

Peace Through Healthcare  
Nicaragua  
Reed College  
Gabriel Butterfield '12 and Michael Gonzales '12, USA, Reed College

Section I:

The Peace Through Healthcare project was originally conceived as a means of combating the worldwide challenge of infant mortality in developing nations due to diarrheal pathogens. Moreover, it was conceived as a means of combating the development of antimicrobial resistance and advocating for the conscientious use of antibiotics by informing physicians of the antibiotic susceptibilities of diarrheal pathogens in their region.

The project was a research-oriented public health initiative made possible by the support of a \$10,000 grant from the philanthropist Kathryn W. Davis through the 2012 Davis Project for Peace.

Overall, the project was very successful. From our time spent in Managua, Nicaragua, we have begun to establish a basic etiology of diarrheal illness in children under five years of age at two public health clinics, El Centro de Salud - Edgard Lang and El Centro de Salud - Francisco Morazán. Furthermore, in partnership with the Universidad Nacional Autónoma de Nicaragua - Managua, we have begun an ongoing study that will assess the extent of antimicrobial resistance in enteric bacteria acquired from the diarrheal stool of children under five years of age in the region. Finally, we have introduced the use of the Wellcolex rapid latex agglutination test for identification of the enteric bacteria *Salmonella*, *Shigella* and pathogenic *Escherichia coli* to local health clinics to significantly increase the clinics' capabilities to provide rapid and accurate diagnoses.

Upon beginning our work at the Laboratorio Clínico de Microbiología y Parasitología Médica at the Universidad Nacional Autónoma de Nicaragua - Managua, we discovered that our preconceived notions of the prevalence of diarrhea of bacterial origin were much overestimated. Similarly, we discovered that local assumption regarding the viral origin of diarrheal illness was similarly overstated. Our project had been designed based on the most recent scientific literature; however, even the most recent scientific literature had been considerably dated. Consequently, our research represents our best effort to provide an updated etiology of childhood diarrhea in Managua, Nicaragua.

Over the course of the summer, we collected and analyzed close to one hundred diarrheal stool samples collected from the two public health clinics, El Centro de Salud - Edgard Lang and El Centro de Salud - Francisco Morazán. We discovered that fewer cases of diarrhea were attributable to the enteric bacteria *Salmonella*, *Shigella* and pathogenic *Escherichia coli* than previously suspected. In addition, none of the samples analyzed tested positive for rotavirus antigens, perhaps due to a substantial recent rotavirus vaccination campaign conducted in 2006. In contrast, over the course of the summer, many enteric

parasites were identified by microscopic analysis of stool samples. At one health clinic, pathogenic and commensal parasites were present in the majority of obtained stool samples.

The work that we have begun in Nicaragua will help physicians in the region to provide more effective care to their respective patient populations. Moreover, our project has begun a dialogue between UNAN - Managua and local health clinics that will continue to assess the antimicrobial resistance of enteric pathogens and their mechanisms of resistance. This dialogue will continue to inform regional health policy and encourage the conscientious use of antibiotics through etiological and antimicrobial resistance data. The collective knowledge that we gain will provide the foundation upon which real solutions can be built to solve the systemic problems that allow childhood diarrhea to remain a leading cause of mortality in developing nations.

All research for this project was conducted in the Laboratorio Clínico de Microbiología y Parasitología Médica at the Universidad Nacional Autónoma de Nicaragua - Managua. The project was made possible by the expertise and continued support of faculty and staff of UNAN - Managua, namely, Doctor Clara Gonzalez, Lic. Mario Romero and Lic. Douglas Espinoza. In addition, a very special thanks is owed to Renata Barreto '11 for her support in seeing this project through to fruition.

## Section II:

At its simplest, peace can be defined as an absence of violence; however, it can aspire to be much more. A true peace should endeavor the highest fulfillment of potential of the society by which it is constituted. While a considerable number of developing nations have achieved a marked absence of violence, as a society, we fail to provide the many that populate those nations with a basic right to health and well-being.

Our research project has provided valuable data that will directly affect the health policy of regional clinics in Managua, Nicaragua. Through this data, public health clinics will be able to provide more effective healthcare within the region. Access to effective healthcare is a prerequisite that, along with other basic human rights, will enable the development of our society to its full potential.

As I leave the project, it has instilled in me a sense of confidence and optimism about the world around me. It has demonstrated that two individuals *can* make a change in the world around them. All that is needed is a good idea.

*"I strongly believe that service to one's community engenders a sense of belonging. That sense of collective responsibility is the first step towards promoting real change in the world around us." - Michael Xavier Gonzales*

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All research for the project was conducted at El Laboratorio Clínico de Microbiología y Parasitología Médica at the Universidad Nacional Autónoma de Nicaragua - Managua. (From Left to Right: Gabriel Butterfield '12, Lic. Douglas Espinoza, Lic. Mario Romero, Michael Gonzales '12)

Two public health clinics, El Centro de Salud - Francisco Morazán (shown right) and El Centro de Salud - Edgard Lang, were the primary sources of diarrheal stool samples. El Centro de Salud - Francisco Morazán primarily serves the slum "La Chureca" and the adjacent Barrio Acahualinca development project.



Half of the diarrheal stool samples for the project were collected from children in a slum called "La Chureca" (shown left), an active municipal landfill that has been co-opted by the poorest of Managuans into a shantytown and source of livelihood consisting of refuse scavenging.