Developing a Clinical Alarms Management Committee at an Academic Medical Center

Michele M. Pelter, James Stotts, Kevin Spolini, Julie Nguyen, Elizabeth Sin, and Xiao Hu

While bedside cardiac monitors and other physiological monitoring devices (e.g., continuous pulse oximetry) are designed to alert clinicians to abrupt and acute vital sign changes, we are now learning that these devices contribute to alarm fatigue.[1–9] Alarm fatigue occurs when clinicians are desensitized by numerous alarms, most of which are false or clinically irrelevant. Alarm fatigue may lead to inadvertently ignoring alarms because the alarm tones are assimilated into the workflow; silenced alarms without checking the patient; lowering alarm volume; or, in extreme cases, permanently disabling the alarm. These reactions occur because the constant noise and messaging is bothersome to clinicians, their patients, and the patient's family.

Alarm fatigue in the hospital setting is now well recognized as a serious detriment to patient safety. The Association for the Advancement of Medical Instrumentation and the Food and Drug Administration have warned of deaths due to alarm silencing on patient monitor devices.[10] A number of other federal agencies and national organizations have issued alerts describing alarm fatigue as a major patient safety concern. For example, the ECRI Institute named alarm fatigue as the number-one health technology hazard in their 2014 report.[11]
The Joint Commission (TJC) issued an alarm safety alert in 2013 and established alarm safety as a National Patient Safety Goal (NPSG) by issuing NPSG.06.01.01 in 2014.[12]
TJC established Jan. 1, 2016 as the date when hospitals must establish an alarms management strategy to maintain their accreditation.[12] The University of California San Francisco (UCSF) Medical Center created a clinical alarms management committee in May 2014 to address this important clinical issue as well as meet NPSG.06.01.01. In this article, we will describe in detail the process undertaken at the UCSF Medical Center.

Setting

The University of California, San Francisco (UCSF) Medical Center is an academic medical center that provides adult, neonatal, and pediatric care management for critical, acute, and intermediate cases over a wide range of specialties. Three UCSF campuses participated in the clinical alarms management effort: 1) Parnassus: a 590-bed hospital focused primarily on adult services. 2) Mission Bay: includes 183 beds for pediatric specialties; 70 adult beds for patients with orthopedic, urologic, gynecologic, head/neck, gastrointestinal, and colorectal cancers; and a 36-bed birthing center. 3) Mount Zion: provides outpatient surgical services.

Committee Makeup

Prior to the creation of the Clinical Alarms Management (CALM) Committee in May 2014, responsibility for alarm management was decentralized, and individual departments,

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units, or specialty committees made their own alarm management decisions. While alarm management questions were often directed to individuals with expertise in using equipment with alarms (e.g., clinical nurse specialists, respiratory therapists, physicians, educators), issues were solved at the unit or department level only. The hospital system lacked standardization.

One of the first steps in UCSF's alarm management process was assigning a lead to coordinate the activities of the CALM Committee. The committee selected the patient safety manager, a masters-prepared nurse responsible for patient safety for all three campuses, to link together this diverse committee, which included clinical leaders, administrative leaders, and clinical staff. This was a critical piece to creating and sustaining change within the organization. The patient safety manager maintains a broad clinical perspective within organization, which helped him identify and communicate with key clinicians and drive the initiatives of the CALM Committee.

Alarm management decisions affect many areas of the hospital, including the emergency department, acute and critical care, and procedural areas. Issues may differ depending on the setting, purpose, and age of the patient. Therefore, identifying key stakeholders in each of these areas was a critical early step. Representatives participated in the CALM Committee from several disciplines and departments, including nursing, medicine, clinical engineering, information technology, risk management, respiratory therapy, and materials management. The committee also included two faculty members from the UCSF School of Nursing. They brought research and clinical expertise in bedside cardiac monitoring as well as biomedical engineering expertise in collecting and analyzing physiologic data.

Timeline

In this article, we describe the work of the CALM Committee during a 24-month period beginning in May 2014. The committee met monthly using a web-based conference calling system, which ensured all participants could join the meetings and easily share documents and PowerPoint presentations. Figure 1 illustrates the major stages of the CALM Committee's activities.

