

The Joint Commission's National Patient Safety Goal on Alarm Management: How Do We Get Started?

September 25, 2013

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 - Brings together multidisciplinary stakeholders to identify patient safety issues
 - Sets priorities and works together to solve them
- Visit our website to learn more about the program
 - Get involved and consider making a donation to this important national effort!
 - www.aami.org/htsi
 - Or...call Marilyn Neder Flack, Executive Director, AAMI Foundation at 703-647-2770
 - Sarah Fanta Lombardi, Senior Project Manager, HTSI at 703-253-8297

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Speaker Introductions

- Pat Adamski, RN, MS, MBA, FACHE, Director, Standards Interpretation Group, The Joint Commission
- Rikin Shah, BSc.Eng, Senior Associate, Applied Solutions Group, ECRI Institute
- Sue Sendelbach, PhD, RN, CCNS, FAHA, Director of Nursing Research, Abbott Northwestern Hospital
- Marjorie Funk, PhD, RN, FAHA, FAAN, Professor, Yale University School of Nursing (Moderator)

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The Joint Commission's National Patient Safety Goal on Alarm Management

Pat Adamski, RN, MS, MBA, FACHE
Director, Standards Interpretation Group
The Joint Commission

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The Alarming Problem

- More and more devices and alarms
- More patients connected to alarms or alarm-based devices
- 150-400+ alarms per patient per day in a typical critical care unit
- Alarm-based devices are not standardized in many organizations
- Inconsistent use of alarms due to flexible alarm setting features

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Medical device alarm safety

Scope of problem

100s → 1,000s → 10,000s

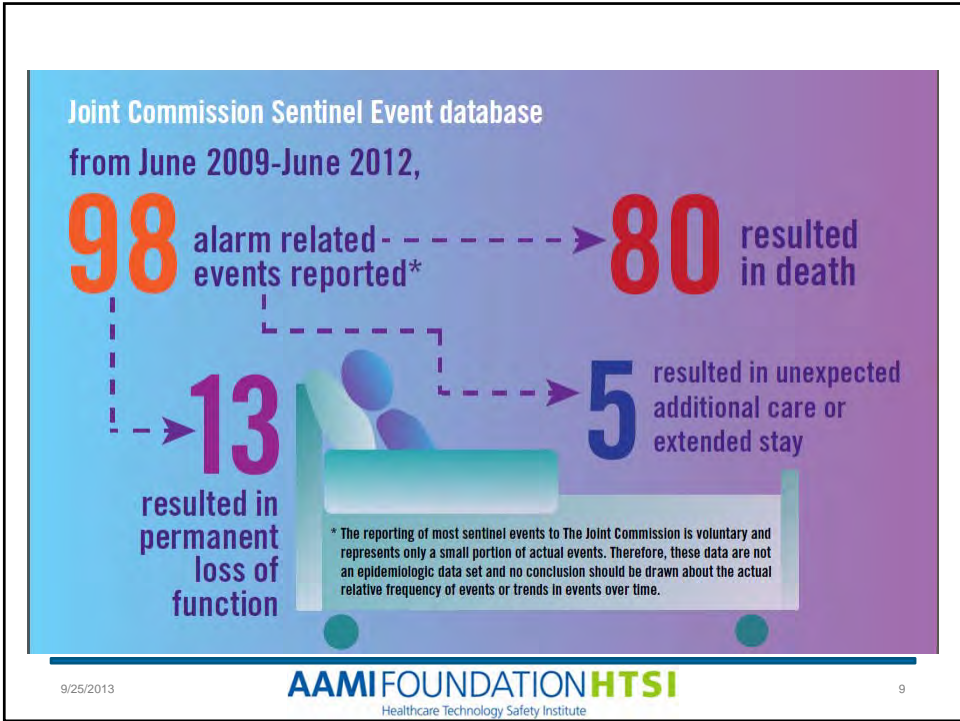
100s of alarm signals per patient, per day = 1,000s
of alarm signals on each unit = tens of thousands
of alarm signals throughout a hospital per day

85-99% of alarms don't
require clinical
intervention

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Alarm Fatigue

Clinicians become desensitized, overwhelmed or immune to the sound of an alarm.

