

Role of Mobile Health in the Care of Culturally and Linguistically Diverse US Populations

by Miguel Tirado, PhD

Abstract

Emerging trends in the health-related use of cell phones include the proliferation of mobile health applications for the care and monitoring of patients with chronic diseases and the rise in cell phone usage by Latinos and African Americans in the United States. This article reviews public policy in four areas with the goal of improving the care of patients belonging to culturally and linguistically diverse populations: 1) mobile health service access and the physician's duty of care, 2) affordability of and reimbursement for health related services via mobile phone, 3) protocols for mobile health enabled patient health data collection and distribution, and 4) cultural and linguistic appropriateness of health related messages delivered via cell phone. The review demonstrates the need for policy changes that would allow for reimbursement of both synchronous and asynchronous patient-provider communication, subsidize broadband access for lower-income patients, introduce standards for confidentiality of health data transmitted via cell phone as well as amplify existing cultural and linguistic standards to encompass mobile communication, and consider widespread public accessibility when certifying new technologies as "medical devices." Federal and state governments must take prompt action to ensure that the benefits of mobile health are accessible to all Americans.

Keywords: mobile health, Latinos, cell phone use

Introduction

While telehealth public policy has had more than 15 years to evolve, it has failed to address two emerging trends in the health-related use of cell phone technology in the United States. The first is the proliferation of mobile health-related applications for health promotion and the care of patients with chronic diseases (diabetes, congestive heart failure, and hypertension). The second trend is the rise in cell phone usage by Latinos and African Americans. A recent Pew Research Center study has found that "nearly two-thirds of African-Americans (64 percent) and Latinos (63 percent) are wireless internet users, and minority Americans are significantly more likely to own a cell phone than their white counterparts (87 percent of blacks and Hispanics own a cell phone, compared with 80 percent of whites)." The study also found that minority cell phone owners are significantly more likely than whites to use non voice data applications on their mobile devices. They also take advantage of a wider range of mobile phone features as compared to whites.¹

A recent Hispanic Institute study noted, "Mobile adoption and usage among the Hispanic population has been bolstered by the proliferation of diverse offerings aimed at putting more mobile products and services within reach of lower-income customers. These options range from pre-paid calling options, to

heavily subsidized smart phone offerings, to unlimited mobile text, phone and data plans as low as \$40 a month.”² In contrast, Native Americans use only 623 voice minutes per month versus 929 for Hispanics and 1,200 for African Americans. This may be a result of the limited access of tribal communities living on reservations or in isolated rural communities where mobile coverage is not available. However, their usage rating is growing by 5 percent a year.³

The convergence of these two trends calls for the review of public policies at both the federal and state government levels with the aim of making specific policy recommendations relating to:

- Access to mobile health services and a physician’s duty of care,
- Affordability and reimbursement of mobile health services,
- Patient privacy and protocols for the collection and distribution of patient data, and
- Cultural and linguistic appropriateness of mobile health-related software content.

Most bills introduced in Congress related to health applications of communication technology have sought to promote dissemination and use of electronic health records. The Food and Drug Administration (FDA), in turn, has struggled with determining whether cellular phones and health-related software applications are subject to regulation as “medical devices.” Congress and the FDA have yet to address the issues surrounding equal and appropriate access to mobile health technologies by vulnerable, culturally diverse low-income communities of color.

Patient Access to Care

Patients’ access to quality healthcare is increasingly dependent on their ability to communicate effectively with their health practitioners. The health of Hispanics and other minority populations can be improved by accessing mobile devices to receive vital health messages, monitor their conditions, and receive other health-related wireless interventions. As the Hispanic Institute concluded, “Hispanics are more likely than other population groups to suffer from diabetes, obesity and cardiovascular disease. Personalized and immediate care, medication reminders and other timely interventions on their mobile devices can enhance their health while also reducing the costs of their medical care.”⁴

One of the major challenges for rural Latino, African American, and Native American populations has been the great distances they often must travel to see a physician. While telehealth has done much to link these general practitioners with specialists in distant medical centers, it has done little to narrow the gap between patients and their doctors. The use of cell phones to support communication between healthcare providers and their patients, referred to as mobile health, affords the potential to increase effective monitoring and management of chronic disease.

