A JOURNEY TO REDUCE ALARM FATIGUE: Tips on What Not to Do

UT Southwestern
Medical Center

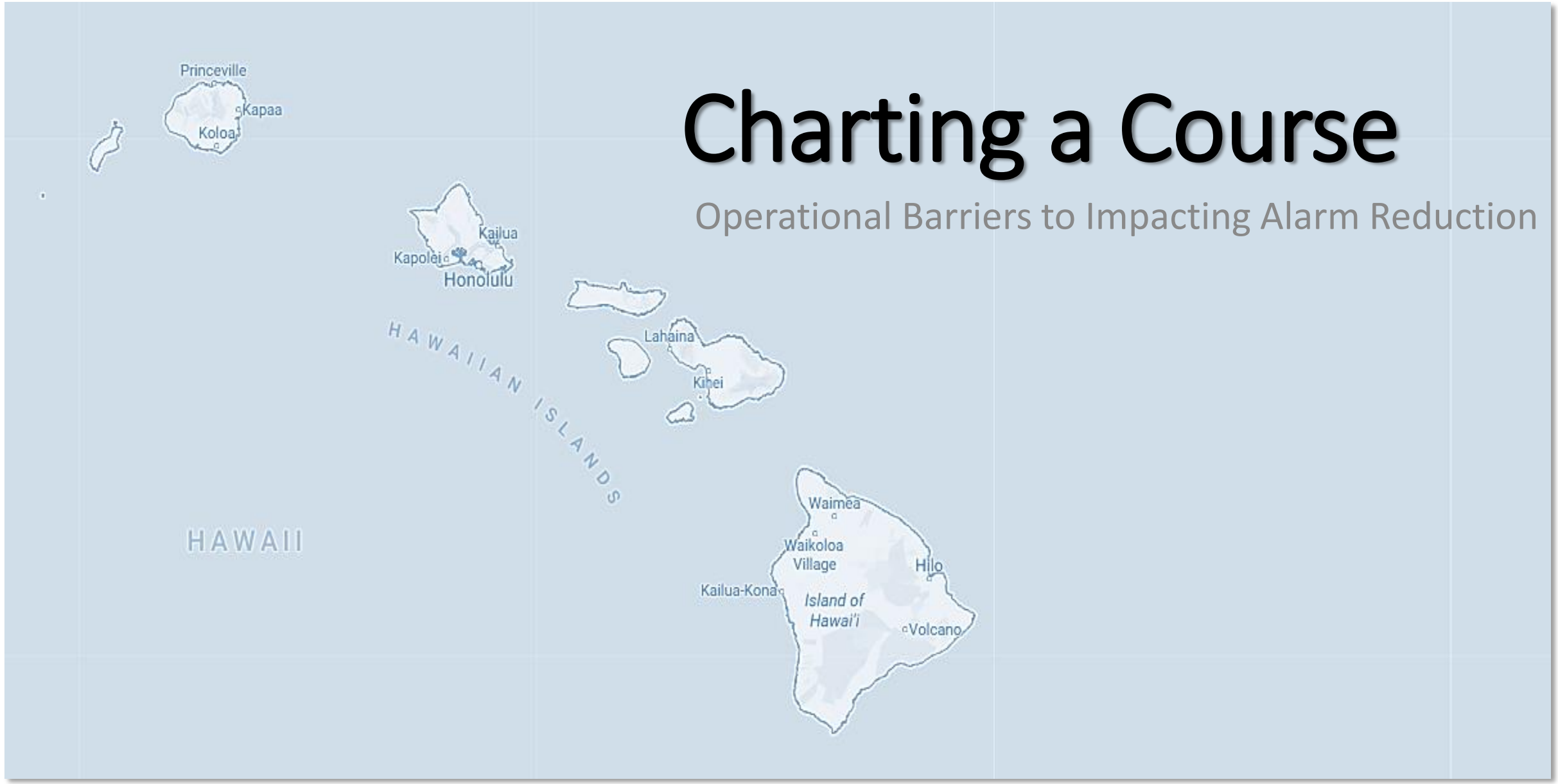
Conflict of Interest Disclosure

- I have no actual or potential conflict of interest in relation to this presentation.

Who is UT Southwestern?

Zale Lipshy University Hospital

William P. Clements University Hospital



Charting a Course

Operational Barriers to Impacting Alarm Reduction

Know the Destination

- Navigating uncharted territory

The Joint Commission Announces 2014 National Patient Safety Goal (continued)

Continued from page 1

Joint Commission

Requirement

Official Publication of Joint Commission Requirements

National Patient Safety Goal on Alarm Management

APPLICABLE TO HOSPITALS AND CRITICAL ACCESS HOSPITALS

Effective January 1, 2014

Elements of Performance for NPSG.06.01.01

A 1. As of July 1, 2014, leaders establish alarm system safety as a [critical access] hospital priority. R

Logistical Challenge

- Two hospitals
  - In 1989, Zale Lipshy opened as the first University Hospital
  - In 2000, St. Paul Hospital joined with Zale Lipshy Hospital

