

Understanding facilitators and barriers to clinic-wide implementation of a population-based tool to identify patients with type 1 diabetes (T1D) at high risk for suboptimal glycemic outcomes



**RISING TIDE**  
ALLIANCE

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# Disclosure Information

*I have no disclosure or conflicts of interest with the presented material in this presentation*



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**Children's Mercy  
Research Institute**  
KANSAS CITY

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# Where is Children's Mercy Kansas City?



Children's Mercy Research Institute



- 2 hospitals
- 10 clinics

# Division of Pediatric Endocrinology & Diabetes

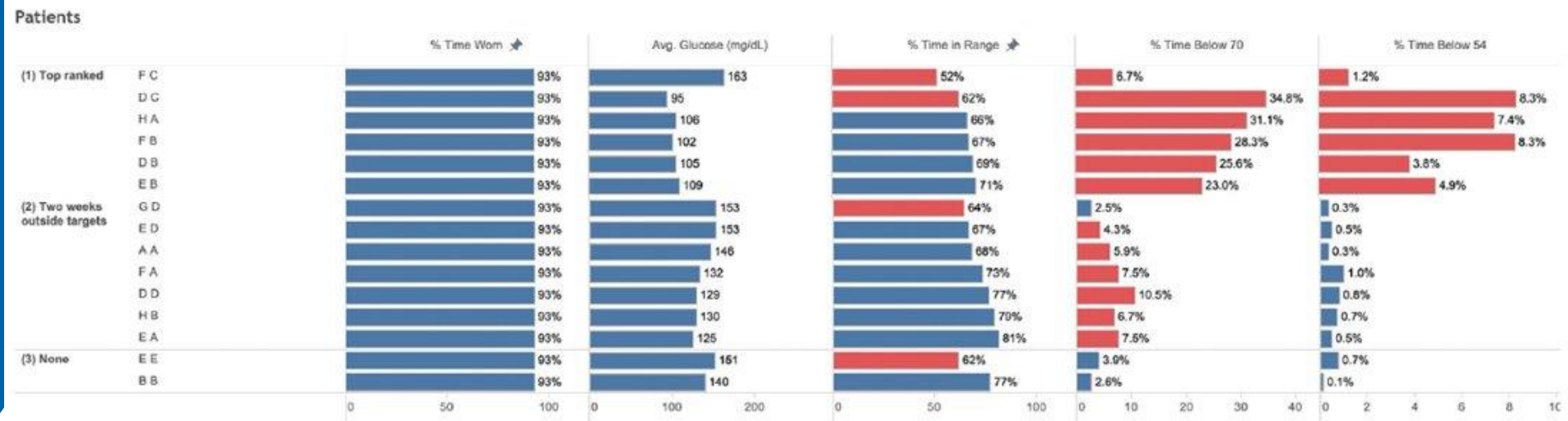


- 29 Pediatric endocrinologists/25.65 FTE
- 5 APRN/4.8 FTE
- 27 Nurses/16 FTE (15 with CDCES certification)
- 5 Dietitians (4 with CDCES certification)
- 5 Social workers
- 2 Psychologists
- 2,700 T1D
- 275 T2D

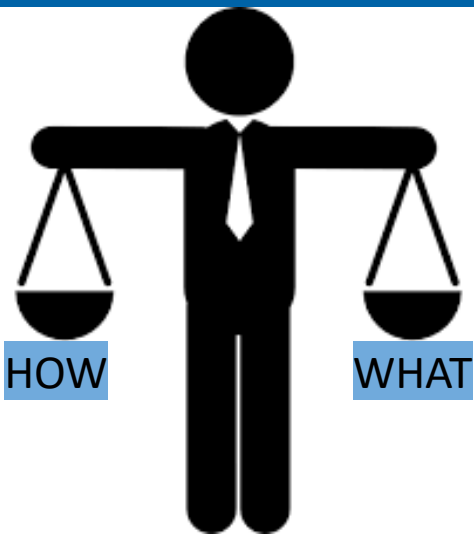


# Background

- *Timely interventions for diabetes excellence (TIDE)* developed by Stanford
- Population-level tool, analyzes CGM data
- Displays summary of patient's data & **identifies** patients with deteriorating glucose control



MRN	Date	CGM Risk Category	CGM Days	Wear %	TIR %	Measure % > 180	Measure % > 250	Measure % < 70	Measure % < 54	TIR Prior Week	Bolus Score	Most Recent Clinic Visit	Age at Visit
	August 6, 2023	(3) >15% Drop in Time	2	56.7	2.8	97.2	72.4	0.0	0.0	20.7		July 18, 2023	18



# SMART AIM

# PRIMARY DRIVERS

# SECONDARY DRIVERS

# INTERVENTION EXAMPLES

Increase the proportion of patients with T1D meeting A1c goal of  $\leq 7\%$  by 10%

- Frequency of clinical care contact
- Engagement in self-care diabetes plan
- Physical activity
- Healthy eating
- Knowledge
- Risk-based management

- Frequent glucose monitoring & data review
- Improve insulin therapy
- Frequent in person, telehealth or remote contacts
- Psychosocial support
- Effective diabetes education
- Population health dashboard for glycemic outcomes & contextual data
- Predicting rise in A1c, DKA admissions

- Use of predictive models to identify patients at risk for near-term rise in A1c, DKA admission
- RPM visits between SOC visits to build problem solving skills relating to nutrition, insulin & glucose management **RPM**
- Teens engage with smart phone app to encourage/prompt/monitor time in range **Happy Bob**
- Depression screening part of SOC visits, referrals for psychosocial support **R2D2**
- Encourage teens needing support to enroll in mentor programs **PEEPS**
- Clinicians monitor CGM data to identify candidates for one RPM encounter **Tide**



# Methods

- Recruited clinicians to participate in

- REDCap® survey

- Video introduction to the tool
    - Anchored staff to CM performance towards T1D Exchange goals (set purpose)
  - COM-B model framed questions
    - Capability
    - Opportunity
    - Motivation

## Organizational Readiness for Implementing Change (ORIC)

	1	2	3	4	5
	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree
1. People who work here feel confident that the organization can get people invested in implementing this change.	1	2	3	4	5
2. People who work here are committed to implementing this change.	1	2	3	4	5
3. People who work here feel confident that they can keep track of progress in implementing this change.	1	2	3	4	5
4. People who work here will do whatever it takes to implement this change.	1	2	3	4	5
5. People who work here feel confident that the organization can support people as they adjust to this change.	1	2	3	4	5
6. People who work here want to implement this change.	1	2	3	4	5
7. People who work here feel confident that they can keep the momentum going in implementing this change.	1	2	3	4	5
8. People who work here feel confident that they can handle the challenges that might arise in implementing this change.	1	2	3	4	5
9. People who work here are determined to implement this change.	1	2	3	4	5
10. People who work here feel confident that they can coordinate tasks so that implementation goes smoothly.	1	2	3	4	5
11. People who work here are motivated to implement this change.	1	2	3	4	5
12. People who work here feel confident that they can manage the politics of implementing this change.	1	2	3	4	5



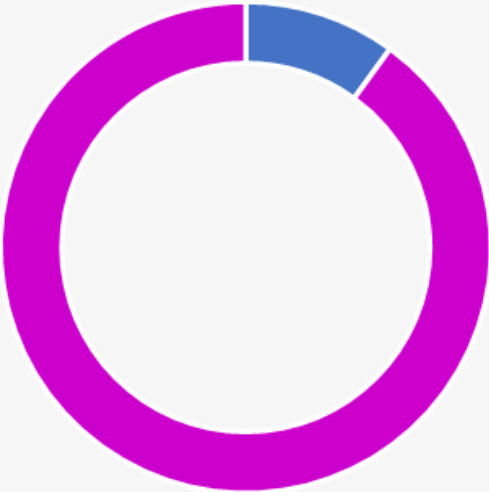
# Results

Role of Respondents



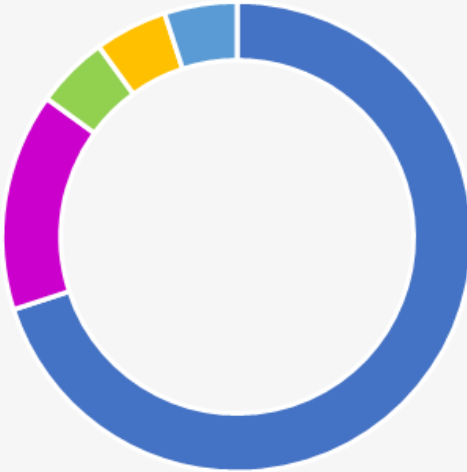
■ Physician ■ Nurse ■ Dietitian ■ Fellow ■ Social Worker

Gender of Respondents



■ Male ■ Female

Tenure of Respondents

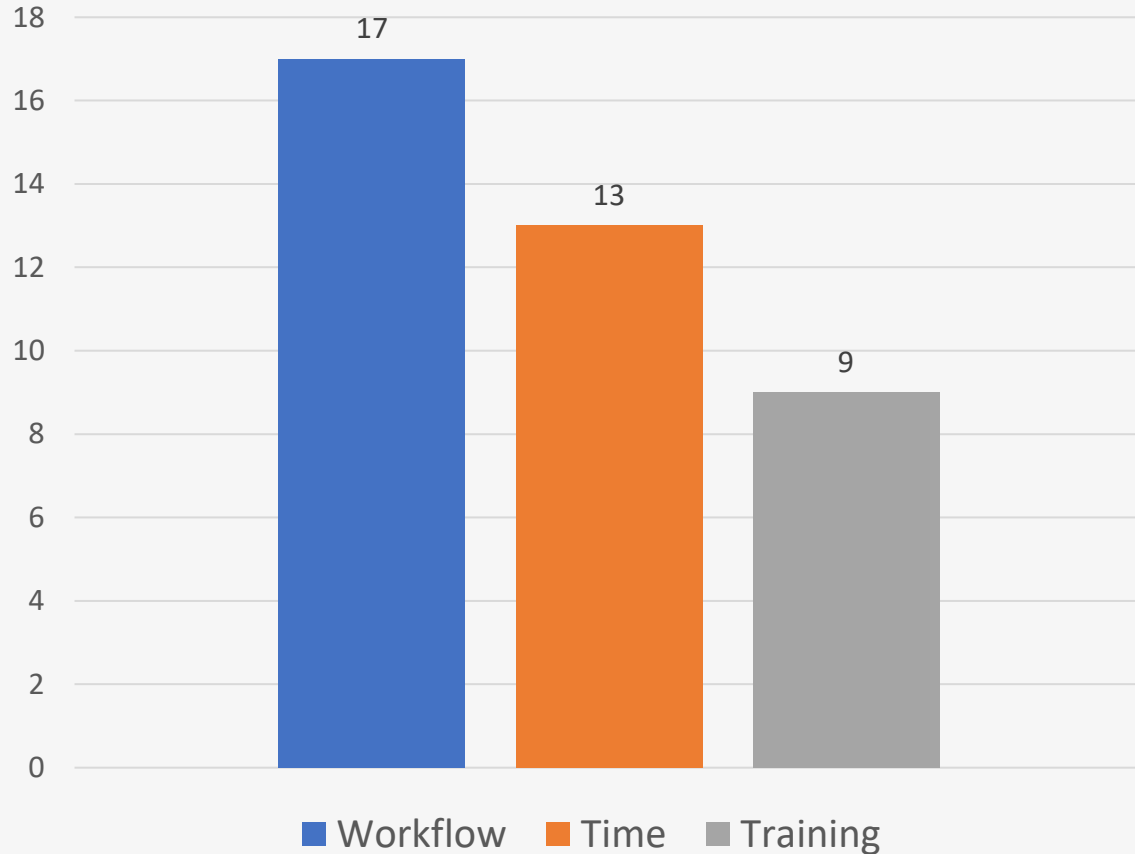


■ 0-5 years ■ 6-10 years ■ 11-15 years ■ 16-20 years ■ 21-25 years



# Results

Perceived **Barriers** to Implementation



## Test Ideas/**Facilitators**





- De-implement ineffective practices
- Build tracking into tool

- Incentives for self-identified champions to start
- Reviewing data during clinic visit (does Tide reduce clinic visit time?)
- Add visual cues to draw attention to risk level