Creating the Team and Developing a Strategic Plan

The overarching strategic plan developed by the CALM Committee was to examine, understand, and improve clinical alarm management at the medical center (adult and pediatric) and to meet TJC's NPSG.06.01.01 (Figure 2). The committee developed a strategic work plan to meet these goals. The initial step included collecting data to understand how alarms were being managed within the entire hospital system (adult and pediatric) and across settings (i.e., intensive care, intermediate care, medical/surgical, emergency department, operating room,

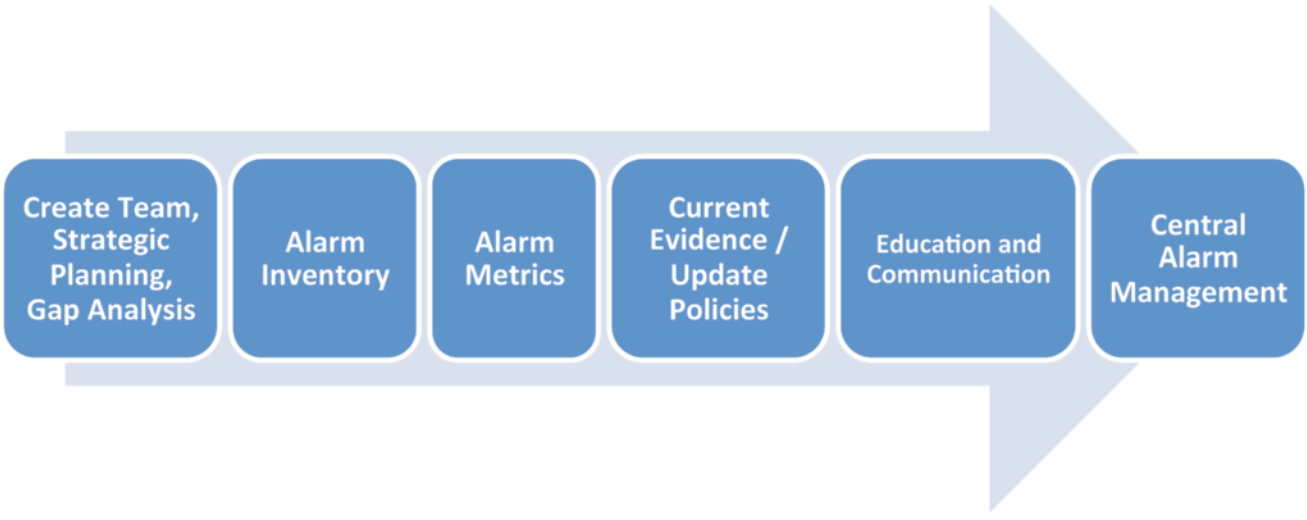


Figure 1. The major stages and initiatives used by the Clinical Alarms Management (CALM) Committee.

radiology). The committee's broad membership enhanced the efficiency in collecting these data. The committee also reviewed current policies related to alarm management from all of the clinical areas in order to understand both consistencies and inconsistencies in practices. During this stage, the committee conducted a gap analysis by reviewing incident reports and sentinel events. The goal was to understand patient safety issues where alarms or alarm management were a central issue. The final step in this stage included a focused work plan to drive the strategic plan, as well as the development of action plans and initiatives.

Alarm Inventory

In stage two of the CALM Committee's work, the group conducted a systemwide inventory of machines with alarms (including an asset count) and conducted an alarm risk assessment. Individual committee members scored each piece of equipment, followed by committee consensus. The risk variables they examined included: potential for harm, clinical oversight required, current clinical oversight, use frequency per patient during hospitalization, and urgency. Each variable received a score on a scale of one (lowest) to three (highest). The scores were summed for each piece of equipment or device to produce an overall risk assessment score. The committee used risk assessment scores, asset counts, and clinical judgment to prioritize alarms associated with bedside monitoring (e.g., electrocardiogram and pulse oximetry) as the committee's initial focus, followed by infusion pumps and ventilators. The alarm inventory is represented in Table 1.

The committee's broad membership enhanced the efficiency in collecting these data.

