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# Enhancing 'M-Health' With South-To-South Collaborations

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**ABSTRACT Partnerships among health care and information technology researchers and designers worldwide are creating mobile health tools tailored to local community needs and resources. Much of the hardware and infrastructure comes from developed countries of the so-called global North. From both these countries as well as developing countries in the global "South" are coming applications that enable health workers to collect and organize data, access diagnostic and treatment support, and promote healthy behavior. Most are still in pilots or demonstration phases, but their use is accelerating.**

The emergent field of "m-health," or mobile health, is characterized by collaborations that take advantage of expanded telecommunications networks and smarter handsets. Particularly in developing countries, m-health offers a great opportunity to strengthen and transform weak health systems and combat everything from maternal and child illness and mortality to chronic and infectious diseases.[1] Mobile network infrastructure—through cell phones and the Internet—allows remote and isolated communities to communicate in "real time" in ways that have not been possible before.[2] Information previously only available in specific locations or to specific populations is now broadly available to physicians, health workers, and patients. Diagnostic tools delivered at the point of care, perhaps through a cell phone, a personal digital assistant (PDA), or a Web camera, are expanding the ways in which people can receive care. In many countries, private and public organizations are working together to use social networking and other media to encourage healthy behavior, assist patients in monitoring their care, train health care workers, track disease outbreaks, and improve diagnostic and treatment support.[1]

## Innovations From The South

Many of the m-health innovations now emerging originated from the ingenuity of social entrepreneurs in Africa, Asia, and Latin America—areas collectively referred to as the South, or global South. Pilot programs are being replicated in other parts of the South as well as increasingly in North American and Western European countries (collectively referred to as the North).[3] Collaborations throughout developing countries among private-sector telecommunications companies and nongovernmental organizations, academic institutions, and software development groups are helping advance innovations that can improve people's health and well-being. South-to-South collaborations—partnerships between individuals and organizations that originate in the South—especially support the development of m-health solutions that are culturally appropriate, are sustainable, and offer lessons learned for similar environments. Moreover, such efforts promote equity—or equality of access at the global level.

This paper aims to describe some of the organizations, institutions, and alliances active in promoting effective South-to-South collaborations. As yet, most of the innovations in mobile technologies for health in developing countries have not gone beyond the pilot stage and have not been properly evaluated. Funded primarily

by private philanthropies and bilateral donors,[4] these interventions need to be reviewed and evaluated both to identify those that show promise and to provide the evidence to encourage governments and industry to invest in expanding these innovations. Such evidence could build momentum to overcoming obstacles to expanding e-health. Several were identified by a recent World Health Organization (WHO) analysis: lack of knowledge about available m-health applications and public health outcomes; high operating cost for mobile communications; undeveloped infrastructure such as unreliable mobile networks; and lack of supportive policies at the country or regional level.[5]

## Examples Of M-Health Innovations

Mobile health initiatives that originate in the South take many forms, demonstrating leadership in innovation and program implementation. For example, a project known as Coded in Country promotes using local software developers to develop programming solutions that address development problems in their own countries, and in the process supports the local information technology market.[6]

**PROJECT MASILULEKE** An example from South Africa is Project Masiluleke, whose mission includes educating people in South Africa about HIV and tuberculosis prevention. The project includes large and small organizations based in South Africa and elsewhere, including the mobile phone operator MTN, the South African National AIDS Helpline, the National Geographic Society, and Nokia Systems Networks. The project takes advantage of extra space available in a text message when one person sends a "please call me" message via cell phone to another. It automatically inserts a brief message about call centers where people seeking health information about HIV/AIDS can obtain it. The message was intended to appear in one million messages every day for a year. In the first five months after it was launched in October 2008, calls to the South African National AIDS Helpline approximately quadrupled. The project is ongoing.

**OTHER PROJECTS, OTHER COUNTRIES** Other countries and organizations are involved in m-health projects. (1) Also in South Africa, organizations such as the Praekelt Foundation (which develops innovative mobile technology solutions) and University of Cape Town are partnering to build and deploy platforms for HIV and AIDS prevention and treatment. (2) In India, organizations such as Asia Media Labs are developing and deploying data collection, support tools for community health workers, and gaming systems to promote behavior change. (3) In Peru, the Universidad Peruana Cayetano Heredia is conducting research and training in biomedical and health informatics. (4) In Ghana, a program called m-Pedigree is using cell phones to identify and reduce the use of counterfeit drugs. (5) In Rwanda, a cell phone–based technology called TracNet is helping follow patients and their treatment. (6) In the Philippines, mobile health technologies are being used to help rural health workers.[1] (7) In Cambodia, the Mekong Collaboration Program has begun using a messaging system developed by Innovative Support to Emergencies, Diseases, and Disasters (inSTEDD) known as GeoChat for group communications.[1,7]

**FUNDING PARTNERS** Although innovation is emerging from the South, funding is primarily channeled through organizations and partners in the North who mentor Southern organizations as they build local capacity in developing and implementing mobile solutions. Partnerships between institutions and organizations should be encouraged to support appropriate design, testing, and evaluation of inexpensive and user-friendly devices for usage mainly by patients and health workers.[8]

**SOUTH-SOUTH COLLABORATIONS** Increasingly, m-health efforts are emphasizing more South-South and South-North collaborations. Examples include the mHealth Alliance, formed by the United Nations, the Rockefeller Foundation, and the Vodafone Foundation. This alliance was created primarily to maximize the effect and use of mobile health in developing nations. It is initially focusing on three areas: leadership, global advocacy and collaboration, and partnership for selective implementations. It generates public and private collaboration in support of m-health innovation and projects that address global health needs.[9]

