ECRI Institute Honors The Johns Hopkins Hospital For Innovations In Alarm Management

Winner of 7th annual Health Devices Achievement Award

Ecri Institute's Health Devices Achievement Award Is Presented Each Year To A Member Hospital to honor excellence in the field of health technology management. For 2012, that honor was bestowed on The Johns Hopkins Hospital for its systematic approach to improving the management of physiologic monitoring alarms yielding substantial reductions in the kinds of clinically insignificant alarms that can lead to alarm fatigue.

Medical device alarms perform an essential patient safety function. However, the sheer number of alarms in some care areas can itself become a patient safety concern. For example, when capturing baseline alarm data, Johns Hopkins recorded an average of 317 alarms per bed per day in one of its intensive care units, and 771 alarms per bed per day in another (during analyses conducted over seven days). With so many medical devices sounding alarms and issuing alerts, caregivers can too easily become overwhelmed trying to respond to the alarms, or they can become desensitized, which can lead to missed alarms or delayed response. The problem is so pervasive, and the potential consequences so severe, that we have included alarm hazards at or near the top of our annual list of the Top 10 Health Technology Hazards every year since the list's inception (www.ecri.org/2013hazards).

The 2012 Health Devices Achievement Award was presented to The Johns Hopkins Hospital for its comprehensive study of alarm desensitization, or “alarm fatigue.” This patient safety initiative has led to demonstrable improvements in the management of clinical alarms within many of the hospital’s care units, reducing the potential for missed alarms and also reducing the noise levels, thereby providing a quieter working environment for caregivers and a safer, more restful environment for patients.

To address problems associated with alarm fatigue, The Johns Hopkins Hospital formed a multidisciplinary Alarm Management Committee. The committee studied the type, frequency, and duration of alarms that occur within particular care units and then used this information to develop and apply changes that would positively affect patient care. A key target of the initiative was to reduce the number of nonactionable audible alarms—alarms that sound for events that do not require staff to intervene. Reducing the number of nonactionable alarms not only reduces the overall alarm load, but also increases the percentage of actionable alarms; thus, nurses are more likely to respond promptly and correctly to the alarms that do sound.

The work of the committee included the following:

- Developing a fault tree analysis to identify all possible failure modes associated with a missed alarm.
- Collecting and analyzing baseline data with respect to the number and types of alarms occurring in each monitored care unit, and using this data to inform committee decisions on alarm-reduction strategies. Software was purchased that allows the facility to build alarm-escalation algorithms specifying how and when a noncrisis alarm should be communicated. For a noncrisis alarm condition, for example, a delay could be instituted so that caregivers are notified only if the alarm persists for a specified period of time (e.g., one minute); thus, conditions that quickly self-correct would not send an alert to the care provider.
• Developing an alarm policy and, where practical, standardizing equipment and methods. Consistent with the committee’s goal of simplifying the alarm management approach, the hospital standardized monitoring equipment across the facility and implemented a uniform approach to alarm management. The committee even extended its standardization efforts down to the feature level—for example, alarm tones were standardized whenever possible so that similar conditions would sound similar tones in different care units. Thus, nurses and physicians who float among various care areas can more readily identify the meaning of the alarms they hear.
• Supporting the alarm policy through reeducation and competency training.
• Analyzing and implementing methods for adjunct alarm notification. Each care unit was required to establish at least one secondary notification method to ensure that alarms are audible and appropriately managed.

The committee also collected and analyzed monitor-alarm data after interventions were made in order to confirm and quantify improvements. Success in that care area prompted the facility to expand its initiative, looking at other ways to improve alarm management and extending its efforts to other care areas.

BEST PRACTICES
The Johns Hopkins alarm management initiative demonstrates that the number of nonactionable alarms can be reduced—thereby decreasing caregivers’ alarm burden without compromising patient safety—by making modest default parameter changes, standardizing care policies and equipment, and providing reliable secondary alarm notification. All that was required was some hard work and desire: The organization invested the time to understand the problem, studied and tested various solutions, and then shared knowledge among various staff and departments. The project truly was a collaborative effort, involving contributions from nurses, physicians, clinical engineers, and IT personnel, as well as the cooperation of the hospital’s monitor vendor.

Keys to the success of the program included:
• Taking the time to understand how the facility’s monitoring systems worked
• Focusing on adjusting alarms to actionable levels
• Clinical engineering staff were vital in helping committee members gain a true understanding of the facility’s monitors and the implications of making any change
• Establishing an alarm committee to make decisions based on experience
• Involving the frontline caregivers in decisions, allowing care units to select alternatives that made sense for their particular workflow

Also, the committee’s thorough approach to collecting and analyzing data, both before and after interventions, allowed Johns Hopkins to measure the effectiveness of its efforts.

Submissions are now being accepted for ECRI Institute’s 8th Annual Health Devices Achievement Award. To learn more, visit www.ecri.org/hdaward.

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