

## ILCOR 10 Steps to improve IHCA – Improving CPR Quality with Feedback Devices – A Case Study from Australia

**Aim:** Implementation of real-time CPR feedback devices to improve the quality of CPR delivered to cardiac arrest patients in the Paediatric Intensive Care Unit at The Childrens Hospital at Westmead. (CHW)

**Background:** Paediatric cardiac arrests occurs in 2-6% of children admitted to a Paediatric Intensive Care Unit (PICU) and survival to hospital discharge is less than 50%.<sup>1,2</sup> Advances in resuscitation science and implementation have resulted in improved outcomes for cardiac arrest over the past decade<sup>3</sup>

Resuscitation guidelines recommend target value parameters for rate and depth of chest compressions and recommend the use of real-time CPR feedback in clinical practice for children during cardiac arrest.<sup>4</sup>

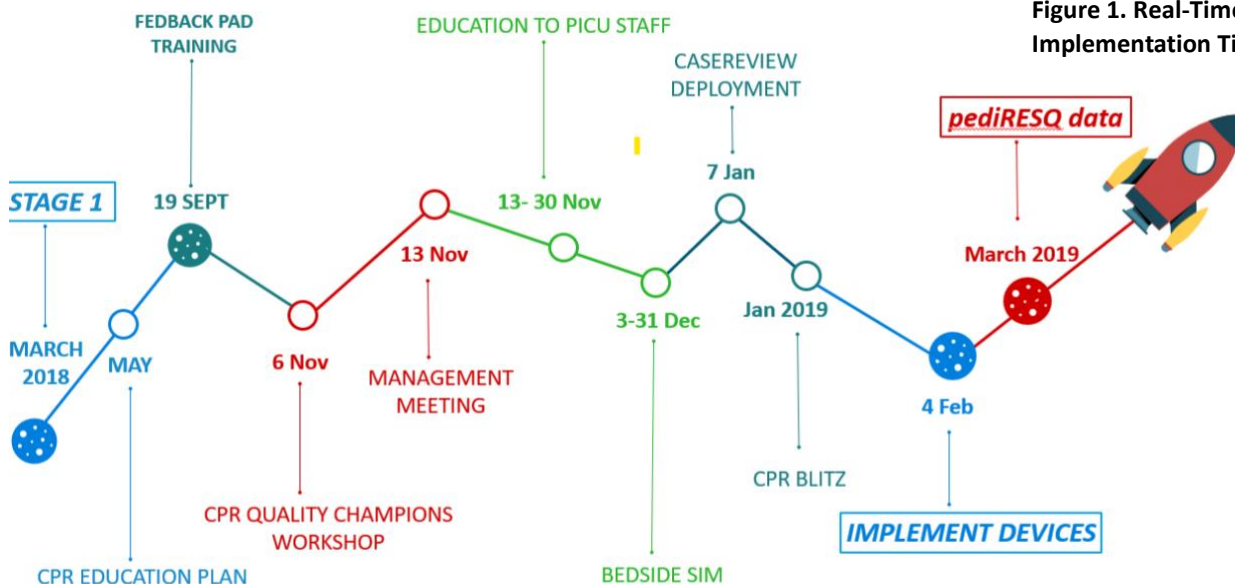
The Paediatric Resuscitation Quality Collaborative (pediRESQ) is a prospective, observational, international multi-centre study of paediatric cardiac arrest, aiming to sustain discovery, analysis and publication of medical science leading to evidence-based CPR guidelines and improved survival for children.<sup>3</sup>

**Steps Taken:** We established a core group of resuscitation champions in PICU to drive local practice change. The group developed an education and training plan for the roll-out and implementation of real-time CPR feedback devices which included standardization of CPR trolley, resuscitation room choreography, and the use of action linked phrases for pad placement.

Over a six- month period prior to implementation our training program incorporated the following:

- Familiarization with defibrillator features and CPR feedback pad placement
- Interpretation of CPR metrics (depth, rate) using bedside task trainers to improve CPR performance.
- Training of CPR quality feedback in simulation-based education and CPR training at PICU (Resus4kids)
- Initiating CWH CPR challenges measuring CPR quality with and without real- time feedback. (Fig 3.)

After the 12 - month education and training real-time CPR feedback for infants and children sustaining cardiac arrest in PICU was implemented. (Fig 1.) The CPR event data and performance report cards are used for ongoing education and training of all IHCA event data is reported to the pediRESQ collaborative data registry to enable international benchmarking.



### Challenges:

- developing a sustainable system of real-time CPR feedback devices use during IHCA;
- multidisciplinary team buy-in about the importance of high-quality CPR as foundation of success;
- barriers to use of CPR feedback pads in cardiac medical and surgical patients

The CPR quality improvement initiative was a change in practice. Defibrillation pads needed to be placed for all arrest events even in non-shockable rhythm. Many meetings engaged the cardiac teams to shared understanding that the change in practice was CPR quality improvement and outcomes for infants and children. We had several collaborative meetings with key stakeholders in order to achieve buy-in prior to implementation. Cardiac services agreed to CPR feedback pad placement for all cardiac surgical patients post-operatively excluding patients with open sternum.

### Results

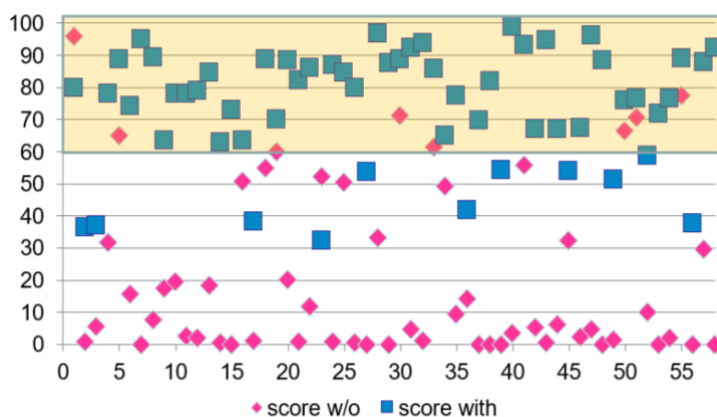
- Successful implementation of real-time CPR feedback devices in the PICU at CHW has enabled teams to function at a high-level resulting in more reliable patient care.
- Team training improved CPR quality using real-time feedback to guide metrics (Fig 2.).
- The CHW CPR Challenge improved the percentage of compression in the aimed target from 20.7% without coaching to 74.8% with coaching. (Fig. 3.)
- Real-time CPR feedback is being used for every PICU cardiac arrest enabling staff to improve the quality of CPR delivered to patients.
- The project has become a catalyst for changes in the hospital re-evaluating the way we delivery resuscitation training with a patient centred outcome focus.
- The hospital resuscitation committee and clinical governance teams have recognized the importance of high-quality CPR. The PICU team present quarterly reports on arrest events to identify themes to focus education training and quality improvement initiatives
- CHW is the first institution in Australia to report arrest data for international benchmarking to improve patient care in cardiac arrest patients.

Figure 2. CPR Quality Improved with Training



**Outlook:** The project has enhanced the delivery of patient centered care in the PICU using an integrated approach for infants and children in cardiac arrest. It has empowered nursing and medical staff to drive change by developing and implementing an educational strategy to improve the quality of CPR as part of a resuscitation bundle of care. Establishing a sustainable process to capture CPR quality during arrest events at CHW provides an opportunity for centers in Australia and New Zealand to collaborate with CHW into the future. Ultimately, fostering international collaboration with data benchmarking to improve outcomes for infants and children after in hospital cardiac arrest.

Figure 3. CPR Quality Improved with Coaching in CPR



### References

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