

Saving lives one breath at a time

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The National Physical Laboratory (NPL) has completed a project to help a UK company diagnose medical conditions through monitoring patients' breath.

Bedfont Scientific Ltd is one of the market leaders in developing personal diagnostic gas sensors for the medical market. Its sensors can continuously monitor levels of certain gases in human breath, and could potentially be used in place of certain invasive blood tests.

In order to extend their position in this market, and confirm their reputation for quality and accuracy, Bedfont required its instruments to be independently evaluated.

To achieve this, Managing Director Trevor Smith, was seconded to NPL under a scheme called Measurement for Innovators. This gave Bedfont direct access to NPL's scientific expertise and state-of-the-art facilities.

NPL helped Bedfont determine key performance parameters for two types of electrochemical breath sensors, one for measuring carbon monoxide and the other for measuring hydrogen. Bedfont tested their instruments against the concentrations of these gases that are relevant to the medical market.

The presence of certain levels of these gases in human breath is medically extremely important. One sensor, for example, shows whether a patient has been smoking, allowing [healthcare workers](#) to demonstrate potentially harmful carbon monoxide levels to smokers. Another detects

if a patient is suffering from gut disorder, indicated by increased levels of hydrogen in a patient's breath.

NPL confirmed that the sensors measured these gases within their technical specification, had linear response characteristics, and had negligible interferences from certain breath gases, which may cause false positives.

The results of the tests carried out at NPL provided Bedfont with the necessary independent verification of its sensors giving it a potential edge over international competitors, and the opportunity to expand within the UK's National Health Service and into other global markets.

Nick Martin, Senior Research Scientist at NPL, said: "Measurement is critical to many areas of the medical industry and can assist in an improved understanding of some diseases. Personalised breath sensors can provide additional diagnostic information for making medical decisions. As the trend for their use widens it will be necessary to establish performance standards and to independently verify equipment using traceable gas mixtures. Companies that meet the standards will find it easier to penetrate the target markets of the future."

Following the secondment, Trevor Smith of Bedfont commented: "It was very important for us to be able to show that our instruments are fit for purpose, and scientifically sound. NPL helped us demonstrate this by revealing the close agreement between analytical techniques of gas analysis, traceable calibration standards and our breath monitoring equipment."

Provided by National Physical Laboratory

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