

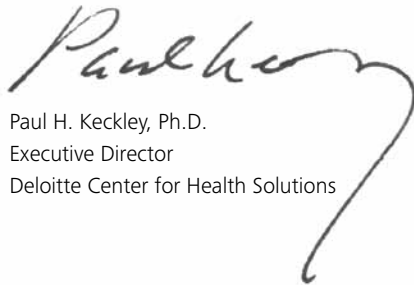
Issue Brief:

The Mobile Personal Health Record: *Technology-enabled self-care*

Foreword

Engaging consumers to live healthier lives and adhere to evidence-based treatment plans using technologies that enhance self-care is central to controlling costs in the U.S. health care system. Realizing this goal entails leveraging familiar technology with incentives for consumers and providers to manage preventive, chronic and post-acute care. The personal health record embedded in mobile communication devices – mPHR – is the “killer app” that may change the game for providers, consumers and payers.

In this issue brief, we offer a perspective on the convergence of personal health records and mobile communication devices, and examine the barriers and opportunities to accelerate their use by health care industry stakeholders.



Paul H. Keckley, Ph.D.
Executive Director
Deloitte Center for Health Solutions



The case for convergence: PHRs and MCDs

The U.S. health care system in the coming years will be increasingly challenged to manage and reduce costs. In 2010, health care is expected to account for 17 percent of the U.S. gross domestic product (GDP); it is anticipated to increase at two percent above the economy's growth rate.¹ Treating chronic disease accounts for more than 70 percent (\$1.7 trillion) of the total \$2.4 trillion in U.S. health care spending.^{2,3}

Technology can help consumers – particularly those with chronic conditions – monitor and manage their care to improve outcomes and decrease costs. Mobile communication devices (MCDs) such as cell phones, smartphones and other mobile tablet PCs are relatively inexpensive, portable technologies that can collect environmental and patient-entered information and transmit it via the Internet to a personal health record (PHR). Combined with actionable decision support, the MCD-PHR combination, or “mPHR,” can analyze aggregate data to activate mobile, patient-specific output such as medication reminders, healthy habit tips and medical bill reminders. Consumers who access such information and decision prompts from a portable communication device in an outpatient setting can make informed health decisions using fewer health system resources. Consider:

- Twice as many Gen X and Y consumers want to access and maintain their PHRs using a mobile device than do Baby Boomers and Seniors – indicating that younger generations are more likely to manage their health using MCDs.⁴
- Fifty percent of consumers want a personal monitoring device to alert and guide them to make improvements in their health or treat a condition.⁵
- Approximately six out of ten consumers (57 percent) want to access an online PHR connected to their doctor's office.⁶

1 “Health Spending Projections Through 2019: The Recession's Impact Continues,” *Health Affairs*, February 4, 2010.

2 *Financial and Health Burdens of Chronic Conditions Grow*, Tracking Report No.24, Center for Studying Health System Change, April 2009.

3 “Healthcare Spending Increase to Set Record in 2009,” *Health Affairs*, February 24, 2009.

4 *2010 Survey of Health Care Consumers: Key Findings, Strategic Implications*, Deloitte Center for Health Solutions, May 2010.

5 *Ibid*

6 *Ibid*

Although mPHR systems are in early-stage development, pilot projects demonstrate their potential to improve outcomes and reduce health system utilization. For example, at the Cleveland Clinic, diabetic and hypertensive patients who used smartphones to transmit vitals to their PHR reduced their number of doctor's office visits as compared to patients who did not track readings.⁷ Austrian investigators found that congestive heart failure (CHF) patients, who typically require extensive hospitalization, had fewer and shorter hospital stays when they used an mPHR system to transmit vitals, medication information and health status to their physicians.⁸ Similarly, researchers at Kaiser Permanente in Colorado discovered that 58 percent of hypertension patients using mPHRs lowered their blood pressure to healthy levels within six months, compared to 38 percent receiving conventional treatment.⁹

Glossary of Key Terms

Personal Health Record (PHR) – An electronic resource storing health data maintained in a secure and private environment by the consumer.