Fatigued clinicians may:

- Turn down alarm volume
- Turn off alarm
- Adjust alarm settings

These actions can have serious or fatal consequences.

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NATIONAL PATIENT SAFETY GOAL

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Previous National Patient Safety Goal

- In the past there was a NPSG on clinical alarms
 - It focused on the “audibility” of clinical alarms
 - Goal retired, but we were still able to survey the issue under Environment of Care EC.02.04.01, EC.02.04.03 (CoP Physical Environment 482.41)
 - Also, under Provision of Care, Leadership and Patient Rights (CoPs: Nursing 482.23 and Patient Rights 482.13)



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NPSG on Alarm Management

- In Phase I (beginning January 2014)
- Hospitals will be required to:
 - establish alarms as an organization priority and
 - identify the most important alarms to manage based on their own internal situations.
 - Input from medical staff and clinical depts
 - Risk to patients due to lack of response, malfunction
 - Are specific alarms needed or contributing to noise/fatigue
 - Potential for patient harm based on internal incident history
 - Published best practices/guidelines

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NPSG on Alarm Management

- In Phase II (beginning January 2016)
- Hospitals will be expected to:
 - develop and implement specific components of policies and procedures that address at minimum:
 - Clinically appropriate settings
 - When they can be disabled
 - When parameters can be changed
 - Who can set and who can change parameters and who can set to "off"
 - Monitoring and response expectations
 - Checking individual alarm signals for accurate settings, proper operation and detectability
 - educate those in the organization about alarm system management for which they are responsible

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RESOURCES

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The screenshot shows the website for The Joint Commission. At the top, there is a navigation bar with links for 'Log In', 'Request Guest Access', 'Contact Us', 'Careers', 'JCR Web Store', and 'Press Room'. Below this is a search bar and a 'Forgot password? | Log In Help' link. The main navigation menu includes 'Accreditation', 'Certification', 'Standards', 'Measurement', 'Topics', 'About Us', and 'Daily Update'. The page content is titled 'Topic Details' and features a 'Sign up for News and Alerts' button. The main article is 'Sentinel Event Alert Issue 50: Medical device alarm safety in hospitals', dated April 8, 2013, with a 'Download This File' button. The article text discusses the importance of medical devices with alarm systems and the challenges they present. An 'Additional resource' section mentions a podcast 'Take 5 with The Joint Commission: Medical Device Alarm Safety'. On the right, there is a graphic titled 'Medical device alarm safety' with statistics: '1,000s - 10,000s' of alarms ignored per patient per day, '85-99%' of alarms ignored throughout a hospital stay, and a section on 'Alarm Fatigue' stating 'Clinicians become desensitized, overwhelmed or immune to the sound of an alarm.' The footer includes '9/25/2013' and 'Healthcare Technology Safety Institute'.

Joint Commission Podcasts

Take 5 with The Joint Commission: Alarm Safety, Part II

Hear the engineer perspective in this Take 5 podcast. George Mills, director of Engineering at The Joint Commission, talks candidly about alarm safety. (7:53)

View [Sentinel Event Alert Issue 50: Medical device alarm safety in hospitals](#)

[Music credit:](#) written by Will Kramer and performed by Meredith Carlton Kramer & Janz.



Take 5 with The Joint Commission: Medical Device Alarm Safety

Hear the first podcast in the Take 5 series. Pat Adamski, director of The Joint Commission's Standards Interpretation Group, talks about alarm safety challenges and offers practical advice. (17:38)

View [Sentinel Event Alert Issue 50: Medical device alarm safety in hospitals](#)

[Music credit:](#) written by Will Kramer and performed by Meredith Carlton Kramer & Janz.



