

**Abstract Title:** Reduction of Pulse Oximetry (SpO<sub>2</sub>) Alarms in Medical Intensive Care

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**Purpose & Rationale:** In November 2013, the Medical Intensive Care Unit (MICU) chartered a team inspired by the Joint Commission (JC) National Patient Safety Goal (NPSG) related to alarm management. NPSG.06.01.01 requires health care facilities to improve clinical alarm safety. In September 2014, reductions in non-actionable, audible telemetry alarms were achieved by changing default settings for PVCs. Alarm data collected later by direct observation of 24 patients during 45 minute periods revealed that SpO<sub>2</sub> alarms became the most frequent non-actionable alarm. The purpose of this project was to safely reduce the number non-actionable SpO<sub>2</sub> alarms.

**Research Questions:** 1. Will decreasing in the low SpO<sub>2</sub> alarm from 90% to 88% safely reduce the number of non-actionable SpO<sub>2</sub> alarms? 2. Will increasing the SpO<sub>2</sub> audible alarm delay from 10 to 15 seconds safely reduce the number of non-actionable SpO<sub>2</sub> alarms?

**Synthesis of Review of Literature:** The JC identified alarm fatigue as a contributing factor causing death or permanent injury of hospitalized patients. (JC, 2015) The ECRI Institute lists alarm hazards at the top of their list of patient safety hazards. (ECRI, 2015). In 2012, the American Association of Critical-Care Nurses released a Practice Alert supporting the use of interdisciplinary teams to address alarm-related issues.

**Methods/Procedures:** The Plan-Do-Act-Study (PDSA) methodology of performance improvement was used. The team included nurses, physicians, clinical engineers and respiratory therapists. Pre-intervention data was collected by a nurse observer who recorded monitor alarms from July 24 - August 7, 2015. 24 patients were observed for 45 minute intervals and alarm data recorded. The most frequent non-actionable audible alarm was SpO<sub>2</sub> (n = 24). Clinical Engineering sampled electronic data from the Philips monitor alarm systems to investigate possible interventions to reduce SpO<sub>2</sub> alarms. SpO<sub>2</sub> alarms were collected for 11 patients over 24 hours. A SpO<sub>2</sub> low limit of 90% caused 148 alarms with no audible delay to alarm initiation. Adding a 10 second delay, reduced the number of alarms by 41%, and a 15 second delay reduced alarms by 55%. With a low SpO<sub>2</sub> limit of 88%, there was 96 alarms with no delay, a 61% reduction of alarms with a 10 second delay and a 75% reduction with a 15 second delay. After analyzing the data, and consulting with clinical experts, the team determined it was safe to decrease the default alarm to 88% with a 15 second delay. Practitioners had the option to adjust the low SpO<sub>2</sub> alarm limited upward based on patient assessment.

**Results:** A post-intervention direct observation data collection of 24 patients was completed March 1 to March 8, 2016. It showed a 50% decrease (n = 18) in the number of SpO<sub>2</sub> alarms without any reports of patient harm.

**Discussion/Applications to Practice:** The results demonstrated a reduction in non-actionable SpO<sub>2</sub> alarms within 25% of what was predicted from prior electronic data analysis. There were no adverse patient events recorded in the post intervention period. These changes to the default SpO<sub>2</sub> alarm settings will be implemented in another hospital ICU in the near future.