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Improving Pediatric Vascular Access: From Data Collection to Solution Implementation

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Background

- Vascular Access is an essential part of patient care, and peripheral intravenous (IV) access needs to be obtained in a timely manner.
- This is particularly challenging in pediatric patients (both in part due to their physiology and all the added behavioral considerations)
- Many pediatric patients require multiple needlesticks to achieve adequate access, which leads to patient/family trauma and a poor overall hospital experience.
- In addition, these multiple needlesticks take time, which leads to significant delays in vital clinical care interventions
- Currently, Baystate Children's Hospital (BCH) **does not have**:
 - An assessment tool to predict whose vascular access is going to be challenging to achieve
 - Safeguards for families and providers when the number of needlesticks needed to achieve an IV is rising
 - A clear escalation pathway for when IV access is difficult to achieve
 - Proper staff resources for escalation (aka a dedicated Pediatric Vascular Access Team)
 - Currently, Baystate VAST (Vascular Access Service Team) only inconsistently services patients > 2 years old
 - Nurses from other departments (ex: PICU) are stepping away from their patient assignments to help with vascular access in departments where help is needed (ex: CHAD)

Purpose

- The purpose of this initiative is to improve pediatric vascular access practices across BCH by creating a multidisciplinary learning team, collecting data, and implementing a multipronged solution.

Goals/Objectives

- 1) **Evaluate current pediatric vascular access practices across BCH and quantify the problem with targeted data collection**
 - Compare pediatric vascular access safety practices and guidelines with those at other Solutions for Patient Safety (SPS) Collaborative Hospitals.
 - Assess the scope of the problem and measure patient experience.
 - Evaluate the impact of difficult vascular access on staff resources.
- 2) **Develop a Pediatric Vascular Access Escalation Pathway for BCH**
 - Create an easy-to-use guideline for difficult vascular access.
 - Integrate a validated tool such as the DIVA Score for standard vascular assessment.
 - Collaborate with Child Life specialists to include adjunct tools for IV placement.
- 3) **Expand the vascular access skillset of current staff members**
 - Develop a pediatric-focused training program for Ultrasound-Guided IV Placement for staff.
 - Conduct training sessions across various shifts and departments for wide participation.

Methodology

- Over the course of 2 months (from April 2, 2023, to June 2, 2023) staff collected specific metrics about every single Pediatric IV placed across Baystate Children's Hospital (patient demographics, number of needlesticks per patient, resource utilization etc.).
- Inclusion Criteria: Patients ages 0-22 years needing IV access
- A Pediatric Intensivist conducted a series of in-person, hands-on classes on Ultrasound-Guided IV Placement for over 30 RNs from multiple departments to enhance their skill level. Resident training coming this fall.
- A working group developed a Pediatric Vascular Access Escalation Pathway that incorporates the validated "Difficult Intravenous Access (DIVA) Score” assessment tool and emphasizes the early and frequent use of both pharmacological and non-pharmacological adjuncts, in alignment with our “Comfort Promise”.
- Descriptive statistics were used to analyze qualitative and quantitative data.
- A Z-test for proportions was conducted to compare the incidence of multiple needlesticks between two age groups: patients aged ≤ 2 years and patients aged 3-21 years.

Outcomes

The Scope:

- 777 Patients, 1010 IVs Needed, 1266 Needlesticks
- Extrapolates to nearly 6,000 pediatric IVs needed per year, or > **16 per day**

The Patient Experience:

- About **6%** of patients experienced > **4 needlesticks**
- About **0.5%** of patients experienced > **10 needlesticks**

