

Difficult Intravenous Access Screening Tool in the Pediatric Cardiac Intensive Care Unit



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Problem Statement

Difficult intravenous access is a clinical condition in which multiple attempts and/or special interventions are anticipated or required to achieve and maintain peripheral venous intravenous (IV) access

- Less than 50% of pediatric patients were successfully cannulated with IV access on the first attempt
- Nearly 30% of the pediatric population are considered difficult access
- Difficult access patients are more likely to experience:
 - Delays in care
 - Longer hospital stays
 - Increased number of unsuccessful PIV attempts

Purpose and Goals

Implement the difficult intravenous access (DIVA) Screening Tool (DST) to identify pediatric patients admitted to the pediatric cardiac intensive care unit (PCICU) considered difficult access.

Difficult Intravenous Access (DIVA) Scale		
Variable	Point Value	Score
Vein visible with tourniquet	Visible	0
	Not Visible	2
Vein palpable with tourniquet	Palpable	0
	Not palpable	2
Age	≥3 years	0
	1-2 years	1
	<1 year	3
History of prematurity	Full-term	0
	Premature	3
Total		

The DIVA scale predicts success of first-attempt peripheral intravenous (PIV) catheter insertion. A DIVA score ≥4 indicates that extra consideration may be needed before placing a PIV.

- Short term:** Identify DIVA patients to prompt referral for ultrasound-guided PIV (USGIV) access to minimize unsuccessful attempts
- Long Term:** Provide data-driven support to provide additional resources to PCICU RNs in USGIV competencies

