

The mHealth Revolution

Industry insiders offer their insight into the way new technologies will change how health care is delivered

by **Brad M. Pruitt, M.D.**

Last year was considered the breakout year for wireless and mobile health, also known as “mHealth.” On Feb. 17, 2009, the Obama administration announced plans to incentivize health care providers with nearly \$23 billion in grants to implement health information technology (IT) systems.¹ There are now over 10,000 medical applications for the iPhone, BlackBerry, Palm, Android and Nokia devices. According to McKinsey & Company, global mHealth market opportunities are estimated to be \$50 billion in 2010. The CTIA, a wireless trade organization, expects the industry to grow at nearly 100 percent per year over the next three years. Michael O’Hara, CEO of GSMA, estimates managing chronic diseases with mHealth would save \$175 billion to \$200 billion globally and \$21 billion in the U.S. alone. Sprint CEO Dan Hesse stated, “If I had to pick the one industry facing the biggest gap between need for change and use of wireless to facilitate that change, it would be health care.”

The following interview highlights the “20/10 Vision” insights of three San Diego mobile health leaders: the iconic Dr. Eric J. Topol, startup guru Darrel Drinan and industry catalyst Paul Sonnier.

What is wireless health?

ET: Wireless health encompasses a broad range of sensors and gadgets designed to prevent, diagnose and monitor health conditions, manage treatment and enable timely communication and intervention. A new era of consumer-driven health care — from my perspective, we’re entering the most exciting phase of innovation in medicine to date.

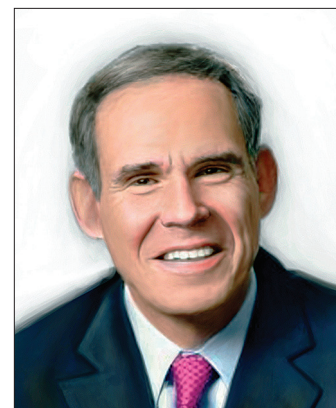
What area of health care will mobile health benefit the most?

ET: The entire continuum of care, across the ages, from preemies to seniors, across the world. Every segment will reap benefits. We’ll see a tremendous impact on chronic care and disease management through remote monitoring, imaging and compliance. Not too far in the future, we will be able to look at a person’s genetic susceptibility for cancer or obesity, make early use of wireless sensors to monitor them in an appropriate, non-invasive way and be out in front of the development of such conditions.

DD: Two market channels could benefit: quality of life, or health maintenance applications and chronic disease applications. Today the largest opportunity in terms of health care expenditures is in the chronic disease market. Most chronic disease expenditures today are on the acute manifestations from underlying disease and most industry experts feel this market channel will achieve the highest growth in the near term. This is said with one caveat; if someone effectively creates a killer application for quality of life that achieves widespread Facebook-like adoption, it may tip the opportunity scales away from chronic disease care to managing and maintaining a person’s health.

Is the iPad, Apple’s new mobile tablet device, a step in the right direction?

PS: The iPad, in its current iteration, doesn’t seem to be a game-changer. It’s not really suited for the hospital environment and doesn’t offer any significant advantages to existing tablets currently being used in hospitals. However, if some key features are added and it becomes ubiquitous, like the iPhone, this outlook could change. Some of the shortfalls include: size (it doesn’t fit into a pocket like an iPhone does), not ruggedized, an inability to run multiple apps concurrently, no camera, no barcode reader, not sanitizable, no radio frequency tag sensor and a non-swappable battery.



Eric J. Topol, M.D.



Darrel Drinan



Paul Sonnier



Zeo's Personal Sleep Coach allows consumers to track personal sleep patterns



GE's Vscan ultra-portable ultrasound produces images in real time

Is the current data transfer speed a limiting factor to wireless health?

DD: For the acute care setting, such as transferring electrocardiograms, electroencephalographs or imaging, spectrum and transfer capacity and speed will be challenging, but not for the majority of care for stable chronic disease or healthy patients. However, the wireless spectrum will be challenged when a large number of users send small amounts of data, while the spectrum is shared with other non-health data applications on smart phones, in densely populated urban areas. I recently made a presentation to the chairman of the Federal Communications Commission and suggested they allow joint use of the D Block spectrum² for health care and first responder applications. It would be a tragedy if a patient's critical health data were delayed because someone was watching a YouTube video on their iPhone.

What major hurdles exist for wireless health?

ET: Changing medical practice is one of the most difficult things to do. We will need to prove that wireless health will not only save lives, but cost less. In addition to that overarching challenge, we will need to work together as an industry to overcome regulatory, reimbursement and legislative barriers. Enlightened policies are desperately needed to change outdated, inefficient models of health care delivery.

How can wireless health reduce health care expenditures?

ET: One example: remote monitoring. Between 2003 and 2007, the Veteran's Affairs conducted the largest study ever in this area, tracking 17,000 veterans with chronic conditions who used technology solutions to manage their health at home. The study demonstrated dramatic results, including a 19 percent reduction in hospital admissions. Additional findings in 2008 showed remote monitoring decreased hospital visits even more dramatically: 20 percent for diabetes patients and 56 percent for patients with depression.³ Health care costs associated with one or more chronic diseases amounted to

about \$1.7 trillion or 75 percent of total health spending in the U.S. in 2009, so you can see we have a remarkable opportunity to help redress this crisis.⁴ One of the main functions of the West Wireless Health Institute⁵ will be to validate wireless health technologies and help show the potential for cutting costs and eliminating the excessive waste in health care.

