A Multi-Disciplinary Approach to Meeting the New JC Standards for Alarm Management
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Objectives
• Describe quality process improvement for Alarm management
• Describe specific policies and procedures related to alarm management

Disclosures
• I have nothing to disclose
Credits
- Jackie Iseri CNIII Supervisor
- Janet Hebert MAS RNC Nurse Manager
- Multidisciplinary Quality Team
- Erika Fernandez MD Medical Director
- Chris Gibu MD Fellow
- Ana Lim RT Supervisor
- Leslie Catalan RT

Our Journey
Alarm Video

New JC National Patient Safety Goal - Where it Started:
Background JC Report

- Safe & effective use of physiological monitoring devices requires a clear understanding of the technology
- As health care professionals we must understand and balance its inherent benefits & risks
  - Benefits: able to “remotely” monitor
  - Benefits: able to pick up on physiologic changes quickly
  - Risk: Research has demonstrated that 72% to 99% of clinical alarms are false.
  - Risk: The high number of false alarms has led to alarm fatigue.

Background/Rationale

- Alarm fatigue is sensory overload when clinicians are exposed to a high number and/or rapid proliferation of alarming devices
- Excessive number of alarms, which can result in:
  - Desensitization to alarms
  - Devalue or ignore alarms
  - Disable and miss alarms
- Patient deaths have been attributed to alarm fatigue.

Our Journey Through JC 2014 NPSG

**Phase I (June 2014-April 2015)**
- Hospital Initiation
- QI on ROP

**Phase II (April 2015 – Dec 2015)**
- QI on ROP
- VON

**Phase III (January 2016 – now)**
- Parent Education
- Move to Single Pt Rooms
JC Patient Safety Goals

PHASE I

Phase I (June 2014-April 2015)

- Joined Hospital Wide initiative for alarm management
  - Worked to establish number of alarms, priority alarms, and what gets responded to, and who responds
  - Identify the most important alarms to manage
- Ongoing QI project on ROP
  - Started process of policy creation

Phase I: Hospital Initiative

- Investigation/Baseline:
  - Relationship between alarm limits and alarm fatigue
  - Spot data collection: 24 hours (day shift + night shift)
  - First go: all alarms
  - Second go: Monitor alarms only (no ventilators, feeding pumps, beds)
- Tally marks on card for monitor alarms only:
  - Low oxygen saturation
  - High oxygen saturation
  - Heart rate (bradycardia or tachycardia)
  - Unknown/Other (e.g. TCM, misplaced leads)
Outcomes

- Low sat: 416 (40%)
- High sat: 519 (50%)
- Heart rate: 34 (3%)
- Unknown/other: 80 (7%)
- Total alarms: 1049 (131 per patient per day)

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PHASE II

Phase II (April 2015 – December 2015)

- Continuation of QI project on ROP and Phase I rolled up into:
  - Developed and implemented policy and procedure for alarm management: Alarm parameters and Limits in NICU
  - Created standard guidelines for managing addressing who can change and silence alarms (RN, RT’s other licensed professionals)
  - Develop staff education
  - VON initiative Looking at Oxygen Saturation Targets
Saturation Orders:
- Clinical practice guidelines were changed based on best practice evidence.
- Oxygen saturation targets are now clearly identified for each patient during rounds daily.
- Physician and Nurse partnership for changing alarm limits.
- Nurses are required to check their oxygen orders and chart limits in EMR (audits for matching).
- Data on outcomes shared with staff.

Age Alarm Sats
- < 32 wk: 85-95%, 88-94%
- >32 wk: 85-98%, 90-95%
- >32 RA: 90-100%, >94%

Heart Rate: 90-200
Pressures: rounds
IV: 2 hours low volume
Vent alarms: RT determined and managed

Cards:
- Oxygen saturation cards were developed that clearly state the target saturations and alarm limits for each patient.
- These cards were developed with input from multiple members of the NICU staff.
- Each infant has a card.

Outcomes: QI Project: Cards
QI Project: Outcomes

Orders Match Monitors and Cards

Phase II (July 2015 – December 2015) cont.

- Completion of QI project on ROP and Phase I rolled up into:
  - Developed and implemented policy and procedure for alarm management; Alarm parameters and Limits in NICU
  - Created standard guidelines for managing addressing who can change and silence alarms (RN, RT’s other licensed professionals)
  - Develop staff education
  - VON initiative Looking at Oxygen Saturation Targets

VON Initiative: Background

- Vermont Oxford Network (VON): A nationwide collaborative that works toward improving the quality and safety of care for infants and their families.
- Each year, the network chooses a topic:
  - Summer 2015: Oxygen monitoring & alarm safety
- Quarterly webinars, Pre/Post audits
VON Initiative: Gaps

Policy:
- Reviewed policy – clarified
- Review of Saturation Cards
- Audit repeat (increased to 98%)

Education:
- Pulse ox monitoring and ventilators
- Oxygen saturation targets
- Oxygen saturation alarms
- Parents
- Single Patient Rooms

PHASE III: Part 1

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Phase III (January 2016 – ongoing)
- Parent education
VON initiative: Parental Involvement

- Baseline survey
  - Whether or not they have received education covering monitor alarms
  - Who provided the education
  - Basic monitor alarm knowledge
  - How monitor alarms make them feel
  - The best time and method to provide education

48% of Parents

Parent Survey

1. Do you feel educated on the monitor alarms in the NICU?
   - Yes □
   - No □

2. What are the three different monitor alarm colors? (Check 3):
   - Red □
   - Blue □
   - Green □
   - Yellow □
   - White □

