Codes in Pediatric Acute Care: The Lessons Learned

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Objectives

• Describe a process to analyze codes in acute care
• Describe benefits of using an early clinical deterioration warning tool
• Identify 3 important questions to ask staff in a code debriefing
Introduction

Acute Care Pediatric Population

- 171 beds, 436 RNs
- Pulmonary/Endocrine/Adolescent medicine
- Renal/Liver transplant/Rheumatology
- Orthopedic/General surgery
- Neurosurgery/Neurology
Introduction

Acute Care Pediatric Population

- Age- newborn to young adult
- Acute & chronic conditions
- Transfers from the emergency department, clinics, operating room & outside facilities
Definition of a Code (CHCA)

Events which meet at least one of the following:

- Chest compressions for bradycardia, pulselessness, or a pulse with inadequate perfusion
- Cardioversion or defibrillation for non-perfusing cardiac rhythm
- Acute Respiratory Compromise (ARC) requiring emergency 1 assisted ventilation 2 (mouth-to-mouth, mouth to-barrier device, bag-valve-mask, or invasive airway)
# Introduction

## FY 2009 Codes
- 10 events
- 5 units involved
- 4/10 RRT called prior to code
- PAWS 0-9

## FY 2010 Codes
- 11 events
- 5 units involved
- 5/11 RRT called prior to code
- PAWS 0-9
FY 2011 Acute Care Goal

Decrease the number of codes in Acute Care
Code Debriefings

- All codes reviewed by CNS (documentation, VS, Pediatric Advanced Warning Score (PAWS), interventions, chain of events)
- Code debriefing Started May 2008
- Staff nurse, unit leadership & CNS
- Report sent to leadership team/director
- Issues identified and addressed
Post Code Debriefings

Creating an environment of transparency and learning is very important to ensuring the delivery of safe quality care. As such, we want to establish a forum for open dialogue and focus our code debriefings on system and processes. The purpose of the debriefing is not to place blame on any individual or individuals, but rather to gather information that will give us the opportunity to better ourselves as an entity that provides exceptional pediatric care. This information is for internal purposes only and will solely be used for system/process improvement.
Post Code Debriefings

• How long have you been a nurse?
• How long have you worked on this unit?
• Thinking back to the care of_______, describe the chain of events during your shift.
• Will you describe your assignment relative to the patient care activities during the shift?
Post Code Debriefings

• During the shift did you offer assistance to a peer that required you to be away from your patients for an extended period of time? Please explain

• We use SBAR as our format for exchange of information; do you think this format is adequate? Please explain
Post Code Debriefings

• Do you feel you have the tools and resources you need to accomplish your job?

• Thinking back to the care of________, do you feel you had the tools and resources you needed to appropriately care for this patient?

• How would you describe physician support for routine care of patients on_______?
Post Code Debriefing

• What about physician support when you have a critical or deteriorating patient?
• What is your experience and level of comfort with RRT?
• Is there anything you would like to add or do you have any questions for us?
Outcomes of Code Debriefings

- Meperidine restriction
- Suction regulators/oxygen flow meter for each patient room
- Education of staff on room set-up
- Education of staff on cardiac disease in renal patients
- Reinforcing seizure treatment algorithm with house staff via partnership with chief residents
Code Prevention Action Plan

- Night shift mock codes started February 2010
  Team A & Team B
- Critical competencies 2010
  Room set-up
  PAWS scenarios
  Code cart scavenger hunt
  Code documentation
- Pediatric Advanced Warning Score (PAWS) interrater reliability (IRR) studies
Clinical Deterioration Warning Tool

- CHCA Collaborative 2007
- Pediatric Early Warning Scale (PEWS)
- Developed in England
- Cincinnati Children's Hospital modified tool
- PEWS modified by TCH to PAWS
- Piloted 1 year
- Implemented housewide 2009
Clinical Deterioration Warning Tool

Pediatric Advanced Warning Score (PAWS)

• A scoring system to assess patient risk for clinical deterioration
• Recognizes the deteriorating patient condition
• Assesses behavior, cardiovascular and respiratory systems
• Patient assigned a color (green, yellow, orange, red) based on score of 0-11
• Treatment algorithm utilized to manage patient based on score
Texas Children’s Hospital PAWS Color and Number Coding

