

## **Evidence-Based Review and Discussion Points**

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# Evidence-Based Review and Discussion Points

By Ruth Kleinpell, RN, PhD

**Evidence-Based Review (EBR)** is the journal club feature in the *American Journal of Critical Care*. In a journal club, attendees review and critique published research articles: an important first step toward integrating evidence-based practice into patient care. General and specific questions such as those outlined in the "Discussion Points" box aid journal club participants in probing the quality of the research study, the appropriateness of the study design and methods, the validity of the conclusions, and the implications of the article for clinical practice. When critically appraising this issue's EBR article, found on pp 28-35, consider the questions and discussion points outlined in the "Discussion Points" box. Visit [www.ajconline.org](http://www.ajconline.org) to discuss the article online.

**T**his quality improvement initiative assessed the impact of management interventions and education to reduce the number of cardiac monitor alarms on a medical progressive care unit. An evaluation of the types and frequency of monitor alarms was conducted and an interdisciplinary alarm management taskforce was formed.

A hospitalwide cardiac monitoring protocol was then developed and tested during a year-long

process. Recommendations for alarm management that were implemented included nursing staff interventions to individualize alarm parameter limits and levels. Results from the initiative showed that implementation of an interdisciplinary monitor policy and education focusing on optimal cardiac monitor alarm limits and levels resulted in a 43% reduction in critical monitor alarms.

## Information From the Authors

Coauthor Maria Cvach, RN, MSN, CCRN, said the idea for a quality improvement project on cardiac monitor alarms was the result of patient safety concerns and risk management issues. She cited the Joint Commission's 2004 National Patient Safety Goal No. 6 to improve the effectiveness of clinical alarm systems as the specific motivation for the project.

Cvach explained how the interdisciplinary alarm management taskforce was formed: "We started with a focus group for the medical progressive care unit (MPCU) for 9 months. The initial group consisted of nurses, clinical engineers, and physicians in the MPCU. We expanded our membership 9 months into the project and brought in nursing staff from other non-MPCU areas including intensive care and telemetry units, human factors engineering, risk management, and operations integration."

Quality monitoring activities were then implemented. She explained: "Clinical engineering connected a tracking device to the unit's physiologic monitors that was able to quantify the number of alarms coming from the monitor at each bedside. This information was downloaded into an Excel spreadsheet and we were able to document the number of alarms and the types of alarms that were occurring on the unit for a period of 18 days."

The timeline for the study was established after the team determined the required components. Cvach said the initiative began in January 2006. "It took us 4 months to study the problem and gather alarm data for objective assessment of excessive alarms. Once we were able to quantify the

## Investigator Spotlight

This feature briefly describes the personal journey and background story of the EBR article's lead investigators, discussing the circumstances that led them to undertake the line of inquiry represented in the research article featured in this issue.



**Maria Cvach**

**B**ecause she had been involved in other safety initiatives, including a Fall Safety program, coauthor Maria Cvach was familiar with many of the safety concerns related to monitor alarms.

She said working with an interdisciplinary team was a very positive experience. The team included engineers, the unit's nursing manager, and even vendors. She noted: "We even had a monitor vendor who eagerly attended meetings, assisted us in understanding the monitor, and brought in experts from the vendor's company when needed." She was also pleased that participants on the interdisciplinary committee participated in writing the hospitalwide policy.

Coauthor Kelly Creighton Graham was the clinical nurse representative from the medical progressive care unit (MPCU) on the alarm committee. She played an active role in implementing change on the MPCU as a senior nurse and later as the unit's patient coordinator. Cvach said, "Since Kelly worked on the MPCU, it was not difficult for her to recruit participants from the unit. The culture of the unit is to promote patient safety."

number, we were able to determine interventions that may be helpful in reducing the number of alarms." The team reviewed the unit's default parameters for physiologic monitor alarms and made recommendations to decrease duplicate alarms. They also lowered threshold parameters to actionable levels and changed alarm levels from advisory to warning where appropriate.

To reduce excessive noise, the intervention team programmed benign alarms to display messages. They also developed a hospitalwide monitor protocol that included alarm management, and assessed the unit staff's knowledge of physiologic monitors and alarm management. An education plan for the staff also was developed.

Cvach said, "All of this was done using a plan-do-study-act approach so that lessons learned could be shared with other units if they were successful."

The team led a small test of change that focused on targeting alarm parameters. Cvach explained, "Performing 'small tests of change' means to make one change and to test it. For instance, if an alarm parameter was changed for heart rate from an upper limit of 120/min to 150/min, or premature ventricular contractions changed from 6/min to 10/min, the change was made and then the effect on the alarms was studied to see the significance on the reduction of alarms and to determine if the change resulted in any kind of patient safety issue."

### Implications for Practice

The results of the study show a significant decrease in the number of alarms due to the initiative. This finding has direct implications for critical care nurses. Cvach believes that critical care nurses who do not have a unit-based or centralized monitor watch would benefit from examining their monitor alarms, parameter thresholds, and levels. Alarms should be set to actionable levels so as not to desensitize staff. She noted, "Critical care nurses should know their equipment and be familiar with troubleshooting nuisance alarms. It is important that alarms be individualized

#### About the Author

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for the patient so when an alarm occurs it is meaningful and handled expeditiously."

In conclusion, Cvach advised nurses to ensure that their hospital has a policy for alarm management that covers alarm audibility, alarm escalation, and troubleshooting alarms. She said, "Educate staff via monitor competency checklists. Study your unit to determine if alarm desensitization is occurring and how it can be reduced."

#### eLetters

Now that you've read the EBR article and accompanying features, discuss them with colleagues. To begin an online discussion using eLetters, just visit [www.ajconline.org](http://www.ajconline.org), select the article in its full-text or PDF form from the table of contents, and click "Respond to This Article" from the list on the right side of the screen. All eLetters must be approved by the journal's coeditors prior to publication.

### Discussion Points

#### A. Description of the Study

- What was the purpose of the project?
- Why is the problem significant to practice?

#### B. Literature Evaluation

- What does the literature indicate with respect to alarm rates and false alarms?
- Why is the concept of alarm fatigue important to patient care?

#### C. Sample

- What were the characteristics of the test unit for the project?

#### D. Methods and Design

- How were cardiac alarm and system status alarm data collected?
- What were the specific tests of change that were implemented during the program?

#### E. Results

- What was the decrease in total number of alarms that occurred due to the initiative?
- How did the alarm data compare to the average census of the unit?

#### F. Clinical Significance

- What are implications of the study for clinical practice?
- How does the study extend the evidence base on the impact of interventions targeting proper tailoring of alarms?