Are you currently using a mobile health device to improve your personal health?

ET: Zeo's Sleep Coach, which captures brain wave data via a headband. Wireless sensors inside the headband relay the data to what looks like an alarm clock, but instead shows a real-time minute-by-minute display of the various stages of sleep. When I wake up in the morning, I know how much time I spent in deep, rapid eye movement sleep, light sleep, when I'm waking up and other events.

During a keynote address at the Consumer Electronics Show in January, I also conducted the first live demonstration of GE's Vscan, an ultra-portable handheld ultrasound. When I was up on stage, I used the device to show a picture of my heart beating in real time. As a cardiologist, this was fascinating and I believe people are going to be doing their own echocardiograms and sending them to their doctors in the not-too-distant future.

DD: I currently use a Garmin 305 heart monitor when I run, and it wirelessly transmits heart rate and calorie consumption data to the watch which then can be downloaded via USB to my computer where I keep track of my runs.

What will be the biggest wireless health breakthrough in 2010?

ET: Hot areas for development right now are the use of wireless sensors for delivering medication, monitoring physical parameters like blood pressure and taking and sending images from inside the human body.



ENDNOTES

- ¹ 111th Congress, 1st Session. American Recovery and Reinvestment Act of 2009 [introduced in the U.S. Senate; 6 January 2009]. 111th Cong., 1st sess. Congressional Bills, GPO Access. Web. 10 May 2010
- ² In 2008, more than a thousand regional licenses in the 700 MHz spectrum were won at government-held auction. Nobody bid the \$1.3 billion minimum for the D blocks (788MHz, UHF 67)
- ³ Darkins A, Ryan P, Kobb R, Foster L, Edmonson E, Wakefield B, Lancaster AE. Care coordination/home telehealth: the systematic implementation of health informatics, home telehealth, and disease management to support the care of veteran patients with chronic conditions. *Telemedicine e-Health* (2008): 10:1118–1126. Web. 10 May 2010
- ⁴ Almanac of Chronic Disease. Partnership to Fight Chronic Disease, 2009. Web. 10 May 2010
- ⁵ Founded in March 2009 by the Gary and Mary West Foundation, the independent nonprofit West Wireless Health Institute is dedicated to innovating, validating, advocating for and investing in the use of wireless technologies to transform medicine. The Institute's primary mission is to cut health care costs by accelerating the availability of wireless medical technology

Garmin's Forerunner® 305 is a GPS-enabled personal trainer and heart monitor with robust wireless capabilities

What we're seeing is an evolution in the consumer-driven use of wireless sensors in preventative health and wellness. Consider the 1.2 million runners who use the Nike+ sensor in their shoe to track how many miles they've run and calories they've burned. Or the 10,000-plus health-related software applications for the iPhone. These products are the forerunners of breakthrough technologies coming this year and over the next decade.

DD: Remote care, the opportunity of practicing medicine from afar, is probably one of the emerging transitions this year. Major companies such as GE and Intel have finally acknowledged this is a growth market, and are shifting large amounts of R&D dollars into low-cost, mobile remote health care development programs.

PS: The home health monitoring segment as a whole seems to have garnered the most attention. Parks Associates forecast that the U.S. market and sales of wireless home-health technology (home-based health care applications and services) will grow from \$304 million in 2009 to \$4.4 billion in 2013; a five-year cumulative annual growth rate of over 180 percent.

Is there a specific topic or question commonly left out of the wireless health discussions in media that you would like to address?

PS: I think the topic of wireless health itself is conspicuously absent from the popular media. This is changing, but there is a lot more visibility that needs to be achieved so that the general public, policy makers and the fragmented system of health care payers are all more aware of the unique benefits of wirelessly enabled health devices, which can help our nation achieve the seemingly paradoxical goal of reducing costs while enhancing patient care and improving our general health. ■

Eric J. Topol, M.D. is vice chairman of the board of directors and chief innovation officer of the West Wireless Health Institute, director and professor at the Scripps Translational Science Institute, chief academic officer and holder of the Gary and Mary West Chair of Innovative Medicine at Scripps Health, a senior consultant cardiologist at Scripps Clinic, and a member of the board of directors of Sotera Wireless. His work in the genomics of heart attack led to the discovery of key genes, which were recognized as American Heart Association Top 10 research advances in 2002 and 2004.

Darrel Drinan is the co-founder and CEO of PhiloMetron, a medical technology accelerator in San Diego that is developing novel therapeutic solutions for chronic disease and quality-of-life conditions. Prior to co-founding PhiloMetron, Drinan was the director of new program management for Braun ThermoScan, a \$2 billion subsidiary of the Gillette Company. He led the new consumer medical products development activities for Braun, including research in wireless, non-invasive, medical sensing applications markets.

Paul Sonnier, MBA is the founder of the Wireless Health group on LinkedIn. The group advances knowledge and relationships between professionals interested in the convergence of wireless technology with the continuum of consumer-health applications and clinical health care. Sonnier is also co-chair of a health care communications group at CommNexus San Diego and managing director at Wireless Health Strategies, an executive management consultancy.

Brad M. Pruitt, M.D. ('11) is involved with the Executive Mentor and Vistage programs and serves as vice president of the Life Science & Health Care Club. Pruitt received his medical degree at Michigan State University – College of Human Medicine in 2007.