

# SODIT Bursary Presentation

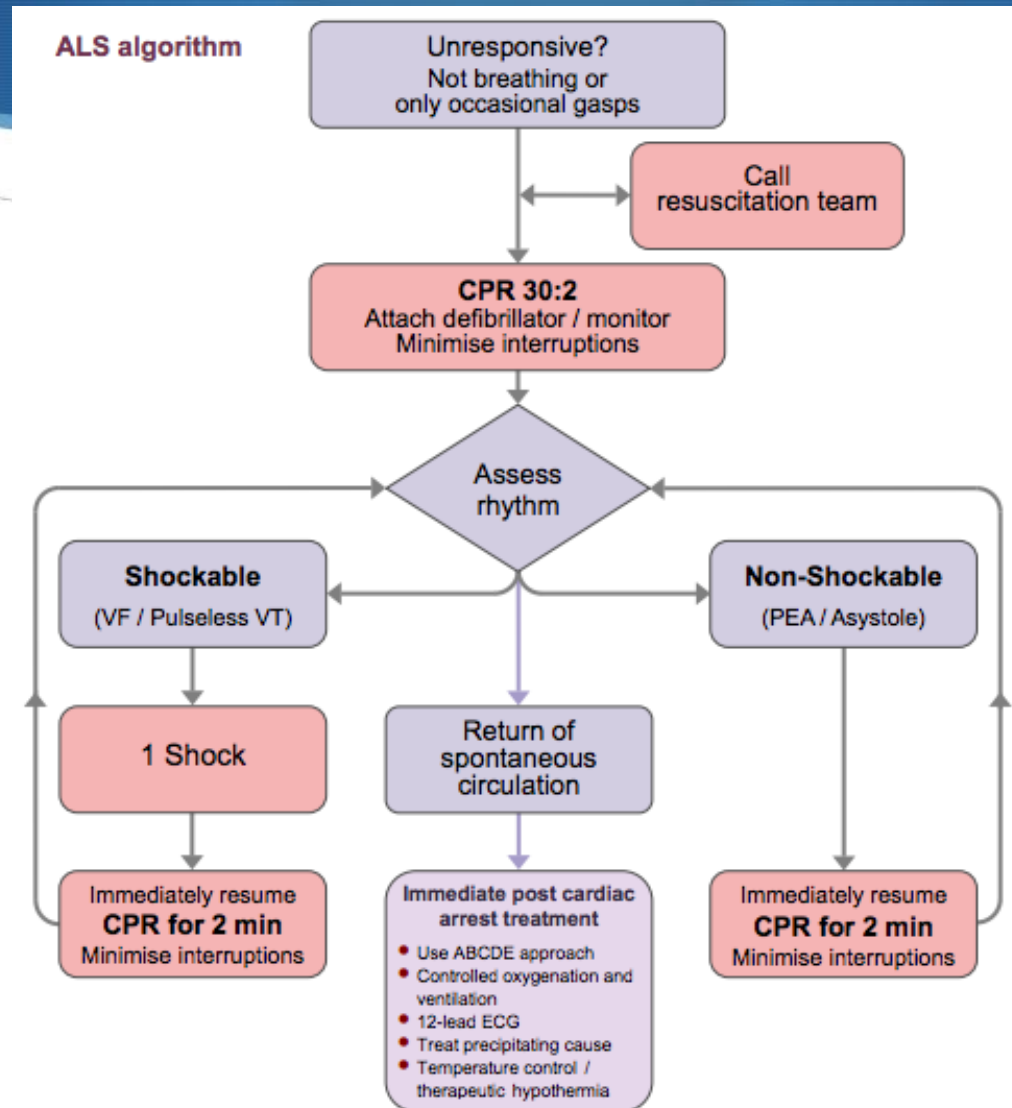
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# Introduction

- ◆ Background
- ◆ The idea
- ◆ The design process
- ◆ Potential for implementation
- ◆ Questions

# Current ALS algorithm [1]



### During CPR

- Ensure high-quality CPR: rate, depth, recoil
- Plan actions before interrupting CPR
- Give oxygen
- Consider advanced airway and capnography
- Continuous chest compressions when advanced airway in place
- Vascular access (intravenous, intraosseous)
- Give adrenaline every 3-5 min
- Correct reversible causes

