

# Type 1 Diabetes: Factors that Affect Youth/Parent Dyads' Health- Related Quality of Life and Youth Metabolic Control

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Kids deserve the best.

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- There are no relevant financial relationships related to this presentation/program.
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# Background

- Type 1 Diabetes (T1D): 1 in 400 to 600 youth
- 80% of youth do not meet goals for metabolic control (A1c)<sup>1</sup>
- Increased technology has not improved A1c outcomes<sup>2</sup>

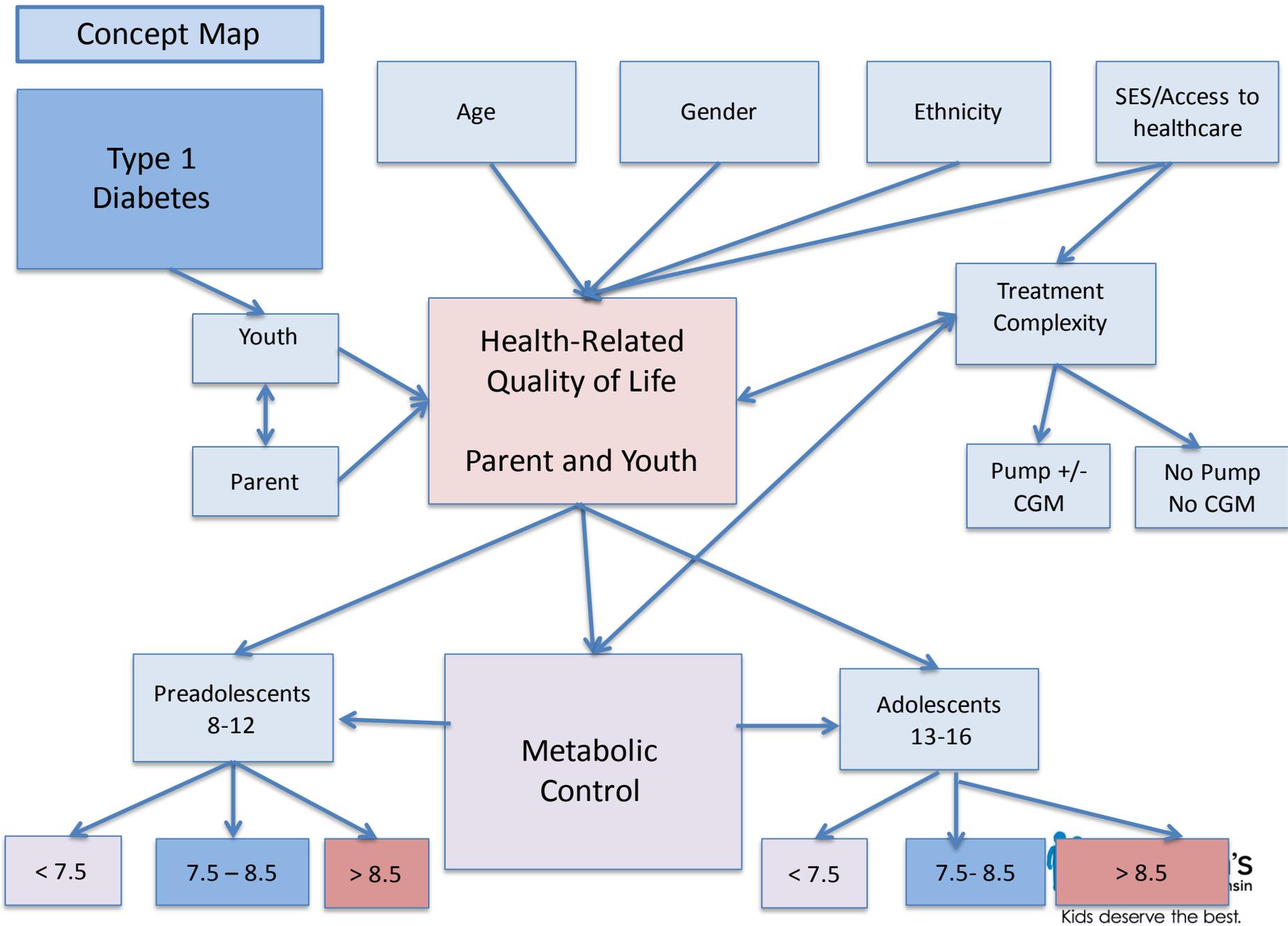
# Significance

- Results of poor metabolic control (A1c) of T1D include
  - blindness, nephropathy, neuropathy, amputations, and heart disease<sup>3</sup>
- Health-related quality of life (HRQOL)
  - Decreased youth and parent HRQOL can impact and be impacted by youth health outcomes<sup>4</sup>

# Purpose

Explore associations between:

- Health-related quality of life of youth and their parents and and metabolic control of youth with T1D.
- Age, gender, ethnicity, socioeconomic status (SES), and use of technology with both HRQOL and the A1c of youth with T1D.



