Where in the world is RTI

INTERNATIONAL DEVELOPMENT BIMONTHLY FEBRUARY/MARCH 2009

Starting Up

Better Records Management for Better Healthcare in Kenya

In Kenya, where HIV infects 5% of adults, according to a 2008 UNAIDS report, access to antiretroviral (ARV) drugs is a critical health need. Public health centers receive their ARVs from the Kenya Medical Supplies Agency (KEMSA). However, the resupply of ARVs is based on a system that requires the typically understaffed centers to fill out monthly drug reports by hand and physically deliver them to KEMSA.

Dr. Sarah Chuchu examines pharmaceuticals at a health center pharmacy in Nairobi. [Photo: Gordon Cressman]

In 2007, the Provincial Medical Office (PMO) of Nairobi received funding from Qualcomm, Inc., under the company's Wireless Reach™ initiative, to improve pharmaceuticals management and reporting, beginning with ARVs.

"The goal of the PMO is high-quality healthcare for all Kenyans," said Nairobi's Provincial Pharmacist Sarah Chuchu, at a recent stakeholders meeting. "We want to make critical medicines available at all times to all people."

With the funding from Qualcomm and contributions from Telkom Kenya (TKL), the Communications Commission of Kenya (CCK), and Axesstel, RTI International is working with the PMO to bolster ARV drug management and reporting at 16 health centers in Nairobi by introducing an electronic reporting and management system. Project goals include improving timeliness, completeness, and accuracy of drug reports; enabling staff to keep better track of patient regimens; and

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Ethnic Minorities in Vietnam Note Barriers to Full-Day Schooling

The Vietnamese Ministry of Education and Training (MoET) is investing in a viable strategy and infrastructure improvements to implement full-day schooling (FDS) in primary schools, especially in disadvantaged areas. FDS addresses one of the main shortcomings of the Vietnamese basic education system: the number of hours of instruction.

Over the past decade, the Government of Vietnam has gradually begun to move from half-day school (HDS) to FDS. Pupils in FDS receive 30–35 class periods per week, compared with 22–25 periods in HDS.

The World Bank, along with the UK Department of International Development (DFID), is collaborating to prepare the School Education Quality Assurance Project (SEQAP) to support MoET's FDS initiatives. Under contract to DFID, a four-person team led by RTI recently performed a social assessment to provide qualitative input to the MoET and World Bank SEQAP design teams.

The World Bank and DFID-supported SEQAP design period processed field surveys on teacher quality, and qualitative and quantitative surveys on FDS, in many provinces

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A school lunch program in Bac Ha District, Lao Cai Province, provides nutrition and decreases families' costs for full-day school. [Photo: Vuong Xuan Tinh]

Searching for the Genetics of Immunity

Cholera strikes quickly, sometimes killing those infected in a matter of hours. The infection, spread through contaminated food and water, remains a scourge of the poorest areas in many developing countries, where safe water supply and sanitation are still elusive. Typhoid haunts many of these same regions.

A substantial obstacle stands in the way of preventing both these infections: The reported effectiveness of the vaccines developed for cholera and typhoid varies greatly among individuals, meaning that as many as a third of people immunized do not actually receive protection from these vaccines.

The study recruited 4,000 participants from Kolkata to receive either the cholera or the typhoid vaccine. [Photo: Priya Sengupta]

To improve our understanding of factors that influence the effectiveness of typhoid and cholera vaccines, RTI is investigating the genetics—and other physiologic factors—that influence individual variation in immune response to these vaccines through a field study in India. RTI is conducting the research under a five-year contract from the U.S. National Institute of Allergy and Infectious Diseases (NIAID, 2004–2009).

The study is one of six that make up NIAID's new Population Genetics Analysis Program, part of a national research effort to improve defenses against bioterrorism and infectious diseases. This RTI project forges a collaboration between private and public sector partners, including Duke University, India's Institute for Molecular Medicine (IMM), and India's National Institute of Cholera and Enteric Diseases.

"Immune response is a complicated biological process," said RTI's Diane Wagener, Principal Investigator of the study. "This is the first study to pair two powerful research technologies—genomics and proteomics—to try to unravel the process and find why some people respond to these vaccines and others don't."