Mobile Communication Device (MCD) – A cellular telephone with built-in applications and Internet access.

mPHR – Term for mobile PHR systems that utilize MCDs to access one's PHR.

Electronic Health Record (EHR) – An electronic record providing consumer health information managed by the provider.

Four major barriers

Despite these promising pilots, widespread application of mPHRs faces four major barriers:

- To maximize utility as a monitoring/care management tool, mPHRs must integrate relevant patient data across sites of care to provide an appropriate set of prompts, alerts and reminders that align with evidence-based self-care. Ideally, the mPHR will also tap data from the consumer's health insurance plan to provide real-time, localized information about treatment option costs (e.g., diagnostic tests, therapeutics) to direct consumers toward appropriate, lower-cost options. Currently, no widely accepted, single technical standard among both PHRs and electronic health records (EHRs) exists, limiting the usefulness of mPHRs to integrate data and movement through different care providers.¹⁰ Furthermore, only one-third of doctor's offices use a basic EHR, further limiting both integration and portability.¹¹

Fifty percent of consumers want a personal monitoring device to alert and guide them to make improvements in their health or treat a condition.

7 Boutros R, M.D., Lazuta G, Harris CM, M.D., et al. *Case Study Conducted by the Cleveland Clinic and Microsoft Corporation Using Technology to Manage Chronic Disease*, HIMSS, March 2010.

8 Scherr D, Kastner P, Kollmann, A, Hallas A, et al. *Effect of Home-Based Telemonitoring Using Mobile Phone Technology on the Outcome of Heart Failure Patients After an Episode of Acute Decompensation: Randomized Controlled Trial*. *J Med Internet Res* 2009, 11(3): e34.

9 "Findings of Home-Based Monitors and Online Coordination," American Heart Association's 11th Scientific Forum on Quality of Care and Outcomes Research in Cardiovascular Disease and Stroke, Kaiser Permanente Colorado, May 2010.

10 Heubusch, K. "IT Standards for PHRs: Are PHRs Ready for Standards? Are Standards Ready for PHRs?" *Journal of AHIMA*, 79, no.6 (June 2008): 31-36.

11 "Physician Office Usage of Electronic Healthcare Records Software," SK&A, A Cegedim Company, February 2010.

- Consumer demand for PHR-accessible data is not yet strong. Only 10 percent of American adults currently use a PHR;¹² when polled, 61 percent of Americans said they do not believe they need a PHR, potentially because they do not see the benefit.¹³ However, several studies suggest that patients do better when they track their condition on a PHR. For example, a California Healthcare Foundation study revealed that PHR users felt they had a better understanding of their care;¹⁴ more than 50 percent of these consumers believed they knew more about their condition and their treatment;¹⁵ and 40 percent believed that it led them to ask their doctor a question they may not have asked before.¹⁶ PHRs also increased these consumers' association with their health care providers, particularly low-income consumers, who believed they were more connected to their doctor.¹⁷
- While privacy is still a concern, consumer sentiment is slowly changing. Once consumers start using a PHR, fears about privacy and confidentiality noticeably diminish.¹⁸
- Providers have historically voiced concern over liability and data integrity of PHRs.¹⁹ Today, more providers are offering pre-populated PHRs to their patients to view their medical history, access test results, email their physicians, refill prescriptions, schedule clinical visits and keep track of personal data such as diet, sleep and exercise. The barrier for providers lies in making the legal medical record distinct from the patient-entered data, both technically and operationally.²⁰

12 *2010 Survey of Health Care Consumers: Key Findings, Strategic Implications*, Deloitte Center for Health Solutions, May 2010.

13 "Consumers and Health Information Technology: A National Survey," California Healthcare Foundation, April 2010.

