HTF Clinical Alarms Initiative & the Joint Commission NPSG

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HTF HealthcareTechnology FOUNDATION

The University of Vermont

Healthcare Technology Foundation

Mission:

- ***"Improve healthcare delivery outcomes by promoting the development, application and support of safe and effective healthcare technologies.“***

Actions:

- The promotion of excellence in clinical engineering leadership through research, education and certification
- Funding of related research and programs,
- Effective collaborations between medical device producers, regulators, users and clinical engineers,
- The creation of safety-related education material that is useful to members of the pubic

Healthcare Technology Foundation

Major initiatives:

- Public Awareness and Education on Technology Safety
- Managing Risks of Integrated Systems
- Clinical Alarms Management and Integration
  - *"To improve patient safety by identifying issues and opportunities for enhancements in clinical alarm design, operation, responses, communication, and appropriate actions to resolve alarm-related events."*

HTF website: http://www.thehtf.org/

Collaborative Organizations

- FDA/MedSun – Food & Drug Administration
- VA – Veterans Administration
- AAMI – Association for the Advancement of Medical Instrumentation
- AORN - Assoc. of periOperative Registered Nurses
- AACN – Amer. Assoc. of Critical-care Nurses
- AARC – American Association of Respiratory Care
- ECRI – Emergency Care Research Institute
- ACCE - American College of Clinical Engineering
- META – Medical Equipment & Technology Assoc.
- Industry – GE Medical, Philips Healthcare, Symantec, Masimo, and others
- Individuals – Clinical engineers and nurses donating time and funds to HTF

Healthcare Technology Foundation
Clinical Alarm Initiative Key Deliverable

Impact of Clinical Alarms on Patient Safety

The HTF White Paper includes results from the 2006 US National Clinical Alarms Survey

Actions to Improve Alarms

Design

- *Smart alarms*
- *Integration/remote*
- *Usability/human factors*
- *Standards*

Care management

- *Training*
- *Monitoring (rounds)*
- *Use best practice guides*
- *Institutional standards*

Environmental

- *Better design of facilities*
- *Monitoring (rounds)*
- *Communication*
  - *Alarm integration to pager, cell phone, etc.*

Clinical engineering

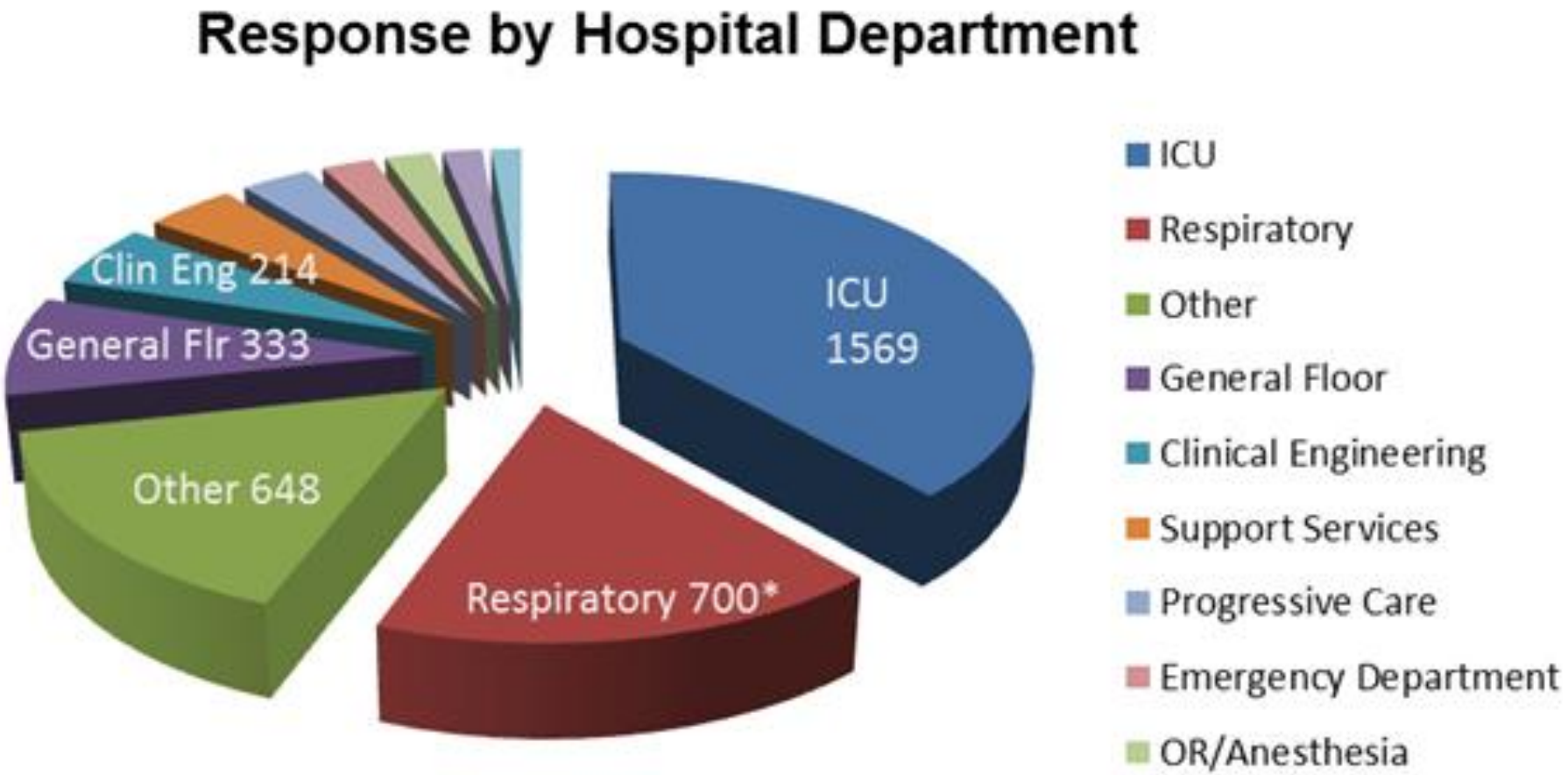
- *Evaluate purchased items for usability*
- *Test alarms in their environment*
- *Software setup/testing*