At the same time, expanding access to mobile health poses a challenge for health practitioners by presenting them with a stream of actionable data resulting from mobile health’s capacity to continuously monitor a patient’s critical values. While providers may appreciate the value of monitoring patients with serious chronic disease, they also may become concerned about their professional and legal obligations under the duty of care to respond to any “actionable data” generated by mobile health devices. As an article in the journal *Telehealth Law* observes: “The existence of a physician-patient relationship is a prerequisite to a medical negligence suit against a physician. . . . A telehealth encounter would not change this fundamental principle, but may complicate the parameters of determining whether a duty of care has been established.”⁵

Affordability of Care

The second public policy issue raised by mobile health is the cost of access to such care for lower-income populations. Mobile technology has an inherent dynamic that drives the market toward ever more costly hardware and software applications. With the rise of iPhones and Android-powered smart phones available only with postpaid cell phone contracts, many low-income users are relegated to using cheaper

basic prepaid phones that lack the ability to support health-related mobile applications available to the more affluent health-conscious user. Even though some mobile carriers subsidize the cost of the smart phone with a multiyear service contract, the monthly charges may prove to be a barrier to access. Currently, it is estimated that only approximately 19 percent of the U.S. population owns a smart phone, while 94 percent of physicians use them.⁶ The lack of this technology's availability limits patients' capacity to access not only their physician but also health-related educational content and social networking sites that could afford them valuable information and social support for their chronic health conditions.

Related to this trend is the rising demand for increased bandwidth driven by more affluent users of mobile technology. This demand requires further investment by service providers in network infrastructure, the costs of which they then pass on to consumers. Yet the recent recession is impeding access to many mobile applications by those who cannot afford postpaid cell phone contracts. As the New Millennium Research Council found, "U.S. consumers struggling to make ends meet . . . are shunning contract-based (also known as "postpaid") cell phones in favor of less expensive prepaid cell phones."⁷ Hassett and Shapiro of Georgetown University pose the critical question for policy makers of "whether all Internet users should bear these additional costs equally, or is it more appropriate to ask those who use the most bandwidth to pay a higher proportion of those costs."⁸ They note that "existing data show that lower-income Americans already are less likely to sign up for broadband service, in large measure because they cannot afford it. Should this group be asked to subsidize high-bandwidth consumers under a pricing model that charges everyone the same fee, even as many of those households may be deterred from adopting broadband service because they cannot afford to pay a higher share of their income to connect to the Internet?"⁹ They conclude that "this outcome would almost certainly expand the existing racial, geographic and income gaps."¹⁰

Related to the issue of affordability is the process by which the FDA approves cellular technology innovations as "medical devices" prior to their introduction to the market. In this process the FDA should consider the issue of the widest public access to the new device in terms of its cost and ease of adoption by lower-income and elderly populations, who may be less adept at the use of new state of the art technologies.

One policy solution to this dilemma may be for the Federal Communications Commission to support broadband direct-to-consumer subsidies (similar to the Lifeline and Link-Up programs for telephone service) that would provide assistance for low-income Hispanic, African American, Native American, and other populations to subscribe to wireless broadband services. Another policy recommendation is for the federal government to endorse reimbursing providers or clinics for synchronously and asynchronously delivered services rendered via mobile health. To date, Medicare and Medicaid have been reluctant to reimburse healthcare providers for services rendered via telehealth without a clear originating site and a distance site. Since mobile health is reliant on both synchronous and asynchronous (store-and-forward) communication with patients via cell phone, it does not easily conform to the real-time requirements of current Medicare and Medicaid reimbursement policies. Mobile health interactions between the provider and the patient tend mostly to be asynchronous and involve an intermediary midlevel staff person. This raises the policy question of whether the time a practitioner spends relaying information to patients and responding to their questions via cell phone should be compensated under current federal health payment plans. Unlike Medicare and Medicaid, the Veterans Administration is beginning to support the use of cell phone technology to address patients with traumatic brain injury and posttraumatic stress disorder.

