MOBILE HEALTH

By Rick Krohn, MA, MAS, and David Metcalf, PhD

Emerging Markets

At the Leading Edge of mHealth Innovation

THE EXPLOSIVE growth of mobile phone users and wireless subscribers, coupled with innovative applications of communication technologies, have the potential to transform healthcare access across entire populations, particularly in emerging markets. But in emerging markets, healthcare resources—facilities, staff and coordinated healthcare infrastructure—are in short supply.

In extreme circumstances (in rural and low income communities) these services may be non-existent. For the healthcare consumer then, access and affordability are common dilemmas. Even when healthcare is available, consumers typically must travel great distances, at excessive cost, only to receive uneven treatment from health care professionals with varying levels of training.

The result is high incidences of sickness, disease and a shortened life expectancy. In these markets there is growing consumer awareness and demand for mobile health services that "backfill" gaps in underperforming healthcare systems. These consumers need—and want—healthcare services that remove time and geography as barriers to care. These customers need to be *engaged*—to be educated about health issues that directly affect them, to become more accountable for their own well being, and to get connected to healthcare resources.

In emerging markets, the range of potential mHealth services spans both clinical (direct healthcare delivery) and non-clinical (health education, health surveillance, insurance, et.al.) services. The services that can be delivered are defined by the type of mobile phone—that is voice, text, data and web enablement. Apps and consumer engagement tools are largely targeted to a smart phone audience, while health tools targeted to a voice/text audience tend to be more utilitarian. But regardless of the handset, the organizing principle of every mobile health solution is engagement: engagement with the consumer, between the patient and provider, between the members of a care team, and between the inputs to care delivery.

Examples of mHealth engagement abound from developing nations as well as rural areas but it's important to remember that the principles of universal design apply when developing for socio-economic levels as well as levels of ability. Initial planning should consider the types of phones that are most prevalent in the community, which will help in developing the most optimal solutions.

In many cases, designing for the lowest common denominator with an expanded capability set for those that have higher levels of technology available can meet the broadest population criteria. Examples of tools like RapidSMS, FrontlineSMS and the Sana platform can provide text messages for use in health campaigns, epidemiology alerts and basic healthcare informatics. Within the mobile education space, technologies provide vital links to information and educational materials through the integrated use of text message and email triggers to launch content. This content can be delivered via integrated secure web link if basic web support is available and affordable on feature phones or phones in remote geographies, information can also be delivered as voicemail-style audio content over a standard audio phone channel using IVR (interactive voice response), just like the technologies used for automated phone ordering, customer service queues, and checking status of flight reservations or bank balances. The robust technology of interactive voice response can further be used for interactive knowledge trees, clinical decision support, simulation, or simply to trigger access to podcast style content from any active voice line even on the most basic phone. This technology is well proven throughout the world in places as remote as sub Saharan Africa. As evidence, pilots conducted close to 10 years ago on MobileEd sponsored by Nokia have provided a low cost and proven platform.[1]

In Haiti, one carrier provides 20 free text messages for every three text messages purchased and in parts of Africa there are free "ring me back" message services that can send a very short message across a phone call. It is important to note that unlike the United States in most other parts of the globe, mobile phones do not have a connection or per minute charge for incoming calls, only for outgoing calls. This may factor heavily in designing public health systems with an automated callback function to deliver audio content in someone's native tongue without the typical charges

Prahalad in "Fortune at the Bottom of the Pyramid"[2] wrote about providing volume services, lower price points and different packaging to meet the basic needs found

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in developing countries. These are a few of examples of ways that we can leverage technologies and models to promote better health through mobile technology across the globe.

One of the most compelling ideas found in Thomas Freidman's book, *The World is Flat*, is the notion of developing nations leap-frogging developed nations in technology and prospective innovations. One stark example occurred in the national science foundation project in Haiti after the 2010 earthquake. Assessing the use of mobile phones in disaster relief and re-development efforts has shown many advanced innovations like Digicel's use of solar-powered phones when battery-power was not readily available (which were given out to 4,000 doctors throughout the country).

This technology combined with the clinics and electronic health record capabilities in Jérémie, Haiti from the Haitian Health Foundation is more advanced and more culturally appropriate than many things we have seen in rural health in the United States. The region around Jérémie has 200,000 people and many of them were displaced after the earthquake. Caring census takers documented the current location of all 200,000 people along with their current and past history in a database that was accessible to their healthcare workers. They were also able to leverage this information to identify the most prominent disease states and potential epidemics early and design culturally relevant public heath campaigns. This is just one example of the leap-frogging effect and our ability to learn from and cross-pollinate innovations in other regions.

Providing simple and efficient services using mobile communication devices is part of the worldwide promise of mHealth technologies. Even in austere settings, as capabilities and access to more advanced android and iOS devices and other platform devices come online it's possible to layer more advanced data, web, video and even connections to medical peripherals on top of the baseline layer of capability.

Looking ahead, mHealth aims to advance beyond single-purpose solutions to create a complete consumer and provider healthcare toolkit and a platform for collaborative, informed care delivery (an ecosystem)—that will support a "longitudinal health view" of the customer, including history, treatments, medications, tests, chronic health issues, all based in the cloud and available to both the customer and his caregivers.

In addition to providing access to health services, mHealth solutions can provide education and self care services targeted to earlier intervention and delivered through SMS texting and web tools. It is a socially responsible strategy: *access* to and *actionable* health information, shared bilaterally, can dramatically impact population health in emerging markets.

As a reality check, mHealth can only be as efficient as the industry it serves. In markets with under funded or absent health services and a lack of trained healthcare professionals, mHealth solutions can supplement—but not substitute—the effectiveness of the healthcare system. Technical limitations of the mobile network can also impact the effectiveness of these tools. Additionally consumer perceptions of these potential weaknesses could have a negative impact on uptake and retention.

Ultimately, as emerging markets mature, and as smart phone usage increases, mHealth developers must anticipate the decline not only of voice but of text communication as well. With increased availability of web access, SMS browsing and cheaper smartphones, mobile traffic in these markets will shift to data services (apps, value added services) that a) deliver compelling value and b) enhance the user experience. Although still over the horizon, like mHealth itself this market shift is fast approaching. **JHIM**

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Rick Krohn (rkrohn@healthsen.com) is President of HealthSense, Inc., a consultancy specializing in health IT corporate strategy, strategic marketing, communications, business development and technology application. He can be reached at 912-220-6563..

David Metcalf, PhD, leads the Mixed Emerging Technology Integration Lab (METIL) at University of Central Florida's Institute for Simulation and Training. The lab and associated spinoff companies are advancing mobile and simulation technologies for essential services in health, education, finance and other areas. He can be reached at 407-882-1496.