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Accreditation Certification Standards Measurement Topics About Us Daily Update

Home > Topic Details Twitter Facebook Google+ Share Print Friday 2:27 CST, August 9, 2013

Topic Details

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Topic Library Item

Alarm safety webinar – May 1, 2013

May 2, 2013

Sentinel Event Alert Issue 50: Medical device alarm safety in hospitals, highlights important issues and approaches to improving safety surrounding alarm-equipped medical devices in hospitals. To stimulate further discussion on this important patient safety issue, The Joint Commission held a web conference featuring an ECRI Institute representative and staff from Boston Medical Center who discussed their successful Cardiac Alarm Management Pilot.

The May 1, 2013 webinar on alarm safety

- [Hear the replay](#)
- [Read the transcript](#)

Speakers:

- Jim Keller, vice president of Health Technology Evaluation and Safety, ECRI Institute
- From Boston Medical Center:
 - Deborah Whalen, M.S.N., M.B.A., APRN, FAHA, clinical service manager and nurse practitioner for Cardiology
 - Patricia Covelle, B.S.N., M.M., R.N., director of Critical Care Nursing
 - Jim Piepenbrink, BSBME, director of Clinical Engineering
- Ron Wyatt, M.D., medical director, Division of Healthcare Improvement, The Joint Commission

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More Information

- For Standards/NPSG questions:
 - 630-792-5900, Option 6 or
 - <http://www.jointcommission.org/Standards/OnlineQuestionForm/>
- Pat Adamski
 - 630-792-5964
 - padamski@jointcommission.org

The Joint Commission Disclaimer

- These slides are current as of **9/1/13**. The Joint Commission reserves the right to change the content of the information, as appropriate.
- These slides are only meant to be cue points, which were expounded upon verbally by the original presenter and are not meant to be comprehensive statements of standards interpretation or represent all the content of the presentation. Thus, care should be exercised in interpreting Joint Commission requirements based solely on the content of these slides.
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Improve Alarm Management: How Do You Get Started?

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ECRI Institute
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Alarm Events Result in Harm



“Patient who was on telemetry monitoring system and continuous pulse oximetry was found in room to be bradycardic with no respirations. System was alarming during event. Code called, patient resuscitated and transferred to ICU” (Delayed Response)

Alarm Interventions During Medical Telemetry Monitoring: A Failure Mode & Effects Analysis, A Pennsylvania Patient Safety Advisory Supplemental Review, March 2008

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Alarms: A Patient Safety Crisis



- Alarm hazards were #1 in ECRI Institute's "Top Ten Health Technology Hazards" in 2013
- 12% of 2,200 reports in ECRI Institute's Problem Reporting Network (2000-2006) were related to alarms; 64% involved physiologic monitor, ventilator, or infusion pump alarms
- ECRI Institute's search of FDA Maude database using "alarm" and "death" revealed 216 deaths involving physiologic monitor alarms (Jan 2005-Dec 2010)

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Could This Be Your Hospital?



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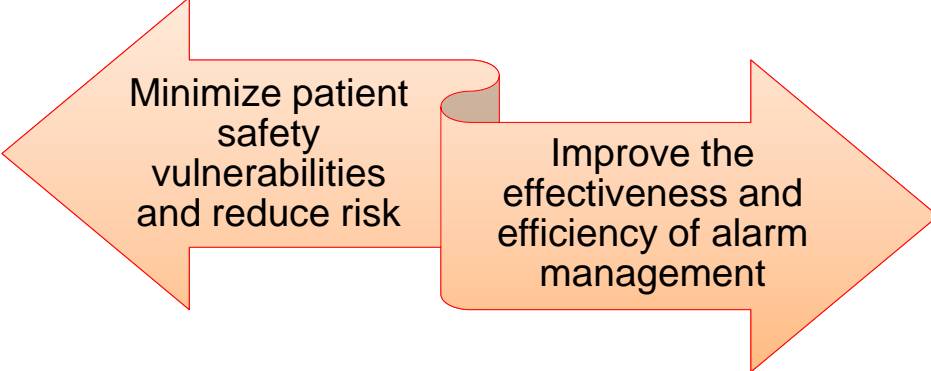
Learning Objectives