Patient Privacy

A third policy consideration is patient privacy issues related to data collected from patients and distributed to them via cell phone. Recently hackers have succeeded in accessing mobile voice communications, revealing the vulnerability of the more affordable 2G cell phones in contrast to more secure but higher-cost 3G and 4G mobile networks. Is there a role for regulatory bodies in assuring that the privacy of all users is protected regardless of their ability to afford better-protected cellular devices? Regulatory oversight is needed to promote the development of encrypted communication protocols designed to safeguard the following processes related to mobile health practice:

- **Data Collection**—The determination of what health-related information should be collected from the patient via cellular device monitoring must be guided by either a standard of care prescribed by professional bodies such as the American Diabetes Association or the primary provider’s care plan for the patient. The choice of what critical values to monitor and the frequency of their collection must be specified in order to construct the software algorithms needed to instigate automated reminders and alerts to the patient.
- **Screening**—Mobile health empowers nurses, diabetes educators, and community health workers to prescreen patient data recorded by cellular devices and manage the flow of information to and from the patient with the help of automated software programs. In order to reduce the burden on the primary care physician of continuously monitoring chronically ill patients, the midlevel staff must have clear parameters in determining when a patient’s critical values require the attention of the responsible physician. The necessary protocols must be flexible enough to accommodate the particular attributes of the individual patient. At the same time, they must offer sufficient clarity and specificity to permit the provider to delegate comfortably this prescreening responsibility to a nurse, diabetes educator, or community health worker.
- **Patient Feedback**—One of the strengths of mobile health is the ability to provide timely and appropriate feedback to patients on their health status in order to promote positive diet, exercise, and other lifestyle changes. It also offers an alert system whereby patients with readings outside their safe range will receive either a yellow or red alert via cell phone to check medications or other parameters of their care with a physician. Mobile health also affords patients an opportunity via their cell phone to seek quick answers to certain frequently asked questions. Since these answers, reminders, and alerts are generated from a central server, the design of the enabling software must conform to a set protocol specifying the triggers and the content of the feedback delivered to the patient.
- **Confidentiality**—The issue of preserving patient privacy is a serious concern in the practice of mobile health, because mobile health tends to collect more sensitive information on a broader range of patient characteristics. It also has the capacity to distribute these data to a wider audience than other forms of telehealth. As Kotz, Avancha, and Baxi note, “although mHealth systems have huge potential to improve quality of healthcare and to improve quality of life, they also generate new security and privacy issues.”¹¹ Patient information can now be shared with a community health worker, a close friend, or family member of the patient to help support the patient’s disease self-management goals. While some concerned leaders of racial and ethnic minority populations are becoming aware of the benefits of the use of mobile health care for promoting the health of their communities, they also are increasingly sensitive to their potential pitfalls. As a study by the Tomás Rivera Policy Institute has found, “Hispanics express very high levels of concern about privacy, security, and objectionable or undesirable content.”^{12, 13}

Culturally Appropriate Telehealth Services

A fourth area that policy makers must address is ensuring the quality and cultural and linguistic appropriateness of health-related applications designed for use with mobile devices. Recent projections by the Stanford Persuasive Technology Lab raise a serious concern. Its director, BJ Fogg, predicts that “in 10–15 years the mobile phone will be the primary platform for changing people’s attitudes and behaviors—the essence of mobile persuasion.”¹⁴ Jerry Michalski in a recent publication of the same Persuasive Technology Lab poses the question who watches the mobile phone application coders? He expresses concern that “the people building these technologies have little understanding of the implications of what they’re creating, and little recourse to call a halt when they do spot something amiss.”¹⁵ In stressing the pervasive nature of these new technologies on the healthcare of patients, Upkar Varshney argues these “devices must be designed to offer intuitive interfaces that can learn with and from individuals.”¹⁶ In addition to concerns about the technology one also must ask what guarantees currently exist for culturally and linguistically diverse patients to ensure that the content of mobile health communication they may receive is respectful of their language, cultural beliefs, and health literacy level.

