2018

Decreasing Cardiac Arrests in the Pediatric Intensive Care Unit

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**Recommended Citation**

Affolter, Jeremy; Baharaeen, Kathlyn; Hanson, Mari; Laddish, Lisa; Bohm, Amy; Bradbury, Lindsey; McGhee, Megan; Leroy, Anne; Cunningham, Hannah; Waddell, Michelle; Mullen, Tiffany; Lucas, Kimberly; Douglas, William; Pope, Angel; Thompson, Marita; Bauer, Paul N.; Molitor-Kirsch, Erica; Benton, Tara; and Miller-Smith, Laura, "Decreasing Cardiac Arrests in the Pediatric Intensive Care Unit" (2018). Posters. 46. https://scholarlyexchange.childrensmercy.org/posters/46

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

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
CARDIAC ARREST RATE: ALL PICU PATIENTS
2018 = 1.7 events/1000 patient days

CARDIAC ARREST RATE: NON-CARDIAC PATIENTS
2018 = 1.6 events/1000 patient days

CARDIAC ARREST RATE: CARDIAC PATIENTS
2018 = 1.8 events/1000 patient days

Preliminary Results: Bundle Reliability
Patient eligibility is determined by the care team, and confirmed at twice daily multidisciplinary huddle.

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.