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Advocate Children's Hospital  
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## Oh Sugar, We are Going Down

A CNS led implementation of an evidence-based clinical pathway to standardize treatment of pediatric hypoglycemia

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## Background

In January 2023, there were a series of patient safety events involving improper identification and treatment of pediatric hypoglycemia.

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## Hypoglycemia??

Upon investigation, there was an opportunity to standardize:

- Definition
- Treatment
- Monitoring

The aim of the initiative was to create a pediatric hypoglycemia evidence-based clinical pathway to standardize care and decrease patient safety events.

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## What is a CNS?

"Clinical nurse specialists are advanced practice registered nurses who have graduate preparation (Master's or Doctorate) in nursing. Clinical nurse specialists provide diagnosis, treatment, and ongoing management of patients. They also provide expertise and support to nurses caring for patients at the bedside, help drive practice changes throughout the organization and ensure the use of best practices and evidence-based care to achieve the best possible patient outcomes."

—National Association of Clinical Nurse Specialists (NACNS)

**CNS CORE COMPETENCIES**

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## Evidence-Based Practice

### THE FRAMEWORK FOR ANSWERING CLINICAL QUESTIONS!

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## Melnik and Fineout-Overholt's: Seven Steps of Evidence-Based Practice

- Step 0 • Cultivate a Spirit of Inquiry
- Step 1 • Ask a Burning Clinical Question in PICOT Format
- Step 2 • Search for and Collect the Most Relevant Best Evidence
- Step 3 • Critically Appraise the Evidence
- Step 4 • Integrate Best Evidence with Expertise, Preferences, Values to Make Implementation Plan
- Step 5 • Evaluate Outcomes of the Evidence-Based Practice Change
- Step 6 • Disseminate the Outcomes of the Evidence-Based Practice Change

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**Step #0: Cultivate a Spirit of Inquiry**



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**Step #1: Ask Clinical Question in PICO Format**

1. In hospitalized pediatric patients, what is the threshold or definition of hypoglycemia?
2. In hospitalized pediatric patients, what is the best treatment for hypoglycemia?

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**Step #2: Search for and Collect the Most Relevant Best Evidence**

- Advocate Health –Midwest Library
  - Databases: CINAHL, Medline Ovid, and PubMed
  - Keywords: pediatric, hypoglycemia definition/threshold, hypoglycemia treatment
- Two clinical pathways from other children's hospitals

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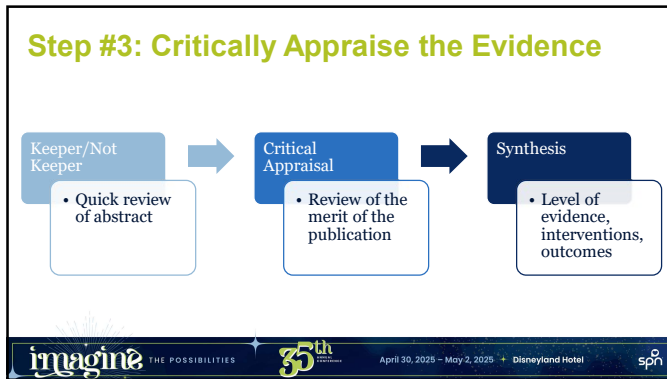
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### Literature Review

- The search yielded 78 articles, 15 were reviewed, and 7 articles were critically appraised and synthesized.
- One level 4, two level 5, and six level 6 articles were synthesized to determine the definition of hypoglycemia, when and what critical labs to obtain, when to obtain intravenous (IV) access, oral (PO) compared to IV treatment, and monitoring parameters.

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### Critical Appraisal & Synthesis

- Variety of critical appraisal tools
- One level 4 (case-control), two level 5 (case reports), and six level 6 articles (expert opinions) were synthesized
- Focus Areas:
  - Definition of hypoglycemia
  - When and what critical labs to obtain
  - Oral (PO) compared to IV treatment
  - When to obtain intravenous (IV) access
  - Monitoring parameters

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	UCSF Benioff Children's Pathway Level 6	Seattle Children's Pathway Level 6	An Overview of Hypoglycemia in Children including a Comprehensive Practical Diagnostic Flowchart for Clinical Use (Gawronski et al., 2021) Level 6	Up to Date Level 6	SPAD Clinical Practice Committee Guidelines 2022 Level 6	Recommendations from the Pediatric Endo Society (Thurston et al., 2021) - see table on right from article Level 6	Incidence and Etiology of Undiagnosed Hypoglycemic Disorders in the Emergency Department: Cook's Children (Whittle, K., et al., 2020) Level 6	Approach for hypoglycemia in infants and children (National Diabetes Children's (NDC) Hospital) (Garcia, 2017) Level 5	Recognition, assessment, and management of hypoglycemia in children (not hospital) (Shuch, A., et al., 2015) Level 5	Endocrine and metabolic emergencies in children: hypoglycemia, hyperglycemia, adrenal insufficiency, and metabolic acidosis including diabetic ketoacidosis (Wong S.C., 2015) Level 6
Treatment - When?	Altered mental status, unable to take PO									
	Episodes of severe, symptomatic hypoglycemia only able to take <75% of recommended 15 g carbs OR not responsive to PO within 15 min									
	Blood glucose <50									
		n = everyone gets better, than 10/11 able to tolerate								