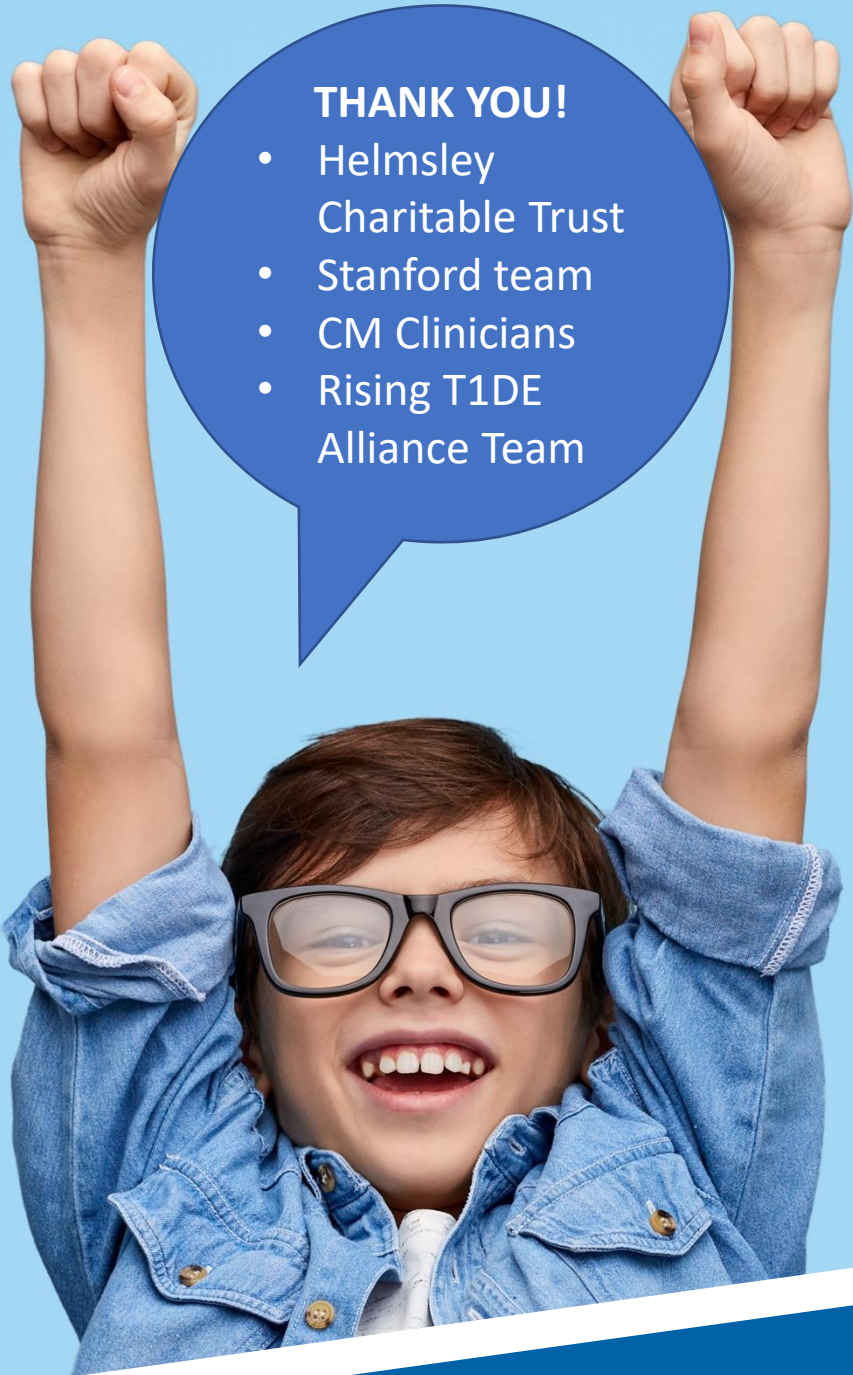
- Recorded, live, and written trainings were developed and implemented
- Shadowing seasoned user

# Conclusion/Lessons Learned

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-  Video introduction and anchoring to existing goals provide clear context for assessing readiness for implementing a new tool/processes
-  Conducting a survey with clinic staff (ORIC and Com-B framed) can identify change ideas to ensure potential barriers are addressed when implementing new tool/processes
-  Acting on feedback from clinic staff gains buy-in
-  Phased implementation beginning with self-identified champions is key for success





## THANK YOU!

- Helmsley Charitable Trust
- Stanford team
- CM Clinicians
- Rising T1DE Alliance Team

## References

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Shea CM, Jacobs SR, Esserman DA, Bruce K, Weiner BJ. Organizational readiness for implementing change: a psychometric assessment of a new measure. *Implement Sci*. 2014 Jan 10;9:7.  
doi: 10.1186/1748-5908-9-7.  
PMID: 24410955; PMCID: PMC3904699.

November 14, 2023

# Improving Glycemic Management in Patients with Type 1 Diabetes through Time in Range Patient Education

*Alexander Waselewski, MD; Ashley Garrity, MPH; Christina Finn, RN; Janet Dominowski, RD, CDCES; Elizabeth S. Sandberg, MD; Inas Thomas, MD; Joyce M. Lee, MD MPH*



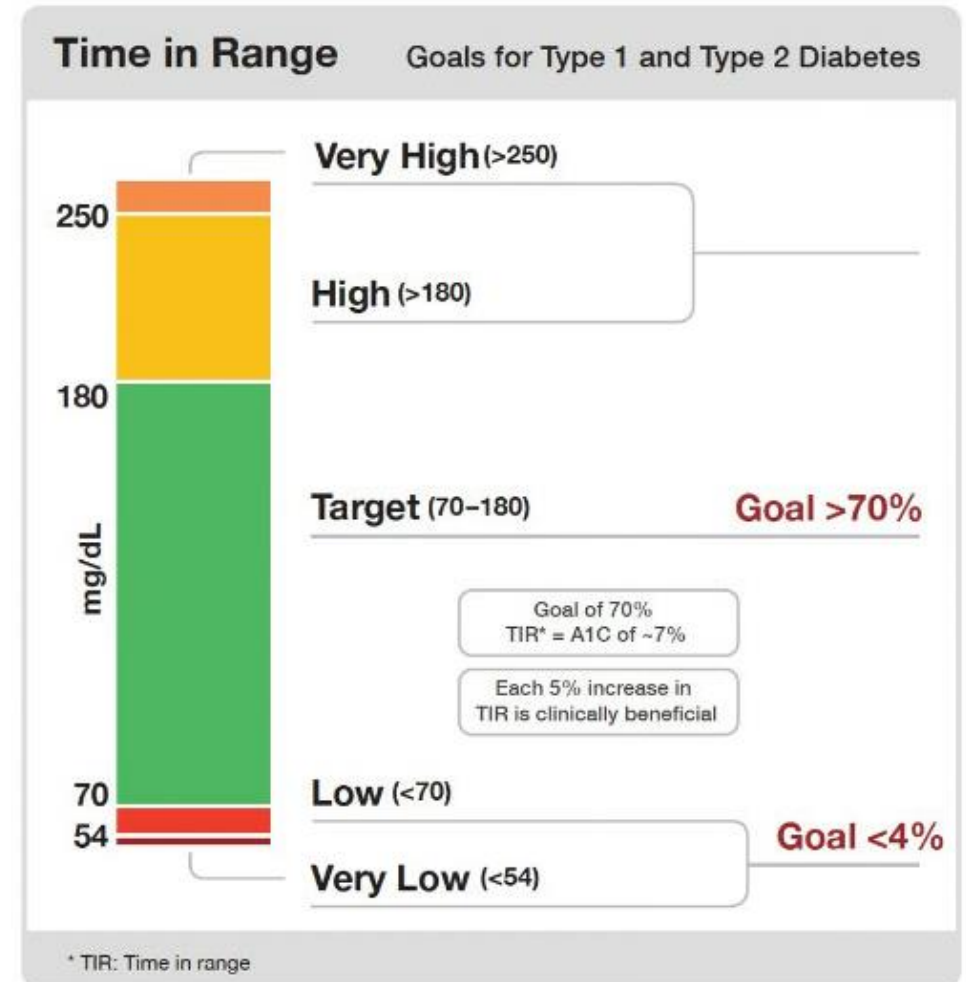
# U-M Pediatric Diabetes

## C.S. Mott Children's Hospital, University of Michigan Health

Multidisciplinary Team (FTEs*)	Patient Volume & Demographics	Contacts
<ul style="list-style-type: none"><li>▪ 3.0 endocrinologists</li><li>▪ 1.5 fellows</li><li>▪ 3.0 dietitians (2.0 w/CDCES)</li><li>▪ 4.8 RNs (2.8 w/CDCES)</li><li>▪ 2.0 social workers</li><li>▪ 1.0 psychologist</li></ul> <p><i>*Devoted to T1D patient care</i></p>	<ul style="list-style-type: none"><li>▪ Main clinic at academic medical center + 1 satellite clinic</li><li>▪ 100-150 new onsets annually</li><li>▪ ~1300 established T1D patients</li><li>▪ 30% publicly insured</li></ul>	<p><b>Site PI</b> Joyce Lee, MD, MPH <a href="mailto:joyclee@med.umich.edu">joyclee@med.umich.edu</a></p> <p><b>Site Coordinator</b> Ashley Garrity, MPH <a href="mailto:ashleyna@med.umich.edu">ashleyna@med.umich.edu</a> <a href="#">u</a></p>

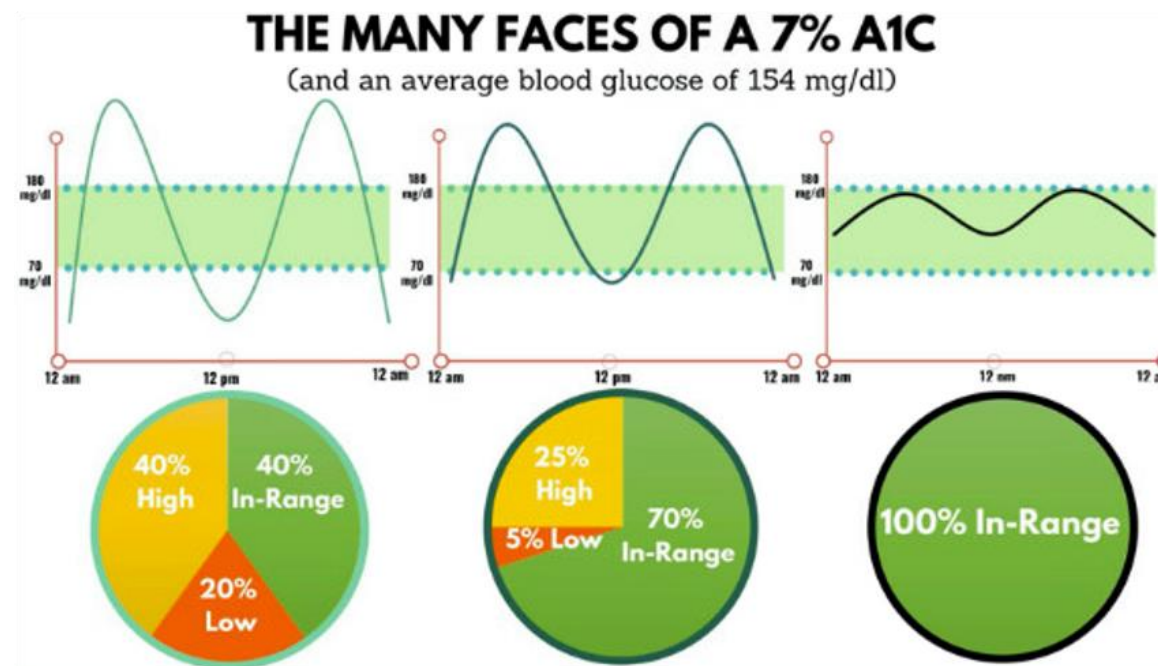
# Background

- American Diabetes Association (ADA) guidelines for type 1 diabetes (T1D) recommend time in range (TIR)  $\geq 70\%$  (blood sugars between 70-180 mg/dL) and less than 4% hypoglycemia (blood sugars  $<70$  mg/dL)
- Optimizing time in range reduces microvascular complications associated with diabetes



# Background

- TIR is an important tool in diabetes self-management as hemoglobin A1c (HbA1c) does not tell the whole story of blood sugar excursions



