THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

Evaluation of Policies and Policy Compliance Related to Cardiac Monitoring and Pulse Oximetry Monitoring Alarms

Kyle Mellinger, Medical Student; Jackie Lamendola, MHA, RN, CPHQ; Vijay Duggirala, MD

Introduction

Alarm fatigue plagues hospitals across America, jeopardizing patient safety. Of the 100's of alarms that sound in hospitals,[1] 85-99% are not clinically relevant.[2] Researchers have looked into lack of guideline adherence as a contributing factor to the high amount of alarms that hospitals experience. One study found that 85% of cardiac monitoring orders fell outside of AHA guidelines.[3] Others have found that nurses do not follow policy and continue monitoring when orders expire[4] and that improvement in the ordering process could decrease the overall number of alarms per hour by approximately 22%.[5]

Aim

Evaluate current policies and practices in place for continuous monitoring and alarms management in order to increase adherence and reduce unnecessary alarms.

Project Design

A Lean Six Sigma DMAIC methodology was used. In scope for this project were define, measure, and analyze phases.

- **Define**
  - Problem: Alarm Fatigue
  - Goal: Reduce alarms through improved guidelines and guideline adherence
- **Measure**
  - Observations: 4 inpatient hospital units
    - 1 med-surg , 1 ICU, and 2 PCU
  - Interview: 44 nurses surveyed in-person regarding guidelines, adherence, and alarms
  - Data: 196 patients regarding alarms, monitoring, and orders
- **Analyze** (Improve and Control future phases)