Infusion Pump

Ventilator

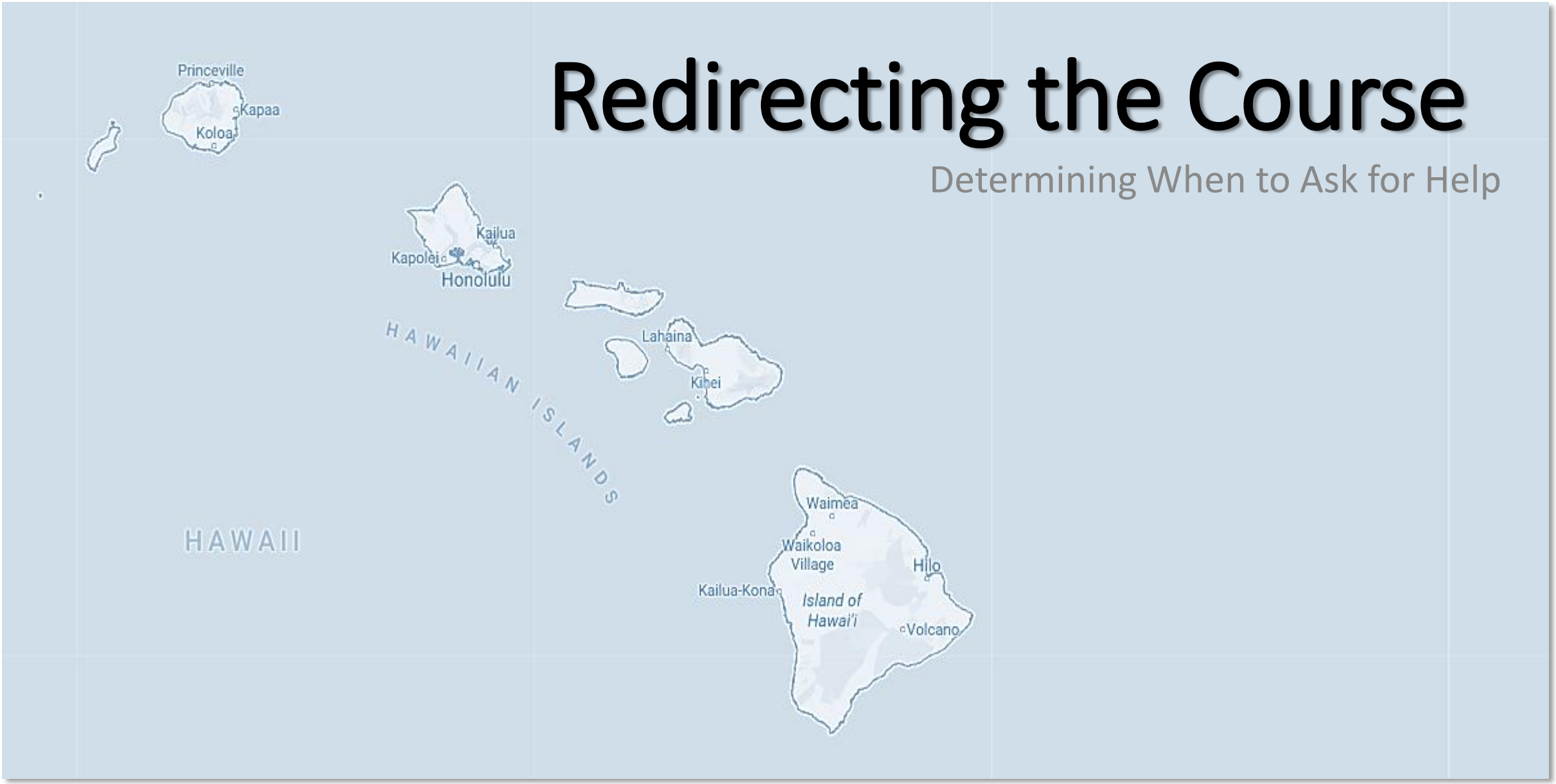
Anesthesia Machine

Physiologic Monitor

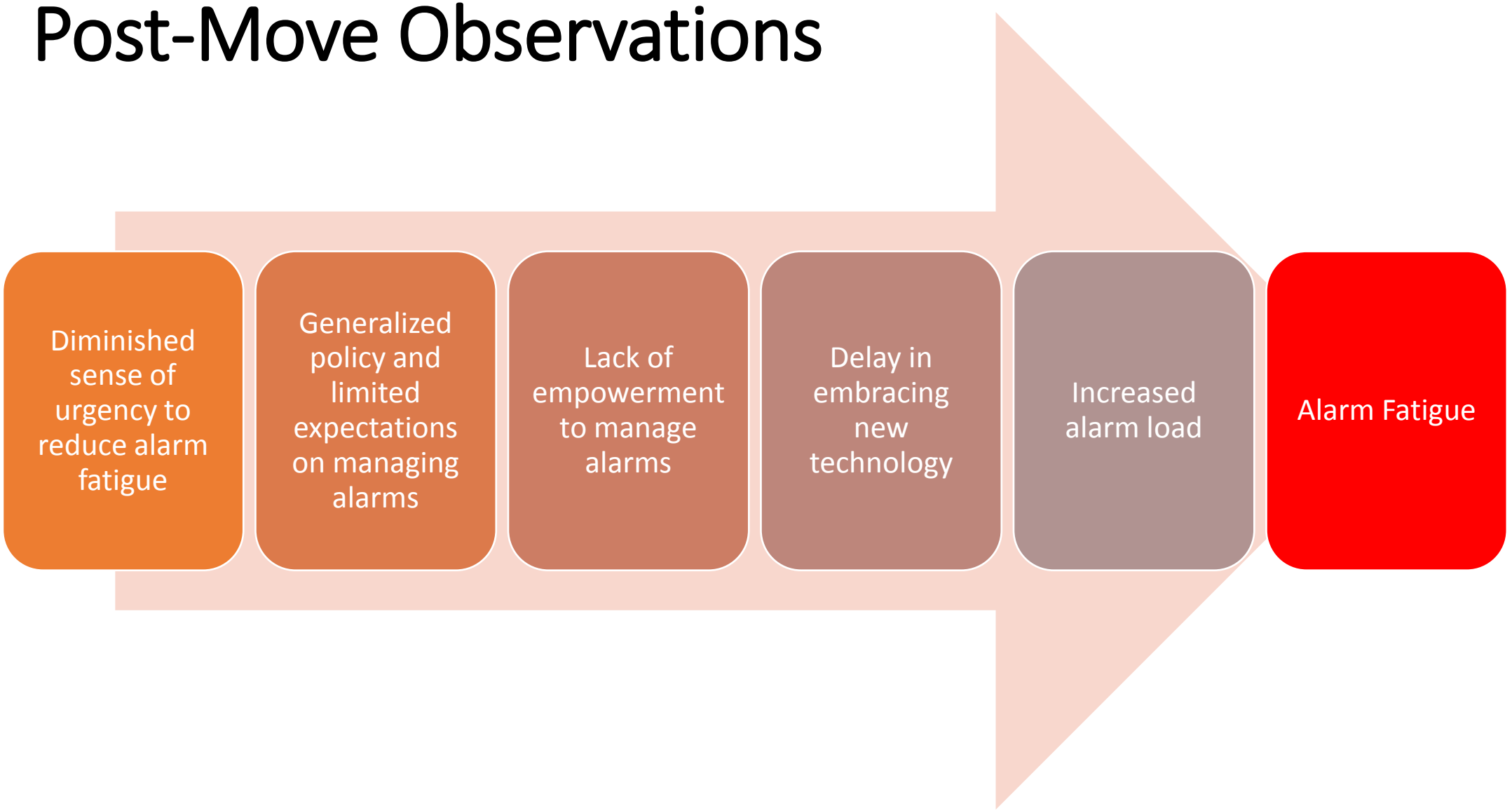
Move to a New Facility

Redirecting the Course

Determining When to Ask for Help

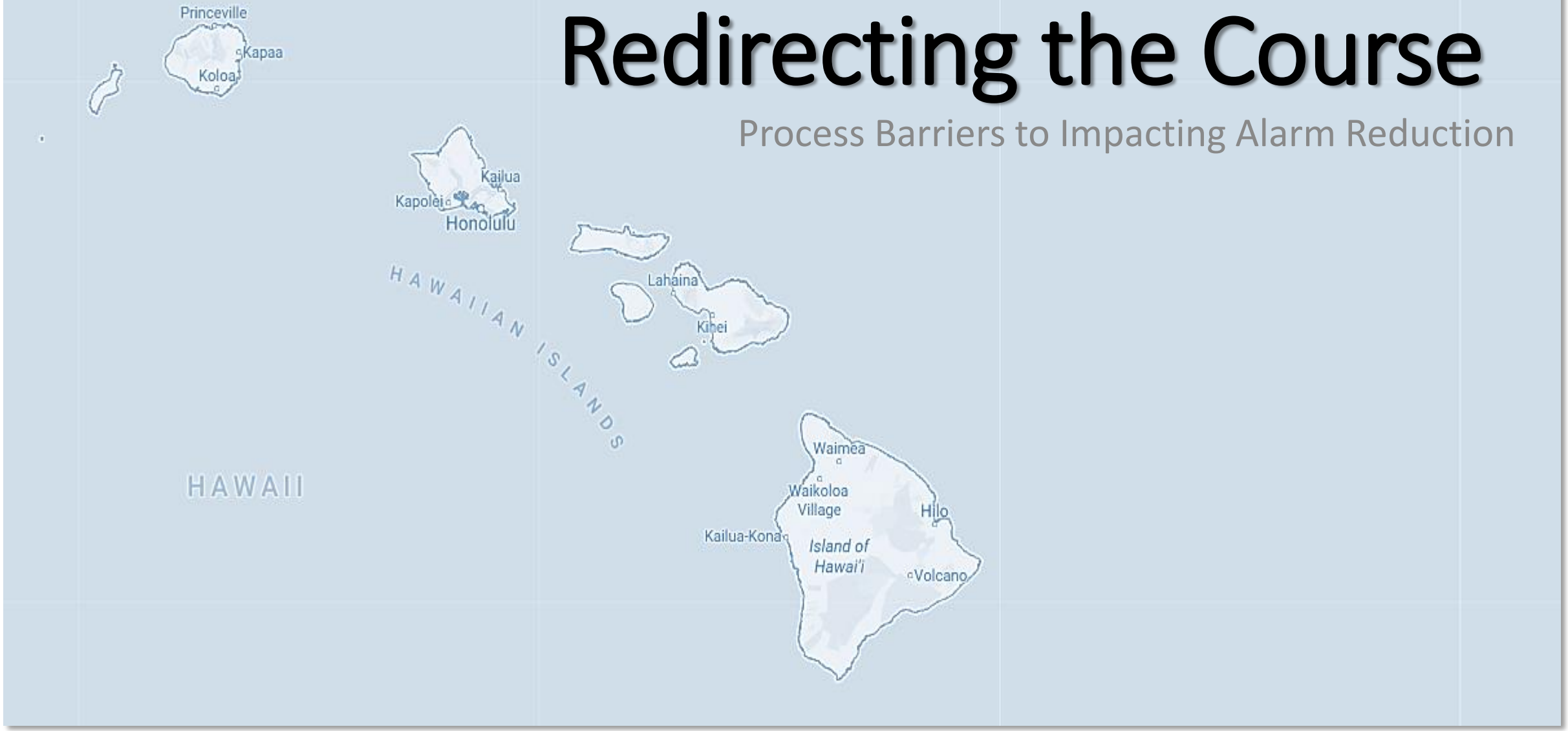


Post-Move Observations



Redirecting the Course

Process Barriers to Impacting Alarm Reduction

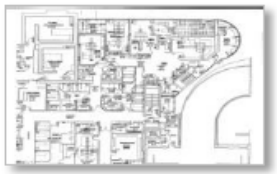


Assessment

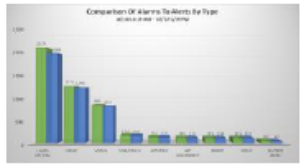
Data was analyzed to support the current baseline and analysis