2011 US National Clinical Alarms Survey

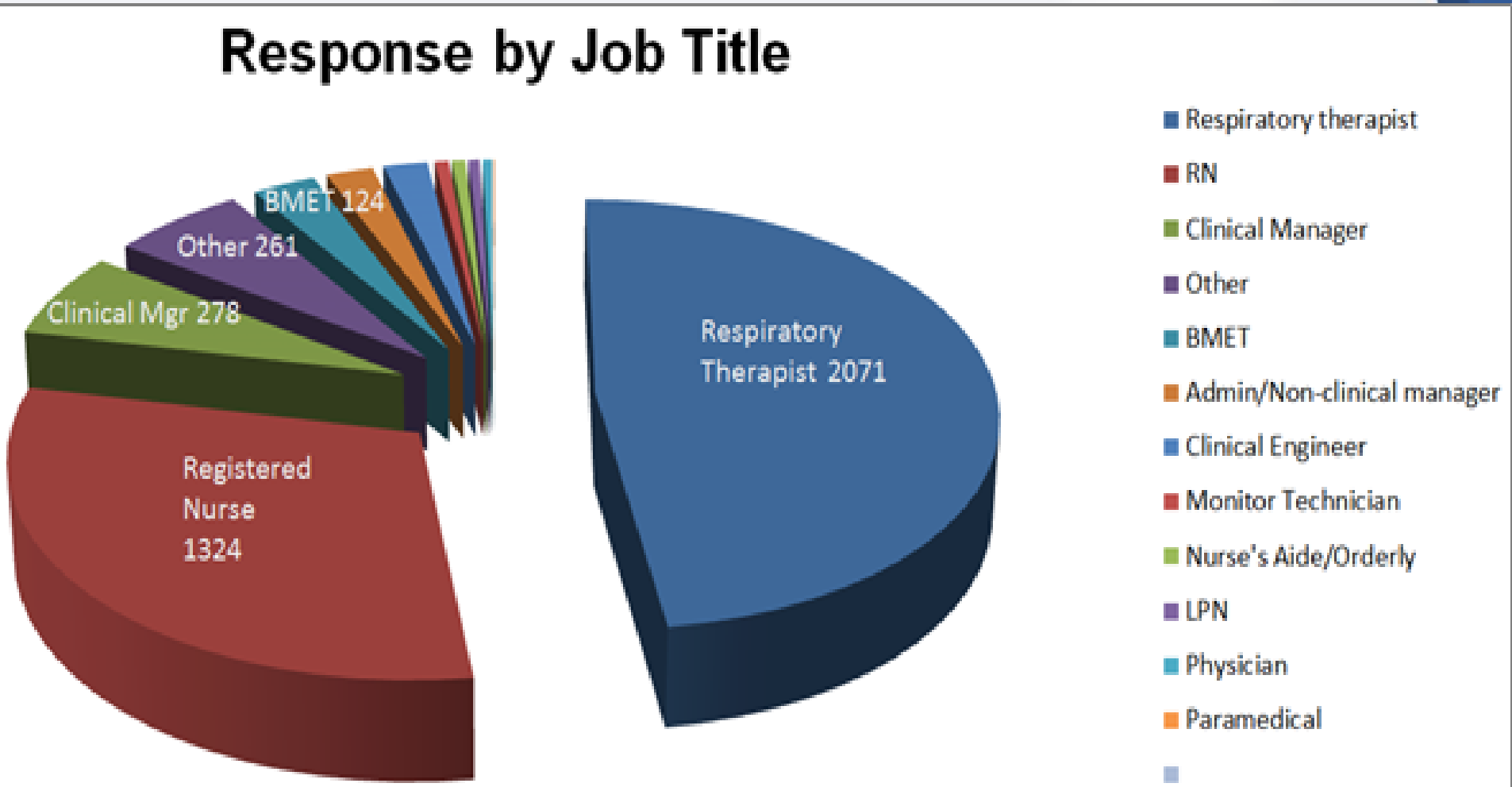
- Re-survey of the field
- Sponsorship – **AAMI, ACCE, PHILIPS & HTF**
- Response:

