implementation www.who.int/entity/neglected_diseases/NTD_Road-Map_2012_Fullversion.pdf

¹⁰ Spanish National Statistics Office (INE).

¹¹ Gascon J et al. Chagas Disease in Spain, the United States and other non-endemic countries. *Acta Tropica*, 2010;115:22-27.

¹² Ministry of Health and Consumption. Royal Decree 1088/2005, of 16 September, laying down the technical requirements and minimum conditions for blood donation and blood transfusion centres and services. http://www.msc.es/profesionales/www.eurosurveillance.org/saludPublica/medicinaTransfusional/legislacion/docs/RD_1088-2005.pdf

¹³ National Transplant Organisation. Criteria for selecting organ donors with respect to the transmission of infections 2004. <http://www.ont.es/infesp/DocumentosDeConsenso/infecciondonante.pdf>

¹⁴ Catalan Department of Health. Screening and diagnostic protocol for Chagas disease in pregnant Latin American women and their infants. <http://www.gencat.cat/salut/depsalut/html/ca/dir2384/protchagas2010.pdf>

¹⁵ Valencian Department of Health. Regulation of the control of congenital and perinatal infections in the Community of Valencia. Informative Note 3/2007, 8-1-8/8.2007. http://www.sp.san.gva.es/DgspPortal/docs/CIRCULAR_3_2007.pdf <http://www.gencat.cat/salut/depsalut/html/ca/dir2384/protchagas2010.pdf>

diagnose Chagas disease in pregnant women from countries with a high incidence of this disease.¹⁶ As a newly imported disease, Chagas is still unfamiliar to many healthcare professionals. Urgent mechanisms are thus needed to ensure the early detection and treatment of disease in at-risk individuals.

ISGlobal's Work in Chagas Disease

The Barcelona Institute for Global Health (ISGlobal) has been conducting research and training activities in Chagas disease since 2002 through its research center, CRESIB. It organises an annual workshop, now in its eight edition, which has become a key forum for the sharing of experiences and knowledge.

CRESIB also works in Bolivia, which has the highest burden of Chagas disease in the world. The research center has been active in the fight against this disease in Bolivia since 2008, initially through funds from the Catalan Development Aid Agency (ACCD) and subsequently through a project funded by the Spanish Agency for International Cooperation for Development (AECID).

The project provides a platform through which CRESIB undertakes activities in partnership with local actors such as the Universidad Mayor de San Simón in Cochabamba, the CEADES, and the national Chagas programme. Its work involves combining the direct provision of healthcare to patients to enhance the **full cycle of care** (prevention, diagnosis, and treatment) with the training of local healthcare professionals and the development of research protocols through a **common scientific platform**.



The model is currently being implemented in other areas of the country such as Tarija, Sucre, and the rural areas of Cochabamba. CRESIB has also created a basic training and **community** awareness network on topics such as insect monitoring, disease prevention,

and access to healthcare services to control Chagas disease.

Of note among the **research projects** currently underway is a **phase 2 clinical trial** to determine the safety and efficacy of a new drug for chronic Chagas disease as well as several projects to develop **new tools to diagnose and monitor the treatment of** Chagas disease. These tools include disease progression and healing markers that will help to assess the effectiveness of treatment in patients with chronic infection.

In Spain, ISGlobal has called for the Spanish public healthcare system to implement **early detection programmes for neonates and to provide quality care for patients with Chagas disease**. Treatment has a success rate of close to 100% in newborns if they are treated in the first year of life, but effectiveness decreases with duration of infection. Spain therefore needs to implement regulatory mechanisms that guarantee the widespread implementation of perinatal screening programmes to reduce the burden of Chagas disease and at the same time generate significant savings for the healthcare system.

It is also essential to correctly diagnose and treat patients with **chronic disease** to prevent and control possible complications.

CRESIB was involved in the drafting of a series of **consensus documents** on the diagnosis, treatment, and management of Chagas disease in patients with different profiles (HIV-seropositive patients, transplant recipients, and patients with cardiovascular or digestive disorders). The documents were drawn up within the framework of the Spanish Society of Tropical Medicine and International Health. The human and economic costs generated by delays in drawing up regulatory recommendations on the management of Chagas disease in Spain are increasing to the point where they will soon be unacceptable.

Main Challenges in the Fight Against Chagas Disease in Spain:

- Implementation of screening programmes for pregnant Latin American women throughout Spain
- Provision of appropriate primary and specialty care for patients with chronic Chagas disease within the public healthcare system

¹⁶ Economic evaluation of Chagas disease screening of pregnant Latin American women and of their infants in a non endemic area, Acta Tropica 118 (2011) 110–117 Elisa Sicuri et al.

¹⁷ Agreement 10-CO1-039. Strengthening of National Chagas Disease Control Programme for the comprehensive management of the disease in Bolivia.