



Showcase for Hopkins Inquiry and Nursing Excellence

SHINE

Conference

Customization of Emergency Resternotomy
Equipment with Simulation Training to Reduce
Time-to-Resternotomy During Post-Operative
Cardiac Arrest

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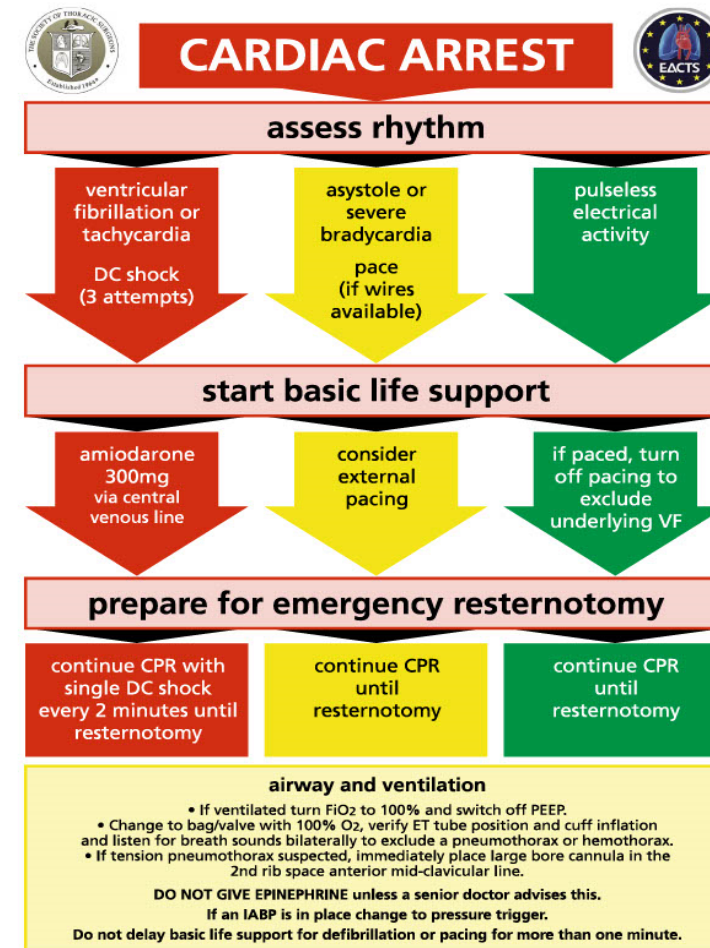
- Over 400,000 patients undergo cardiac surgery at more than 1200 centers across the US annually. Between 0.7% to 8% will experience a post-operative cardiac arrest, and half of those will be within 3 hours post-op (Dunning & Society of Thoracic Surgeons Task Force on Resuscitation after Cardiac Surgery [STSTFRCS], 2017).
- Of those experiencing cardiac arrest, the majority are precipitated by reversible causes including tension pneumothorax, cardiac tamponade, and hemorrhagic hypovolemia that can be rapidly treated by emergent resternotomy (Morton, 2020; Dunning & STSTFRCS, 2017).
- Standardized equipment and the use of a cardiac arrest protocol can reduce the time to resternotomy by 50% and reduce cardiac arrest-related complications (Morton, 2020).

Cardiac Arrest Protocol

- Early defibrillation for ventricular fibrillation and ventricular tachycardia by performing 3 stacked shocks
- Use of epicardial pacing wires for asystole or profound bradycardia prior
- Identify key roles at the bedside and practice cardiac arrest scenarios
- Prompt re sternotomy for all patients
- Limited use of epinephrine

