Boston Medical Center alleviates alarm fatigue by decreasing noise

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Boston Medical Center (BMC) successfully reduced audible alarms as a way to combat alarm fatigue and improve patient safety. The hospital, one of two in the country that spearheaded this issue, implemented a novel cost-effective approach during a six-week pilot program that resulted in a drastic drop in audible alarms. The successful approach has since been expanded to all BMC inpatient medical surgical units and is being touted as a model for other hospitals working to combat alarm fatigue.

Clinical alarm fatigue describes when providers become desensitized to the constant beeps from monitors that could result in a failure to respond (or failure to respond quickly enough) to alarms indicative of a potential life-threatening condition. A recent *JAMA* article warned of alarm fatigue from the number of monitor alarms sounding, creating a potential hazard to patients.

The Joint Commission, a nonprofit organization that accredits more than 20,000 health care organizations and programs in the United States, issued a Sentinel Event Alert about 80 alarm-related deaths that occurred between January 2009-June 2012 and identified alarm safety as a 2014 national patient safety goal. BMC's innovative alarm work was featured in a May 2013 Joint Commission webinar that attracted thousands of participants nationwide and served as an example to urge hospitals to develop and implement plans to better manage alarms to increase patient safety.

"Alarm fatigue and management of alarms are important safety issues that we must confront," says Ana McKee, M.D., executive vice president and chief medical officer, The Joint Commission. "The work of Boston Medical Center and numerous others who are trying to find solutions to this very serious patient safety issue should be applauded. By making alarm safety a priority, lives can be saved."

BMC data showed that patient status arrhythmia and parameter limit "warning" alarms frequently preceded life-threatening arrhythmic events. During the pilot, these alarms were raised to "crisis." "Crisis" alarms are heard in real time and require immediate action, which nurses felt could increase patient safety. Nurses also tailored alarm settings that did not indicate a true crisis based on individual patient health care needs.

Working in a cardiology unit, BMC reduced audible cardiac monitor and telemetry alarms by 89 percent, dropping daily audible alarm averages from 12,546 to 1,424. Before the pilot, the unit averaged 87,823 weekly audible alarms. During the pilot, the number dropped significantly to an average of 9,967 weekly audible alarms, with the largest decrease from the changes to monitors for bradycardia, tachycardia and heart rate parameter limits, which dropped from 62,793 to 3,970. Additionally, daily reviews of incident reports showed that no reports were filed during the pilot for adverse events involving cardiac monitoring.

Noise levels fell to 72 decibels from 90 decibels pre-pilot. Patient and clinician satisfaction increased and none of the changes made during the pilot required additional technology or financial resources.

"While some hospitals are looking to add technology to combat this issue, BMC's approach demonstrates the opportunity for clinicians to interact with current alarm systems more effectively to decrease clinical alarm fatigue while simultaneously capturing and displaying all

important alarms," said James Piepenbrink, BSBME, director of clinical engineering at BMC and a study co-author.

The pilot's results led BMC to implement these changes on inpatient medical/surgical units throughout the hospital. By January 2013, 310 of 332 beds in these units were operating under the new alarm standards with significant alarm reductions and increases in patient and staff safety and satisfaction.

Nurses were surveyed anonymously both before and after the pilot about the unit noise level, and the "acceptable" noise level score went from 0 to 64 percent. Additionally, nurses were asked how these changes had impacted their work environment. One said, "I feel so much less drained going home at the end of my shift."

While patient satisfaction was not an area of focus for the pilot study, scores recorded through Press Ganey Inpatient Metrics showed an increase in nurse responsiveness and patients' needs being addressed more promptly.

"These changes resulted in staff having more time to directly care for patients and interact with their families, which corresponded to an increase in both patient and provider satisfaction," said Deborah Whalen, MSN, APRN, ANP-BC, BMC clinical service manager, cardiology nurse practitioner and study co-author.

More information: Results of the pilot study are published online in the *Journal of Cardiovascular Nursing*.

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