

World's first oncology lab-in-a-briefcase

November 2 2015



Dr Nuno Reis demonstrates how the disposable microfluidic test strip works.

Academics at Loughborough University hope to boost early detection rates of cancer in developing countries with their portable lab-in-a-briefcase that can operate even at high temperatures.

Believed to be the first kit of its kind dedicated to the portable measurement of cancer biomarkers, the concept is the brainchild of Dr Nuno Reis, a Lecturer in Chemical Engineering. The full study has been published in the *Lab on a Chip* journal.

The number of people dying from cancer in developing [countries](#) is on the increase, partly due to steadily ageing populations, but also due to limited access to proper diagnostic tools. Cancer is a leading cause of death worldwide, accounting for over 8 million deaths per year, and 70%

of the world's cancer deaths occur in Africa, Asia and Central and South America. The number of new cancer cases is expected to rise by 70% over the next two decades.

With the help of his Research Associate Ana Isabel Barbosa, Dr Reis has developed a solution for diagnostic testing in remote areas of developing countries that lack adequate technology to support a full laboratory.

The lab-in-a-briefcase comprises of four components; a manually driven multi-syringe device capable of performing up to 80 simultaneous tests from whole blood samples at any one time; microwell plates pre-loaded with assay reagents; a portable USB-powered film scanner to image the test strips; and a portable computer for real-time data analysis.

The entire system can be carried in a small briefcase, handbag or laptop case, and requires just one operator with minimal training to conduct the test within 15 minutes – with no need for additional equipment or instruments.

One of the remarkable features of the lab-in-a-briefcase is that it uses whole blood without the need for any sample preparation – a previously challenging task outside of a laboratory setting.

A new affordable and disposable microfluidic test strip – comprising of tiny tubes about the size of a human hair – is used specifically for the quick measurement of different types of [cancer biomarkers](#) in a whole blood sample. This technology, which operates in a similar way to a pregnancy test, has already been used successfully by Dr Reis in a separate study that detected prostate cancer with the help of a smartphone camera.

Dr Reis said: "Our lab-in-a-briefcase is both inexpensive and simple to use; it means that high precision diagnostic kits, complete with clinical

laboratory equipment, can be made accessible to remote populations, and this is what makes it a truly life-changing concept for the screening and monitoring of different types of cancer.

"This portable lab can really make a difference, boosting levels of [cancer](#) detection in [developing countries](#) where ordinarily people would not have such easy access to early diagnostics. I envisage that our lab-in-a-briefcase could also be developed further in the future to allow for rapid testing of infectious diseases and allergens."

More information: Ana I. Barbosa et al. Portable smartphone quantitation of prostate specific antigen (PSA) in a fluoropolymer microfluidic device, *Biosensors and Bioelectronics* (2015). [DOI: 10.1016/j.bios.2015.03.006](#)

Ana I. Barbosa et al. A lab-in-a-briefcase for rapid prostate specific antigen (PSA) screening from whole blood, *Lab on a Chip* (2014). [DOI: 10.1039/C4LC00464G](#)

Provided by Loughborough University

Citation: World's first oncology lab-in-a-briefcase (2015, November 2) retrieved 6 May 2024 from <https://phys.org/news/2015-11-world-oncology-lab-in-a-briefcase.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.