

Insulin Pump Uptake and Outcomes in Very Young Children with Type 1 Diabetes

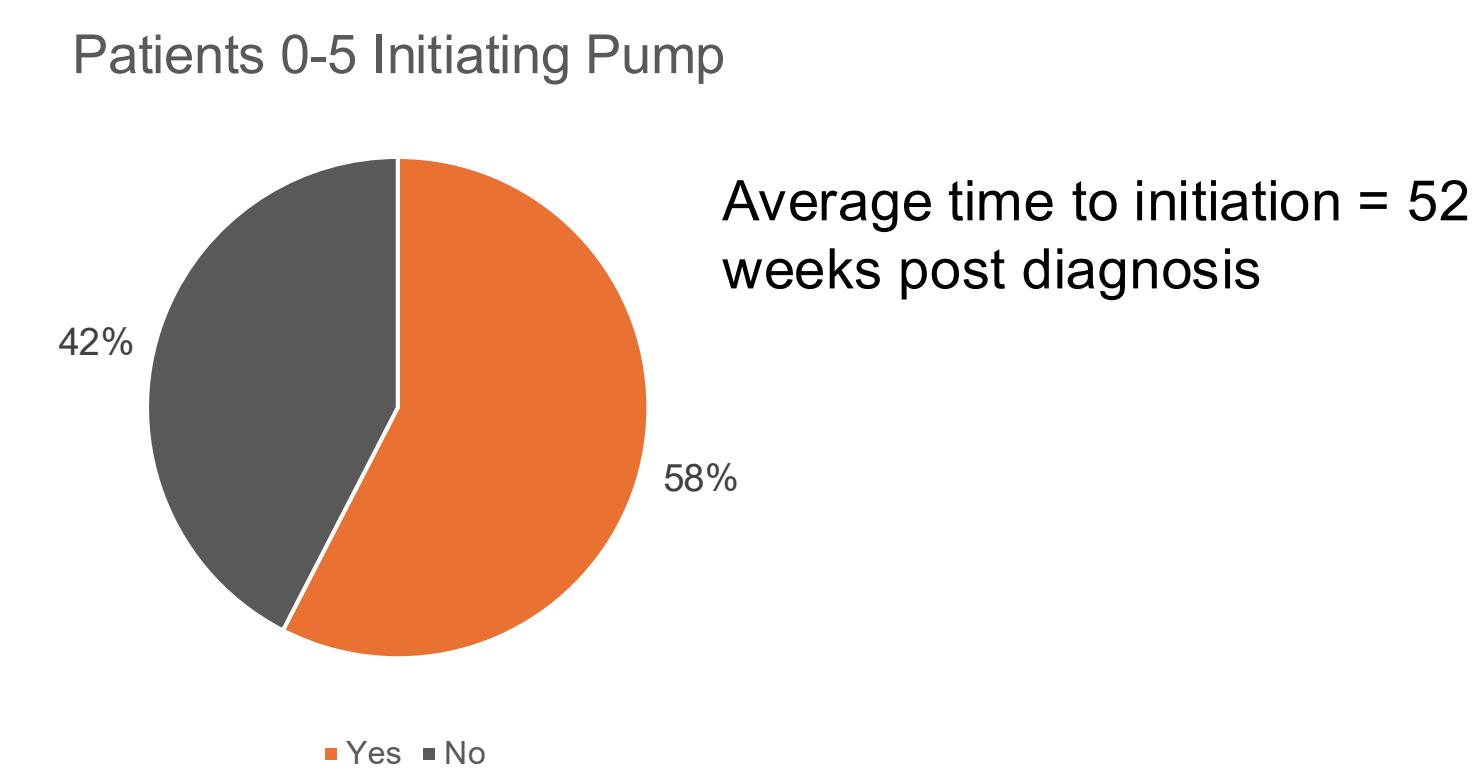
Matthew Canonic, BS; Alyssa Dye, MD; Blake Adams, RN; Grace Nelson, MD
Department of Pediatrics, College of Medicine, The University of Tennessee Health Science Center

