Improving Accuracy of PEWS Scoring on Pediatric Acute Care Units

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Aim Statement

- The goal of this project is to improve the accuracy of the Pediatric Early Warning Scores (PEWS) for admitted patients in the Pediatric Acute Care Units:
- The completion and accuracy rate will increase from the baseline average of 77% to ≥ 85% by May 2023
- Secondary Aim: The accuracy rate for PEWS completed on patients in the Pediatric Emergency Department (PED) being admitted to the pediatric acute care floor will decrease the PEDS ED bounce up rate for patients requiring admission to the Pediatric Intensive Care Unit (PICU).

Introduction

- The PEWS provides objective data in the assessment of ill children and aids in the early identification of deterioration in clinical status.
- Correct use of PEWS may help predict and/or prevent critical events including Rapid Responses (RRT's), respiratory and/or cardiac arrests, safer transport of inpatients from the PED to acute units and help identify decompensating patients to promote earlier interventions or a higher level of care.
- The PEWS is made up of 3 physiologic systems (cardiovascular, respiratory and neurologic) with multiple parameters feeding into the score, which then guides further actions based on an algorithm.
- Early warning scores in children uses age-specific ranges and a neurologic/behavioral component.
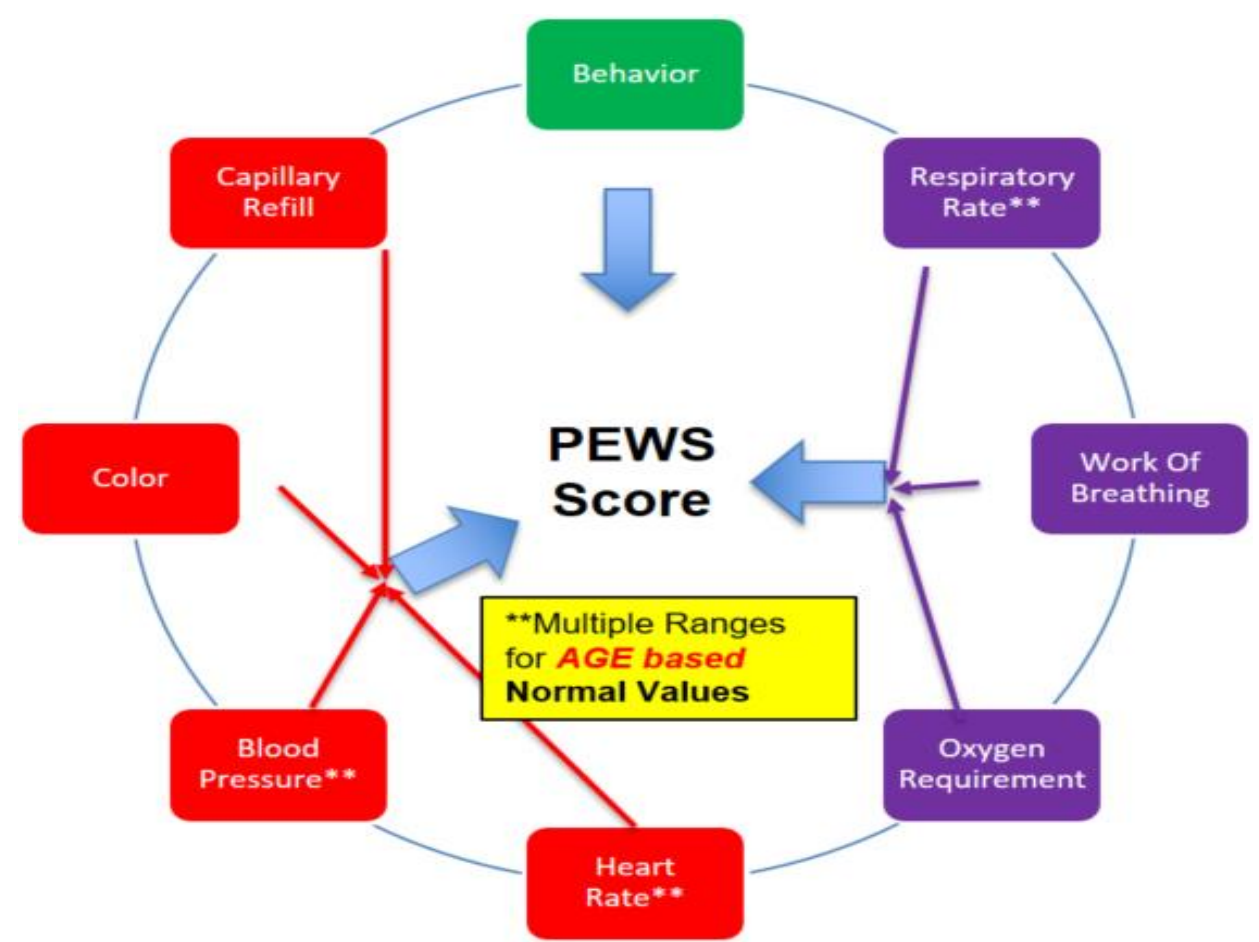
- Electronic medical record (EMR) systems may be cumbersome, requiring multiple toggles to access the required information needed to accurately complete PEWS scores, potentially leading to transcription errors.
- A Multidisciplinary team consisting of nursing and physician leadership from pediatric acute care units and the PED in addition to, quality improvement specialist and IT specialist collaborated.
- The team focused on improving the accuracy of PEWS calculation, which were frequent triggers for rapid responses and/or bounce-ups to the PICU.