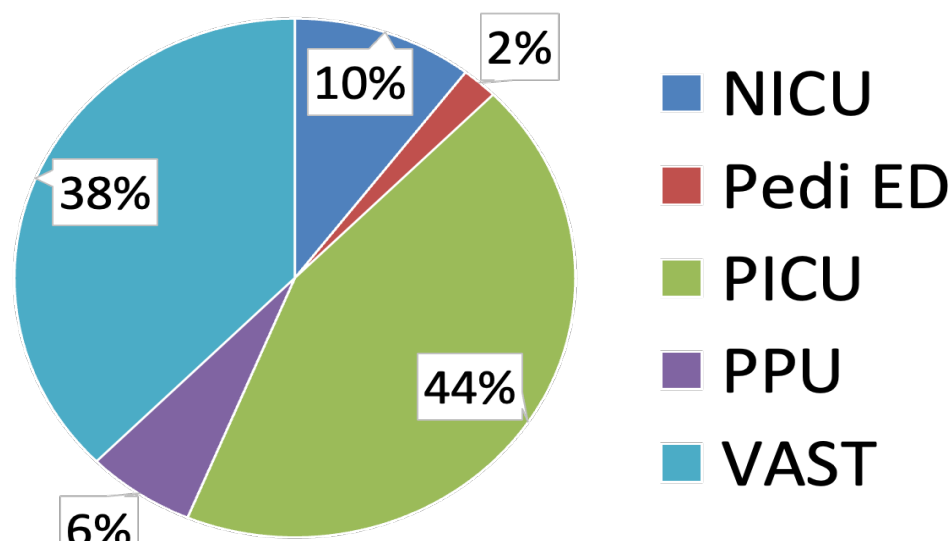
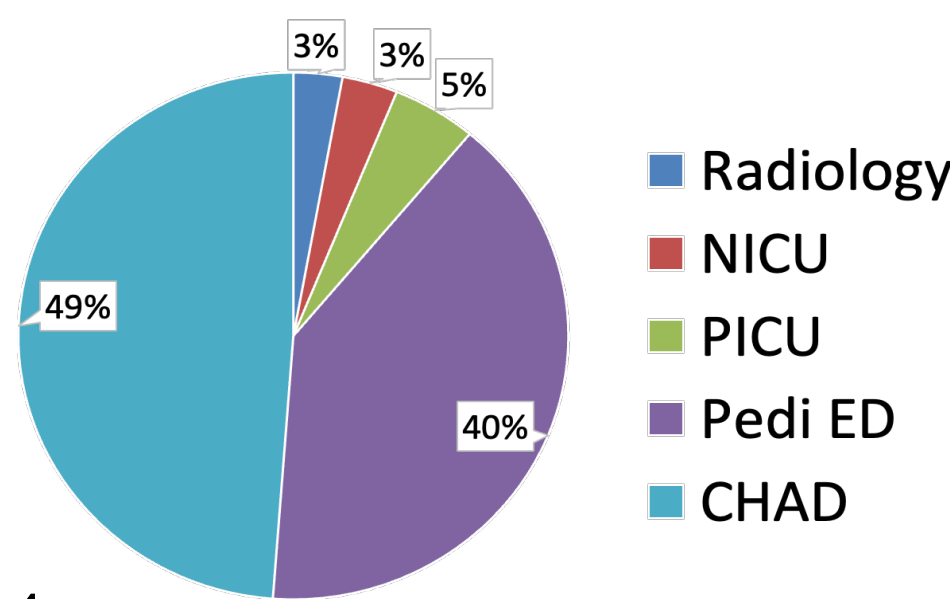
- Average # of Needlesticks/Patient for **patients ≤ 2 years = 2.1**
- Average # of Needlesticks/Patient for **patients 3-21 years = 1.4**

Statistically significant difference. (P-value < 0.00001)

The Demand on Current Resources:

