

Reducing alarm fatigue

THE ESSENTIAL GUIDE FOR HOSPITALS



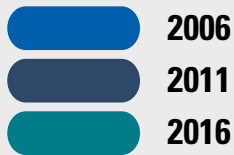
Insights into the ongoing issue of alarm fatigue

Audible alarms from infusion pumps, cardiac monitors, ventilators, and other machines constantly compete for nurses' attention during a shift. More often than not, the message isn't relevant or actionable.¹ The result can be deadly if a patient's caregiver becomes desensitized and assumes an alarm is false or misdirected.

It's no secret to nurses or hospital administrators that alarm fatigue is a persistent problem. An article in the American Journal of Critical Care² reported the findings of a clinical alarms survey (conducted at five-year intervals since 2006) to see how the challenge of alarm fatigue is trending. The most recent survey results from over 1,200 nurses and other clinicians are not encouraging, including responses to a key question about so-called "nuisance alarms." The percentage of respondents reporting that nuisance alarms "occur frequently" has jumped more than 10% in the past five years.

Nuisance alarms on the rise

Respondents who agree/strongly agree with these statements (see right).



The authors noted that in comparison to prior years, the most recent survey results show a higher proportion of respondents who said their organizations have instituted clinical alarm initiatives and/or alarm management technologies. That's the good news. However (the bad news), a higher proportion also reported that "nuisance alarms occur frequently, disrupt patient care, and reduce trust in alarms."³

Nuisance alarms occur frequently



Nuisance alarms disrupt patient care



Nuisance alarms reduce trust in alarms and cause caregivers to inappropriately turn alarms off at times other than during setup or procedures



Three ways alarm fatigue produces harm

1 Patient safety is at risk

Patient care and monitoring devices (pulse oximeters, ventilators, heart monitors, nurse call systems, infusion pumps, etc.) are critical to alerting caregivers when a patient's condition changes. But so many alerts are produced every day (a study at Johns Hopkins Hospital⁴ found a daily average of 350 alarms per bed) that the sheer number of alerts can quickly become problematic.

False positives from loose leads, redundant alerts from poorly set thresholds, and notifications for patients under someone else's care are just the beginning. Not only are alerts often distracting and difficult to decipher, but they can also be deadly if excessive alarms cause care teams to become desensitized. Common responses to this issue are to turn down the volume, turn alarms off, or adjust settings outside safe limits—none of which is a desirable solution.⁵ For several years, The Joint Commission has addressed alarm fatigue as a patient safety concern by including it as national patient safety goal NPSG.06.01.01: Improve the safety of clinical alarm systems.⁶

2 Staff retention is at risk

Beyond the risk to patient safety—which is sobering enough—are other negative effects of too many alarms. There is growing evidence that alarm fatigue contributes to clinician burnout.⁷ For nurses on today's hospital units, the complex devices for multiple patients that must be constantly monitored add to an already stressful job.

Yet a study from the Association for the Advancement of Medical Instrumentation reported that an amazingly high number of alerts, between 85 and 99%, do not require clinical attention.⁸ Caregivers nevertheless are interrupted and must respond in some way. It's a small wonder that nurses report being desensitized to alarms.

3 Patient healing is at risk

Too many audible alarms contribute to another issue for hospitals: a too-noisy environment. Whether it's constant overhead paging or the patient's own monitors going off, excessive hospital noise inhibits patient healing and recovery. It's a patient satisfaction issue, too: By a substantial margin, noise is the highest-ranked patient complaint⁹ on the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey.

Clinician Burnout in healthcare: A report for healthcare leaders

Learn what over 470 clinical staff shared on their perceptions of burnout and how their organizations are working to tackle it.

[Read the report](#)

Alarm surveillance technology and effective alarm management

Many hospitals aren't efficiently using alarm management. Combating alarm fatigue is daunting, but not insurmountable. The latest alarm surveillance technology can filter out nuisance and non-clinically actionable alarms, alert the correct providers or teams, and escalate critical alarms.