Background/Objective

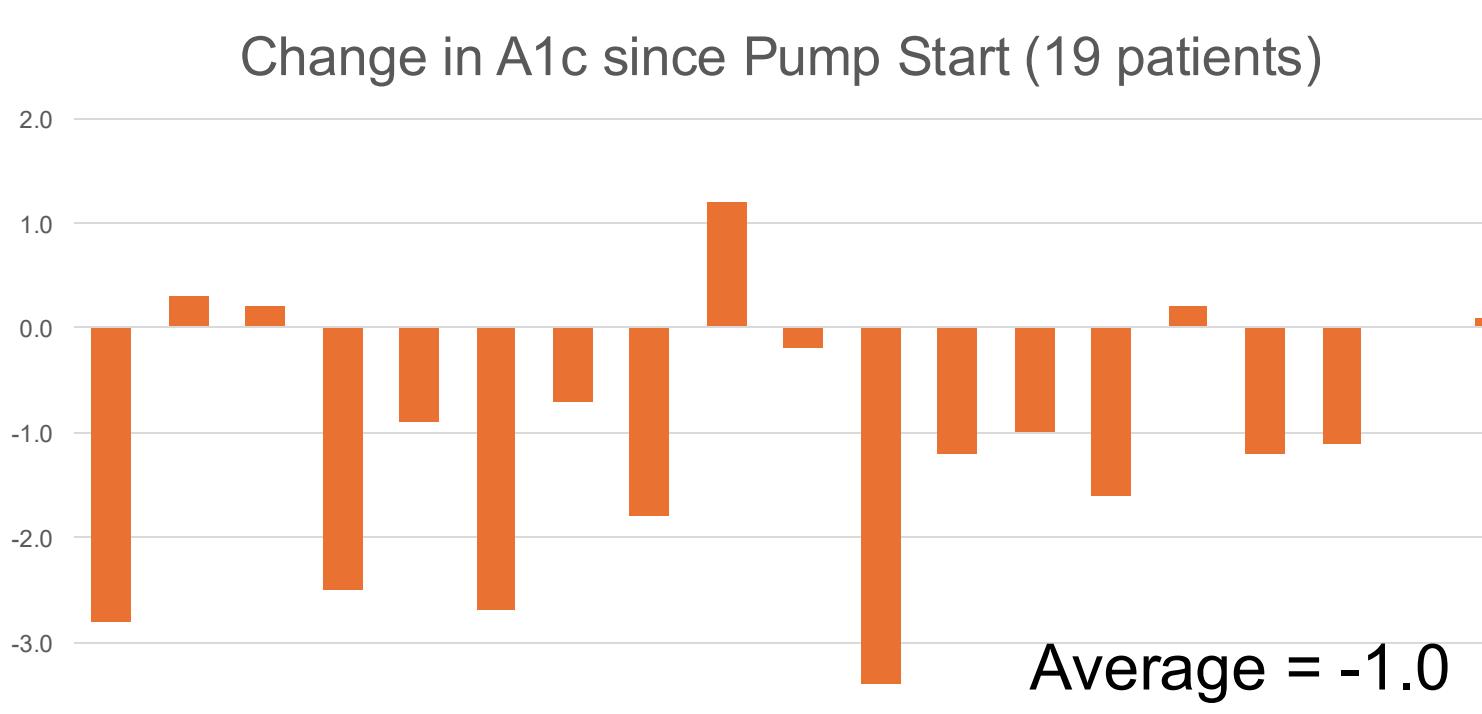
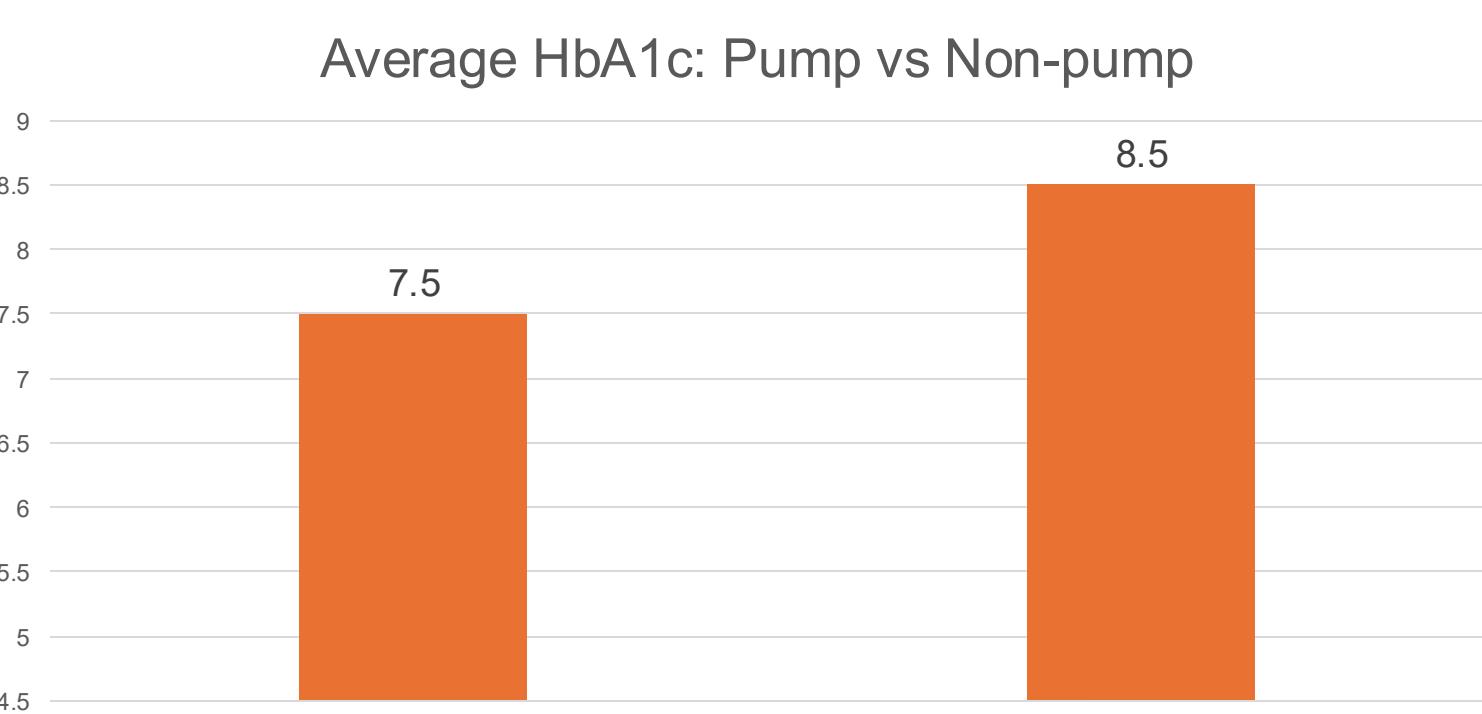
- Insulin pumps have transformed type 1 diabetes (T1D) management, yet their use in **very young children (0-5 years)** remains variable.
- Early pump initiation may improve glycemic control and reduce acute care utilization, but real-world uptake and outcomes are not well characterized.
- Objective:** To assess the **rate of insulin pump adoption** and its impact on **glycemic control** and **diabetes-related emergency care** among very young children with T1D followed in our clinic.

