Gary & Mary West Wireless Health Institute

WIRELESS SOLUTIONS FOR HEALTH CARE REFORM

Wireless health solutions hold the potential to revolutionize health care in the United States and overhaul our $2.3 trillion "disease care" system. Their promise lies in dramatically reducing costs associated with health care; increasing the efficiency and effectiveness of health care providers; and extending the reach of health care services to every segment of the U.S. population[i].

Better access to health care

Mobile devices, from cell phones to wearable sensors, offer individuals health care "at their fingertips" – any time, any place. They extend the reach of physicians into underserved communities and into the homes of older Americans, helping them stay independent and out of institutional settings. In addition, they provide a new channel for targeted public health campaigns, particularly for groups who are difficult to reach through conventional means. Wireless health is a direct pathway to cost-effective, universal health care.

More affordable health care

According to the Center for Connected Health, a simple set of wireless technologies and coaching can keep congestive heart failure patients out of the hospital and emergency room, saving tens of thousands of dollars per avoided admission. Annual savings with remote patient monitoring for congestive heart failure alone exceed $10 billion per year[ii]. Multiplied across the spectrum of conditions that can be prevented, diagnosed, monitored and treated via wireless technologies, cost savings will exceed hundreds of billions of dollars annually.

Preventive health care

Sensors and other mobile devices can accurately monitor a variety of physiological functions, including respiration, body temperature, heart rate, and blood glucose levels. These sensors detect 'shifts' in health as they occur. A patient with high blood pressure, for example, can be monitored with a wireless device that captures physiological changes and sends an alert to the patient's doctor, with the unprecedented potential of preventing complications such as stroke, heart attack, or kidney disease. Additionally, personalized applications from pill reminders to environmental sensors will help people maintain their own health and wellbeing.

Chronic disease management

At least 125 million Americans are currently living with at least one chronic health condition, and expenditures on chronic disease account for $1.4 trillion of the cost of the U.S. health care system. Because of their pervasiveness and low cost, cell phones and other wireless technologies are well-suited for care coordination, as well as managing and treating chronic diseases. These technologies make it possible for health care providers to monitor patients' health and to track and guide self-care beyond the clinical setting, resulting in improved outcomes and dramatically reduced health care costs (Figure 1).

Realizing the enormous potential of wireless health will require significant investment in new technologies, and proponents will have to document that wireless health applications produce better health outcomes, cost-effectively. Most wireless health applications are relatively new or have undergone only small-scale testing[iii].

In response, the West Wireless Health Institute was launched in 2009 with $45 million in seed funding by the Gary and Mary West Foundation, along with Scripps Health (founding health care affiliate) and Qualcomm (founding sponsor). The Institute is a non-profit medical research organization, the first of its kind with a focus on the convergence of wireless technology and health care. The Institute is based in San Diego, California, which is home to 650 wireless companies and 150 wireless medicine companies, by far the largest concentration of such expertise in the world.

The West Wireless Health Institute's mission is to advance health and wellbeing around the world by identifying, validating and accelerating the use of innovative and cost-effective wireless solutions to critical, unmet medical and community needs. The Institute's four focus areas — Preempting Disease, Disease Management, Aging in Place and Underserved Communities — complement President Obama's plans to lower health care costs and ensure affordable, accessible coverage for all.

The Institute and its research team will conduct clinical research to validate wireless health solutions to better prevent, diagnose, manage and treat major health conditions — ranging from obesity to Alzheimer's to heart disease (Figure 2). For example, one wireless health solution to prevent and mitigate obesity is a smart "band-aid" that is worn on the abdomen. The wearer receives real time data on calorie intake via a smart phone, and the data can also be transmitted to a physician or caregiver if desired. Such solutions have considerable promise in preventing debilitating and costly diseases.

The Institute is building a base of biomedical and bioengineering expertise to ensure devices in development improve the existing level of care, and are safe, reliable, and cost effective. In addition to being a center for clinical research and validation, the Institute will be a global resource for education, developing a 21st century wireless health workforce that is cross-trained in engineering and medicine. Projected to be a multi-billion dollar industry in just a few years, wireless health will create tens of thousands of high paying American-based jobs. The Institute will also work across the public and private sectors to address challenges to the widespread adoption of wireless health solutions, such as provider reimbursement; unproven clinical benefits; concerns about maintaining privacy and security; and a lack of industry standards (Figure 3).

We believe we can help create a connected healthcare system, with solutions that are predictive, preventive and personalized. The Institute will advance the emerging field of wireless health to help it reach its full potential, including engaging in efforts to inform health care reform legislation later this year in Congress. Wireless health is a vanguard solution to improving the overall quality of our healthcare and quality of life.

The West Wireless Health Institute has an aggressive timeline to place solutions into the hands of healthcare organizations, physicians, patients and caregivers. By end of 2009, the Institute will:

- Fill key positions including CEO, Medical Director and VP of Engineering Technology
- Hire its clinical validation team
- Initiate two clinical validation trials
- Complete work on its facility and labs
- Aggregate medical, scientific, and engineering information related to wireless health into its public website
- Identify unmet medical needs with significant potential for impact via wireless health innovations
- Validate wireless health solutions for those unmet medical needs
- Inform health care reform discussions and legislation
- Continue to build local, national and global affiliations with companies, healthcare organizations, advocacy and caregiver groups, universities, entrepreneurs, government agencies, and other public and private sector entities.

By 2010, the Institute will be fully staffed and operational, with a fellowship training program in full swing. The Institute's website will be developed into a global resource for education on wireless health, with a clearinghouse for engineers and physicians. Multiple clinical research trials will be underway, and by the end of 2010, the first trials will be completed.

Goals for 2011 include securing NIH and other grant funding to further expand clinical validation trials, and demonstrating the efficacy and impact of individualized wireless health solutions by making devices available in the market.

[i] Richard Adler. *Healthcare Unplugged: The Evolving Role of Wireless Technology*, California Healthcare Foundation, November 2007.
[ii] Ribert Litan. *Vital Signs via Broadband*, October 2008.
[iii] *Healthcare Unplugged: The Evolving Role of Wireless Technology.*

Figure 1

Savings With Remote Monitoring Per Year

Disease	Emergency Care	Hospitalization	Nursing Home	Total Savings
Congestive Heart Failure	$50 M	$7.4 B	$2.7 B	$10.1 Billion
Diabetes	$100 M	$3.5 B	$2.5 B	$6.1 Billion
Chronic Obstructive Pulmonary Disease	$200 M	$2.9 B	$1.8 B	$4.9 Billion

Robert Litan, *Vital Signs via Broadband*, October 2008.

Figure 2

Ten Targets for Wireless Medicine

Disease	No. Affected	Wireless Solutions
Alzheimer's	5 M	Vital signs, location, activity, balance
Asthma	20 M	RR, FEV1, Air quality, oximetry, pollen count
Breast cancer	3 M	Ultrasound self-exam → Web
COPD	10 M	RR, FEV1, Air quality, oximetry
Depression	19 M	Med Compliance, Activity, Communication
Diabetes	21 M	Glucose, Hemoglobin A1C
Heart Failure	5 M	Cardiac pressures, weight, BP, fluid status
Hypertension	74 M	Continuous BP, Med compliance
Obesity	80 M	Smart scales, Caloric in/out, Activity
Sleep Disorders	15 M	Sleep phases, quality, apnea, vital signs

Data: U.S.

Figure 3

Accelerating the Era of Wireless Medicine