**Pediatric Advanced Warning Score (PAWS)**

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<td><strong>Cardiovascular</strong></td>
<td>Playing Appropriate</td>
<td>Irritable (consolable)</td>
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<td>Lethargic/confused</td>
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<td>Pink or baseline color and Cap. refill 1-2 seconds</td>
<td>Paled or Cap. refill 3 seconds</td>
<td>Pale &amp; Cap. refill 4 seconds or Tachycardia of ≥ 20 above baseline or Diaphoresis</td>
<td>Grey or Mottled or Cap. refill ≥ 5 seconds or Tachycardia ≥ 30 above baseline or Bradycardia</td>
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<td><strong>Respiratory</strong></td>
<td>RR and O2 sats within baseline limits and No signs of increased work of breathing</td>
<td>RR ≥ 10 above baseline or Mild use of accessory muscles</td>
<td>RR ≥ 20 above baseline or O2 sats 5 pts below baseline or Moderate use of accessory muscles</td>
<td>Slowing of RR below baseline &amp; increased work of breathing or O2 sats &gt; 5 points below baseline or Severe Retractions</td>
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</table>

- Score 2 extra points for patients who are on every hour respiratory treatments or with persistent vomiting following surgery.
- Review VS at time of scoring & repeat if isolated score of 3 in any category OR total score of ≥ 4 obtained.
- Review O2 requirement & trend at time of scoring.


Revised 7-21-09
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Adult Early Warning Scoring Tools

Early Warning Score (EWS) & Modified Early Warning Score (MEWS)

– Systolic blood pressure
– Heart rate
– Respiratory rate
– Body temperature
– Level of consciousness
– Urine output

PAWS Pilot Study

• Retrospective chart reviews
• 48 hour period of time
• January 1, 2009-June, 2009
• 150 patients (76 female, 74 male)
• Infants and children 2 months to 17 years
• 3 units (12 WT, 14WT & 15 WT)
• Patients with cardiac, medical & surgical diagnoses
Items Measured

- Reliability of the measurement scale/relationship between items in the scale
- Rate of RRT calls based on score
- Communication among healthcare team
- Correlation between increase score with increase in respiratory and cardiovascular rates
- Correlation of PAWS with decreasing GCS
Reliability & Validity Results

• The Cronbach alpha reliability coefficient was 0.75
• An increasing PAWS of ≥ 5 resulted in RRT calls 80% of the time
• Communication among health care professionals occurred 80% of the time when the PAWS was 3 or 4
• Significant correlations with Spearmen’s Rho between PAWS respiratory score/patient respiratory rate and cardiovascular score/ patient cardiovascular rate
• All correlations were positively correlated ranging from 0.261 to 0.406 and were statistically significant
Housewide PAWS Education

• Face to face 1 hour session on the unit
• Case scenarios
• Focus on patient safety - Josie King
• Focus on safety programs throughout the country
  – Medication reconciliation
  – Ventilator bundles
• Scoring tool & algorithm bedside binders
Physician Education

• 30 minute educational sessions
  – Grand rounds
  – Resident orientation
  – Department head meetings
  – Quality meetings

• Pocket cards
  – Scoring tool
  – Algorithm
Benefits of PAWS

• Helps to recognize the deteriorating patient so prompt intervention can occur
• Can decrease code red events because deterioration can be identified 2-6 hours sooner
• Physicians can use it for prioritizing rounds
• Improves communication among health professionals
How PAWS Is Utilized

Nurses score patients:

• Every 4 hours & document on flow sheet
• With changes in patient condition
• After interventions are performed
• When a Rapid Response Team (RRT) is called
How PAWS Is Utilized

PAWS is given as part of SBAR upon transfer from

– Emergency Center
– Pediatric Intensive Care Unit
– Progressive Care Unit
– Cardiovascular Intensive Care Unit
PAWS Interrater Reliability Studies

Objective: To champion PAWS adoption and promote accountability to the process at the unit level in order to maintain an acceptable PAWS interrater reliability score of 0.74 across Acute Care.
PAWS Interrater Reliability