  4278 responders – 93% clinical staff
- Reported on the results at the AAMI Medical Device Alarms Summit

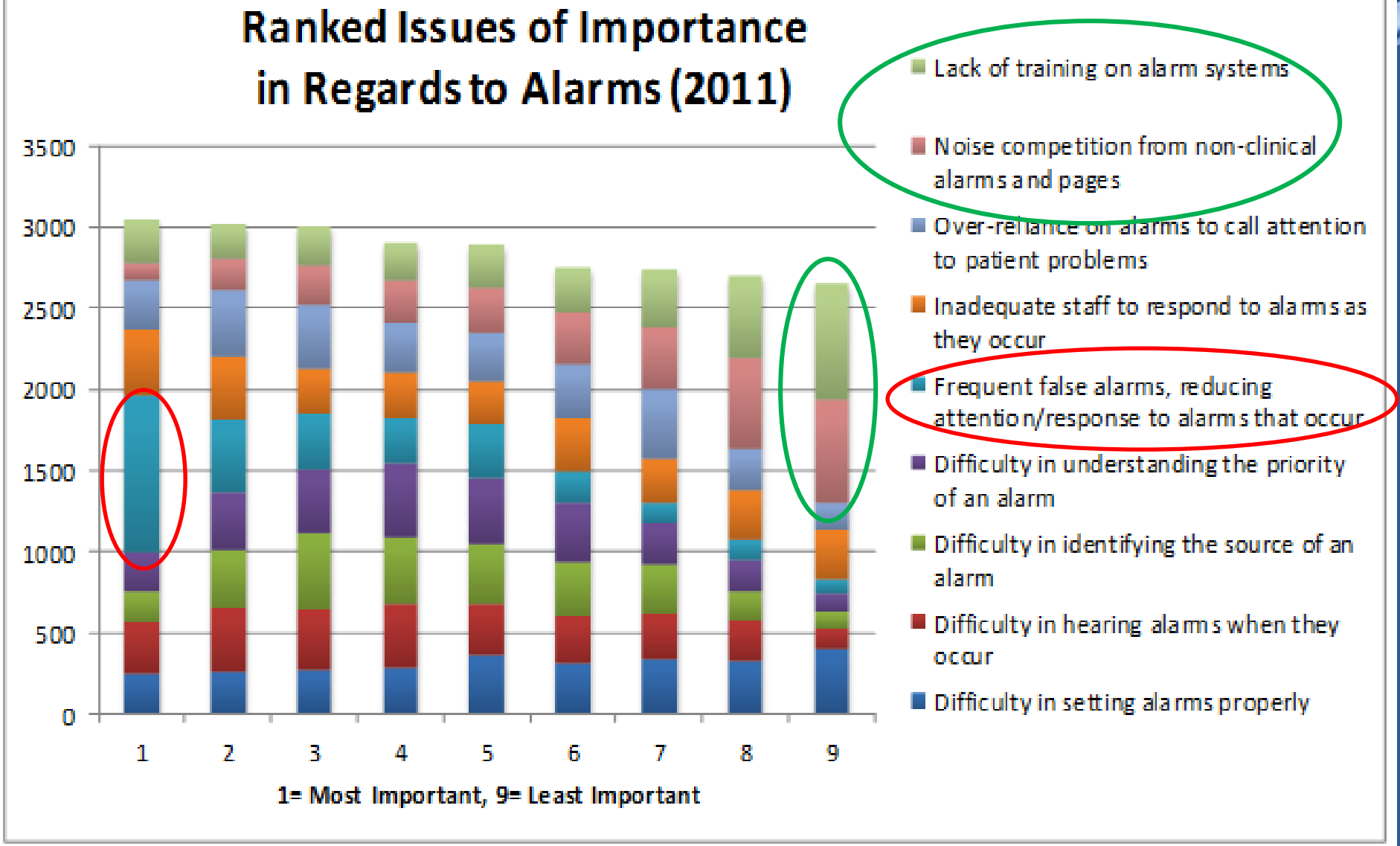
Survey Demographics: *4,278 healthcare staff responded to the survey*



Survey Demographics:
2071 Respiratory Therapists & 1650 Nurses



Priorities


Ranked Issues of Importance in Regards to Alarms (2011)
3500
3000
2500
2000
1500
1000
500
0
1
2
3
4
5
6
7
8
9
1= Most Important, 9= Least Important
Lack of training on alarm systems
Noise competition from non-clinical alarms and pages
Over-reliance on alarms to call attention to patient problems
Inadequate staff to respond to alarms as they occur
Frequent false alarms, reducing attention/response to alarms that occur
Difficulty in understanding the priority of an alarm
Difficulty in identifying the source of an alarm
Difficulty in hearing alarms when they occur
Difficulty in setting alarms properly