# Research Design: Cross-sectional Secondary Analysis

Baseline data of a PCORI funded longitudinal interventional study:

- 210 youth with T1D and their parents.
- Two pediatric diabetes centers in the Midwest (rural and urban)
- Age, gender, ethnicity, SES, technology use.
- HRQOL data of youth/parent dyads
- Metabolic control data of youth (A1c)

*Family-Centered Tailoring of Pediatric Diabetes Self-Management Resources (IH-1304-6279)*

# Research Hypotheses

There will be an association between:

- Treatment complexity and HRQOL/A1c
- Gender, age, ethnicity and SES and HRQOL and A1c
- Youth HRQOL and parent HRQOL
- Youth A1c and Parent HRQOL
- Youth HRQOL and A1c

# Categorical Variables

Categorical Variables		N	%
Age:	Preadolescent	93	44.3
	Adolescent	117	55.7
Gender:	Male	106	50.5
	Female	104	49.5
Ethnicity:	White	192	91.4
	Non-white	18	8.6
Socioeconomic Status (SES)	Private insurance	154	73.3
	Public insurance	56	26.7
Treatment Complexity	Technology use (+/- pump/CGM)	140	66.7
	No Technology	70	33.3
A1c Control Groups	Within Goal (< 7.5%)	39	18.6
	Moderate control (7.5-8.5%)	70	33.3
	Poor control (> 8.5%)	101	48.1

# Variables/Measurement Tools

- Youth HRQOL: The PedsQL™ Diabetes module<sup>5</sup>
- Parent HRQOL: Family Impact Module of the PedsQL™<sup>6</sup>
- Metabolic control: A1c test (POC)
- SES: represented by insurance
- Treatment complexity: Use of insulin pump/continuous monitor or syringe and meters

# Data Analysis

- Correlations conducted for all youth between independent variables of age, gender, ethnicity, SES and technology and dependent outcome variables HRQOL and A1c (continuous) and A1c Control Group.
- Age then separated into two categories to look at differences between preadolescents and adolescents.

# Data Analysis

- Associations between total scores of youth and parent HRQOL and A1c outcomes of youth were tested.
- Regression analysis was completed with all independent variables, now including HRQOL of youth/parent dyads, to test any significance in prediction of outcomes of the dependent variable of A1c.

# Findings of the Hypotheses

There were no associations between:

- Treatment complexity, Age, Gender and youth A1c
- Treatment complexity, Age, Gender, SES and youth HRQOL
- Youth A1c and parent HRQOL (total score)

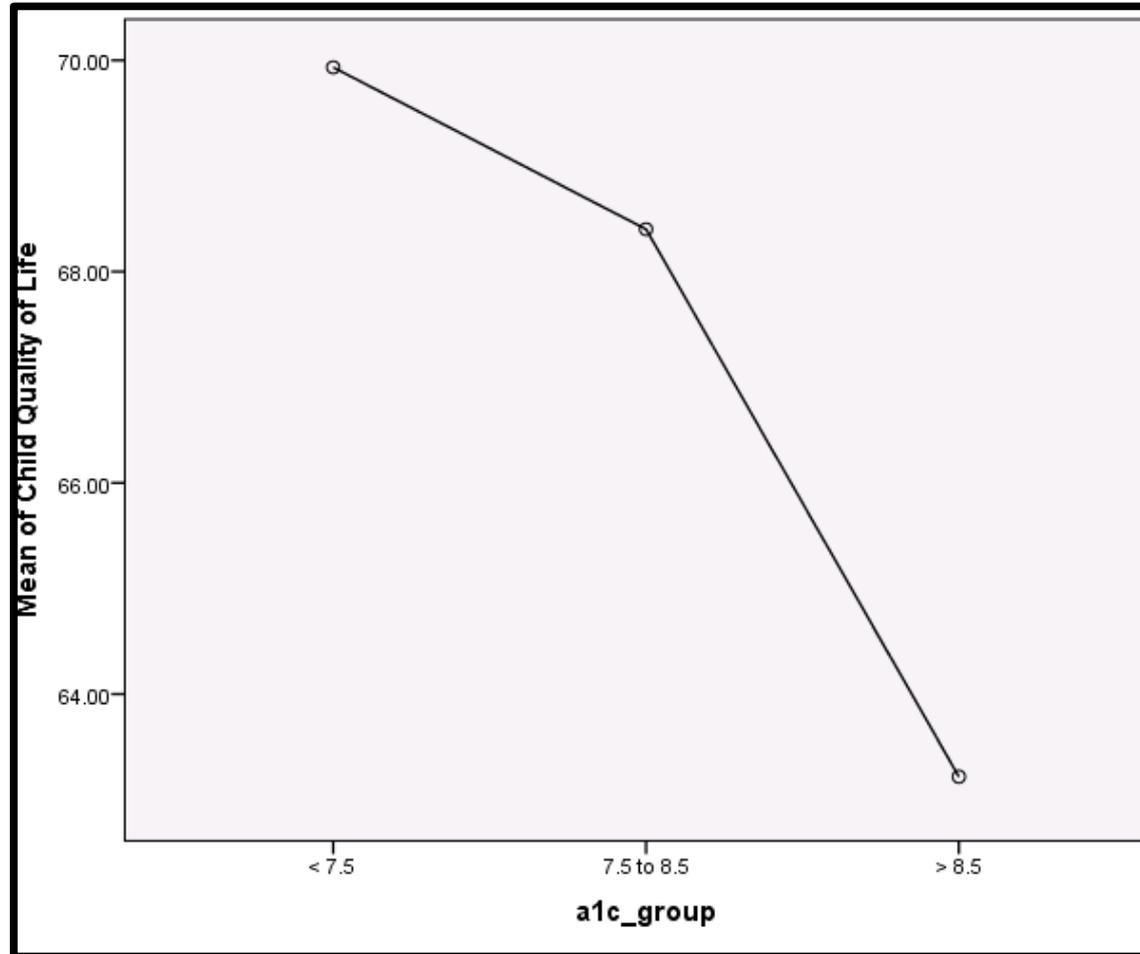
# Findings of the Hypotheses (cont'd)

