

# Global Capnography Project (GCAP): implementation of capnography in Malawi – an international anaesthesia quality improvement project

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## Introduction

- Capnography is an essential monitor for safe anaesthesia in high income countries but is rarely available in low-income countries.
- The Global Capnography Project (GCAP) was set up in 2016 to introduce capnography to low-income countries <https://gcap.blog/>
- The southern region of Malawi chosen as the pilot site



## Objectives

- To quantify the capnography gap; to identify the training and education needs of the anaesthesia providers; and to distribute 40 capnographs
- The follow-up assessed performance of the capnograph and whether its introduction improved the early recognition of critical airway events.
- **This is the first project worldwide to do so.**

## Methods

- In 2017, GCAP team travelled to Southern Malawi and provided capnography training courses.
- The courses incorporated clinical scenarios with capnography waveform recognition and explained what action was needed to prevent patient harm. Waveform recognition included used the ‘Hats and Caps’ system
- 40 capnographs donated by Medtronic were given to 8 hospitals for use in their Theatres + ICUs.
- In August 2017, GCAP returned to conduct a 6 month follow up study and conduct more training.



Good	Bad
<p>Top hat – good Indicates – clear unobstructed airway</p>	<p>Dunce hat – bad Indicates – significant leak</p>
<p>Assez hat – OK Indicates – bronchogram - Partially obstructed airway</p>	<p>No hat – very bad Indicates – dislodged/displaced tracheal tube or tracheostomy - Oesophageal intubation - Lack of ventilation</p>

## Results

- Only 1 capnograph in Malawi at the start of project
- Overall 97% and 100% capnography gaps were identified in the theatres and ICUs respectively.
- Training course improved knowledge MCQ 15.0 > 18.7 p = < 0.001
- The capnography equipment performed well and six months later 24 (77%) of anaesthesia providers reported recognising 44 oesophageal intubations and **28 (90%) believed it had saved lives ( ≈ 57)**



## Conclusions

- This study has shown it is feasible to produce a training package for anaesthesia providers and successfully introduce capnography in a low-income country
- Capnographs used were appropriately robust and demonstrated with education could change in practice, increasing patient safety
- From Malawi evidence we estimate over 11,000 oesophageal intubations occur per year in sub-Saharan Africa, This significant patient safety risk could be mitigated by using capnography
- 70,000 operating theatres in the world are without capnography
- **For these reasons, we believe that this is one of the most important projects in anaesthesia safety in the last decade.**
- The results support the development of an international project to help make global capnography provision a reality, so that like pulse oximetry, it can be included in the WHO surgical safety checklist and improve patient safety worldwide.
- **All relevant organisations should consider taking this forward.**