Methods

Multiple PDSA cycles: were conducted with several of the most impactful cycles detailed below.

PDSA Cycles # 1-3 A knowledge deficiency was identified based on pre-survey and baseline data collection from random chart reviews confirmed the gaps in PEWS accuracy and timeliness.

PDSA #4: Education regarding process for PEWS. Improvement was made in both the completion rate and accuracy, but was not sustained. Review of the PEWS tool in our EMR showed the difficulty to use.

PDSA # 5: Collaboration with IT to create a user friendly semi-automated PEWS tool in the EMR with the most recent time-stamped vital signs. Additionally, age-specific vital signs and RRT algorithm reference were located within the tool.

PDSA #6: Nursing education with scenarios and new PEWS tool went live.

PDSA #7: Policy change to require PEWS only on admitted patients in the Pediatric Emergency Department (previously, all patient in the PED were required by policy to have PEWS).

PDSA # 8: If PEWS was found to be inaccurate on random audits, nurses were notified of non-compliance and re-educated.
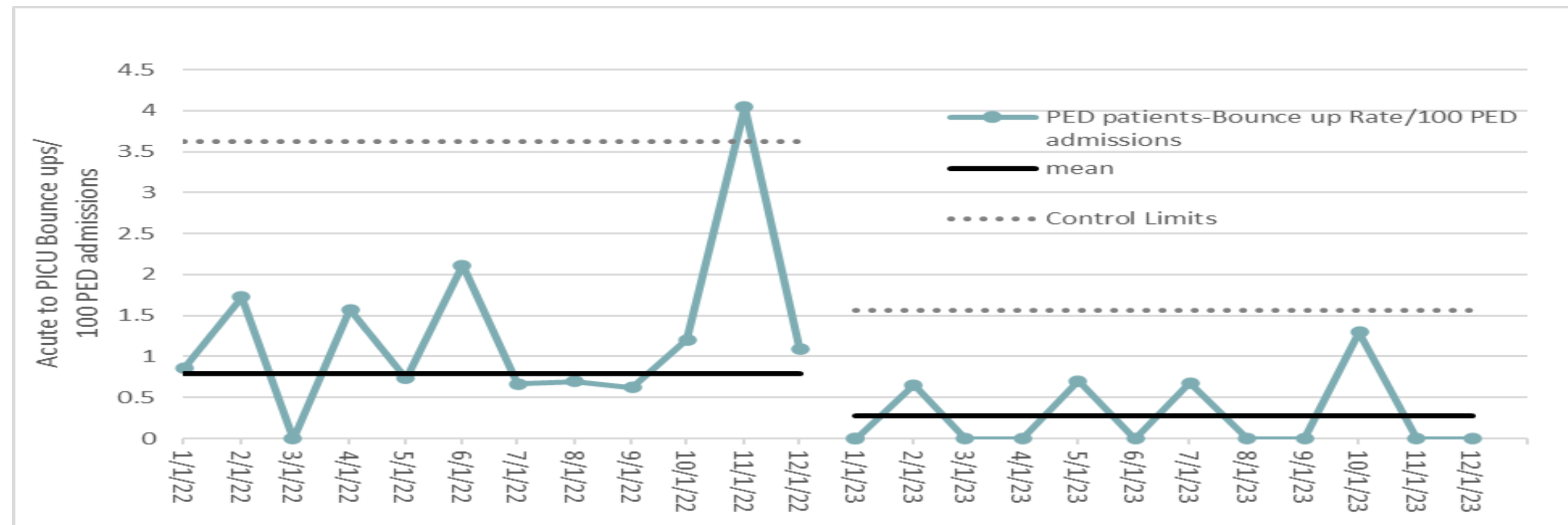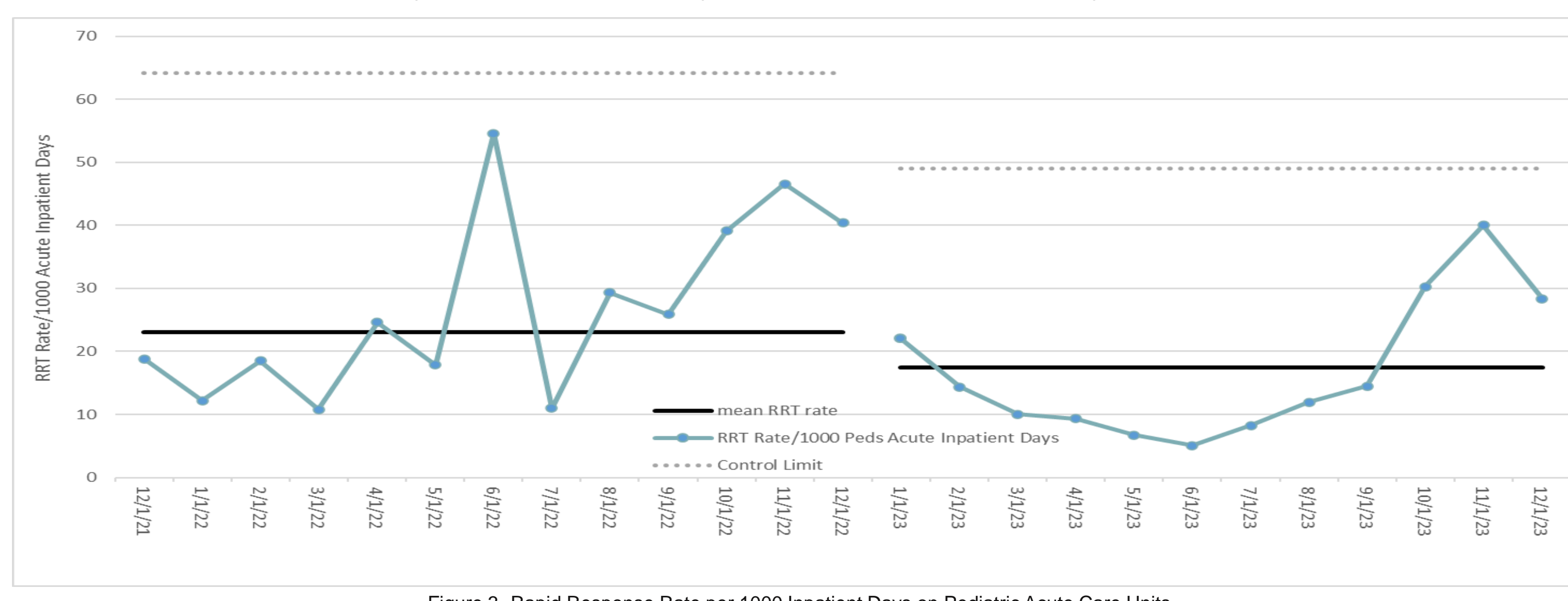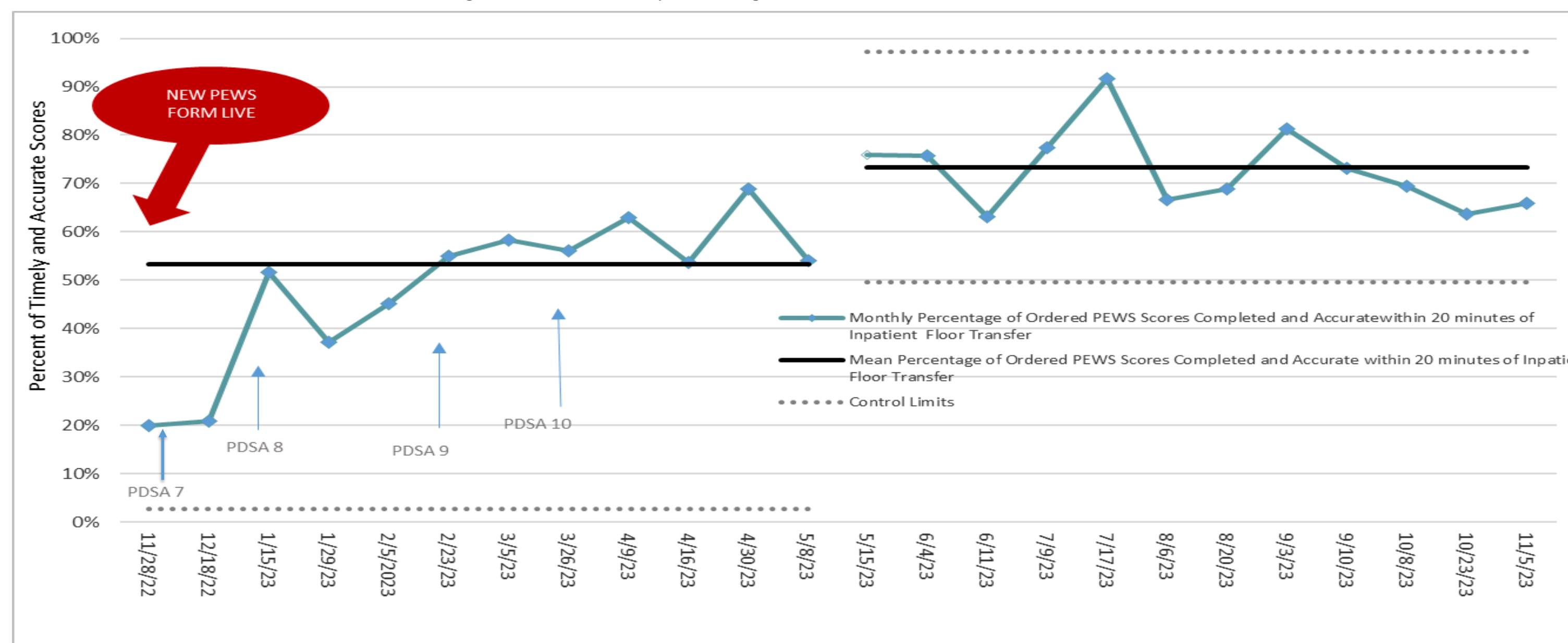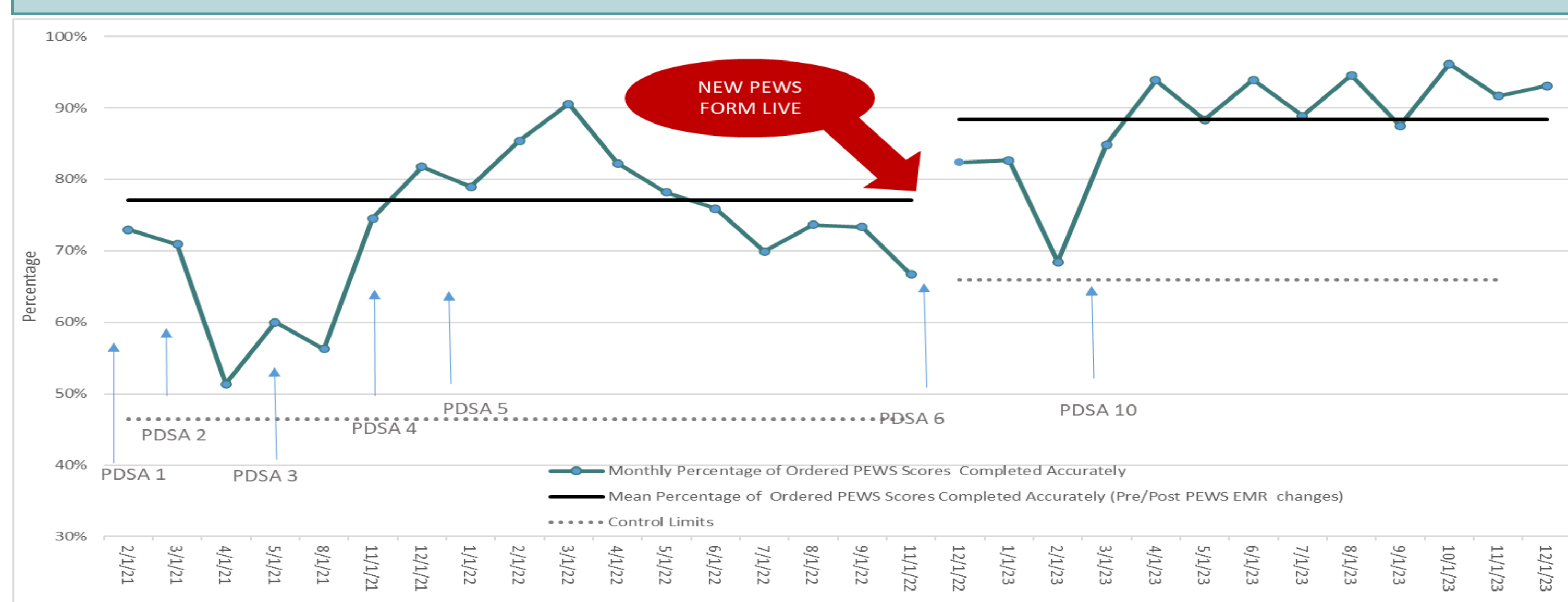
EMR Enhancements

