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IDSA SUMMER GRANT REPORT

During this summer research experience, I spent two months in Arequipa, Peru working on two research endeavors in collaboration with Principal Investigators from several US universities, the Universidad Cayetano Heredia and the Ministry of Health (MoH) of Arequipa. The first of these projects, and the one that I proposed in my IDSA grant application, was a series of experiments testing the effectiveness of insecticide impregnated durable wall lining on the viability, mortality and feeding success of *Triatoma infestans*, the vector that transmits the *T. cruzi* parasite, the causal agent of Chagas' Disease. In addition, I worked on a collaborative project assessing house level risk of infestation with T. infestans in the district of Mariano Melgar, Arequipa, in order to provide a "risk map" that will guide upcoming MoH spraying operations.

The investigation of durable wall lining was part of a larger project being carried out by our research group on novel prevention methods for Chagas Disease. This aspect of the project involves a series of experiments including a bioassay of this innovative prevention method in a laboratory as well as both a series of aquarium studies and, in the future, a study in a semi-field system simulated environment. The latter two study types are meant to test the effectiveness of this technology in controlled but increasingly realistic settings. The first step in carrying out this project was to design and write protocols and IACUC applications for each of the experiments. During the time that I was in Arequipa, we were successful in writing protocols for the bioassay and the aquarium studies and obtaining IACUC approval. We then ran a test of the bioassay experiment and ultimately the full bioassay experiment, for which we are currently analyzing the data. Finally, we also completed a first test of an aquarium experiment in which we examine the feeding success, viability and mortality of Triatoma vectors in an aquarium-based simulated environment. With support from Peruvian and American colleagues, this study is underway and we intend, once the results are available, to use these in conjunction with the bioassay results to compose a manuscript for publication.

A picture of the bioassay experiment, performed at the laboratory facility in Arequipa, Peru

The second project that I initiated while in Arequipa is being carried out as a consultation for the regional Ministry of Health's Chagas Disease program and involves the development of a "risk map" of house infestation in the Mariano Melgar district of Arequipa. This map will be used to guide spray operations there starting in the fall of 2010. The project consists of building a predictive model of infestation based on a baseline infestation survey was taken almost two years ago. During my time in Arequipa, I visited high-risk homes in Mariano Melgar in order to gain a realistic sense of the area, crafted a model plan in conjunction with collaborators and assembled additional data sources that were only available locally. Once the model has been completed, we will generate a risk map for the MoH to use in a targeted spray campaign. Once available, the infestation data that is collected by the MoH at the time of spray will then be used to calibrate and validate the model, which can then be applied in targeting house spraying of neighboring districts and potentially cost effectiveness analyses comparing targeted spraying to a more traditional blanket spraying approach. This project will be ongoing for the next year, though the initial risk map will be provided to the MoH in the fall of 2010. I and the investigators I am currently working with on this project intend to publish this model in an infectious disease journal once it has been validated and calibrated.

Finally, this grant and summer research endeavor provided me with a truly outstanding opportunity to experience the culture of Peru and practice the Spanish language. Arequipa was a very interesting city in which I was able to experience the challenges present in newly urbanized settlements. My Peruvian co-workers on the project were also excellent and very supportive of the projects we were working on, shared their knowledge of Chagas Disease locally as well as the local culture and language. My participation in this research project would not have been possible with the support of the IDSA, and I cannot express my appreciation enough for this opportunity. As I move forward in my career, my short term goals include completing and hopefully publishing the results of these projects, completing medical school

and hopefully going on to participate in further research endeavors in both Chagas' Disease specifically and infectious diseases generally as well as a residency in internal medicine or pediatrics and a fellowship in Infectious Disease. Ultimately, I hope to become a research scientist and practicing physician in the field of Infectious Disease.

The staff of the laboratory and field teams at the research facility in Arequipa, Peru