

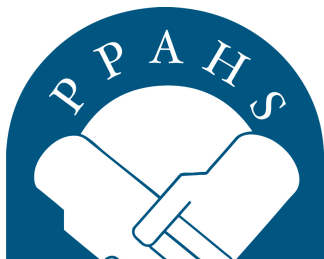
Alarm Fatigue Attitudes and Alarm Management Tools Hospitals Want/Need

Results from
First National Survey of
Patient-Controlled Analgesia
Hospital Practices

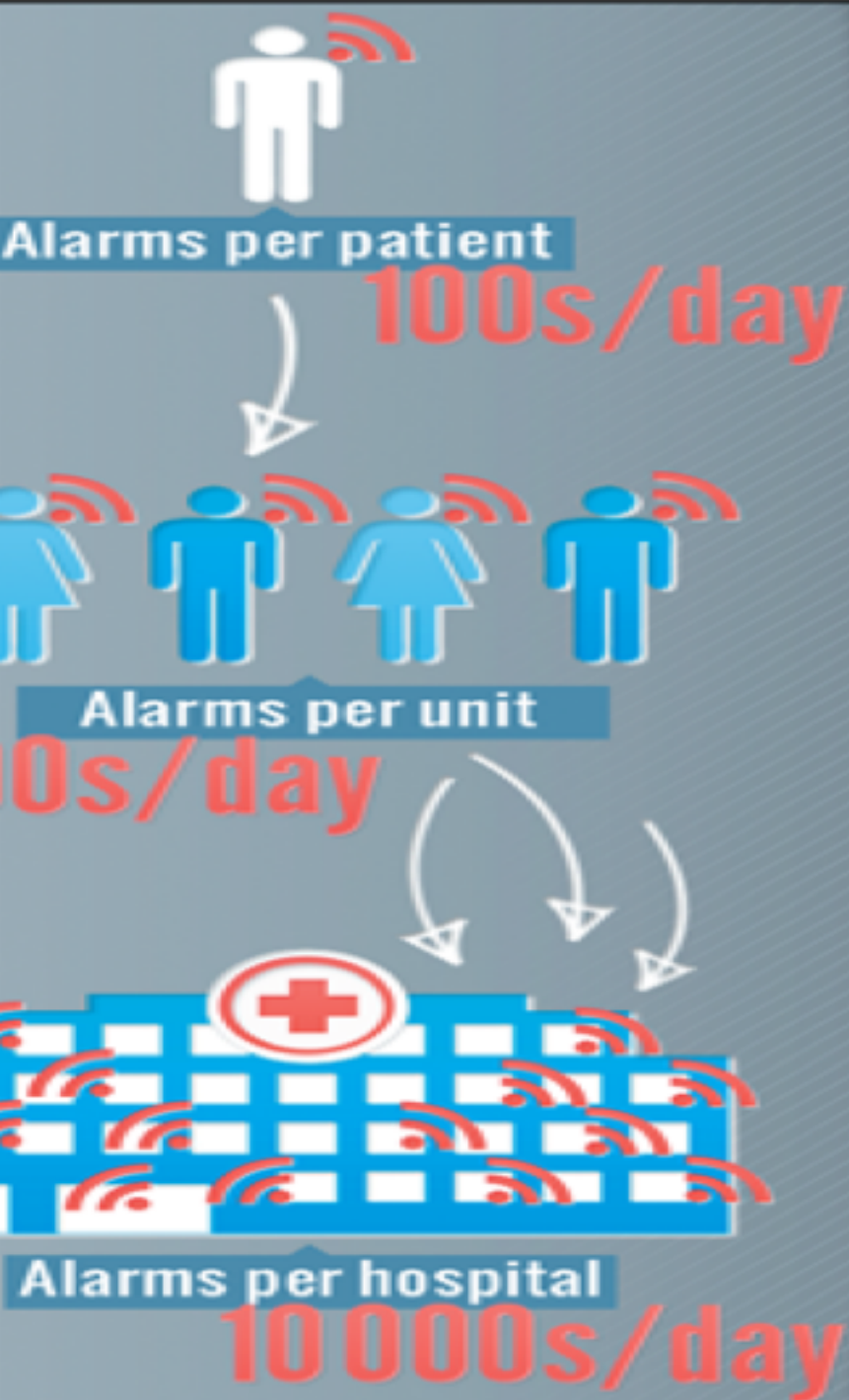


Support for website and some activities:

- AccelRx
- CareFusion
- Covidien
- Incline Therapeutics
- Massimo



1. What's the Problem?
2. Why We Should Care?
3. How We Can Address the Issue?



Hospital staff experiencing “**Alarm Fatigue**”

