After 100 Years, the Diagnosis, Treatment, and Control of Chagas Disease Remains a Challenge

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Chagas cardiomyopathy still burdens a large population and is the primary cause of nonischemic cardiomyopathy in Latin America [1–3]. Dr. Carlos Chagas first described the disease in 1909 and described much of what we know about the transmission and natural progression of Chagas disease [4]. Dr. Chagas suspected the disease vector was an insect and noted that it was associated with rural populations and poor housing conditions. He was the director of Instituto Manguinhos, an important institute for health research in South America at the time, and he advocated for public health interventions, such as making laws to improve housing in endemic areas, as the most effective way to eliminate the disease.

Today, we know much more about the immunology of the disease than Chagas did in the early 1900s, and we have treatments and vector control strategies that were unavailable during his lifetime. Chagas disease is primarily transmitted through bites from the nocturnal "kissing bug," *Triatoma infestans*, but can be transmitted congenitally, as well as through blood transfusions and organ transplantation, and needle sharing. The rapid diagnostic tests can detect the causative parasite *Trypanosoma cruzi* in serum and diagnose chronic infections. Pesticides have been developed for vector control programs, but much is still unknown about this disease. The prevention and elimination of the vector remains the key.

If the initial infection goes untreated, which is frequently the case, approximately 30% of affected individuals progress to Chagas cardiomyopathy [5]. The approach to treatment of cases has been controversial and a randomized placebo-controlled trial using benznidazole is underway in patients who have already developed Chagas cardiomyopathy [6]. Even if treatment proves to be effective, primary prevention is needed to eliminate the burden of Chagas disease on a population level. Chagas eradication has been effectively achieved in many areas in Latin America, such as much of Chile, Uruguay, and Brazil, but requires strong public health infrastructure and policies to implement vector control programs in the remaining parts of South and Central America. In certain underserved and rural areas of Argentina, Paraguay, Mexico, and Bolivia, inadequate housing and lack of vector control remain a big problem, and the disease continues to disproportionately affect people living in extreme poverty and who lack access to health care and treatment. The lack of care further propagates the vicious cycle of ill-health and subsequent poverty in these areas.

In this context, the authors in this special issue of *Global Heart* report on how far we have come in the past 100 years since the first description of the disease. The authors are commended for their efforts to address this rather mysterious and often neglected tropical disease. Prof. Joao Carlos Pinto Dias [7] provides a comprehensive historical perspective of this disease and the social and political context behind why elimination of this disease has been challenging and what is needed for effective eradication of the disease. Five original manuscripts focus on different aspects of Chagas cardiomyopathy using different diagnostic tools, such as electrocardiography, echocardiography, and biomarkers [8–12]. A review by Belisario Falchetto et al. [13] describes the pathophysiology of how magnetic resonance imaging can play a role in the diagnosis and prognosis of this disease. Treatment for chronic Chagas remains controversial and Oliveira et al. [14] describe the current treatments available and completed and forthcoming randomized studies including: BENEFIT (Benznidazole Evaluation for Interrupting Trypanosomiasis), CHAGASICS (Chronic Use of Amiodarone Against Implantable Cardioverter-Defibrillator Therapy for Primary Prevention of Death in Patients With Chagas Cardiomyopathy Study), and STCC (Selenium Treatment and Chagasic Cardiopathy).

Whereas the exact numbers are difficult to estimate, as Stanaway and Roth [15] discuss in their review about the global burden of disease, there are many millions of people currently infected with *T. cruzi*. Researchers, health care providers, teachers, and policy makers need to work together to better understand and eradicate this disease and to grant the populations at risk the same opportunity for good health granted to those benefiting from the past century's scientific, public health, and clinical advances. It is time to make Chagas disease a disease of the past, as we have done for the bubonic plague, leprosy, and polio, so that future generations will only read about it in textbooks.

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