The Open Mobile Consortium is a thriving community of mobile technologists and practitioners working to develop open-source mobile solutions for more effective and efficient humanitarian relief and global social development. It aims to implement joint mobile solutions in the field; maximize interoperability and data-sharing capabilities between member technologies; and streamline development, deployment, and use of open-source mobile technologies. Members of the Open Mobile Consortium cooperate on open-source

mobile solution development, system testing, program implementation, and evaluation, while sharing code, standards, plans, progress, and lessons learned.[10]

DataDyne.org initiated Coded in Country, mentioned above, to develop and encourage information and communication technology capacity in local areas. The theory behind this effort is that information and communication technology capacity building is more likely to happen when more of a project's "coding," or, programming, is done in country, by local developers. The Coded in Country initiative, developed in conjunction with D-Tree International, a nonprofit organization,[11] and Dimagi, a health care technology company,[12] encourages funders or operations to put more than 50 percent of their programming funding toward local coders. DataDyne programmers now work with Dimagi and other organizations on collaborative projects including the JavaROSA project in Nairobi, Kenya.[13]

The OpenROSA consortium is a group of developers, or programmers, working to create open-source, nonproprietary, standards-based tools for mobile data collection, aggregation, analysis, and reporting.[14] Open-source software development increases the opportunities to work on larger development efforts in different countries and systems. Some of the participants include a variety of small private companies, Google, the University of Bergen, Makerere University, and the University of Washington. The group has active developers in many developing countries including Bangladesh, Kenya, India, Pakistan, Tanzania, and Uganda.[15]

OpenROSA has helped develop solutions to the common need of many of the collaborating groups for a "mobile data capture solution," or a way to capture or record data transferred via mobile devices.[16] One of the main projects of the OpenROSA consortium is JavaROSA, an open-source platform for data collection on mobile devices.[17] JavaROSA is being developed globally for a wide range of uses, including disease surveillance, household surveys, collection of longitudinal data for electronic medical records, guiding health workers through medical protocols at the point of care, and supporting community health workers. Projects using the JavaROSA platform can be run on most Java-enabled phones, which can be found in low-income regions, even though Java compatibility is neither universal nor cheap.[16]

**LOCAL DEVELOPERS** The closer the developers of solutions are to where the problems are, the more effective the solutions become and the more transferable they become to similar environments. In many cases, local development is leading to more rapid trial and error with a goal of faster and greater success. Some companies, including Google, are engaging in ethnographic research to help inform the design and implementation of solutions.[18] Greater effort is needed at the national level to create the enabling environment that will nurture these innovations. Such solutions can then be scaled and sustained, so that more people can be supported in efforts to promote health and well-being in developing countries.

## Concluding Comments

Because mobile phones and other mobile technologies require less infrastructure than other e-health systems,[19] scale-up of m-health may be the most promising investment in developing countries. It can be used to support remote health workers and to reach people anytime or anywhere.[20] Mobile phone use continues to increase, expanding the networks of those connected through this medium. More sophisticated 3G networks, mobile broadband, and smart phones suggests that opportunities to exchange information will continue to emerge. Key to maximizing these technologies will be direct support to Southern partners alongside ongoing mentoring relationships between institutions in the North and the South. ■

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**NOTES**


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## ABOUT THE AUTHOR

**Walter H. Curioso**

Peruvian Walter H. Curioso expected to follow in his father's footsteps and become a gastroenterologist. But then two forces intervened: his passion for music, and the advent of the Internet.

As a fourth-year medical student at Universidad Peruana Cayetano Heredia in Lima in the late 1990s, Curioso, who plays piano and keyboards, began experimenting with producing different sounds by connecting his beloved instruments to computer technologies. He also started exploring biomedical informatics. He developed a free Web page in Spanish (http://www.enlacesmedicos.com), with a comprehensive list of medical links for medical students and health professionals that remains in wide use throughout the Spanish-speaking world today. Then he created an e-mail list and chat group for medical students, and he organized Peru's first medical school course in medical informatics.

Although his father's pursuit of a medical career inspired his own, "my involvement in music and computers led me toward research and teaching, which I love," says Curioso, now 34. Today he is a research professor at the Universidad Peruana Cayetano Heredia and an affiliate assistant professor of biomedical and health informatics at the University of Washington in Seattle, where he expects to receive his Ph.D. in biomedical informatics in 2011.

While pursuing a master of public health degree at the University of Washington, Curioso developed an interactive computer system using cell phones to conduct research involving female sex workers and bacterial vaginosis. "This project proved that you didn't need a tablet personal computer or personal digital assistant to create a sophisticated public health surveillance system; you could use cell phones," he says. Even in a resource-constrained setting, the effort proved to his satisfaction that "it is possible to move from a paper-based system of data collection to an electronic one."

Curioso's latest projects involve using cell phones to support HIV patients' adherence to their drug regimens; using personal digital assistants to assess sexual risk and medication adherence among HIV patients in Lima; and using cell phones and the Internet to develop a real-time surveillance system for adverse events.

The author of more than eighty-five publications, Curioso also has collaborated on public health informatics programs in Thailand and Africa. His near-term goal is to establish a center of excellence for biomedical informatics for the Andean and Latin American regions to address local training and research needs, and to share his research with other developing countries, especially in Africa. He is a proponent of partnerships between academia and national governments to improve public health. Even in his personal life, he takes that view to heart: He recently married Elizabeth Espinoza, who works for Peru's minister of health. They hope to work together on some joint projects, such as implementing technologies for Peru's recently created universal health insurance system.