

## **Surveillance Monitoring Management for General Care Units: Strategy, Design, and Implementation**

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**BACKGROUND:** The growing number of monitoring devices, combined with suboptimal patient monitoring and alarm management strategies, has increased "alarm fatigue," which have led to serious consequences. Most reported alarm management approaches have focused on the critical care setting. Since 2007 Dartmouth-Hitchcock (Lebanon, New Hampshire) has developed a generalizable and effective design, implementation, and performance evaluation approach to alarm systems for continuous monitoring in general care settings (that is, patient surveillance monitoring).

**METHODS:** In late 2007, a patient surveillance monitoring system was piloted on the basis of a structured design and implementation approach in a 36-bed orthopedics unit. Beginning in early 2009, it was expanded to cover more than 200 inpatient beds in all medicine and surgical units, except for psychiatry and labor and delivery.

**RESULTS:** Improvements in clinical outcomes (reduction of unplanned transfers by 50% and reduction of rescue events by more than 60% in 2008) and approximately two alarms per patient per 12-hour nursing shift in the original pilot unit have been sustained across most D-H general care units in spite of increasing patient acuity and unit occupancy. Sample analysis of pager notifications indicates that more than 85% of all alarm conditions are resolved within 30 seconds and that more than 99% are resolved before escalation is triggered.

**CONCLUSION:** The D-H surveillance monitoring system employs several important, generalizable features to manage alarms in a general care setting: alarm delays, static thresholds set appropriately for the prevalence of events in this setting, directed alarm annunciation, and policy-driven customization of thresholds to allow clinicians to respond to needs of individual patients. The systematic approach to design, implementation, and performance management has been key to the success of the system.