Implementation of Extubation Readiness Trials in a Pediatric ICU

ECU HEALTH | ECU BRODY SCHOOL OF MEDICINE

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BACKGROUND

Ventilator length of stay (LOS) is the number of days of intubation.
Increased ventilator LOS drives up costs and risk of complications.
Extubation readiness trials (ERTs) were implemented in a pediatric intensive care unit (PICU) to try to decrease ventilator LOS.

PROJECT AIM

Primary aim:
Decrease ventilator LOS by 10% within 6 months after implementation of ERTs

Sub-aims:
(1) process measure of number of ERTs performed
(2) process measure of % ERTs documented
(3) balancing measure of re-intubation rates

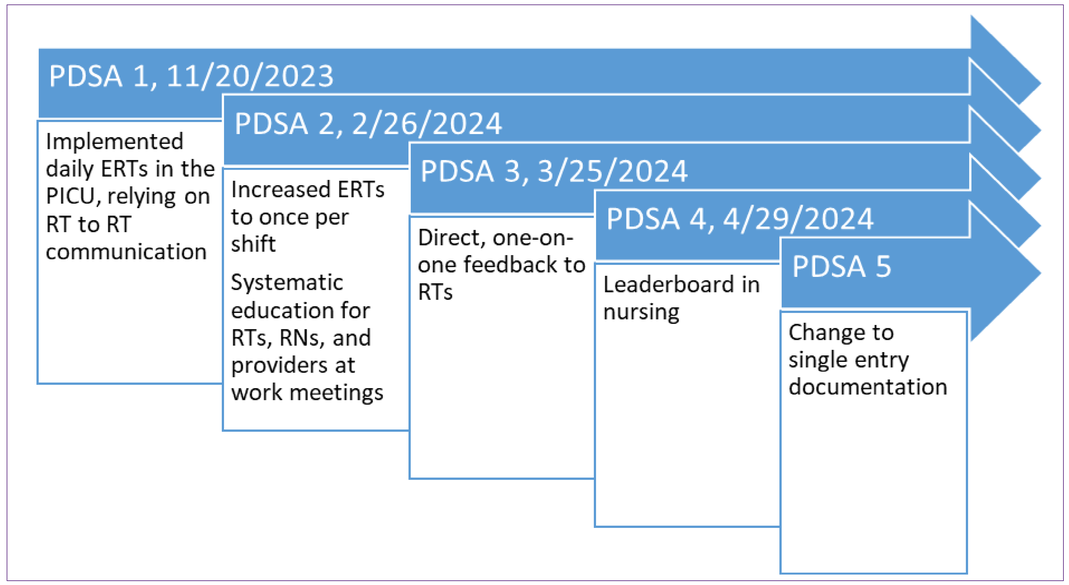
PROJECT DESIGN/STRATEGY

Context and methods:
Intubated PICU patients aged 0-21 years old from November 2022-June 2023 (control group) and November 2023-June 2024 (intervention group) were included.

Intervention:
Extubation readiness trial:
1) Identify appropriate patients
2) Change to pressure support mode 5/5
3) Documentation note and flowsheet

Analysis:
Monthly changes to process were implemented using PDSA cycles.
The two groups were compared in terms of ventilator LOS (primary outcome) and re-intubation rate (balancing measure).

CHANGES MADE (PDSA CYCLES)



RESULTS/OUTCOMES

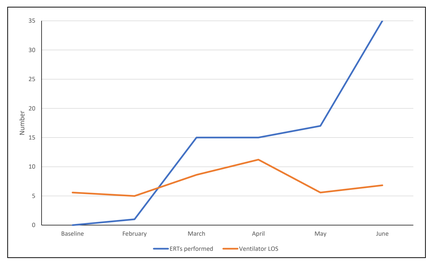


Figure 1. Number of ERTs performed per month and the effect on the primary outcome of ventilator LOS. November-January data not shown due to low numbers of ERTs performed and no expected effect on outcomes. Implementation of ERTs improved significantly after the second PDSA cycle in February. No decrease in ventilator LOS was seen after four PDSA cycles. Median ventilator LOS was 6 days.

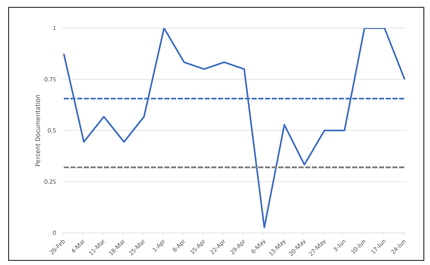


Figure 2. Run chart of percent documentation by week after the second intervention. November-January data (not shown) had a percent documentation rate of 0-32%. Baseline rate shown as 32%. PDSA cycles 2-4 focused on improving compliance through staff education, and a significant shift was seen using Nelson's rules with a new mean rate of 66%. The week of May 6 was an outlier.

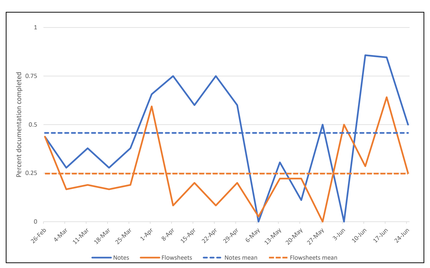


Figure 3. Break-down of process measure of documentation. Although overall documentation was improving, both parts of the documentation (note and flowsheets) were not always completed. Notes mean was 46% and flowsheets mean was 25%.

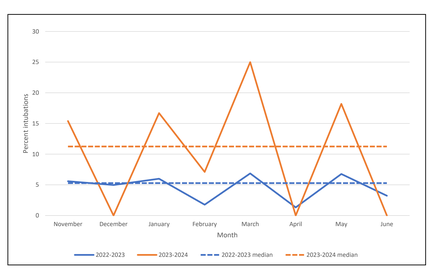


Figure 4. Balancing measure of average re-intubation rate changed from median of 5% to goal of median 11%.

LESSONS LEARNED

ERTs were successfully implemented with no decrease in ventilator LOS.

Although there was no positive finding on ventilator LOS from this intervention, ERTs remain a point of standardization in PICUs nationally.

Lurking variables may be influencing ventilator LOS aside from ERT implementation.

ERTs should not be abandoned but continued with further PDSA cycles and analysis.

NEXT STEPS

Upcoming PICU QI projects:
-rounding checklist
-ventilation weaning guidelines
-sedation management guidelines

The ERT project is ongoing, with the next intervention (PDSA 5) aimed at streamlining the documentation process.

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