There were associations between:

- Higher A1c of youth and Parent Emotional Functioning, Family functioning subscales.
- Higher Youth HRQOL and lower youth A1c (better).
- Higher Youth A1c and non-white ethnicity
- When Youth A1c reflected poor control (> 8.5%) youth HRQOL was worse (lower).

# Findings

- A1c for youth with T1D is predicted in part by the youth's HRQOL and ethnicity.
- A1c of greater than 8.5% was associated with lower HRQOL of youth with T1D.



# Findings for preadolescents

There were no associations between

- Ethnicity and HRQOL of preadolescents
- A1c and parent HRQOL
- HRQOL (total score) and A1c

There were associations between:

- Non-white ethnicity, lower SES and higher A1c
- HRQOL and parent HRQOL (moderate positive)
- Lower HRQOL (subscale only) and higher A1c

# Findings of regression analysis

- SES was predictive in part of A1c in preadolescents only when ethnicity was eliminated. All non-white preadolescents were outliers.
- The A1c of preadolescents was associated with Child HRQOL Treatment- II subscale only.

## Child HRQOL Treatment-II subscale

- It is hard for me to take blood glucose tests.
- It is hard for me to take insulin shots.
- It is hard for me to exercise or do sports.
- It is hard for me to keep track of carbohydrates.
- It is hard for me to carry a fast-acting carbohydrate.
- It is hard for me to snack when I go low.

# Findings for Adolescents

No associations between:

- SES and adolescent HRQOL or A1c

Associations between:

- Non-white ethnicity, lower HRQOL, and poor metabolic control.
- HRQOL and parent HRQOL (small)
- A1c and parent HRQOL (Subscales only Emotional Functioning and Social Functioning)
- HRQOL and A1c (medium negative)