Results

- Pump Uptake**
 - Of 33 children ages 0-5 with T1D, **19 (58%)** initiated insulin pump therapy.
 - Mean time to pump initiation: **52 weeks post-diagnosis**.



- Glycemic Control**
 - Mean HbA1c among pump users: **7.5%**, compared with **9.5%** in non-pump peers.
 - Within pump users, HbA1c improved by an average of **-1.0%** from initiation to present.



Methods

- In **October 2023**, **Little's Clinic** was launched within the **Le Bonheur Diabetes and Endocrinology Clinic** to improve care for children **ages 0-5** living with T1D.
- The clinic provided **more frequent visits**, caregiver education, and early discussion of insulin pump therapy when appropriate.
- Design:** Retrospective chart review of all patients aged 0-5 with T1D, through **August 2025**.
- Data collected:**
 - Pump use and timing of initiation
 - Hemoglobin A1c (HbA1c) trends
 - Diabetes-related **emergency department (ED)** visits and **hospitalizations (DKA)**
- Analysis:** Comparison between pump and non-pump users and pre/post comparisons among pump users.

Fishbone Diagram for Little's Clinic

Policies and Procedures:

- Insulin pump starts have not always been initiated consistently for our T1DM patients
- Our 5 and under T1DM patients have not always been seen by one provider to offer continuity of care

Place:

- One dietitian available for diabetes education classes.
- Insulin pump class only available at downtown location with no virtual option.

Product:

- There are multiple insulin pumps on the market today and each one requires specific training and education.
- Each pump offers different benefits and should be considered when determining the best pump for our 5 and under patients
- Difficulty troubleshooting insulin pumps
- There can be difficulty obtaining supplies for diabetes technology

Process:

- Not consistently discussing insulin pumps with all patients
- Insulin pump start requires insulin pump class at our downtown clinic and education from insulin pump company.
- Utilizing educational handouts to assist with troubleshooting
- Two-week post pump start follow up appointments

People:

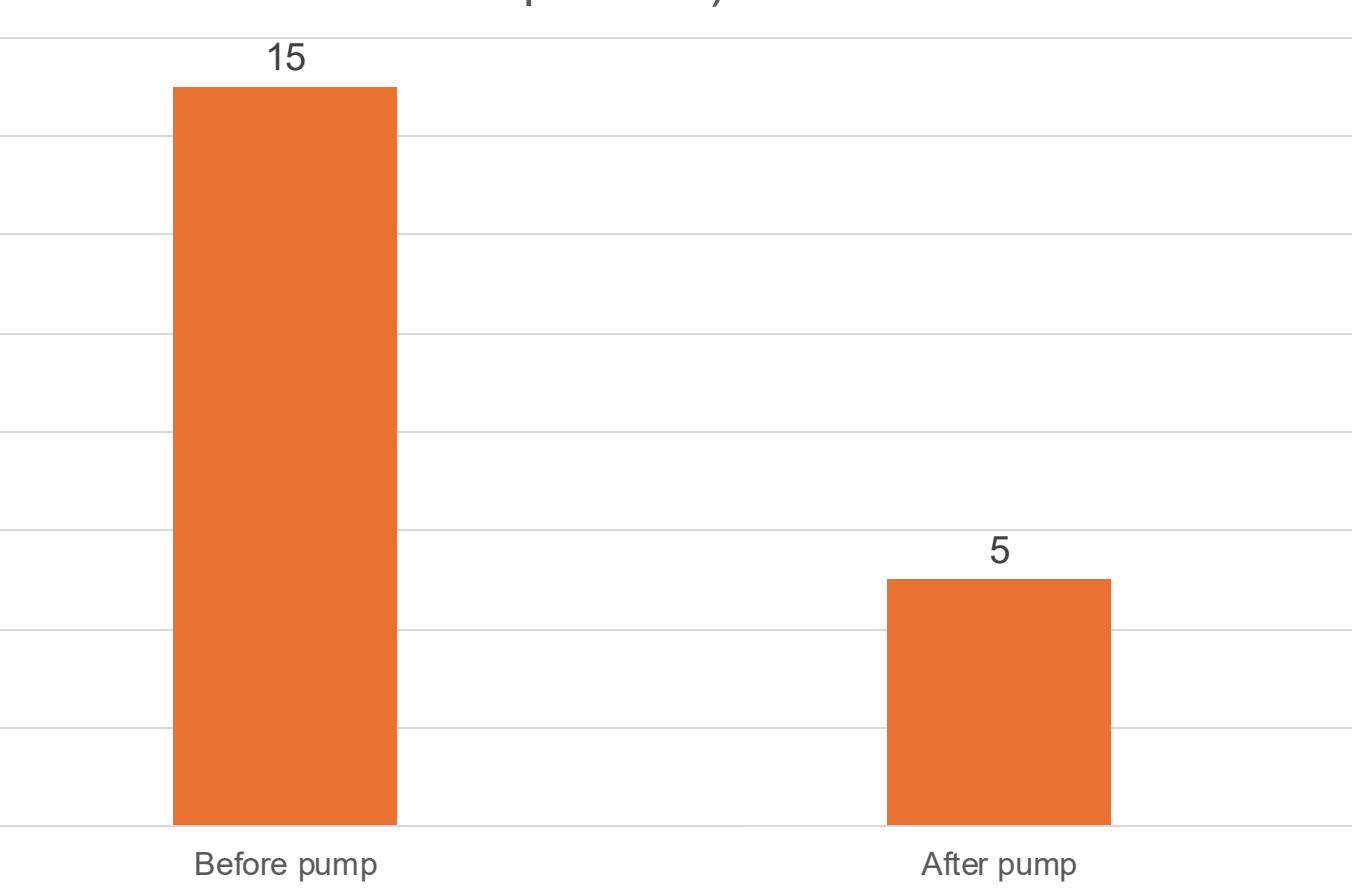
- Provider/staff forgot to offer diabetes technology
- Patients unable to troubleshoot issues with insulin pump
- Patient unable to consistently get supplies
- Patients 5 and under

Smart AIM: To assess the rate of insulin pump adoption and its impact on glycemic control and diabetes-related emergency care among Type 1 Diabetes patient 5 years or younger with a decrease in A1C by 1%.

Results (continued)

- Acute Care Utilization**
 - DKA admissions:** No change in rate before vs after pump initiation.
 - ED visits:**
 - Before pump:** 15 of 19 (79%) had at least one diabetes-related ED visit.
 - After pump:** Only **5 of 19 (26%)** had such visits.

Diabetes-Related ED Visits by Pump Status (19 patients)



Conclusions

- Pump users demonstrated **substantially improved glycemic control** and **fewer diabetes-related ED visits** compared with non-pump peers.
- DKA rates remained stable**, suggesting safety of early pump use.
- These findings support **encouraging pump adoption soon after diagnosis** to improve outcomes in this high-risk population.

Acknowledgments

Special thanks to the Little's Clinic staff, Le Bonheur Diabetes & Endocrinology team, and patient families for their partnership in improving care for our youngest patients with T1D.