The Beginnings: Field Work

The researchers chose India as the study location for two reasons. First, NIAID required that the study investigate infectious diseases from a specific list that included cholera and typhoid, which are endemic in India. Second, RTI had previously developed a relationship with IMM and this study provided a partnership opportunity. IMM identified the National Institute of Cholera and Enteric Diseases as an important collaborator based on its epidemiological data sets.

The study randomly recruited 4,000 participants from the slums of Kolkata, where cholera and typhoid are rampant. Half the subject pool received the cholera vaccine, and half received the typhoid vaccine. Participants' families were also offered the vaccines.

"The study is both medically and socially beneficial," said Partha Majumder of IMM, Co-Principal Investigator.

The study collected baseline blood and saliva samples from participants the day they received the vaccines, then took follow-up samples again three and 28 days following immunization. The researchers used the samples to determine the level of immune response the vaccine prompted in each individual. The study had a dropout rate of 5–6%—quite low for this type of field study.

Once the samples were collected, the genomics and proteomics analyses began. India's Institute of Molecular Medicine took the lead on the genomics segment, while RTI and Duke worked on proteomics.

Discovering Variations in Genetics and Immune Responses

Genes are the blueprints that instruct the body how to make proteins, which are responsible for the body's development and functioning on all levels. Different versions of the same gene, known as genotypes, may code for differing proteins. When combined with environmental factors, these proteins may result in different physical or behavioral traits.

Although the human genome has been analyzed extensively over the past 15 years, most of what we know about genes comes from studies involving Caucasian, African, and Asian populations. We have little information on the genetics of the Indian population.

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Genetics of Immunity (continued)

In the wards of Kolkata, cholera and typhoid are endemic. The PopGen study may help determine why vaccines for these diseases are more effective in some people than in others. [Photo: Priya Sengupta]

The study team suspected Indians could have greater genetic variation in their gene pool than some other groups, because of the population's varied demographic history. To determine whether these distinctions occur, the study used participants' samples to examine 270 genes thought to be involved with the body's immune response.

What they found: genetic changes in the Indian population that had never been seen in other populations. In addition to uncovering this genetic variation, initial analysis also revealed information on individual immune responses to the vaccines.

"The basic tenet in all of vaccination is that individuals will show an immune response—but that's an assumption," Majumder said. "Our study is showing there is a huge amount of variability in immune response, which means that the same vaccine will not be as effective in all individuals."

The team expects that the greatly differing genomic profiles of the participants explain to some extent the large variability seen in the individual immune response to the vaccine, he said.

The researchers said they believe the study may represent the largest ever examining immune response variability. With the first steps completed, they are now beginning the task of deciphering which genotypes may be associated with which immune responses.

Deciphering Proteins

Back at RTI and Duke, researchers are now delving into the proteomics portion of the study, attempting to determine which proteins are associated with the various immune responses. Protein expression reflects a combination of genetic and environmental factors and could help researchers tease out the influences of each factor when compared to the genomic analyses. For example, an individual could have a genetic predisposition to develop an appropriate immune response to a vaccine, but if that individual's immune system is suppressed due to malnutrition, an adequate response may not follow, said RTI's Carol Whisnant, Co-Principal Investigator of the study.

To conduct this work, the research team had to familiarize themselves with new statistical technology used for proteomic analysis, as well as develop new assays to test for the proteins involved.

"Proteomics is a new field in science and to RTI, so it was important to demonstrate that we could do a number of proteomic assays," Wagener said.

While some of the proteins involved in immune response are known, the study is working to identify more. In addition, the team is looking for differences in the concentration of proteins from the baseline samples to those taken four weeks after vaccination. If the immune system kicks in following the vaccine, the associated proteins should, in theory, change in concentration to direct the response.

Developing More Effective Vaccines

Genomic and proteomic analysis will continue through the year, the results of which may reveal the role genes play in individuals' immune responses to cholera and typhoid vaccines. The findings could help pharmaceutical companies reformulate these vaccines to make them more broadly effective. The research may have additional implications, as well. It will contribute to the general body of literature on genetic variation and may offer insight into other types of immune responses.

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Because the field of proteomics is relatively novel, RTI had to develop new assays to conduct the proteomic analysis. [Photo: Diane Wagener]

Records Management in Kenya (continued)

reducing reporting burdens to enable staff to spend more time on patient care than paperwork.