It's all about making notifications smarter.¹⁰ Technology that sends alerts to the right person at the right time can reduce the number of non-actionable messages. Through integration with a variety of patient care devices and clinical systems such as ventilators, pulse oximeters, and patient monitors, smart alarms can capture and correlate real-time patient data. Alarm surveillance technology can then analyze the data via established rules:

- **Combination alarms**

When two or more independent patient measurements violate specific limit thresholds simultaneously.

- **Consecutive alarms**

When a patient measurement goes in and out of a limit threshold, a given number of times, over a specified amount of time.

- **Sustained alarms**

When a patient measurement violates a specific threshold for a specified minimum period of time.

The result is more relevant, actionable alarms, as well as a dramatic reduction in the overall number of alarms.¹¹ Moreover, intelligent software provides escalation for unacknowledged alerts and allows hospitals to maintain a full audit trail of every notification—when it was received, viewed, and responded to.

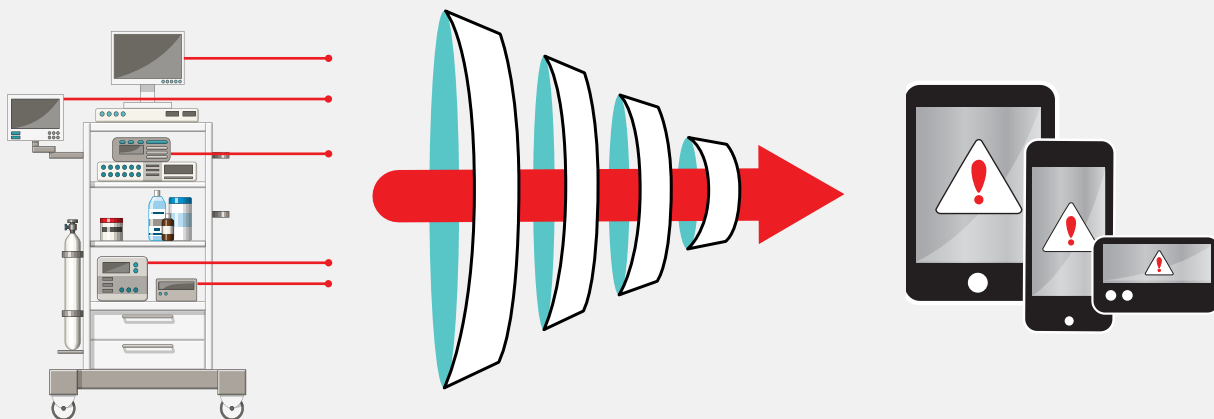
Capture live streaming data from patient care devices



Unique smart alarms filter out non-actionable alarms



Filtered alarms sent to caregivers' mobile devices



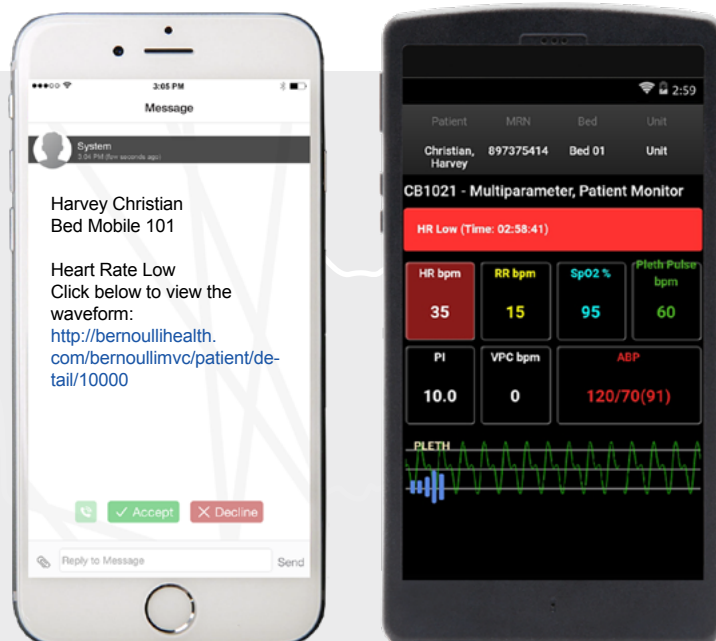
Getting started on your alarm management initiative