DATA SOURCEs

Floor Plans



SPOK Reports



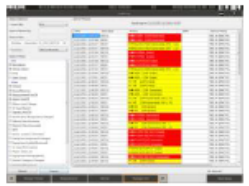
Policies & Procedures

Benchmarks

AAMI

Advancing Safety in Healthcare Technology

PIIC iX Audit Log

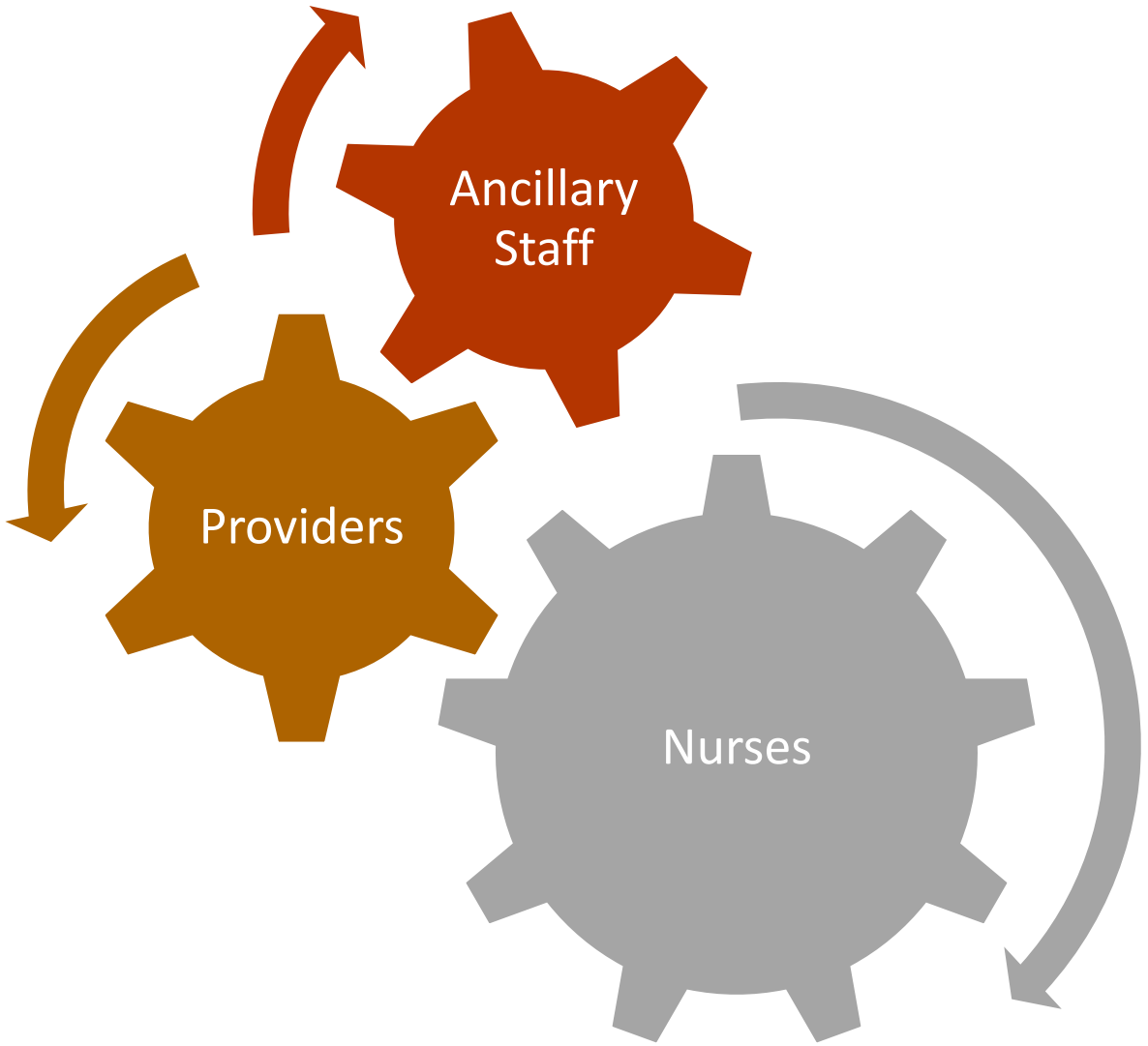


Configuration Reports

SCOPE and ACTIVITIEs

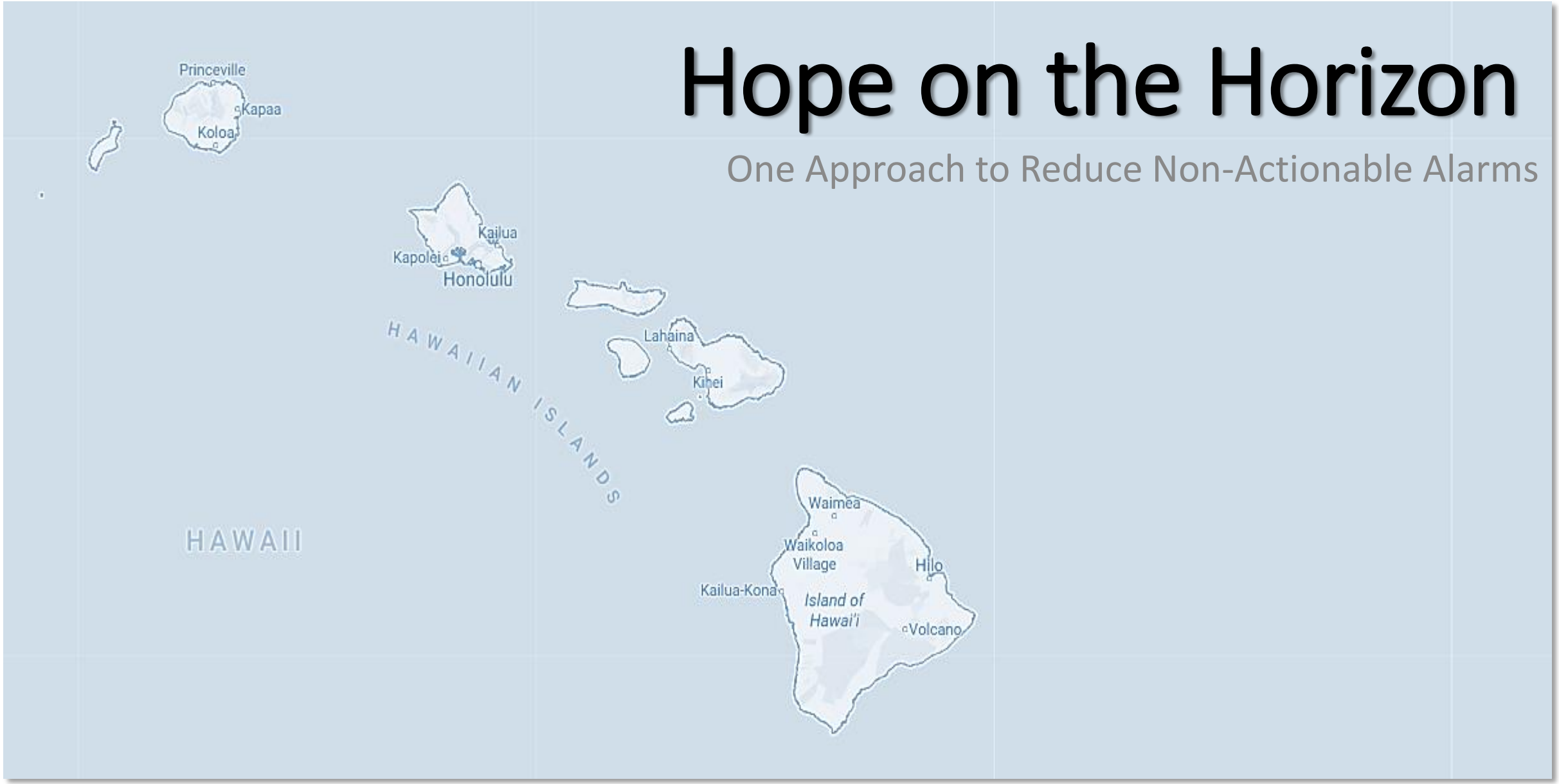
- Data Analysis
  - Monitoring alarm data for 30 days on 19 units
  - SPOK Alert data (limited) for CVICU, SICU, and MICU
  - Configuration reports
- Interviews
  - Formal with leadership & committee members
  - Informal with staff
- Observations
  - 4 units and the CMU
  - Day, night, and weekend shifts
- Reviews
  - Policies
  - Committee Meeting participants and structure

- High occurrence of non-actionable alarms
- Lack of awareness of default settings
- Gaps in our customization processes and practices
- Gap in understanding and use of our technology
- Identified policy gaps