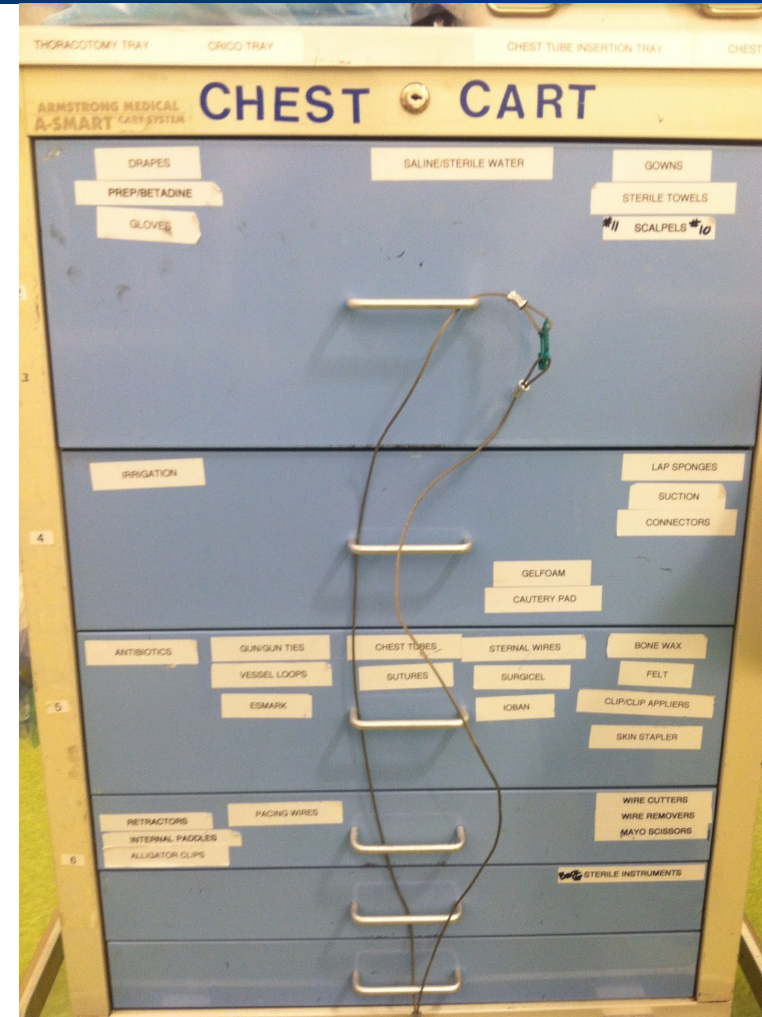
Ann Thorac Surg
2017;103:1003-20

STS EXPERT CONSENSUS STATEMENT DUNNING ET AL 1007
RESUSCITATION AFTER CARDIAC SURGERY



Inspiration for Project

- Existing chest cart was over 25 years old, in disrepair, and unsafe; fell twice on staff during patient emergencies
- Modifying existing cart was not viable option due to lack of vendor support



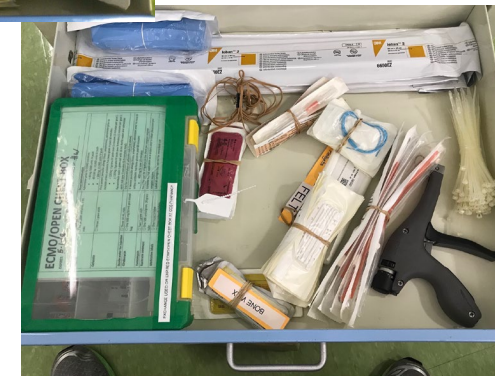
Inspiration for Project

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- Inconsistent supply management and or overstock on the chest cart leading staff to spend critical time locating emergency items



- In an 18 bed CVSICU, resternotomy and cardiac arrest intervention times were unknown and likely not optimal with an outdated chest cart
- Lack of coordination between multi-disciplinary team members during cardiac arrest
- Lack of routine practice and simulation equipment for post-operative cardiac arrest training

- Primary aim to reduce time to emergent re-sternotomy to decrease cardiac surgical post-operative arrest mortality
- The secondary aim is to standardize emergency resuscitation equipment to improve staff efficiency