- Understand the complexity of alarm management
- Understand how to take a proactive risk assessment approach to improving alarm management
- Identify examples of frequent failures and underlying causes in the alarm management system
- Identify implementable strategies for improving alarm management

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Make Alarm Management Safer



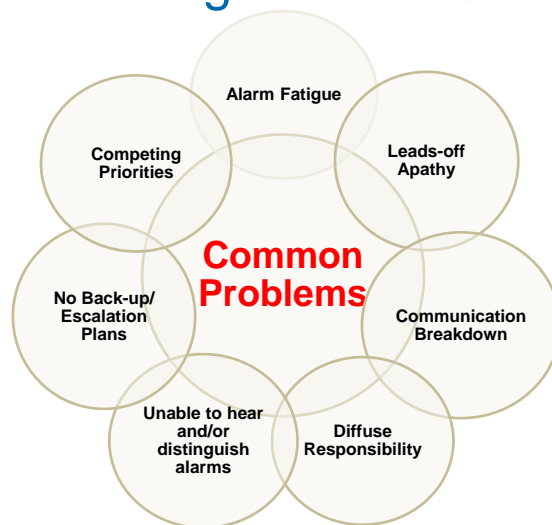
Minimize patient
safety
vulnerabilities
and reduce risk

Improve the
effectiveness and
efficiency of alarm
management

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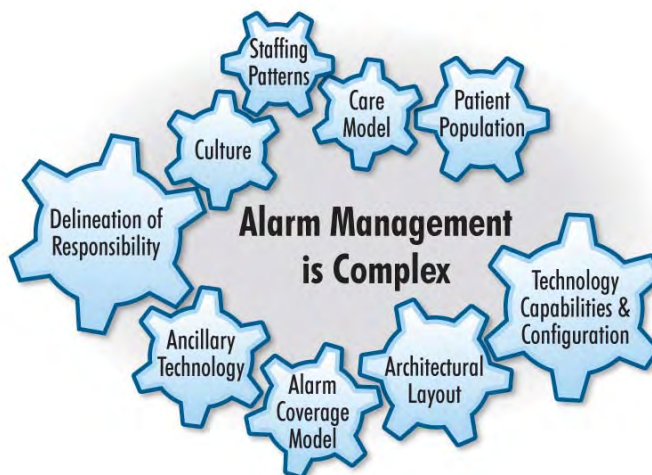
Alarm Management is Complex



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Unique Set of Variables

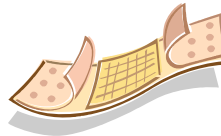


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What Can You Do?

- Improving Alarm Management Requires System's Approach
- Applying a "Quick Fix"
- Without Thorough Planning Is Likely to Introduce New Failures



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A System's Approach

- 1 • Assemble a multidisciplinary team
- 2 • Review recent events and near misses
- 3 • Observe alarm coverage processes and ask nurses and other staff about their concerns

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A System's Approach

- 4 • Review entire alarm coverage system
- 5 • Identify patient safety vulnerabilities and potential failures
- 6 • Determine underlying causes of potential failures

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A System's Approach

- 7 • Develop realistic, implementable strategies to address underlying causes
- 8 • Implement strategies and evaluate their effectiveness
- 9 • Monitor effectiveness of strategies and provide feedback to staff

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Assemble a Multidisciplinary Team

- Administrative sponsor (e.g., CNO, VP Quality)
- Key medical staff
- Nurse managers
- Front-line nurses
- Monitor technicians
- Patient safety/risk manager
- Clinical engineering staff
- IT staff
- Consult with others, as appropriate