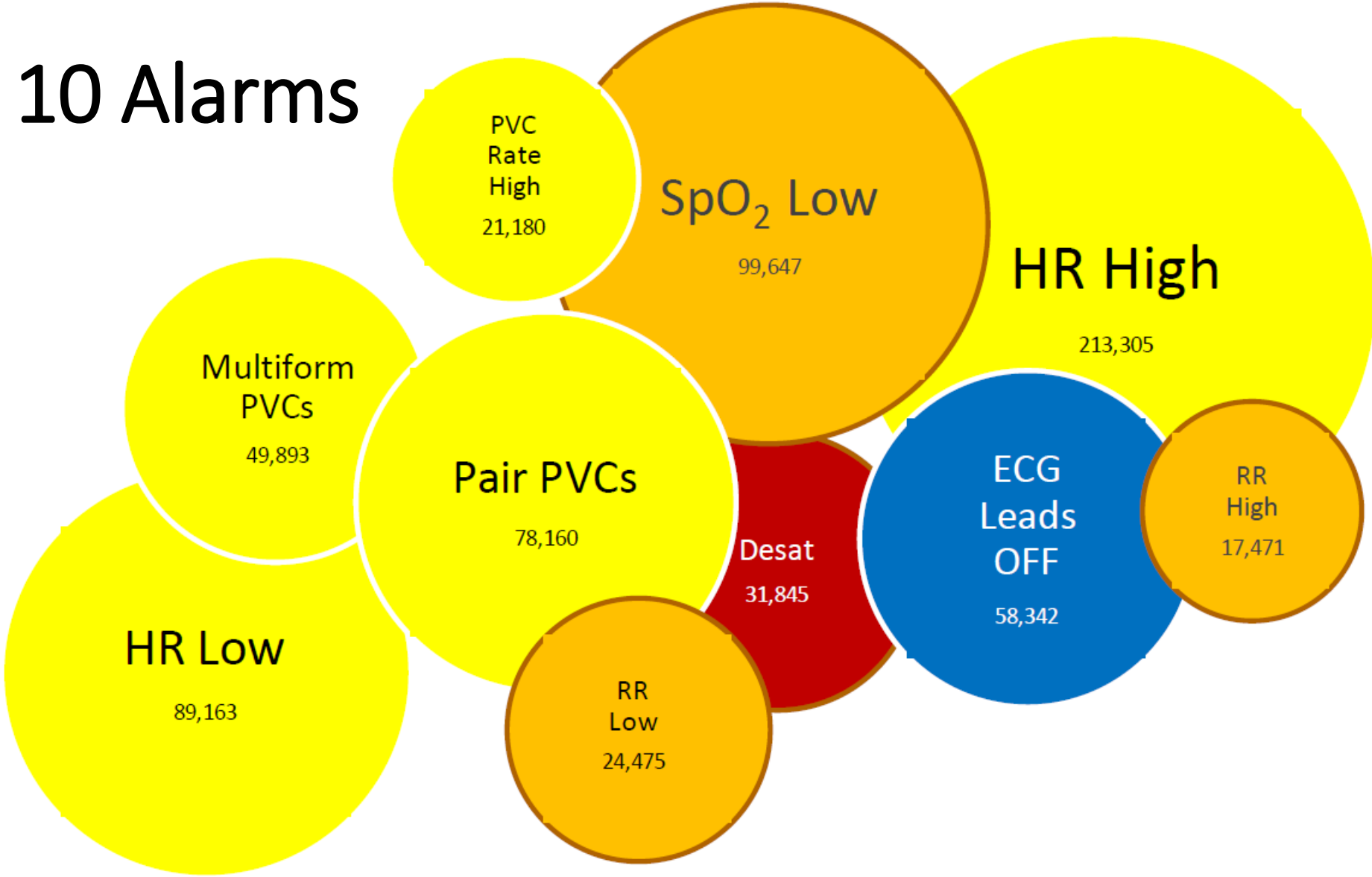


Hope on the Horizon

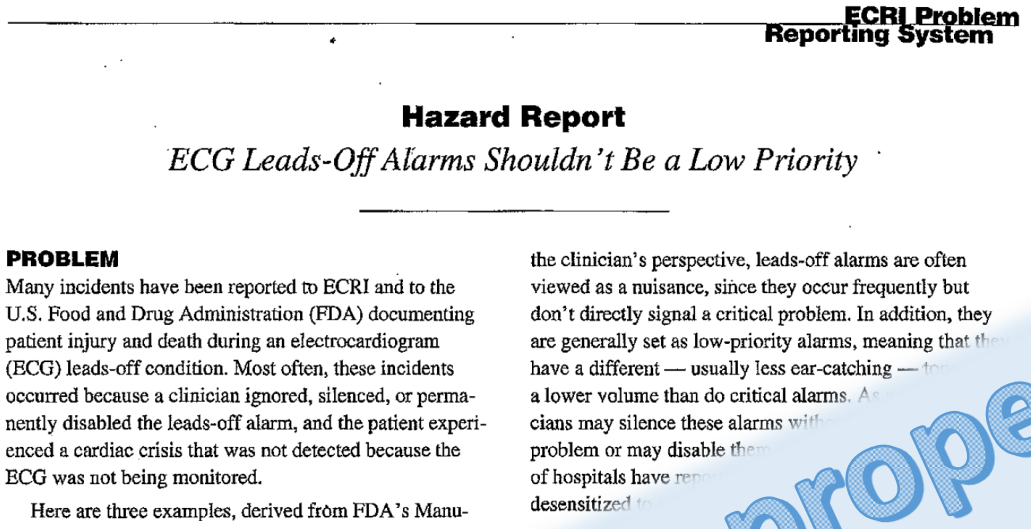
One Approach to Reduce Non-Actionable Alarms



Top 10 Alarms



ECG Leads Off Alarm



ECRI Problem Reporting System

Hazard Report

ECG Leads-Off Alarms Shouldn't Be a Low Priority

PROBLEM

Many incidents have been reported to ECRI and to the U.S. Food and Drug Administration (FDA) documenting patient injury and death during an electrocardiogram (ECG) leads-off condition. Most often, these incidents occurred because a clinician ignored, silenced, or permanently disabled the leads-off alarm, and the patient experienced a cardiac crisis that was not detected because the ECG was not being monitored.

Here are three examples, derived from FDA's Manu-

the clinician's perspective, leads-off alarms are often viewed as a nuisance, since they occur frequently but don't directly signal a critical problem. In addition, they are generally set as low-priority alarms, meaning that the have a different — usually less ear-catching — to a lower volume than do critical alarms. As cians may silence these alarms with problem or may disable the of hospitals have re desensitized

Is the alarm properly prioritized?

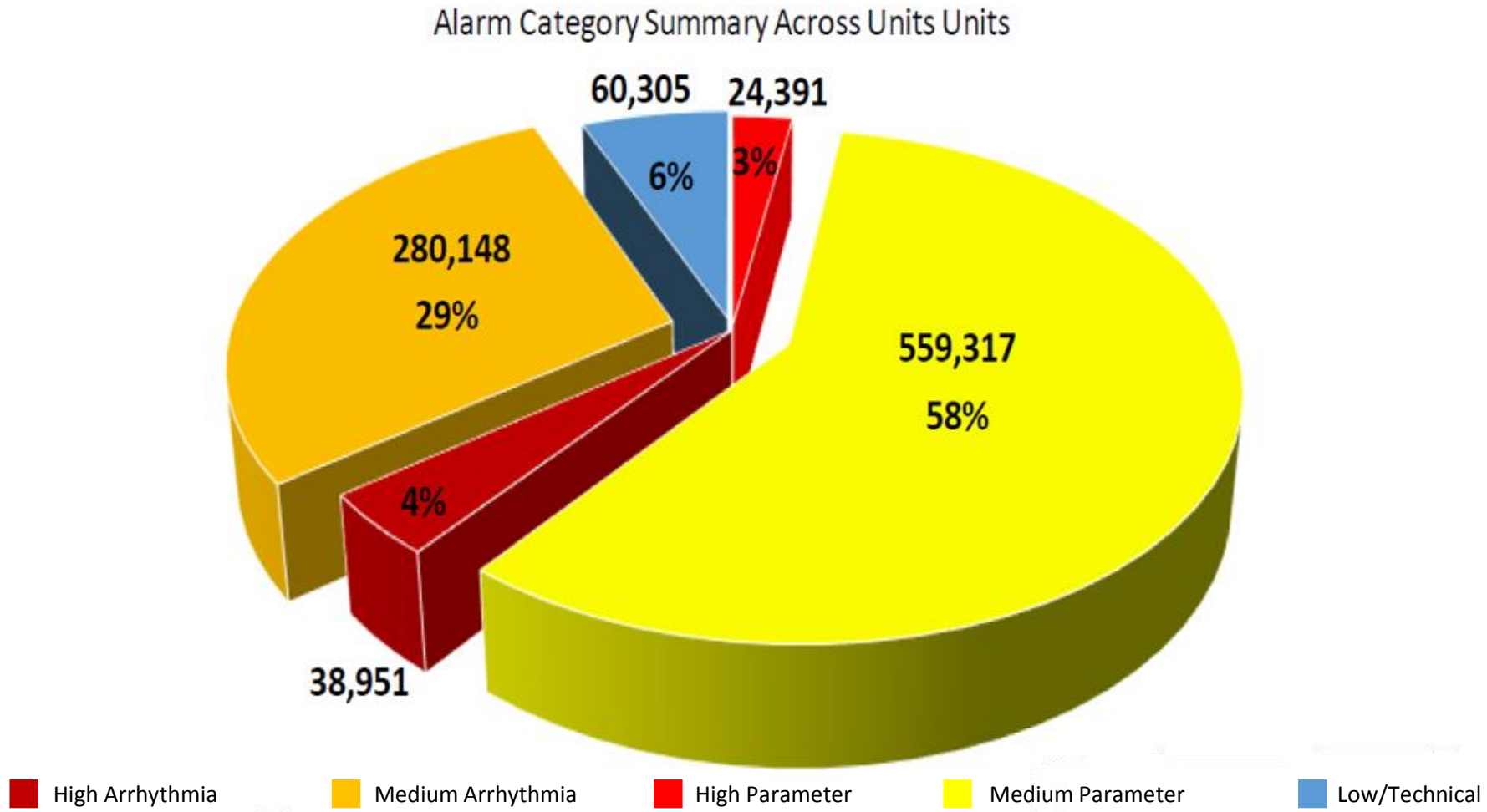
- Assessed the risks to patient when alarm is prioritized a high, medium or low
- Piloted a change from a low to high priority alarm in one ICU

Results for a two week pilot

- Pre-intervention
  - Average duration per alarm
    - **6 minutes 17 seconds**
- Post-intervention
  - Average duration per **high** alarm
    - **1 minute 2 seconds**
  - Average duration per low alarm
    - 8 minutes 58 seconds

Alarm Categories Across Units

Medium priority arrhythmia alarms contribute to over half of all the alarms captured