### Reversible Causes

- Hypoxia
- Hypovolaemia
- Hypo-/hyperkalaemia/metabolic
- Hypothermia
  
- Thrombosis - coronary or pulmonary
- Tamponade - cardiac
- Toxins
- Tension pneumothorax

- ◆ Timing is crucial to correct implementation of the algorithm
- ◆ The whole arrest should run in 2minute cycles
- ◆ Interruptions should be minimal to chest compressions (these are the most important intervention)
- ◆ Time to first shock (for VF / VT arrests) is also important
- ◆ Adrenaline should be administered every 3-5mins

# In hospital cardiac arrests

- ◆ Extrapolating from 2010 NCEPOD “Time to intervene” data approximately 22,000 inpatient cardiac arrests (excluding pre-hospital ICU and paediatric cardiac arrests) [2]
- ◆ 2012 NCEPOD data suggests that only 3/10 patients undergoing cardiac arrest receive “good” care, the rest receiving “some improvement” or “bad” care [2]
- ◆ NCAA - “Healthcare organisations have an obligation to provide a high-quality resuscitation service, and to ensure that staff are trained and updated regularly to a level of proficiency appropriate to each individual’s expected role.” [3]
- ◆ Current survival for in-hospital cardiac arrest is approximately 15%

# The idea

- ◆ The timing of CPR is not great for the following reasons:
  - ◆ In hospital cardiac arrest is generally unexpected and can be stressful for medical and nursing staff
  - ◆ Currently only **one person** can see how much time has elapsed via their phone / stopwatch / watch or clock on the wall
  - ◆ There may be a significant delay between the arrest being identified and timing commencing
  - ◆ Uncertainty about the precise time and stage of the CPR algorithm can lead to disjointed and disorganised resuscitation, especially with junior staff present
  - ◆ Studies have shown that the “perception” of time elapsed by clinical staff is inaccurate [4]



*Katherine Gorge, NT*

# The idea

- ◆ A visible, simple and durable CPR timer with logging functions to improve adherence with current algorithms.
- ◆ **The hope is to also improve team cohesion and potentially improve patient outcomes**
- ◆ **Human factors would suggest offloading simple information to a machine or device may free up “thinking space”**
- ◆ Improved logging of data for mandatory national data collection forms, audit and medicolegal purposes.