Intervention

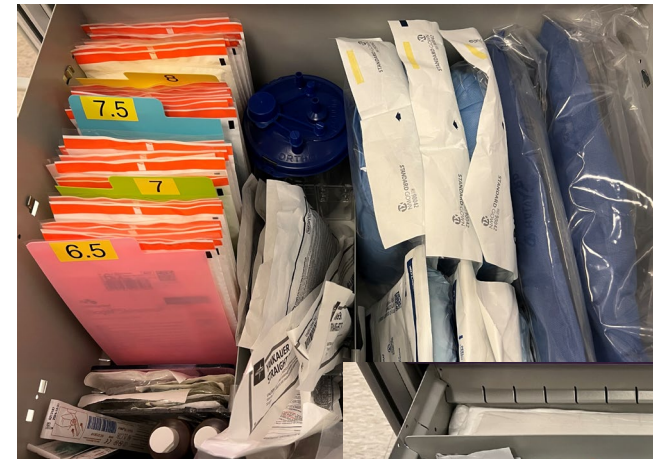
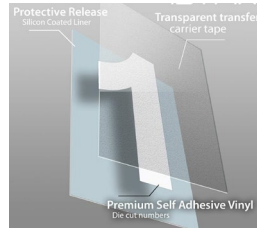
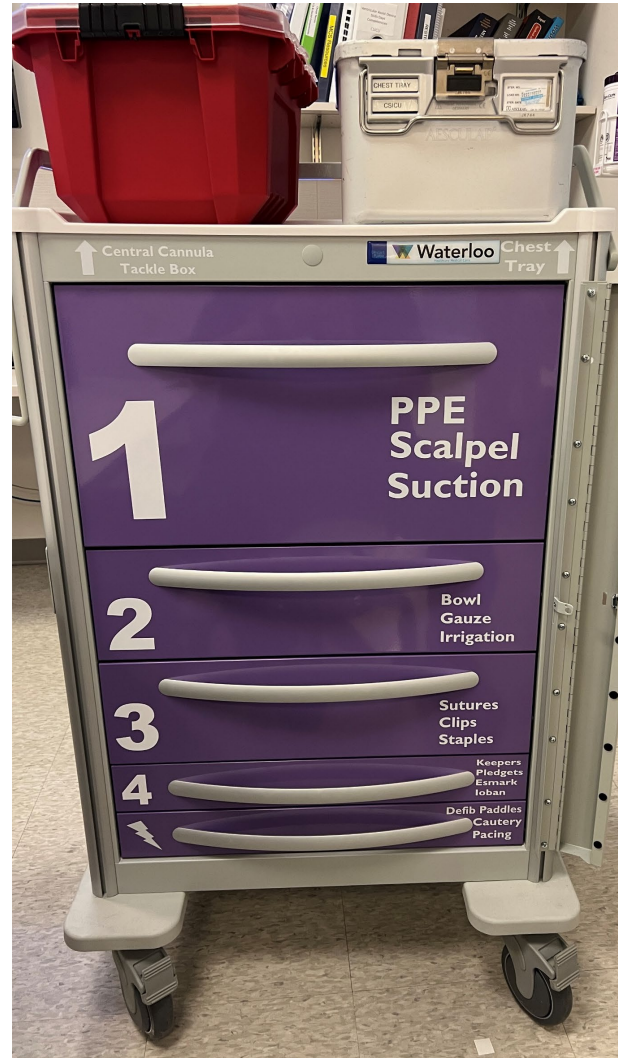
New Emergency Resternotomy Cart

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- Weighted cart base to accommodate larger top drawer
- Dividers, labels, and organizing devices in key locations
- **Purple color**



Intervention

New Training Manikin

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Intervention

Resternotomy Training Instruments



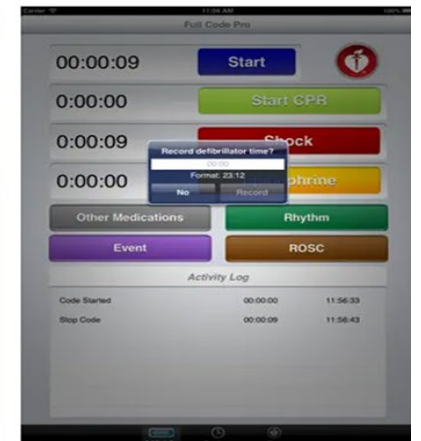
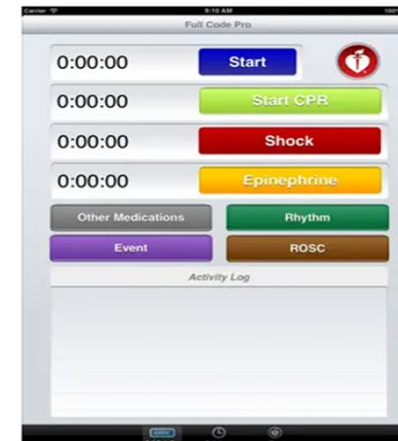
- Cardiac Arrest protocol education for CVSICU nurse leaders, advanced practice providers, and intensivists
- Implementation of cardiac arrest simulation training for CVSICU staff
 - Weekly “Mock Code Mondays”
 - Quarterly mandatory CVSICU Skills Days
 - Training new staff during onboarding
 - “First 90 Seconds”
 - Now what?
 - Stress on collaborative

Mock Code Video

- [Mock Code 4.18.23 STS.MOV](#)

Data Collection and Analysis

- Time to defibrillation and resternotomy data was collected using American Heart Association's Full Code Pro application software.
- A pre and post chest cart usability survey link was created in Qualtrics and sent via JHH email to collect staff and provider project perceptions.
- Data was password protected, stored, and analyzed in an Excel document.

