Abstract:

Objectives: To investigate the change in rate of invasive procedures (endotracheal intubation, central venous catheters, arterial catheters, and peripheral inserted central venous catheters) performed in PICUs per admission over time. Secondarily, to investigate the change in type of respiratory support over time.

Design: Retrospective study of prospectively collected data using the Virtual Pediatric Systems (VPS; LLC, Los Angeles, CA) database.

Setting: North American PICUs.

Patients: Patients admitted from January 2009 to December 2017.

Interventions: None.

Measurements and main results: There were 902,624 admissions from 161 PICUs included in the analysis. Since 2009, there has been a decrease in rate of endotracheal intubations, central venous catheters placed, and arterial catheters placed and an increase in the rate of peripheral inserted central venous catheter insertion per admission over time after controlling for severity of illness and unit level effects. As compared to 2009, the incident rate ratio for 2017 for endotracheal intubation was 0.90 (95% CI, 0.83-0.98; $p = 0.017$), for central venous line placement 0.69 (0.63-0.74; $p < 0.001$), for arterial catheter insertion 0.85 (0.79-0.92; $p < 0.001$), and for peripheral inserted central venous catheter placement 1.14 (1.03-1.26; $p = 0.013$). Over this time period, in a subgroup with available data, there was a decrease in the rate of invasive mechanical ventilation and an increase in the rate of noninvasive respiratory support (bilevel positive airway pressure/continuous positive airway pressure and high-flow nasal oxygen) per admission.

Conclusions: Over 9 years across multiple North American PICUs, the rate of endotracheal intubations, central catheter, and arterial catheter insertions per admission has decreased. The use of invasive mechanical ventilation has decreased with an increase in noninvasive respiratory support. These data support efforts to improve exposure to invasive procedures in training and structured systems to evaluate continued competency.

Reference:

Ross PA, Engorn BM, Newth CJL, Gordon C, Soto-Campos G, Bhalla AK. Declining Procedures in Pediatric Critical Care Medicine Using a National Database. Crit Care Explor. 2021 Mar 5;3(3):e0359. doi: 10.1097/CCE.0000000000000359. PMID: 33786435; PMCID:

PMC7994033.