



# The impact of standardized interprofessional rounds on critically ill patients in the emergency department: A quality improvement initiative

Kalina Repin<sup>1</sup>, MN, NP(F), Will Thomas-Boaz<sup>2</sup>, RN, BScN, MN, ENC(C), Bourke Tillmann<sup>3</sup>, MD, FRCP(C), Barbara Duncan<sup>4</sup>, RN, BScN, and Grace Walter<sup>5</sup>, RN, BScN, CNCC(C)

<sup>1</sup> ORCID: 0000-0002-2062-078X, University of British Columbia, Fraser Health Authority, BC; [Kalina.Repin@Fraserhealth.ca](mailto:Kalina.Repin@Fraserhealth.ca)

<sup>2</sup> Sunnybrook Health Sciences Centre, Emergency, Toronto, ON; [Will.Thomas-Boaz@sunnybrook.ca](mailto:Will.Thomas-Boaz@sunnybrook.ca)

<sup>3</sup> Sunnybrook Health Sciences Centre, Department of Critical Care Medicine, Toronto, ON; [Bourke.Tillmann@sunnybrook.ca](mailto:Bourke.Tillmann@sunnybrook.ca)

<sup>4</sup> Sunnybrook Health Sciences Centre, Trauma Services, Toronto, ON; [Barb.Duncan@sunnybrook.ca](mailto:Barb.Duncan@sunnybrook.ca)

<sup>5</sup> Sunnybrook Health Sciences Centre, Trauma, Toronto, ON; [Grace.Walter@sunnybrook.ca](mailto:Grace.Walter@sunnybrook.ca)

**Corresponding author:** Kalina Repin, 1-10973 Barnston View Rd, Pitt Meadows, BC V3Y 0B8; 236-632-5837; Twitter: @kalinaRepin; Instagram: @KalinaChernoff @Will.Boaz

## Abstract

**Background & Local Problem:** Emergency department (ED) boarded intensive care unit (ICU) patients are generally not included in interprofessional ICU rounds. The project objective was to implement interprofessional rounds in the ED on boarded ICU patients.

**Methods & Interventions:** ICU patients in the ED were followed for two months from admission to transfer. The primary outcome was feasibility of ED ICU rounds, measured as the proportion of days on which rounds occurred. Secondary outcomes included communication quality, time to oral intake, and deep venous thrombosis (DVT) prophylaxis documentation.

**Results:** A total of 92 patients were included in this project. Rounds occurred on 33 of 36 possible days. Following rounds, nurses and physicians reported improved communication. New DVT prophylaxis orders were written for 42% of cases, and 61 near-miss events were corrected. Time from patient ED presentation to first oral intake decreased from 28 to 17 hours.

**Conclusions:** Interprofessional rounds in the ED are feasible, improve patient care, and enhance communication among team members.

**Keywords:** critical care, emergency medicine, quality improvement, nursing, patient care team, interprofessional relations

## Introduction

Emergency Department (ED) visits and length of stay (LOS) have increased dramatically over the past decade (CIHI, n.d.). In Canada, the annual number of ED visits increased from 1,041,271 in 2013 to 1,145,433 visits in 2017. Consequently, an increased proportion of patients are boarded in the ED. ED boarding occurs when a patient is held in the ED while awaiting transfer to an inpatient unit, and is associated with adverse patient outcomes (ACEP, 2018; Mohr et al., 2020; Santos et al., 2020).

One strategy to improve the outcome of critically ill patients is standardized interprofessional rounds (Jain et al., 2006). Bedside interprofessional rounding is the process where the intensive care unit (ICU) team meets at a set time every day to discuss and plan a patient's care (Holodinsky et al., 2015; Jain et al., 2006; McNeil et al., 2015). These rounds confer significant benefits including reduced infection rates and frequency of adverse events, shorter LOS, and lower costs to the healthcare system (Jain et al., 2006). Additionally, interprofessional rounds provide an opportunity for colleagues within different environments to collaborate (Longo, 2010; Platis et al., 2015). However, critically ill patients boarded in the ED are not routinely included in ICU rounds.