Figure 1: Cardiac Monitoring

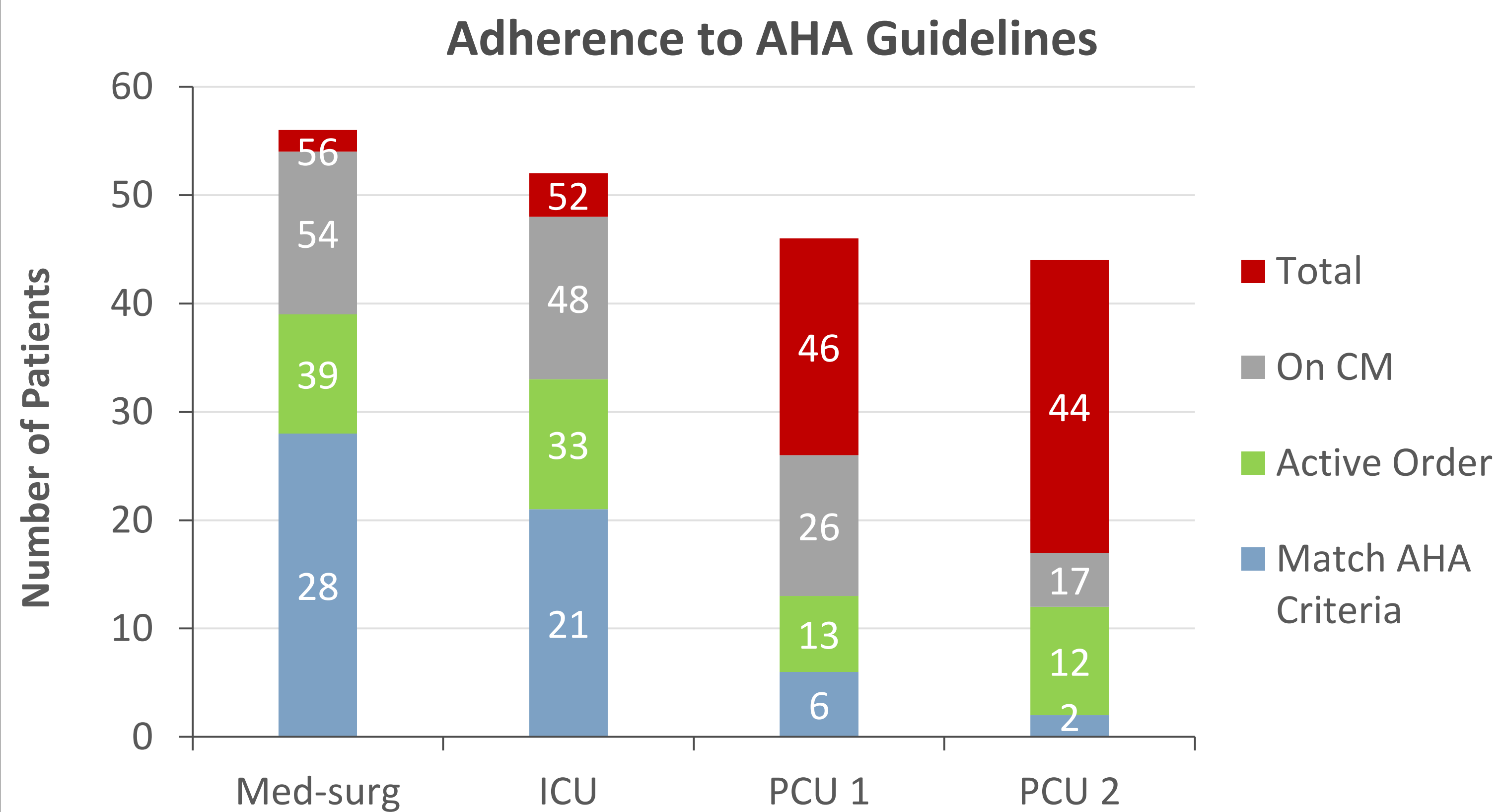
