

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:

- 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:

Available in every roor Wires can be hazard fo Screen right next to the patient be Varving degree of expertise and comfor not a lot of time to do eeding back to central monitor in nursin vouna patients Can affect mobility/being able Rapid turnov Varying degree of illnes to ambulate or held ving degree of medical complexit Easily misplaced/displaced tient moving) Can be ignored by health ca workers due to inaccura tential anxiety provoked by frequent alarms · Probes/leads can injure t Anxiety provoking fo Can get used to patient on central monitors and be reticent to remova Busy and noisy ly resident or attending environment Monitoring may be omitted A lot of people No guideline use
No formal No iustification required for o come and go from unit after admissio Central monito 12 rooms per pod alarms ringing constantly at nursing station · One nursing station with central monitor Single rooms (varying distance from ursing station

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

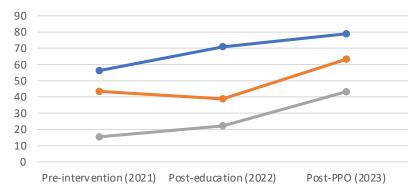
- · Education of healthcare providers via oral presentations
- Display of a visual campaign
- Implementation of a pre-printed order sheet for general admission orders containing specific monitoring prompts

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

Appropriate use per monitor type (%)



-----Pulse oximetry ------Cardiac telemetry -------Respiratory rate

Determination of appropriateness based on recommendations from Choosing Wisely statements, a recent expert consensus Delphi process¹ 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.

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