

Why we all need a hand from EMMA®

Problem

Despite Resus Council UK guidelines, it was found that reliable and rapid access to equipment able to provide waveform capnography during cardiac arrest was rarely achieved outside of the theatre or intensive care environment.

67% of anaesthetists report having access to capnography during the management of a cardiac arrest less than half of the time.

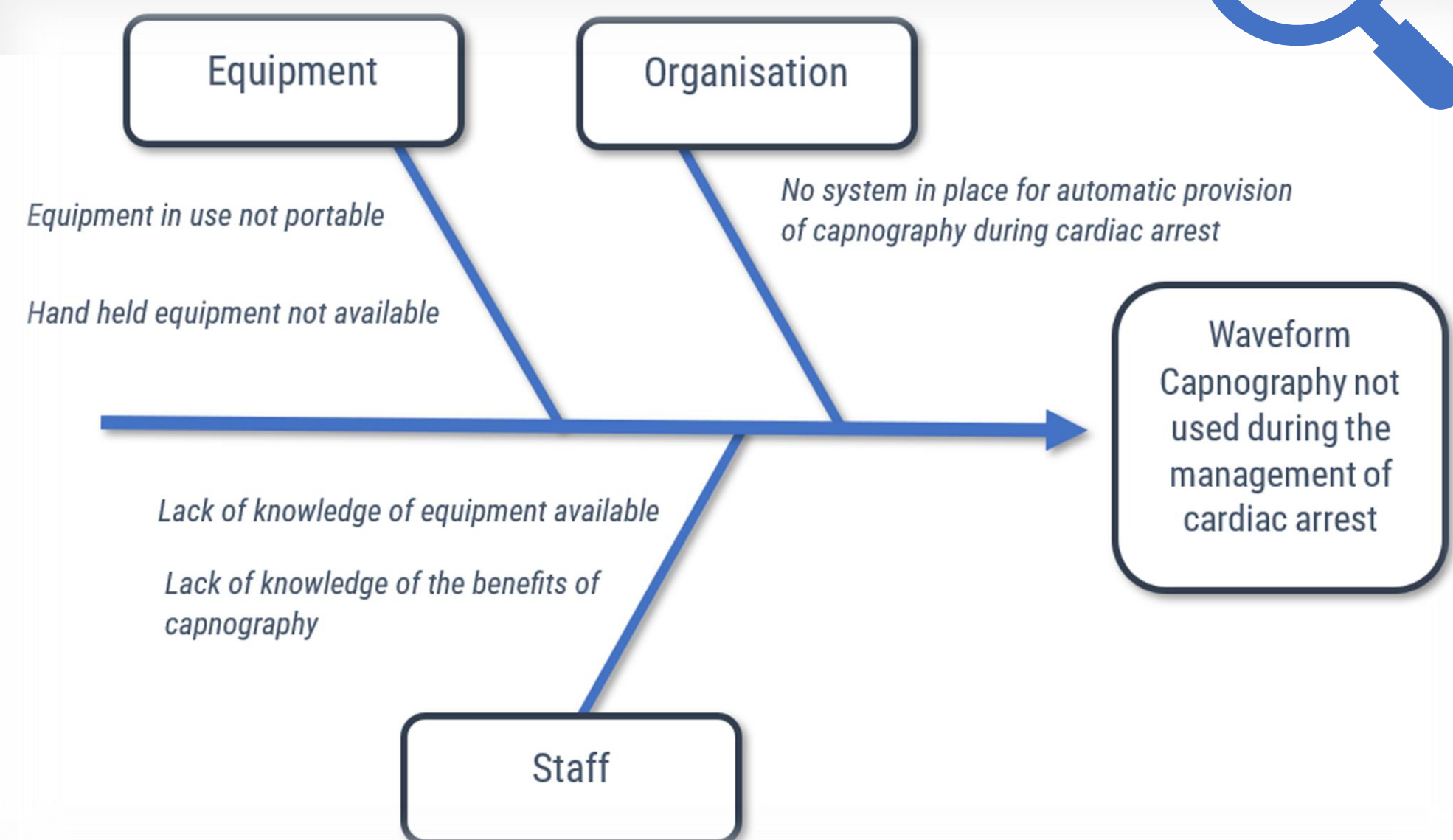


BACKGROUND

The use of waveform capnography is a mandatory requirement during cardiac arrest – Resus Council UK [1]