14 *Ibid*

15 *Ibid*

16 *Ibid*

17 *Ibid*

18 *Ibid*

19 Robeznieks, A. "PHR Data Overload, Legal Liability Concern Docs," *Modern Healthcare*, May 21, 2007.

20 Fahrenholz, CG, Buck, SL. "PHRs and Physician Practices," *Journal of AHIMA*, 78, no.4 (April 2007): 71-75.

Five accelerators

Five accelerators position mPHRs as the self-care management platform of the future (Figure 1):

Figure 1: mPHR Accelerators

Trend	Description	Impact
Greater EHR adoption by hospitals, physicians and allied health providers	<ul style="list-style-type: none"> Federal and state government-created incentives such as the HITECH Act and the American Recovery and Reinvestment Act of 2009 (ARRA) are incentivizing providers to adopt health IT.²¹ 	<ul style="list-style-type: none"> Due to the HITECH Act, more physicians are expected to adopt EHRs over the next five years. Capital provided under the stimulus act slightly obviates the monetary constraint to install an EHR. Adoption could improve information exchange between an EHR and PHR. Adoption could enable a consumer to access longitudinal medical data across the consumer's health experiences.
Increasing regulatory clarity around standardization of health records, privacy protections and provider liability	<ul style="list-style-type: none"> The Continuity of Care Document (CCD) standard, which exchanges basic patient care information (demographics, medications, allergies, labs, immunizations, etc.), is gaining recognition among federal agencies.²² Third-party personal health platforms, such as Microsoft's Health Vault and Google Health, are developing a universal PHR format.²³ Due to these companies' size and influence, they are attracting notable partners and increasing acceptance of this format. Regulators are nearing privacy and security standards to better define ways for consumers to control their health information.²⁴ 	<ul style="list-style-type: none"> Government agencies might prefer CCD-compliant health IT tools, thus increasing the format's adoption. Consumers could download their provider data into their mPHR system. Consumers would not be tied to a provider- or payer-supplied PHR. Consumers would have access to their information and define with whom (providers, family members, etc.) to share it. As pilot programs illustrate mPHRs' usefulness via improved outcomes, providers' liability concerns might lessen. Efforts enhancing provider-consumer connectivity (without exposing providers to liability), would most likely be led by the Center for Medicare and Medicaid Innovation.²⁵

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21 H.R. 1 – 111th Congress: American Recovery and Reinvestment Act of 2009. (2009).

22 Heubusch, K. "IT Standards for PHRs: Are PHRs Ready for Standards? Are Standards Ready for PHRs?" *Journal of AHIMA*, 79, no.6 (June 2008): 31-36.

23 Google.com and Microsoft.com.

24 Heubusch, K. "IT Standards for PHRs: Are PHRs Ready for Standards? Are Standards Ready for PHRs?" *Journal of AHIMA*, 79, no.6 (June 2008): 31-36.

