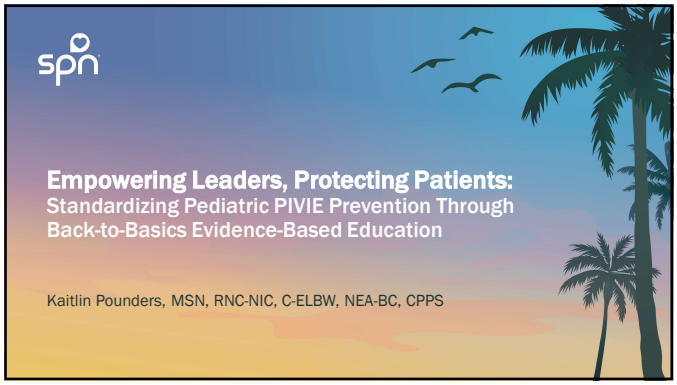
1



2

Disclosures

No relevant disclosures.

3

Learning Objectives

- Describe evidence-based pediatric PIV care and PIVIE prevention strategies.
- Identify gaps between perceived and actual PIV knowledge.
- Apply leader-driven education models to standardize care.
- Evaluate the impact of education on patient safety outcomes.

4

C.S. MOTT CHILDREN'S HOSPITAL
UNIVERSITY OF MICHIGAN HEALTH

University of Michigan Affiliations
Medical School
School of Nursing

1,500 Registered Nurses
Magnet Designation since 2017
High Reliability Organization

5

PIVIE Impact on Patient Safety

Vulnerability of Pediatric Patients	• Fragile vasculature • Limited communication abilities • Complicated early injury detection
Consequences of PIVIEs	• Physical harm • Emotional harm
Organizational Impact	• Regulatory and liability risk • Reputational harm • Resource allocation
Need for Systemic Solutions	• Consistent application of knowledge • Leadership-driven interventions beyond policy existence

6

Identification of Trends and Practice Gaps

Rising PIV Complications	Practice Variation Identified	Nursing Team Knowledge Gaps	Leadership-Driven Intervention
• Pediatric leaders noticed an increase in serious harm from the use of PIVs despite existing prevention efforts	• Local practice reviews showed inconsistent site assessments, securement techniques, and escalation protocols.	• Assumed foundational PIV care and maintenance knowledge • Limited unit-level coaching and oversight	• Educational program to standardize practices and reinforce accountability

7

Intervention Purpose

- Reduce Pediatric Peripheral IV Harm
  - Focus on reducing serious harm by enhancing nursing leadership knowledge
- Standardize Nursing Practice
  - Standardize core principles
  - Reduce practice variation
- Leadership Accountability
  - Empower leaders to identify, coach, and correct unsafe practices
  - Culture of accountability for patient safety
- Evaluate Knowledge Gaps
  - Discrepancies between nursing leaders perceived and actual PIV knowledge

8

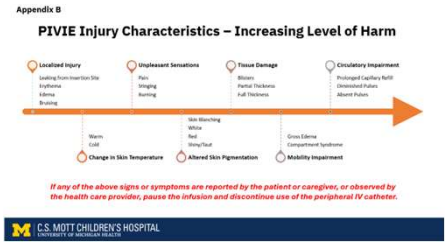
Intervention Design

- Foundational Training
  - Mandatory 2-hour “back-to-basics” session to reinforce foundational peripheral IV care and maintenance principles
- Normalization of Knowledge Gaps
  - Framed session as a refresher to reduce stigma and encourage open learning
- Balancing Theory and Practice
  - Didactic content with practice scenarios to enhance application
- Leadership Role in Safety Culture
  - Empowerment to recognize patient harm, intervene effectively, and set similar clear expectations for teams

9

Session Content

- Pediatric PIV fundamentals
- Risk factors for infiltrations and extravasations
- Evidence-based prevention strategies
- Early recognition and assessment of injury
- Harm mitigation and escalation protocols