Waveform capnography is the non-invasive measurement of the partial pressure of carbon dioxide from the airway, providing physiological information on ventilation, perfusion, and metabolism [2]. The use of waveform capnography during cardiac arrest has a number of potential clinical benefits:

- **Confirming Endotracheal Tube placement.** Endotracheal intubation during cardiac arrest is associated with a lower first-time success rate, especially when outside of a theatre environment [3].
- **Monitor the quality of cardiopulmonary resuscitation (CPR).** Successful resuscitation from cardiac arrest is dependent upon the provision of adequate blood flow to organs which is generated by CPR. The measurement of end-tidal expiratory pressure of CO₂ provides a non-invasive estimate of cardiac output and organ perfusion during cardiac arrest [4].
- **Indication of return of spontaneous circulation.** An abrupt increase in end-tidal CO₂ during CPR can be an indicator of return of spontaneous circulation.



Project Aim

To develop a system to ensure that waveform capnography equipment was available 100% of the time, no matter the location within the hospital or time of day.

Strategy for change

Introducing EMMA®

Step 1: Find an appropriate portable capnograph

EMMA® mainstream capnograph

- Portable
- Fully functional in 15 seconds
- Provides real time waveform, RR and ETCO₂ measurement
- Compatible with all ETT, SGA, facemasks used

Step 2 – Develop a system so it is delivered to patients

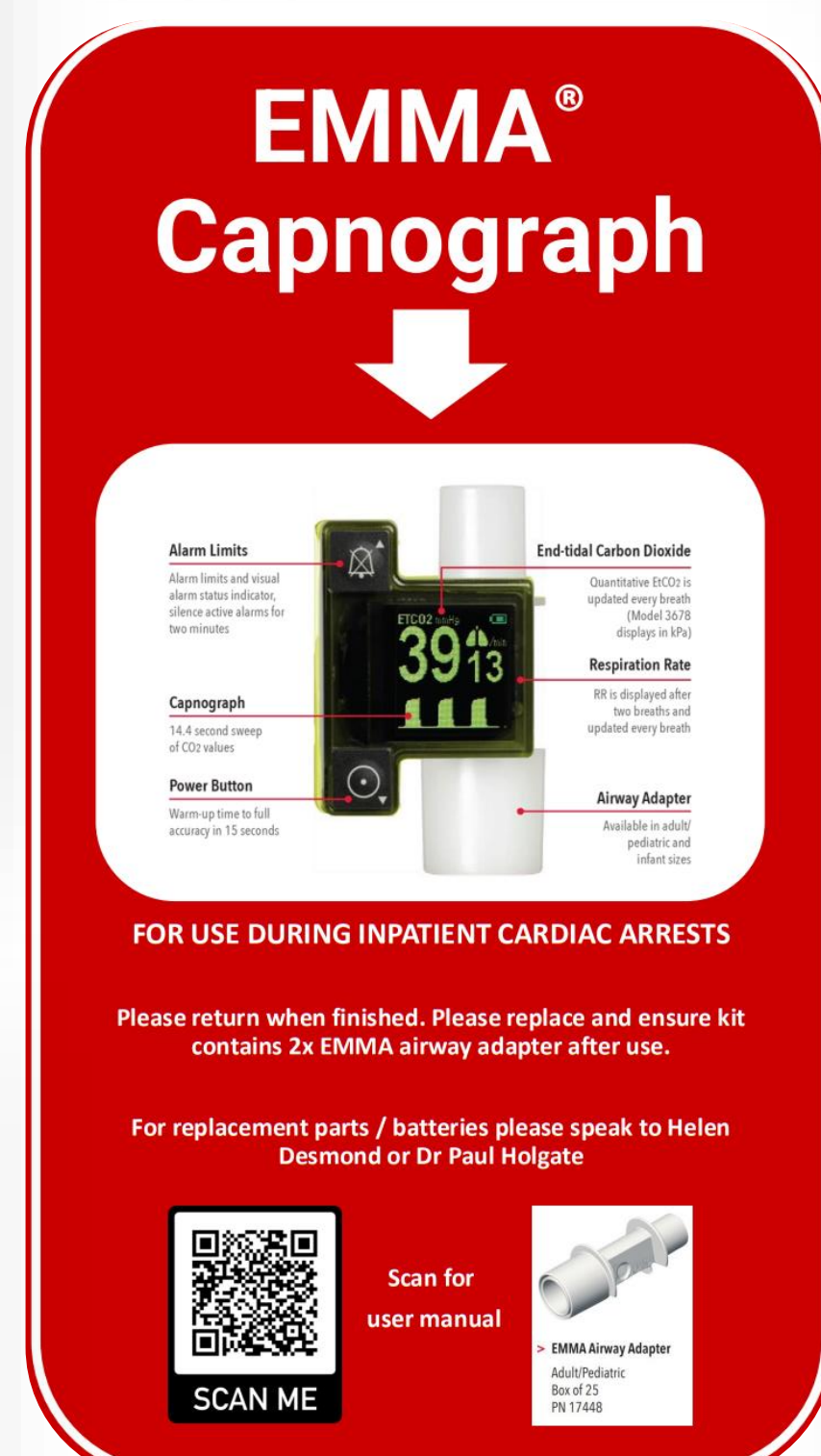
On call operating department practitioner (ODP) nominated as responsible to bring EMMA to cardiac arrest calls