Clinical Alarm Management (CALM) Committee
Alarm Management and Safety Strategic Work Plan

Objective:	**Establish alarm system safety as a hospital priority**
Target:	***Jul 2014****
Tactic:	Develop strategic workplan
Tactic:	Present to Patient Safety Committee
Tactic:	Establish a cross-disciplinary team to address alarm safety andpotential impact of alarm fatigue in all patient care areas
Objective:	**Identify the most important alarm signals to manage**
Target:	***Dec 2014****
Tactic:	Prepare an inventory of alarm-equipped medical devices
Sub Tactic:	Determine which alarm signals are needed (critical)
Objective:	**Develop metrics for alarm management and safety and a process for data collection**
Target:	***Dec 2014***
Objective:	**Evaluate optimal environments for identification of alarms**
Target:	***Jan 2016***
Tactic:	Assess whether the acoustics in patient care areas allow critical alarm signals to be audible
Sub Tactic:	Determine which alarm signals unnecessarily contribute to alarm noise and alarm fatigue
Objective:	**Establish policy/procedure with guidelines for alarm settings**
Target:	***Jan 2016****
Tactic:	Identify situations when alarm signals are not clinically necessary
Tactic:	Identify the default alarm settings and the limits appropriate for each care area
Tactic:	Reduce alarm noise and fatigue
Sub Tactic:	Determine which alarm signals unnecessarily contribute to alarm noise and alarm fatigue
Tactic:	Establish guidelines for tailoring alarm settings and limits for individual patients
Tactic:	Procedure for checking individual alarm signals for accurate settings, proper operation, and detectability
Objective:	**Develop orientation and on-going education plan for staff and providers on operation of alarm systems**
Target:	***Jan 2016****
Tactic:	Provide training on the process for safe alarm management and response, safe use of the alarmed medical devices
Tactic:	Provide ongoing training on new alarmed medical devices and updates to alarmed medical devices
Tactic:	Ensure that new members of the clinical care team receive training on alarmed medical devices
Objective:	**Establish priorities for the adoption of alarm technology**
Objective:	**Establish a process for continual improvement and constant optimizing of alarm system policies and configurations**
Objective:	**Develop strategy for sharing information about alarm-related incidents, prevention strategies, and lessons learned**

Figure 2. Strategic plan developed by the Clinical Alarms Management (CALM) Committee. *Joint Commission requirement.

Classification Name	Asset Count	Severity Risk[a]	Clinical Oversight Level Required[b]	Current Clinical Oversight[c]	Use Frequency Per Patient During Their Stay[d]	Urgency[e]	Priority Score (C + D + E + F + G)
ALARM, BED	407	2	1	3	3	3	12
ANESTHESIA MACHINE	76	3	3	1	3	3	13
AUTOTRANSFUSION UNIT	12	3	3	1	3	3	13
BLENDER, OXYGEN – AIR	240	3	3	3	2	3	14
CO2 MONITOR – TRANSCUTANEOUS	24	2	2	2	2	2	10
CPAP UNIT (OSA)		3	2	2	2	3	12
CPAP UNIT (ICN)	47	3	3	1	3	3	13
DEFIBRILLATOR, AED	51	3	2	2	2	3	12
DEFIBRILLATOR, PACING	140	3	3	1	2	3	12
DIALYSIS/APHERESIS UNIT – General	51	3	3	1	2	3	12
DIALYSIS UNIT – NxSTAGE/Prismaflex	20	3	3	1	2	3	12
HEART-LUNG BYPASS UNIT	9	3	3	1	3	3	13
HUMIDIFIER, HEATED	389	1	1	3	2	1	8
INCUBATOR, INFANT	35	2	2	2	3	2	11
INCUBATOR, INFANT TRANSPORT	4	2	2	2	2	2	10
INJECTOR, SYRINGE, CONTRAST	48	1	3	1	2	2	9
INSUFFLATOR	34	2	3	1	1	2	9
MONITOR, CARDIAC OUTPUT	14	1	1	3	1	1	7
MONITOR, FETAL	41	3	3	2	3	3	14
MONITOR, INTRACRANIAL PRESSURE	8	3	3	1	1	1	9
MONITOR, VITAL SIGNS (Dinamap)	496	1	1	3	3	1	9
MONITOR , PATIENT BEDSIDE (ECG or Telemetry)	963	3	3	1	3	3	13
MONITOR, MODULE, AIRWAY GAS (ET CO2)	179	2	2	2	1	2	9
MONITOR, TRANSPORT/PORTABLE	250	3	3	1	3	3	13
NITRIC OXIDE DELIVERY SYSTEM	21	3	3	1	1	3	11
OXIMETER, PULSE	466						0
OXIMETER, PULSE (Centrally Monitored)	63	3	3	1	3	3	13
PACEMAKER, EXTERNAL – MEDTRONIC	61	3	3	1	1	3	11
PUMP, FOOD, ENTERAL	136	1	1	1	2	1	6
PUMP, FOOD, ENTERAL, AMERITUS (neonatal)	26	2	2	2	2	2	10
PUMP, INFUSION (High Risk Meds)	505	3	3	1	3	3	13
PUMP, INFUSION (Low Risk Meds)	683						0
PUMP, INTRA-AORTIC BALLOON	6	3	3	1	1	3	11
PUMP, VENTRICULAR ASSIST	24	3	3	1	1	3	11
REFRIGERATOR, GENERAL MEDICAL	18	2	1	2	3	1	9
SEQUENTIAL COMPRESSION DEVICE	465	1	1	3	2	1	8
THERMIA UNIT, HYPO-HYPER (Gaymar)	83	1	1	3	2	1	8
THERMIA UNIT (Arctic Sun)	2	2	3	1	1	2	9
TOURNIQUET, AIR PRESSURE	16	2	3	1	1	2	9
VENTILATOR	103	3	3	1	3	3	13
WARMER, BLANKET – FLUID (Cabinet)	179	1	1	3	1	1	7
WARMER, BLOOD – FLUID (Hot Line)	131	3	3	1	2	2	11
WARMER, CONVECTIVE (Bair Hugger)	102	1	1	3	1	1	7
WARMER, RADIANT, INFANT	46	3	3	2	3	2	13