Old PEWS Form

New PEWS Form Post EMR changes

Results

Figure 1-PEWS Accuracy Percentage for Admitted Patients in Pediatric Acute Care Units

Figure 2-PEWS Accuracy Percentage for Admitted Patients in the Pediatric Emergency Department

Figure 3- Rapid Response Rate per 1000 Inpatient Days on Pediatric Acute Care Units

Figure 4- PICU Bounce Up Rate per 100 100 Pediatric ED Acute Care Admissions (within 6 hours of Admission)

Discussion

- During the baseline data collection, auditors were unable to review the physical assessment components of PEWS, including behavior, retractions or perfusion. Therefore, RN scores that were higher than the auditors were assumed to be accurate. RN scores that were lower than auditors were always due to objective vital signs and therefore, inaccurate
- Accurate PEWS for admitted PED and acute care patients may lead to earlier interventions, promoting stable in house transfer and prevent the need to transfer patients to higher level of care.
- With improving PEWS accuracy, perhaps there were earlier interventions prior to RRT being called. We thought that the RRT rate would increase initially but we didn't see that happen, even during the winter surge of 2022.
- Mean accurate completion rate of PEWS increased on the acute care units from 77.1% to 88.4%, with the last 5 months demonstrating a mean accuracy of >92%. In the PEDS ED, mean accuracy increased from 53.2% to 73.4%
- Our mean Acute Inpatient RRT rate decreased from 23.1 to 17.4 RRTs/ 1000 inpatient days
- Our Pediatric ED bounce-up rate (PED --> Acute Unit --> PICU) decreased from 0.79 to 0.28 per 100 admitted PED patients.

Limitations

- Many RRTs are triggered by a deterioration in respiratory status. Despite the increased number of viral related admissions with respiratory symptoms, we were able to demonstrate a reduction in our RRT rate. The effect of seasonal associated diagnosis and RRTs/bounce-ups has not been fully assessed since we changed our PEWS scoring forms in December 2022. Data collection continues.
- Bounce-up cases that are held on the acute care floor until there is bed availability may potentially have been missed as the report is run based upon patient location. However, this limitation exists during both the pre and post time frames.
- PEWS is used for patients <18 years old, while the number of RRTs and bounce-ups reported includes all ages up to 21 years old.

Conclusions

- A semi-automated PEWS tool, was created in the EMR due to unsustainable improvement in the PEWS score despite education and practice scenarios.
- With the implementation of the new PEWS tool in the EMR, PEWS score accuracy increased due to the ease in workflow for the nurses completing the PEWS.
- The algorithm and vital sign reference score was made easily accessible.
- A decrease in the number of RRTs called on the inpatient acute care unit by 24% (baseline RRT rate = 23.1 RRTs/ 1000 inpatient days.
- A decrease in PEDS ED to Acute Bounce Up Rate/100 PED Admissions by 65%.
- Next Steps: Evaluate PEWS accuracy leading up to RRT's and adherence to he RRT algorithm.

References

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