

Lifebox Foundation



Saving lives through safer surgery

The problem

A routine day at a regional referral hospital. A 45-year-old woman is undergoing an elective partial thyroidectomy. She is monitored with the only equipment available: a stethoscope and manual blood pressure machine.

Part way through the operation, the anaesthetist notices the pulse feels weak and rapid. The surgeon says that the blood is dark. The vital signs continue to deteriorate and despite CPR, the patient cannot not be revived. "If I had a pulse oximeter," wrote the anaesthetist later, "I may have noticed something going wrong earlier and my patient may have been saved."

Thanks to a generous donation from the Association of Anaesthetists of Great Britain and Ireland, this hospital now has a pulse oximeter. So too do 79 other hospitals across Uganda, the first country selected for a nationwide 'oximetry' programme by the Lifebox Foundation.

Lifebox is a new charity formed through a collaboration between the AAGBI, the World Federation of Societies of Anaesthesiologists (WFSA), the Harvard School of Public Health and Brigham and Women's Hospital. The principle aims of Lifebox are to improve the safety of surgery in low-income countries through improving access to high-quality low-cost pulse oximeters and the adoption of the WHO Surgical

Safety Checklist. The WFSA 2010 International Standards of Anaesthesia effectively made monitoring with a pulse oximeter mandatory, and it is an essential component of the WHO Surgical Safety Checklist. Each oximeter Lifebox distributes will save many lives, and safeguard hundreds more.

The Pulse Oximetry Gap

In UK hospitals we take anaesthesia monitoring for granted. The introduction of safety standards and equipment began in the 1980s and is now universal in high resource countries in Europe and North America. This has contributed to a dramatic reduction in anaesthesia-related mortality; from 1 in 2700 in the 1950s, it has fallen to 1 in 200 000 today.

In low-resource countries, the reverse is the case: a chronic lack of appropriate training and monitoring equipment, alongside a global surge in the number of operations performed each year, means that the anaesthesia mortality rate can be up to 1000 times higher than in high-income countries.

Today there are an estimated 77,000 operating rooms worldwide without access to a pulse oximeter. Of the 270 million operations performed each year, an estimated 31 million are taking place in the absence of any monitoring save a finger on the pulse and a precordial stethoscope.

Closing the oximetry gap is a matter of urgency. Surgery is not a 'rich country' phenomenon - an estimated 85% of children in low-income countries are likely to require treatment for a surgical condition by the age of 15, and access to safe and effective surgery is essential to safeguarding the health of populations worldwide.¹

The History

The ideal of universal pulse oximetry was first envisaged in 2004 when the WFSA, AAGBI and GE healthcare launched a Global Oximetry initiative to promote oximetry use and reduce its costs. A 15-month study at sites in Uganda, Vietnam, India and the Philippines demonstrated both need and receptiveness to oximetry, while concluding that any technological intervention must be introduced with an education package. In 2008, the WHO included a pulse oximeter as an essential item on the WHO Surgical Safety Checklist.

The Lifebox Foundation is the progression of these efforts. And slowly, since May 2010, oximeters have begun to make their way in ones, twos, tens and eighties to facilities in more than 25 low-resource countries.

The Lifebox Model

We all know of initiatives that, with the best intentions, parachute unsuitable equipment to colleagues in low-resource countries. Over-complex devices don't respond to essential need;

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basic components can't be replaced; plugs don't fit – and that's before an absence of reliable electricity threatens to make the whole thing redundant. Equipment languishes in warehouses while desperate need goes unmet.

The Lifebox oximeter and model of distribution is different. The oximeter is designed to specifications set by the WHO and WFSA as the ideal oxygen monitor for low-resource settings. Robust, intuitive and easy to maintain, it is operational from mains electricity and with both rechargeable and disposable batteries. Spare probes, so often a hidden cost of maintaining pulse oximeters, are low-cost.

The oximeter comes in a package with an education CD Rom, a complete suite of self-learning and classroom teaching materials about pulse oximetry and the WHO Checklist.

And at just £160, including delivery, it is available for use in low and lower-middle income countries at roughly a quarter of the cost of a comparable device on the open market. In a recent survey, 83% of anaesthesia providers in Asia and Australasia gave financial cost as the main reason for scarcity of oximetry in their practice.² For some facilities, this high-quality piece of monitoring is now within economic reach.

For others it remains an impossible price, and so Lifebox raises money to fund donations. Donors are invited to buy an oximeter for a colleague, and are encouraged to select the country, and even facility, which they would like to support. Clinicians are also able to purchase pulse oximeters to take on projects in target countries, and to use, teach, and donate in person.

Through direct contact with the anaesthesia provider, we are able to ensure that each device goes directly to meet an identified need. Using a traceable global courier system we are able to ensure that each shipment arrives. And by supporting providers with education and follow-up outreach, we aim to ensure that the oximeters stay in the facility, where they are needed most, contributing to a permanent change in safety and practice.

Oximetization

Lifebox works through its extensive anaesthesia networks to identify and contact the facilities currently lost in the 'oximetry gap,' but to supply the estimated 77000 operating rooms, it needs a strategic approach: a country-by-country oximetization.

In June 2011, Dr Isabeau Walker (AAGBI and a Lifebox trustee), and Dr Stephen Ttendo (Uganda Society of Anaesthesia), led a faculty at Mbarara University Teaching Hospital, in Southern Uganda. Dr Ttendo had conducted a needs assessment amongst the members of the Uganda Society of Anaesthesia and the group delivered a one-day training session and donated 80 oximeters to anaesthetist working without access to them. Feedback was overwhelmingly positive.

"I am grateful for the knowledge I gained from the conference,"

wrote one anaesthetic officer who attended. "[You] have done so much to the lives of the patients who pass through my hands...I am now a happy man with my new Lifebox pulse oximeter."

A follow up survey is underway to explore the impact of this work in Uganda, and similar projects are now under development in other low-resource countries, in association with other national societies of anaesthesia.

This initiative, to ensure that every patient undergoing anaesthesia has routine, continuous monitoring, is bold, innovative and lifesaving.³ We are sincerely grateful to the anaesthesia community for your support in seeing it through.

For more information please visit www.lifebox.org

References:

1. Bickerl SW, Telfer ML, Sanno-Duanda B. Need for paediatric surgery care in an urban area of The Gambia. *Trop Doct* 2003;33:91-4
2. Thoms GM, McHugh GA, O'Sullivan E. (2007), The Global Oximetry Initiative; Anaesthesia: The Association of Anaesthetists of Great Britain and Ireland, 62 (suppl. 1): 75-77
3. Editorial: Extending the WHO 'Safe Surgery Saves Lives' project through Global Oximetry, *Anaesthesia*, 64, pp 1045-1050.



Trainers and Uganda Society of Anaesthesia members at Mbarara Teaching Hospital, Uganda, July 2011