Table 1. Systemwide inventory of machines/devices with alarms and asset count. The committee conducted an alarm risk assessment. For each piece of equipment, risk variables were scored by individual committee members, followed by committee consensus. The risk variables collected included potential for harm, required clinical oversight, current clinical oversight, use frequency per patient stay, and urgency. Each variable was scored on a scale from 1 (lowest) to 3 (highest). The scores for each piece of equipment or device were then summed. The risk assessment scores, asset counts, and clinical judgment were used to prioritize alarms associated with bedside monitoring (ECG and pulse oximetry) as the committee's initial focus, followed by infusion pumps and ventilators. [a]3 (high), could result in death if unattended; 2 (moderate), may lead to unintended consequence if unattended; 1 (low), little/low-risk injury if unattended. [b]3 (high/continuous); 2 (moderate/intermittent); 1 (low), little to no oversight. [c]3 (low), little to no oversight; 2 (moderate/intermittent); 1 (high/continuous). [d]3 (high/continuous); 2 (moderate/intermittent); 1 (low/minimal). [e]3 (must respond in <1 min); 2 (must respond in <10 mins); 1 (must respond in <30 min).

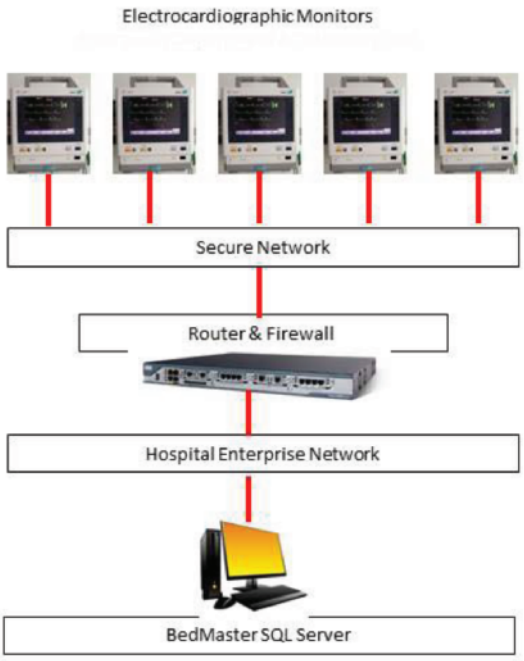
Metrics and Defaults

The CALM Committee collected hospital-level data, as well as determined how to obtain alarm metrics (i.e., number, type, level) and prepare data reports. The Parnassus campus hospital captured alarm data using a sophisticated research-based infrastructure created by School of Nursing researchers.[4] Figure 3 demonstrates the research infrastructure and provides a sample of the data available for analysis.