10

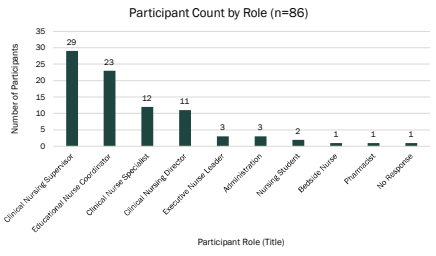
Intervention Strategy

- Dissemination Through Nursing Leaders
  - Leaders deliver standardized content to frontline staff
  - Leverage authority and communication channels
- Leader Accountability and Coaching
  - Leaders observe, coach, and reinforce behaviors to ensure practice alignment and sustainability of practice changes
- Embedding Education in Workflow
  - Education is integrated into unit workflows promoting local ownership, adaptability, and consistent messaging
- Sustainability of Intervention
  - Elevating PIV safety as an ongoing leadership responsibility supports long-term sustainment beyond initial training

11

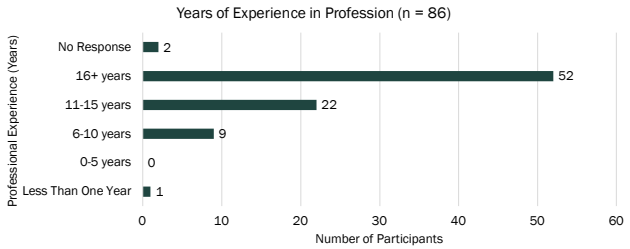
Participant Characteristics: Role

- Scope: All pediatric care areas who place or provide care to peripheral IVs
- Reinforces standardized care practices across all care settings, not isolated by specific unit
- Shared responsibility for pediatric peripheral IV safety



12

Participant Characteristics: Professional Experience



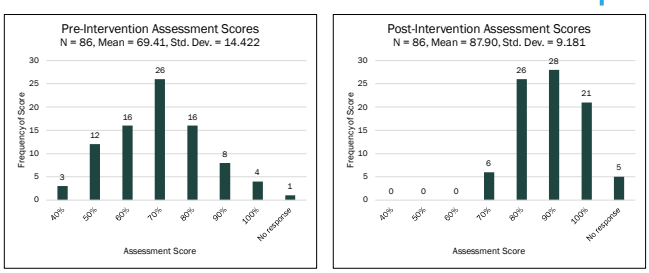
13

Intervention Assessment

- Standardized Knowledge Testing
  - Participants completed pre- and post-tests measuring core PIV care, maintenance, and injury prevention practices
- Self-Assessment of Knowledge
  - Leaders completed a self assessment of their perceived PIV knowledge to compare confidence to actual competence
- Statistical Evaluation
  - Analysis of educational score changes and identification of significant difference reflecting intervention impact

14

Assessment Results



15

Assessment Results: Discussion

- Leader Knowledge Assessment Results
  - Post-test scores showed a significant increase in pediatric nursing leaders' PIV knowledge, indicating effective education ($p = <0.001$)
- Reduced Score Variability
  - A lower post-intervention standard deviation indicates more consistent knowledge levels among participants
- Impact on Leadership Effectiveness
  - Improved leader knowledge supports better unit level coaching, surveillance, and accountability

16

Clinical Outcome Tracking

- Events Over Time
  - Clinical outcomes monitored by comparing serious harm events pre/post intervention periods
- Focus on Significant Outcomes
  - Monitoring PIVIEs with serious harm ensured focus on clinically important outcomes aligned with safety goals
- Early Trend Identification
  - Data trends provide insights into effectives of leadership education on reducing patient harm

17

Perceived vs. Actual Knowledge

- Leader Self-Perception
  - Nursing leaders reported strong confidence in their PIV care, maintenance, and injury prevention knowledge
- Objective Assessment
  - Pre-intervention testing identified statistically significant gaps between perceived and actual knowledge
  - Discrepancy between self-reported confidence and measured knowledge was significant ($p = 0.004$)
- Key Learning
  - Self-assessment alone is unreliable
  - Objective measurement is essential to identify true learning needs and reduce practice variation

18

Intervention Outcomes Discussion

- Significant Harm Reduction
  - PIVIEs with serious harm events dropped from eight pre-intervention to one post-intervention, suggesting meaningful improvement
- Impact on Leadership education
  - Leadership education is associated with improved patient safety and reduced serious harm events
- Evidence-Based Accountability
  - Findings highlight the role of evidence-based knowledge and accountability in enhancing clinical outcomes