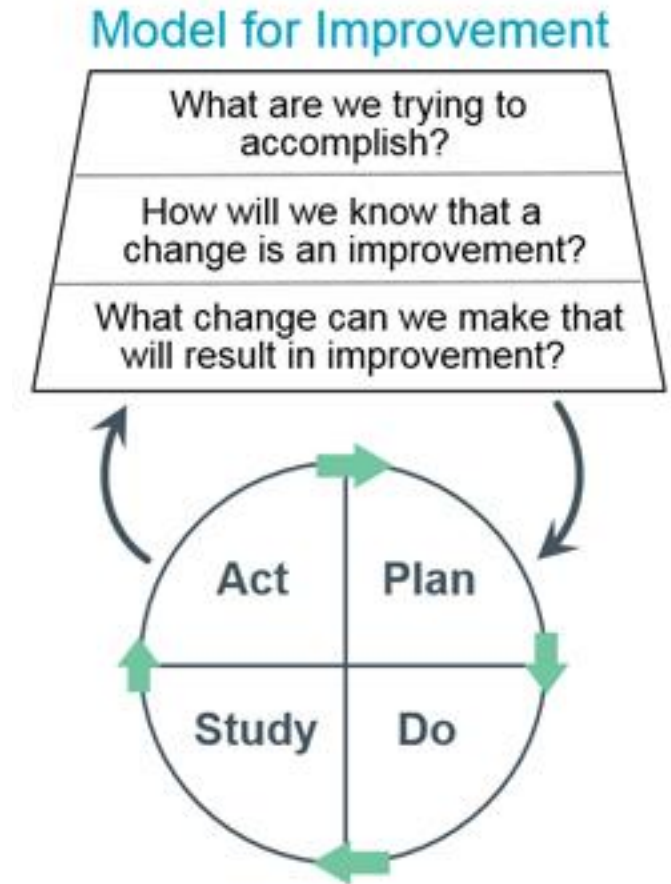
# Aims

- Overall aim to improve TIR among our patients with T1D using a continuous glucose monitor (CGM)
- Short-term aim to increase point-of-care TIR education at quarterly clinic visits from 0% to 95% over 12 months



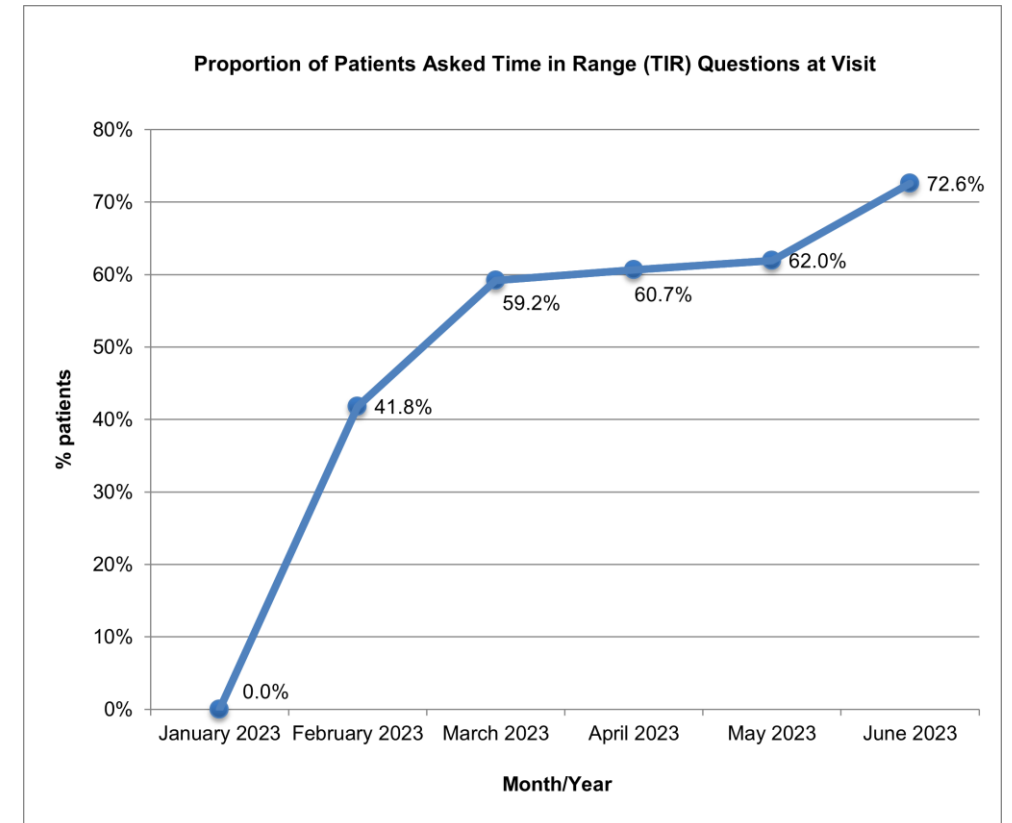
# Methods

- PDSA cycle #1: QI team identified knowledge gap in patient understanding of TIR by asking individual patients and families at clinic visits and recording responses
- PDSA cycle #2: Created an educational handout for patients, electronic health record (EHR) smart phrase about TIR, and added clinic flowsheet questions to standardize TIR education
- Initially tested with QI team, then scaled to entire division
- Measured: 1) providers discussing TIR and 2) patient/family knowledge about TIR and goals at quarterly visits



# Results

- Initial knowledge gap identified January 2023
- Pilot implementation of interventions (EHR flowsheet questions, educational materials) began with two providers in February 2023
- Patients asked 3 questions: definition/target range, goal for in range, and goal for hypoglycemia
- Scaled to full implementation across division in June 2023
- Over six months, the proportion of patients asked about TIR increased from 0% to 72.6%



# Conclusions

- Implementing standardized questions in EHR flowsheet increased number of patients with whom our diabetes team discussed TIR goals during clinic visits
- We have yet to see an effect on the proportion of patients meeting TIR goals, but expect with time this will improve with further education
  - Increased adoption of diabetes technology, particularly automated insulin delivery systems, is also expected to improve the number of patients meeting TIR goals
- Project ongoing to reach remaining patients and assess if TIR goals are being met by patients

For more information, please contact Alexander Waselewski, MD:  
waselewa@med.umich.edu

# CONNECT1D

*Connect1D aims to reinforce connections between patients, the clinic, and community partners to achieve excellent and equitable glycemic and psychosocial outcomes for young people with type 1 diabetes.*

Health Equity Network

T1Dx-QI 11.14.23



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# Parent Perspective



“The clinic visit is a small portion of the care for a child with diabetes. Parents/ caregivers come to the clinic visit to get recharged – to get questions answered – to talk to the people who know how to take care of a child with diabetes.

Between the visits – The parent caregiver is the one providing the care to the child. Many times, It is their sole responsibility.”

Justin Masterson, Parent of child with T1D

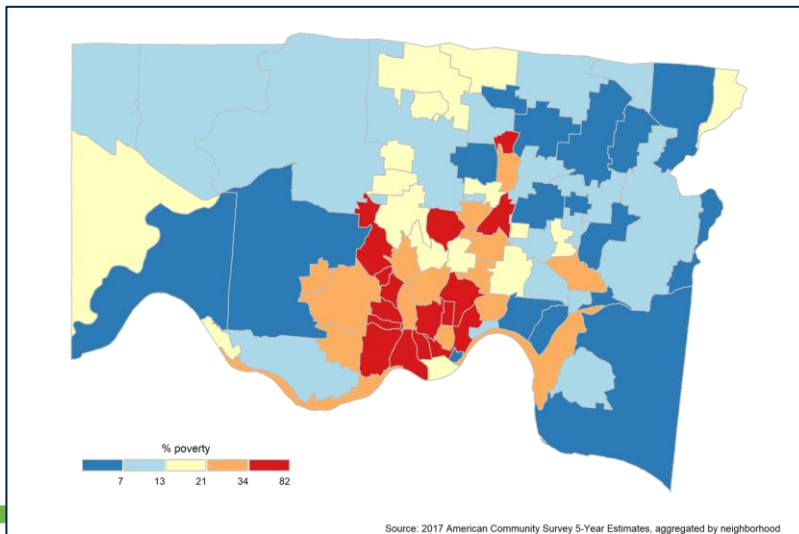
# Type 1 Diabetes Health Equity Program Goals

Through partnerships locally, nationally and internationally, Cincinnati Children's will contribute to achievement of health, longevity and quality of life for all youth and young adults with diabetes.

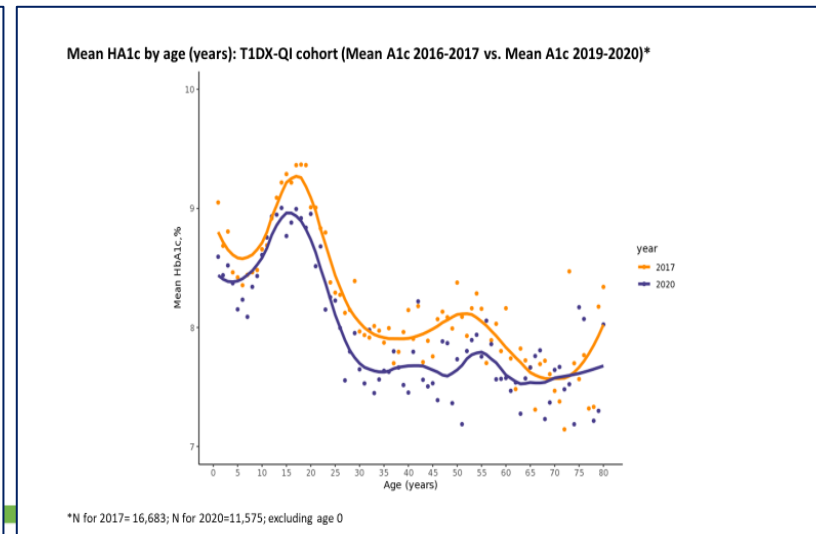
## Health Equity Network



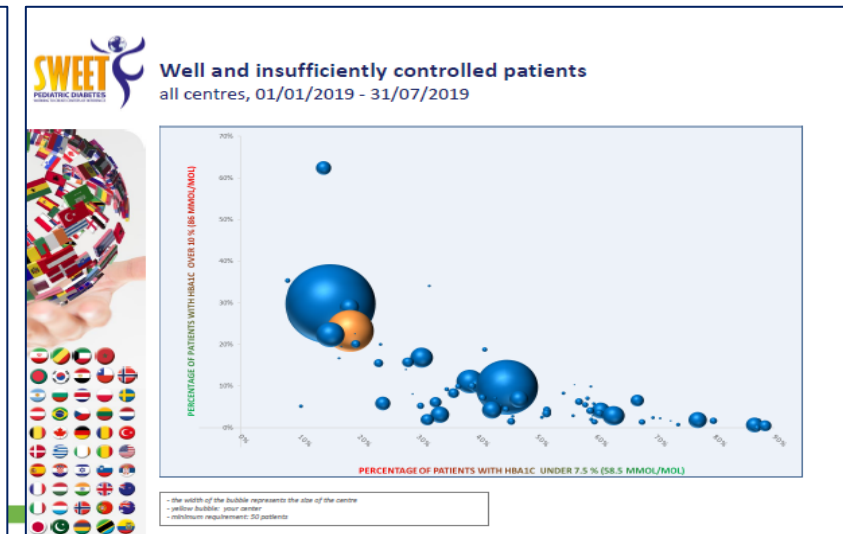
Poverty quintiles in Hamilton County, Ohio



Improvement in HbA1c over time in T1Dx-QI



International SWEET registry benchmarking



# CONNECT1D



*Design and implementation of a more efficient, proactive delivery model for T1D care that supports patients and families through:*

- Equitable access to diabetes technology*
- Strengthening community relationships*
- More frequent communication between visits*
- Integration of diabetes devices into the electronic medical record.*