- + Overwhelmed by information
- + Desensitized to number of alarms
- + Immune to alarm sounds

Improper responses

- + Turn down volume
- + Turn alarms off
- + Adjust settings outside safe

Serious or fatal consequences

- + Patient falls
- + Delays in treatment
- + Treatment errors

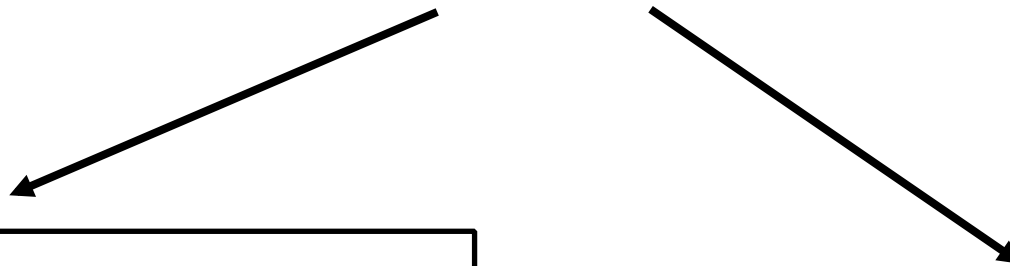
Source: The Joint Commission. *Sentinal Event Alert*. April 8

Sample from Johns Hopkins Hospital ICU

12 Day Sample of Alarm Data	Quantity
High Priority	1587
Medium Priority	6673
Low Priority	48277
Technical Alarms	2227
Grand Total of Alarms	58764
Ave Pt Census	14
Average Alarms/Bed/Day	350

Alarm-Related Deaths

http://www.jointcommission.org/assets/1/18/SEA_50_alarms_4_5_13_FINAL1.PDF



The Joint Commission's Sentinel Event database (January 2009 - June 2012):

- 98 alarm-related events
- **80 resulted in death**
- 13 in permanent loss of function
- 5 in unexpected additional care or extended stay

U.S. Food and Drug Administration's (FDA) Manufacturer and User Facility Device Experience (MAUDE) database (January 2005 - June 2010)

•**566 alarm-related patient deaths**

**Voluntary reports, under represent the actual number of incidents
(research shows total actual number between 300 - 1,000 voluntary reports)**

<http://ppahs.org/2011/11/30/errors-with-patient-controlled-analgesia-pca-just-the-tip-of-the-iceberg/>

Joint Commission's Sentinel Event
Database (January 2009 - June 2012):
8 alarm-related events
0 resulted in death
3 in permanent loss of function
in unexpected additional care or
extended stay



Estimated patient deaths:

- Total: 29,400 - 98,000
- Per Year: 8,400 - 28,000
- Per Month: 700 - 2,333

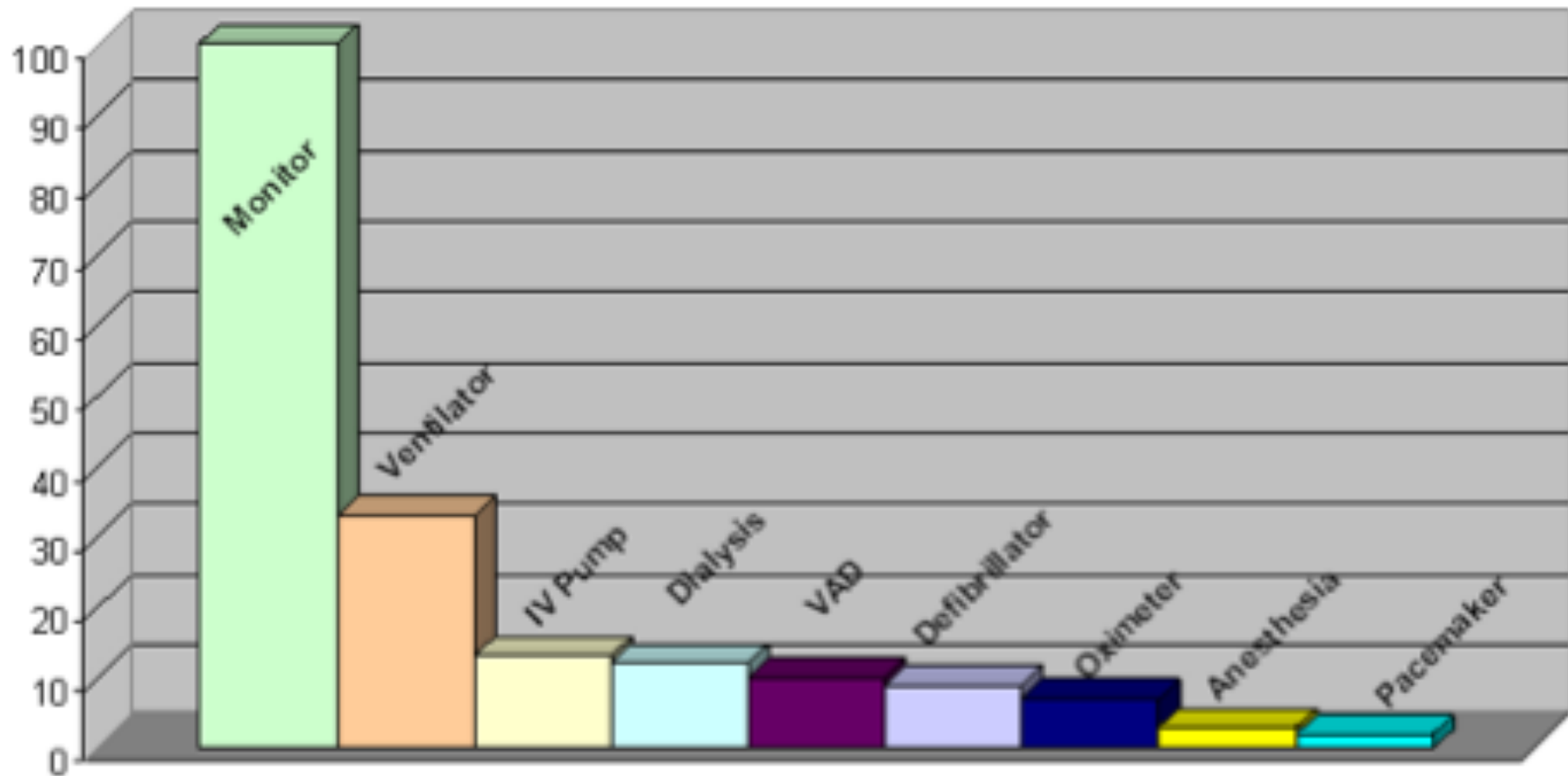
U.S. Food and Drug Administration's
(FDA) Manufacturer and User Facility
Device Experience (MAUDE) database
(January 2005 - June 2010)
566 alarm-related patient deaths



Estimated patient deaths:

- Total: 169,800 - 566,000
- Per Year: 30,873 - 102,909
- Per Month: 2,573 - 8,576

2005-2006 Alarm Related Death by Device FDA MAUDE DATABASE



Kathy Weil, MS, BSN, RN
Nurse Consultant
CDPH/FDA

National Patient Safety Goal on Alarm Management

www.jointcommission.org/assets/1/18/PREPUB-06-25-2013-NPSG060101.pdf

“Clinical alarm systems are intended to alert caregivers of potential patient problems, but if they are not properly managed, they can compromise patient safety.”

Requirements:

- As of July 1, 2014, leaders establish alarm system safety as a [critical] hospital priority
- During 2014, identify the most important alarm signals to manage



https://www.ecri.org/Press/Pages/2014_Top_Ten_Hazards.aspx

“Excessive numbers of alarms—particularly alarms for conditions that aren’t clinically significant or that could be prevented from occurring in the first place—can lead to alarm fatigue, and ultimately patient harm. That is:

- Caregivers can become overwhelmed, unable to respond to all alarms or to distinguish among simultaneously sounding alarms.***
- They can become distracted, with alarms diverting their attention from other important patient care activities.***
- They can become desensitized, possibly missing an important alarm because too many previous alarms proved to be insignificant.”***