Interrater Reliability February 2010

- Data collection times (4hrs, 8 hrs)
- Days and Nights
- Nurses were from 7N, 7S, 6N, Float Pool, 10 WT, 11 WT, 12 WT, 14 WT, 15 WT
- N=58 RNs (21% Acute Care staff)
## Days VS. Nights

### Correlations

<table>
<thead>
<tr>
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**. Correlation is significant at the 0.01 level (2-tailed).
# Intraclass Correlation Results

## Intraclass Correlation Coefficient

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<tr>
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<th>Intraclass Correlation</th>
<th>95% Confidence Interval</th>
<th>F Test with True Value 0</th>
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<tr>
<td></td>
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<td>Lower Bound</td>
<td>Upper Bound</td>
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<tr>
<td>Single Measures</td>
<td>.740&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.603</td>
<td>.835</td>
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<tr>
<td>Average Measures</td>
<td>.851&lt;sup&gt;c&lt;/sup&gt;</td>
<td>.752</td>
<td>.910</td>
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</table>

Two-way mixed effects model where people effects are random and measures effects are fixed.

- a. Type C intraclass correlation coefficients using a consistency definition—the between-measure variance is excluded from the denominator variance.

- b. The estimator is the same, whether the interaction effect is present or not.

- c. This estimate is computed assuming the interaction effect is absent, because it is not estimable otherwise.
Composition of Rapid Response Team (RRT) at TCH

- Critical Care Fellow/Attending Physician or Cardiology Fellow/Cardiology Attending
- Critical Care Nurse
- Patient Bedside Nurse
- Critical Care Respiratory Therapist
- Acting Chief for Unit
- Resident with responsibility for patient
- Nursing Administrative Coordinator
RRT Activation Criteria

- PAWS of 3 in one category or total score of 4
- Acute change in vital signs (HR, RR, B/P, O₂ Sat)
- Respiratory distress
- Acute change in mental status
- Difficult to control agitation/pain
- Prolonged seizure
- Acute change in urinary output
- Staff or family worried about the patient
Family RRT Activation

Patient or family calls 2-Safe (2-7233)
- Operator sends page of family RRT activation

Conditions warranting team activation
- Difficulty Breathing
- Worsening condition
- Health care team not addressing parent concerns
- Parent concern/“bad feeling”
Acute Care RRTs & Codes 2009-2010

2009: 256
2010: 213

RRT
Codes

Texas Children's Hospital
# EPIC PAWS & RRT Documentation

## RRT Assessment - RRT Assessment

- **Time Taken:**
  - Date: 3/5/2010
  - Time: 15:19
- **To flag data as significant, right click on the row name.**

### RRT Assessment

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<td>Capillary Refill</td>
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<tr>
<td>ECG Rhythm</td>
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### Additional Observations

- **Additional Observations:**
  - Observations recorded here.

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**Nursing**

**Texas Children’s Hospital**
Lesson Learned: Patient Safety
Lesson Learned: Change is Slow
Lesson Learned: Change Involves Continuous Process Improvement
Lesson Learned: Support from Staff & Management is Required
Lesson Learned: Teamwork is Key to Success

Nursing

Texas Children's Hospital
Future Goals

• Decrease the code events in Acute Care 2011
• PEARs certification for every nurse
• Improve the PAWS IRR score > 0.74
• Point in time education when appropriate
• Establish continuing education program (code readiness) to reinforce code response (high risk, low frequency)
Goal: Targeted Continuing Education

- Provide staff more opportunity to score patients with higher PAWS scores
  - Lower PAWS scores have higher interrater reliability
  - Infrequent codes in Acute Care (relatively speaking)
- Provide staff with program of continuing education to strengthen deterioration assessment & code response skills
Summary

• Helpful information can be retrieved from reviewing past code events
• Develop current plan of action to reach goals
• Partner with Quality Improvement to track progress and make adjustments in plan
• Continuously assess the multiple components of the plan (PAWS, RRTs) and results of their interfacing
• Keep everyone on the team informed about progress & opportunities
Questions?