# Design Day Session: Engaging Patients, Caregivers, & Diabetes Center

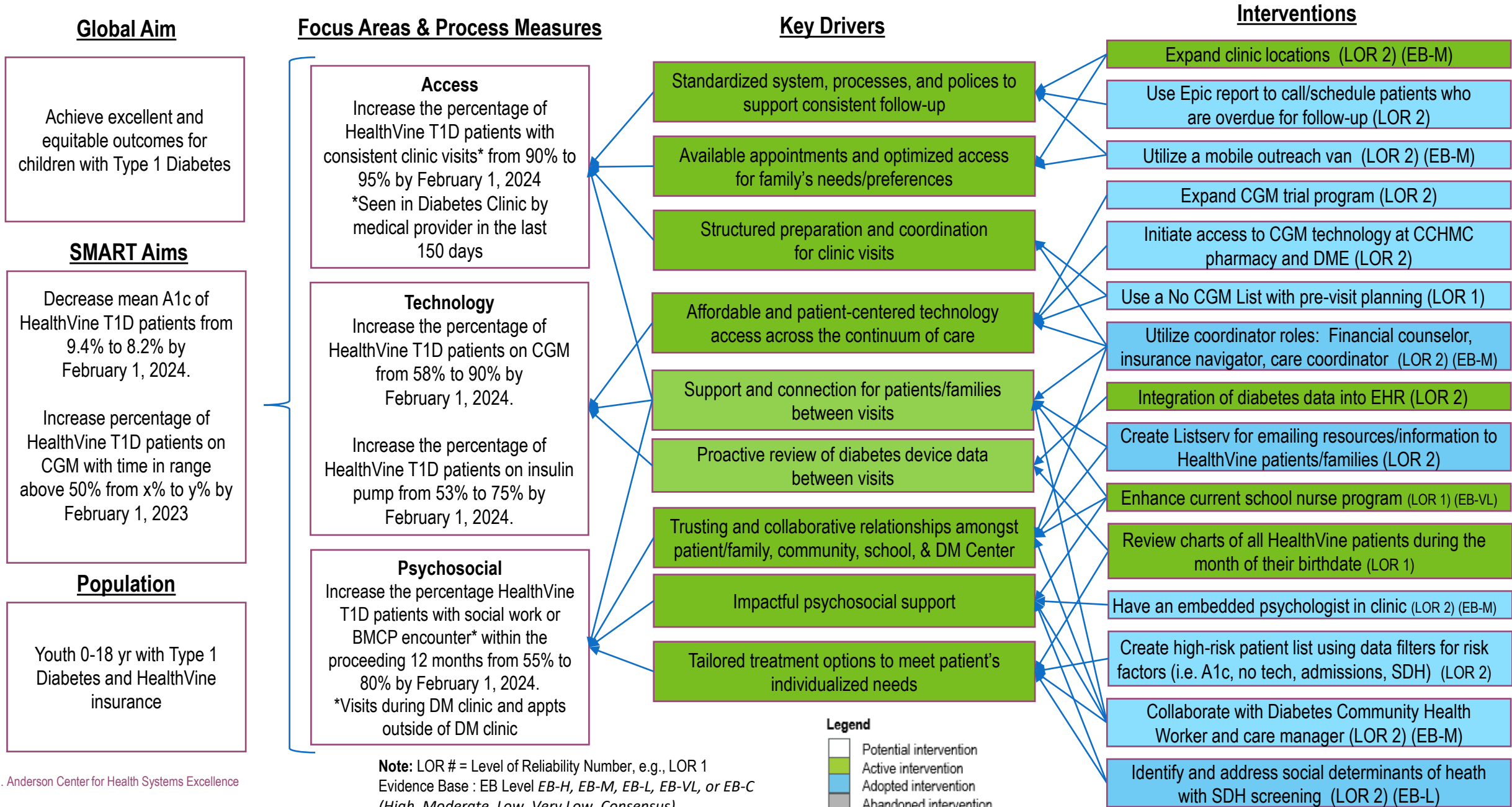




# Connect1D—HCT Key Driver Diagram (KDD)

Project Leader: Sarah Corathers, MD

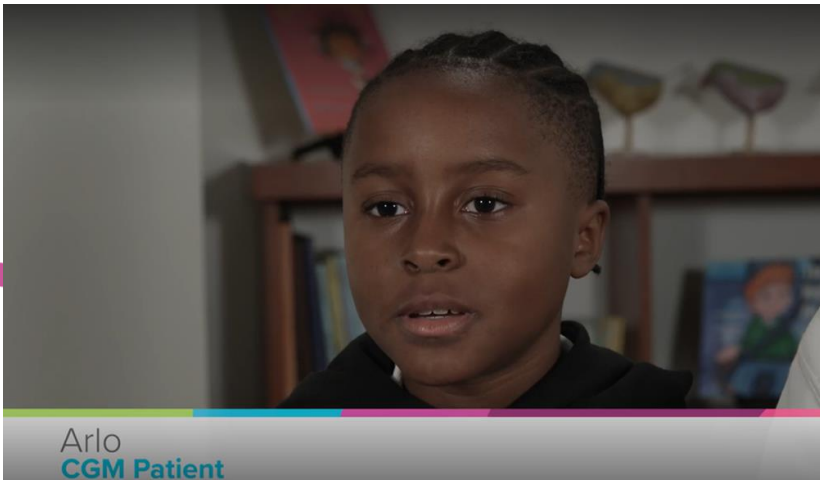
Revision Date: 8/1/2023



# EDICT: Equity in Diabetes Care & Transformation

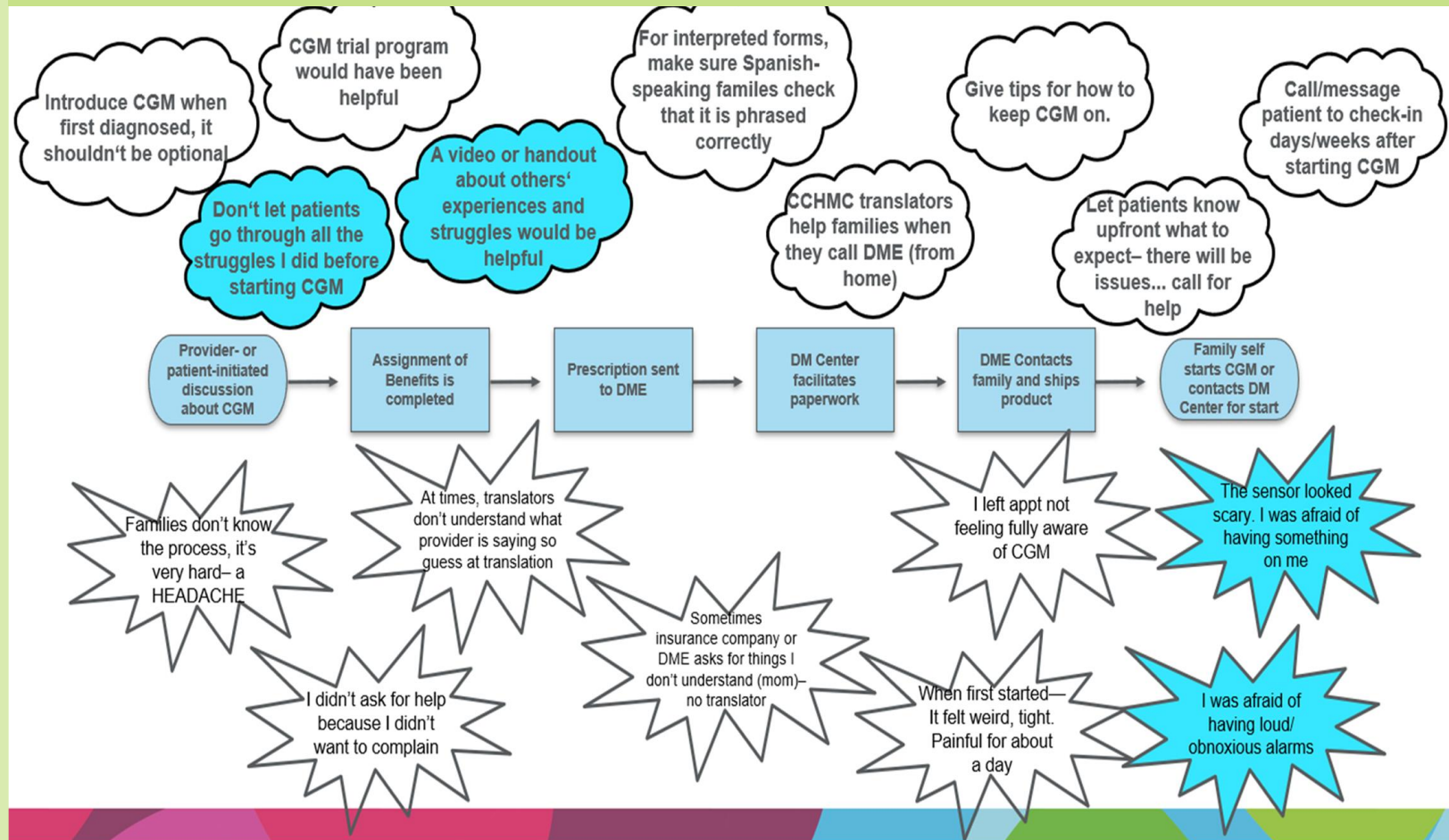


Jasmin  
CGM Patient



Arlo  
CGM Patient

## Voice of the Customer



# Example Interventions/Interventionalists



## Diabetes Community Health Workers

- Enhancing access to care:
- Proactive contact between visits
  - Mobile care unit
  - Embedded psychologist in clinic
  - Consistent clinic visit and pre-visit planning

Diabetes and community expertise:

- Address housing, transportation, safety, behavioral health needs
- Navigate phone programs for diabetes technology needs



## Mobile Care Clinic



## Social Supports Beyond Clinic

Expanding team diabetes:

- Family and peer support through community programs like Friends for Life and ADA camp
- School nurse program attended by 115 participants
- Partnership with JDRF for back-to-school workshops

Measures improving for entire population while closing health equity gaps.

Measure	1/2021 - 6/2023	Desired Direction
Patients with Consistent Clinic Visits (%)		↑
Percentage of Patients on CGM		↑
Percentage of Patients on Insulin Pump		↑
Patients with Psychology and/or Social Work Visits (%)		↑
Mean Hemoglobin A1C		↓