17-Year Old Dies After Alarm Muted





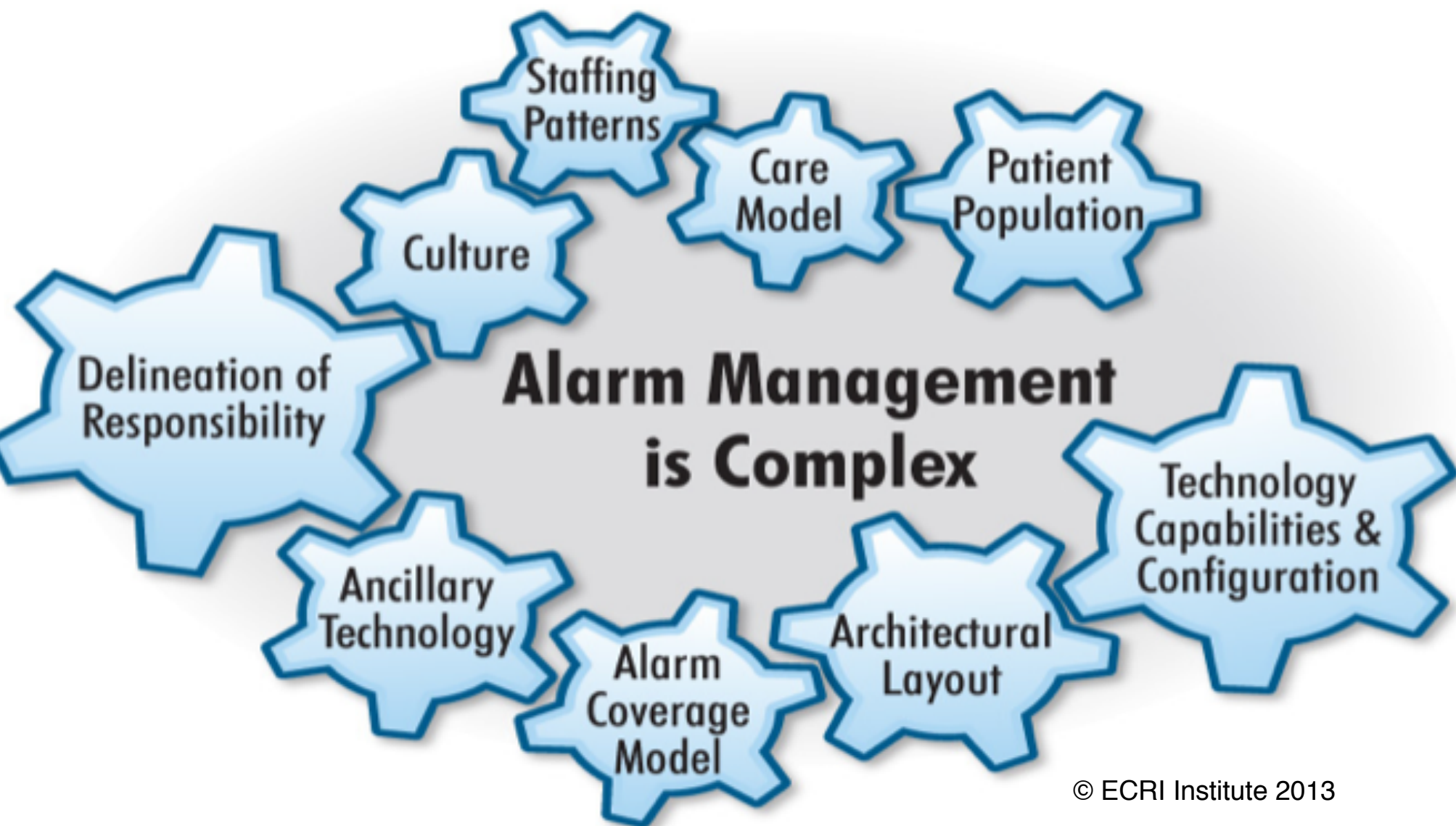
17-Year Old Dies After Alarm Muted

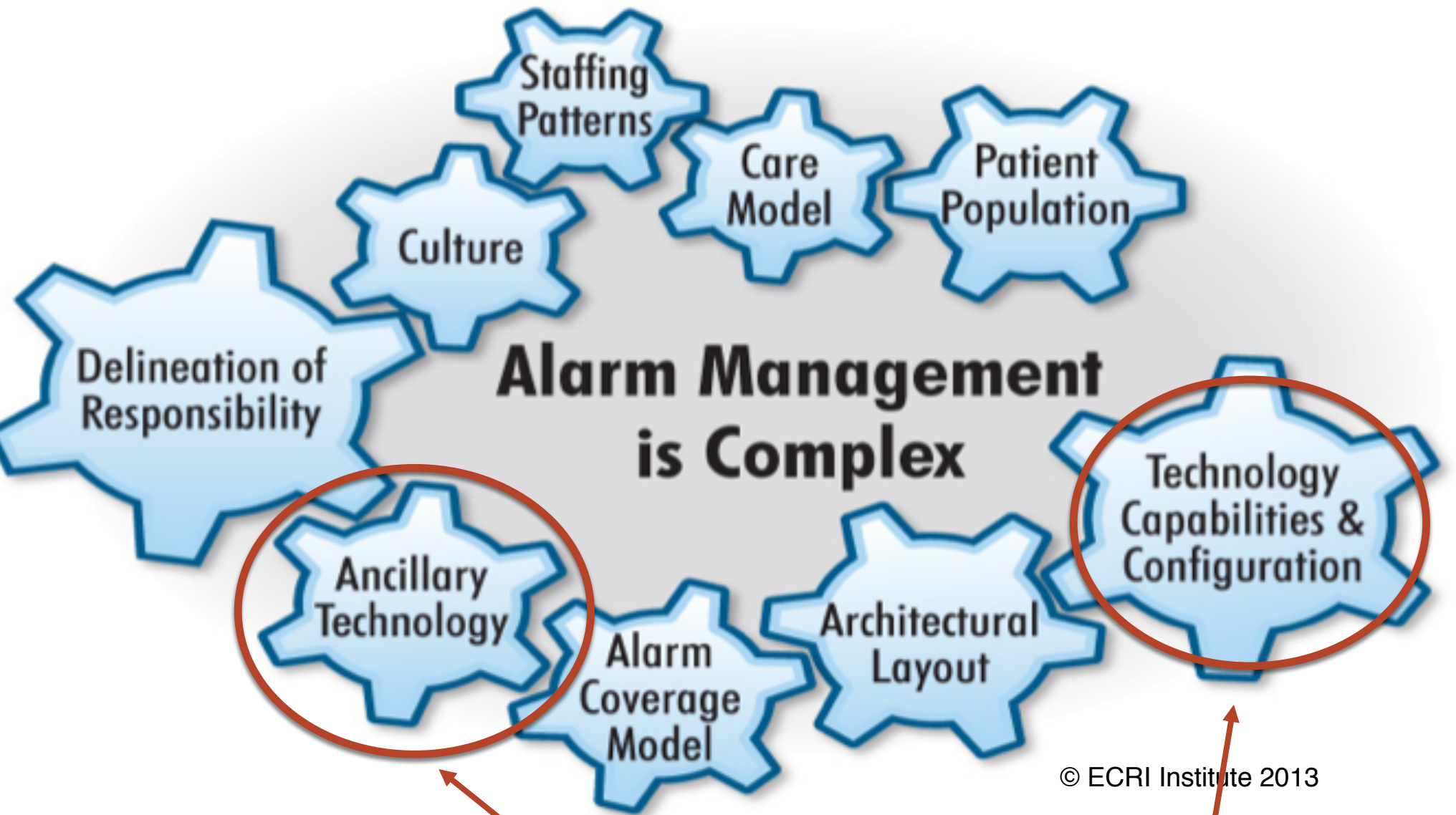
ring after successful tonsillectomy
age pain, administered a dose of fentanyl
uously electronically monitored
urse admitted that monitors muted for sound
EMENT: \$6 million



<http://www.rossfeller Casey.com/news-stories/44>

http://abclocal.go.com/wpvi/story?section=news/special_reports&id=8980647





**National Survey & Technological
Wants/Needs**

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This survey was conducted during March & April 2013*.

Respondents include...