25 H.R. 3590 – 111th Congress: Patient Protection and Affordable Care Act. (2010), Section 3201.

Figure 1: mPHR Accelerators

Trend	Description	Impact
Increasing MCD capacity and functionality	<ul style="list-style-type: none"> • 1 GHz processors (like those in home PCs) are replacing the typical 500 or 600 MHz processors in most MCDs.²⁶ • Sensors that can detect and analyze the user’s environment will soon be embedded in most MCDs.²⁷ • The emergence of ultra-compact processors that boost performance while drawing less battery power further enhance the functional capabilities. • Mobile Internet data speeds are improving as telecommunication providers are piloting new wireless networks with mobile data speeds comparable to home or work networks.²⁸ 	<ul style="list-style-type: none"> • Larger processors could enable mPHRs to support ever-more complex data input from medical devices, further integrating mPHRs into patient care. • Sensory capabilities could transform the MCD from a transmission solution between the medical device and PHR to a direct medical device, supporting its increased applicability in care management. • Faster data transmission could enable mPHRs to be a real-time monitor of consumer health status and provide timely alerts to and from the doctor.
Decreasing cost of MCDs (scalability) in tandem with payer incentives for their use	<ul style="list-style-type: none"> • The original iPhone cost \$599 at its 2007 launch; market saturation is driving device costs down.²⁹ • Price points for service plans are likely to be embedded in insurance premiums and offset by improved consumer adherence (lower health costs). 	<ul style="list-style-type: none"> • 45 million people in the U.S. have a smartphone.³⁰ Smartphone sales in 2009 increased year over year by 27 percent, making it the fastest-growing segment of the mobile devices market.³¹ • Bio-monitoring devices are currently provided at no cost by some health plans and employers. MCDs could be a cost-effective alternative.³² • Care management organizations might provide MCDs at no cost to consumers for targeted disease-specific populations.
Increasing consumerism in health care	<ul style="list-style-type: none"> • As health care costs rise, employers are likely to continue to shift costs to their employees. For example, the average premium for a family health insurance plan purchased through an employer doubled between 2000 and 2009.³³ • One-third of employers are reducing costs by incentivizing employee fitness, wellness and disease management initiatives.³⁴ • The Patient Protection and Affordable Care Act of 2010 (PPACA) is likely to incentivize consumers who participate in wellness and preventive care.³⁵ 	<ul style="list-style-type: none"> • On-demand, transactional mPHR applications, such as co-pay and formulary reminders, would help consumers make cost-effective choices at the point of care. • Integrating wellness and disease management applications on MCDs may show incremental financial benefit to those who use mPHRs to manage their health and health care costs.

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26 Miller, M. "Smartphone Processors Getting Smarter," PCmag.com, February 22, 2010.

27 Brandon, J. "The Future of Smartphones: 2010-2015 and Beyond," Digitaltrends.com, February 16, 2010.

28 Zibreg, C. News release: "AT&T doubling 3G data speed to 14.4MBps for 250 million Americans by the year’s end," Geek.com, May 17, 2010.

29 Walmart.com, May 24, 2010.

30 February Market Share Report, ComScore, April 5, 2010

31 "Competitive Landscape: Mobile Devices, Worldwide, 2Q09," Gartner, August 2009.

32 Deloitte interviews with select Fortune 500 companies, 2009-2010.

33 2010 Top Five Total Rewards Priorities Survey, Deloitte Research, February 22, 2010.

34 Ibid

35 H.R. 3590 – 111th Congress: Patient Protection and Affordable Care Act. (2010).

Immediate opportunities

The mPHR has immediate utility in several areas where managing prevalent health problems currently show suboptimal results. Examples include:

- **Obesity:** Microsoft is piloting the MyLife for Windows Mobile Phones application, which leverages integrated MCD cameras, accelerometers and microphones to input a user's physical activity to Microsoft's PHR Health Vault.³⁶ "The dream," according to Eric Chang, Microsoft's director of technology strategy for Asia, "is that a user could photograph each meal with their phone, and have the application return data such as caloric content, food group and allergy information for each item."³⁷ In the future, consumers could use an MCD with integrated biosensors to longitudinally track activity and align them to diet and exercise goals in their mPHR. Also, with greater Internet operability, consumers could share data with their social network to gain peer support, advice and motivation.
- **Post-acute care:** At some point, patients with an mPHR might be discharged from a hospital sooner than before because of an enhanced ability to monitor progress without being in the hospital. For instance, Kiwok combines a smartphone, decision support software and an electrocardiogram (ECG) sensor to monitor non-hospitalized chronically ill CHF patients.³⁸ The product detects when patients may benefit from changing diet, increasing exercise, decreasing stress or changing medications. It alerts the medical team of abnormal readings and recommended changes to the consumer's treatment regime.
- **Home care:** In the future, patients may be able to avoid or delay moving to nursing home and long-term care (LTC) facilities by using an mPHR. For example, Control4 and CloseBy Network together offer a solution that combines sensor technology embedded in the home to monitor the elderly and alert caregivers and doctors to changes in status via their cell phones.³⁹ They can receive instant alerts via email or text when specified sensors are triggered or if normal behavioral patterns change. Patient health information also can be collected and imported to a PHR.
- **Asthma:** As MCDs continue to integrate environmental sensors, they could measure an asthmatic patient's immediate surroundings for triggers such as smog, pollen or other allergens and use an mPHR to issue alerts.⁴⁰ It is also possible to link the mPHR to devices that monitor the patient's respiratory metrics, creating alerts when the condition is sub-acute.
- **Diabetes:** Dexcom uses a biosensor inserted into the skin to continuously monitor blood sugar levels and transmit that data to an MCD, which distributes it to the mPHR and the provider's EHR. The medical team can then adjust insulin doses accordingly. If readings drop too low, the device sends an alert to the user's and provider's cell phones.⁴¹

