



Nicaragua - Dengue Epidemic in Nicaragua

Dengue Virus Infection in Nicaragua

[Eva Harris](#) (UC Berkeley), Anna Gajewski (Sustainable Sciences Institute/UC Berkeley), Angel Balmaseda (National Virology Laboratory at the Centro Nacional de Diagnóstico y Referencia)

Background: Dengue virus (DENV) causes the most prevalent mosquito-borne viral disease, with up to 390 million infections, 50-100 million cases of dengue and ~500,000 hospitalizations annually. Infection with any of the four DENV serotypes (DENV1-4) results in a spectrum of disease from inapparent infection to classic dengue fever to life-threatening severe disease characterized by vascular leakage and shock. After several years of low DENV transmission, there are now huge dengue epidemics in Latin America and the largest dengue epidemic in a decade in Managua, Nicaragua, due to DENV2. Dr. Eva Harris and long-term collaborators at the Ministry of Health and Sustainable Sciences Institute in Managua have been conducting a series of investigations of DENV infection and disease for over 20 years, including a pediatric cohort study of 3,800 children 2-17 years old and a pediatric hospital-based study. The team also studies the related Zika flavivirus, which caused an enormous Zika epidemic in 2016, as well as the immunological interactions between ZIKV and dengue viruses. Numerous virological, molecular biological, and immunological studies are ongoing.

Project Description: The project includes determining the number of DENV2 infections that occurred during the 2019 dengue epidemic, using enzyme linked immunosorbent assay (ELISA) and other methods. Annual healthy samples are collected every March from participants in the cohort study, and 2018 and 2019 samples will be processed side-by-side to determine which show a ≥ 4 -fold increase in antibody titer are therefore defined as an infection during the intervening year. This will be compared to the number of symptomatic infections that were laboratory-confirmed (n=150 to date) to define the symptomatic:inapparent (S:I) ratio. This will in

turn be compared to previous DENV2 epidemics that occurred in the cohort prior to the introduction of Zika.

International Site: Our foreign research site is embedded within the Ministry of Health of Nicaragua and administered in collaboration with the Sustainable Sciences Institute (SSI). Placement is available at the National Virology Laboratory of the National Center for Diagnosis and Reference (CNDR) of the Ministry of Health. The site is well-established, with over 100 study employees, and serves several large prospective studies of dengue, chikungunya, influenza and Zika. Numerous MHIRT, MPH, and PhD students have been hosted by SSI and the National Virology Laboratory in Managua. Dr. Harris has been collaborating productively with the Nicaraguan CNDR/Ministry of Health for over 30 years.

Required Qualifications: Motivated undergraduate with Spanish language proficiency. Previous laboratory experience required. STAT/SAS programming experience preferred, but not required.