CVICU

- Piloted **arrhythmia default** setting changes

MICU

- Piloted **alarm parameter** default setting changes

NSICU

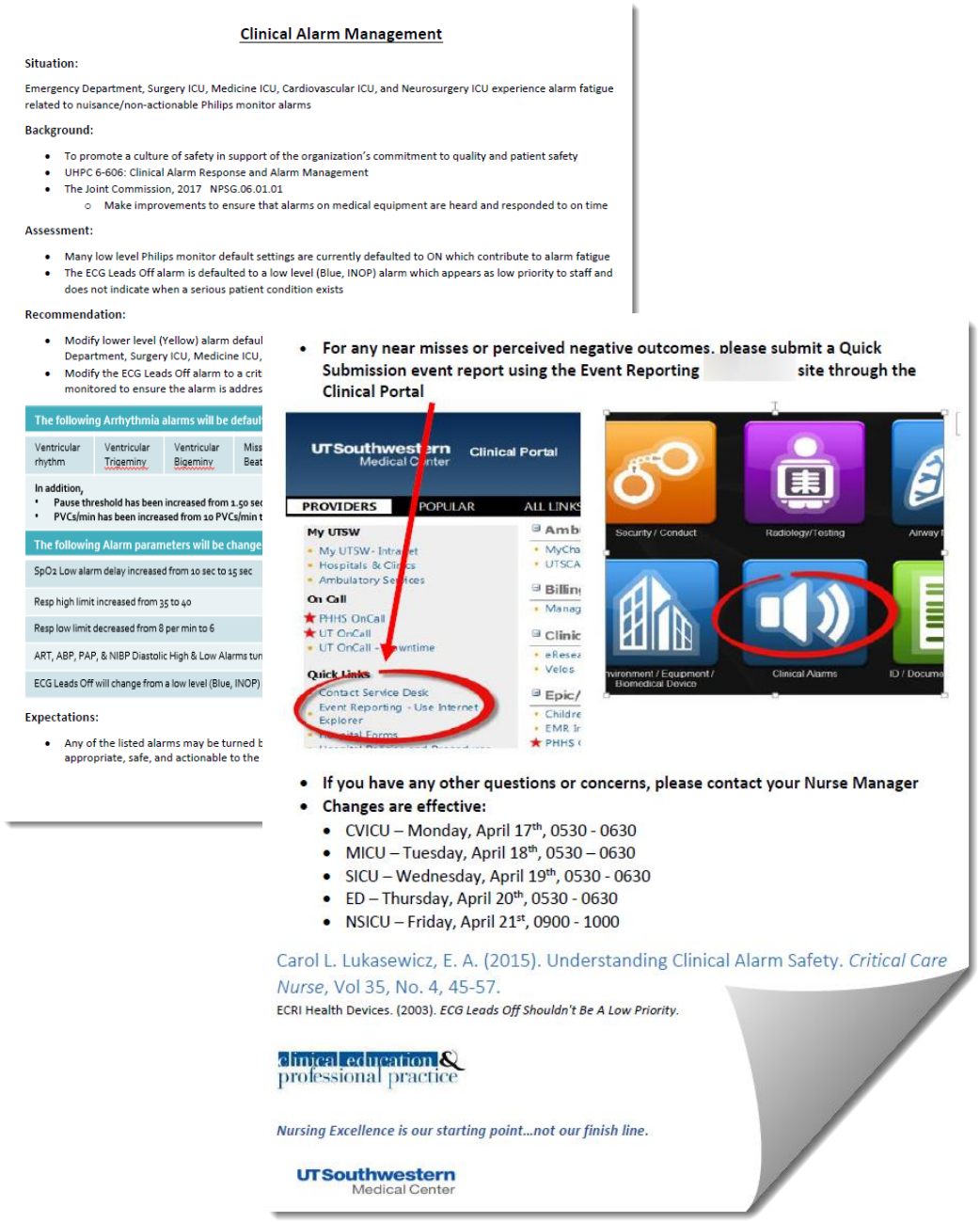
- Piloted **manual customization** of all alarm settings

In Zale ICU, the following alarms will be customized to the patient if provider is aware that the condition is pre-existing and patient is hemodynamically stable :	
Turn OFF Arrhythmia alarms -	
• Atrial Fibrillation	• Pair PVCs
• Irregular HR	• Ventricular Bigeminy
• Missed Beat	• Ventricular Trigeminy
• Multiform PVCs	• Ventricular Rhythm
NIBP alarms – adjust up to **10 mmHg above/below** if charge nurse agrees; consult provider for anything beyond	
Resp High/Low Limit – allowed **OFF** if patient has ETCO2 monitor/alarms	
ICP Low Alarm, any Temperature-related alarm – Nurse discretion	
Discuss alarm settings or alarm setting changes with provider – • **ART, ABP** – Turning alarm settings OFF (must have either invasive pressure or NIBP alarms on) • **PAP** – Turning alarms OFF • **Pause, PVCs/min, Run PVCs, awRR High/Low, ICP High, CPP High/Low, ETCO2 High, SpO2 Desat** – Changing alarm limits Higher/Lower	

Piloted Changes

In CVICU, the following Arrhythmia alarms will be defaulted to OFF:	
Ventricular Rhythm	Ventricular Trigeminy
Run PVCs	Multiform PVCs
Pair PVCs	Missed Beat
Ventricular Bigeminy	Irregular HR
In addition, • Pause threshold has been increased from 1.50 seconds to **2.00 seconds**	
• PVCs/min has been increased from 10 PVCs/min to **15 PVCs/min**	

In MICU, the following Alarm Parameter changes will be piloted:	
SpO2 Low alarm delay ↑ to 15 sec	ART & ABP Mean Low ↓ to 65 mmHg
Resp High Limit ↑ to 40	PAP Systolic Low ↓ to 10 mmHg
Resp Low Limit ↓ to 6	CVP Alarms turned OFF
ART, ABP, PAP, & NIBP Diastolic High & Low Alarms turned OFF	



Clinical Alarm Management

Situation:

Emergency Department, Surgery ICU, Medicine ICU, Cardiovascular ICU, and Neurosurgery ICU experience alarm fatigue related to nuisance/non-actionable Philips monitor alarms

Background:

- To promote a culture of safety in support of the organization's commitment to quality and patient safety
- UHPC 6-606: Clinical Alarm Response and Alarm Management
- The Joint Commission, 2017 NPSG.06.01.01
  - Make improvements to ensure that alarms on medical equipment are heard and responded to on time

Assessment:

- Many low level Philips monitor default settings are currently defaulted to ON which contribute to alarm fatigue
- The ECG Leads Off alarm is defaulted to a low level (Blue, INOP) alarm which appears as low priority to staff and does not indicate when a serious patient condition exists

Recommendation:

- Modify lower level (Yellow) alarm defaul
  Department, Surgery ICU, Medicine ICU,
- Modify the ECG Leads Off alarm to a crit
  monitored to ensure the alarm is addres

The following Arrhythmia alarms will be defaul

Ventricular rhythm	Ventricular Trigeminy	Ventricular Bigeminy	Miss Beat

In addition,
- Pause threshold has been increased from 1.50 sec
- PVCs/min has been increased from 10 PVCs/min t

The following Alarm parameters will be change

SpO2 Low alarm delay increased from 10 sec to 15 sec
Resp high limit increased from 35 to 40
Resp low limit decreased from 8 per min to 6
ART, ABP, PAP, & NIBP Diastolic High & Low Alarms tur
ECG Leads Off will change from a low level (Blue, INOP)

Expectations:

- Any of the listed alarms may be turned b
  appropriate, safe, and actionable to the

- **For any near misses or perceived negative outcomes, please submit a Quick Submission event report using the Event Reporting site through the Clinical Portal**

- **If you have any other questions or concerns, please contact your Nurse Manager**
- **Changes are effective:**
  - CVICU – Monday, April 17th, 0530 - 0630
  - MICU – Tuesday, April 18th, 0530 – 0630
  - SICU – Wednesday, April 19th, 0530 - 0630
  - ED – Thursday, April 20th, 0530 - 0630
  - NSICU – Friday, April 21st, 0900 - 1000

Carol L. Lukasewicz, E. A. (2015). Understanding Clinical Alarm Safety. *Critical Care Nurse*, Vol 35, No. 4, 45-57.

ECRI Health Devices. (2003). *ECG Leads Off Shouldn't Be A Low Priority.*

clinical education & professional practice

Nursing Excellence is our starting point...not our finish line.