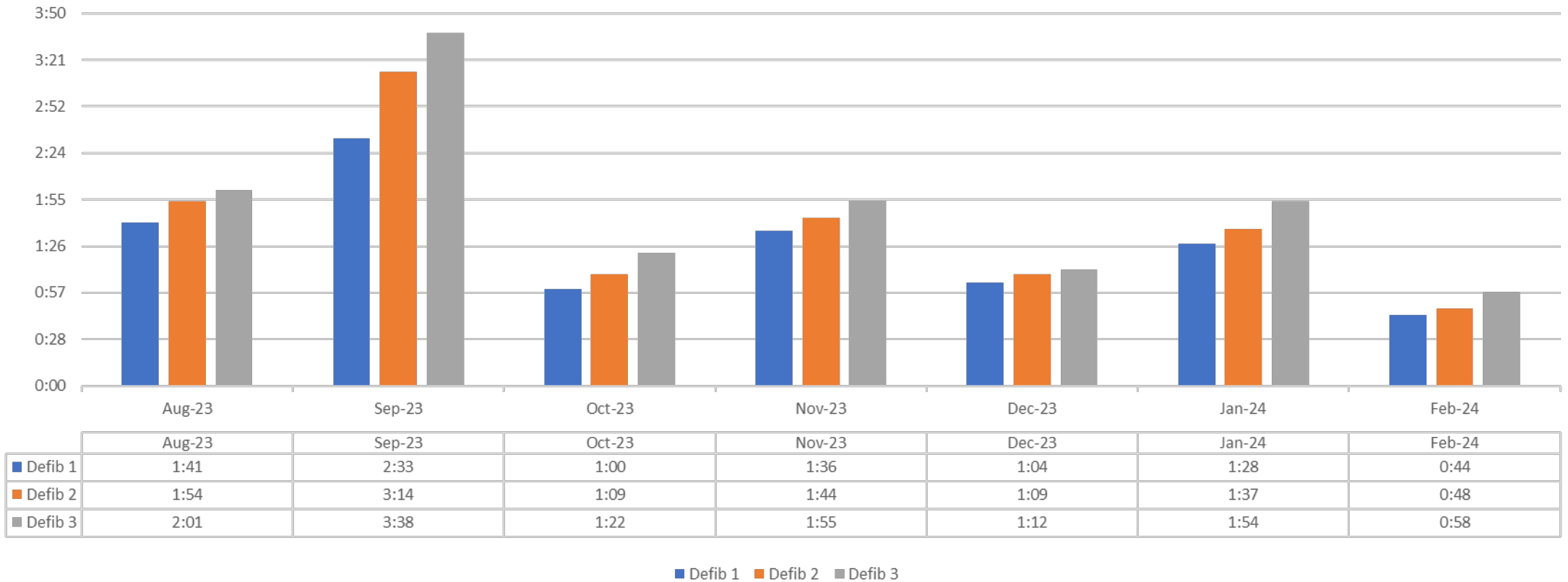


(American Heart Association, 2024)

