Housing Improvements and Chagas' disease control in the Southern Cone

Gilberto Padilla Mercado

Background:

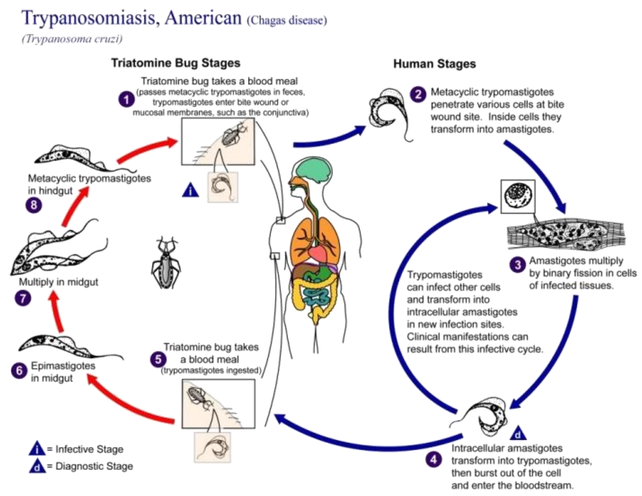
Chagas' disease, discovered by Carlos Chagas in 1909, is a blood borne disease that causes lesions in cardiovascular and digestive tissues (Moncayo, 2009). There are three main pathways of transmission: through blood transfusions, congenital (from mothers to their children during birth), and via insect vectors called triatomines. In the early 1990s the Pan American Health Organization (PAHO) brought the Ministries of Health of Brazil, Bolivia, Chile, Argentina, Paraguay, and Uruguay together to form what was called the Southern Cone Initiative, which began work to systemically interrupt Chagas disease transmission (Dias, 2002). The transfusion and congenital transmission pathways were fairly easy to interrupt due to increased effectiveness of blood screenings that began during the 1980s in response to the discovery of AIDS (Massad, 2008). The challenge was to interrupt the triatomine vectors. A successful attack phase relied on focused spraying of insecticides on houses. Now, much of the Southern Cone Initiative has transitioned into a surveillance stage, where it hopes to maintain interruption and make the process more sustainable.

Methods:

First, research was conducted on the Southern Cone Initiative and Chagas' disease in general and followed by additional, narrower searches. Google Scholar provided results for the majority (8) of searches, and some (4) of the sources came from Memórias do Instituto Oswaldo Cruz, a Brazilian institute with a large collection of literature on Chagas disease (accessed via the Scientific Electronic Library Online). Most of the articles went to great lengths about Chagas disease and the control efforts of the Southern Cone Initiative. However, to get a basic understanding of the nature of the disease itself, I found an educational article by Teixeira et al. published in 2012 that explained the life cycle of the disease and the damage it does to tissues. Research on the battle against Chagas indicated that certain things became overlooked through the years, including a focus on housing improvement, favoring instead insecticide use on homes.

Results:

Most articles about the Southern Cone Initiative emphasized the use of pesticides against triatomine vectors. An epidemiological perspective pointed out that the use of pesticides was the most significant way disease vectors could be attacked and interrupted, as well as it being the most cost-effective action at the time (Massad, 2008). The Ministries of Health involved in the Southern Cone Initiative continued this strategy of attack into its surveillance and sustainability phase. Dias reported that the first country to be certified as interrupted of domestic disease vectors was Uruguay (2002). That same report also found that Uruguay had the housing initiative MEVIR that improves housing among disadvantaged populations (Dias, 2002). A study on Uruguayan housing policies noted MEVIRs efforts to involve rural communities in housing improvements (Garabato, 2011). Other studies showed that housing improvements could interrupt insect vectors without the need of focal spraying for longer periods of time as opposed to unimproved housing structures (Cecere, 2002). Dias later acknowledged Carlos Chagas' advocacy for housing improvements, but how costs impeded further implementation of this method of interruption (Diaz 2007). A study conducted in Bambuí, by the institute where many of my sources came from, showed evidence that housing improvements interrupted insect vectors for indefinite periods of time, provided that these were improvements of good quality (Dias 1982). This same study also suggested that rural people were more receptive of houses improved or constructed from traditional materials as opposed to modern construction materials (Dias 1982).