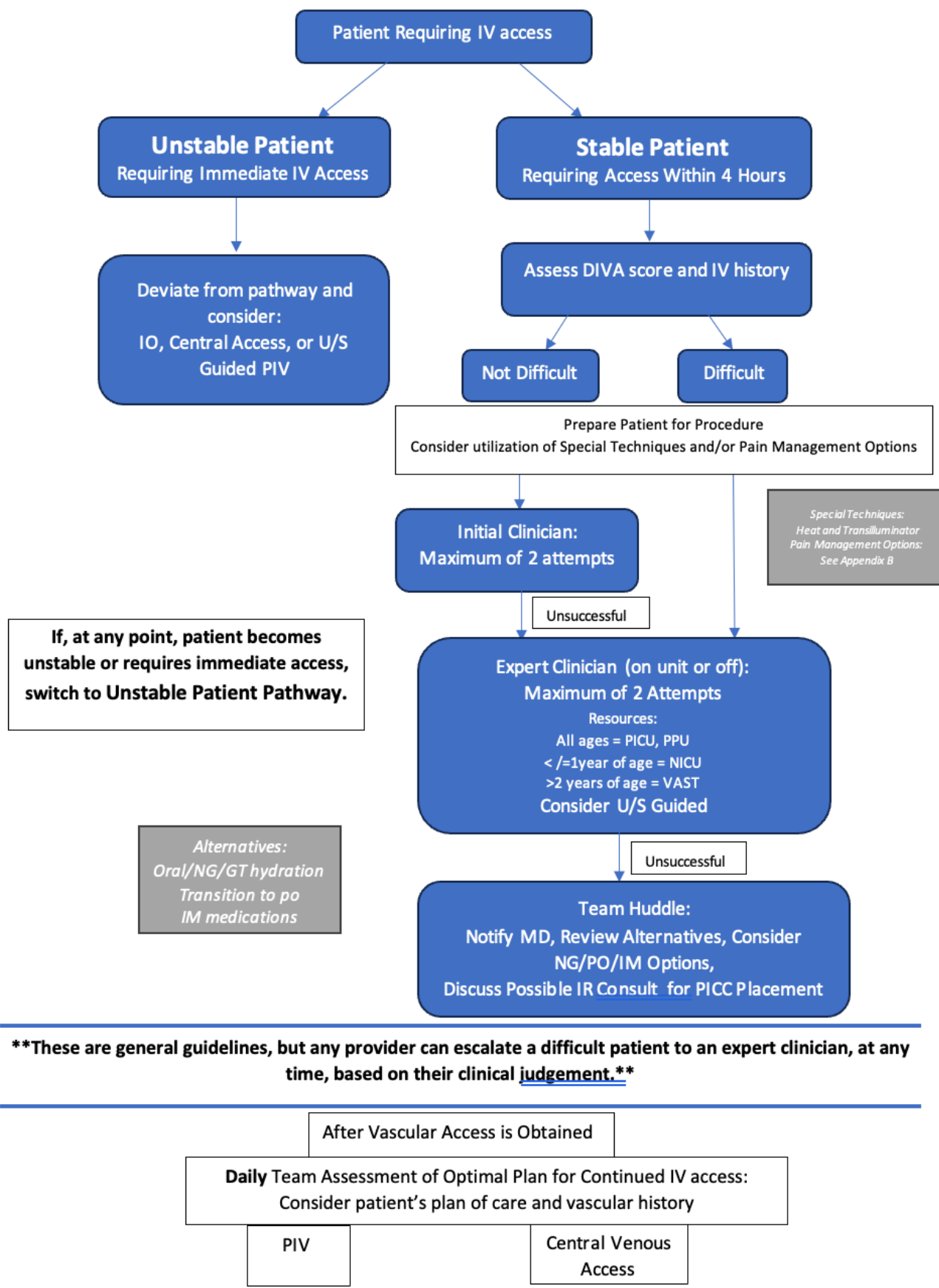
- About **5%** of the time a staff resource from another department was needed for help, and they were spending a reported **10-20 minutes** off their originally assigned unit.

IVs Needed per Department



Resources’ Originally Assigned Unit

Outcomes Cont.



Conclusions

- Timely and trauma-free pediatric vascular access is a widespread need across Baystate Children's Hospital.
- In particular, patients ≤ 2 years old are requiring significantly more needlesticks than older pediatric patients, and we don't have proper supports to service this vulnerable population.
- We are currently forced to take valuable resources from high acuity areas to temporize the problem.
- **Next Steps:** We need a dedicated Pediatric Vascular Access Team with skilled proceduralists who will consistently incorporate pediatric specific tools and care considerations as they services pediatric patients of all ages. By decreasing the burden on other departments and reducing the number of needlesticks needed to obtain each IV, this will improve care coordination, the overall patient experience, and ultimately clinical outcomes.

References

- SocSciStatistics. (n.d.).
Two-sample Z-test calculator. <https://www.socscistatistics.com/tests/ztest/default2.aspx>

Acknowledgements

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