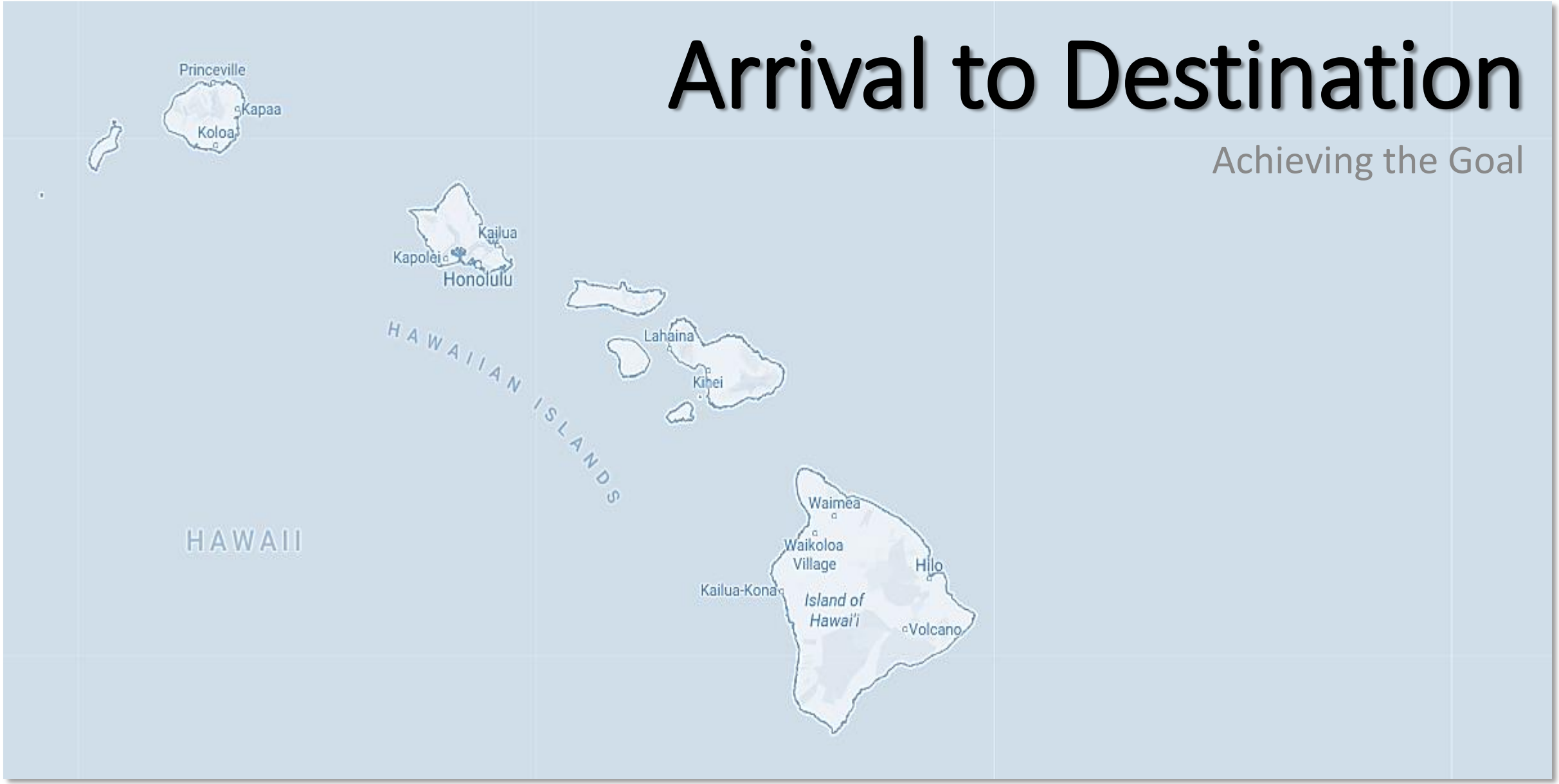
UTSouthwestern Medical Center

SBAR Communication

- Shared with providers and nursing
- Modified event reporting system to include clinical alarms
- Encouraged staff to submit event reports or notify Nursing manager to ensure patient safety

Arrival to Destination

Achieving the Goal



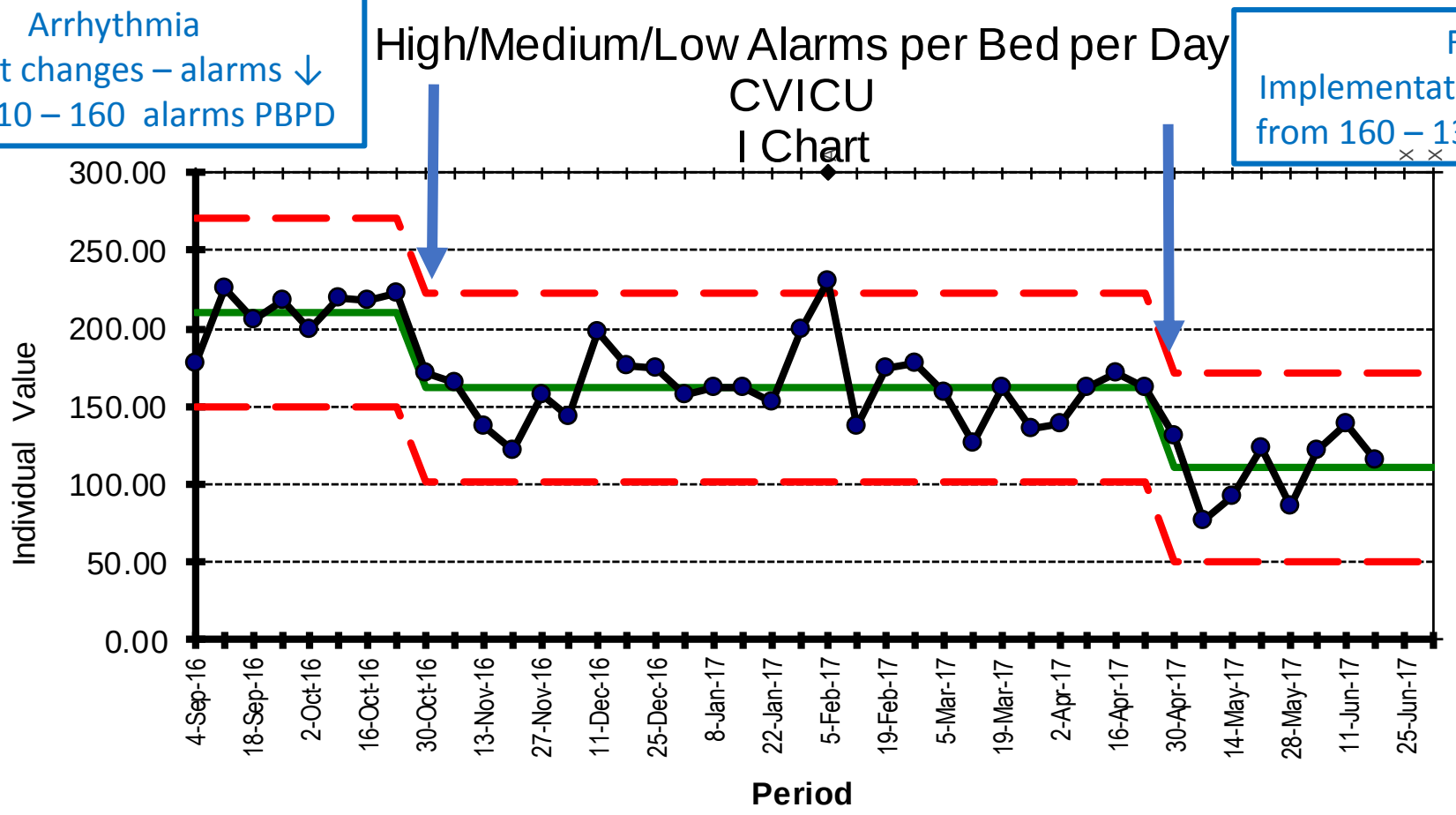
Pre/Post Full Implementation

	Total Alarms (Pre/Post Full Implementation)	% Change in Total Alarms (Pre/Post Implementation)	Total Alarms Per Bed/Per Day (Pre/Post Implementation)	% Change in Total Alarms Per Bed/Per Day (Pre/Post Implementation)
MICU	118,576/ 56,422	- 48%	173/79	- 46%
CVICU	152,043/ 77,933	- 51%	216/116	- 46%
NSICU	68,526/ 43,462	- 37%	120/74	- 38%
SICU	54,433/ 45,843	- 16%	81/68	- 16%
ED	79,710/ 49,331	- 38%	71/44	- 38%

Four weeks pre-intervention – Jan 2017
Four weeks post-intervention – May/June 2017