2015 HTF Clinical Alarms Task Force

- Chair: Izabella Gieras, Huntington Hospital
  - Jennifer Ott, Thomas Bauld, Marge Funk, Yadin David, Karen Giuliano, Paul Coss, Marcia Wylie, Tony Easty, and Tobey Clark
- Current/Recent Projects
  - Alarm Management Workshop
    - 2015 Association for the Advancement of Medical Instrumentation annual meeting
  - Three American Journal of Critical Care papers
  - Alarms and home health
  - Patient brochure
    - Alarms 101

Patient Education Brochures: *Safe Use of Technology*

Focus on critical equipment

Alarms Brochure for Patients and Families

- Introduction
- Types of alarms
- Why do these alarms sound? Is something wrong?
- Impact of Clinical Alarms on Patients and Families
- Role of the patients and visitors when clinical alarms sound
- Healthcare Organizations involved with alarms
  - *Review of publication by patient advocate*

National Patient Safety Goal NPSG.06.01.01

Effective January 1, 2014, the Joint Commission is requiring hospitals to establish alarm management as an organization priority. Each organization must design a systematic and coordinated approach to this important safety issue. Additional requirements for policies and procedures and education will be required beginning in 2016.

TJC National Patient Safety Goal:

Goal 6: Reduce the harm associated with clinical alarm systems

Elements of Performance for NPSG.06.01.01

1. As of July 1, 2014, leaders establish alarm system safety as a hospital priority. R A
2. During 2014, identify the most important alarm signals to manage based on the following: R A
   - Input from the medical staff and clinical departments
   - Risk to patients if the alarm signal is not attended to or if it malfunctions
   - Whether specific alarm signals are needed or unnecessarily contribute to alarm noise and alarm fatigue
   - Potential for patient harm based on internal incident history
   - Published best practices and guidelines

   (For more information on managing medical equipment risks, refer to Standard EC.02.04.01.)
3. As of January 1, 2016, establish policies and procedures for managing the alarms identified in EP 2 above that, at a minimum, address the following: R A D
   - Clinically appropriate settings for alarm signals
   - When alarm signals can be disabled
   - When alarm parameters can be changed
   - Who in the organization has the authority to set alarm parameters
   - Who in the organization has the authority to change alarm parameters
   - Who in the organization has the authority to set alarm parameters to "off"
   - Monitoring and responding to alarm signals
   - Checking individual alarm signals for accurate settings, proper operation, and detectability

   (For more information, refer to Standard EC.02.04.03)
4. As of January 1, 2016, educate staff and licensed independent practitioners about the purpose and proper operation of alarm systems for which they are responsible. R C

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Fletcher Allen HEALTH CARE
In alliance with The University of Vermont

DEPARTMENT CLINICAL ALARMS INVENTORY

Date: _____

Contact Name: , **Manager**

1. Location *(circle one)*:		Off Site/Satellite *(fill in name below)*	FAH	MCHV	UHC
Off Site Location:					
2. Department/Service:					
3. Building:					
Floor:					
4. Clinical[1] Equipment Type:	**In Unit**	**Equipment Type**	**Risk Scoring**		
Facilities:					
		Nurse Call *(Routine)*	0	1	2	3
		Nurse Call *(bath room)*	0	1	2	3
		Nurse Call *(Code Blue)*	0	1	2	3
		Nurse Call (staff assist)	0	1	2	3
		Nurse Call (staff emergency)	0	1	2	3
		Nurse Call (other:_____)	0	1	2	3
		Door Exit Alarm	0	1	2	3
		Security/Elopement (WanderGuard/HUGS)	0	1	2	3
		Medical Gas Alarm	0	1	2	3
		Isolation Room Alarm	0	1	2	3
		Line Isolation Monitor	0	1	2	3
		Panic Button	0	1	2	3
		Other *(please define below):*	0	1	2	3
			0	1	2	3
			0	1	2	3
			0	1	2	3
			0	1	2	3

University of Vermont Medical Center (formerly Fletcher Allen Health Care)