One policy recommendation for ensuring informed consent in applying these powerful technologies of persuasion with vulnerable populations is to adapt the existing National Standards on Culturally and Linguistically Appropriate Services (CLAS) of the U.S. Department of Health and Human Services to encompass health messages delivered via mobile devices. In 1997 the Office of Minority Health undertook the development of national standards for the provision of culturally and linguistically appropriate healthcare as an alternative to the prior patchwork of guidelines and requirements. Since then, healthcare has experienced dramatic changes with the introduction of new telehealth technologies as a platform for communication between healthcare providers, health plans, and their patients. These standards need to be adapted to accommodate the use of mobile health to communicate with culturally and linguistically diverse patients. The CLAS guidelines should be updated in the following manner:

- **Culturally Competent Care**—Midlevel staff responsible for monitoring and managing mobile communication should be trained in culturally sensitive protocols for collecting and disseminating information to and from the patient. The successful application of telemedicine to Latinos is dependent on the use of these protocols. The Promotora Telemedicine Project in California used a support network of Spanish-speaking facilitators to demonstrate how “new technology can be combined with culturally sensitive programs to improve access to high-quality care.”¹⁷
- **Language Access Services**—Mobile health text and verbal content should be in the preferred language and forms of expression of the patients and their culture. Healthcare organizations must ensure that developers of mobile health software applications are competent in the patients’ language and culture. This requirement is especially significant for health-related cell phone text messaging sent by health plans and other health providers. Since so few characters must transmit so much meaning, the potential for misunderstanding in communication via cell phone is much greater.
- **Organizational Support**—Healthcare organizations should utilize formal and informal electronic social networking platforms to facilitate community, family, and patient involvement in the patient’s care. This recommendation includes enabling access to culturally and linguistically sensitive online social networks via MySpace, Facebook, and YouTube for information sharing and social support for patients with chronic health conditions. Individual patients’ health-related information derived from mobile platforms by health plans also must include the patient’s race, ethnicity, and spoken and written language. These data should be regularly recorded in a patient medical record as part of mobile health data collection and regularly updated into the organization’s medical record system. In this way automated health messaging can be targeted to the appropriate group of patients according to their linguistic and cultural preferences.

Conclusions

The prior review of four areas of mobile health policy demonstrates the need for the following recommendations to be adopted by the federal government:

1. Medicare and Medicaid reimbursement policies should be amended to permit health providers to bill for mobile-technology-enabled synchronous and asynchronous communication with their patients.
2. The Federal Communication Commission should establish a pricing model for high-volume users of broadband cellular service to subsidize access to broadband-supported health applications by chronically ill lower-income patients unable to afford such services.
3. The Department of Health and Human Services should introduce standards to protect confidentiality involving transmission via cell phones and should amplify the CLAS guidelines to ensure culturally and linguistically appropriate mobile-phone-supported communication between providers, health plans, and their patients.
4. The Food and Drug Administration should consider questions of wide public accessibility to mobile health technology innovations based on costs and ease of adoption before certifying them as “medical devices.”

Some of the above policy recommendations will require new legislation, and others may only call for changes in existing government regulations. In either case, policy makers must confront the fact that mobile health applications and the potential for Web-based social networks (Facebook, MySpace, YouTube, etc.) to support wellness are so new that many of the pitfalls involved in their implementation for health-related purposes have yet to fully surface.