Monitoring Plan – CVICU

Arrhythmia
default changes – alarms ↓
from 210 – 160 alarms PBPD

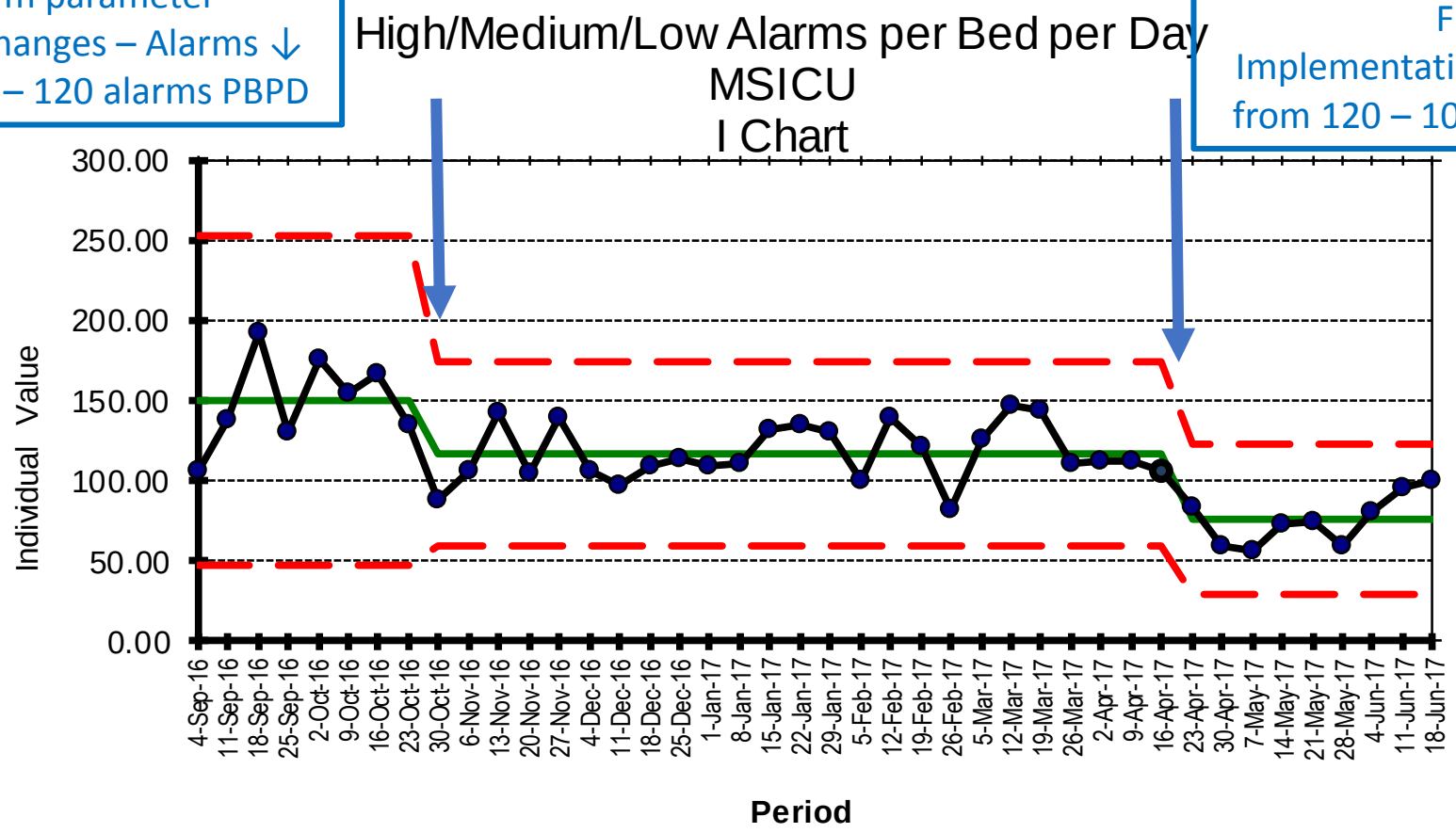


Full
Implementation – Alarms ↓
from 160 – 130 alarms PBPD

Monitoring Plan – MICU

Alarm parameter default changes – Alarms ↓ from 170 – 120 alarms PBPD

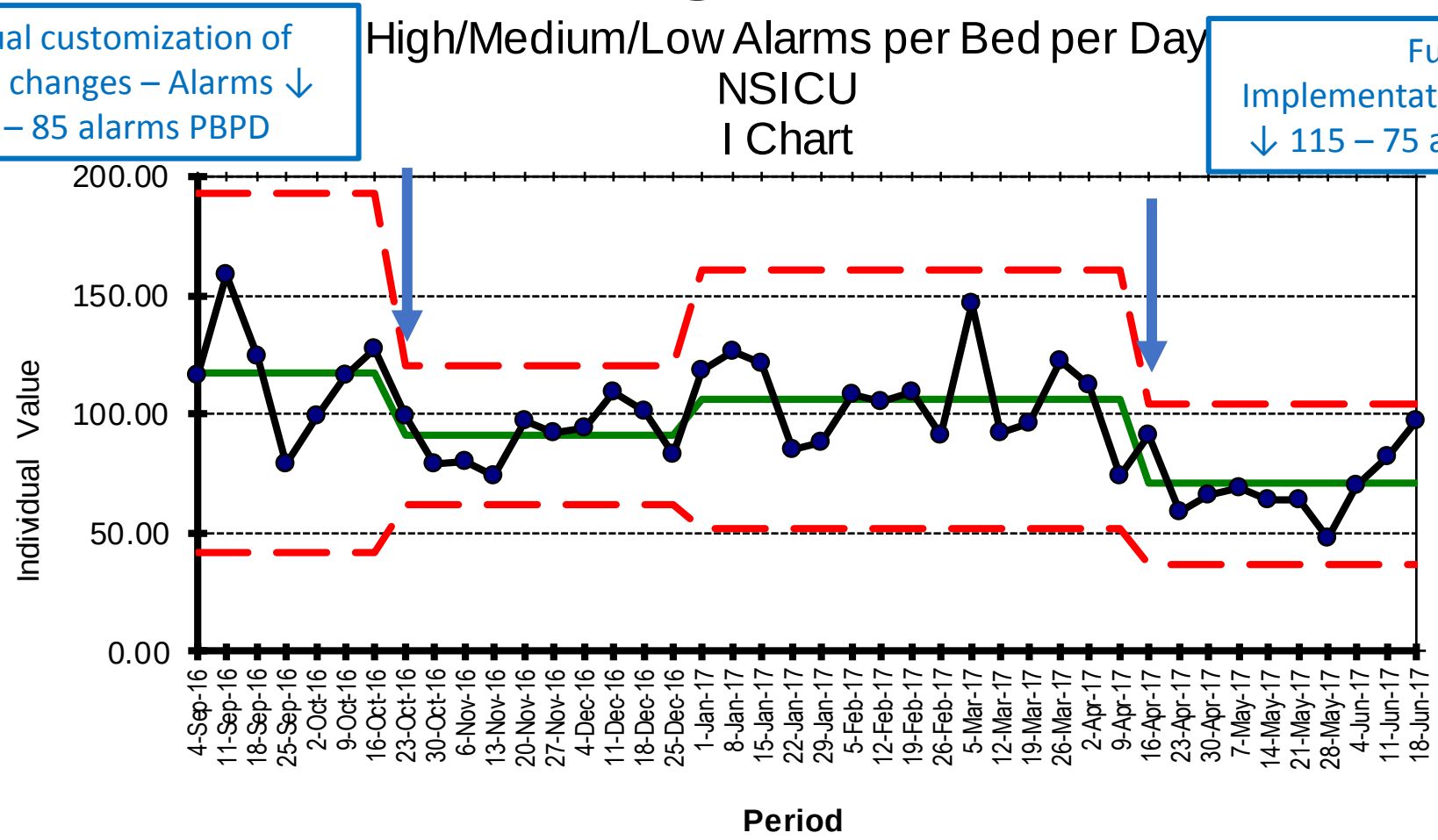
Full Implementation – Alarms ↓ from 120 – 100 alarms PBPD