First, to demonstrate the feasibility of an electronic ARV drug reporting system, four health centers compiled their reports using an Excel spreadsheet that mirrored the government's existing report template. They e-mailed the completed reports to KEMSA.

The pilot phase demonstrated that transmitting reports electronically, via 3G wireless broadband, even using a simple spreadsheet, conserved valuable staff time and resources. One pilot pharmacist stated that e-mailing the report saved her an entire day each month of travel to and from KEMSA.

Building on the pilot's success and seeking much greater efficiency, RTI is now working with the PMO to create pharmaceutical management software tailored to pharmacy staff needs.

Qualcomm selected RTI as the implementing partner based on RTI's experience developing the Zambian Electronic Perinatal Record System (ZEPRS), a Web-based open-source system that will undergird the new software, said Eileen Reynolds, RTI Information Communication and Technology Specialist. The project will also demonstrate the value of the 3G technology EV-DO Rev, a wireless technology created by Qualcomm, provided over TKL as Orange Broadband, using Axesstel's devices. It offers an affordable way to provide Internet, especially in areas where access is limited or nonexistent.

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Where in the World Is RTI is a bimonthly publication of RTI's International Development Group (IDG). This publication is intended to inform clients and partner organizations about RTI's global activities and research areas. RTI is dedicated to improving the human condition in developing and emerging countries. RTI has worked for over 40 years in 140 countries around the world. We offer a broad range of policy support, applied research and analysis, and other technical expertise in strategic planning, institutional development, and training. Our expertise is multisectoral and spans the fields of education, health, environment and natural resources, governance, finance, and information and communication technology.

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Schooling in Vietnam (continued)

during 2008. However, ethnic minority students tend to live in more isolated highland areas and often face unique constraints to school access. The social assessment engaged a cross-section of parents, principals, teachers, and parent association members and nonmembers in ethic minority communities, adding their perspectives on FDS to the SEQAP survey data.

"The social assessment concentrated on interviews of stakeholders in Lao Cai Province in the northern highlands and Kon Tum Province in the central highlands, ensuring that their preferences on measures to improve educational attainment were included. It found broad support for FDS tempered by concerns among respondents," noted Myles Elledge, RTI social assessment team leader.

Barriers that were identified for ethnic minority children include physical distance, financial cost, differences in educational opportunities and benefits, language of instruction, and discriminatory gender practices, such as girls kept at home to care for younger siblings.

"Vietnam has one of the world's best records in implementing poverty-reduction programs in the past 10 years. However, in ethnic minority highland areas, much remains to be done. The topography poses challenges to school attendance. Low population densities, poor roads, impassable streams during the rainy season, and lack of warm clothes and rain gear negatively affect children in disadvantaged areas," said Elledge.

Understanding these issues among ethnic minority populations will help project designers incorporate measures into SEQAP to overcome many of the barriers to primary school access and will support schoolteachers and principals in their transition to FDS.

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Selected Publications

Antlöv, Hans. (2008). "Kata Pengantar" [Preface]. In Abdul Waidl, Arie Sudjito and Sugeng Bahagio (Eds.), *Mendahulukan si Miskin. Buku Sumber bagi Anggaran Pro-Rakyat* [Prioritizing the Poor: A Resource Book for Pro-Poor Budgeting], pp. v-xiii. Yogyakarta: LKiS Press.

Antlöv, Hans, Derick W. Brinkerhoff, and Elke Rapp. (2008). *Civil Society Organizations and Democratic Reform: Progress, Capacities, and Challenges in Indonesia.* Paper presented at the 37th Annual Conference of the Association for Research on Nonprofit Organizations and Voluntary Action, November 20–22, 2008, Philadelphia, Pennsylvania.

McClure, Elisabeth M., Sarah Saleem, Omrana Pasha, and Robert L. Goldenberg. (2008). "Stillbirth in Developing Countries: A Review of Causes, Risk Factors and Prevention Strategies." *The Journal of Maternal-Fetal and Neonatal Medicine,* 16 December 2008, pp. 1–8. [Epub ahead of print] Abstract: http://www.informaworld.com/smpp/content~db=all?content=10.1080/14767050802559129