

A member of the Berkeley public health community speaks out on a current topic of interest



UNCOVERING INFLUENZA IN THE TROPICS

By Aubree Gordon, Ph.D. '09 (Epidemiology), M.P.H. '05

When I left for Nicaragua to begin the field component of my dissertation research in 2006, I expected that the time I spent there would be crucial to my doctoral career at Berkeley. I did not expect that both my dissertation topic and my entire career trajectory would change. And yet that is just what happened, as I became involved in a field of research that was new to me and the country of Nicaragua—**influenza epidemics in tropical locales.**

Upon arriving, I worked rapidly with our team to set up a hospital-based study on dengue fever. But only three months later, few dengue cases had occurred. This decrease in dengue was wonderful news for the country—and devastating for my dissertation. I began the daunting task of finding a new dissertation topic, and discovered one ripe for the picking and much needed. Nicaragua was experiencing a large and moderately severe epidemic of an acute respiratory illness. In the children's hospital, we saw a surge of admissions, with offices being converted into patient rooms and hallways crowded with cots. Nicaragua, like most developing countries, had neither the necessary number of hospital beds nor mechanical respirators to deal with such an epidemic.

Surprisingly, no one knew for sure what virus was causing the epidemic, because the Nicaraguan Ministry of Health had no capacity to test for respiratory viruses. In addition, there was general confusion amongst public health professionals and the academic community as to whether or not influenza was a major burden in tropical countries, as it has been shown in animal models not to transmit at high temperature or humidity. There were also conflicting reports about the existence of any seasonality of influenza in the tropics.

Clearly, there was a need to study influenza and other respiratory diseases in the tropics. Our team was in a unique position to do so, as my co-adviser, Professor Eva Harris, had established together with her colleagues at the Nicaraguan Ministry of Health an ongoing community-based study of dengue fever in 3,800 children aged 2 to 12 years in Managua. Since both dengue and influenza are febrile illnesses and children in the cohort visit our study physicians at the first sign of fever, this cohort would be able to capture influenza cases.

As a first step, I performed a retrospective analysis of data collected through the dengue cohort, examining the incidence and seasonality of influenza-like illness (ILI). The analysis revealed a defined seasonality, with peaks each June to August and an additional peak some years in November through January. There was also a substantial burden of ILI in the Nicaraguan children, similar to what is seen in temperate countries such as the United States. Further serological analysis revealed that the peaks of ILI were indeed due to influenza.

We established a prospective study of influenza piggy-backed onto the existing dengue cohort, an efficient and economic way to study influenza in Nicaraguan children. During my time at Berkeley, I learned that local capacity building could and should be a part of research project in a developing country. Therefore the next step was clear: influenza testing using the latest methods needed to be set up at the Ministry of Health National Virology Laboratory. Thanks largely to capacity-building efforts through Professor Harris's 20-year collaboration with the Ministry of Health, I was able to work with the lab and set up PCR-based testing within two months.

In June 2007, the Nicaraguan Influenza Cohort Study was formally established in collaboration with the Ministry of Health. Study acceptance has been phenomenal since then, with 99 percent of eligible children participating. We have detected more than 500 cases of laboratory-confirmed influenza, and the findings have corroborated those from our ILI study—there is a substantial influenza burden with a defined seasonality in Nicaragua.

When the H1N1 pandemic began in April of 2009, we moved quickly to assist the laboratory in setting up testing for novel influenza, and the first H1N1 case detected in the country was detected by our cohort study. The cohort study is ongoing and provides valuable community-based information on pandemic H1N1 in children in a tropical, developing country, which will be beneficial to the people of Nicaragua and the world as a whole. 🌍