CLAHRC BITE — Brokering Innovation Through Evidence

13 A bite-sized summary of a piece of research supported by NIHR CLAHRC West Midlands

Nov 2015

International

Pulse Oximetry During Surgery is a Cost-effective Intervention for Low-Income Countries

Evaluating the cost-effectiveness of pulse oximetry during surgery in low-income countries

Background

- A pulse oximeter monitors oxygen saturation and pulsation during surgery, and can provide early warning of hypoxia, hypovolaemia and impending cardiac arrest.
- Routine use is recommended for all patients undergoing anaesthesia.
- However, pulse oximetry is unavailable in many operating theatres in low-income countries (LICs) – partly because of the high purchase cost.
- The Lifebox® oximetry project provides a low-cost, hand-held pulse oximeter.
- However, as this is still a considerable investment for resource-constrained settings, a cost-effectiveness analysis is needed for patients undergoing surgery in LICs.

Findings

- The Lifebox® hand-held oximeter performs as well as standard tabletop oximeters,
- Total peri-operative mortality was 2,445 deaths per million procedures in LICs, and 467 deaths per million were potentially preventable by oximetry.
- Estimated that 10% of anaesthetic-related deaths could be averted by oximetry.
- 15.5 DALYs (disability adjusted life years) are averted per anaesthetic-related deaths avoided.
- Costs per DALY averted were US$115 for the hand-held oximeter, and US$374 for the tabletop pulse oximeter, and fell below the *very cost-effectiveness* threshold of one times the GDP per capita for low-income countries.
- Purchasing hand-held oximeters for the 77,000 operating theatres around the world without oximeters would cost US$19.3 million and would reduce the global burden of disease by an estimated 63,800 DALYs annually.
- Sensitivity analysis suggests the hand-held pulse oximeter would be very cost-effective even if it prevented only 1.7% of anaesthetic-related deaths, or 0.3% of total peri-operative deaths. This could increase if non-fatal brain damage was also taken into account.

References

Burn SL, Chilton PJ, Gawande AA, Lilford RJ. Peri-operative pulse oximetry in low-income countries: a cost-effective analysis. *Bull World Health Organ*. 2014; **92**(12): 858-67. http://goo.gl/OejlCZ

Recommendations for practice

Providing hand-held pulse oximeters to hospital settings in low-income countries is a cost-effective intervention and pulse oximetry should be made more widely available.

What is NIHR CLAHRC West Midlands?

The Collaboration for Leadership in Applied Health Research and Care (CLAHRC) is a partnership between universities (Birmingham, Warwick and Keele) and a number of health and social care organisations in the West Midlands. We are funded by the National Institute for Health Research with a mission to undertake high-quality applied health research focused on the needs of patients to improve health services locally and beyond.

For further information, visit: www.clahrc-wm.nihr.ac.uk

The research is funded by the National Institute for Health Research. The views expressed are those of the author and not necessarily those of the NHS, the NIHR or the Department of Health.