My First Taste of Public Health Work: Dengue in Costa Rica

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One of the best decisions I made during my undergraduate years was to study abroad. Through an ACM program, I spent the spring semester of my junior year in Costa Rica. This particular program is structured around a two-month independent study which allows students to delve into a project under the expertise of a research advisor. My post-graduate goal is to attend medical school, so I looked for a research project related to medicine and public health. Throughout this essay I would like to share my first exposure to public health, and the special opportunities I encountered while studying abroad in Costa Rica. While my focus here is my research project, the most important values and lessons I learned while studying abroad were from the people I met and the culture I joined. I hope that other students considering to study abroad take my word: studying abroad is a decision you will be very happy you made. It will also provide you with unmatched scholastic opportunities.

My advisor in Costa Rica was Anabelle Alfaro Obando, MD. She is a well-known expert on Dengue fever across Latin America, and I was very fortunate to have been assigned as her advisee. Within one of our first emails, Dr. Alfaro told me about a previous ACM student she had worked with. In a social evaluation project, that student conducted interviews in two communities to gather their knowledge, practices and attitudes in regards to dengue fever. Dengue fever is the most deadly arthropod borne human virus in the world, and is contracted an estimated 300 million times every year. It is transmitted by mosquitoes of the genus Aedes, which live exclusively in areas with human population. Dengue is endemic in Costa Rica; in 2013 the rates of infection were unexpectedly high. Before leaving the US I knew my project would roughly resemble the work the previous student had done, and I would conduct door to door interviews in a town. With that idea in mind, I headed off for Costa Rica.

Upon arriving to Central America, I lived an exotic, colorful, new life, which in many ways was uncharted by my previous influences and molds. During my first month I lived in the city of San Pedro, read a number of articles on: dengue symptoms and treatment, outbreaks in other countries, factors that exacerbate transmission and prevalence, and very importantly, manuals for the planning and mobilization of dengue prevention in communities. I wrote a research proposal and completed the interview I would use door to door. The research planning process was slow at times and took many turns.

Picture 1. I learned the role of MH workers in the community. Here are two of the workers I learned from. From left to right: me, Maynor Peraza Solas, Jaime Rodriguez Arguedas.

Picture2. Door to door property inspections conducted by MH workers in QG.

Though I will highlight points relevant to my research project, there were undoubtedly a variety of obstacles throughout the semester as well.

Two of the most important structures related to public health that I became familiar with involved the role of the local ministry of health, and the broader influence of the World Health Organization (WHO) in dengue control. The Pan-American Health Organization (PAHO) is a sector of the WHO, with a specialized domain of the western hemisphere. For some background information it is important to know that post-World

Picture 3. Problems on the left, corresponding solutions on the right. The top left image is a vacuum cleaner that was kept outside and found positive for Aedes larva and pupa. It was drained to prevent Aedes from developing into adult mosquitoes. The bottom left image is a metal pole that collects rainwater. By covering it with plastic, mosquitoes cannot access the water to deposit their eggs.

Picture 4. In-house education by MH workers.

War II a very successful mosquito eradication campaign utilized DDT to kill disease vectors. The campaign was successful in eliminating dengue in many countries, and Costa Rica remained free from dengue until 1993. Eventually, however, the detrimental and carcinogenic effects of DDT were recognized and the campaign ended. When the use of DDT was no longer an option, effective methods for dengue prevention were up for evaluation. Nothing seemed to work as well as a strong chemical like DDT. In 2003 the PAHO developed an integrative management strategy (EGI in Spanish) for dengue control and prevention which has five components: social communication, epidemiological surveillance, entomology, patient attention and laboratory.

Studies show that the most successful methods for dengue control and prevention rely on active community involvement. Dengue is a community problem so institutions alone cannot uphold prevention for an extended period. In a large part, educational efforts teach community members to eliminate all stagnant water on their properties so that the dengue vector cannot lay her eggs and reproduce. My project focused on the social communication component of the EGI. Through my interviews, I aimed to evaluate the knowledge, perceptions, attitudes and practices of community members in a mid-Pacific coastal town in regards to dengue and its prevention.

When I moved from the city to the small town of Quebrada Ganado (QG), I began observing the vector control workers from the Ministry of Health (MH) (Picture 1). Their job is to conduct door to door property inspections for Aedes breeding sites (Picture 2), provide short term solutions to the problems (Picture 3), and educate property owners on dengue fever and its prevention (Picture 4). In two weeks I gained a solid understanding of the workers' role in the community, which gave me great insight when I began conducting the interviews thereafter. Specifically the objectives of my study were to: evaluate community knowledge and opinions about dengue and its prevention, gather opinions on how to effectively educate the community and solicit their involvement, and to relate findings from property inspections conducted by MH workers with the knowledge of property owners.

I conducted interviews at residential properties in QG for about six weeks. While I had the opportunity to collect data from interviews that lasted anywhere from seven minutes to two hours, I had the added benefit of living with a family in the community and thereby integrated myself into their way of life. As a researcher, living in the town gave me more comprehensive depth and perception on my project because I experienced the community members' day to day life, culture and norms. In total I interviewed 320 households, and was able to pair my data with the results from property inspections at 264 of those houses.

After two months in QG I moved back to San Pedro and began my final research report and presentation. After compiling the data and analyzing it, I had abundant information to address each of my objectives. To highlight some of our results, some of the participant characteristics we identified to correlate with more Aedes breeding sites were people who: do not live with anyone previously infected by dengue, do not understand the symptoms of dengue, have more frequent infections in the household, have a lower education level, rate the importance of actions on dengue prevention lower, and rate dengue to be less dangerous. During the final week in the program I finished a written report and presented on the results of my project at the ACM. Additionally, I translated my PowerPoint for the head of the Ministry of Health near QG so he could present and share our findings at an important MH meeting.

My experience in Costa Rica opened my eyes to the role that organizations play in public health. Controlling a vector born disease is a community problem, and there are no simple answers to the questions who is responsible for preventing dengue, and how dengue can be eliminated? The MH, municipality, community leaders, politicians, private companies and every individual citizen play a role. Leaders at each of these levels need to lead by example, and make the elimination of breeding sites a priority, and property review for stagnant water a norm.

This opportunity gave me first-hand experience in the intricacies of vector borne diseases and their control/prevention. In the future I hope to continue work with Dr. Alfaro and build off of the work I have begun. I am very grateful for the service I could provide to this community and hope our findings play a role in improving social communication on dengue and its prevention.

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