Recent Advances in Mobile Technology Benefit Global Health, Research, and Care

Tracy Hampton, PhD

Now that more than 5 billion people worldwide have a cell phone, mobile technology sits poised to revolutionize the way medical care and health information are delivered, particularly in the developing world. A number of efforts are under way to leverage mobile technology’s tools to align with pressing health priorities through a field called mobile health (mHealth).

“Wireless has leapfrogged wired services in much of the world, and it provides an opportunity to connect providers, patients, and communities in ways not previously possible,” said Wendy Nilsen, PhD, who leads the National Institutes of Health’s Office of Behavioral and Social Sciences Research in the area of mobile health.

MOBILIZING MOBILE HEALTH

Nearly 90% of the world’s population has wireless coverage and 65% of subscribers are in the developing world, according to mHealth Alliance, an organization hosted by the United Nations Foundation that works with diverse partners to promote the use of mobile technologies to improve health throughout the world (http://www.mhealthalliance.org). Its executive director, Patricia Mechael, PhD, said there are numerous opportunities to support recognized health interventions and reach isolated populations with mobile phones. “Ministries of health are increasingly engaging with the private sector as well as nongovernmental organizations and academic institutions...to promote scale and sustainability in the use of mobile technologies for remote diagnostics, treatment adherence, disease surveillance, behavior change, and patient monitoring.”

Many mHealth efforts are simple by design. For example, the Mobile Alliance for Maternal Action, a public-private partnership launched in 2011, provides vital health information to new and expectant mothers in Bangladesh, India, and South Africa, which have high maternal and infant mortality rates. The program provides low-cost mobile phone access to pregnant women and mothers, who receive health information targeted to their pregnancy stage or children’s ages through text messages or voice mail alerts.

Other mHealth projects help patients with different medical conditions monitor their health by recording various health measures. For example, researchers at the University Health Network’s Centre for Global eHealth Innovation, in Toronto, have designed smartphone apps that interface wirelessly with medical devices such as blood pressure and blood glucose monitors, providing patients with recommendations based on the monitors’ readings. Pilot clinical trials have revealed that patients using the programs lowered their blood pressure and monitored their blood glucose more than those who did not use them. “The technology allows patients to see trends and react to them in real time,” said Mark Casselman, who is senior project manager at the center.

mHealth also shows promise in disease surveillance in the developing world. At the International Conference on Emerging Infectious Diseases in March, the Kenya Ministry of Health and the Centers for Disease Control and Prevention reported that smartphone use was cheaper than paper survey methods used to gather information from Kenyan influenza surveillance sites. Smartphone use also generated more accurate survey data that were more quickly available for analyses than data collected on paper.

FUTURE OF mHEALTH

mHealth may have countless other applications, as indicated by the wealth of new and emerging programs and proposals. Global efforts that received funding last December at the 2011 mHealth Summit in Washington, DC, as part of the United Nations Secretary General’s Every Woman Every Child initiative included a mobile phone–based application that helps health care workers identify and treat children with severe acute malnutrition, a messaging program to help prevent mother-to-child...
HIV transmission, and a combination of messaging and electronic mapping technology to track weekly stock levels of antimalarial medicines in remote health facilities.

Also in development are mobile echocardiograms, mobile microscopes that work through mobile phone cameras, mobile devices that detect toxins in the environment, and numerous other mobile-based tools that can be used alone or with existing technologies.

mHealth approaches offer considerable potential benefits, but few have been scientifically evaluated, taken to scale, or carried out long enough to determine their effect, according to Flora Katz, PhD, who is deputy director of the division of international training and research at the National Institutes of Health’s Fogarty International Center. “The technology and number of apps and sensors are exploding,” she said. “If we evaluate in the traditional way with randomized control trials, the technology might be obsolete by the end of the trial, so there is a need to develop a rigorous but rapid assessment approach.”

IOM Report Lays Out a Blueprint for Improving Regulatory Systems Worldwide

Mike Mitka

The emergence of the global economy is affecting the supply chains of food and medical products, raising public health and safety concerns throughout the world. To combat the situation, governments are looking at improving regulatory systems to ensure that medical products and foods are safe regardless of where they are produced or consumed.

In the United States, the supply chain issue has drawn the attention of Congress and the Food and Drug Administration (FDA) because an estimated 80% of active pharmaceutical ingredients and 40% of finished drugs come from abroad. Food is also a concern, as it is also increasingly imported; for example, about 85% of seafood consumed in the United States is from abroad.

Problems are also being imported. Contaminated heparin made in China caused 150 deaths in the United States in 2007. In 2011, counterfeit Avastin (bevacizumab), suspected to have been made somewhere in the Middle East, was discovered being shipped through the United Kingdom to US medical facilities. In 2007, some pet foods containing vegetable proteins imported into the United States from China were recalled after the FDA learned they were sickening and killing cats and dogs.

Members of Congress have told the FDA they want the agency to be more active in overseeing imported medical products and food. However, a lack of funding and mandated priorities that focus on domestic production prevent the agency from providing robust oversight of products made abroad. In turn, the FDA is asking Congress to provide the necessary funding and legislation that could make the agency more effective at ensuring the safety of imports.

FDA leaders have pointed out that a key element to more effective oversight would be to allow for more cooperation among regulatory agencies domestically and around the world. To aid in its arguments, the FDA commissioned a report by the Institute of Medicine (IOM), “Ensuring Safe Foods and Medical Products Through Stronger Regulatory Systems Abroad,” which was released April 4 (http://tinyurl.com/74pegz6).

In the foreword to the report, IOM President Harvey V. Fineberg, MD, PhD, wrote about the supply chain issue: “Domestic programs, however, regardless of how well they are coordinated, will not be sufficient for the task. The integrated global economy demands cooperation across borders—to thwart terrorists, reduce environmental hazards, and ensure that our food and medical products are safe and effective. This requires coordination across both industrialized trading partners and emerging economies that have not had the ben-