Results

Primary Aim

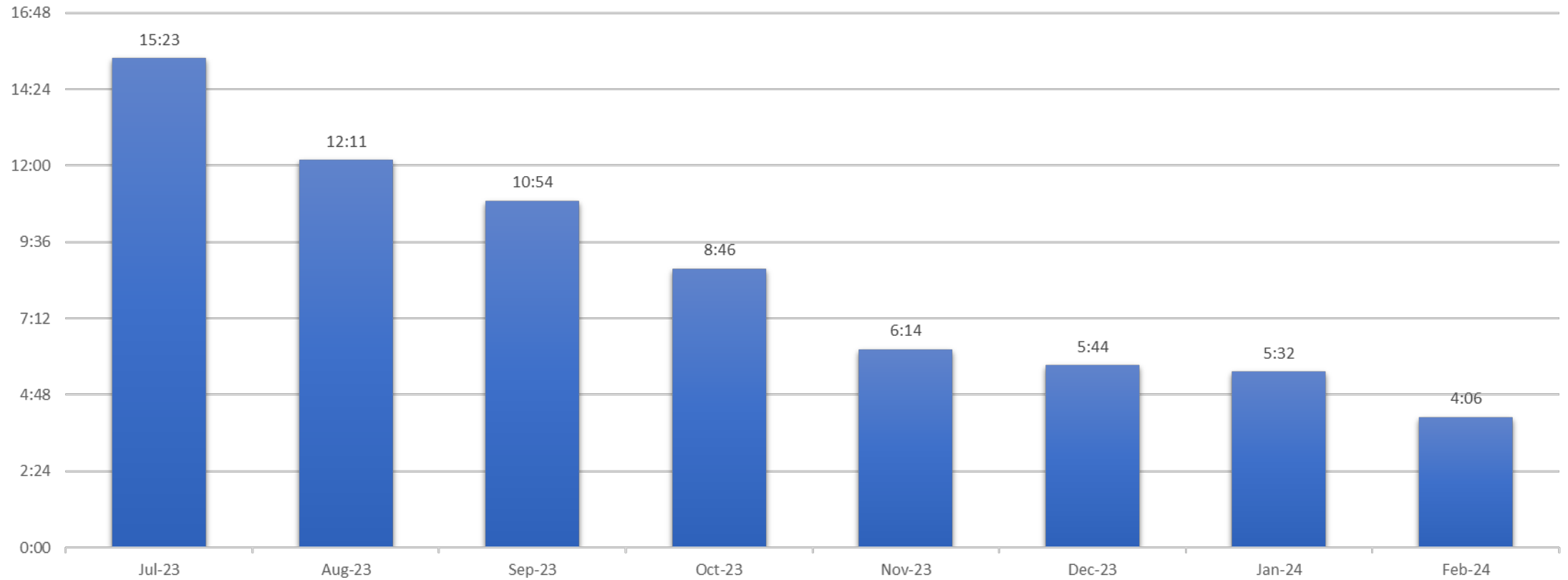
Minutes to Defibrillation



Results

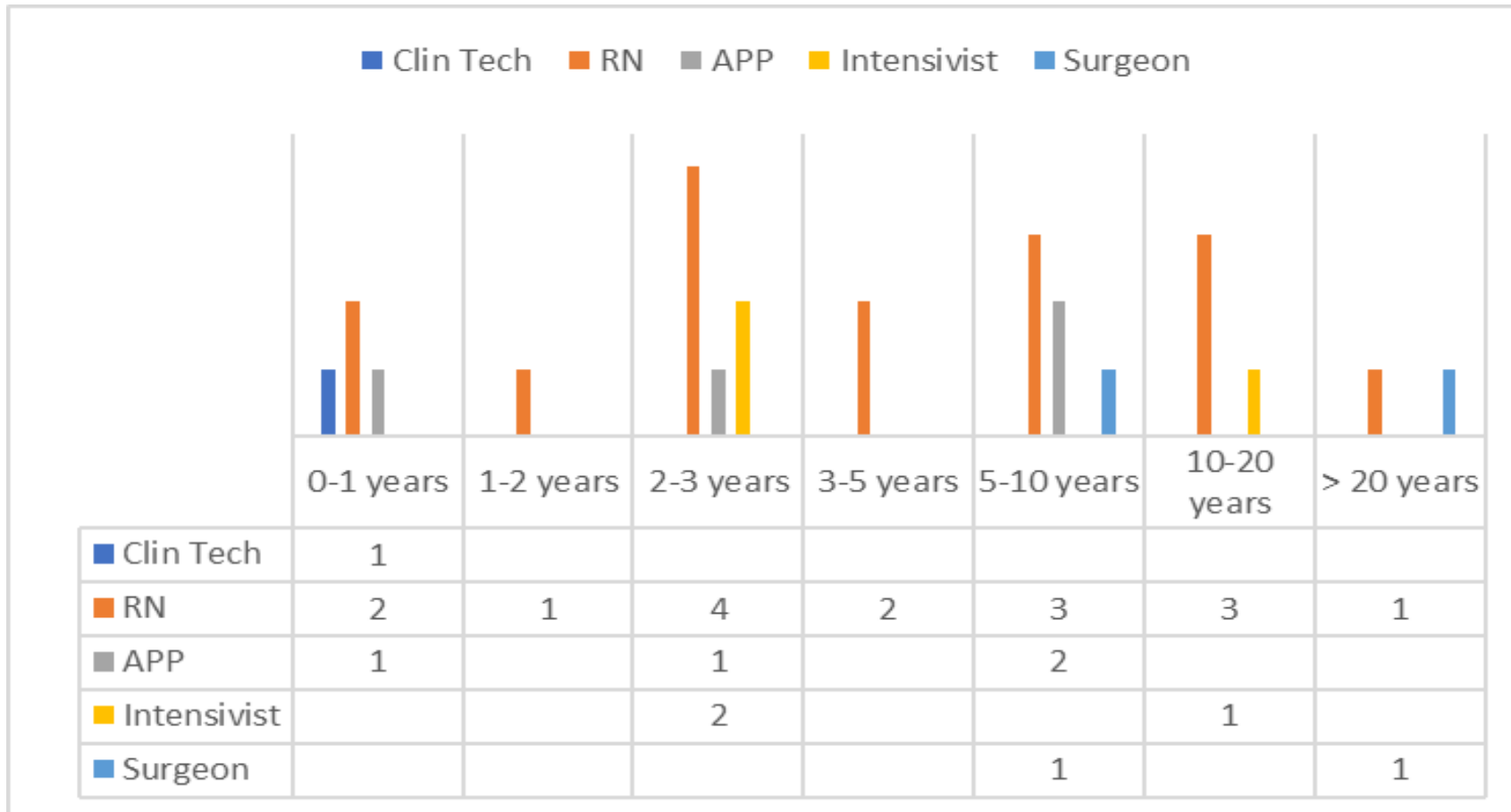
Primary Aim

Minutes to Resternotomy



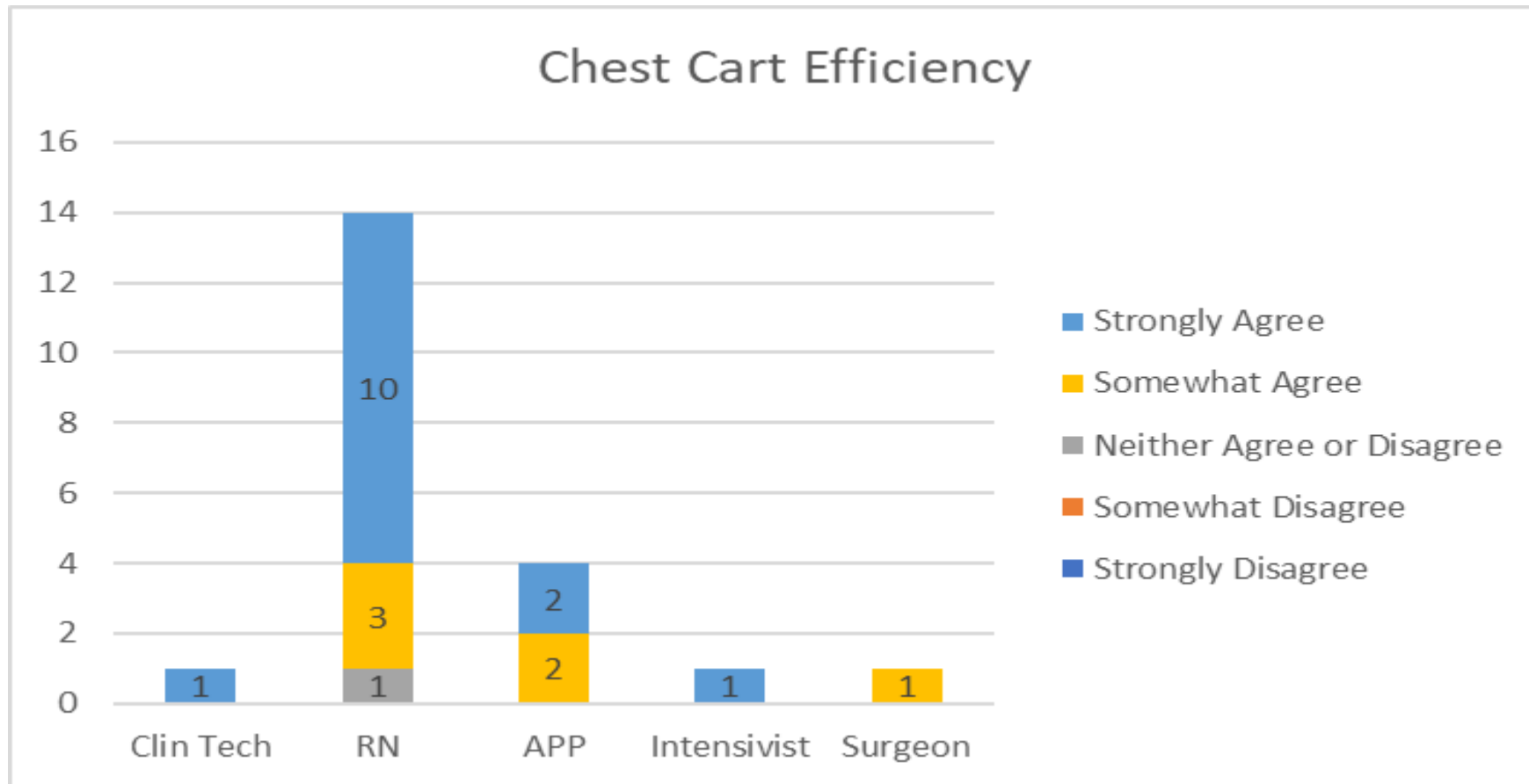
Pre-Intervention Chest Cart Survey

Respondents Demographics



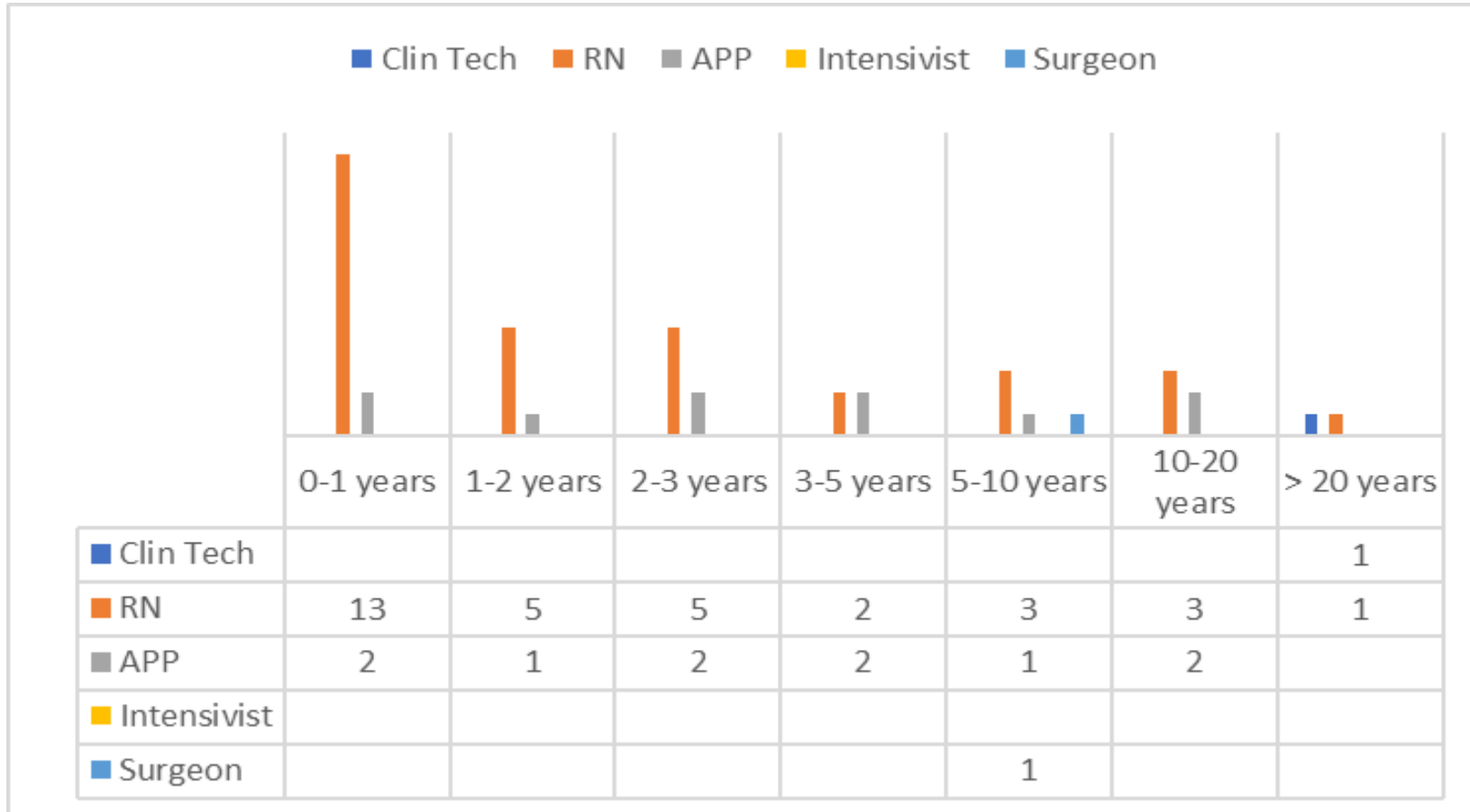