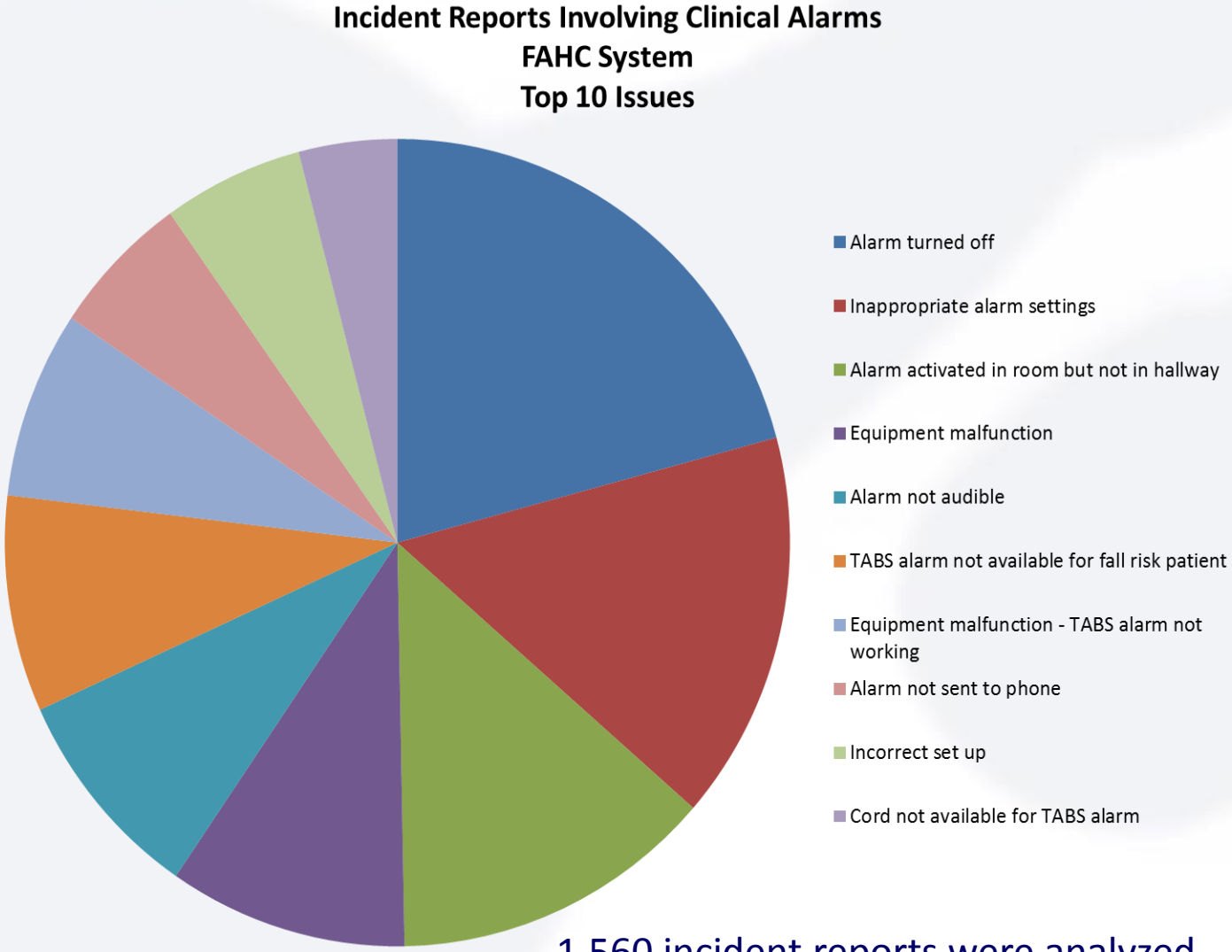
Medical Equipment and Devices:		ECG/Arrhythmia*	0	1	2	3
		Pulse Oximeters (Masimo)	0	1	2	3
		Invasive Blood Pressure*	0	1	2	3
		Non-Invasive Blood Pressure (Dinamap)	0	1	2	3
		End Tidal CO2 Monitors	0	1	2	3
		Central Monitoring (Philips)*	0	1	2	3
		Central Monitoring (Masimo Pat Safety Net)	0	1	2	3
		Secondary alarm system (Cisco)	0	1	2	3
		Infusion Pumps; PCA, PCEA	0	1	2	3
		Feeding Pumps	0	1	2	3
		Chair alarm (Tabs)	0	1	2	3
		Seq Compress Device (SCD, Covidien)	0	1	2	3
		Intra Aortic Balloon Pump	0	1	2	3
		Defibrilator (Lifepak)	0	1	2	3
		High Flow Delivery (Level 1)	0	1	2	3
		Hypo/Hyperthermia Unit (Artic Sun/other)	0	1	2	3
		Ventilators (Drager, LTV, Hamilton)	0	1	2	3
		Transport Ventilator	0	1	2	3
		CPAP/BI-PAP	0	1	2	3
		Wound care system (VAC)	0	1	2	3
		Bed Exit (Stryker)	0	1	2	3
		Kidney Dialysis, Dialyzer	0	1	2	3
		Automated Drug Dispenser (Pixis)	0	1	2	3
		Drug Carts	0	1	2	3
		Blood Warmer	0	1	2	3
		Other *(please define below):*	0	1	2	3
			0	1	2	3
			0	1	2	3
			0	1	2	3
			0	1	2	3
			0	1	2	3
			0	1	2	3

[1] *Clinical and or support alarms that require patient care services to react to an alarm or warning device.*

[2] *Assess each device and assign a risk score based on the consequences of not responding to the alarm and the likelihood of a timely, reliable staff response to the alarm. Risk scoring will be assigned on a* ***0 - 3 scale****, 0 being no risk to patient, 1 low risk to the patient, 2 moderate risk to the patient with timely, reliable response to the alarm, 3 high risk to the patient with the potential for unreliable or delayed response to the patient.*

