Optimization of continuous physiological monitor use on the pediatric medical inpatient unit

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BACKGROUND

Continuous physiological monitoring is now frequently used on the pediatric inpatient unit at the Montreal Children's Hospital. There remains limited available evidence to guide its use outside of the ICU setting. Alarm fatigue has been recognized as a significant hazard to patient safety for several years and alarm management has been made a priority by the Joint Commission in the United States since 2013.

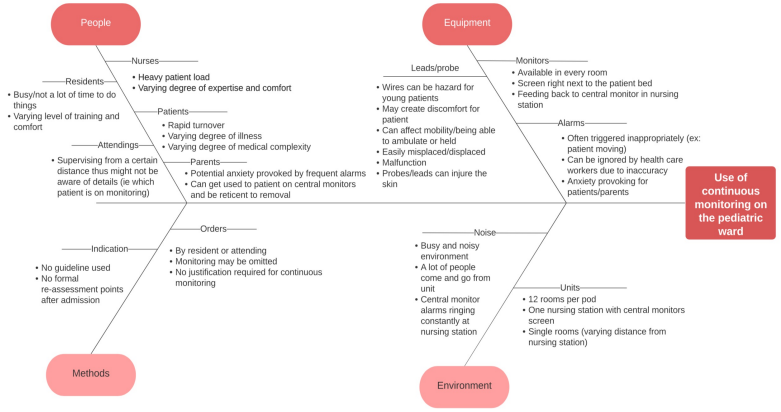
OBJECTIVES

This quality improvement project aimed to:

(1) Better align the use of continuous physiological monitors with relevant medical indications, and to consequently decrease unnecessary continuous monitor use
(2) Decrease the overall unnecessary alarm burden on the unit
(3) Increase awareness among healthcare providers regarding alarm fatigue and potential associated harms

METHODS

Focus groups with key stakeholders were held to define the problem and develop a strategy for intervention:



Periodic audits were conducted on all patients on the B9 unit prior to, during, and after the launch of a stepwise intervention plan including:

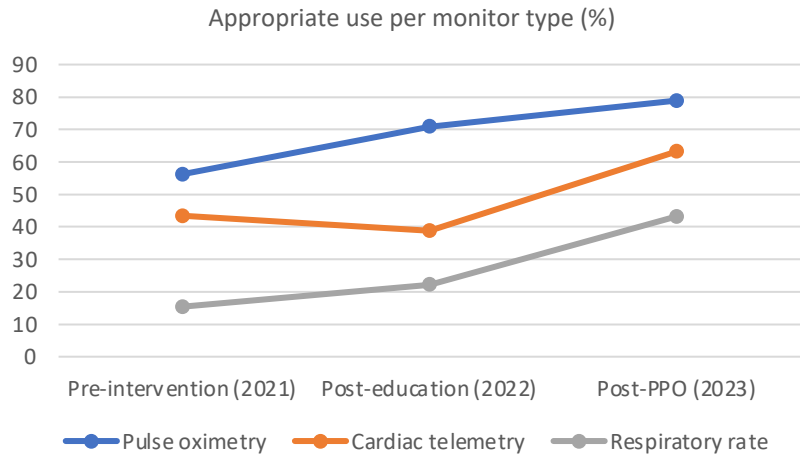
- Education of healthcare providers via oral presentations
- Display of a visual campaign
- Implementation of a pre-printed order sheet for general admission orders containing specific monitoring prompts

Audits consisted of documentation of alarm types and number over a 12h period and patient chart review for monitor indication and orders.

RESULTS

Table 1. Average percentage of inappropriate alarms

Pre-intervention	Post-education	Post-PPO	p value
58,4	27,5	25,7	0,04



Determination of appropriateness based on recommendations from Choosing Wisely statements, a recent expert consensus Delphi process[1] as well as the MCH protocol pertaining to continuous monitor use.

Table 2. Average percentage of patients on monitor

Pre-intervention	Post-education	Post-PPO	p value
56,6	51,3	47,4	0,157

Average alarm number per patient over 12h decreased by 5 after the intervention plan (not statistically significant).

Balancing measures remained stable throughout (readmission rates, PICU consults/transfer, significant patient events and representation to ED within 7 days of discharge).

DISCUSSION

The overall decrease in unnecessary monitor use suggests a practice change following education and visual campaign

Adoption of the pre-printed order sheet remains inconsistent, requiring ongoing efforts to improve adherence

It is difficult to determine a trend in total alarm number and percentage of patients on monitor due to intermittent and limited observation points in a context of high variability of patient diagnoses and unit acuity at a given time

Maintenance of initial improvement will require ongoing multidisciplinary education and audits for monitoring

CONCLUSION

There has been a significant improvement in the appropriate use of continuous physiological monitoring since the initiation of our intervention plan. Additional work is required to further standardize practice and maintain awareness regarding alarm fatigue.

[1]Schondelmeyer, A. C., et al. (2020). Cardiorespiratory and Pulse Oximetry Monitoring in Hospitalized Children: A Delphi Process. *Pediatrics, 146*(2), 08.