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Review Recent Events/ Near Misses

- Root causes
- Frequency of alarm types
- Aggregate of alarm types per care area/shift
- Review remediation/results
- Trends

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Observe Alarm Coverage Processes/Gather Staff Input

- Routine rounding
- Listen to staff concerns/problems
- Map processes for alarm notification and response
- Identify obvious problems
 - Excessive alarms
 - Difficulty in hearing alarms
 - Delayed alarm response
 - Pagers not being worn

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Review Alarm Management System

- Culture
- Infrastructure
- Practices
- Technology

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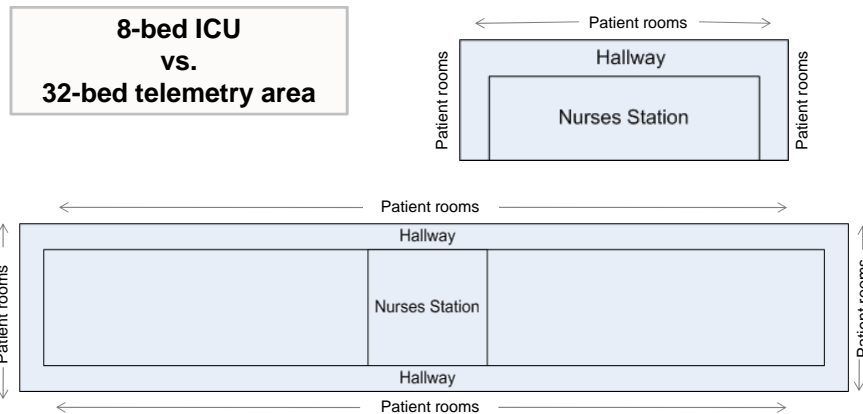
Culture

- Demonstration by leadership that patient safety is a core value
- Beliefs, Attitude, and Ownership
 - Believing that the monitoring system is a tool to provide a more complete picture of the patient's physiologic status
 - Understanding that effective and efficient alarm management is essential to patient safety
- Education
- Reinforcement

Infrastructure

- Staffing patterns and care models
- Architectural layout
- Alarm coverage model
- Policies

Architectural Layout



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Alarm Coverage Models

- Decentralized, unit-based monitoring
 - Direct alarm notification
 - Alarm notification via monitor technician, communication vehicle may vary
- Remote centralized monitoring room
 - Alarm notification via monitor technician, communication vehicle may vary
- Alarm integration system
 - Alarm notification via clinician-worn communication device

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Practices

- Process steps for alarm notification, verification, and response
- Delineation of responsibility and accountability
- Back-up plans/escalation
- Transport communication
- Admitting and discharging patients to monitoring
- Protocols

Technology

- Monitoring modalities and capabilities
- Configuration
- Ancillary alarm technologies
 - Alarm integration system
 - Non-interactive remote displays
 - Interactive remote displays
 - Enunciators
 - Notification/communication devices

Identify Failures and Determine Causes

Failure

- Delayed alarm response

Causes

- Diffuse responsibility for alarm response
- Competing priorities
- Assumptions that someone else will respond
- No back-up plan/escalation

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Develop Implementable Strategies

- Delineate responsibility for alarm response
- Develop a back-up plan with tiers of coverage
- Delineate responsibility for back-up response
- Implement two-way communication devices that would allow a nurse to request help
- Develop an alarm escalation scheme
 - Who receives initial alarm notification for each type of alarm
 - Who receives back-up alarm notification for each type of alarm
 - Time intervals per escalation