19

Lessons Learned

- Knowledge Gaps in Leadership
  - Experienced leaders are at risk for foundational knowledge gaps affecting nursing practice consistency and patient safety
- Standardized Evidence-Based Education
  - Implementation standardize education on evidence-based fundamentals rapidly improves knowledge and practice alignment.
- Engaging Leaders and Educators
  - Involving leaders as both learners and educators fosters accountability and sustains safe clinical practices
- Back-to-Basics Approach
  - Reinforcing core principles through mandatory education improves knowledge and patient safety outcomes

20

Replication Steps

- Data driven approach
- Early nursing leadership engagement and buy-in
- Anchor content within a “back-to-basics” philosophy
- Pair knowledge and outcomes measurements
- Reinforce accountability and sustainment through nurse leaders

21

Final Conclusions

Leadership as a lever for harm reduction

- Returning to evidence-based fundamentals reduced practice variation and improved patient safety outcomes
- Leadership-driven education accelerates meaningful clinical practice change
- Objective measurement strengthens accountability and reveals true learning needs
- A “back-to-basics” model is scalable across any metric or quality indicator requiring improvement

22

Questions?

Kaitlin Pounders, MSN, RNC-NIC, C-ELBW, NEA-BC, CPPS
Clinical Nursing Supervisor
Brandon Neonatal Intensive Care Unit
kkumm@med.umich.edu

23

References

Baird, J., Lindstadt, K., & Uddin, C. W. (2022). A call to action: Establishing an evidence base for pediatric extravasation injury management. *Journal of Hospital Medicine, 17*, 1033-1034. https://doi.org/ 10.1002/jhm.12965.

Children’s Hospitals’ Solutions for Patient Safety (SPS). (2022). Operational definition measurement: Peripheral intravenous infiltration and extravasations (PIVIEs). https://portal.solutionsforpatientsafety.org/HAC/pivie/Document%20Library1/PIVIE_Op_Def_SPS.pdf.

Children’s Hospitals’ Solutions for Patient Safety (SPS). (2023). Peripheral IV infiltrations and extravasations (PIVIE) prevention bundle 1.0. https://portal.solutionsforpatientsafety.org/HAC/pivie/Document%20Library1/PIVIE_Bundle_SPS.pdf.

Clark, E., Giambra, B. K., Hingl, J., Doellman, D., Tofani, B. & Johnson, N. (2013). Reducing risk of harm from extravasation. *Journal of Infusion Nursing, 36* (1), 37-45. https://doi.org/10.1097/NAN.0b013e3182798844.

David, V., Christou N., Etienne, P., Almeida, M., Roux, A., Taibi, A., & Mathonnet, M. (2020). Extravasation of noncytotoxic drugs. *Annals of Pharmacotherapy, 54*(8), 804-814. https://doi.org/10.1177/1060028020903406.

Dufficy, M., Takashima, M., Cunninghame, J., Griffin, B. R., McBride, C. A., August, D., & Ullman, A. J. (2022). Extravasation injury management for neonates and children: A systematic review and aggregated case series. *J Hosp Med*. 17, 832-842. https://doi.org/10.1002/jhm.12951.

Indarwati, R., Munday, J., & Keogh, S. (2022). Nurse knowledge and confidence on peripheral intravenous catheter insertion and maintenance in pediatric patients: A multicentre cross-sectional study. *Journal of Pediatric Nursing, 62*, 10-16. https://doi.org/10.1016/j.pedn.2021.11.007

Nickel, B., Gorski, L., Kleidon, T., Kyes, A., DeVries, M., Keogh, S., Meyer, B., Sarver, M., Crickman, R., Ong, J., Clare, S., & Hagle, M. (2024). Infusion therapy standards of practice, 9th Edition. *Journal of Infusion Nursing, 47* (1S), S1-S285. https://doi.org/10.1097/NAN.0000000000000532.

Ong, J. & Van Gerpen, R. (2020). Recommendations for management of noncytotoxic vesicant extravasations. *Journal of Infusion Nursing, 43* (6), 319-343. doi: 10.1097/NAN.0000000000000392.

Stefanos, S.S., Kiser, T.H., MacLaren, R., Mueller, S.W., & Reynolds, P.M. (2023). Management of noncytotoxic extravasation injuries: A focused update on medications, treatment strategies, and peripheral administration of vasopressors and hypertonic saline. *Pharmacotherapy*. 43, 321-337. https://doi.org/10.1002/phar.2794.

24