In this quality improvement project, we implemented standardized interprofessional rounds on critically ill patients boarded in the ED. To evaluate the impact of these rounds, we measured nursing satisfaction regarding communication between the ED and ICU teams, as well as two ICU best practice standards: time to enteral nutrition intake and prescription of appropriate deep venous thrombosis (DVT) prophylaxis.

## Methods

### Context

We included adult patients,  $\geq$  age 18, admitted to a Level 2 or 3 ICU through the ED of a single tertiary, academic hospital in Ontario, Canada. In Ontario, Level 3 ICU patients are considered the sickest patients and typically require 1:1 nursing care for invasive ventilator support or multisystem organ failure (Critical Care Ontario, 2020). Level 2 patients require close monitoring and extensive medical care for single organ failure or short-term, non-invasive ventilation (Critical Care Ontario, 2020).

At this facility in 2018 there were a total of 50 care spaces in the ED, 20 Level 2 ICU spaces, and 38 Level 3 spaces. Annual ED volumes in 2018 were near 61,000 and 1,363 of these patients were admitted to an ICU. The nurse-to-patient ratio is four to one (4:1), whereas in the Level 2 ICU the ratio is 2:1, and 1:1 in Level 3 units. In 2018, critically ill patients boarded in the ED waited on average 28 hours before being initiated enteral nutrition, and the 90th percentile ED LOS exceeded 48 hours.

### Interventions

This quality improvement project took place between January 3, 2019 to February 21, 2019. Rounds were performed in the ED Monday through Friday at 10:00 am, and all Level 2 or 3 ICU patients in the ED at the time of rounds were included. Rollout was based on the Plan-Do-Study-Act theory (Leis & Shojanja, 2017). Implementation was overseen by the project team, which consisted of an ED staff nurse, the ED clinical nurse specialist (advanced practice nurse) and unit educator, an ICU physician, the ICU clinical educator, the ED pharmacist, and the ED manager. The project team met biweekly for three months prior to project implementation, as well as throughout the project.

The study was conducted in three stages. The first stage was a needs assessment where data were collected through a chart audit of randomly selected patients admitted to the ICU from the ED in the summer of 2018. Additionally, during this stage, ED nurses and ICU physicians were asked to complete a survey to determine their perceptions of interprofessional communication in the ED.

The second stage included designing the rounds to fit in with ED processes. As it was not regular practice to have ICU rounds in the ED, ED nurses were educated on the process of ICU rounding and their role during these rounds. The third stage was implementation and data collection.

#### *Structure of the Rounds*

The rounds were structured to mirror daily rounds conducted in the ICU, and adjusted to fit the time constraints of the ED. The goal was to have bedside rounds in the ED every Monday to Friday at 10:00 and ensure an interprofessional team was in attendance; at minimum a physician representative (fellow or staff) and an ED nurse. Rounds were encouraged to take less than 10 minutes per patient to minimize disruption to the ED.

The rounds were designed through consultation with ICU physician leaders and best practice guidelines (Holodinsky et al., 2015; Jain et al., 2006; McNeil et al., 2015). Rounds were activated by an overhead page at 09:50, and the team was expected to assemble at the ED charge nurse desk by 10:00. The team fluctuated from its minimum size (ICU physician and ED nurse) up to its optimal composition, which included the staff, fellow, and resident ICU physicians, ED charge nurse, ICU nurse, pharmacist, respiratory therapist (RT), and a nursing leadership representative. The order of patients was determined based on acuity and location.

The rounding proceeded in a structured order as follows. To initiate rounds, the physician lead (staff, fellow, or resident) would introduce the team, summarize the case, and highlight critical laboratory values. If the patient required ventilation (invasive or non-invasive), the RT would then identify airway and breathing concerns or improvements. Next, the primary ED nurse would address three items: significant events within 24 hours, abnormal findings, and any concerns (from their own assessment or shared by family). Pharmacy would then review medications and the ICU nurse would be invited for comment. Following this, the lead physician would summarize the plan and invite family input. At the end, any significant changes in patient status were communicated to the ED Charge Nurse.

