PREVENTING UNPLANNED EXTUBATIONS IN A TERTIARY NEONATAL INTENSIVE CARE UNIT
Quality Improvement project

Dr. Rashida Javed, Dr. Kanwal Mahadev, Dr. Harsha Gowda

NICU, Birmingham Heartlands Hospital, Birmingham, UK

NHS
University Hospitals Birmingham
NHS Foundation Trust

Background

Mechanically ventilated neonates are prone to unplanned extubation (UE) or accidental extubation causing cardiorespiratory deterioration and repeated reintubation causing airway trauma. Studies have shown a variation in the rate of unplanned extubation in NICU from 1.14 to 5.3 per 100 ventilation days. Reasons for this increased incidence include longer duration of intubation, shorter neonatal tracheal length, less routine use of sedation, use of uncuffed endotracheal tubes and method of fixation.

Aim

The aim of this Quality Improvement project (QIP) is to reduce the rate of unplanned extubations.

Methods

We introduced a PDSA cycles.

Cycle 1 (Sep 2019 to Aug 2021): Retrospective data collection to identify risk factors and rate of unplanned extubation. This was followed up by data presentation in local Governance meeting and staff education on risk factors for UE, introduction of proforma and incident reporting of UE.

Cycle 2 (Mar 2022 to Feb 2023): Prospective data collection, analysis of rate of unplanned extubations and further staff education.

Cycle 3 (Mar to Feb 2024): Ongoing prospective data collection.

Results: *Table 1*

|	Cycle-1 (Sept2019-Aug2021)	Cycle-2 (Mar2022-Feb2023)	Cycle-3 (Mar2023-Feb2024)
No.of intubated babies	366	138	138
UE	49(13.4%)	33(23.9%)	12(8.7%)
UE/100 intubated days	2	3.19	1.45
Reintubated	32(65%)	18(54.5%)	10(83%)

Unplanned extubations were 49 in cycle one and 33 in cycle two and 12 in cycle three. The UE rate was 2 initially which was increased to 3.2/100 ventilated days due to better data capture because of incident reporting and use of proformas. Subsequently, rate of UE reduced to 1.45/100 ventilated days. Table:1 describes the UE rate in three PDSA cycles. The increased rate of UE in cycle-2 was because of better data capture by incident reporting of all UE.

Key reasons of UE were vomiting (44%), endotracheal tube (ETT) dislodgement during fixation (18.5%), baby movement (15%) & cuddles with parents (15%).

Conclusion

Introduction of PDSA cycle resulted in reduction of unplanned extubation with good data capture. Multidisciplinary approach with staff education and regular scrutiny of each unplanned extubation is important to keep unplanned extubation rates low. Timely extubation is equally important to reduce the rate of unplanned extubation.

Results
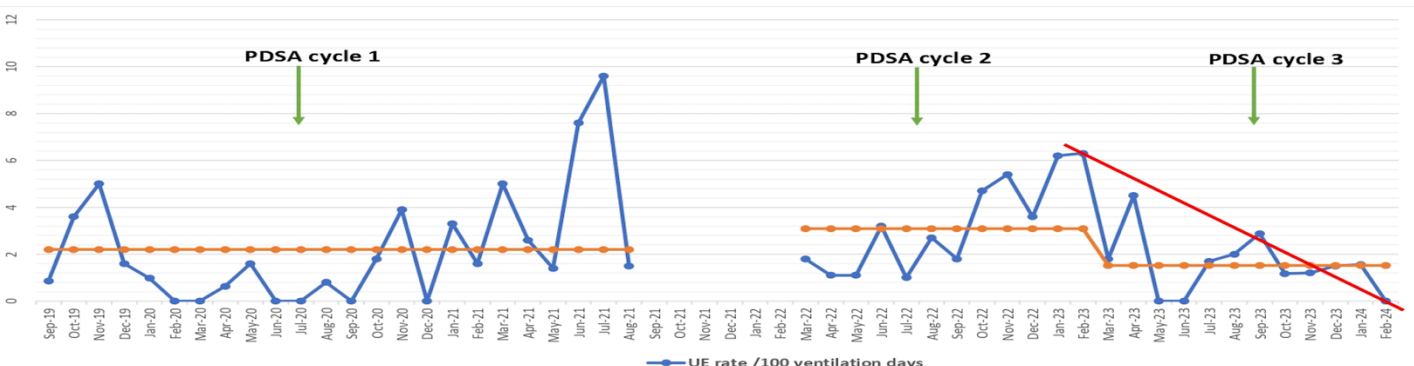
Run chart of PDSA cycles showing monthly UE rates
Key: Monthly UE rates — Reduction in UE rate — Average UE rates