At some point, patients with an mPHR might be discharged from a hospital sooner than before because of an enhanced ability to monitor progress without being in the hospital.

36 MyLife for Windows Mobile Phones, Microsoft Research, Microsoft.com.

37 Fletcher, O. "Microsoft e-Health Research Taps Xbox, Mobile Phones," *PC World*, February 8, 2010.

38 "Cool Vendors in Healthcare Providers, 2009," Gartner, Industry Research ID Number: G00166283.

39 Montgomery, L. "New Health Technology Lets Elderly Stay at Home," *Electronic House*, February 25, 2010.

40 "Cool Vendors in Healthcare Providers, 2009," Gartner, Industry Research ID Number: G00166283.

41 Mendosa, D. The Dexcom Continuous Sensor, DiabetesHealth.com, September 1, 2006.

Looking ahead

The mPHR shows great promise as an optimal platform for engaging consumers in self-care. The mPHR enables health management programs for conditions across the continuum through monitoring, real time decision support, education and the collection of aggregate data for trend analysis. The impacts and implications for stakeholders are clear:

- **For consumers:** Better care and lower costs via access to real-time information that is useful in “teachable moments” when diagnostic and therapeutic decisions are made. These therapeutic interventions create an interdisciplinary care environment that directly involves the patient.
- **For hospitals and physicians:** A mechanism to coach consumers to make better judgments about their care and to align provider incentives with optimal patient outcomes. mPHR is likely to be a key component supporting accountable care organizations and medical home initiatives.
- **For life sciences companies:** A platform for demonstrating value (efficacy and effectiveness) of therapeutics and diagnostics within the context of an informed consumer population. If consumers agreed to share information, the consumer-reported database unlocks potential for manufacturers to learn more about product use.
- **For health plans:** Lower costs associated with fewer admissions and emergency room visits, avoidable drug-drug interactions, avoidable over-use of medications and increased use of self-care/over-the-counter therapeutics in treating common chronic conditions. Health plans will have a new platform to fully enable health and disease management programs.

With growing recognition among policy makers, health plans and providers that the key to reduced health care costs and improved population-based outcomes is more effective consumer self-care, the mPHR is positioned as a natural progression of technological capabilities to help achieve this desired future state.

Authors

Paul H. Keckley, PhD
Executive Director
Deloitte Center for Health Solutions
pkeckley@deloitte.com

Bianca Chung
Manager
Deloitte Consulting LLP
bkchung@deloitte.com

Contributors

Michelle Hoffmann, PhD
Senior Manager
Deloitte Center for Health Solutions
mihoffmann@deloitte.com

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Contact information

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Deloitte Center for Health Solutions
555 12th Street N.W.
Washington, DC 20004
Phone 202-220-2177
Fax 202-220-2178
Toll free 888-233-6169
Email healthsolutions@deloitte.com
Web <http://www.deloitte.com/centerforhealthsolutions>

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