▶ **168**
Respondents

▶ Hospitals from across



▶ Institution Type

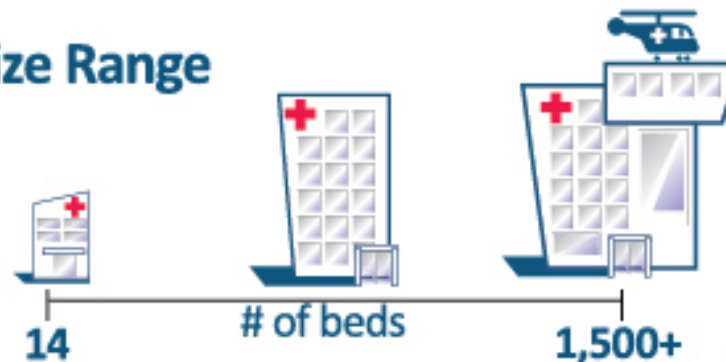
Non-teaching

45%

Teaching

55%

▶ Hospital Size Range

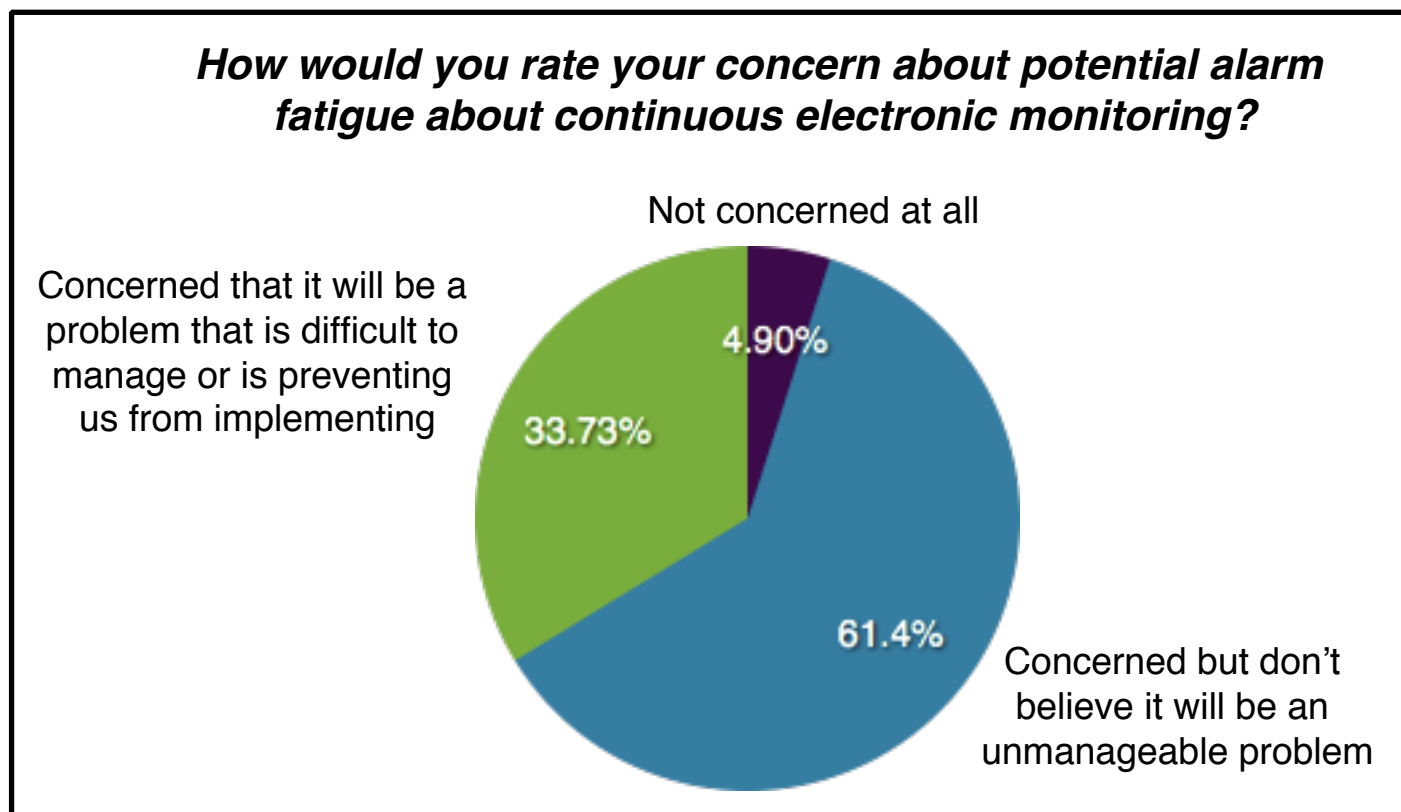


18%
Physicians

35%
Non-Physicians
(Nurses, R.T.s)