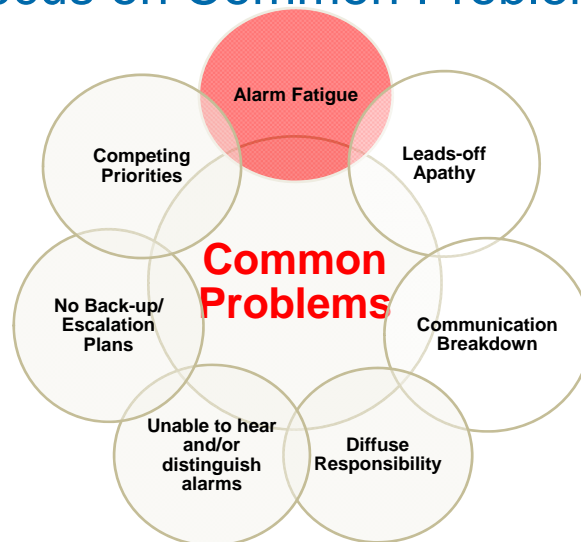
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Next Steps

- Educate staff about strategies/process redesign
- Roll-out implementation
- Evaluate /monitor the effectiveness of the strategies and process redesign
- Modify the strategies, if indicated
- Provide feedback to staff
- Celebrate your success

Focus on Common Problems



Common Problems & Strategies for Improvement

- Examples of frequent problems/underlying causes
 - Alarm fatigue
 - Leads off apathy
 - Transport communication breakdown
- Implementable strategies for addressing underlying causes and improving alarm management

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Alarm Fatigue → *Underlying Causes*



- Units have high noise level and too many alarms
 - Monitors, infusion pumps, ventilators, call bells, phones, etc
- Alarm limits are not tailored for individual patient
- Poor skin prep and electrode placement
- Preventive maintenance/troubleshooting not done
- Lack of 'trust' in the system

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Reducing the Frequency of Nuisance Alarms

- Make alarms actionable
 - Analyze unit default settings
 - Tailor alarms per patient
- Alarm escalation plan
- Preventive maintenance
 - Skin prep
 - Proper electrode placement
 - Routine battery replacement
 - Routine change of electrodes
- Reinforce the high-urgency to address alarms
- Hold staff accountable
- Track progress and provide feedback to staff

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Alarm Fatigue Case Study

→ *Medical Progressive Care Unit
at The John Hopkins Hospital*

- 15 bed unit
- 1:3 nurse to patient ratio
- Physiologic monitoring system (bedside monitors with 12-lead ECG)
- Capability of arterial BPs, SpO2, central venous pressures
- Diverse patient population

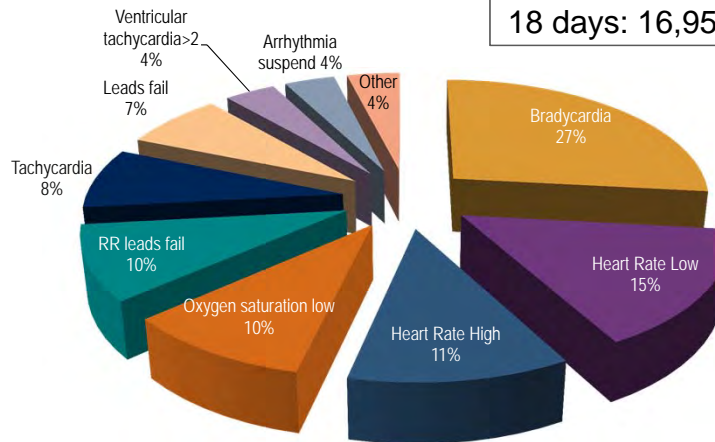
Graham, K.C. & Cvach, M. Monitor Alarm Fatigue, Standardizing Use of Physiological Monitors and Decreasing Nuisance Alarms. American Journal of Critical Care, 2010 Jan;19(1): 28-34.

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Pre-Intervention Data Collection

18 days: 16,953 alarms



Graham, K.C. & Cvach, M. Monitor Alarm Fatigue, Standardizing Use of Physiological Monitors and Decreasing Nuisance Alarms. American Journal of Critical Care, 2010 Jan;19(1): 28-34.

