An Innovative Approach to Preventing Unplanned Extubations in the PICU

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Problem/Significance

Unplanned extubations (UE) are some of the most serious and potentially life threatening events in the Pediatric Intensive Care Unit (PICU). Rates reported range from 0.11 to 6.4 events/100 ventilator days. These events can be associated with cardiovascular collapse, reintubation, and increased duration of mechanical ventilation and PICU length of stay (LOS). At the start of this project, our unplanned extubation rate was 1.19 events/100 ventilator days. The ideal would be to have zero unplanned extubation events but at a minimum, we aim to decrease our unplanned extubation rate to below the national benchmark of ≤ 1.0 per 100 ventilator days.

Evidence

A retrospective review of the extubations from September 2010 to September 2012 was performed as part of the quality improvement initiative.

Events were analyzed according to the following risk factors: patient age, type and integrity of securing device, level of endotracheal tube (ET) placement, ET manipulation, sedation, use of neuromuscular blockade or physical restraints, and level of nursing coverage.

The two most significant factors contributing to unplanned extubations in the PICU were the age of the patient and their level of sedation. Transports and procedures were also contributing factors.

Implementation

An airway safety bundle was created to address the increase in our UE rate.

Standardization of endotracheal tube positioning, care and securement practices was implemented.

Variation in sedation practices was minimized with the use of a sedation assessment tool and prescription of sedation goals.

Heightened situational awareness was promoted using tools from TeamSTEPPS®.

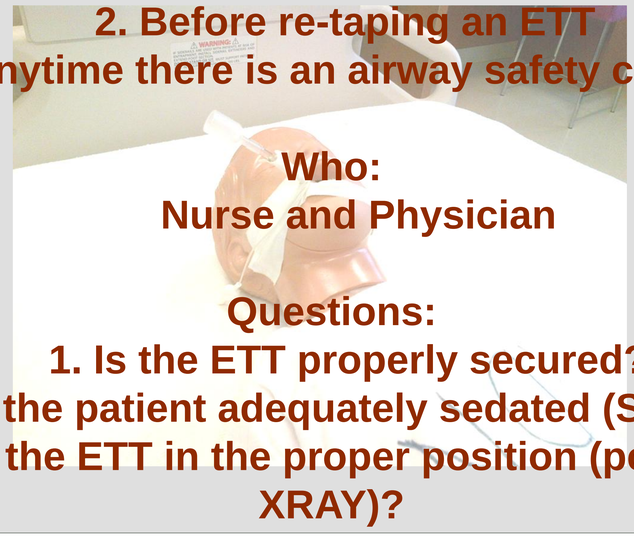
There were daily reminders on airway safety during shift briefs.

The bundle shared components with those previously described in literature with a unique feature in the form of an airway time out tool.

PICU AIRWAY TIMEOUT

When:

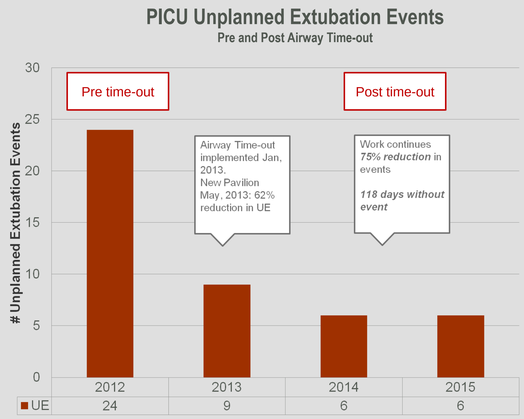
1. When transferring patients to and from the PICU
2. Before re-taping an ETT
3. Anytime there is an airway safety concern



Who:
Nurse and Physician

Questions:
1. Is the ETT properly secured?
2. Is the patient adequately sedated (SBS -2)?
3. Is the ETT in the proper position (per chest XRAY)?

Evaluation



In 2013, following implementation of the bundle, the PICU experienced a 62.5% reduction in unplanned extubations (1.19 extubations/100 ventilator days to 0.45 extubations/100 ventilator days). With ongoing effort and utilizing PDSA methodology we achieved an overall reduction of 75% by the end of 2014 with sustainment through 2015.

Recommendations

Continued monitoring of this airway quality improvement initiative using the PDSA cycle is required to study for further decline and stabilization of unplanned extubation rates.