Keys and obstacles to e-health in low income countries

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In an essay in the February 2010 issue of *Health Affairs*, a special issue of the journal devoted to global e-health, William Tierney, M.D., of Indiana University School of Medicine and the Regenstrief Institute, and colleagues, who like Dr. Tierney have significant experience in the development of workable health information technology systems in low-income countries, identify critical steps toward allowing developing countries to cross the "digital divide" to realize the full potential of e-health to improve the quality and efficiency of their health care systems.

"Although business enterprises in developed nations have begun to use electronic information systems to collect, manage and communicate information, low-income nations generally lack advanced e-health tools that can help them achieve better health outcomes. In countries where per capita spending on health care barely reaches US $10 per year, it is key that they get the most out of whatever they can spend," said Dr. Tierney, an Indiana University-Purdue University Indianapolis Chancellor's Professor of Medicine, Joseph J. Mamlin Professor of Medicine at the IU School of Medicine and executive director of the Regenstrief Center for Healthcare Improvement and Research at the Regenstrief Institute.

"To be most efficient and effective, health care delivery and public health needs require timely access to high-quality secure data because health care is essentially an information business. The quality and efficiency of care are directly related to the availability of timely, high-quality patient information," said Dr. Tierney.

Key to implementing e-health tools in developing countries is developing local human capacity; but there is a chicken and egg problem. Low-income countries typically lack programs to train individuals to develop and implement health information technology tools. Without the implementation of these tools there is no place to train people to work with them.

To address this problem Dr. Tierney created and directs the East African Center of Excellence in Health Informatics, which was established in 2009 with a grant from the Fogarty International Center at the U.S. National Institutes of Health. The new center, located in Eldoret, Kenya, builds upon two decades of collaboration between the IU School of Medicine, Regenstrief Institute, and Moi University in Eldoret. This collaboration is responsible for the Academic Model Providing Access to Healthcare (AMPATH), one of sub-Saharan Africa's largest health care programs.

AMPATH has enrolled more than 100,000 HIV-infected Kenyans and 50,000 Kenyans being treated for other acute and chronic medical conditions. AMPATH operates in 23 sites in western Kenya, including rural health centers, district hospitals, and Kenya's second national referral hospital, Moi Teaching and Referral Hospital. AMPATH is served by the AMPATH Medical Record System (AMRS), the first and most successful outpatient electronic medical record system in sub-Saharan Africa, built on a model developed in Indianapolis over 30 years by the Regenstrief Institute.

"With academic partners from more than a dozen universities in the U.S. and Canada, and with funding from U.S. government and several foundations, we have shown in Kenya that in spite of problems such as scarce resources, lack of trained personnel, ethnic tension and even lack of dependable electricity, we can capture data electronically that have been used to enhance health care delivery and outcomes along with

community-based public health. Electronic medical records have allowed our Kenyan clinics to care for two to four times more patients than similar clinics using paper records. Hence, the investment in e-health pays for itself both financially and in terms of enhancing quality of care and accountability. But for such benefits to be sustainable, these systems must be maintained and improved by trained local technicians and developers," Dr. Tierney said.

"We do not want to create dependency on American developers who are far away and don't fully comprehend local health care and public health needs. Ultimately Africans have to solve African problems; South Americans have to solve South American problems. We can't keep building dependences on us. Eventually they have to come up with solutions to their own problems," said Dr. Tierney.

The AMRS has spawned OpenMRS, a free open-source electronic medical record system that is now the most widely adopted electronic medical record system in the developing world. OpenMRS is used in Kenya, Rwanda, South Africa, Uganda, Tanzania, Zimbabwe, Lesotho, Malawi, as well as Peru and Haiti. It also has been implemented in several health centers in the United States, including in Indianapolis.

In addition to Dr. Tierney, co-authors of "A Toolkit For E-Health Partnerships In Low-Income Nations" are Andrew S. Kanter of Columbia University, Hamish S.F. Fraser of Brigham and Women's Hospital and Partners in Health, and Christopher Bailey of the World Health Organization.

The authors conclude with a call to action. "Establishing effective partnerships in e-health will take time and sustained effort. Those aiming to improve health care by improving information management in developing countries must have patience and take the long view. Ultimately, we must improve the availability of electronic health

information broadly in the developing world, not just in an increasing number of targeted demonstrations. Partnerships sustaining these demonstrations must become part of the fabric of global health care. President John F. Kennedy famously stated, 'We choose to do these things, not because they are easy, but because they are hard.' The challenge of global e-health is great. All important challenges are."

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