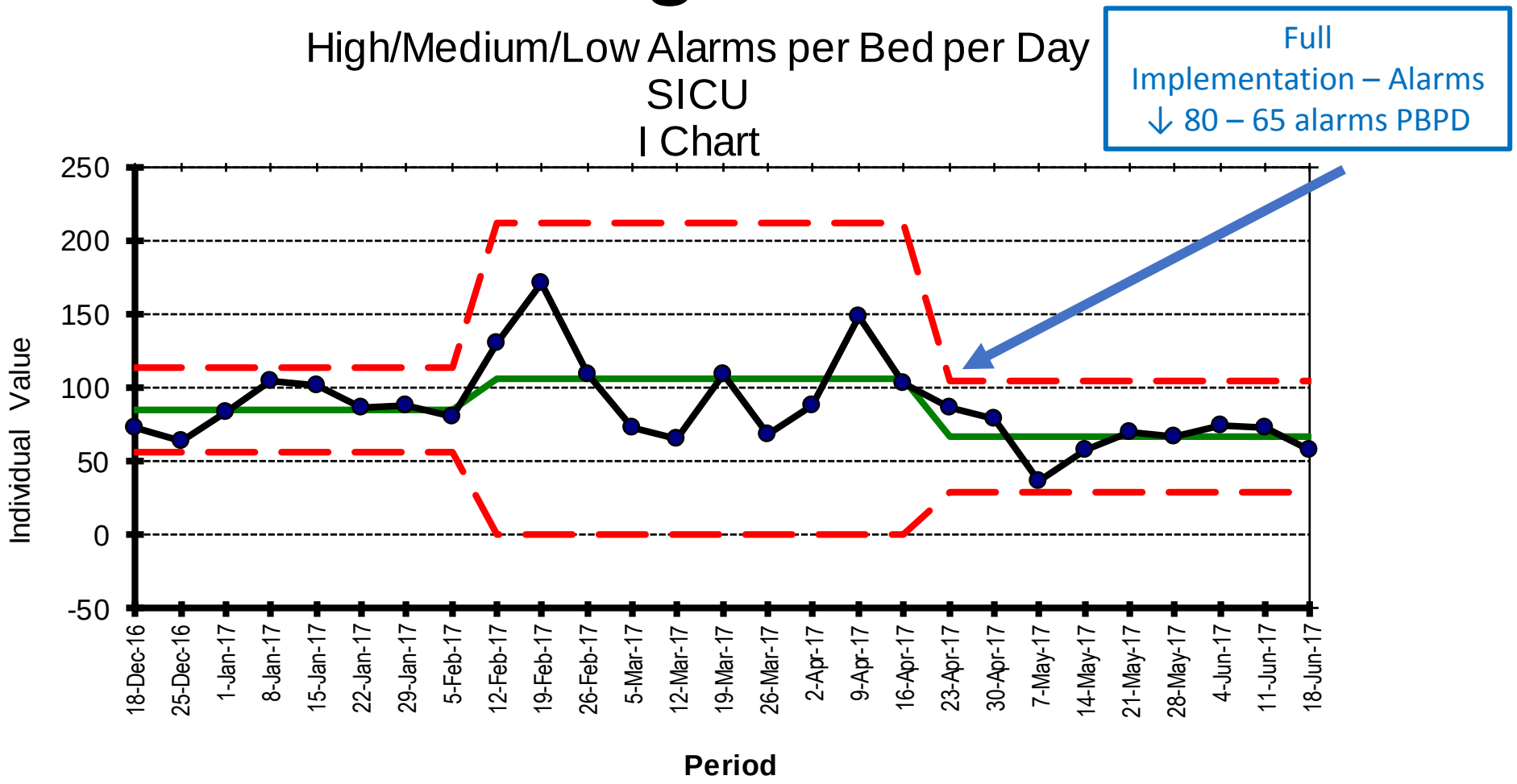
Monitoring Plan – NSICU

Manual customization of default changes – Alarms ↓ 115 – 85 alarms PBPD

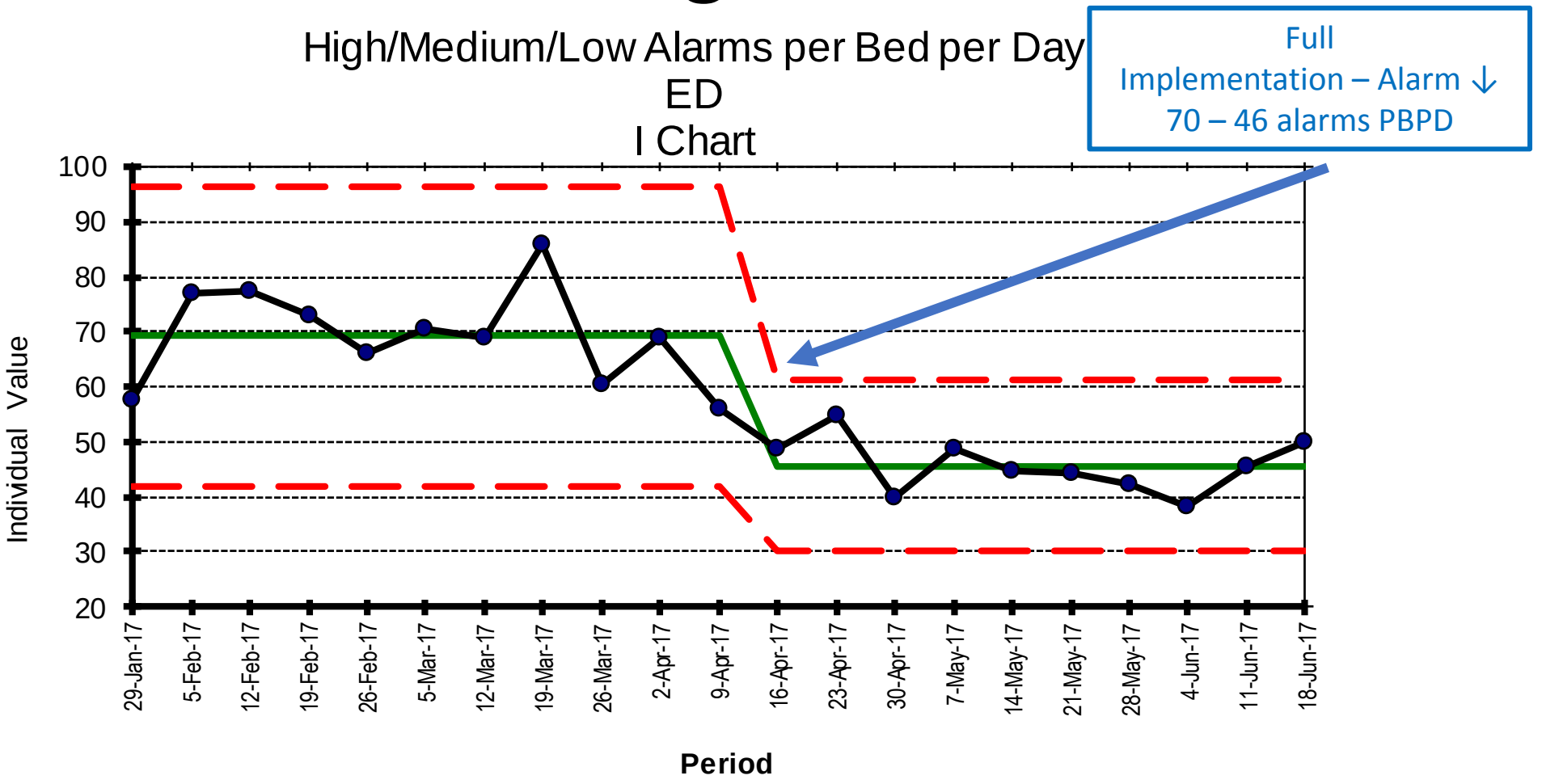
Full Implementation – Alarms ↓ 115 – 75 alarms PBPD

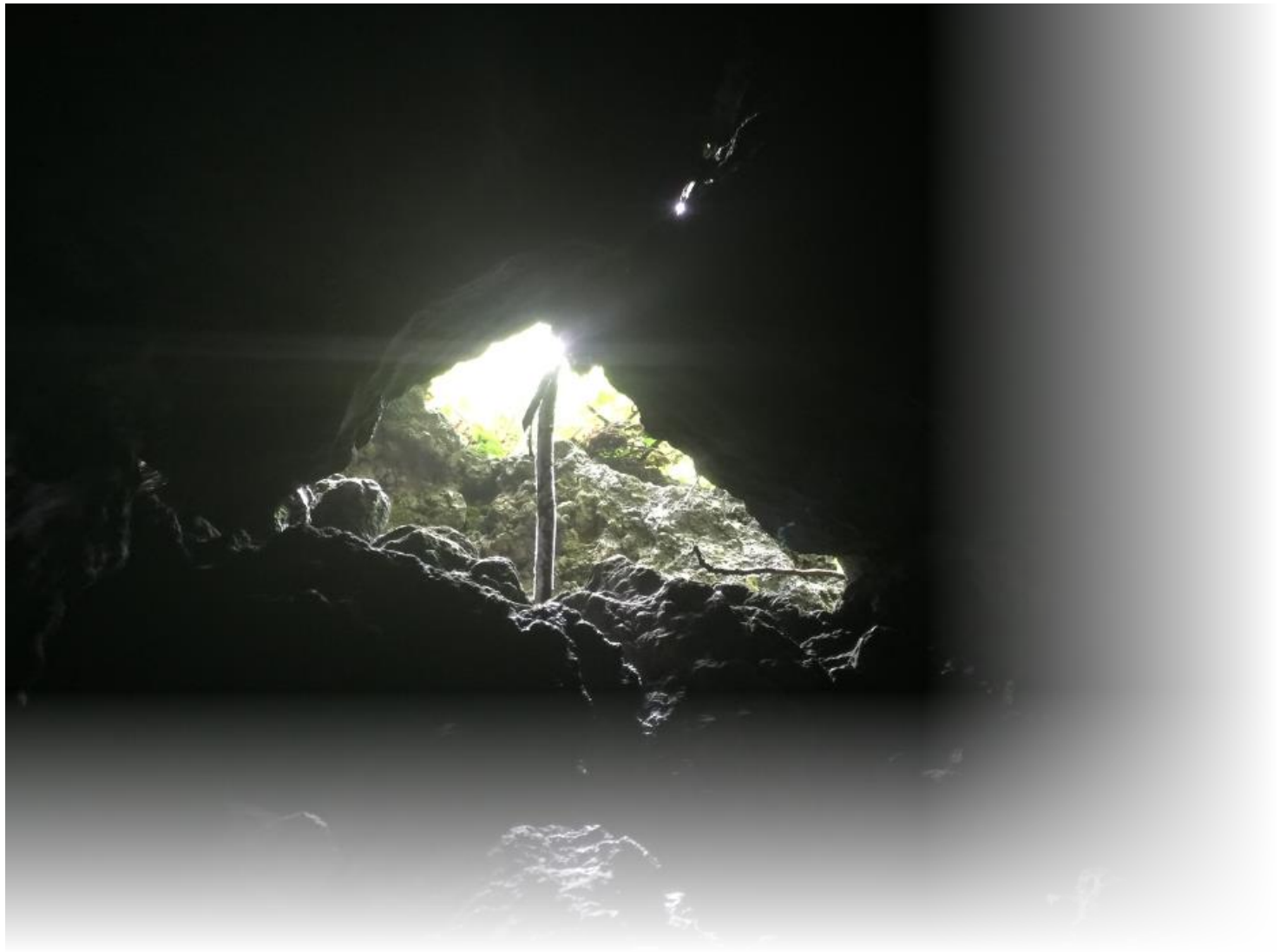


Monitoring Plan – SICU



Monitoring Plan – ED





Sustaining the Progress & Future Plans

- Transitioning to a future Alarm Safety Committee and Process Owner
- Determining the frequency of monitoring
- Developing Standard Operating Procedures
- Sharing the data
- Continuing the progress

Lessons Learned

- Understand the workflow
- Understand the device
- Determine a governance structure
- Organize, structure, and plan efforts early
- Find a process owner sooner rather than later
- Narrow the scope
- Educate early and often
- Ask for help if needed; know your limitations

References

- Alarm & Noise Management – Phase I: Current State Assessment; Healthcare Transformation Services, Lisa Pahl and Jillann Walker, February 25th, 2016.
- Alarm Management - Phase II: Post Changes - Healthcare Transformation Services, Lisa Pahl and Jillann Walker, December 21, 2016.
- American Association of Critical-Care Nurses. AACN Practice Alert. Alarm management. *Crit Care Nurse.* 2013;33(5): 83-86. Available at: http://www.aacn.org/wd/practice/docs/practicealerts/alarm-management-practice-alert.pdf. Accessed July 20, 2015.
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Thank you!