

The Potential of Human Body Communication in mHealth



Use of wearable devices such as smart watches, wristbands, remote sensors, medical devices and the like makes it easier for individuals to track their health and fitness. Moreover, [wearables can transmit data](#) that provider organisations can use in monitoring patient conditions and adherence to medication. Since this kind of connectivity and data transmission is largely dependent on wireless signals, sensitive health data is vulnerable to security risks.

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What about using the human body itself to transfer and collect information? This area of research is known as **human body communication (HBC)**. This method, as its name suggests, uses the human body to transmit power and data, very much like the Internet. Notably, HBC is a smaller and closed network, offering the benefit of being more secure and power efficient, according to a [recent study published by a team of Japanese researchers](#). Dr. Dairoku Muramatsu of the Tokyo University of Science has been conducting research on this topic with Mr. Yoshifumi Nishida of the University of Tokyo. HealthManagement.org spoke with Dr. Murumatsu on the potential of HBC in the healthcare landscape.

You say that HBC could best suit transmitting “relatively low-capacity data, such as authentication information and biomedical signals, for long periods with low power consumption.” With this in mind, how do you think HBC could combine with the more immediate, real-time applications of mHealth to improve patient outcomes and make care more efficient?

We should combine HBC with the applications that focus on vital signals that are important for specific diseases, such as blood sugar levels, as well as regular measurement of ECG, pulse, and blood pressure.

The idea of embedding sensors/ technology into the human body for healthcare monitoring could make some people nervous, as it could require a new structure of ethics. How does your work align with policy? Is policy limiting your work and does it need to change?

Since our present research is limited to wearable devices, estimation and minimisation of electromagnetic exposure to the human body are the [most important ethical issues](#). However, I think that new ethical structures are needed, especially for implantable devices. We should discuss not only technical issues but also ethical issues in the academic field and standardisation meetings.

Is the HBC team collaborating with any other partners in the healthcare world to further their work and who is most interested to date?

At present, we have not conducted large-scale collaborative research with specific companies on healthcare applications. However, our team independently study and develop healthcare technology such as non-invasive vital signal measurement and integrate them with HBC. As well as **engineers and researchers, hospital staff are interested** in the wireless body area networks including HBC to solve specific problems in their wards.

What timeframe do you see for your work developing and being implemented?

Current research has been confined to the very basic area of the physical layer of HBC, such as antenna propagation and front-end design. In the next few years, in addition to study the coding and modulation method, we plan to optimise the entire system.

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