Effects of Family-Centered Education on Peripheral Intravenous Infiltrations and Extravasations (PIVIEs)

Erin Reed, MSN, RN, CPN, VA-BC

Introduction

- Peripheral IV (PIV) placements are one of the most common invasive medical interventions performed
- ACNW identified an increasing rate of PIV infiltrations and extravasations (PIVIEs) and a lack of consistent patient/family education on PIV care and complications
- Infiltrations are the most frequent complication associated with PIV catheters and may result in serious complications such as tissue necrosis, ulcerations, and compartment syndrome. These complications may lead to surgery, long-term pain and suffering, longer hospital stays, and increased costs[1]
- Children may be more susceptible to PIV infiltration and extravasation because of developmental and physiological factors, such as communication skills, activity level, and fragile veins[2]
- Frequent assessment of PIV sites can help identify infiltrations and extravasations in their early stages and a significantly lower incidence of pediatric IV infiltrations occurred when patient guardians were educated and involved in the frequent observation of IV sites[1]
- Caregivers spoke about feelings of being inundated with verbal information, especially after feeling exhausted from the routine of caring for a sick child, and suggested that written information would be beneficial[2]

Purpose

The purpose of this quality improvement project was to decrease the frequency and severity of PIVIEs at ACNW by educating patients and families with a handout on how to recognize signs of complications with their PIV such as pain, discomfort, swelling, blisters, tissue injury, or even necrosis, and when to call their nurse. Being able to recognize complications and intervene earlier in the occurrence of infiltration or extravasation directly decreases the amount of harm reaching patients while promoting family-centered care
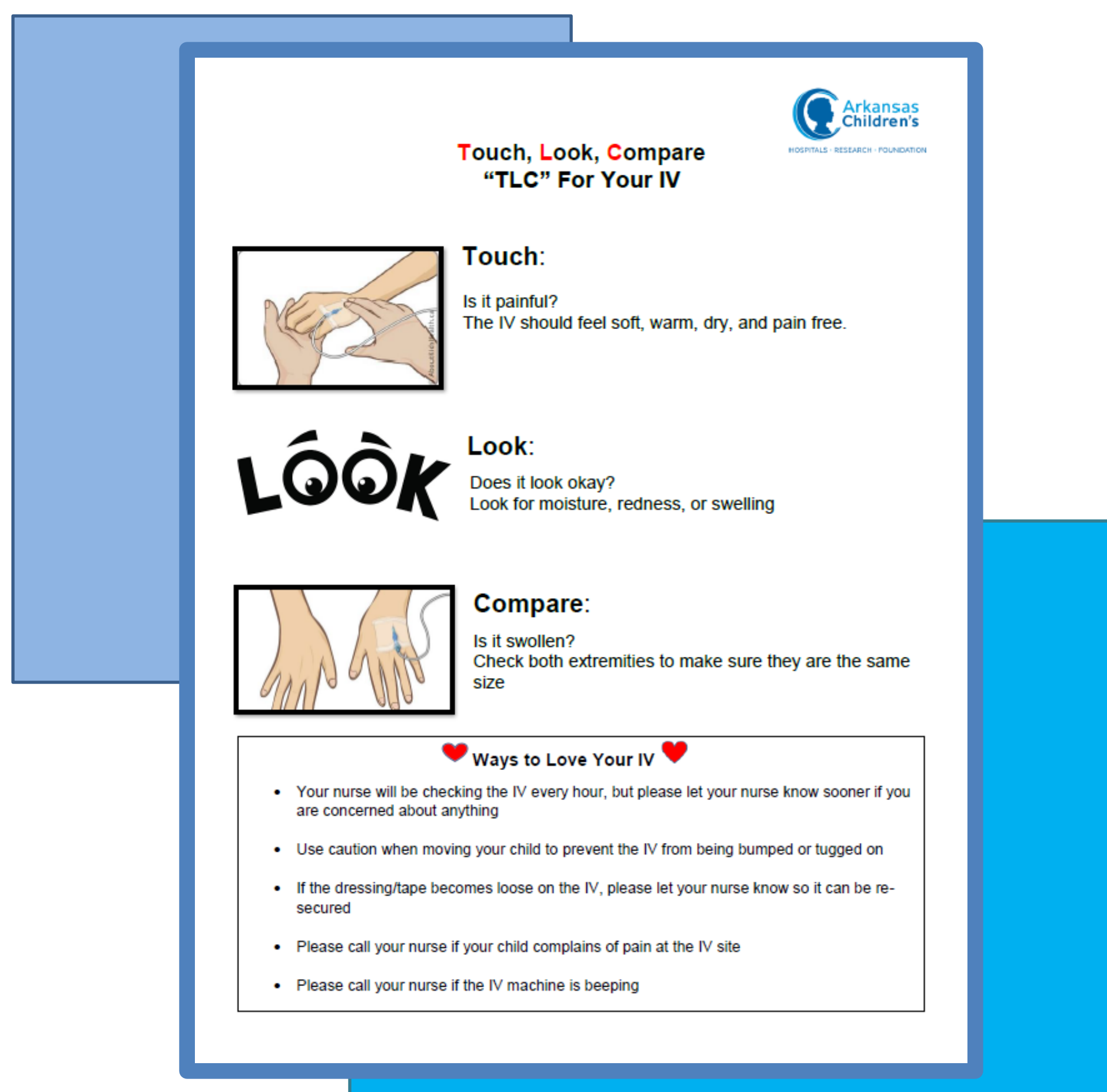
Hypothesis