Pre-Intervention Chest Cart Survey

Responses to Outdated Chest Cart



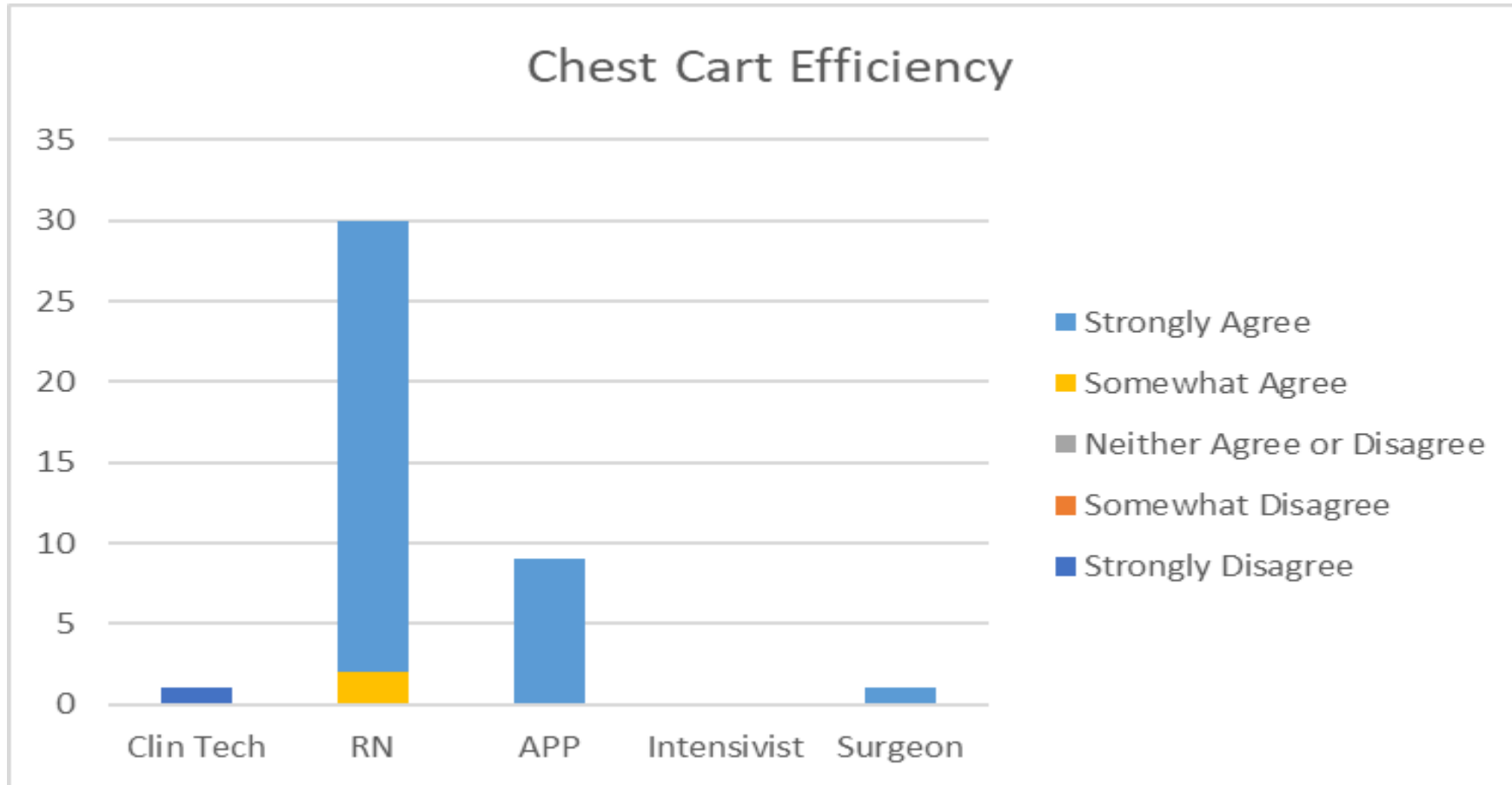
Post-Intervention Chest Cart Survey

Respondents Demographics



Post-Intervention Chest Cart Survey

Responses to New Chest Cart



Summary of Outcomes

- Delivery of 3 stacked defibrillations consistently under 2 minutes
- Time to resternotomy decreased averaging 4-6 minutes
- Post-intervention survey respondents strongly or somewhat agree to new chest cart efficiency, except for one respondent

- Expand emergency chest cart fleet throughout the Cardiac Service line
 - Have a rotation of emergency chest carts to replace used carts
- Transition chest cart supply restocking to Materials Management
 - For Quality and Infection control purposes
- Formalize rapid re sternotomy protocol during cardiac arrest
- System protocol for activation of rapid re sternotomy team

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