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Can smart, wearable medical technology revolutionize chronic care?

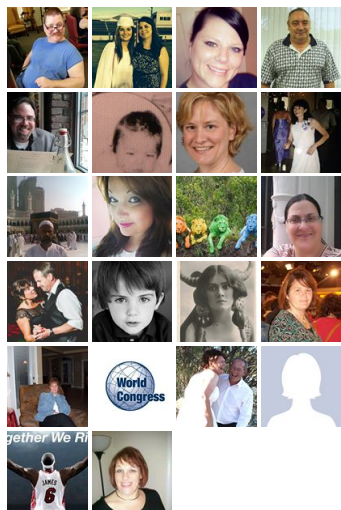
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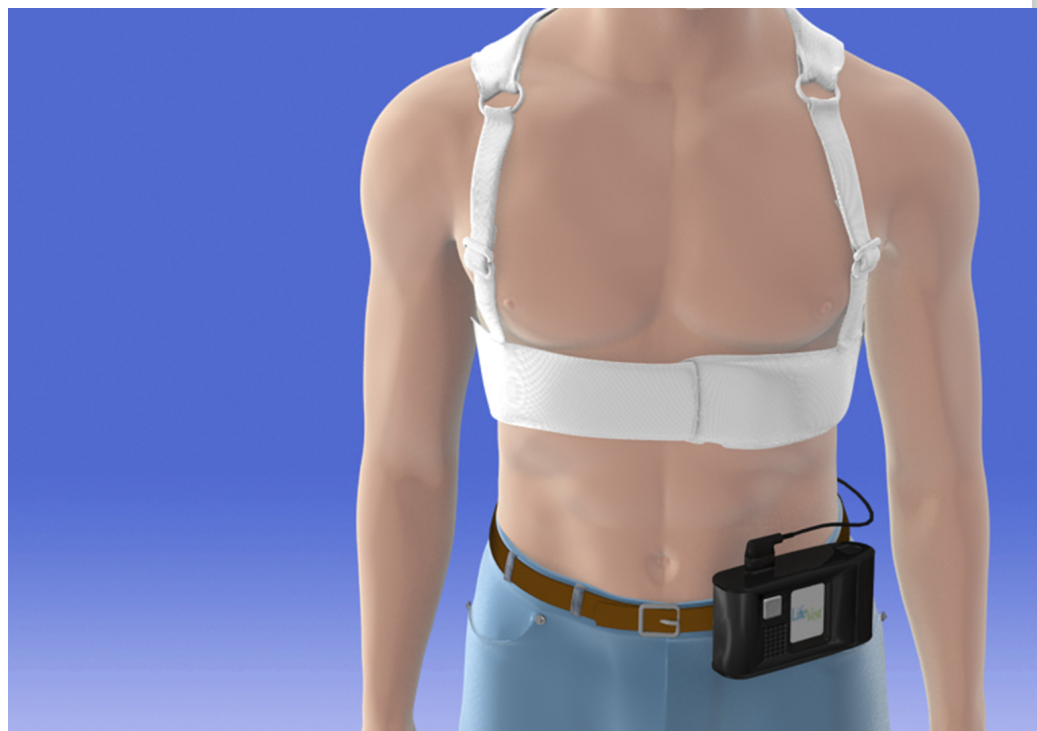
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By Jovanka JoAnn Milivojevic

Freedom to move, to travel, to just enjoy a day without constantly worrying about meds and monitoring biometrics — that would revolutionize life for people with chronic diseases. The good news is there are products already on the market and many more in development poised to do just that.

Available Now

Getting and staying fit can be especially challenging for people with chronic diseases. Meet [Metria IH1](#).

a small disposable adhesive patch that tracks your activities and biometrics and can be worn for up to seven days. Sensors collect more than 5,000 readings every minute. Data such as calories burned, breathing rates, and quality of sleep can be downloaded via USB cable to a MAC or PC. The details revealed can help you and your healthcare providers make adjustments to improve your health.

Perhaps you've done everything right to lose weight: reduced calories, got more exercise and still those pounds don't budge. The Metria patch reveals you've had trouble sleeping. Poor sleep can inhibit weight loss. Now you and your healthcare advisor can take steps that promote a better night sleep such as regular bed times, avoiding caffeine, and sleeping in a cool, dark room.

Gait and balance issues accompany a number of chronic diseases such as Parkinson's and multiple sclerosis. An intelligent insole created by [Motico](#) can provide data that physical therapists can use. It's completely wireless, has no switches and it can be placed in virtually any shoe. The insole's sensors analyze foot pressure distribution, strain on the leg, and the acceleration of the foot. It gets activated automatically as soon as you start moving. Data is sent wirelessly to mobile devices.

Remote monitoring devices significantly improve lifestyles for patients with heart rhythm problems. They reduce the need for in-office visits, thereby holding down medical costs. One such product is the [BodyGuardian](#). Developed in collaboration with the Mayo Clinic, it allows physicians to monitor key biometrics outside the clinical setting while patients go about their daily lives. A small body sensor attached to the patient's chest collects such data as ECG, heart rate, respiration rate and activity level. Patient data can be transmitted to physicians via mobile phone technology. This kind of technology helps identify and potentially prevent problems and also allows for patients to be dismissed from the hospital earlier because monitoring can continue anywhere and everywhere the patients goes.

Patients at risk for sudden cardiac arrest need more than just monitoring, and that's where the [Zoll LifeVest](#) is especially useful. It's an external wearable defibrillator that continuously monitors heart rate and delivers a shock to restore normal heart rhythm when a life threatening aberration is detected. The vest is lightweight and easy to wear under clothes. It has a variety of applications, such as after a heart attack and before or after bypass surgery or stent placement. It's also suitable for patients with cardiomyopathy or congestive heart failure.

A Promising Future

People with diabetes would be thrilled to never prick their fingers again and many scientists have been working to make that a reality. Among them are the innovators at Google's X lab who are developing [smart contact lenses](#). Embedded between two thin layers of soft lens material are tiny sensors the size of flecks of glitter that measure glucose levels in tears. Hair-thin antennas, also in the lenses, transmit data to wireless devices. To provide early warnings of changes in glucose levels, researchers are looking into adding LED lights that would illuminate and alert wearers.

[AiQ](#) creates smart clothing with flexible sensors woven into the fabric. The BioMan t-shirt has sleeves that monitor heart rate, respiration and skin temperature. It's expected to be available sometime this summer and priced at about \$100 per shirt. It can also be customized for the healthcare setting; for example, to measure electrophysiological signals such as EKG, electroencephalography (EEG), or electromyography (EMG).

Smart phones are entering more deeply into health and medical wearables. Hot off the presses is the just announced new iPhone operating system with [an integrated health app](#) that features a new dashboard tool that developers can use to integrate and aggregate data from existing and new health apps. Blood pressure, fitness and nutrition reporting can all be part of the mix, especially with the soon-to-be released iWatch (due out in October). Samsung has a similar data-sharing platform with a prototype wristband called [Simband](#) which would track biometrics like heart rate and skin conductance

that reveals stress. The key differences between the two are that the Simband is an open platform, unlike Apple; and the Simband is not yet available for sale.

According to ABI, a market research and market intelligence firm, 90 million wearable devices will be shipped in 2014, up from 50 million in 2013. There's a wide array of products in the pipeline from the big players and nimble startups. That's good news because you can bet that more ingenious healthcare devices for chronic disease management are sure to come soon.

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