Our newest hospital, the Mission Bay campus, shared a similar system as Parnassus for capturing alarm data. However, Mission Bay used a new bedside monitoring system, which included an integrated system where GE Monitor alarms (CareScape Bx50 Monitor) pass through BedMaster software to a Connexall middleware system, then to a Voalte phone. The committee's goal was to understand how alarms moved within this sophisticated system, and determine the appropriate alarms to send to the nurse's Voalte phones via this complex system. Figure 4 illustrates data available for analysis within this system.

The last step completed in this stage was obtaining alarm defaults (i.e., on/off, parameters) and alarm levels (i.e., crisis, warning, advisory, message) for devices within the hospital. Because we used different physiologic monitoring systems (i.e., GE, Philips, Masimo), we also determined definitions used for dysrhythmia alarms to gain a better understanding of possible variations. The goal of this step was to determine if we could standardize

A



B

Study Dates	3/1/2013	3/2/2013	3/3/2013	3/4/2013	3/5/2013	3/6/2013	3/7/2013
ASYSTOLE	8	4	32	9	9	1	1
VFIB	1	0	6	4	0	0	0
VTACH	17	14	13	12	4	5	12
ACC VENT	5	8	7	2	3	30	2
PAUSE	18	19	98	7	6	2	7
VBRADY	2	3	3	0	1	0	0
VT>2	39	25	29	30	17	25	33
APNEA	168	205	185	210	264	290	210
AFIB	5	0	4	0	861	503	152
OTHER ARRHY							
BRADY	114	37	146	46	35	39	178
TACHY	147	121	32	499	1570	725	233
ST ALARMS							
ALL ST ALARMS	712	104	9	51	292	65	316
NBP							
NBP SYS LO	0	0	1	1	3	1	1
NBP SYS HI	10	14	7	5	4	23	7
NBP DIA LO	1	11	8	19	20	15	20
NBP DIA HI	3	8	3	4	2	10	3
NBP MEAN LO	6	10	11	16	26	15	28
NBP MEAN HI	9	14	5	6	6	18	7
ART							
ART SYS LO	33	110	44	62	100	48	49
ART SYS HI	389	300	98	124	142	81	34
ART DIA LO	570	641	140	208	437	381	306
ART DIA HI	203	335	257	178	262	281	76
ART MEAN LO	383	319	145	215	145	216	319
ART MEAN HI	180	218	251	163	181	119	75
ALARM LEVEL							
CRISIS (High Priority)	83	43	322	134	112	18	28
WARNING (Medium Priority)	7,816	9,651	6,384	6,088	7,792	7,927	5,920
ADVISORY (Low Priority)	4,714	4,050	4,146	3,500	5,936	2,811	4,101
MESSAGE (Inaudible Text)	18,724	16,508	9,796	10,450	11,865	11,089	11,974

Figure 3. Illustrated in A is the research infrastructure used to capture alarm data from the bedside electrocardiographic monitor. Figure B shows an example of alarm data available. Displayed is the total number of alarms by day for several parameters, and the level (i.e., crisis, warning, advisory, message/unknown).

alarm defaults and alarm levels with the goal of minimizing unnecessary alarms while ensuring patient safety. Figure 5 illustrates an example of the data collection tool we used to collect and compare these data. The committee also used research data collected by the School of Nursing faculty to better understand common nonactionable alarms to determine if adjustments could be recommended. From examining all of these data sources, the committee was able to make policy recommendations regarding default settings, and alarm levels (i.e., crisis, warning, advisory, message).

Dysrhythmia and SpO_2 settings (i.e., parameter and level [low, medium, high]) were changed in the adult intensive care units based on research data.[4] A repeat analysis of dysrhythmia alarms over the course of one month did not reveal new opportunities for making adjustments in dysrhythmia alarms for adult patients, and there were no untoward patient outcomes. Monitoring data for both dysrhythmia and pulse oximetry in pediatric patients revealed a number of opportunities for reducing alarm fatigue, particularly from alarms sent to the nurse's Voalte phone. Figure 6 illustrates the reduction in the number of alarm sent to the Voalte phone following this intervention.

