Medical Xpress

GaitTrack app makes cellphone a medical monitor for heart, lung patients

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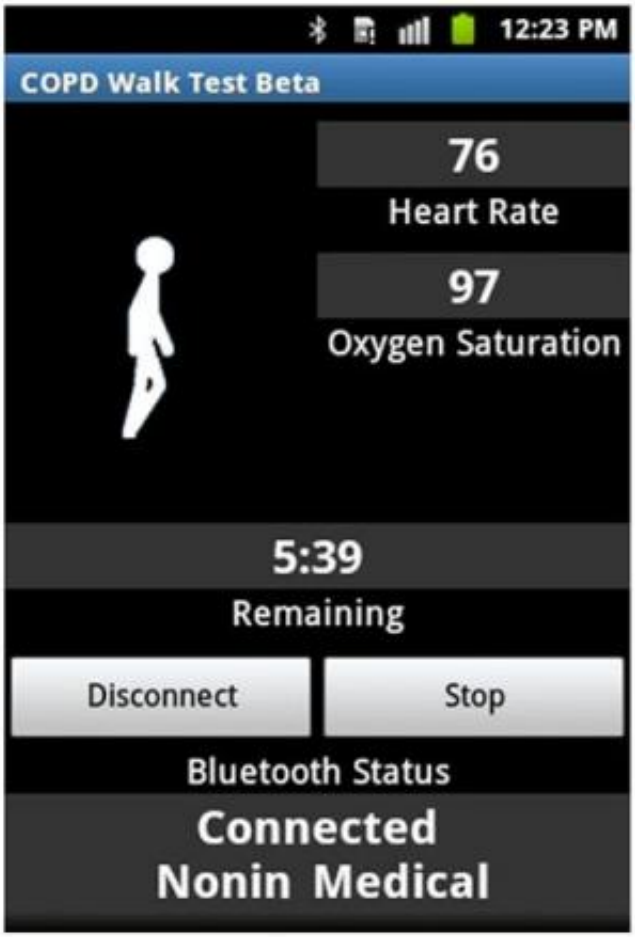

A screenshot of the GaitTrack app, which monitors how heart and lung patients walk, a key metric for physicians. Credit: Bruce Schatz

(Medical Xpress)—By simply carrying around their cellphones, patients

who suffer from chronic disease could soon have an accurate health monitor that warns their doctors when their symptoms worsen.

GaitTrack, an app developed by researchers at the University of Illinois at Urbana-Champaign and the U. of I. at Chicago, turns a smartphone into a sophisticated medical device. Unlike other apps that merely count steps, GaitTrack uses eight motion parameters to perform a detailed analysis of a person's gait, or walking pattern, which can tell physicians much about a patient's cardiopulmonary, muscular and neurological health.

Led by Bruce Schatz, the head of medical information science and a professor of computer science at the U. of I., the team published its findings in the journal Telemedicine and e-Health.

"Fitness apps and devices are tuned for healthy people," said Schatz, who also is affiliated with the Institute for Genomic Biology at the U. of I. "They cannot accurately measure patients with chronic disease, who are the biggest medical market. A pedometer is not a medical device. But a cheap phone with GaitTrack software is."

According to Schatz, gait is sometimes called the "sixth vital sign" – after temperature, blood pressure, heart rate, respiratory rate and blood oxygen level. Gait speed involves several systems of the body working together in coordination, so changes in gait can be a sign of trouble in one or more systems.

Doctors often use an assessment called the six-minute walk test for patients with heart and lung disease, such as congestive heart failure, chronic obstructive pulmonary disease (COPD) and asthma. Patients with chronic disease often cannot be measured with typical pedometers since they tend to walk with shorter, more careful strides, or to shuffle, so specialized medical accelerometers are used.

The Illinois team used GaitTrack to administer six-minute walk tests to 30 patients with chronic lung disease and found that it monitored more accurately – and more cheaply – than the medical accelerometers. In addition, they discovered that analysis of the gait data could predict lung function with 90 percent accuracy, within an age group.

"The original plan was just to validate the software against the standard medical walk test," Schatz said, "but we looked at other data and found that it matched well with a pulmonary function test called FEV1. Predicting FEV1 is useful because that's the standard number used to determine treatment. That's worth a lot to a health system."

Schatz envisions the GaitTrack app running constantly in the background as a patient carries a phone. The phone would periodically collect data, analyze it and keep tabs on the patient's status, alerting the patient or patient's doctor when it detects changes in gait that would indicate a decline in health so that treatment could be adjusted responsively.

The researchers now are testing GaitTrack in larger trials within health systems. Schatz hopes to have the app available for download within months.

"Population health measurement is the key to making health care viable. If you could just measure what people were doing all the time, then you could get enough information to make rational decisions," Schatz said.

More information: "Health Monitors for Chronic Disease by Gait Analysis with Mobile Phones." JuenJoshua, ChengQian, Prieto-CenturionValentin, KrishnanJerry A., and SchatzBruce. *Telemedicine and e-Health*. DOI: 10.1089/tmj.2014.0025. online.liebertpub.com/doi/full … 0.1089/tmj.2014.0025