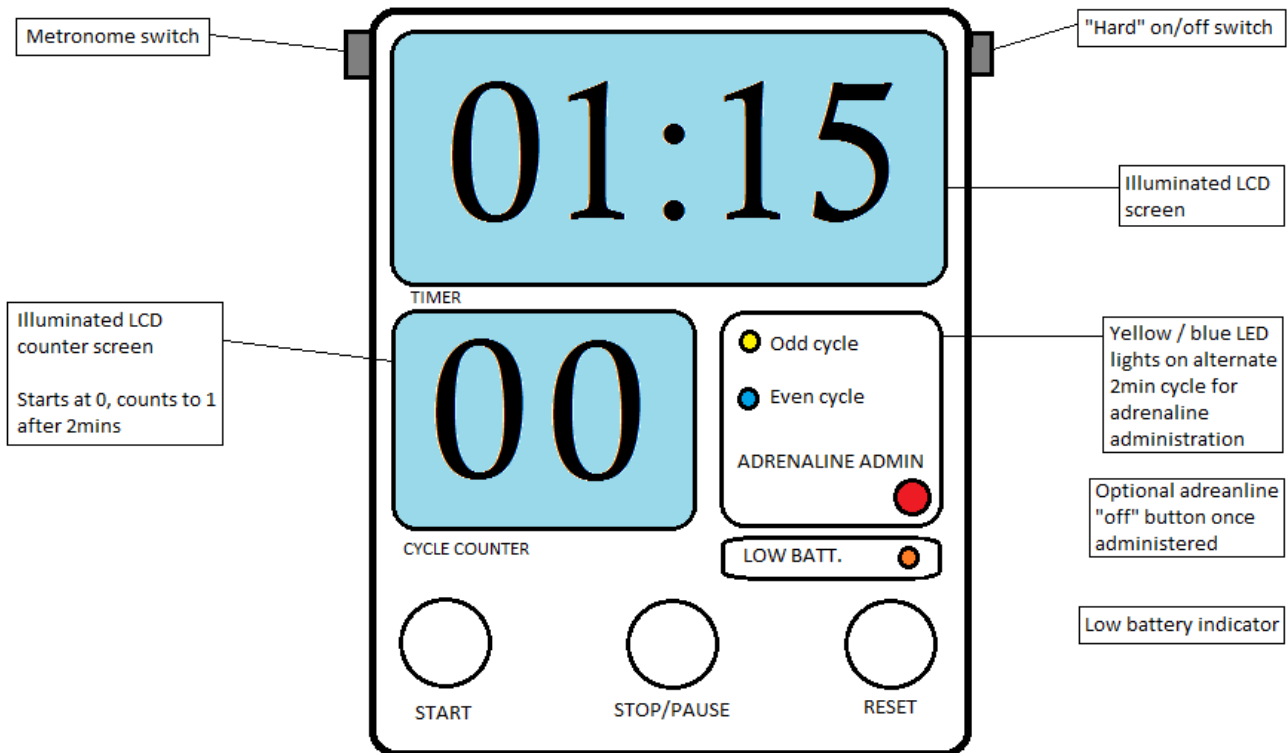




Medical Equipment  
Management

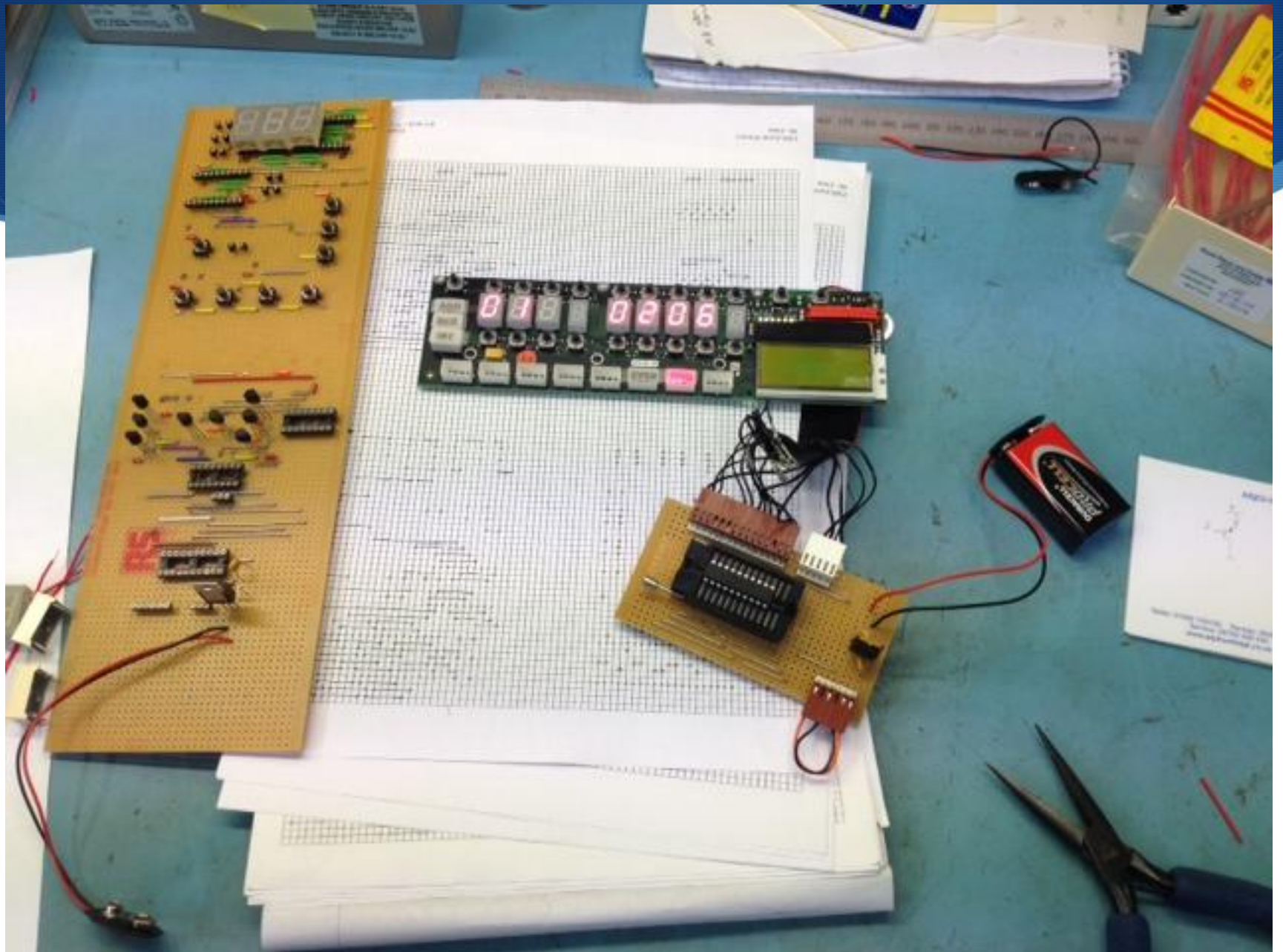
Abel

# The draft



# Development

- ◆ Paper idea with plans and details of each individual function
- ◆ Discussion with medical device manufacturer – essentially expensive and fruitless
- ◆ Attempt at patenting the idea – essentially fruitless
- ◆ Discussion with medical electronics at RD+E and Andy Rivers – extremely useful
- ◆ Meeting with “innovation capture” team at RD+E – waiting to see where this may take the idea



# The prototype







# Functions

- Large timer screen – visible to all of the resuscitation team
- Cycle counter (increment by 1 every 2min cycle)
- Adrenaline administration prompt
- Metronome feature (intermittent for 10secs at the start of each cycle to ensure 100bpm suggested rate)
- Adrenaline / intubation / shock buttons to log when these interventions occur
- Recall button to record all events within the arrest at the end



# Benefits of the timer

- ◆ Long / complicated arrest scenarios (LA toxicity / thrombolysed PE)
- ◆ Better documentation of arrest events (now a national requirement via NCAA)
- ◆ Improved team cohesion, no longer hearing “are we at 2 minutes yet?”
- ◆ Prompting to administer adrenaline and ability to log exactly when the dose was given
- ◆ Metronome feature to improve accuracy of CPR rate

# Potential for implementation

- ◆ Initial plans to trial the timer prototype in a simulation lab environment
