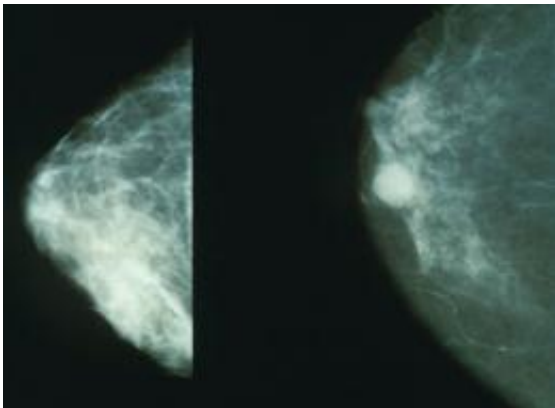


# New wireless device can aid recovery of breast cancer patients

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Mammograms showing a normal breast (left) and a cancerous breast (right).  
Credit: Wikipedia.

Patient studies of a new sensing device have proved it can provide early warning of the potential failure of breast reconstruction surgery, making it easier to take effective remedial action.

Funded by the Engineering and Physical Sciences Research Council (EPSRC) and led by Imperial College London, an international team has developed the wireless 'bio-patch' as part of the Smart Sensing for Surgery project.

Incorporating electronics measuring just 1.8 x 1.1cm, the bio-patch was attached to a group of patients for 48 hours following breast

reconstruction [surgery](#). It successfully performed continuous monitoring of the level of oxygen saturation in transferred tissue – a key indicator of whether there is a risk of reconstruction failure.

Professor Guang-Zhong Yang, Director of the Hamlyn Centre at Imperial College London, has led the Smart Sensing for Surgery project. He says: "Poor blood supply or failure of breast reconstruction surgery can have a major impact on a breast cancer patient's recovery, prognosis and mental wellbeing. Clinical signs of failure often occur late and patients may be returned to the operating room on clinical suspicion. Our new bio-patch tackles this problem by providing objective data as an [early warning](#) system for medical staff, enabling earlier and simpler interventions, as well as giving patients increased peace of mind."

Breast reconstruction surgery following a mastectomy routinely includes transfer of the patient's own tissue to help rebuild the [breast](#). This procedure achieves high success rates but early detection of possible problems could help further reduce post-surgical complications and cut surgery failure rates.

Science Minister Sam Gyimah said: "This technology has the potential to be truly life-saving. It is scientific inventions like this, pioneered by our world-leading experts and institutions, that will help us meet the grand challenges of tomorrow.

"We want to keep the UK at the front of the pack when it comes to innovative science. That's why we have committed to the biggest ever increase in research and development spending by 2027."

Professor Lynn Gladden, EPSRC's Executive Chair, says: "This Smart Sensing for Surgery project is an excellent example of how science and engineering can have direct impacts on people's lives. Spotting post-surgery problems early can help clinicians treat patients quickly and

improve outcomes. It is particularly heartening to hear about the application of this technology during Breast Cancer Awareness month."

Harnessing a technique known as near-infrared spectroscopy (NIRS), the new device safely captures and transmits data using sensors hermetically sealed inside fully biocompatible materials. The data is encrypted to ensure security and privacy.

Early trials have opened up the prospect of the bio-patch becoming available for widespread clinical use within two to three years. The project team is currently exploring the scope to secure commercial or National Institute for Health Research (NIHR) support for the next stage of development and commercialisation.

The device is now being adapted to help monitor conditions such as dementia and chronic obstructive pulmonary disease (COPD).

Smart Sensing for Surgery has achieved other promising advances, including development of sensors that can be implanted just under the skin to provide continuous measurement of pulse rate, temperature and pH balance, for example, and development of 'smart' catheters or drains enabling problems (e.g. relating to infection) to be spotted early on.

Professor Yang says: "The Smart Sensing for Surgery project demonstrates how engineers and clinicians can come together to develop 'smart' solutions that have huge potential not just to enhance patient health and wellbeing but also to help reduce the burden on healthcare resources."

Provided by Engineering and Physical Sciences Research Council

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