Alarm fatigue is a systemic issue, and the response also needs to be systemic. Take the time to ensure your solution addresses all pain points and encompasses people, processes, and technology. Here are some steps to help you get started:

Do your homework

- **Include all who have a stake in this issue.** Use a process improvement team that spans a diversity of disciplines. The entire care team will need to understand, be trained on, and carry out whatever solution they develop. Remember to include non-clinical roles that impact patient care, like biomedical technologists and health unit coordinators.
- **Conduct an alarm assessment on each unit.** Each unit will have its own set of issues that require unique responses. A comprehensive assessment will give you a better idea of what's needed to decrease hospital noise on every floor. Don't assume! If you're having a lot of lead-fail alarms, fixing your alarm defaults isn't going to matter: You probably have a problem with your electrode practices.¹²
- **Clean and monitor equipment.** The frequency of monitor alarm sounds can often be reduced by simply cleaning and replacing electrodes, or by ensuring a monitor is working properly. Regularly changing single-use sensors and establishing routine times to inspect, clean, and maintain equipment is a good best practice.¹³
- **Tailor alerts to patient characteristics.** Make a dent in the number of sounding alarms by resetting device parameters for individual patients depending on their specific condition. Alarms that require immediate attention for one patient may not be important for the next, so tailoring parameters will reduce the overall number of alarms as well as alert caregivers to problems that truly need attention.¹⁴

Alarm surveillance software and mobile access to important patient data improves response



Choose the right technology

Choose an enterprise-wide mobile alarm management solution. Look for a technology that provides a common alarm management platform across the health system, including biomedical devices, your EHR, and facility devices. Engage your vendor: They may be able to offer capabilities you've never considered. With alarm management software, you're doing more than accommodating staff on the go:

- **Get the right message to the right person.** By sending alerts (including live waveforms when appropriate) from patient care monitoring devices directly to the correct care team member's preferred mobile device (smartphone, Wi-Fi phone, tablet, or pager), you get speedier response times as well as more informed decisions—thus improving patient care.
- **Decrease noise, increase patient satisfaction.** By bypassing the nursing station and sending secure alerts to the correct on-duty clinician's mobile device, you can reduce the number of calls and overhead announcements. This minimizes noise and promotes a quieter environment for resting and healing for patients.
- **Triage alerts with software.** Intelligent clinical alerting software can incorporate your facility's preset priority levels and use built-in logic to pass along the highest levels of alerts first. Thus, nurses only receive alerts to their mobile device that require immediate attention and are actionable. Further, you can build escalation paths to help ensure critical alarms receive a timely response.
- **Decrease clinically inconsequential alerts.** Changing a monitor's thresholds (when appropriate) can cut the number of non-actionable alarms. By switching cardiac monitor thresholds from "warning" to "crisis," daily audible alarm averages at Boston Medical Center dropped 89% (from 12,546 to 1,424). This change not only increased nurse responsiveness, but it also dropped noise levels from 92 decibels to 70.¹⁵

Keep the momentum going

- **Ensure proper training.** The sophisticated monitoring devices in use today require staff members to be educated in sensor management, patient skin preparation, customization of alarm parameters, and more. As part of an alarm management plan, your hospital should establish processes to ensure clinical care teams receive continuing education on new and updated devices and protocols.¹⁶
- **Measure your progress.** Sharing data about alarm reduction, improved message response rate, or faster response time for critical alerts will keep you and your organization on the right path. Metrics will help you refine parameters, improve escalation paths, and find ways to safely reduce non-actionable and non-clinically relevant alarms. You'll also identify any root causes leading to excess alarms—and thus help identify correctable patient safety issues.
- **Support your process improvement team.** These people will help push through the rocky spots, particularly during the tough work of maintenance and continuous education. Their passion for improving patient care (and by extension improving the clinical experience) will keep the initiative on track.

CASE STUDY

UNIVERSITY OF UTAH HEALTH

spok

THE CHALLENGE

The patient was admitted for hypoxia and fatigue, and by the next day, he had his first fever and registered a modified early warning system (MEWS) score of 8. Sepsis protocol was initiated to start the rapid response team, and the provider view of the bedside within just seven minutes. Within twenty minutes, lactate and blood cultures were collected, and fluids and antibiotics were initiated. Less than an hour, the patient improved over the next few days and was discharged home.