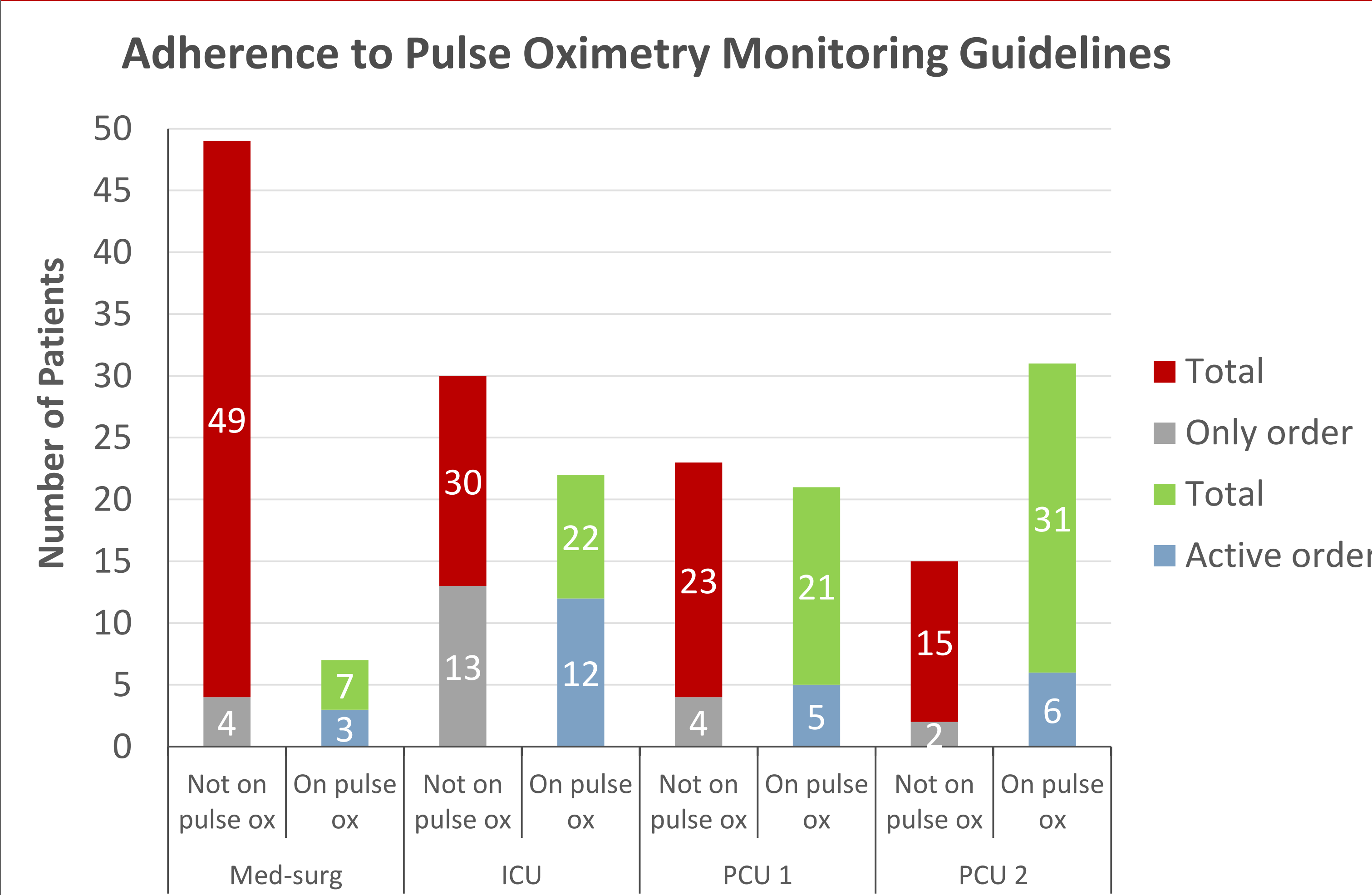