Understanding Current Evidence and Policy Updates

The next step in CALM Committee's work was to understand evidence-based approaches to ensure our hospitals met current standards and determine areas for improvement. A literature search identified research and best practices for alarm management and gathered both databased (i.e., research articles) and non-databased information (i.e., information from manufacturers, other hospitals). Individual committee members contacted experts at other hospitals to learn their practices and attended webinars on alarm management. Committee members explored a broad range of alarm management topics, including: interventions to minimize false and nonactionable alarms; responsibilities of individual clinician (nurses, respiratory therapists, clinical engineering, providers, and monitor watchers); alarm settings; response to alarms (i.e., by clinician type [nurses versus monitor watcher], changing alarm settings); and education and training.

One example of a topic examined by the committee was skin electrode practices (i.e., type, storage, frequency of changing, packaging) for cardiac monitoring. The literature cites skin electrode management as a possible source of false alarms.[13–15]

Bed	Count of Alarms	Alarm	Count of Alarm
12	6,627	Couplet	10,487
16	6,360	SPO2 Low	9,118
15	5,904	RR IMP.High	8,291
7	5,484	Art Mean High	5,032
20	4,929	Frequent PVC	4,770
10	4,846	Tachy	3,804
8	4,592	Brady	3,411
9	4,135	Art Sys High	3,353
6	4,118	Art Dia High	3,164
18	3,616	VT > 2	2,893
5	3,562	RR IMP. Low	2,736
4	3,456	Leads Fail	2,217
13	3,354	R on T	2,046
3	3,258	ARRH Paused	1,996
14	3,005	Bigeminy	1,330
11	2,893	Arat Mean Low	1,295
2	2,641	Art Syst Low	1,233
17	2,040	Art Dia Low	1,210
19	1,923	Atrial Fib	1,174
1	957	Apnea IMP	950
Total	**77,700**	Trigeminy	949
		V Tach	927
		Check NIBP	898
		CVP Mean Low	570

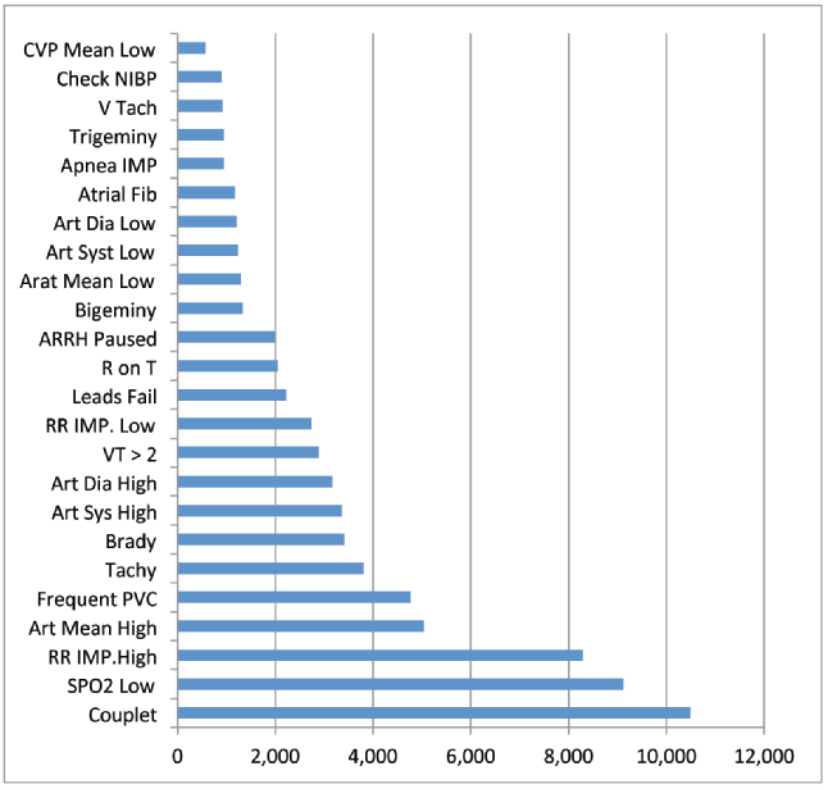


Figure 4. An alarm report generated from the bedside electrocardiographic monitor in a pediatric unit. Shown are alarm totals (counts) for several alarm parameters during a 1-month period.