* *Red alarm level to be assessed*

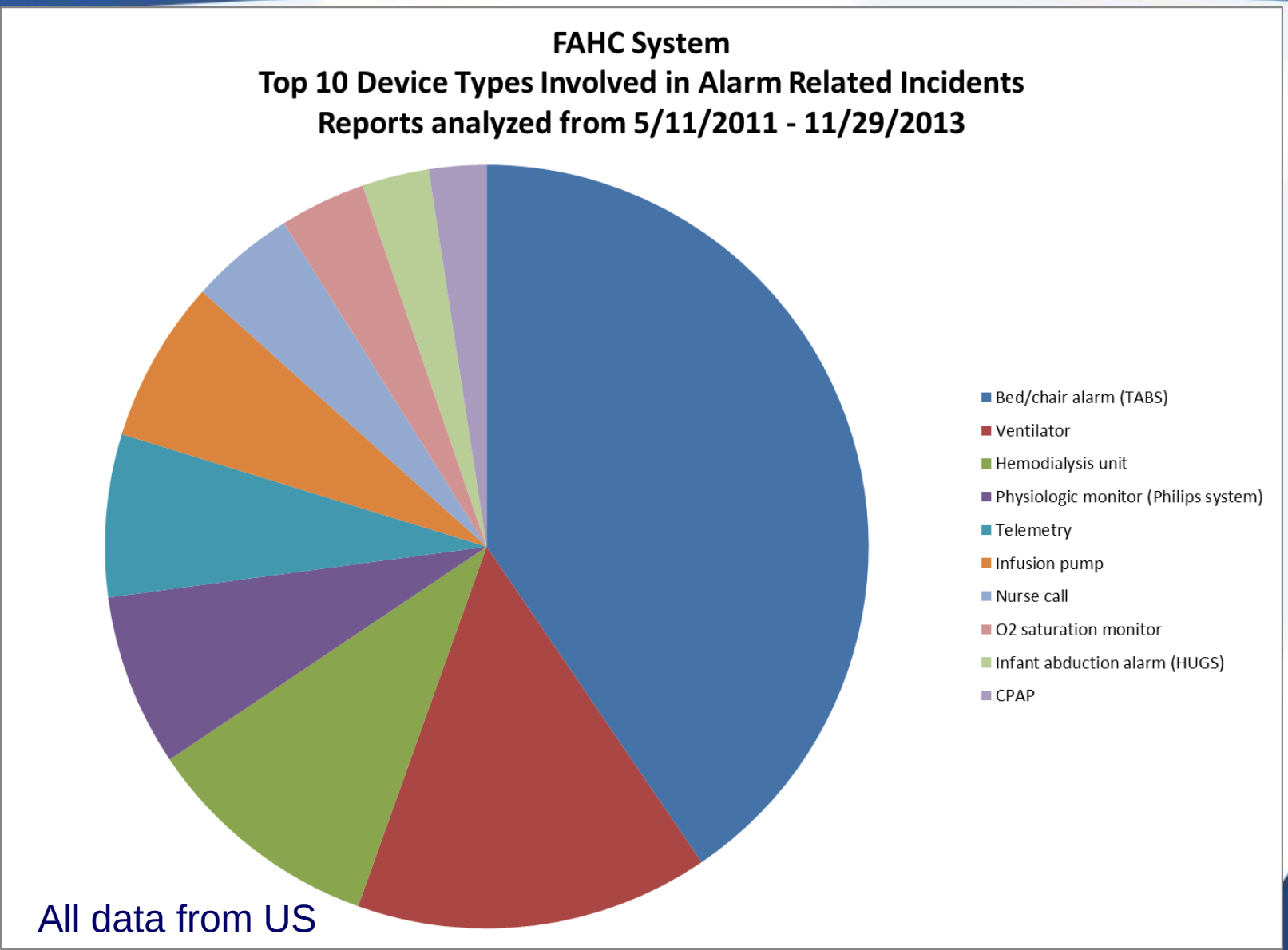
Incident Data Review



All data from US