Designated location found for device to be stored and signposted.

Step 3 – Education of users

1:1 teaching sessions with anaesthetists on using the device and the uses of capnography in cardiac arrest.

Group presentation to ODPs on the new system and device training.



PDSA Cycles

PDSA 1 – Location

The initial location for the EMMA capnograph to be stored was altered as it was found this was not accessible by some staff out of hours. A new location was found that provided security to the device but allowed direct access at all times.

PDSA 2 – Portability

Delays occurred for the delivery of the device if the ODP responsible was not near the device at the time of a cardiac arrest call. A belt clip was provided allowing the device to be carried by staff members if they were to be away for a prolonged period.

Conclusion and Reflection

The necessary equipment was obtained and system was developed and implemented successfully. Early feedback from staff demonstrated a positive response.

Because of the relative infrequency of cardiac arrests, it will take time to build up enough data to reliably confirm the aim of the project.

The system may need further adaptation over time and new staff will need to be trained continuously.

Managing all viewpoint and opinions when implementing a new way of working can be challenging!

References

1. Jasmeet Soar, Charles D Deakin, Jerry P Nolan, Gavin D Perkins, Joyce Yeung, Deakin CD, et al. Adult Advanced Life Support Guidelines [Internet]. Resuscitation Council UK; [cited 2023 Jun 27].
2. A. A. Klein, T. Meek, E. Allcock, T. M. Cook, N. Mincher, C. Morris, A. F. Nimmo, J. J. Pandit, A. Pawa, G. Rodney, T. Sheraton and P. Young. Recommendations for standards of monitoring during anaesthesia and recovery 2021 [Internet]. Guideline from the Association of Anaesthetists; [cited 2023 Jun 27].
3. Wang, H.E. and Yealy, D.M. (2006), How Many Attempts Are Required to Accomplish Out-of-hospital Endotracheal Intubation?. Academic Emergency Medicine, 13: 372-377. <https://doi.org/10.1197/j.aem.2005.11.001>
4. Sandroni C, De Santis P, D'Arrigo S. Capnography during cardiac arrest. Resuscitation. 2018;132:73-77. doi:10.1016/j.resuscitation.2018.08.018

Improving Access to End-Tidal Capnography for Inpatient Cardiac Arrests

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