

Vital Sign Monitoring in the Emergency Department: A Quality Improvement Project

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Introduction

Upsurges in patient healthcare complexity have led to greater efforts to identify early clinical deterioration and adverse events.¹ Vital signs are simple measurements of physiologic parameters that represent a valuable set of objective data used to establish general parameters of a patient's health.² Often these deteriorating patients have antecedent abnormalities in vital signs (abnormal blood pressure, abnormal heart rate, and/or respiratory distress) before clinical deterioration, which is often not fully captured by the health care team.³

Background

- ❖ A lack of consistent and timely vital sign collection or a failure to appreciate how observed changes in vital signs can impact a clinician's ability to recognize and respond to the deteriorating patient, and can lead to sub-optimal patient outcomes.⁴
- ❖ Consistent collection, documentation, and trend analysis of vital signs as a means to improve the prediction of deterioration prior to a serious adverse event is key.⁵
- ❖ Fortunately, nurses are responsible for the recording and documenting of vital signs, and are therefore positioned to recognize and respond to the deteriorating patient.
- ❖ Yet, documentation of vital signs has been reported as a routine, task-oriented, often ritualistic process, and currently, there are no published standards of care or guidelines on the recommended frequency for obtaining vital signs in the Emergency Department (ED).⁶
- ❖ In the fast-paced, often chaotic ED work environment, taking measures to recognize and treat the deteriorating patient can be challenging.⁷
- ❖ At the project site, pre-project chart audits have found missing or abnormal vital sign data relating to adverse patient outcomes requiring intensive care unit admission or code team activation.
- ❖ Vital sign abnormalities during a patient's length of stay in the ED can have significant consequences following inpatient admission, given their correlation to unplanned intensive care unit transfers and in-hospital mortality.⁸

Purpose

The purpose of this Quality Improvement (QI) project is to determine if an e-learning educational module that provides knowledge translation of unit policies and vital sign monitoring techniques can improve the frequency, consistency, and completeness of vital signs collected and documented by ED nursing staff.

Aims

- ❖ **Aim 1.** Implement a robust, expert clinician reviewed and approved evidence-based best practice vital sign e-learning educational module.
- ❖ **Aim 2.** Improvement in pre-to 30-day post evaluation of the *Practices and Attitudes of Vital Signs Instrument for Emergency Nurses (PAVSI-EN)* survey scores.
- ❖ **Aim 3.** Improvement in pre-to 60-day post intervention frequency, consistency, and completeness of vital sign documentation within the electronic medical record (EMR) for admitted patients.

Methods

- ❖ **Design.** Retrospective pre- and post-intervention.
- ❖ **Setting.** Single-site emergency department, located in the Mid-Atlantic region of the United States.
- ❖ **Participants.** A convenient sample of ED nurses 21 years of age or older, from all shifts and FTE's.

Intervention

- ❖ A 20-minute expert-clinician approved web-based e-learning module comprised of:
 - ❖ Current, evidence-based best practice knowledge and critical-care analysis of vital signs
 - ❖ The most up-to-date, unit-specific policies regarding vital signs for ED patients
 - ❖ Review of polices regarding RRT-activation criteria and intra-unit transfer
 - ❖ Real-time case studies previously warranting RRT-activation within 12-hours of ED admission

	Never	Sometimes	Often	Most of the time
Practice Statements				
I review triage vital signs prior to evaluating the patient.				
I repeat abnormal vital signs as part of my assessment of patients.				
I have someone else repeat triage vital signs and then I check those vital signs as part of my patient assessment.				
In developing a plan of care, I refer to triage vital signs.				
I repeat vital signs on non-critically ill patients as part of my initial assessment.				
I repeat vital signs on critically ill patients as part of my initial assessment.				
I review a patient's vital signs prior to giving medication that may alter their vital signs.				
I review the record of a patient's vital signs when reporting off to a peer.				
I review the record of a patient's vital signs prior to admission or discharge.				
I repeat vital signs prior to admission or discharge.				
I rely on changes in a patient's vital signs to alter my plan of care.				
Attitude Statements				
I believe that vital signs taken in triage are an accurate reflection of the patient's condition.				
I believe that vital signs taken in the emergency department are performed according to evidence-based practice guidelines.				
I feel that repeating vital signs regularly is necessary to protect my practice and the institution in case of a lawsuit.				
Vital signs taken at regular intervals are often unnecessary for selected populations.				
Taking vital signs at regular intervals to document that a patients has been observed is often unnecessary for patients that are stable with non-life-threatening conditions.				
Too much time is spent repeating vital signs on stable patients.				
Clinicians should determine the frequency of vital signs on a case-by-case basis.				
Clinicians value having frequent vital signs on their patients to guide clinical care.				
Frequency of repeating vital signs should be uniform for patients in the ED.				

8-Question EPIC Chart Query

1. Were vital signs documented at time of triage?
2. Were all of the vital signs documented at time of triage?
3. Were vital signs documented within 30 minutes of triage?
4. Are vital signs documented every two hours?
5. Are blood pressure, pulse, respiratory rate, and pulse oximetry documented every two hours?
6. Are blood pressure, pulse and pulse oximetry documented every two hours?
7. Were vital signs obtained within one hour prior to transfer out of ED?
8. Are abnormal vital signs present?