The CALM Committee reviewed the literature for recommendations and compared our current practices to those cited in research studies to determine best practices. We also collected data on all of the units that utilize skin electrodes for cardiac monitoring to determine electrode type, packaging (bulk versus single packet), cost, and total number of electrodes used. Following the literature review and using data from a research study conducted within our facility we standardized electrode management and revised our alarm management policy. The committee decided to use packaging with five skin electrodes in units with a low volume of cardiac monitoring and bulk packaging in units with high use of cardiac monitoring. This ensured electrode freshness with the goal of minimizing poor signal quality.

A

	ICU	Acute Care	Acute Care
	GE	GE	Philips
Heart Rate Parameter	50-130	50-130	50-120
Asystole	HR=0		ON >4 sec
Ventricular Tachycardia	>100b/min, >=6 PVCs		>100b/min, >=8PVCs
Non-sustained Vtach	>2 <6 Ventricular beats, >100b/min		On
Extreme Vtach			+ 40b/min, max 200b/min
Extreme Bradycardia	"Vbrady" <50		-25b/min, min 40b/min
Arrhythmia	Full	Full	
PVC/min	10	10	>10
Ventricular Rhythm			>14 PVCs
Run PVCs			>2 PVCs
QTc			High >500
dQTc			Hight >60
Bigeminy	>=3 bigmeny cycles		
Trigeminy	>=3 trigeminy cycles		
Missed Beat			On
SVT			>180/min 5 SVBs
AFIB			ON
Irregular HR			On
Lead Analysis		Multi-Lead	
ST Analysis		On	ON
SpO2	88-105	88-105	88-100
SpO2 alarm delay	15 sec		

B

Arrhythmia Alarm Levels

	Crisis	Warning	Advisory	Message
Asystole	X			
Vfib/Vtac	X			
V Tach	X			
VT >2				X
V Brady		X		
Couplet				X
Bigeminy				X
Acc Vent			X	
Pause		X		
Trigeminy				X
R on T				X
PVC				X
Tachy			X	
Brady			X	
Atrial Fib			X	

Parameter Alarm Levels

	Crisis	Warning	Advisory
HR		X	
PVC			
ST			X
ART		X	
PA			X
CVP			
CO2			X
NBP			X
SPO2			X
FEM		X	
ICP		X	
SP			
SVO2			X
BIS			
RR		X	

Figure 5. In A is the data collection tool used to compare alarm defaults (i.e., on/off, parameters), and definitions by manufacturer (GE or Philips). In B are illustrated alarm levels (i.e., crisis, warning, advisory, message).

Education and Communication

The next stage of the CALM Committee's process focused on educating and communicating new policies and procedures to all of the clinicians involved with alarm management. Because alarm management affects broad clinical specialties within the UCSF hospital system (e.g., nurses, respiratory therapists, pharmacists, clinical engineers, physicians, nurse practitioners, and monitor watchers) we conducted a gap analysis regarding educational approaches used to deliver education to nurses and other clinical staff. Table 2 lists the topics covered in the clinical alarms management policy that required education and training for clinical staff in areas affected by clinical alarms. Personnel responsible for managing alarm systems received more focused education on: how to set alarms; when alarm signals can be disabled; when alarm parameters can be changed; who in the organization has the authority to set, change, or disable alarm parameters; procedures for monitoring and responding to alarms; and procedures for checking alarm accuracy. Alarm management education is provided during initial orientation and with annual competency reviews.

Responsibilities by clinical specialty	Response to alarms
Maintenance and testing of alarm system	Orientation and ongoing training
Appropriate settings	Performance improvement
Adjustment of alarm parameters	Alarm audibility and visibility

Table 2. The eight broad topics covered in the clinical alarms management policy that required education and training of all clinical staff in areas with clinical alarms.

In addition, we issued a Patient Safety Bulletin to illustrate case examples where alarm fatigue compromised patient safety. Each issue of the Patient Safety Bulletin described an actual clinical event that triggered an incident report, which led to a root-cause analysis and subsequent policy and/or process change to prevent and/or mitigate a similar future event. The publication's objective was to further organizational learning about adverse events and to encourage staff to identify and report situations that could result in an untoward patient outcome. This would address potential problems that require resolution with broad, interdisciplinary input.