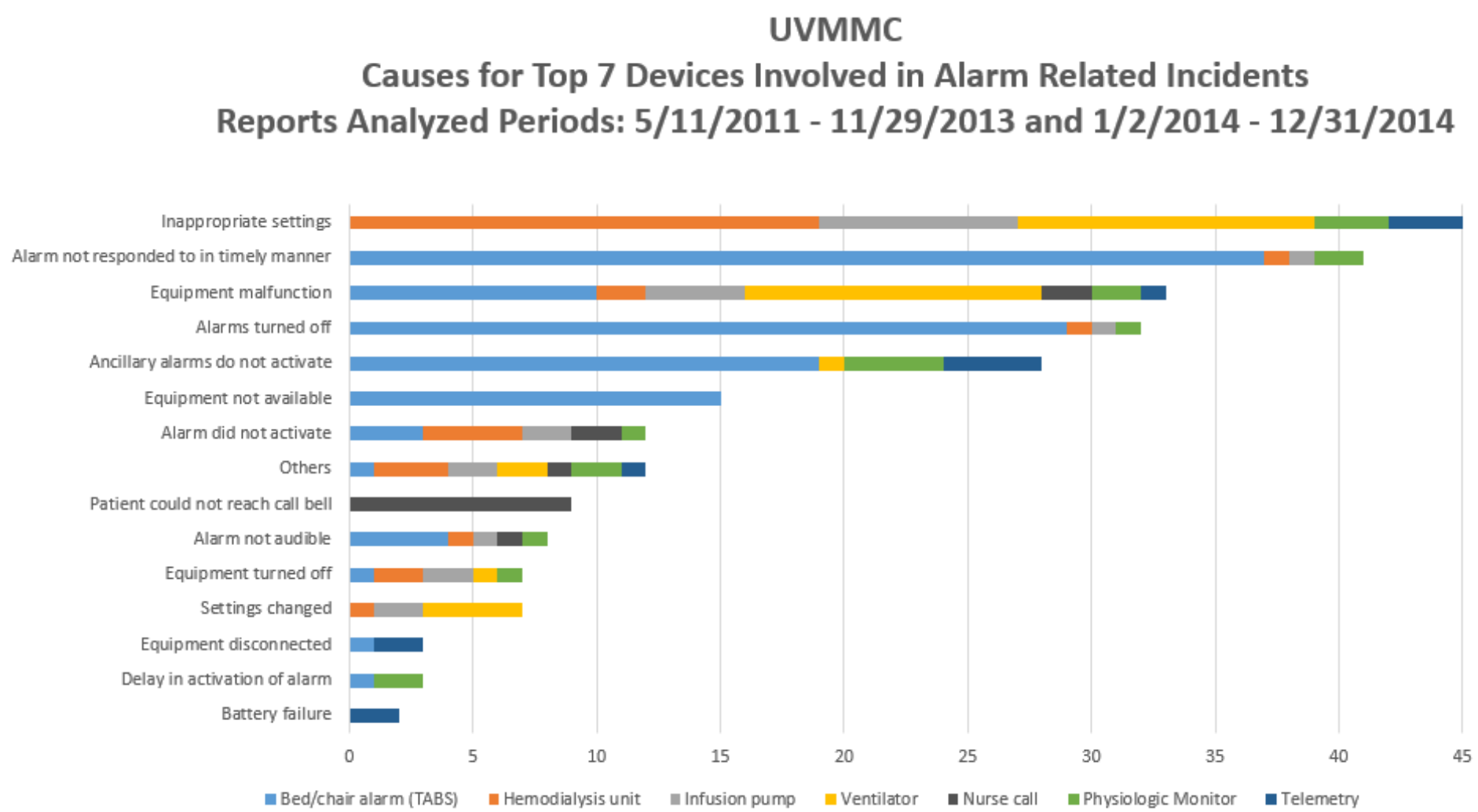
1,560 incident reports were analyzed.
314 reports directly involved the alarms