- ◆ Feedback on adherence to algorithms and human factors improvements that the timer may provide
- ◆ Opinion from clinicians on it's utility
- ◆ Hopefully eventual implementation into key resus environments in the hospital (CCU / A+E / ICU) as a formal trial vs. current standard of care

# Flies in the ointment

- ◆ The 2 minutes is unimportant / a made up number
- ◆ Could a basic timer from a shop do the same thing?
- ◆ Is it really warranted as outcomes from arrests are so dismal?
- ◆ Will it actually improve morbidity / mortality from in hospital cardiac arrests?

# SODIT Bursary

- ◆ So far none of the allocated funds have been used
- ◆ Plans for a local simulation trial also unlikely to require funding
- ◆ Provided me with the stimulus to get the project off of the ground
- ◆ Hopefully presenting at this regional meeting will allow the idea to be trialed and implemented across the hospitals in the region
- ◆ Huge thanks to Andy Rivers for making a working prototype possible

# Questions and discussion

# References

- ◆ 1. ALS algorithm - <https://www.resus.org.uk/pages/als.pdf>
- ◆ 2. NCEPOD – Time to intervene. A review of patients who underwent CPR as a result of inpatient cardiopulmonary arrest.
- ◆ 3. NCAA - [http://www.resus.org.uk/pages/QSCPR\\_Acute.pdf](http://www.resus.org.uk/pages/QSCPR_Acute.pdf)
- ◆ 4. Does anybody really know what time it is? Does anybody really care?. Ann Emerg Med. 1994; 23: 1032–1036