'Ultrawideband' could be future of medical monitoring

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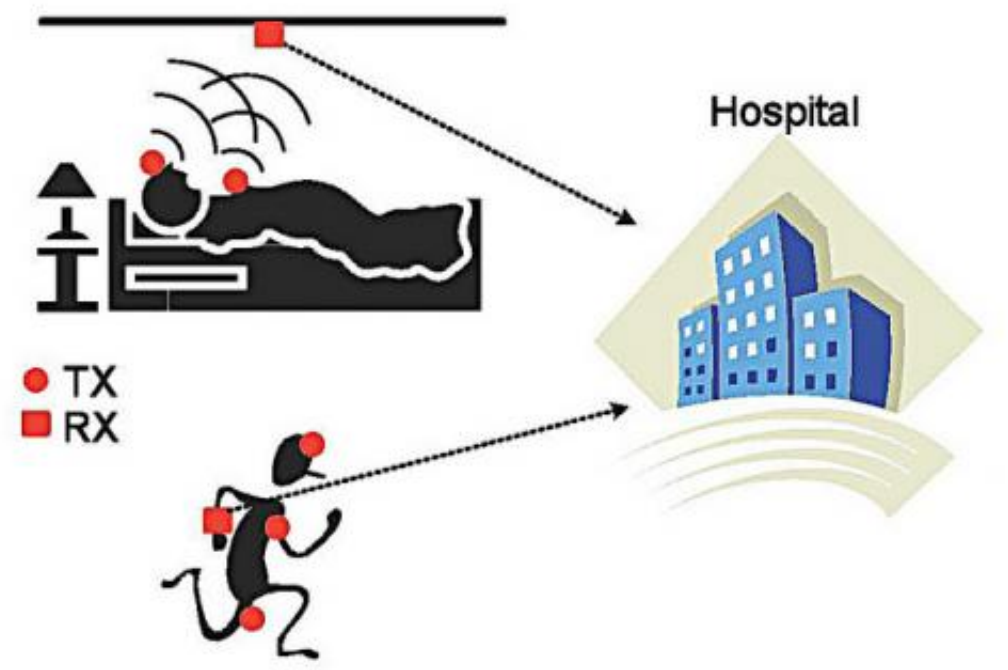

Body-area networks under development at Oregon State University may hold the future of medical monitoring. Data might first be transmitted at a low data rate to a local storage sensor, then received by a doctor at a high data rate. Such approaches may improve medical care, cut costs and help prevent or treat disease. (Graphic courtesy of Oregon State University)

New research by electrical engineers at Oregon State University has

confirmed that an electronic technology called "ultrawideband" could hold part of the solution to an ambitious goal in the future of medicine – health monitoring with sophisticated "body-area networks."

Such networks would offer continuous, real-time health diagnosis, experts say, to reduce the onset of degenerative diseases, save lives and cut health care costs.

Some remote health monitoring is already available, but the perfection of such systems is still elusive.

The ideal device would be very small, worn on the body and perhaps draw its energy from something as minor as body heat. But it would be able to transmit vast amounts of health information in real time, greatly improve medical care, reduce costs and help to prevent or treat disease.

Sounds great in theory, but it's not easy. If it were, the X Prize Foundation wouldn't be trying to develop a Tricorder X Prize – inspired by the remarkable instrument of Star Trek fame – that would give $10 million to whoever can create a mobile wireless sensor that would give billions of people around the world better access to low-cost, reliable medical monitoring and diagnostics.

The new findings at OSU are a step towards that goal.

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"This type of sensing would scale a monitor down to something about the size of a bandage that you could wear around with you," said Patrick Chiang, an expert in wireless medical electronics and assistant professor in the OSU School of Electrical Engineering and Computer Science.

"The sensor might provide and transmit data on some important things, like heart health, bone density, blood pressure or insulin status," Chiang

said. "Ideally, you could not only monitor health issues but also help prevent problems before they happen. Maybe detect arrhythmias, for instance, and anticipate heart attacks. And it needs to be non-invasive, cheap and able to provide huge amounts of data."

Several startup companies such as Corventis and iRhythm have already entered the cardiac monitoring market.

According to the new analysis by OSU researchers, which was published in the *EURASIP Journal on Wireless Communications and Networking,* one of the key obstacles is the need to transmit large amounts of data while consuming very little energy.

They determined that a type of technology called "ultrawideband" might have that capability if the receiver getting the data were within a "line of sight," and not interrupted by passing through a human body. But even non-line of sight transmission might be possible using ultrawideband if lower transmission rates were required, they found. Collaborating on the research was Huaping Liu, an associate professor in School of Electrical Engineering and Computer Science.

"The challenges are quite complex, but the potential benefit is huge, and of increasing importance with an aging population," Chiang said. "This is definitely possible. I could see some of the first systems being commercialized within five years."

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