This is the sepsis response at University of Utah Health, but it wasn't always that fast and smooth. Like at countless other hospitals across the U.S., sepsis response is a priority for University of Utah Health. Sepsis, a life-threatening complication of an infection, occurs when chemicals released into the bloodstream to fight the infection trigger inflammatory responses throughout the body. It's one of the leading causes of death in the U.S., and costs hospitals nearly \$24 billion annually.

Sepsis is treatable, but the condition must be identified and treated quickly. As part of its ongoing care quality improvement program, University of Utah Health launched a sepsis initiative to evaluate their sepsis response workflow and determine how they could better identify when patients are showing signs of sepsis, and more quickly into the sepsis response team for treatment, with the goal to improve their sepsis mortality rates.

The process they had in place previously involved a nurse or nursing assistant writing about the vital signs, that entering them into the EHR, sometimes in a delayed manner. The nurse would then have to make a judgment call about the patient's condition if vital were out of range, and could decide to manually page the rapid response team for assistance. The step-by-step process wasn't very efficient and had the potential for error.

THE SOLUTION

A longtime customer of the Spok healthcare communication platform, Spoke Care Connect®, University of Utah Health recognized that there may be a way to use Spok to automate sepsis alert notifications.

"Getting people to act faster has a huge amount of value, especially when you're talking about sepsis. We wanted to get providers to the bedside in minutes every single time that sepsis is recognized," explains Dr. Katherine Davies, Inpatient and assistant professor of internal medicine at University of Utah Health, and coordinator of the sepsis initiative.

"We knew that making electronic communication more efficient was something Spok could help us with."

OVERVIEW

University of Utah Health is the mountain state's only academic health system, combining excellence in patient care, the latest in medical research, and teaching to provide leading-edge medicine in a caring and personal setting. The system provides care for residents of Utah and the surrounding states in a hospital area encompassing more than 100 percent of the continental U.S. University of Utah Health is frequently ranked among U.S. News & World Report's Best Hospitals and is consistently recognized for quality in the nation among academic medical centers.

INDUSTRY

Healthcare

BUSINESS DRIVERS

- Streamline sepsis identification and notification workflow
- Recognize and treat sepsis more quickly for better outcomes
- Implement more streamlined workflow as best-practice standard

SOLUTION

- Spok® critical alerting
- Spok® paging

RESULTS

- Reduced sepsis mortality rate for patients with MEWS scores 7-11 by 20 percent
- Prolonged in-hospital stay and increased direct and indirect hospital following success
- Boosted clinician satisfaction by streamlining manual steps and preprogrammed their confidence in the automated process through increased patient business driver and mortality rate data

Case study: Reduced sepsis mortality rate with automated sepsis alerts

University of Utah Health automated elevated MEWS score alerts to speed sepsis response while reducing length of stay and direct costs for all septic patients by 10%.

See how they did it



The bottom line is better patient outcomes

Reducing alarm fatigue is a tough job, and a team effort involving all staff. Because the issue involves a complex web of people, communication devices, monitors, and alert sources, it can be easy for your initiative to stall or lose momentum.

Start now (if you haven't already) and make alarm management a priority to improve patient safety and mitigate provider burnout. Health systems should have an alarm management plan that works today and in the future, since the number of monitoring devices will only increase.

It can be done! As a key issue for all hospitals, alarm fatigue is generating a continual stream of new research, advances in technology, and best practices shared by others from which to learn. Use the information strategically and ensure it all works together for a better healthcare experience for everyone.

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Spok, Inc., a wholly owned subsidiary of Spok Holdings, Inc. (NASDAQ: SPOK), headquartered in Springfield, Virginia, is proud to be a global leader in healthcare communications. We deliver clinical information to care teams when and where it matters most to improve patient outcomes. Top hospitals rely on the Spok Care Connect® platform to enhance workflows for clinicians, support administrative compliance, and provide a better experience for patients. Our customers send over 100 million messages each month through their Spok® solutions. Spok is making care collaboration easier.

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