Centralized Alarm Management

For the final stage of this 24-month project, the CALM Committee developed a structure and process to evaluate and improve alarm management throughout the health system. This included multiple clinical departments, radiology, and the operating room. The committee's role was to identify alarm issues, problem solve alarm management, and reach out to key individuals related to alarm management. The CALM Committee was established as the centralized governing and oversight committee for ensuring alarm safety. Topics reviewed by the committee include: appropriate defaults, alarm volume, standardization of alarms across units, (i.e., multiple intensive care units with varied clinical focus), unit type (ICU versus telemetry versus operating room, etc.), and patient type (adult, pediatric).

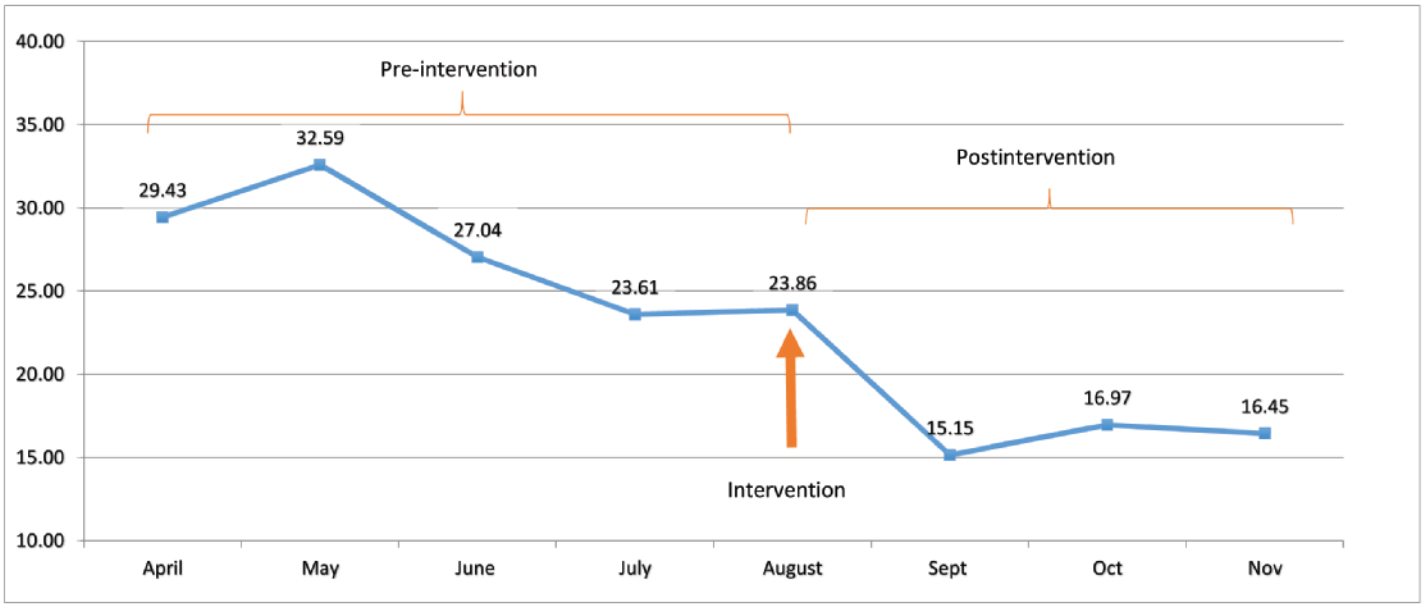


Figure 6. The number of alarm sent to a nurse's Voalte phone are reduced following an intervention consisting of eliminating nonactionable alarms and adding time delays. The intervention allowed the primary nurse more time to accept an alarm on the phone and additional time to cancel the alarm at the bedside prior to the alarm escalating to the backup nurse's Voalte phone.

Summary and Future Directions

The CALM Committee continues to meet and organize activities around alarm management. The initial work of the committee was to gain an understanding of clinical alarms within our hospital system, and identify key stakeholders to participate in the development of a strategic plan around clinical alarms management. Once formed, the committee obtained alarm metrics, including an inventory of where alarms were located within the organization, the number and type of alarms, and default settings. The committee's next steps involved identifying research and evidence-based research related to clinical alarms management in order to benchmark our hospital's current policy and practice and adjust accordingly. The committee then developed and rolled out educational initiatives and developed communication strategies to reach the clinical staff regarding policy changes and competency requirements. This 24-month process positioned us to move forward with strategies and interventions to address alarm fatigue, including research[16,17] and quality assurance projects aimed at reducing the high number of false and nonactionable alarms while ensuring patient safety. ■

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