This project aimed to improve patient outcomes through family-centered education by decreasing PIVIEs in frequency and severity (percentage of swelling) by 10% after the implementation of the "TLC" Handout

Methods

- Education on the use of the handout and proper PIVIE documentation was provided to all nursing staff throughout the month of October 2022 during education rounds
- The handout was displayed in every inpatient room in English
- The handout was given to patients/families by the nurses when a PIV was placed in any other unit throughout the hospital (available in English, Spanish, and Marshallese)
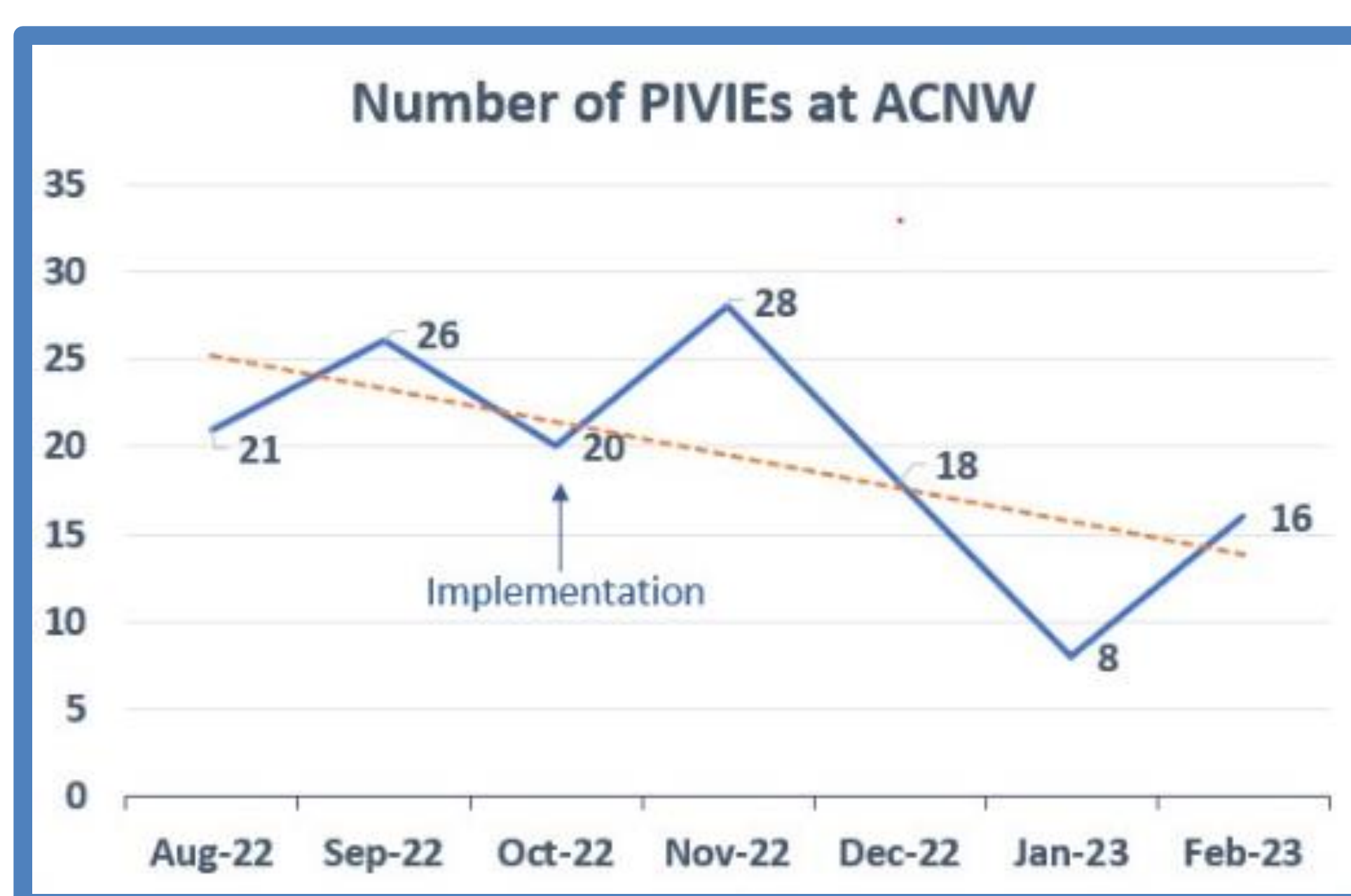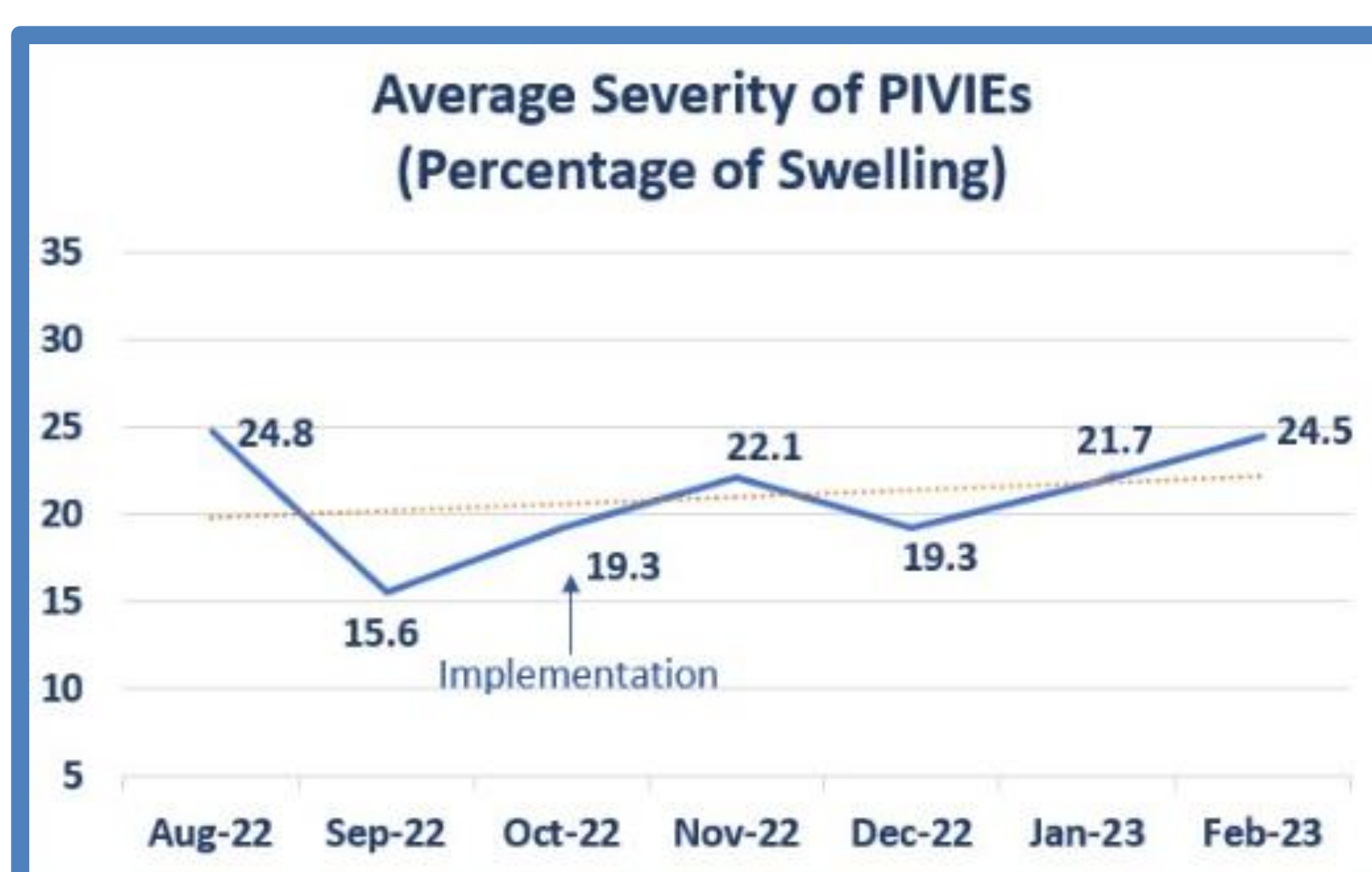
Methods: Continued