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Change the Culture

→ *Re-Program Mind-set*

- Implement retraining program
- Focus on best practices in managing monitoring system
 - Customizing parameters
 - Troubleshooting

Graham, K.C. & Cvach, M. Monitor Alarm Fatigue, Standardizing Use of Physiological Monitors and Decreasing Nuisance Alarms. American Journal of Critical Care, 2010 Jan;19(1): 28-34.

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Revise default settings

→ “Alarms should be actionable and clinically significant”

Parameter	Before	After	Rationale
Low Heart Rate	60	50	Tremendous variation in heart rate throughout day
High Heart Rate	120	150	Tremendous variation in heart rate throughout day
Oxygen Saturation %	90	88	Respiratory issues, constant decreases in saturation

Graham, K.C. & Cvach, M. Monitor Alarm Fatigue, Standardizing Use of Physiological Monitors and Decreasing Nuisance Alarms. American Journal of Critical Care, 2010 Jan;19(1): 28-34.

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Results

→ 43% Reduction in Critical Alarms (18-day time period)

Alarm Type	Pre-Intervention: Jan 2006 (Mean # Patients=12)	After Intervention: Jan 2007 (Mean # Patients=13.3)
Total critical alarms	16,953	9,647
Heart rate low	2,598	310
Heart rate high	1,949	294
Oxygen saturation low	1,685	623

Graham, K.C. & Cvach, M. Monitor Alarm Fatigue, Standardizing Use of Physiological Monitors and Decreasing Nuisance Alarms. American Journal of Critical Care, 2010 Jan;19(1): 28-34.

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Key Lessons

- Form a multidisciplinary task force
- Analyze your current system
- Identify patient safety vulnerabilities
- Develop strategies to minimize risk
- Utilize shared strategies to address common problems and adapt per your unique set of variables
- Carefully plan for implementation
- Monitor the effectiveness of strategies and modify, as needed
- Provide feedback to staff
- Celebrate your success

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Always Maintain Focus on Your Goal

→ *Make Alarm Management Safer*

Minimize patient safety vulnerabilities and reduce risk

Continually improve the effectiveness and efficiency of alarm management

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Challenges, Barriers, and Opportunities When Starting a Program to Reduce Nuisance Alarms

Sue Sendelbach, PhD, RN, CCNS, FAHA
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Challenges/Barriers: Measurement

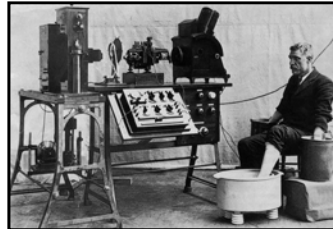
- Lack of systems to automatically get the data
 - Hand-collected data
- Architecture of the monitoring system
 - Configuration
 - Available space
- Resources to get data

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Challenges/Barriers: Technology Limitations

- Age of system
- Oximetry
- Literature support – customizing threshold and/or delays



Challenges/Barriers: Competing Priorities

NIH Public Access
Author Manuscript
[View Open Access PDF](#) | [Download Manuscript](#) | available in [PMC](#) | 2011-5-february-01
 Published in final edited form as:
Curr Opin Infect Dis. 2010 February ; 23(1): 76–82. doi:10.1097/QCO.0b013e328334dda8.

Management of Catheter-Associated Urinary Tract Infection (CAUTI)



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Challenges/Barriers: Overwhelming

Monitor

Feeding Pump

Ventilator


Infusion Pump

Bed Exit

Pulse Oximeter

Sequential Compression Device

IABP



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Challenges/Barriers: Financial Constraints

As Medicare Costs Rise, Reimbursements Drop

John C. Nordt, MD; Michael P. Connair, MD; Jamie A. Gregorian, Esq.

In 1990, Medicare expenditures totaled \$111 billion. That number has more than quintupled today. But even as Medicare costs have skyrocketed, the individual payments to physicians for services rendered have plummeted—particularly for surgical procedures.