Conclusion:

The evidence points to a successful attack phase in the Southern Cone Initiative that has led to a less sustainable surveillance stage. Housing improvements would reduce domestic re-infestation, especially in endemic areas, such as the Southern Cone. Some countries have worked with separate programs to improve housing, and this has affected the effectiveness of their disease interruption. The positive response from rural people for the use of traditional materials also indicates that if housing improvements become a priority, there should be community groups making key decisions so that their communities as a whole will be more receptive to housing improvements. By refocusing on communities as opposed to large areas, and shifting from focused pesticide use to housing improvements, there can be greater strides in the sustainability of triatomine vector interruption.

Sources:

Cecere, M. C., Gürtler, R. E., Canale, D. M., Chuit, R., & Cohen, J. E. (2002). Effects of partial housing improvement and insecticide spraying on the reinfestation dynamics of *Triatoma infestans* in rural northwestern Argentina. *Acta tropica*, *84*(2), 101-116.

Dias, J. C. P. (2007). Southern Cone Initiative for the elimination of domestic populations of Triatoma infestans and the interruption of transfusion Chagas disease: historical aspects, present situation, and perspectives. *Memórias do Instituto Oswaldo Cruz*, *102*, 11- 18.

Dias, J. C. P., & Dias, R. B. (1982). Housing and the control of vectors of human Chagas' disease in the state of Minas Gerais, Brazil. *Bulletin of the Pan American Health Organization*, *16*(2), 117-129.

Dias, J. C. P., Silveira, A. C., & Schofield, C. J. (2002). The impact of Chagas disease control in Latin America: a review. *Memórias do Instituto Oswaldo Cruz*, *97*(5), 603-612.

Dias, J. C. P., & Schofield, C. J. (1999). The evolution of Chagas disease (American trypanosomiasis) control after 90 years since Carlos Chagas discovery. *Memórias do Instituto Oswaldo Cruz*, *94*, 103-121.

Garabato, N., & Ramada-Sarasola, M. (2011). Are Uruguayan Housing Policies Reaching the Poor? An Assessment of Housing Deficit, Housing Informality and Usage of Housing Programs in Uruguay.

Massad, E. (2008). The elimination of Chagas' disease from Brazil. *Epidemiology and infection*, *136*(9), 1153-1164.

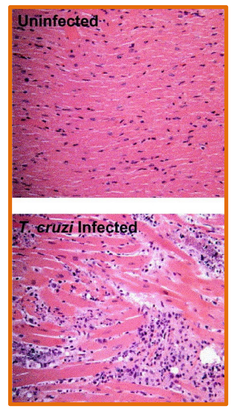
Moncayo, A. (1993). Chagas' disease. *Tropical Disease Report Progress 1991*, *92*, 67-75.

Moncayo, A., & Ortiz Yanine, M. I. (2006). An update on Chagas disease (human American trypanosomiasis). *Annals of tropical medicine and parasitology*, *100*(8), 663-677.

Moncayo, Á., & Silveira, A. C. (2009). Current epidemiological trends for Chagas disease in Latin America and future challenges in epidemiology, surveillance and health policy. *Memórias do Instituto Oswaldo Cruz*, *104*, 17-30.

Schofield, C. J., Jannin, J., & Salvatella, R. (2006). The future of Chagas disease control. *Trends in parasitology*, *22*(12), 583-588.

Teixeira, D. E., Benchimol, M., Crepaldi, P. H., & de Souza, W. (2012). Interactive Multimedia to Teach the Life Cycle of Trypanosoma cruzi, the Causative Agent of Chagas Disease. *PLoS Neglected Tropical Diseases*, *6*(8), e1749.



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Hedgecock, C. Triatomine Bug. Digital image. *Emerging Infections Diseases*. Centers for Disease Control, 14 Dec. 2010. Web. 19 Apr. 2013.

American Trypanosomiasis Infection Cycle. Digital image. *American Trypanosomiasis (Chagas Disease)*. Centers for Disease Control, n.d. Web. 18 Apr. 2013.

Rural Housing Conditions. Digital image. *Ecosystems and Human Health*. International Development Research Centre, n.d. Web. 18 Apr. 2013.

South America Political Map. Digital image. *South America Political Map - South America Maps*. Mapsof.net, n.d. Web. 18 Apr. 2013.

Engman, David M., and Juan S. Leon. Infected and Uninfected tissue. Digital Image. *Pathogenesis of Chagas heart disease: role of autoimmunity*. Acta Tropica, Feb. 2002. Web. 18 Apr. 2013.