Incident Review



All data from US

Incident Review



All data from US

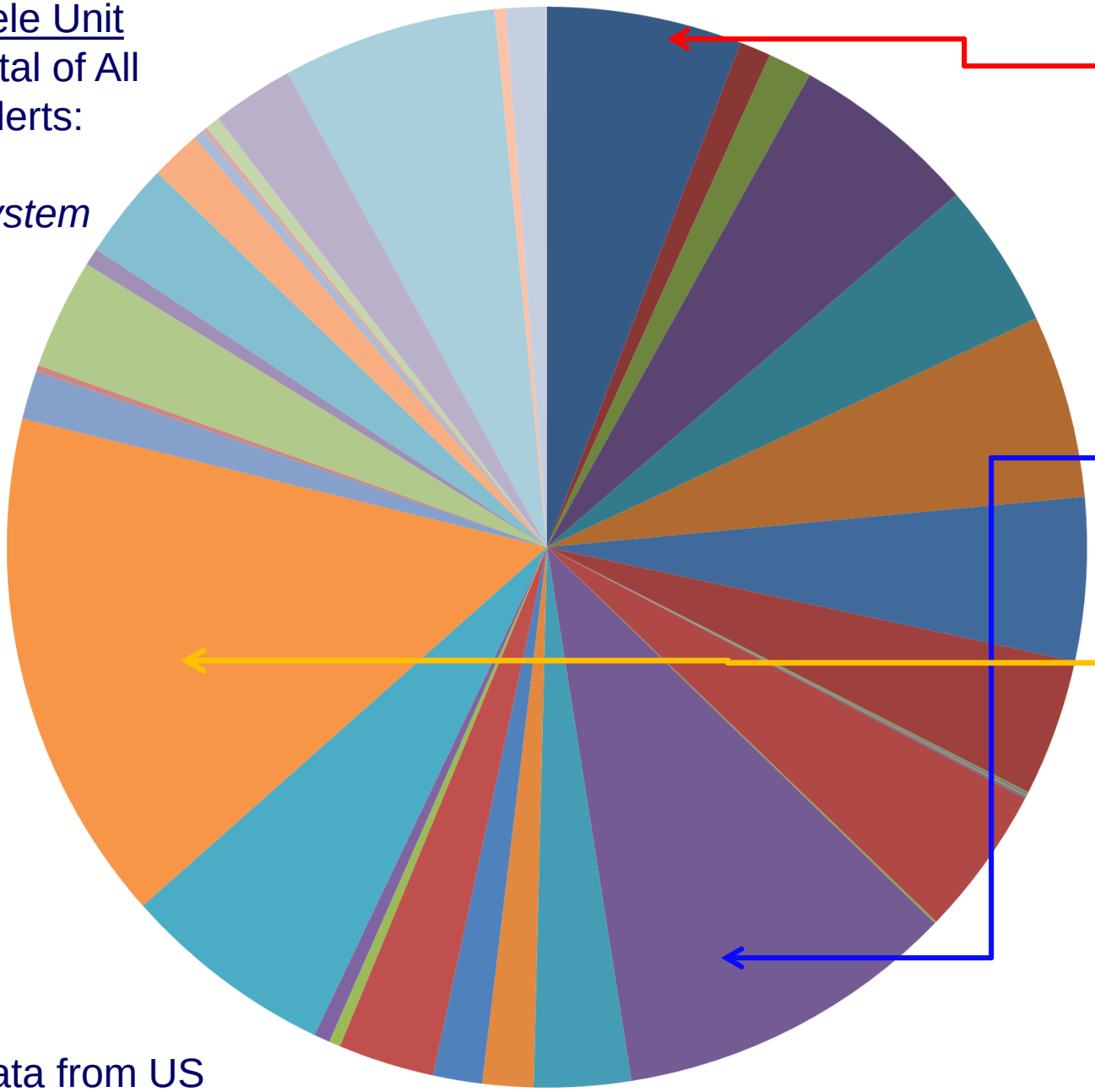
Alarm Type Review: 30 days data

50 bed Tele Unit

Grand Total of All Alarms/Alerts:

172,970

Philips system only



- AFIB
- ASYSTOLE
- DESAT
- Extreme BRADY
- Extreme Tachy
- High Heart Rate
- IRREGULAR HR HR
- Leads Off ECG
- Leads Off LA
- Leads Off LL
- Leads Off RA
- Leads Off RL
- Leads Off V
- Low Heart Rate
- MISSED BEAT
- MULTIFORM PVCs HR
- NBPd
- NBPs
- No Signal
- NON SUSTAIN VT HR
- Nurse Call
- PACER NOT CAPTURE
- PACER NOT PACE
- PAIR PVCs
- PAUSE HR
- PULSE
- PVCs > 10/min
- R-ON-T PVC
- RUN PVCs
- SpO2
- Tele Batt Empty
- Tele Batt Replace
- Tele Battery Low
- V Fib
- V Tach
- VENT BIGEMINY
- VENT RHYTHM
- VENT TRIGEMINY

All data from US

Improvement: *Online Alarms Education*

THE University of Vermont MEDICAL CENTER

- Online education since 2008
- Orientation and ongoing education on high priority device alarms
- Sections
  - Importance of alarms
  - Device background & specific device guide
  - Alarm audio and video for all device alarms
  - Meaning and response / Evaluation
- http://its.uvm.edu/FAHC_Alarms/McClure5/IndexMCC5.html
- http://its.uvm.edu/FAHC_Alarms/Web%20Page/IndexNICU2.html

What Can Clinical Engineering Do?

- Establish alarm system safety as hospital priority
  - Play a role in supporting leaders to make clinical alarms a priority
- Identify the most important alarm signals to manage
  - Meet with clinical staff to prioritize
  - Provide risk-based input, failure data
  - Incident review
  - Educate on published best practices and guidelines
- What alarm signals unnecessarily contribute to alarm noise and alarm fatigue
  - Alarms rounds – use your senses
  - Measure alarm frequency by type
  - Support the process to revise default alarm settings
    - Non actionable, unreliable, procedural
    - Individualized by patient
  - Training development and delivery

Resources

- Healthcare Technology Foundation (HTF)
  - Clinical Alarms Management and Integration
    - http://thehtf.org/clinical.asp
- Association for the Advancement of Medical Instrumentation (AAMI)
  - Healthcare Technology Safety Institute – Clinical Alarms
    - http://www.aami.org/htsi/alarms/index.html
    - http://www.aami.org/htsi/safety_innovation.html
- American Association of Critical-care Nurses (AACN)
  - Strategies for Managing Alarm Fatigue
    - http://www.aacn.org/dm/practice/actionpakdetail.aspx?itemid=28337&learn=true&menu=practice&utm_medium=print&utm_source=various&utm_campaign=actionpak

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