### Outcome measures

The primary outcome was feasibility of ICU rounds in the ED. This was measured as the proportion of days in which interprofessional rounds occurred during the study period. Secondary outcomes included quality of communication between nurses, physicians, and family regarding the patient's care plan, time to first enteral intake, interdisciplinary team attendance, family attendance, number of near misses (defined in this project as events that could have resulted in patient harm) corrected, and number of DVT prophylaxis orders written. Quality of communication was measured using a standard questionnaire on communication generated in collaboration with the project team (Appendix A; Critical Care Ontario, 2020; Stratton, 2018).

### Data collection

Quantitative and qualitative surveys were used to collect data regarding healthcare provider, patient, and family satisfaction with the rounding process (Appendix A). Prior to distribution, survey questions were reviewed with all members of the project team for validity and consistency. Survey questions were formulated using standardized questions through SurveyMonkey and used questions with Likert scale grading (Appendix A; Stratton, 2018; SurveyMonkey, 2020). Patient community partners were informed of project steps during quarterly community partner initiative meetings.

Surveys of healthcare staff were distributed and completed online through SurveyMonkey (Appendix A). Family satisfaction surveys were distributed and collected online from families who had received ICU care in the ED (Appendix A). Data related to patient care were collected daily by representatives of the project team attending rounds. Collected data included physician, ED nurse, ICU nurse, pharmacist, and family attendance, discussion of diet, ordering of new diet and appropriate DVT prophylaxis, identified near misses, and if the patient was downgraded to a ward team.

## Analysis

Baseline patient characteristics (age, gender, diagnosis, time in the ED) were evaluated using descriptive statistics (Figure 1). Continuous variables were presented as means with standard deviations and categorical variables as counts and percentages. To examine the representativeness of patients included in this project, baseline characteristics were compared between patients admitted to the ICU during weekdays and those admitted on the weekend. Categorical variables were compared using the Chi-square test and continuous variables using the T-test. Nurse survey responses were analyzed for changes in trends pre and post implementation of rounds.

As this project was structured using quality improvement guidelines, formal ethics approval was waived. Patients and the public were not involved in the design, conduct, or recruitment of the project.

## Results

Over the two-month intervention period, a total of 188 critically ill patients were boarded in the ED. Of these patients, 93 (49.5%) were in the ED during a weekday morning when rounds occurred. Most critically ill patients boarded in the ED during the study period were 65 years of age or older and a slightly greater proportion were male (Figure 1). Nearly a third of patients completed their entire ICU course while boarded in the ED. Although patients admitted on weekends appeared to be younger, there were no significant differences between patients admitted on weekdays or weekends.

### Feasibility

The project spanned a total of 36 weekdays, during which rounds occurred on 33 days (92%). Rounds were cancelled one day due to staff physician shortage, and twice due to high acuity in the ED.

### Participation in rounds

The patient's primary ED nurse attended 87 of the 93 cases. Attendance increased as the rounds went on, and by the last month of the project ED nurses were present at 100% of the cases. The most common reasons for nurse absence included

scheduled breaks ( $n = 4$ , 66.7% of absences) and assignment acuity ( $n = 2$ , 33.3% of absences).

An ICU physician was present at every case, an ICU nurse at 49% ( $n = 46$ ), a family member at 49% ( $n = 46$ ), and a pharmacist at 31% ( $n = 29$ ). RTs were requested to attend rounds on all ventilated patients ( $n = 37$ ) and attended rounds in 24% ( $n = 9$ ) of these instances.

### Patient outcomes

Diet was discussed during 95% of cases (Figure 2). Average time to first enteral nutrition intake decreased from 28 hours, as identified during the needs assessment, to 17 hours following implementation of the rounds. Thirty-nine patients (41%) had new DVT prophylaxis orders written during rounds and 22 patients were downgraded to lower acuity teams. Additionally, 61 near-miss incidents were caught and corrected.