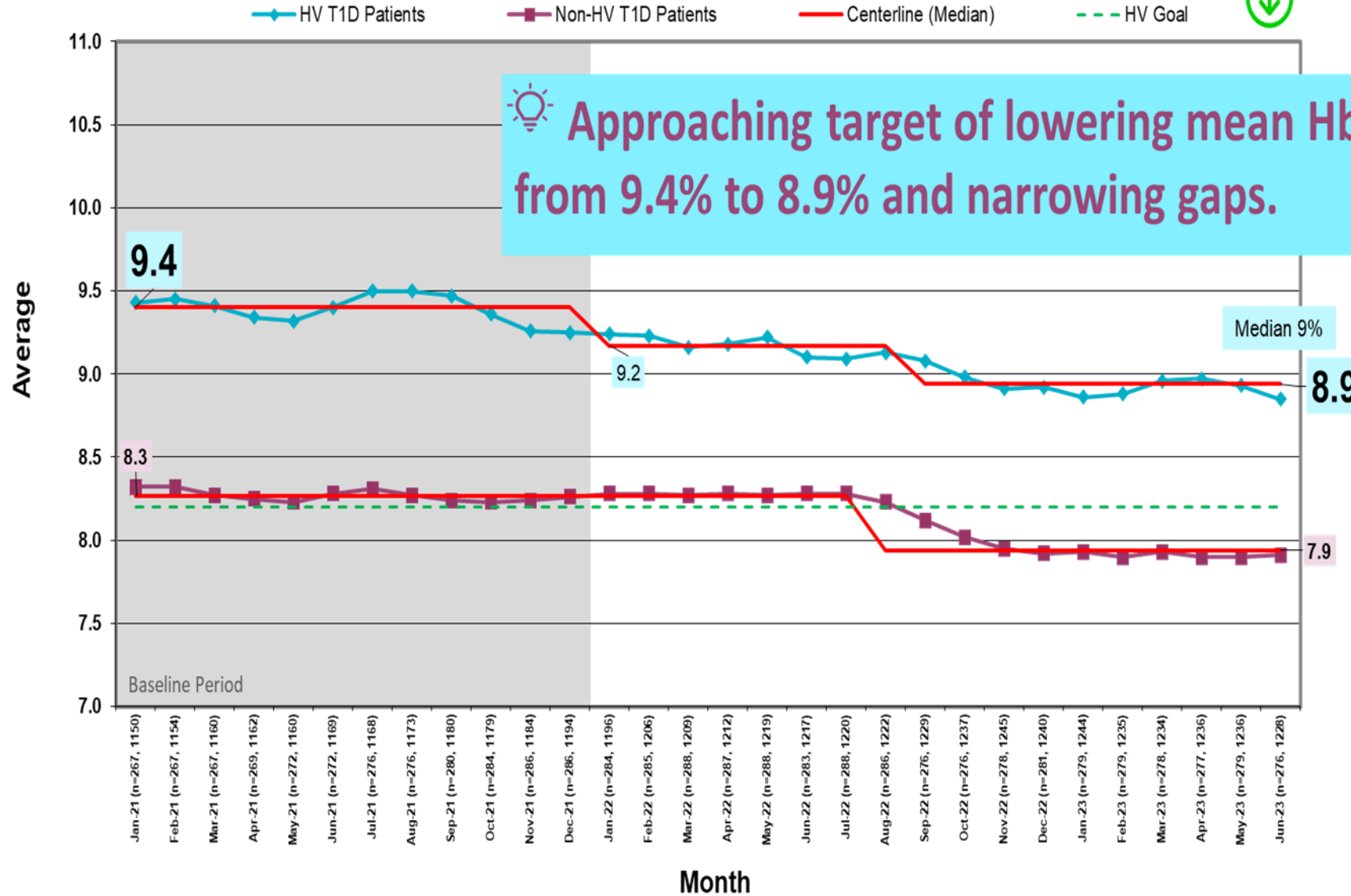
Changing care delivery

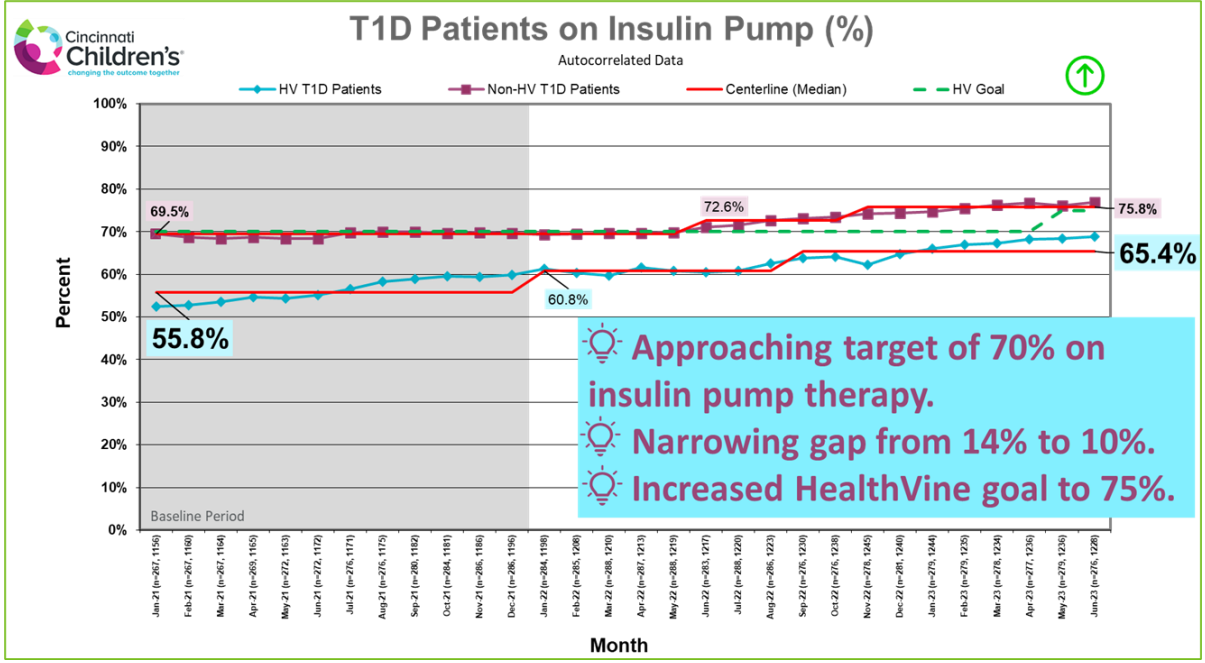
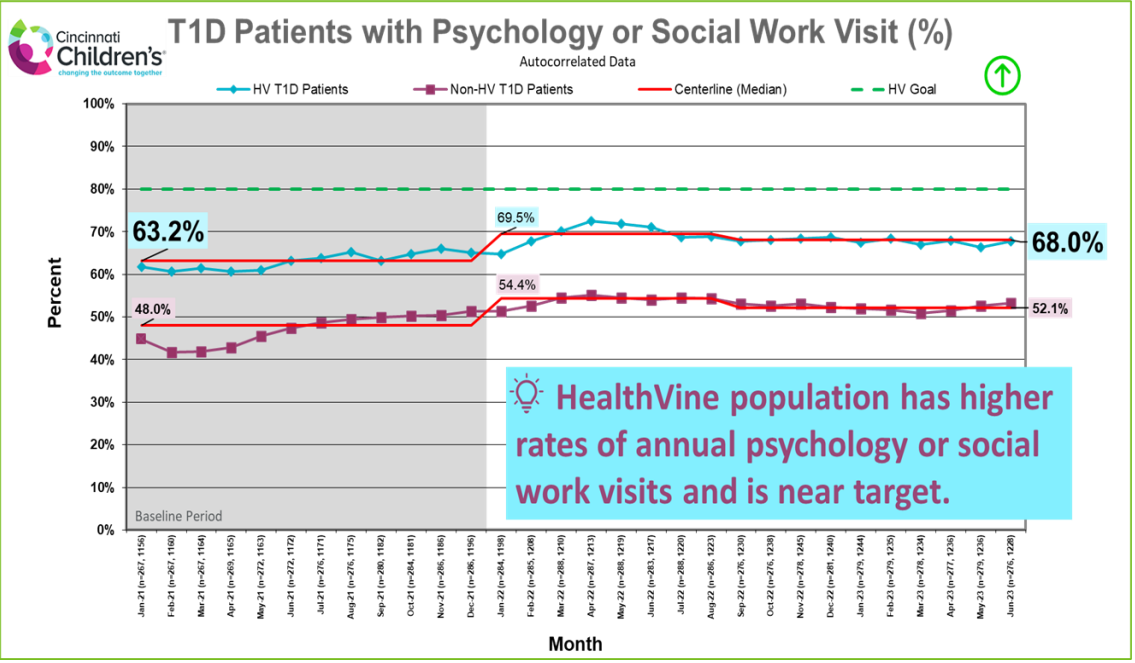
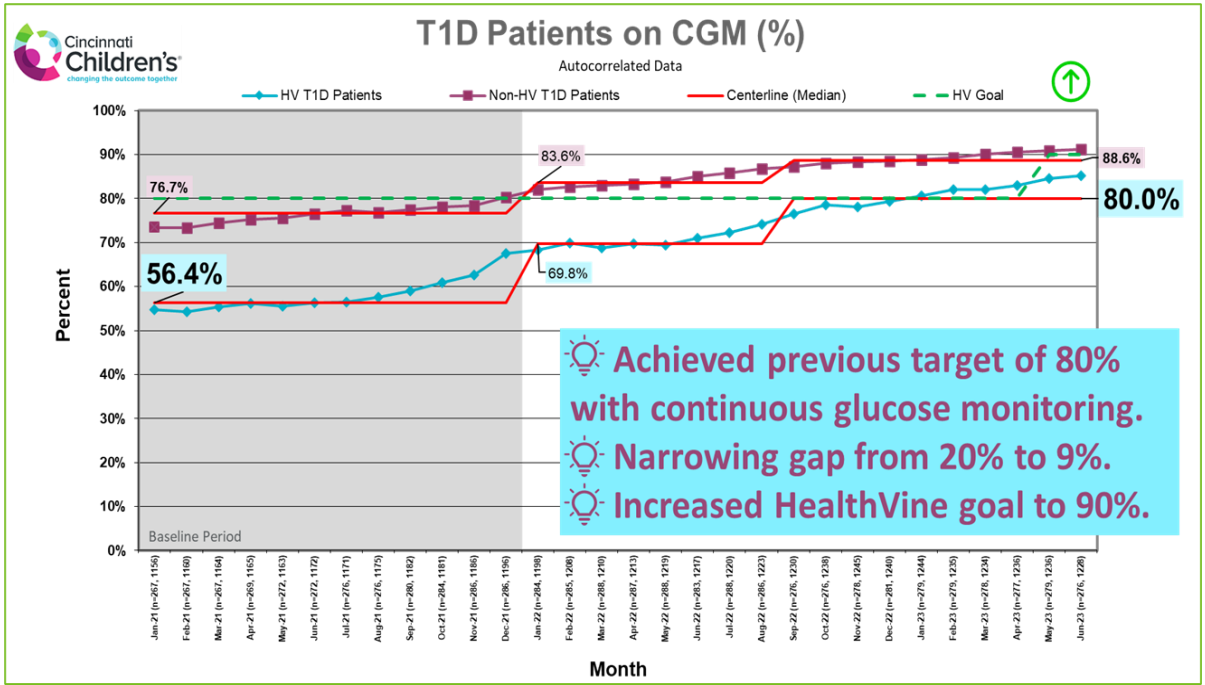
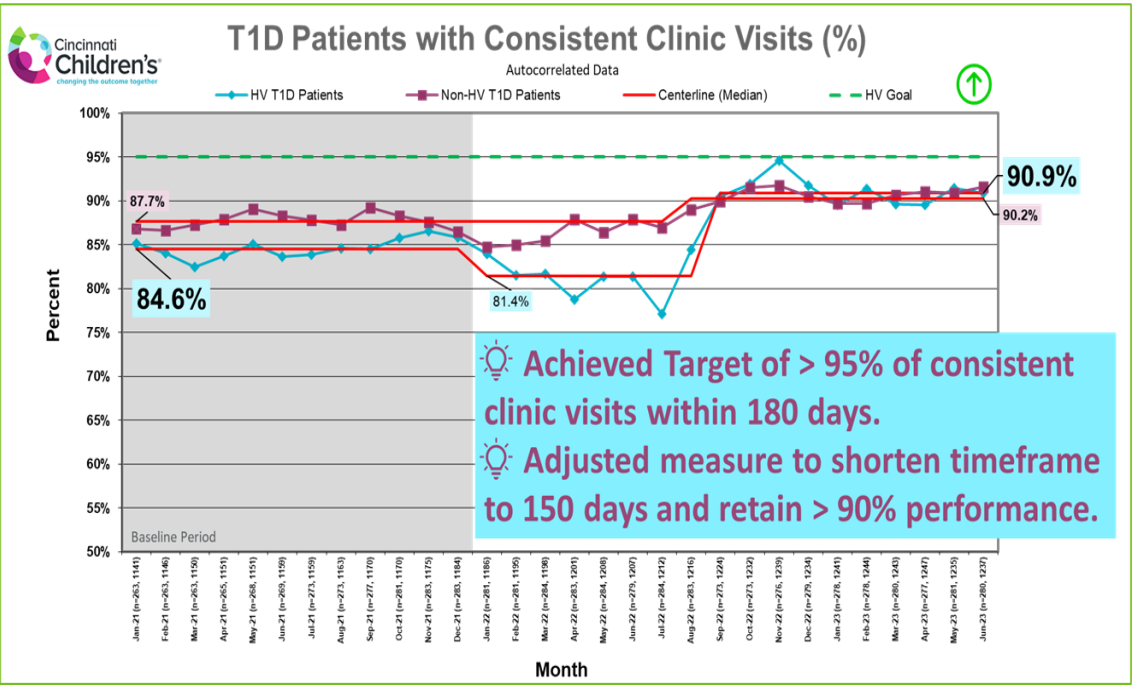
Improving health outcomes