# Findings of regression analysis

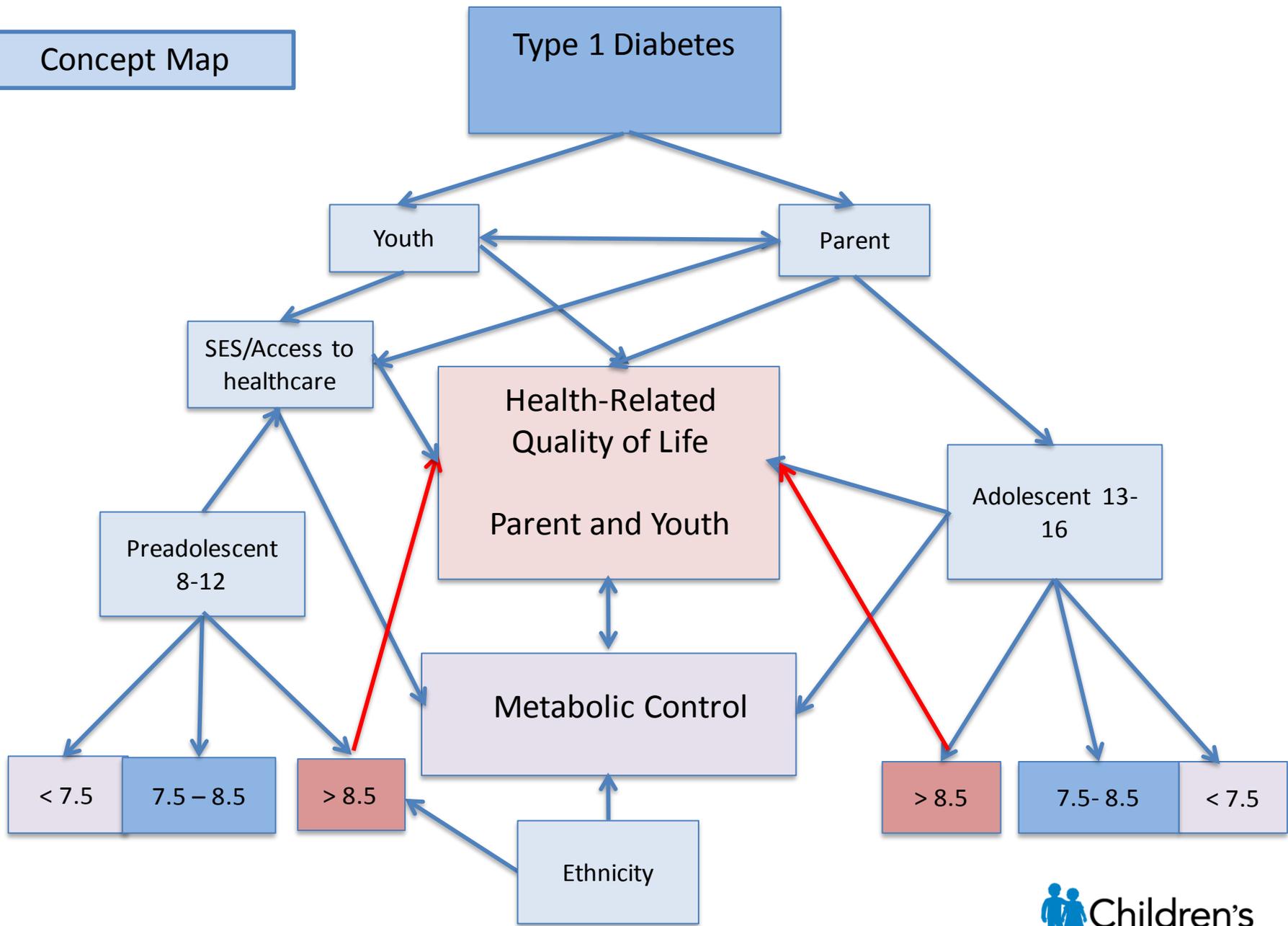
## Teen HRQOL Treatment-I

- It hurts to get my finger pricked.
- It hurts to get insulin shots.
- I am embarrassed by my diabetes treatment.
- My parents and I argue about my diabetes cares.
- It is hard for me to do everything I need to do to care for my diabetes.

## Parent HRQOL Social Functioning

- I feel isolated from others.
- I have trouble getting support from others.
- It is hard to find time for social activities.
- I do not have enough energy for social activities.

Concept Map



# Strengths of the study

- Secondary analysis of a PCORI funded study.
- Access to data, analysis tools and research team of the primary study
- Size of the data set exceeded the number indicated by the power analysis.
- HRQOL was gathered from both youth and parents
- Used a diabetes specific tool to collect data from youth

# Limitations of the study

- Secondary analysis included measures chosen to answer questions of the primary study
- Cross-sectional design- correlations do not equal causation.
- Limited ethnic diversity in pre-adolescent youth
- Limited age range of youth with T1D
- Study conducted in one state in the Midwest, therefore may not be generalizable.

# Recommendations for Practice

- A1c > 8.5% is an indicator of decreased HRQOL of youth with T1D.
- Screen youth/parent HRQOL using the subscales that were associated with poor metabolic control.

# Recommendations for Research

Test interventions to support:

- social functioning of parents of adolescents with T1D and its impact on adolescent A1c.
- smaller age ranges of youth, 8-10, 11-13, 14-16 to refine the results for different developmental groups.

# More research needed to explore

- Why was the quality of life lower for non-white pre-adolescents?
- Why was the metabolic control lower for non-white pre-adolescents?
- What do we need learn from outcome disparities?

# Conclusion

- A1c of  $> 8.5\%$  poor control of T1D based on decreased HRQOL.
- Factors associated with HRQOL and A1c differ by age and interventions should be developmentally based.
- Policy should support advocacy of non-white youth with T1D and research related to ethnic disparity and implicit bias in healthcare.
- Psychosocial health and HRQOL of youth with T1D and their parents must be supported to improve outcomes of care.

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