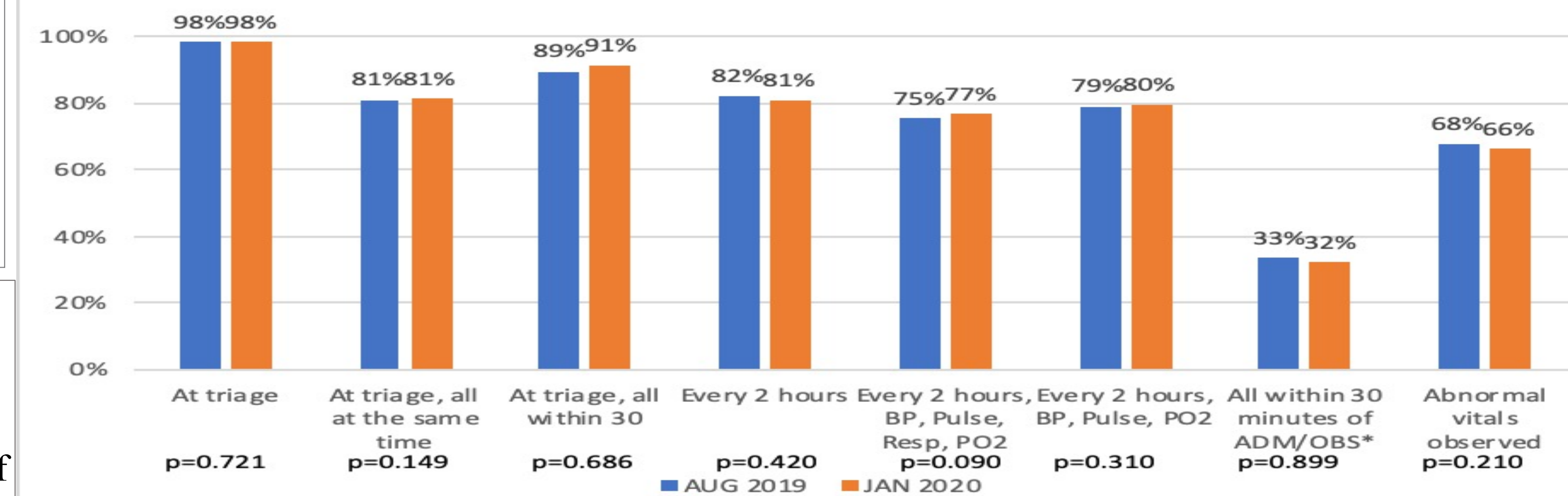
Measures

- ❖ Aim 1: Intervention compliance assessed via e-learning report.
- ❖ Aim 2: Pre-and post-intervention *PAVSI-EN* survey.
- ❖ Aim 3: Pre-and post-intervention retrospective chart queries, utilizing eight points of vital sign data extraction from the electronic medical record.

Results

- ❖ **Aim 1 Outcome:** 57% (52/92) eligible ED nurses completed web-based e-learning module.
- ❖ **Aim 2 Outcome:** Shows a high baseline captured by the PAVSI-EN survey.
 - ❖ PAVSI-EN "Practice" Questions (11 questions), rated on a 4-point Likert scale.
 - ❖ Pre-Intervention: majority of questions answered 3 (*often*) or 4 (*most of the time*).
 - ❖ Post-Intervention: majority of questions answered 3 (*often*) or 4 (*most of the time*).
 - ❖ PAVSI-EN "Attitude" Questions (9 questions), rated on a 5-point Likert scale.
 - ❖ Pre-Intervention: majority of questions answered 3 (*neither*) or higher.
 - ❖ Post-Intervention: majority of questions answered 3 (*neither*) or 4 (*agree*).
- ❖ **Aim 3 Outcome:** There were no statistically significant differences from comparison of the pre- and post-intervention EPIC queries.
 - ❖ > 65% of ED patients had one or more abnormal vital signs.
 - ❖ < 35% of admitted patients have nurse documented vital signs within one-hour of transfer out of the ED.

Percentage of "Yes" Answers - August 2019 to January 2020 comparison (based on mean) of vital signs taken



Project Data Conclusions

- ❖ High baseline *Practices* and *Attitudes* captured by the PAVSI-EN survey correlate with the high rate of consistently documented vital signs by ED nurses.
- ❖ Vital signs documented within one hour of transfer from the ED represented the lowest point of data extraction both pre- and post- intervention.
- ❖ Clinical decision-making may be compromised, leading to poor patient outcomes secondary to deficiencies in the collection and dissemination of vital signs at time of transfer from the ED.⁸
- ❖ An effective clinical handover, including communication of current vital signs, is essential for safe patient care transitions.⁸

Dissemination

Results of this project will be shared with the nursing director and medical director, and at the ED Council at the host institution. The evidenced-based module has been provided to the ED clinical educator for future adaption and dissemination.

References: See Notes