### Change in communication

Prior to the implementation of rounds, 32 ED nurses and six ICU physicians were surveyed to understand their perception of the quality of interprofessional communication regarding critically ill patients boarded in the ED. Most ICU physicians (83%) stated that the plan of care was often very clear, while most nurses (84%) reported the plan of care was not very clear (Figures 3a and 3b). Following implementation of the rounds, most nurses (94%) stated that the plan of care improved to being very or extremely clear. Additionally, all surveyed physicians ( $n = 5$ ) stated that the plan of care was either often or always clear.

A total of three families were surveyed in the post implementation phase. All surveyed family members reported feeling involved in the discussion during rounds, and two families (67%) reported they understood the plan of care better following rounds.

## Discussion

### Summary & interpretation

Our quality improvement initiative suggests that standardized rounds for critically ill patients in the ED are feasible. Additionally, the implementation of these rounds was associated

**Figure 1**

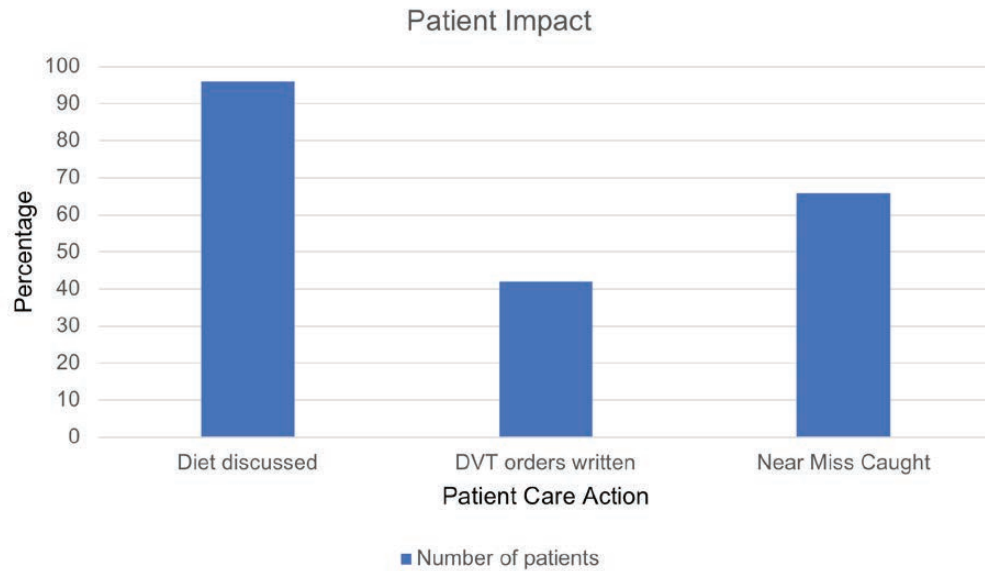
*Patient characteristics*

	All patients ( $n = 188$ )	Patients admitted to an ICU during the week ( $n = 129$ )	Patients admitted to an ICU during the weekend ( $n = 59$ )	p- value
Age, mean ( $\pm$ SD)	64.9 (21.9)	68.5 (21.7)	61.4 (22.0)	0.14
Age $\geq$ 65 years, $n$ (%)	105 (55.9)	77 (59.7)	28 (47.5)	0.12
Female, $n$ (%)	88 (46.8)	60 (46.5)	28 (47.5)	0.90
Diagnosis, $n$ (%)				
Medical	86 (45.7)	60 (46.5)	26 (44.1)	
Neurologic	39 (20.7)	25 (19.4)	14 (23.7)	
Trauma	50 (26.6)	35 (27.1)	15 (25.4)	0.93
Surgical	13 (6.9)	$\leq 10$	$\leq 10$	
Completed entire ICU course in the ED, $n$ (%)	56 (29.8)	43 (33.3)	13 (22.0)	0.12

