2018

Decreasing Cardiac Arrests in the Pediatric Intensive Care Unit

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Background

Cardiac arrest (CA) occurs in 1.4-2.2% of PICU admissions, and up to 55% of patients do not survive after CA.

Cardiac admissions to the PICU have higher risk.

- CA occurs in 3.1% of cardiac admissions
- 4.8 CA events/1000 cardiac patient days

In 2016 and 2017, CMH PICU CA increased.

Non-cardiac patients:

- 2014-2015 = 3.3 CA events/1000 patient days
- **2016-2017 = 3.6 CA events/1000 patient days**

Cardiac patients:

- 2014-2015 = 4.7 CA events/1000 patient days
- **2016-2017 = 6.5 CA events/1000 patient days**

Prospectively decreasing CA was a PICU priority for 2018.

One aspect of this initiative involved participation in the Cardiac Arrest Prevention (CAP) QI project with the Pediatric Cardiac Critical Care Consortium (PC4).

Project Aims

1. Develop CAP bundle for cardiac PICU patients
2. Decrease cardiac patient CA events by 25%
3. Develop a multidisciplinary review process for all PICU CA
4. Develop a bundle specific to non-cardiac PICU patients after evaluation of CA events

Cardiac Patient Interventions

PICU Cardiac Patient CAP bundle

1. Bedside safety huddle twice daily
2. Discussion of vital sign ranges and ensuring ranges are programmed into the bedside monitor
3. Discussion of interventions for noxious stimuli
4. Discussion of bedside code medications
5. Timely multidisciplinary review of CA events

Patient Population

High-risk cardiac patients targeted for CAP bundle inclusion include:

1. Neonates undergoing cardiopulmonary bypass for repair of congenital heart disease
2. Neonates/infants undergoing surgery involving a shunt or pulmonary artery banding
3. Patients with cardiac disease who are intubated within 4 hours of PICU admission
4. Any other cardiac patient deemed high-risk by the team

High-risk non-cardiac patients for CAP bundle inclusion requires prospective CA event analysis.

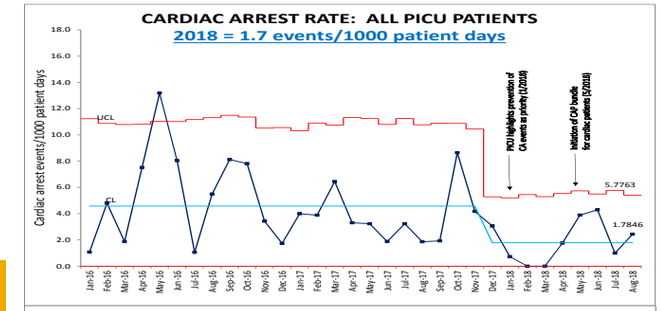
Outcome Measurements

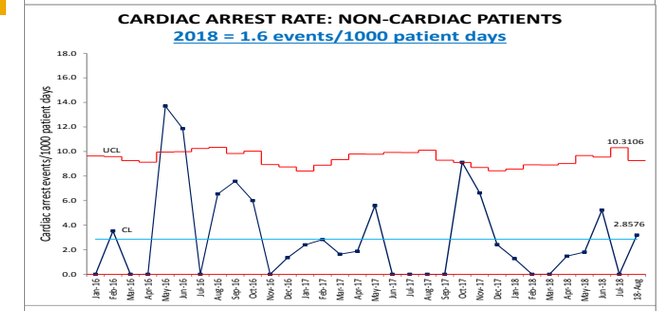
Primary outcome: CA events/1000 patient days in all PICU, non-cardiac, and cardiac patients

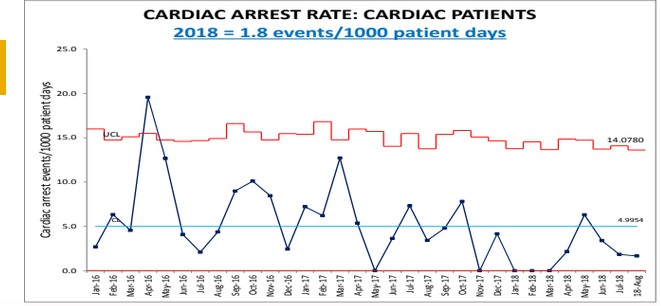
Process measures: Weekly audit of bundle-eligible patients and bundle compliance

Balancing measures: Length of mechanical ventilation and total PICU days

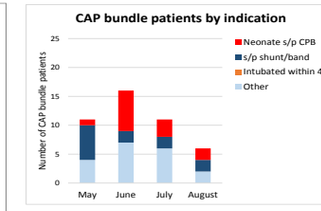
Preliminary Results: CA Events

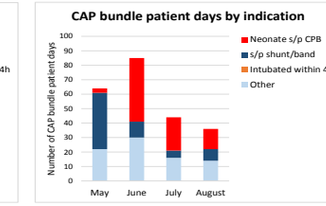






Preliminary Results: Bundle Reliability





Patient eligibility is determined by the care team, and confirmed at twice daily multi-disciplinary huddle.

Night Shift Huddle Forms Incomplete		
Month	Not done	Missed
June	36/39	92%
July	17/22	77%
Aug	10/20	50%

VS not Programmed into Monitor		
Month	Not done	Missed
Aug	59/72	82%

Preliminary Results: CA Review

12/13 events (92%) have been reviewed, occurring an average of 13 days from the event.

Review pearls are presented to the multidisciplinary care team upon completion of review.

Event trends are presented in scheduled updates.

Next Steps

The current PICU CA decrease is likely related to several factors including CAP bundle implementation.

Work remains to determine bundle component utility, improve compliance, and formalize event reviews.

Further review of non-cardiac CA is required to determine high-risk populations.

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