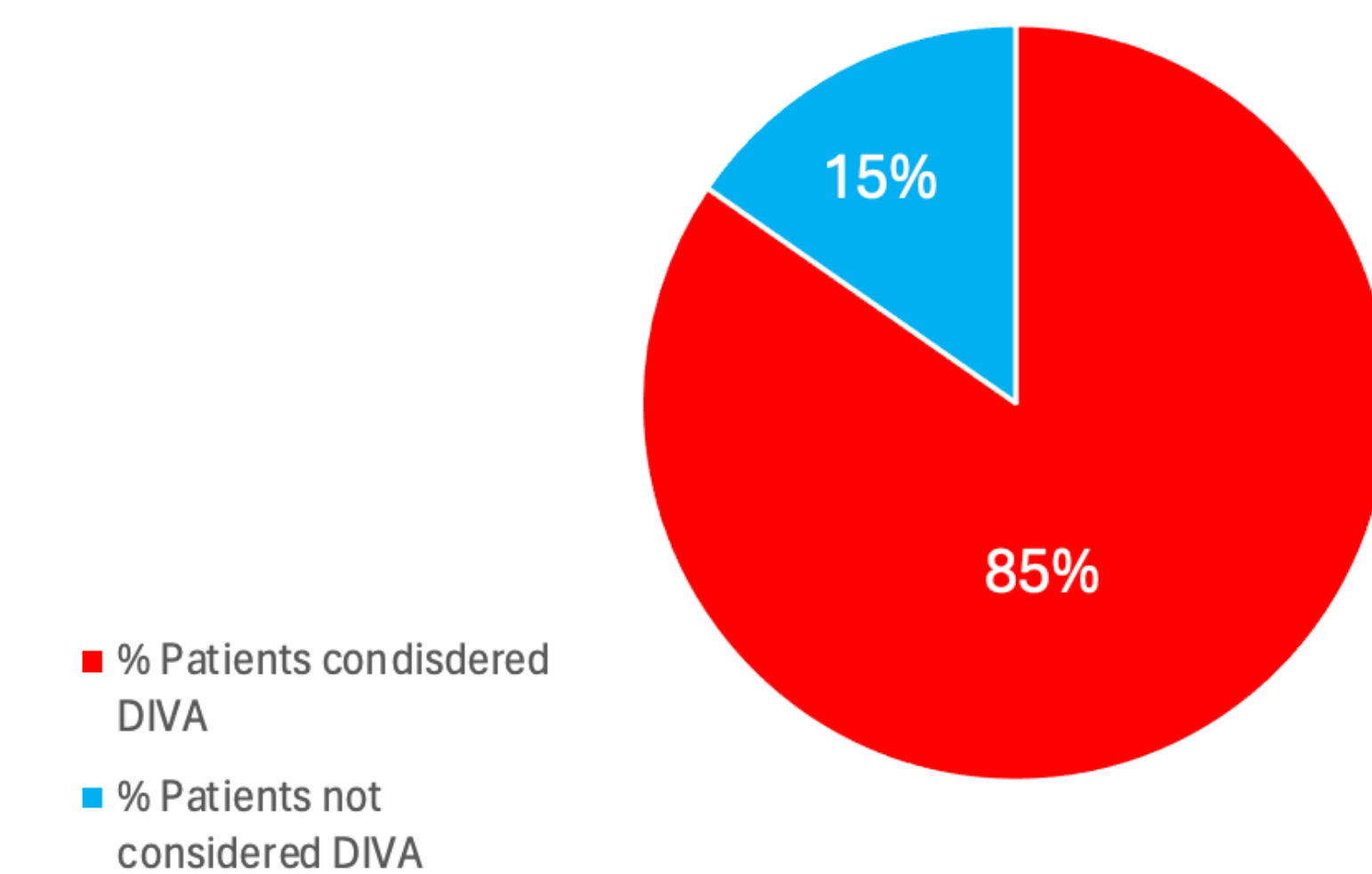
Methods

- Setting:** 12-bed PCICU in a large, urban children's center
- Population:** Critically ill pediatric patients ages 0-18 years with congenital and acquired heart disease who may require multiple vasoactive drips, intubation and mechanical ventilation, and extracorporeal membranous oxygenation as life sustaining treatment
- In periods of low PCICU census, the PCICU cares for minimally complex PICU patients being treated for respiratory distress/failure
- Implementation:** 15-week period in the Fall of 2024.
- Education provided to nursing staff on the purpose and use of the DST and the PIV Access Pathway (PAP)
 - All patients admitted to the were eligible to be screened using the DST, regardless of existing IV access.
 - RNs calculated patient score on a scale from 0-10, where scores > 4 indicate the need for additional resources in PIV access attempts.
 - DIVA scores were entered into the patient's electronic health record (EHR) Sticky Note.
 - If a patient required PIV access, the active DIVA score was applied in the PAP to direct patient-appropriate workflow

