Alarm Fatigue: Understanding the Problem & Strategies for Reducing Alarm Burden

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The Problem of Excessive Alarms
Released in 2013
As of July 1, 2014, hospitals must establish alarm system safety as a hospital priority
As of January 1, 2016, have staff education completed and have updated policies implemented

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Total Alarms 5,820
Total Threshold Alarms 4,057
Total Technically False Alarms 1,505 (36.3%)
Implementation of a Nighttime Noise Reduction Bundle and Modified Alarm Profile to Reduce ICU Noise and Alarms

Hypothesis
Implementing a nighttime noise reduction bundle (NNRB) concurrently with a streamlined patient monitoring alarm profile will reduce Medical Intensive Care Unit (MICU) noise levels and decrease alarm frequency.

Methods
ALARM PROFILE: The new profile was designed with the goal of reducing nuisance alarms by applying more stringent criteria. Proposed changes were presented to and approved by the institutional Critical Care Quality Council before implementation. The final alarm profile was active 24 hours per day.

Strategies for Managing Alarms

What We Need to Do
• Individualize Alarm Parameters
• Optimize Signal Quality
  - ECG electrodes
  - O2 Sat Monitoring
  - BP Cuff Positioning

How We Need to Do It
• Interprofessional Teams
• Measurement
• Human Factors Engineering

Alarm Reduction Protocols

Outcome Measures | Pre | Post
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Total Number of Alarms | 16,953 | 9,647
Nurse Ratings of Noise Level | 4.0 | 3.5
Nurse Ratings of Noise From Monitor Alarms | 3.1 | 2.97
The frequency of alarms in ICU's today is putting patients at risk. Alarm management is a priority set by the Joint Commission. Eliminating false and/or clinically irrelevant alarms reduced alarm burden and improves effectiveness of remaining alarms.

The issue of alarm management requires on-going monitoring to maintain reductions in alarm levels. Reducing false alarm rates and improving effectiveness of existing alarm systems is crucial. This involves analyzing current alarm levels and types, setting appropriate alarm thresholds, and evaluating the impact of changes over time.

### Alarms

- **Red Arhythmia Alarms:**
  - Case 1: No activity for >4 seconds
  - Case 2: Combination of PVCs at HR < 100
  - Case 3: HR < 40 above threshold OR < 50
  - Case 4: HR < 20 below threshold OR < 30

- **Yellow Arrhythmia Alarms:**
  - Case 1: No PVCs in 3.5 min.
  - Case 2: No QRS or pacing spikes in 3.5 minutes
  - Case 3: No QRS or pacing spikes in 2.5 minutes
  - Case 4: No QRS or pacing spikes in 1.5 minutes

- **Miscellaneous:**
  - Case 1: No activity for >4 seconds
  - Case 2: Combination of PVCs at HR < 100
  - Case 3: HR < 40 above threshold OR < 50
  - Case 4: HR < 20 below threshold OR < 30

### Summary

- The frequency of alarms in ICU's today is putting patients at risk.
- Alarm management is a priority set by the Joint Commission.
- Analyzing current alarm levels and types is the first step in alarm reduction.
- Eliminating false and/or clinically irrelevant alarms reduced alarm burden and improves effectiveness of remaining alarms.
- A systematic, interprofessional approach is needed for success.
- The issue of alarm management requires on-going monitoring to maintain reductions in alarm levels.
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References


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