The question for policy makers is whether to anticipate these challenges with early legislative and regulatory actions or wait until the technologies and related applications mature further before acting. The risk in waiting is that lower-income patients' access to such developments will continue to be limited by the high cost of smart phones and their health-related applications. Also, the cellular device industry, software developers, and mobile carriers may become increasingly resistant to accepting such regulations and public policies. In summary, policy makers at both the federal and state government levels need to take action now to ensure that the benefits of mobile health are equally accessible to all Americans.

Miguel Tirado, PhD, Professor of Health and Human services at California State University, Monterey Bay, in Seaside, CA, and Research Associate with the Center for Telehealth and Cybermedicine Research at the University of New Mexico in Albuquerque, NM.

Notes

1. Smith, A. *Mobile Access 2010*. Pew Research Center, 2010, 3, 4. Available at <http://www.pewinternet.org/Reports/2010/Mobile-Access-2010.aspx>.
2. Hispanic Institute and Mobile Future. *Hispanic Broadband Access: Making the Most of the Mobile, Connected Future*. September 15, 2009, 8. Available at http://thehispanicinstitute.net/files/u2/Hispanics_and_Broadband_Access_0.pdf.
3. Telephia Research Report. "Cell Phone Usage Highest Among African American and Hispanic Consumers." January 17, 2006.
4. Hispanic Institute and Mobile Future. *Hispanic Broadband Access: Making the Most of the Mobile, Connected Future*, 2.
5. Donahue, M. "Regulating Telehealth in Ontario—Next Step in the Transformation Agenda." *Telehealth Law* 6, no. 2 (2005–6): 21.
6. Spyglass Consulting Group research study based on interviews with 100 physicians working in U.S. acute care and ambulatory environments. Menlo Park, CA, July 2010.
7. New Millennium Research Council. "Recession Has Cell Phone Users' Number, as Two Out of Three New Wireless Subscribers in U.S. Go Prepaid." Press release, March 31, 2010. Available at http://www.newmillenniumresearch.org/news/110410_NMRC_Net10_prepaid_trends_survey_news_release.pdf.
8. Hassett, Kevin A., and Robert J. Shapiro. *Towards Universal Broadband: Flexible Broadband Pricing and the Digital Divide*. Washington, DC: Georgetown Center for Business and Public Policy, August 2009, 7.
9. Ibid.
10. Ibid.
11. Kotz, David, Sasikanth Avancha, and Amit Baxi. "A Privacy Framework for Mobile Health and Home-Care Systems." Paper presented at the ACM Workshop on Security and Privacy in Medical and Home-Care Systems (SPIMACS '09), 16th ACM Conference on Computer and Communications Security, Chicago, IL, November 13, 2009, pg. 1.
12. López-Aqueres, Waldo, and Elsa Macias. *Broadband Internet Access among Latinos: Status, Issues and Opportunities*. Tomás Rivera Policy Institute, August 2004. Available at <http://www.trpi.org/PDFs/BBDaccess.pdf>.
13. U.S. Department of Health and Human Services, Centers for Medicare and Medicaid Services. *HIPAA Security Guidance for Remote Use of and Access to Electronic Protected Health Information*.
14. Fogg, BJ, and Richard Adler (Editors). *Texting 4 Health*. Captology Media, Stanford, California, 2009, page 4.
15. Jerry Michalski in BJ Fogg and Dean Eckles (Editors). *Mobile Persuasion: 20 Perspectives of the Future of Behavior Change*. Captology Media, Stanford California, 2007, p. 137.
16. Varnshey Upkar, "Pervasive Healthcare and Wireless Healthcare Monitoring," *Mobile Networks and Applications*, 12, no. 2-3 (2007), p. 124
17. Higgins, J., J. Prendergast, and W. Bortz. "The Promotora Telemedicine Project: Combining Technology and Cultural Sensitivity to Improve Diabetes Care in a Medically Underserved Community." *Californian Journal of Health Promotion* 1, no. 2 (2003): 36.