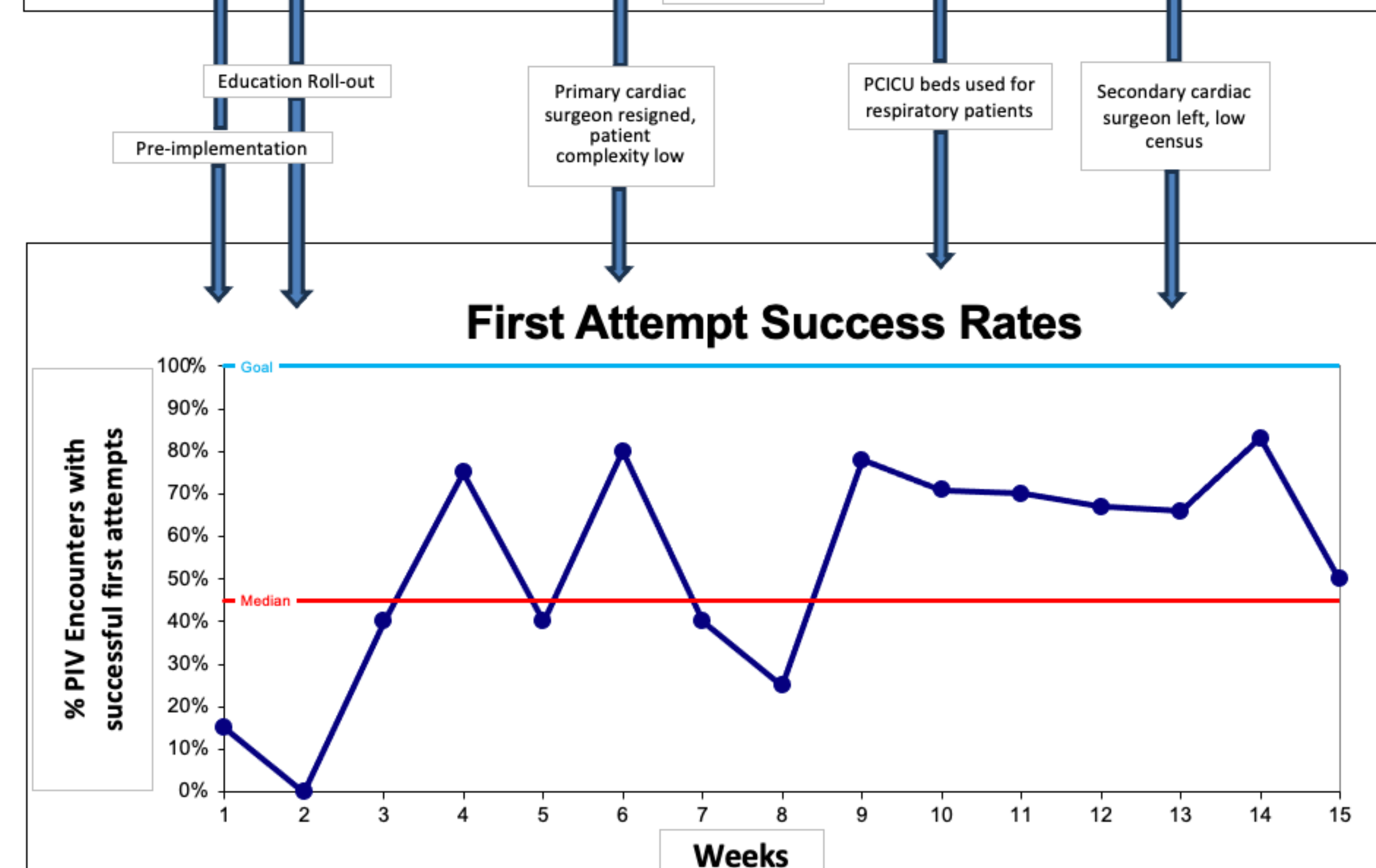
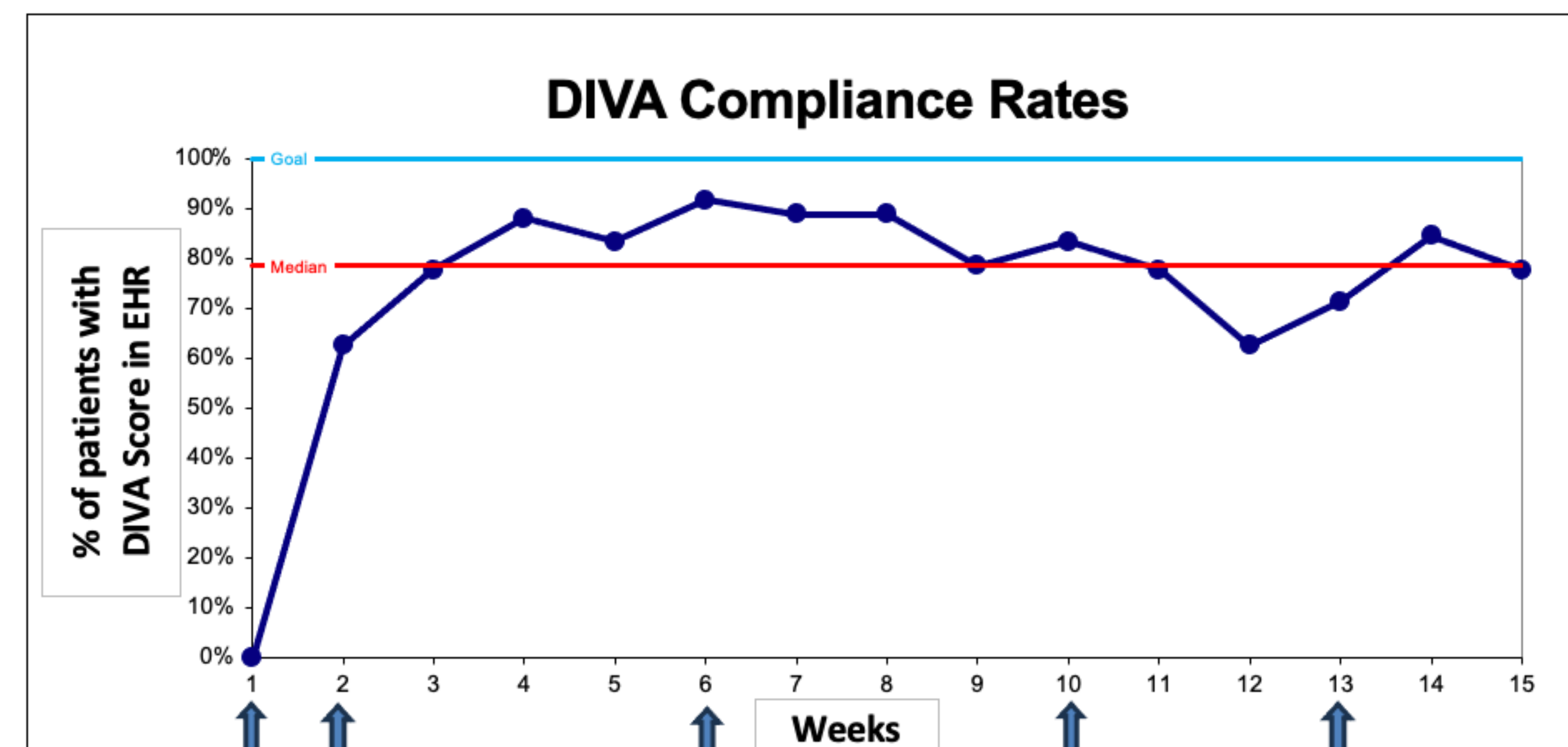
Results