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### Step #4: Integrate the Best Evidence with Expertise, Preferences, Values to Make Implementation Plan



**Not Evidence-ONLY Practice!**

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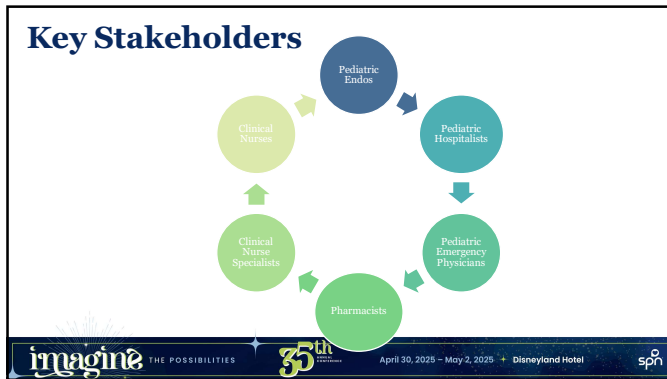
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### Clinical Pathway Development

- Hypoglycemia thresholds were established as <80 mg/dL in diabetic patients and <60 mg/dL in non-diabetic patients.
- Critical labs were agreed upon and to be drawn for non-diabetic patients, prior to treatment.
- PO treatment was established as the preferred route for patients that are conscious and able to tolerate PO safely.

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### Clinical Pathway Development

- IV access would be considered if patient's glucose was <50 mg/dL.
- IV treatment was reserved for patients with altered mental status and those unable to take PO.
- Parameters were established for glucose reassessment, as well as escalation to IV dextrose treatment.

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# Pediatric Hypoglycemia Clinical Pathway

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# Implementation Plan

- Creation of clinical pathway
- Development of pediatric hypoglycemia order set
- Updated dextrose containing items stocked in the Pyxis to align with the pathway

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# Communicating the Change

## ACH Pediatric Hypoglycemia Pathway SBAR

**Situation:** NEW ACH Pediatric Hypoglycemia Pathway available on the Pediatric Clinical Pathways internet site.

**Background:** Opportunity to standardize hypoglycemia management in our pediatric inpatient and emergency departments.

**Assessment:** Key decision points in the creation of the hypoglycemia pathway included hypoglycemia thresholds, critical labs (glucose), PO vs. IV treatment (dextrose), monitoring, admission/discharge criteria.

**Recommendation:** The ACH Pediatric Hypoglycemia Clinical Pathway was developed by a multidisciplinary team of nursing, physicians, and pharmacy leaders from ACH inpatient and emergency departments.

**Implementation:**

- Pediatric patients < 18 years old
- Non-diabetic patients < 18 years old presenting with hypoglycemia
- Critical lab should be drawn a minimum 30 minutes prior to treatment
- Data tracked in the pediatric unit of treatment for patients that are assessed and able to tolerate safety
- Re-check glucose 15 minutes post treatment

Pathway will go live November 2023. [Link to Pathway](#)

## ACH Pediatric Hypoglycemia Clinical Pathway

Nursing Education  
October 2023

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### Step #5: Evaluate outcomes of the change based on evidence

- In the 9 months post go-live, there have been:
  - Zero hypoglycemia related patient safety events
  - 105 pediatric patients that have had the hypoglycemia order set utilized to guide their care.
- One limitation was the ability to capture time related data on achieving normoglycemia in pediatric patients presenting with hypoglycemia.



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### Implications for Practice

Utilizing evidence-based methodology to answer the clinical questions surrounding hypoglycemia has resulted in improvements in patient safety and demonstrated sustained standardization in best practices.



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### Thank you!

Dr. Seetal Mishra, Dr. Svetlana Kravchenko, Dr. Kanika Ghai, Liz Simmons, Kelly Perez, Ivelisse Sanchez, Dr. Jen McCarthy, Amanda Bryant, Jessica Dukats, Danielle Vella, Reem Hassan, Kara Fifer, Dr. Emily Dawson, Kathy Kocovsky



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# Questions?

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