

VentureBeat

INTERPRETING INNOVATION

Can your smartphone save your life?

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Every meal you eat is analysed by a nutritionist. Your workouts are monitored and progress tracked. When driving, an app checks you for alertness and let's you know if you need to stop and take a rest.

Since you are diabetic, you use a mobile glucose monitor to regularly send readings to your doctor via your mobile phone. The house of your elderly Dad is instrumented with motion, pressure, fall and temperature sensors and you get an alert if he hasn't gotten out of bed or taken his medication. Welcome to the brave new world of healthcare.

The mobile health revolution

Healthcare in the past effectively meant "sickcare" and revolved around physicians and hospitals. But mobile and sensor technologies have the potential to make healthcare a truly personalised and 24 hour affair. Think Scrubs meets the quantified self.

Business as usual isn't really an option for the healthcare system. 17 percent of U.S. GDP is spent on healthcare and McKinsey reports that healthcare spend in the U.S. is growing 2 percent faster than GDP per year, clearly an unsustainable situation. An aging population and soaring levels of chronic diseases all add up to a ticking healthcare time bomb. Technology can help.

Wellness

The first wave of mHealth (mobile health) apps are in areas like fitness, nutrition and general wellbeing which fall under the umbrella of "wellness". Since the majority of contributing factors to diseases like heart disease, diabetes and cancer are lifestyle-related and therefore modifiable, these apps can be important preventative tools.

Endomondo is a mobile app which uses GPS to track distances covered in sports like running and cycling and allows users to share the results. The company did a 12-week pilot with 120 white-collar workers in Copenhagen who all started using the app. The most active segment increased their activity by 13 percent but more surprisingly the most inactive segment increased their activity by 148 percent, going from an average of 1.8 to 4.5 hours of sport per week.

Even the fittest among us can benefit from mobile health technology. Hidalgo makes wearable sensors which track an array of vital signs like heart rate and send the data back to a central server. CEO Anmoi Sood told me that a typical application is monitoring firefighters who are supposed to cycle in and out of a fire area in order to avoid too much heat stress. However, men being men, they often overestimate their own endurance, faint and need to be rescued by their own colleagues. Using the sensors means that individual firefighters get automated alerts when it's time for them to take a break. The US Marine Corps has also used the system on soldiers on operational duties in Iraq.

Wellness doesn't just mean fitness and nutrition. Anti sleep pilot is an iPhone app to help prevent fatigue-related driving accidents. The app calculates a your fatigue level in real-time, maintains your alertness via reaction tests and notifies you when it is time to take a rest break. Since Swedish research shows that 40 percent of accidents involving a single car are due to fatigue, such apps can prevent many deaths and injuries.

Chronic diseases

75-85 percent of healthcare spending goes to chronic diseases like diabetes and heart disease. The Continua health alliance reports that remote monitoring can reduce mortality by 35-56 percent and hospitalization by up to 47 percent.

With diseases like diabetes patients are often asked to keep a diabetes log book or enter data manually. Most don't stick to it. WellDoc, which was founded by an endocrinologist, has developed a product to measure, monitor and manage chronic diseases.

The mobile-phone based system provides alerts, e.g. check your blood sugar using a glucose monitor or take medication as well as coaching in the management of the chronic disease. An expert system observes a range of patient data over time and uses this to provide recommendations to the patient and care-givers, e.g. eat 4 ounces of carbohydrates to boost blood sugar. Finally, there are decision-support tools for health care workers to help them optimize their patients' therapies. There is continuous communication between the patient and care providers using data logged via the patient's mobile phone.



WellDoc has published clinical trials on the effectiveness of its platform which show statistically significant improvements in the health of patients using the system. The company claims that it can save up to \$2,000 per patient per year by increasing adherence to treatment and effecting changes in patient behavior.

The devices available for monitoring health indicators, from glucose meters and blood pressure monitors to mobile ultrasound, are getting smaller and more sophisticated all the time. One company has even developed a smartphone with a built-in electrocardiogram (ECG) for those who suffer from heart disease. A 24 hour health concierge service ensures that every ECG is analysed and responded to within 10 minutes.

The elderly

In our youth-obsessed world, nobody likes to think about getting old and frail. But it happens to us all (if we are lucky) and we would all like to stay active and independent for as long as possible. Independa combines sensors, tablets and mobile technology to allow family caregivers to monitor the well-being of their elderly relatives when they can't be physically present and gives the elderly easy access to services they need.

At the core of the system is a customized Android tablet called Angela. Angela gives one-touch access to email, Facebook, video chat and other services, and does not require any particular computer skills. Angela also acts as a hub for data gathered by a variety of health, environment and activity sensors in the home.

Health sensors include weighing scales, pulse oximeters (which measure oxygen levels and heartbeat) and blood pressure monitors. Environment and activity monitors track things like air temperature, whether the person has gotten out of bed or the front door has been left open. You can ask for an alert, for

example, when your relative has been in the house all day but the refrigerator hasn't been opened. The data gathered by the sensors is saved to the cloud via a 3G wireless connection and integrated with Google Health's online health records.

Obstacles

The technology required for the Mhealth revolution are mostly in place but there are other obstacles. Awareness of Mhealth apps is low among patients and medical professionals. Research from Accenture showed that among members of Generation X who had a chronic condition, only 9 percent were aware of Mhealth applications and a mere 3 percent owned one.

Mhealth is also a business in search of a business model. Consumers are often prepared to pay for wellness applications directly but the big money is in convincing the insurance companies and employers that Mhealth can reduce medical costs. AT&T is using WellDoc's system internally to reduce employee health insurance costs as well as marketing the system to insurers.

"There is a lot of noise in the marketplace right now" says WellDoc founder Ryan Sysko. He explained that clinical studies are needed to establish the kind of evidence of effectiveness that physicians, pharma companies and insurance companies are used to seeing. Regulation, such as FDA approval for Mhealth devices and applications, is also important. Nevertheless, he expects to see to see a big pharmaceutical or medical device company make a major marketing investment in the area and drive demand via physicians and consumers.

We already use our smartphones for communication and entertainment. Now they can make us healthier too.