- Nearly 80% (n=36) of PCICU RNs completed DIVA education
- An active DIVA score was present on average in 78% (n=173) of all EHR chart audits
- Over 85% (n=110) of EHR chart audits resulted DIVA score ≥ 4
- PIV pathway compliance was erratic throughout project implementation, with highest weekly compliance at 66% in weeks thirteen and fourteen
- First attempt success rates averaged 45% throughout all weeks of implementation, with a clear upward shift above the mean during weeks nine through fifteen to 69%.

PCICU Patients Considered DIVA



Figures



Discussion & Conclusions

- DIVA compliance had an upward shift after education roll-out that lasts until week 8. There was a subsequent downward shift in the following four weeks. During this time, the PCICU primary cardiac surgeon resigned, leading to a decreased unit census and acuity. Beds were used for low acuity respiratory patients, who are often less acute and have shorter hospital stays compared to cardiac patients. DIVA scoring was likely deprioritized during this high turnover admissions.
 - Establishing and maintaining active DIVA scores over time correlate with improved first attempt success rates.
- Findings support the speculation that significant numbers of PCICU patients are considered difficult access, which can result in increased number of unsuccessful PIV attempts and delays in care.
- Based on DIVA burden data, nearly all PCICU patients should be accessed using "extra considerations" per the pathway, but erratic pathway compliance data may be attributed to the unique processes of obtaining PIV access within the PCICU.
- Further QI may seek to increase PCICU RN competency in USGIV use to meet the needs of the patient population.

References



Notes

Special thanks to the PCICU RNs who aided in obtaining and maintaining active DIVA scores. I am so appreciative!