Closing equity gaps

# Mean Hemoglobin A1C of T1D Patients

Autocorrelated Data





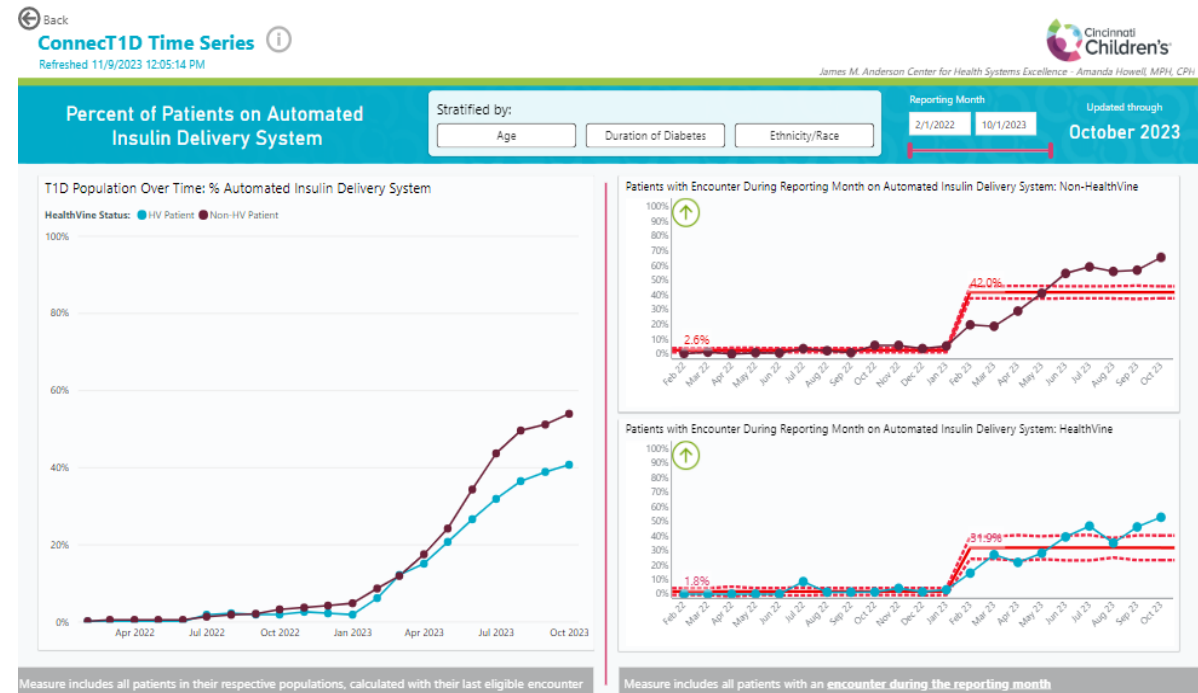
# Upcoming:



- Community outreach event at Cincinnati Zoo
- Developing measures for TIR, AID
- Access between visits (Joyce Lee 6 habits®)
- Integrating CGM data into Epic



*Holiday Lights and Sweet Delights:*  
Cincinnati Children's Diabetes Center New Year's Gathering





**Montefiore**



# Promoting Continuous Glucose Monitoring (CGM) Prescriptions in Academic Training Clinics

**Jovan Milosavljevic, MD; Rohan Maini, MD; Sarah Baron, MD, MS; Jing-Yu Pan, MD; Priyanka Mathias, MD; Shivani Agarwal MD, MPH**

Albert Einstein College of Medicine, Bronx, New York, USA.



# Introduction

- CGM could be a transformative diabetes management tool and is likely underutilized in trainee clinics, especially in primary care
- There is unique opportunity to start CGM interventions in trainee clinics where provider practice habits are being developed
- Over the last year, we have used QI methodology to increase CGM prescription rates in endocrinology trainee clinic
- Objectives:
  - Examine baseline CGM prescription rates across endocrinology and primary care trainee clinics and evaluate factors associated with CGM prescriptions
  - Plan and test interventions to promote CGM prescriptions in trainee clinics using QI methodology

# Methods

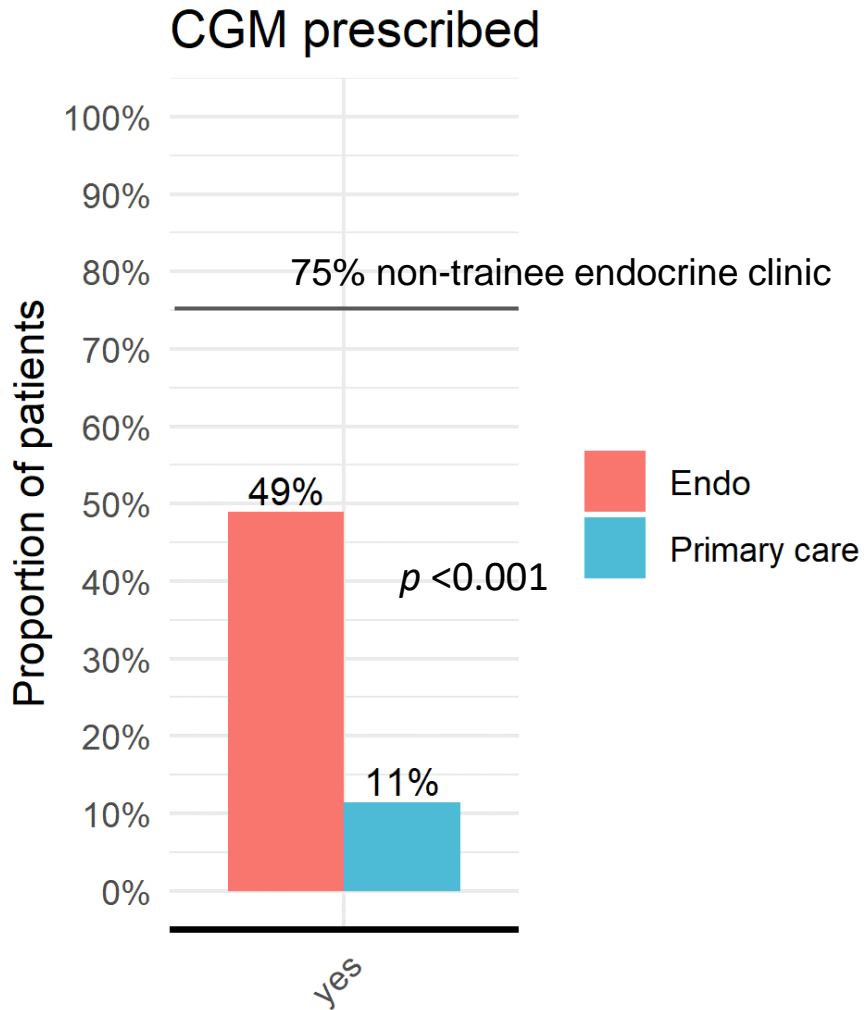
- Inclusion criteria (baseline data analysis, January-March 2023):
  - Age  $\geq$  18 years
  - Visit with adult endocrinology or primary care trainee clinic in study period
  - Treatment with multiple daily injection (MDI) insulin
- Data collected from EHR
- Statistical analysis:
  - Primary outcome: CGM prescribed (yes/no)
  - Descriptive statistics
  - Logistic regression

# Table 1. Participant characteristics

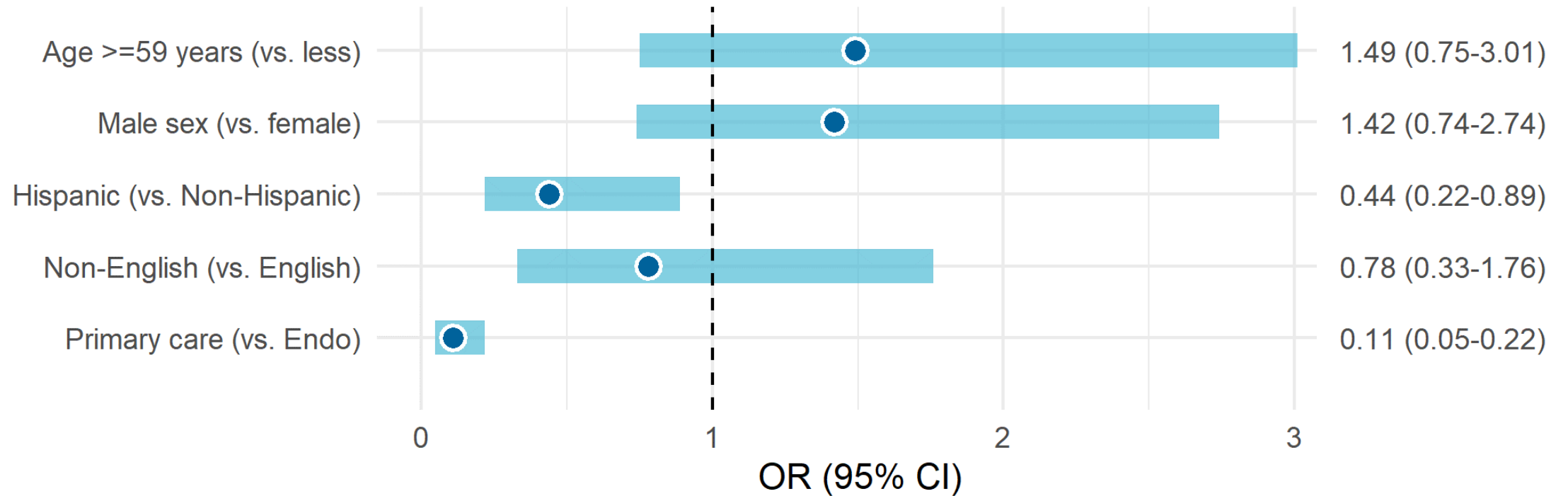
Characteristic	All patients (n = 244)	Endocrinology (n = 96)	Primary care (n = 148)	p-value
<b>Age (years)</b>	58.5 ± 14.7	54.7 ± 15.0	60.9 ± 14.0	0.001
<b>Sex (male)</b>	127 (52.0)	49 (51.0)	78 (52.7)	0.80
<b>Race/ethnicity</b>				0.30
Hispanic	121 (49.6)	50 (52.1)	71 (48.0)	
Nonhispanic Black	58 (23.8)	26 (27.1)	32 (21.6)	
Nonhispanic White	11 (4.5)	2 (2.1)	9 (6.1)	
Other	54 (22.1)	18 (18.8)	36 (24.3)	
<b>Language</b>				0.014
English	173 (70.9)	76 (79.2)	97 (65.5)	
Spanish	57 (23.4)	19 (19.8)	38 (25.7)	
Other	14 (5.7)	1 (1.0)	13 (8.8)	
<b>Diagnosis</b>				<0.001
T2D	87 (75.0)	30 (57.7)	57 (89.1)	
T1D	24 (20.7)	20 (38.5)	4 (6.3)	
Other	5 (4.3)	2 (3.8)	3 (4.7)	
Missing data	128 (52)	44 (46)	84 (57)	

Numerical data expressed as mean ± SD. Categorical data expressed as n (%).

# CGM prescription rates: Endocrinology vs. primary care



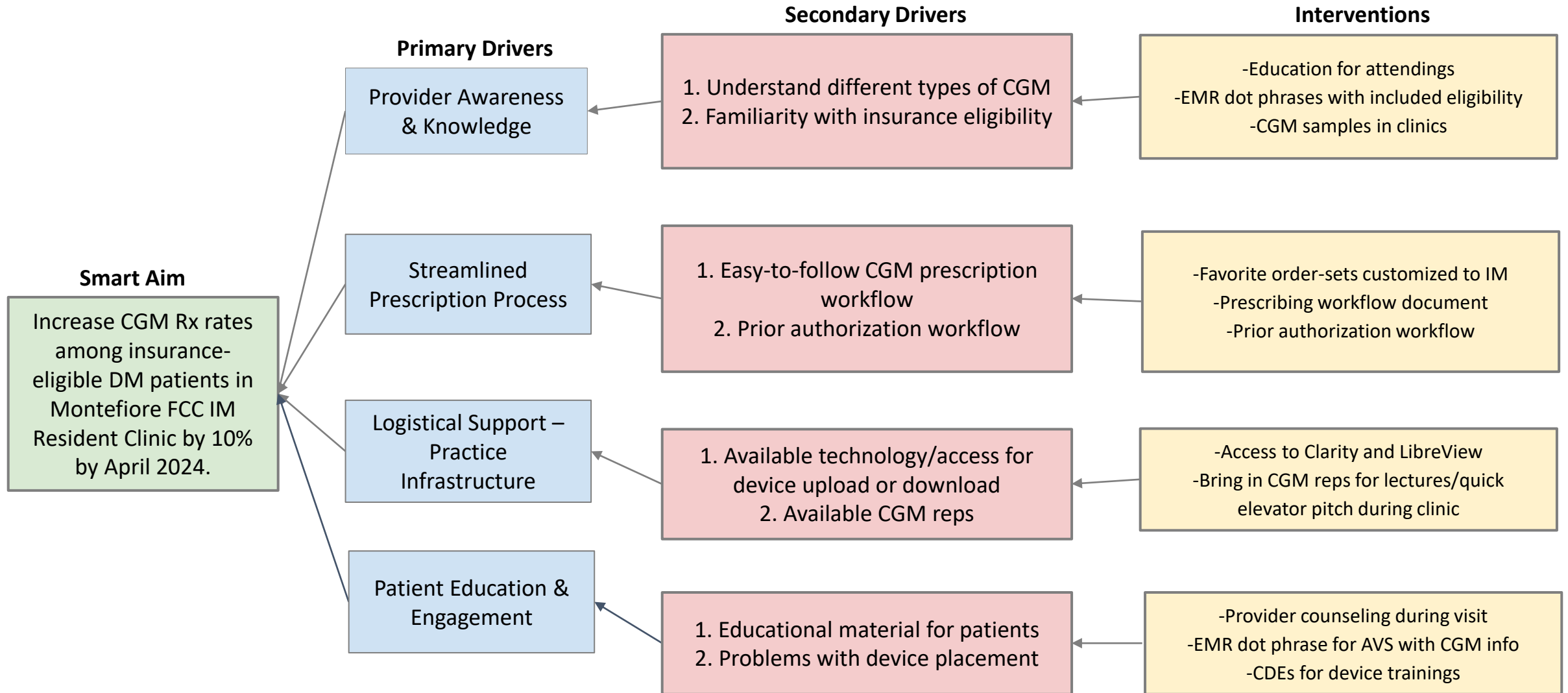
# Factors associated with CGM prescription



