

## Clinical Evidence Series

Time series evaluation of improvement interventions to reduce alarm notifications in a paediatric hospital

### What's different

A multicomponent, longitudinal alarm management strategy combining customizable alarm logic, new technology, and workflow redesign was implemented and sustained over 3.5 years, including the step of silencing in-room alarms while preserving alarm notification pathways.

### Interpretation

This study shows that alarm burden can be substantially and sustainably reduced through systematic customization of alarm logic and clinical workflows without evidence of compromised patient safety, supporting a shift toward context-specific alarm management.

### Key takeaways

Initial **alarm notifications decreased by 68%** (71 to 22 per monitored bed-day) over 3.5 years, with no increase in safety events, highlighting the role of integrated alarm strategies beyond a single platform.

### Background

- Continuous physiologic monitoring generates a high volume of non-actionable alarms, contributing to alarm fatigue and delayed response
- Alarm reduction strategies must decrease unnecessary alarms without compromising patient safety

### Objectives

Determine if structured alarm reduction interventions can sustainably reduce alarm frequency while maintaining patient safety.

### Study design and methods

- Time series evaluation conducted in a pediatric acute care cardiology (ACCU) setting at a large academic medical center, assessing longitudinal alarm interventions
- Multidisciplinary quality improvement program using small tests of change and Plan-Do-Study-Act (PDSA) cycles
- Multi-component intervention over 3.5 years, including:
  - Optimization of ECG lead maintenance to reduce signal artifacts
  - Standardization and customization of alarm thresholds and delay settings
  - Reduction or silencing of non-actionable and in-room audible alarms
  - Implementation of tiered alarm notification and paging logic
  - Deactivation of non-actionable system-level default alarms

### Results



**68%**  
reduction in initial alarm notifications per monitored bed day (71 → 22)



**Improved nursing satisfaction** with faster, more appropriate alarm response



**No change in safety outcomes**, including medical emergency team activations and ICU transfer