- Data was collected from August 1, 2022 through February 28, 2023 using chart reviews, reports generated from the electronic medical record, and event tracker software to identify incidents of infiltrations or extravasations
- The data was analyzed using descriptive statistics including counts, averages, and percentages to determine the results of the quality improvement project

Results

- The demographics included the pediatric patient population, age 0-18, at ACNW and the family members involved in their care
- The average number of PIVIEs prior to implementation was 22 a month and decreased by 20% to 17.5 in the months following implementation, far exceeding the goal of 10%

- The average severity of swelling prior to implementation was 19.9% and increased to 21.9% post-implementation, a 2% increase. Although the majority of PIVIEs were caught early, two outliers significantly increased the overall average swelling

Discussion of Findings

- The TLC handout decreased the average number of PIVIE events after implementation
- Based on Safety Tracker reports on the PIVIE events, families were empowered to recognize and call for help when they identified signs/symptoms of IV complications
- A limitation that impacts the validity of the project is the inability to track exactly how many handouts were given to patients/families on the units where it wasn't permanently posted on the wall in patient rooms
- The increase in the severity of swelling was skewed due to two (high percentage) moderate PIVIES that affected the overall percentage due to the small sample size

Implications for Practice

- The handout can decrease patient harm by preventing PIVIEs and catching them earlier due to families knowing how to care for their IV and how to recognize complications
- The families will keep nurses accountable by ensuring a nurse is assessing their child's IV hourly
- The project impacted nursing practice by empowering and utilizing the family's involvement in their child's care to become a unified team to create a safe and positive hospital experience
- Through education, the project effectively decreased the number of children negatively affected by a PIVIE event, directly improving patient outcomes
- Ultimately, the education was disseminated to the main campus of Arkansas Children's Hospital to improve patient outcomes on a larger scale system-wide
- Recommendations for the future would be the implementation of a more comprehensive PIVIE bundle for nursing staff in addition to the family education. The bundle should include catheter selection, insertion, securement, maintenance, and line necessity components
- In the future, the handout will be displayed in every patient room on all units, instead of relying on nurses to hand them out

References

1. Watterson, K., Hauck, M. J., Auker, A., Burns, R., Greider, J., Marlin, M., McAlpin, N., Melville, S., Shirley, J., Stevens, L., Logan, C., & Fenimore, E. (2018). S.T.I.C.K.: A quality improvement pediatric IV infiltration prevention bundle. *Journal of Pediatric Nursing*, *41*, 38–41. https://doi.org/10.1016/j.pedn.2018.01.003
2. Kleidon, T. M., Cattanach, P., Mihala, G., & Ullman, A. J. (2019). Implementation of a paediatric peripheral intravenous catheter care bundle: A quality improvement initiative. *Journal of Paediatrics and Child Health*, *55*(10), 1214-1223. https://doi.org/10.1111/jpc.14384

Contact

Scan to contact
Erin Reed, MSN, RN, CPN, VA-BC
reede@archildrens.org