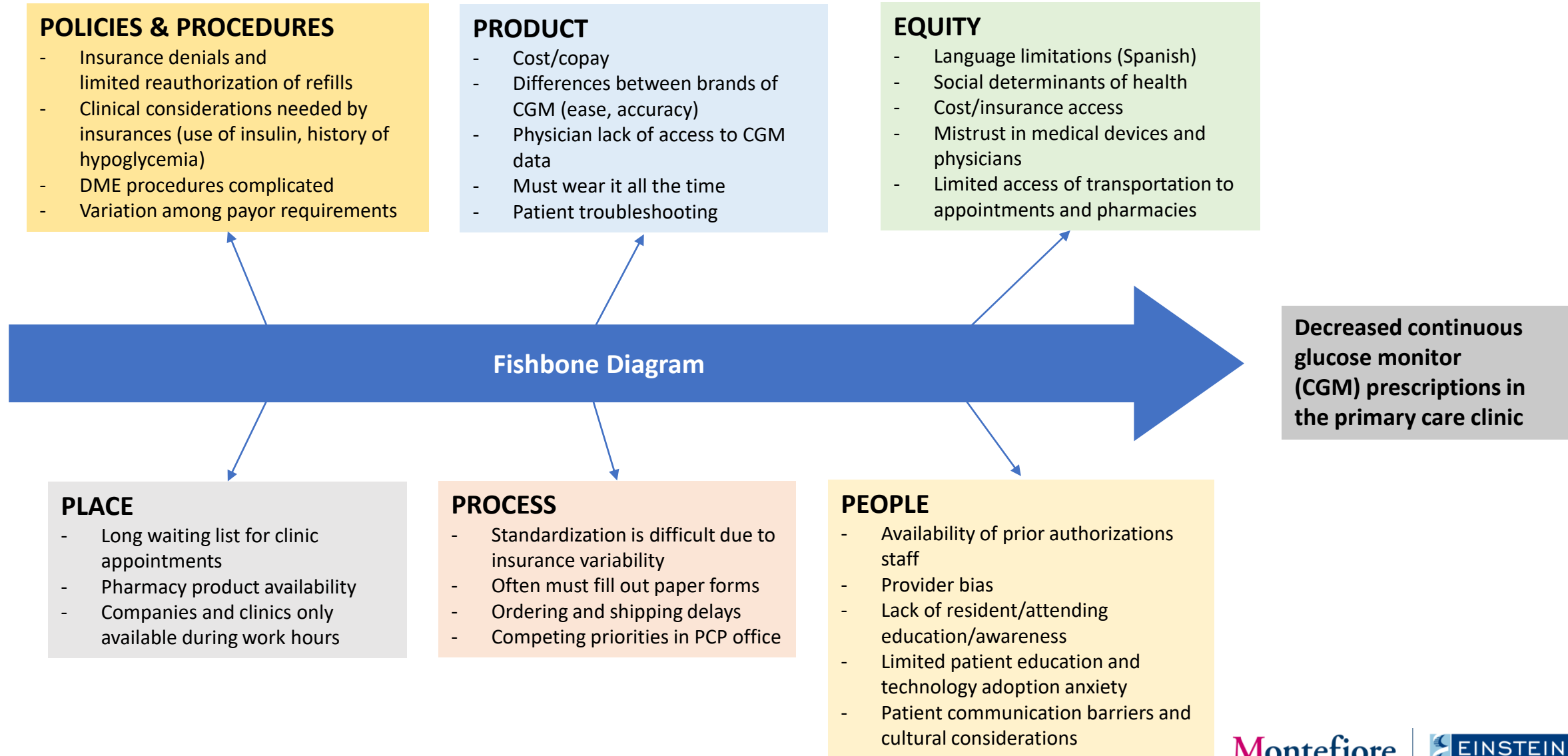
# Conclusions

- CGM prescription rates overall were low in trainee clinics compared to Montefiore endocrinology benchmark
- Expected in primary care, but unexpected in endocrinology trainee clinics
- CGM was less likely to be prescribed for patients of Hispanic race-ethnicity but was not associated with Spanish language preference
- Efforts need to be ongoing in endocrinology trainee clinic, with new focus in primary care

# Future directions: promoting CGM uptake in primary care trainee clinics

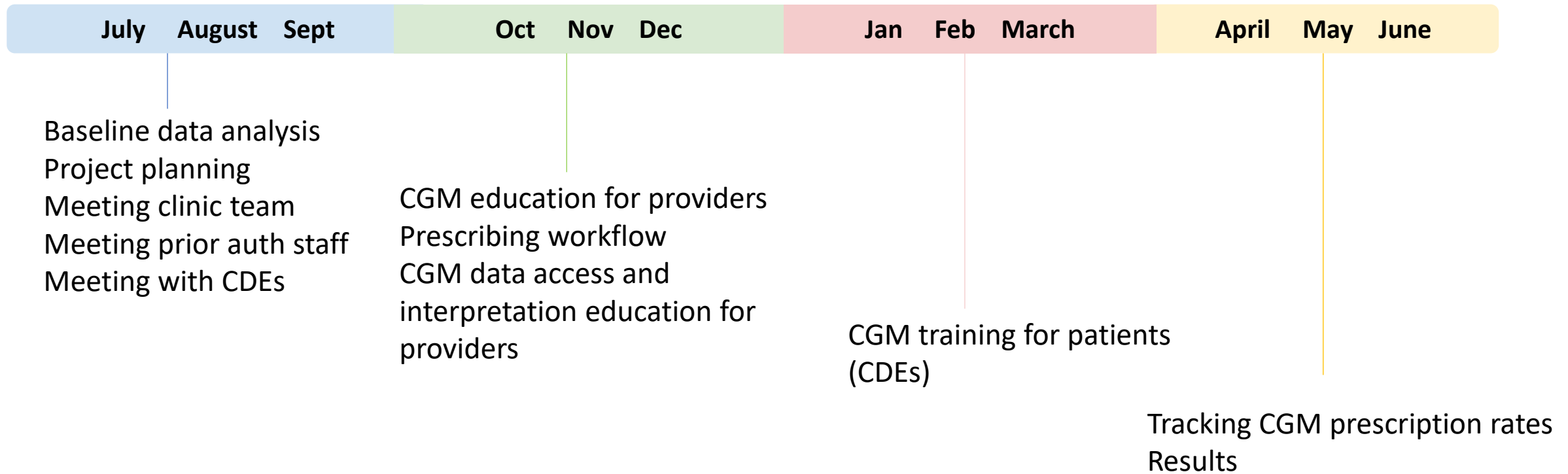


# Fishbone diagram





# Timeline for the project: July 2023 - June 2024





**Montefiore**



## THANK YOU

QI team

Rohan Maini, MD

Jing-Yu Pan, MD

Priyanka Mathias, MD

Shivani Agarwal MD, MPH

The Philip Lief Quality Improvement Program

QI Coaches

Sharon Rikin, MD

Sarah Baron, MD, MS

FCC clinic staff

T1D Exchange QI collaborative

November 14, 2023

# Managing Diabetic Ketoacidosis in a Moderate Ca Quality Improvement Initiative

*Nellie S. Hani, MD, Athina Sikavitsas, DO, Ashley Garrity, MPH, Kimberly K. Monroe, MD, Christine E. Mikesell Thomas, MD*



# Background

- Pediatric DKA has been managed at our tertiary care center with an insulin drip and 2-bag system.
- This acute and intensive condition has been managed in either the emergency department (ED) or pediatric intensive care unit (PICU).
- Limitations of general pediatrics beds have resulted in longer wait times in the ED and PICU, and delays in starting education for families of newly diagnosed patients with diabetes, and thus longer hospitalization times.



# Objective

- To establish a moderate care unit on the general pediatrics floor to care for patients with mild-moderate DKA on an insulin drip with 2-bag fluid delivery method.

# Hypothesis

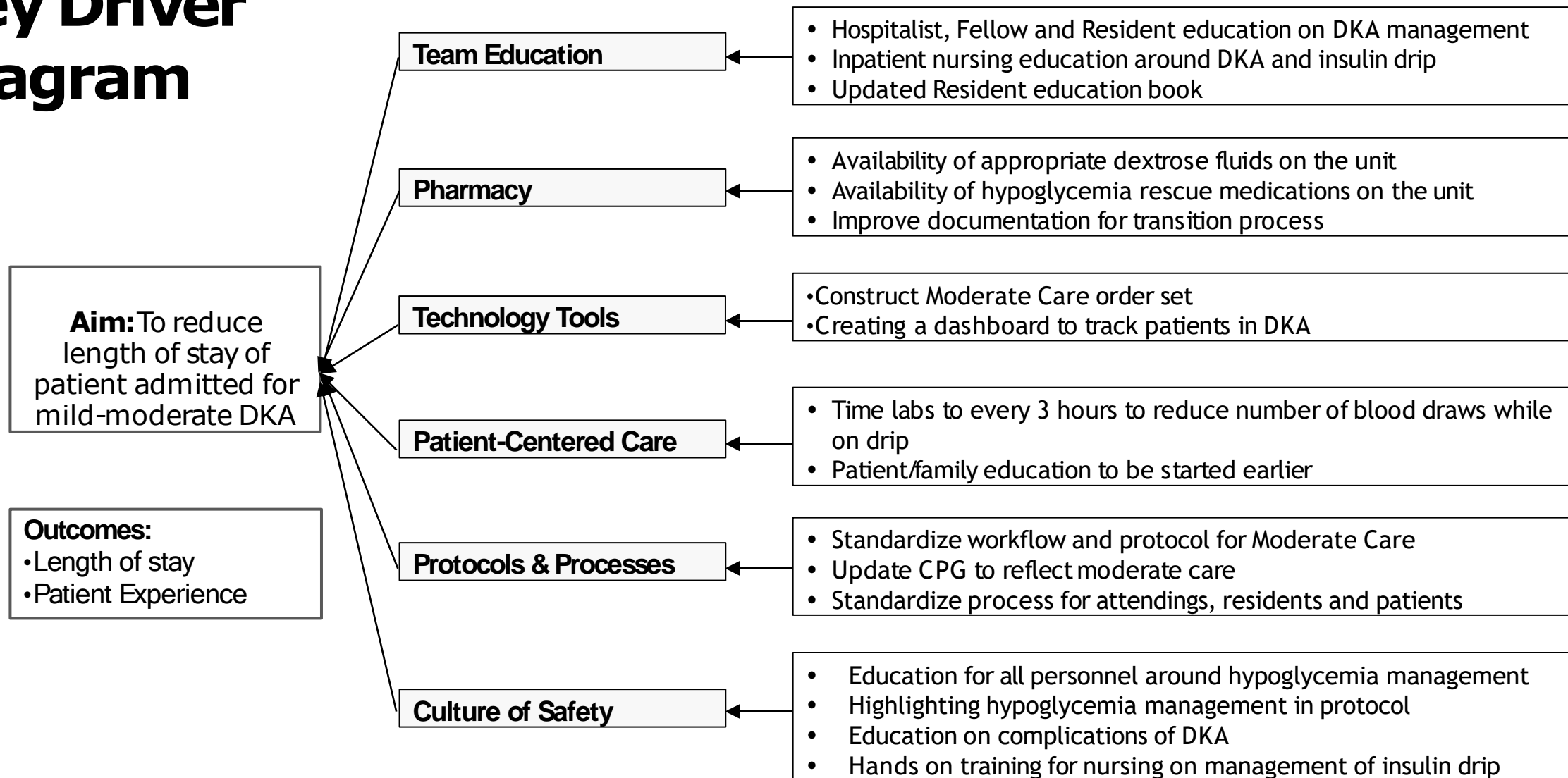
- This shift in our care model will ***shorten length-of-stay*** in the hospital.