3. Which alarm color notifies the medical team to look at your baby quickly?
   - Red □
   - Blue □
   - Green □
   - Yellow □
   - White □

4. Which alarm color notifies the medical team of an equipment error?
   - Red □
   - Blue □
   - Green □
   - Yellow □
   - White □

5. Which alarm color notifies the medical team of a slight change in your baby's vital signs?
   - Red □
   - Blue □
   - Green □
   - Yellow □
   - White □

6. This picture may produce a:
   - "True" alarm □
   - "False" alarm □

7. Which of these scenarios may produce a "false" alarm? (Check ALL that apply):
   - Infant moving □
   - Infant kicking □
   - Monitoring leads off □

8. I feel the medical team responds well to monitor alarms. (Medical team includes: Doctors, Nurses, Respiratory Therapists).
   - Strongly Disagree □
   - Disagree □
   - Neutral □
   - Agree □
   - Strongly Agree □

9. I feel monitor alarms help keep my baby safe in the NICU.
   - Strongly Disagree □
   - Disagree □
   - Neutral □
   - Agree □
   - Strongly Agree □

10. I feel that knowing the different monitor alarms makes me more comfortable in the NICU.
    - Strongly Disagree □
    - Disagree □
    - Neutral □
    - Agree □
    - Strongly Agree □

11. I feel my baby is safe in the NICU.
    - Strongly Disagree □
    - Disagree □
    - Neutral □
    - Agree □
    - Strongly Agree □

Parent Survey Results

- While 77% of surveyed parents reported that they felt educated on the monitor alarms, 39% were able to correctly identify the 3 alarm colors.
- 84.6% correctly identified what color alarm means "look at your baby quickly"
- 92.5% correctly identified what color alarm means "slight change in baby's vital signs"
- Only 54.5% could identify which color means "equipment error".
- 54.5% were able to state that the image of the poor waveform would create a "false alarm"
- 53.8% correctly chose all possibilities for causes of false alarms.
- 61.5% strongly agreed that the medical team responds well to monitor alarms.
- 69.2% strongly agreed that monitor alarms help keep their baby safe in the NICU.
- 69.2% strongly agreed that knowing the different monitor alarms makes them more comfortable in the NICU.
- 100% strongly agreed that their baby is safe in the NICU.
Parent Survey Results (cont.)

- What do you think is the best way for parents to be taught about monitoring systems and alarms?

70% Parents Wanted One on One

Parent Survey Results (cont.)

- What would be an ideal timeframe in your NICU stay for our team to educate you on monitor alarms?

EDUCATION PREFERENCE

VON Initiative: parent Involvement

- Formal education materials for parents:
  - One page handout added to nurse created admission packet
    - Meaning & consequences of O2 saturation alarms
    - When pulse ox alarm signals can be "paused"
    - Which staff members have authority to set pulse oximeter settings to "off"
    - Pictures of good vs bad readings
Monitors are used in the Neonatal Intensive Care Unit to help the medical team care for your baby. The vital signs that they read are used as a piece of information. These vital signs include heart rate, oxygenation, respiratory rate, and blood pressure. When we consider these numbers with other information, like patient history, they can help us create a plan of care. Looking at the monitor once is a small piece of information, but looking at how the numbers change over time can be valuable.

Leads (stickers with wires) are placed on your baby so that the monitor can measure these vital signs:

- **Heart rate:** GREEN.
  - Measured in beats per minute.
  - 2 leads on the chest or arms

- **Oxygenation:** PURPLE.
  - Measured in percent.
  - It is the amount of oxygen in the baby's blood.
  - The pulse oximeter (“pulse ox”) looks like a Band-‐Aid with a sensor. It can be on the wrist, foot, hand, finger, toe, or ear.

- **Respiratory rate:** YELLOW.
  - Measured in breaths per minute.
  - 1 lead on the abdomen or leg.

Monitors signal to the healthcare team using 3 different colors and sounds. These signals are important in our unit because they tell the team that something has changed and it requires our attention.

- **Blue:**
  - Equipment error
  - Low-‐pitched beep

- **Yellow:**
  - Slight change in the baby’s vital signs
  - Low-‐pitched ringing

- **Red:**
  - Look at the baby quickly
  - High pitched ringing

“False” alarms are caused by anything that keeps the monitor from measuring baby’s vital signs correctly. Remember, vital signs are measured by stickers, so if they fall off or a baby is moving a lot, they do not work properly. You can usually tell a “false” alarm by a crooked and uneven line. The healthcare team is experienced in knowing the difference between a “true” alarm and a “false” alarm, so they may not always rush to baby’s bedside. How a baby looks is more important than what the monitor is saying.

Please ask a member of your medical team if you have questions.
Outcomes: Repeat survey of Alarms shows:

- Low sat: 320 (40%)
- High sat: 200 (50%)
- Heart rate: 30 (3%)
- Unknown/other: 120 (7%)
- Total alarms: 670 (84 per patient per day)

Future Directions/Concerns

- Address other alarms/noise within unit
  - Ventilators
  - Feeding Pumps
  - IV Pumps
  - Talking
JC Patient Safety Goals

PHASE III: Part 2

Phase III (NOW)

- Move to new facility October 2016:
  - JC added to the Initiative:
    - “It has been a challenge for NICUs transitioning from open bay to single patient room environments…”
  - Identify Key Issues:
    - Assessment of our alarm and phone system
    - Duplicating alarms
    - Noise
References


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Thank You