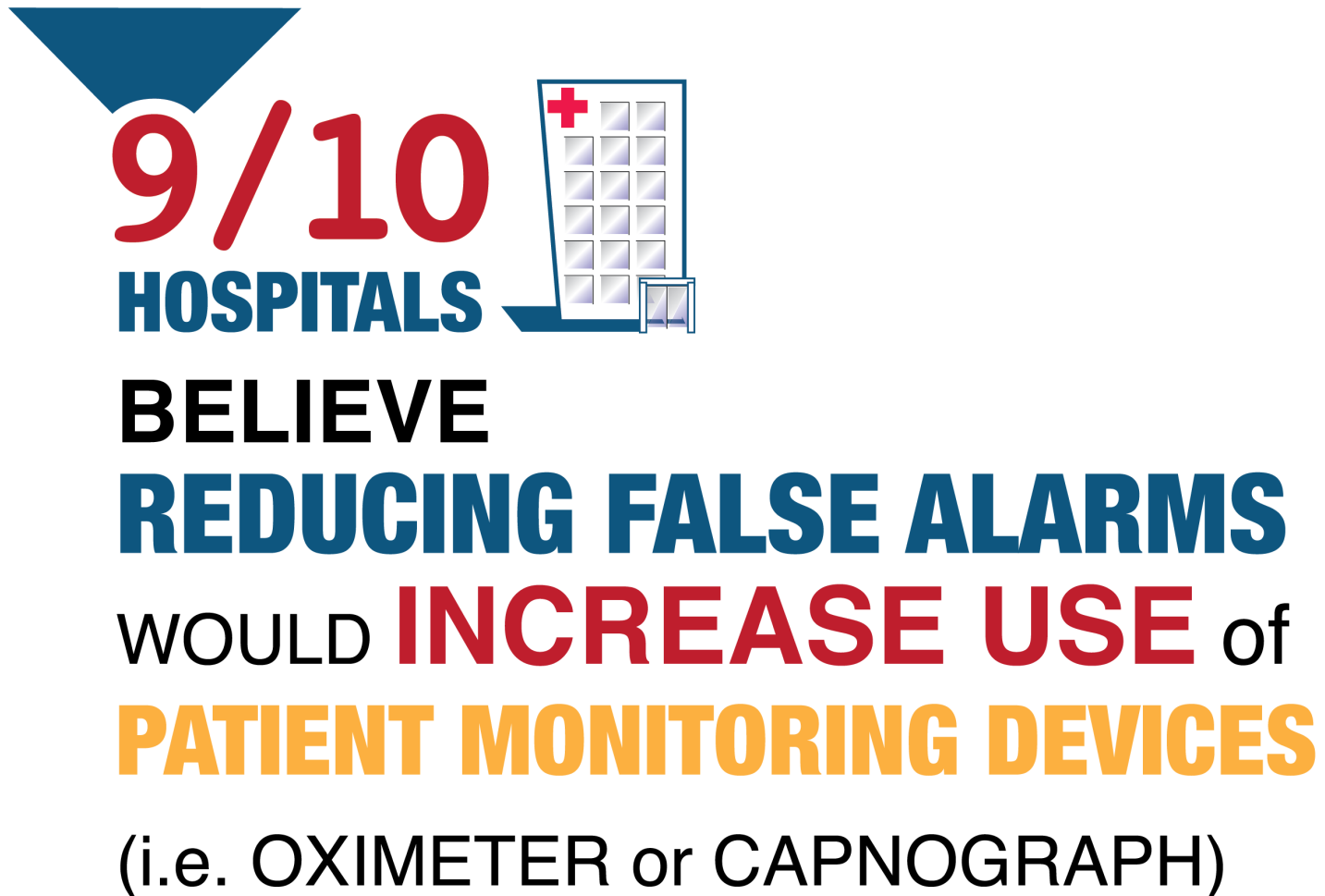
47%
Pharmacists

More than 19 in 20 hospitals (95.1%) say they are concerned about alarm fatigue

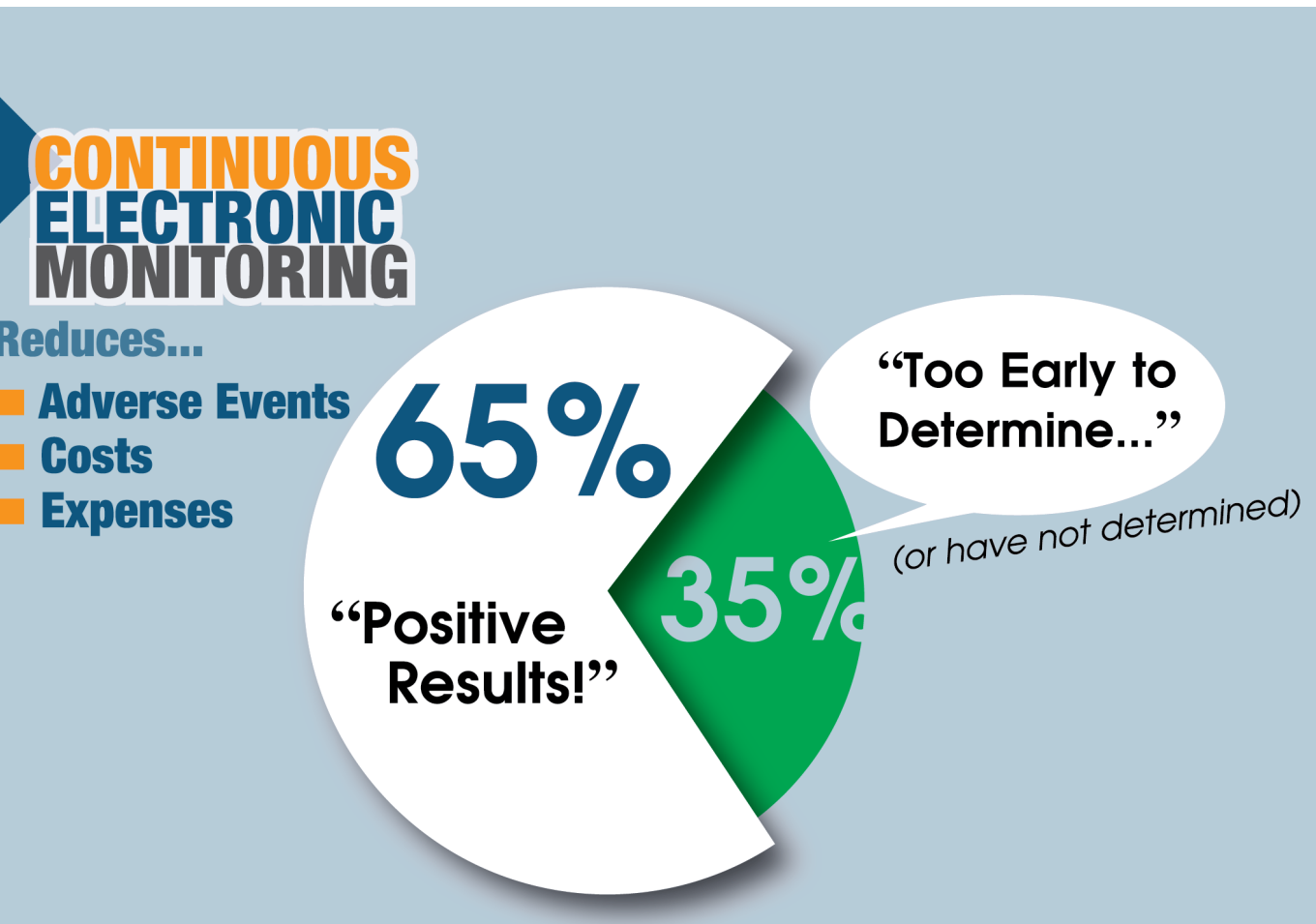


If No Alarm Fatigue, More Hospitals Would Monitor

Almost one in ten hospitals (87.8 percent) believe that a reduction of false alarms would increase the use of patient monitoring devices, like an oximeter or capnograph.



Continuous Electronic Monitoring Reduces Adverse Events, Costs, and Expenses



- ➔ Of those hospitals that monitor some or all of their patients with pulse oximetry or capnography, more than 65 percent have experienced positive results, either in terms of a reduction in overall adverse events or of costs and expenses. The other 35 percent of those that monitor it is "too early to determine" or have not determined.
- ➔ Those using smart pumps with integrated end tidal monitoring were almost three times more likely to have had a reduction in adverse events or a return on investment in terms of a reduction in costs and expenses (OR=2.95 95% CI 1.112-6.996).

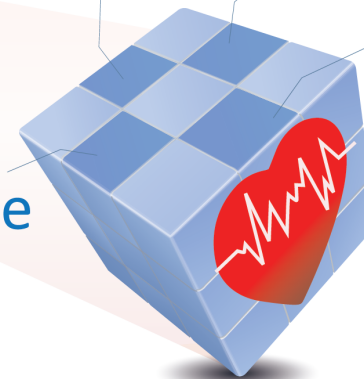
Ease of Assessment: Need for Single Indicator



7 OUT OF **10**
HOSPITALS
WOULD LIKE
“a Single Indicator”



carbon dioxide
exhaled



pulse
rate

respiratory rate

oxygenation

Recommendations:

44.6% would like “recommendations on how best to easily make such assessments” of patients

Clinical Training:

52.9% would like to see more clinical training

Single Assessment Indicator:

Multi-parameter alarms vs single parameter to improve alarm specificity and decrease the false alarm rate

Standardize Alarm Sounds:

Standardization of alarm sounds across similar devices (all vents sound the same, all monitors have the same sounds, etc)

Pause Before Alarming:

Short delays to eliminate nuisance alarms that auto-correct – example ST alarms delayed by 2 minutes prior to sounding an alarm

Electrode/Skin Interface:

Simple way for staff to determine if electrode/skin interface is good

Adaptation of Alarm Levels:

Adaptation of alarm levels based on quantity/or change in alarm pattern (i.e. patient has a sudden increase in the number of PVCs; HR suddenly goes down from 90s to 60s)

Smart IV Pumps:

Infusion pump that can be smart enough to know when a critical med is infusing and alarm sound is different and more urgent

Device Interoperability:

Interoperability among multiple devices

Central Alarm Integration:

Centralized notification system that integrates all alarms within the patient room to a single device (highly accurate; no more than 3-4 alerts/hour)

Multi-Function Wireless Device:

Single device that integrates multiple functions (e.g. patient identification, medication administration, vital signs monitoring, etc)