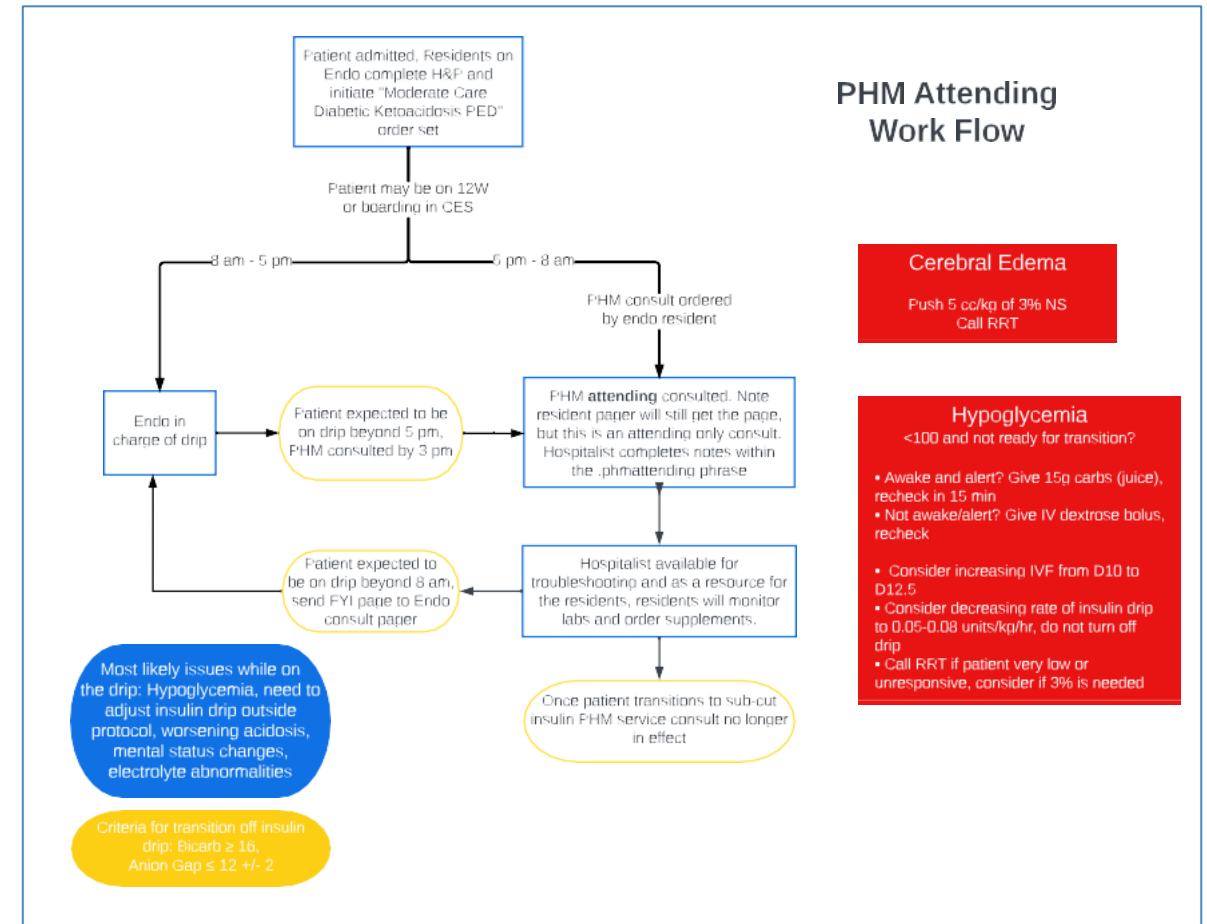
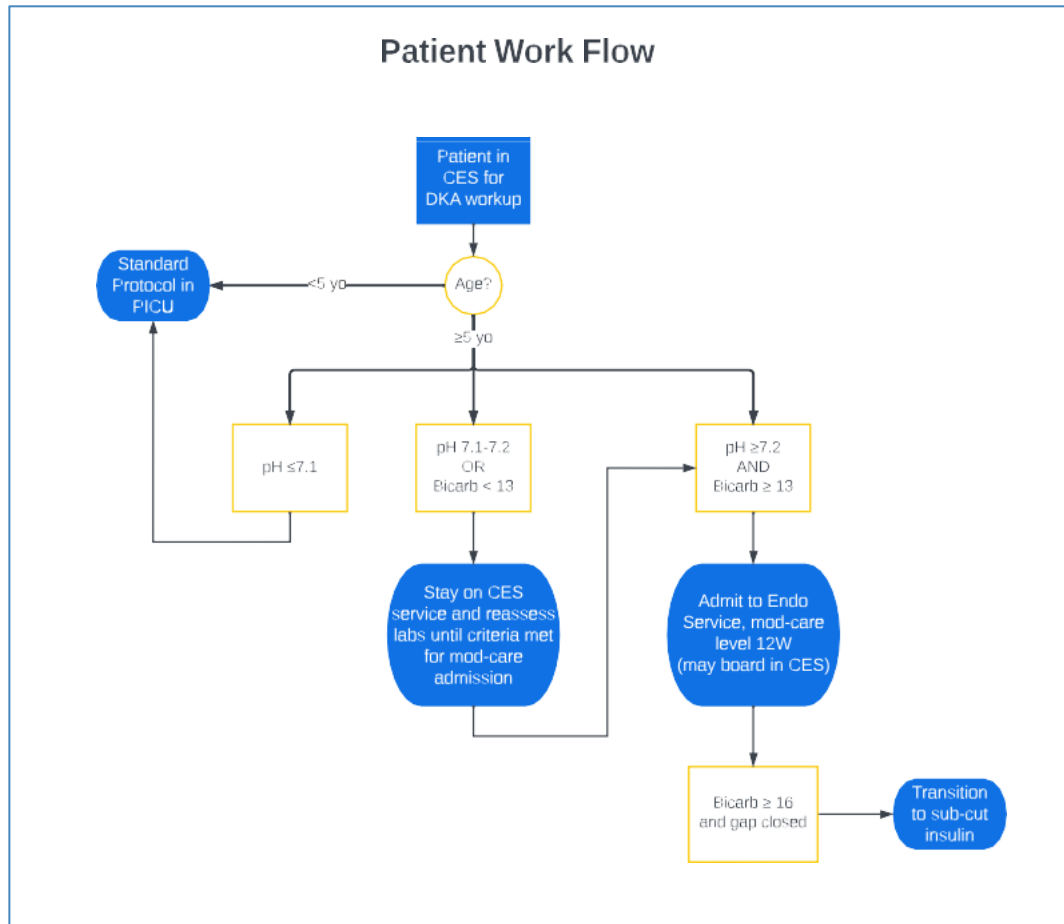
# Methods

- Mild-moderate DKA: pH on VBG  $\geq 7.2$  and a serum bicarbonate of  $\geq 13$ .
- We included children  $\geq 5$  years old.
- QI methods:
  - Created Key Driver Diagram
  - Mapped processes for patients and physicians and developed care protocols
  - Designed educational materials for all care providers involved

# Key Driver Diagram

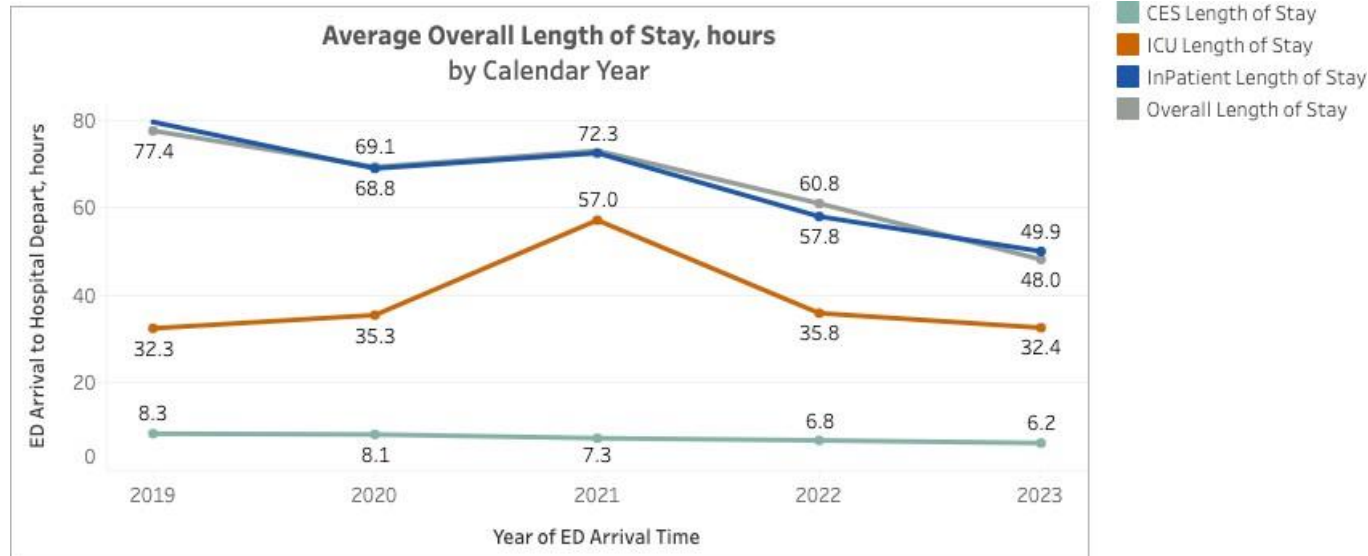


# Process Maps



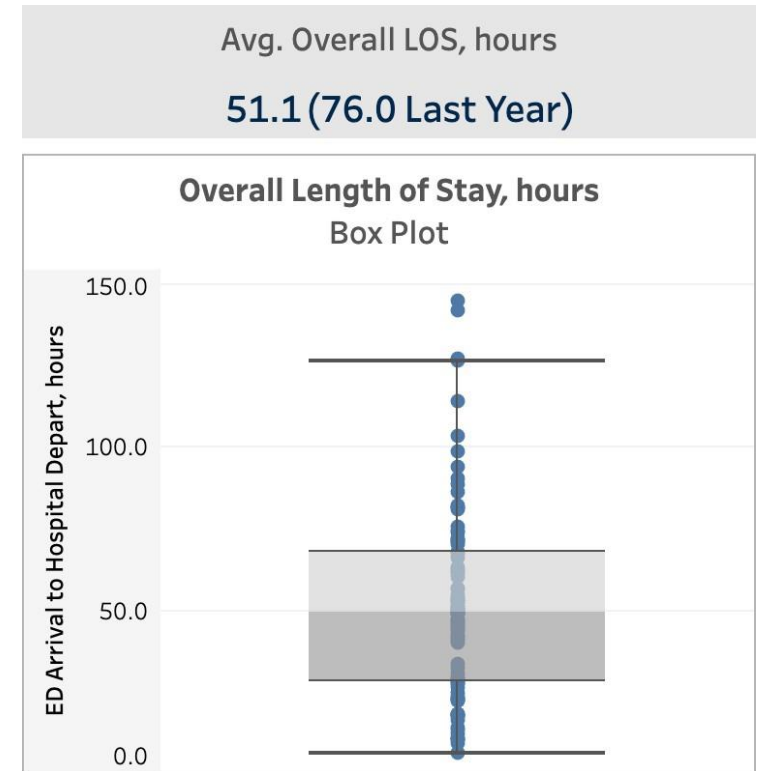


# Results



**Fig 1. Year to year comparison of LOS by admission location**

Compared to patients treated in the last year, there was a decrease in LOS following pilot of moderate care protocol



**Fig 2. LOS May 1, 2022–June 30, 2023 compared to prior year**

Overall hospital LOS reduced by 30% compared to the prior year

# Conclusions

- Mild to moderate DKA can be successfully cared for in a moderate care setting.
- Our initiative shortened length of stay for hospitalized patients who present in DKA.

# Acknowledgements & Contact

The authors thank the Pediatric Endocrinology, Pediatric Emergency Medicine, and Pediatric Hospital Medicine teams for their collaboration on this project.

For more information, please contact Dr. Nellie Hani at [nelliesa@med.umich.edu](mailto:nelliesa@med.umich.edu).