Figure 2: Pulse Ox Monitoring



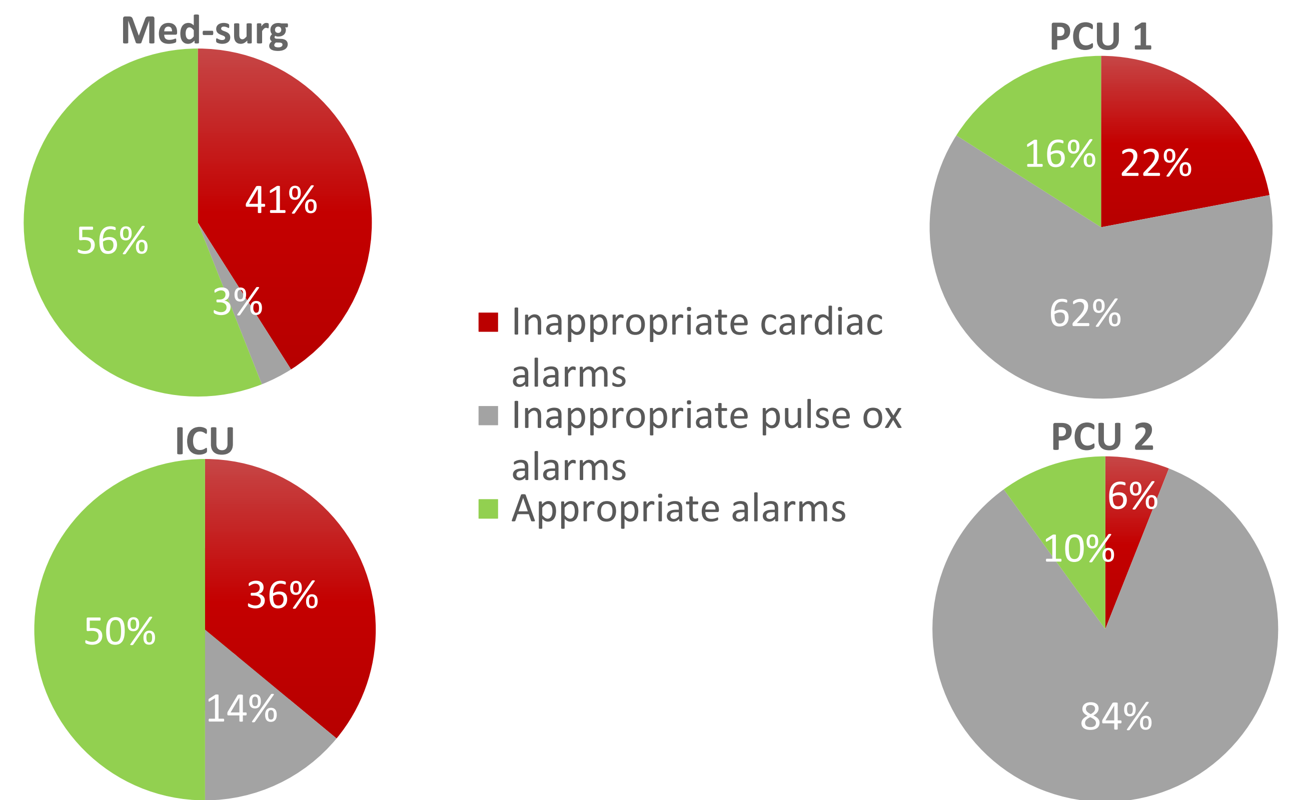
Recommendations

1. Form multidisciplinary team to address problem
2. Gather additional data on policies and practice
3. Identify causes for lack of adherence to monitoring policies
4. Align policies and practices

Figure 3: Alarm Consequences

Percentage out of total alarms for each unit

- *Inappropriate alarms* are from patients who do not have appropriate orders for HR or SpO2 monitoring
- *Appropriate alarms* are from patients who have appropriate orders for HR or SpO2 monitoring



Culture: Gaps Between Policy and Practice

"At the beginning of the shift and/or with a change in patient assignment, the RN must visually check and document in EPIC that all monitor alarms are activated, on and audible, and alarm limits set appropriately per protocol and orders"[6]

	Med-Surg	ICU	PCU 1	PCU 2
% HR Parameter Documented	80%	29%	12%	23%
% SpO2 Parameter Documented	71%	32%	5%	16%
Mean Time to Last Documentation	17.5 hours	94.5 hours	37.0 hours	56.7 hours

Order in EMR to notify physician if patient's HR or SpO2 go outside of specific parameters

	Med-Surg	ICU	PCU 1	PCU 2
% Match with Monitor Alarm Parameters	5%	0%	0%	0%

Culture: Gaps Between Policy and Practice

Culture influences practice more than policy

- Comments from nurses:
  - "We assume all of our patients are on telemetry"
  - "If patients are on this floor it is assumed that they need pulse ox and cardiac monitoring"

Literature review

- One study found that 91% of nurses are aware when telemetry orders end but are unwilling to discontinue without direct communication with physician [4]
- Another study found that 67% of nurses disagreed that clinical policies regarding alarms are effectively used. After an intervention where nurses were re-educated on alarm policies, alarm rates dropped by 65%.[7]

Conclusions

1. Non-adherence to monitoring guidelines leads to more alarms

- Inappropriate cardiac monitoring accounted for 25% of total alarms
- Inappropriate SpO2 monitoring accounted for 44% of total alarms

2. Adherence to guidelines likely related to culture on units

- Differing unit culture likely contributes to variation between 10% appropriate alarms on one unit vs. 50% on another

3. Polices that are not conducive to practices lead to non-compliant habits

- Nurses may believe that documenting parameters does not add value
- Contradiction between notify physician order limits and monitor alarm limits leads to difficulties in compliance

References

1. Dandoy CE, Davies SM, Flesch L, Hayward M, Koons C, Coleman K, Jacobs J, McKenna LA, Olomajeye A, Olson C, et al. A team-based approach to reducing cardiac monitor alarms. *Pediatrics*. 2014 Dec;134(6):e1686-94.
2. Joint Commission. Medical device alarm safety in hospitals. Sentinel Event Alert. 2013 Apr 8;(50):1-3.
3. Funk M, Winkler CG, May JL, et al. Unnecessary Arrhythmia Monitoring and Underutilization of Ischemia and QT Interval Monitoring in Current Clinical Practice: Baseline Results of the Practical Use of the Latest Standards for Electrocardiography (PULSE) Trial. *Journal of electrocardiology*. 2010;43(6):542-547.
4. Miller, H. An Updated Rounds Checklist to Increase Appropriate Use of Telemetry Monitoring. *Master's Theses and Capstones*. 2015;16.
5. Winfrey, JA. Reducing Alarm Fatigue in Critical Care. *Master's Projects and Capstones*. 2017;516.
6. Wexner Medical Center Clinical Standards Committee: Continuous Cardiac Monitoring 2018.
7. Speich, ME. Reducing Alarm Fatigue in the Intensive Care Unit: A Quality Improvement Research Study. *Doctoral Dissertations*. 2017;1449.