Recently, the American Association of Orthopaedic Surgeons (AAOS) conducted a retrospective analysis of the inflation-adjusted trends in Medicare reimbursements for orthopaedic surgeons. It will likely come as no surprise to AAOS members that the real dollar rate of reimbursement has suffered a precipitous drop.




CMS To Cut Reimbursement Rates By Up to 2% for About 2K Hospitals

Monday, August 5, 2013

Beginning Oct. 1, CMS will reduce Medicare reimbursement rates by up to 2% for 2,225 hospitals in 49 states as part of a program designed under the Affordable Care Act to curb hospital readmission rates, according to CMS' latest data calculations released last week, *Kaiser Health News* reports (Rau, *Kaiser Health News*, 8/2).

TOPIC ALERT:

- Health Care Reform
- Health Care Costs
- Medicare

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Opportunities

- Proper skin preparation for ECG electrodes
- Daily ECG electrode changes
- Customize physiologic alarms
 - ECG
 - Eliminate duplicative alarms
 - “Tachycardia” and high heart rate
 - Life threatening vs. serious vs. advisory
 - Couplet and bigeminy ventricular beats
 - Pulse oximetry monitor
 - Delay and/or threshold settings

<http://www.aacn.org/wd/practice/docs/practicealerts/alarm-management-practice-alert.pdf>

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Opportunities (continued)

- Education – initial and ongoing
- Multidisciplinary teams
 - Champions
 - Administrative support
 - Industry
- Monitor only patients with clinical indications for monitoring

<http://www.aacn.org/wd/practice/docs/practicealerts/alarm-management-practice-alert.pdf>

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Additional Considerations

- Middleware
- Research
- Technology
 - “Smart alarms”

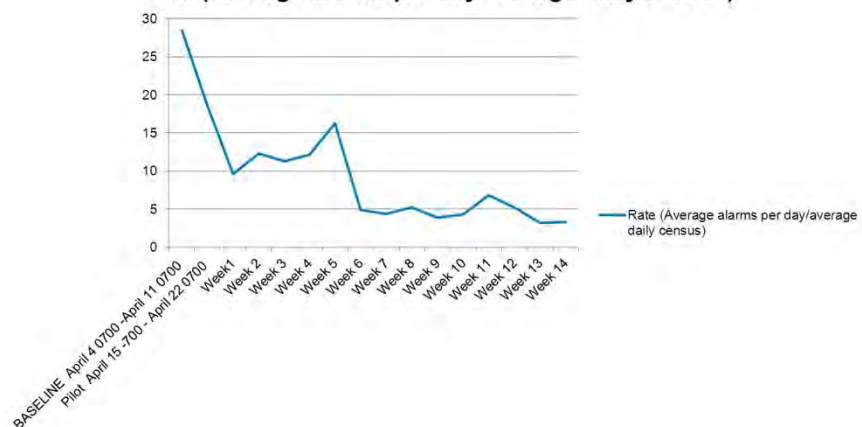


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Outcomes

Rate (Average alarms per day/average daily census)



Peer Review Protected under 145.61 et seq. Prepared at the direction, request, and in furtherance of the purposes of the Allina Quality Council.

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Questions?



Type your question in the Q&A box on the left side of your screen and press Enter



If you are attending via phone, please email your question to ehughes@aami.org



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Continuing Nursing Education 1.0 contact hour

For those desiring CNE, please visit the link below for the test, evaluation form, and certificate:

<http://www.aacn.org/DM/CETests/Overview.aspx?TestID=1021&mid=2864&ItemID=1013&menu=CETests>

The American Association of Critical-Care Nurses (AACN) is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center's Commission on Accreditation.

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Evaluation Form (Non-CNE)

Please let us know how we did!

<http://aami.confedge.com/ap/survey/s.cfm?s=NPSG>

Mark Your Calendars!

How to Identify the Most Important Alarm Signals to Manage

Wednesday, October 30, 2013

1:00-2:00 pm Eastern

www.aami.org/htsi/events.html