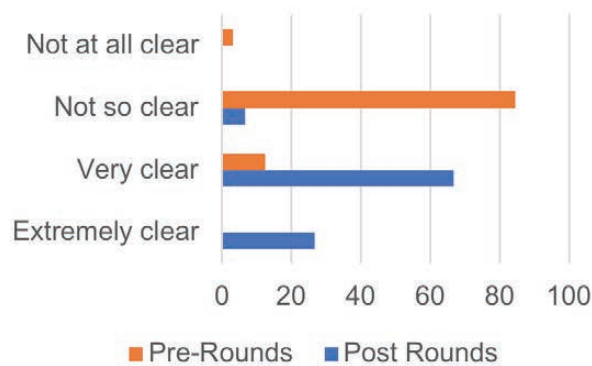
SD = standard deviation; ICU = intensive care unit; ED = Emergency Department

**Figure 2**

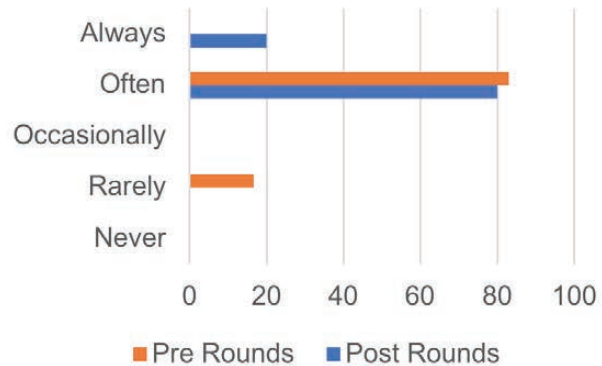
Comparison of pre- and post-implementation nursing perspective on the clarity of plan of care



Nursing Group: How clear is the plan of care for ICU patients held in the ED?



Physician Group: The plan of care for ICU patient's held in the ED is very clear.



**Figure 3A**

Comparison of pre and post-implementation nursing perspective on the clarity of plan of care

with improvement in the communication between the physician and nursing teams. Finally, our results suggest that standardized rounds offer an opportunity to improve the care of critically ill patients located outside of the ICU.

In this project, rounds were successfully run 92% of the time. This high-frequency rate, despite high levels of acuity and occupancy in the ED suggests this project could be successful in other institutions. In addition to the education campaign, key drivers identified by the project team in ensuring rounds took place were daily ED unit leadership engagement at the start of rounds, ICU leadership and nursing participation, and gaining

**Figure 3B**

Physician comparison of pre- and post-implementation of communication

ICU staff physician buy-in, which was done via short presentations at the ICU quality rounds.

Following collection of our pre-implementation survey, we noticed the disparity between physicians' and nurses' perceived level of communication clarity. This finding highlights challenges in communication between members of the healthcare team (Bambi et al., 2014). Specifically, prior to the implementation of the rounds it appeared that communication occurred in silos. Physicians appeared to discuss the plan of care among themselves, with ED nurses not included in the process. Following implementation of rounds the perceived clarity



of communication improved between both groups. It is our hypothesis that this improvement in communication is one of the key drivers in the improvement in patient care demonstrated during this quality improvement endeavor. This finding is consistent with previous literature demonstrating that as communication between healthcare staff improves, so do patient outcomes (Townsend-Gervis et al., 2014; UMBERFIELD et al., 2019).

Staff engagement was encouraged throughout this project. Nursing and physician teams were notified, asked for feedback, and educated in the process changes for three months prior to rollout. Due to high ED and ICU workloads, the rounds were tailored to meet the needs of the busy ED and ICU teams. Likewise, it was crucial to have allied health teams (pharmacy, RT, clerks) participate in both planning and execution of the rounds to ensure their unique perspectives were integrated into the project. We feel that because of extensive staff education, communication, and project champions, the project required minimal adjustments following initiation and, therefore, only one PDSA cycle was run. ICU nurse presence during the rounds also encouraged team building and collaboration between the two nursing units. To ensure this collaboration succeeded, we solicited the input from the ICU clinical educator and leadership teams, and the ICU practice-council. Throughout the project adjustments were made to the rounds to improve functionality and process. We found that ED nurses were concerned that the 10:00 start time would impact break times and patient care; and so, following the first week of rounds, a page was made at 09:50 announcing the rounds. This page allowed nurses to schedule their breaks, patient care tasks, and rounds.

