

Chagas Disease in Humans, Animals, and Insect Vectors across a Transnational Gradient: Preventing Vector-Borne Diseases that Know No Borders

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Chosen in the area of global health and security, this proposal was submitted by six faculty representing six colleges/schools at Texas A&M. Chagas disease is a devastating cardiac disease of humans and dogs caused by the parasite *Trypanosoma cruzi* and is spread by kissing bug vectors that are prevalent across central and South America. In South America, the disease has been reported in cattle and pigs, potentially creating an economic threat to communities in Texas. This transdisciplinary team will work together with public health officials to assess the distribution and determinants of disease across the landscape and generate innovative solutions to the problems of Chagas disease in the Americas.

The research will initially quantify the spatial and temporal magnitude of the animal disease problem and identify risk factors, which are prerequisites for more applied research to evaluate intervention strategies. Spatial models will be developed to understand the relationships between environmental, climatic, and demographic factors that influence spread and severity of disease. These models could be used in a transformative manner to influence policy with particular consideration paid to cross-border collaboration. Furthermore, this program will train a cohort of students in disciplines with little history of collaboration (human medicine, veterinary, architecture, and geosciences) to work together to address one of society's most pressing infectious disease problems.

Two main activities will occur in Year One: a South Texas pilot research project and a one-day conference. The pilot research project will assess Chagas disease ecology and epidemiology in a hotspot of disease transmission in south Texas, as a precursor for expanding studies to a broader geographic area to encompass a U.S.-Mexico transnational gradient. The conference will bring together TAMU investigators with international Chagas disease experts to generate white papers based upon the pilot data generated in the South Texas pilot project. The white papers will be used as the basis for developing full proposals to external funding agencies.

Faculty collaborators:

- College of Architecture
 - Cecilia Giusti, Associate Professor, Department of Landscape Architecture & Urban Planning
- College of Agriculture & Life Sciences
 - Gabriel Hamer, Clinical Assistant Professor, Department of Entomology
- College of Geosciences
 - Dan Goldberg, Assistant Professor, Department of Geography
- College of Science
 - Charles Criscione, Assistant Professor, Department of Biology
- College of Veterinary Medicine & Biomedical Sciences
 - Sarah Hamer, Assistant Professor, Department of Veterinary Integrative Biosciences
- Texas A&M Health Science Center, School of Public Health
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