Unlike in the ICU, where every patient is rounded on and cared for by the same team and where nurse-to-patient ratios are lower, in the ED, patients from all admitting services are held waiting for an inpatient bed. As such, identifying the ICU rounding team was a challenge. Initially, when the ICU team arrived at the bedside the ED nurses were not aware of them. Therefore, in order to identify the ICU team better, unique lanyards and a designated computer on wheels were assigned to the ICU rounding team.

### Limitations & future research

The project strategies used and the impact of our project need to be interpreted in context of specific limitations. This project was performed at a multispecialty tertiary care centre with a large volume of high-acuity patients. Accordingly, our results may not be reflected in other settings with lower numbers of ICU admissions. Future research should include smaller settings with an environmental scan before implementation. Another limitation of our project was the absence of a cost analysis. However, no additional resources, materials, or equipment were used, and no additional personnel added, suggesting that, at worst, this initiative was cost neutral. Future projects should consider cost analysis of ICU rounds in the ED. Additionally, we obtained minimal family feedback. Previous data suggest that family involvement in rounds is beneficial to patients and medical staff, and improves communication among staff and families (Des Ordon et al., 2020; Kang et al., 2020). It is unlikely the results would be different in our project. Moreover, due to staffing limitations

our rounds did not include dietitians, physiotherapists, social workers, or occupational therapists. These disciplines would be beneficial to include in future rounding structures. A final consideration for future research should be aimed at an analysis of ICU rounds in the ED on patient morbidity and mortality, as this was not reviewed in this project.

### Conclusion

This quality improvement initiative demonstrated that bedside interprofessional rounds in the ED on ICU patients are feasible, improve staff communication, and enhance the patient and family experience. Rounding on ICU patients in the ED can be used as a safe approach to improve the care for ICU patients boarded in the ED without increasing burden to front line staff. Future projects should focus on the cost effectiveness of standardized rounds on critically ill patients outside of the ICU as well as further delineating the impact of these rounds on patient-centered outcomes.

### Implications for emergency clinical practice

- ED boarding of critically ill patients is an increasing concern globally
- ED boarded ICU patients may not be included in daily ICU rounds
- Interprofessional bedside rounds are feasible in the ED on ED boarded ICU patients
- These rounds improve communication between interdisciplinary staff and thus improve patient care

### Author notes

*Kalina Repin is a Family Nurse Practitioner currently practicing with the Fraser Health Authority near Vancouver, BC. She graduated from the University of Victoria in 2014 with her BScN and completed her graduate degree at the University of British Columbia. Kalina has spent the majority of her career in the Emergency Department and is passionate about change management, quality improvement, and patient-centred care.*

*Will Thomas-Boaz is a Patient Care Manager at Sunnybrook Health Sciences Centre. He graduated from McMaster University in 2005 with his BScN and has also completed a Master's of Nursing degree with a teaching focus from Athabasca University. Will has spent most of his nursing career in the Emergency Department setting and was a mentor to new staff, triage nurse, and charge nurse before moving into the role of Clinical Educator and then Advanced Practice Nurse. Will has an interest in quality improvement, professional practice, and education.*

*Bourke Tillmann is a Clinical Associate in the Department of Critical Care Medicine and a Trauma Team Leader at Sunnybrook Health Sciences Centre. He received his medical degree in 2010 from the University of Western Ontario and subsequently specialized in emergency medicine and adult critical care. Currently he is undertaking his PhD studies in Clinical Epidemiology and Health Care Research at the Institute of Health Policy, Management, and Evaluation at the University of Toronto. Dr. Tillmann's research interest is in health services, seeking to improve equity in access to critical care and trauma care services.*

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## Conflict(s) of interest

**Declarations of interest:** none

**Conflict of interest:** The authors have no conflicts of interest to disclose.

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