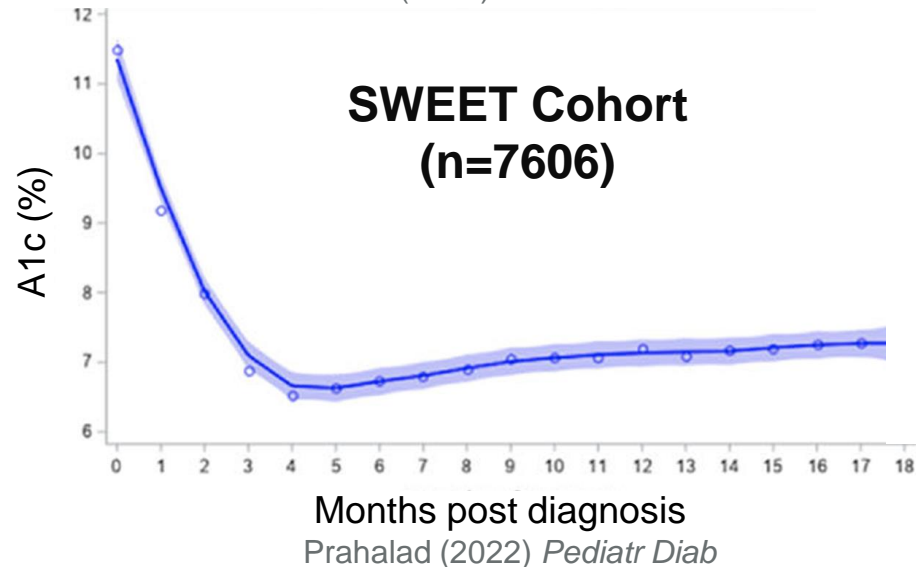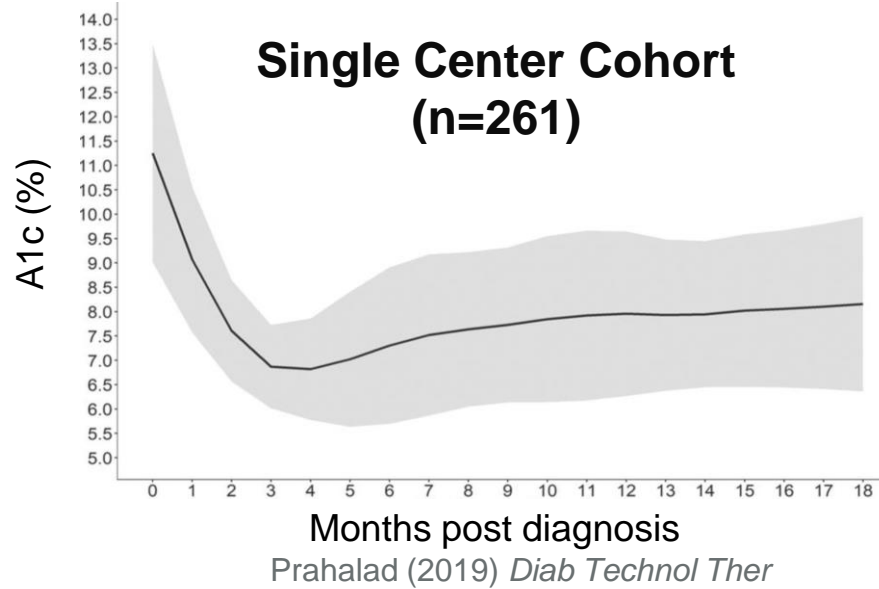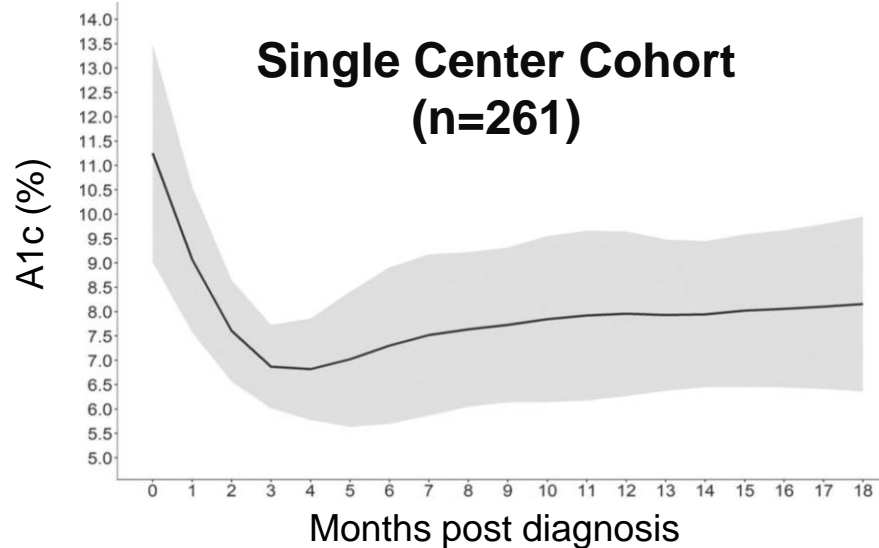# CGM initiation within 6 months of diagnosis associated with lower A1c at 3 years in youth with T1D but disparities persist

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Trajectory of A1c in T1D suggests early interventions have lasting impact

Single Center Cohort (n=261)

A1c (%)

Months post diagnosis

Prahalad (2019) *Diab Technol Ther*

SWEET Cohort (n=7606)

A1c (%)

Months post diagnosis

Prahalad (2022) *Pediatr Diab*

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T1D Exchange

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Difference in HbA1c (mmol/mol)

Duration of diabetes (years)
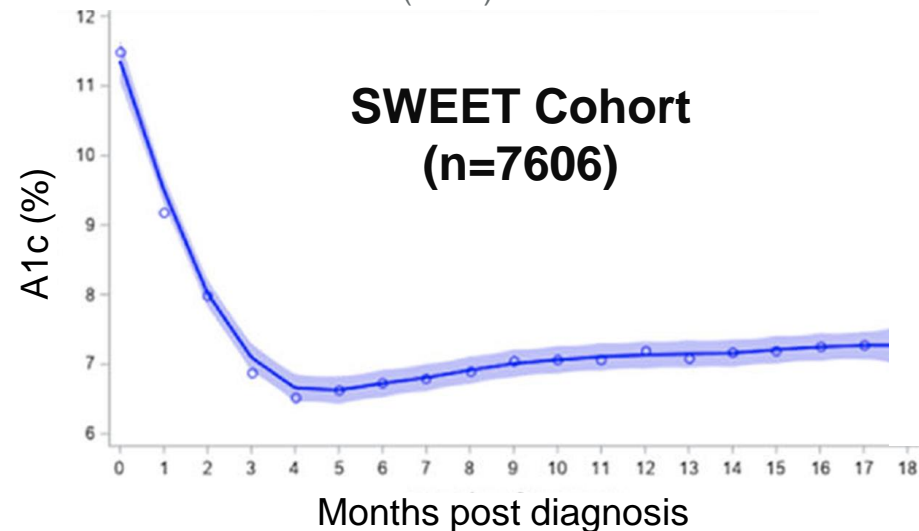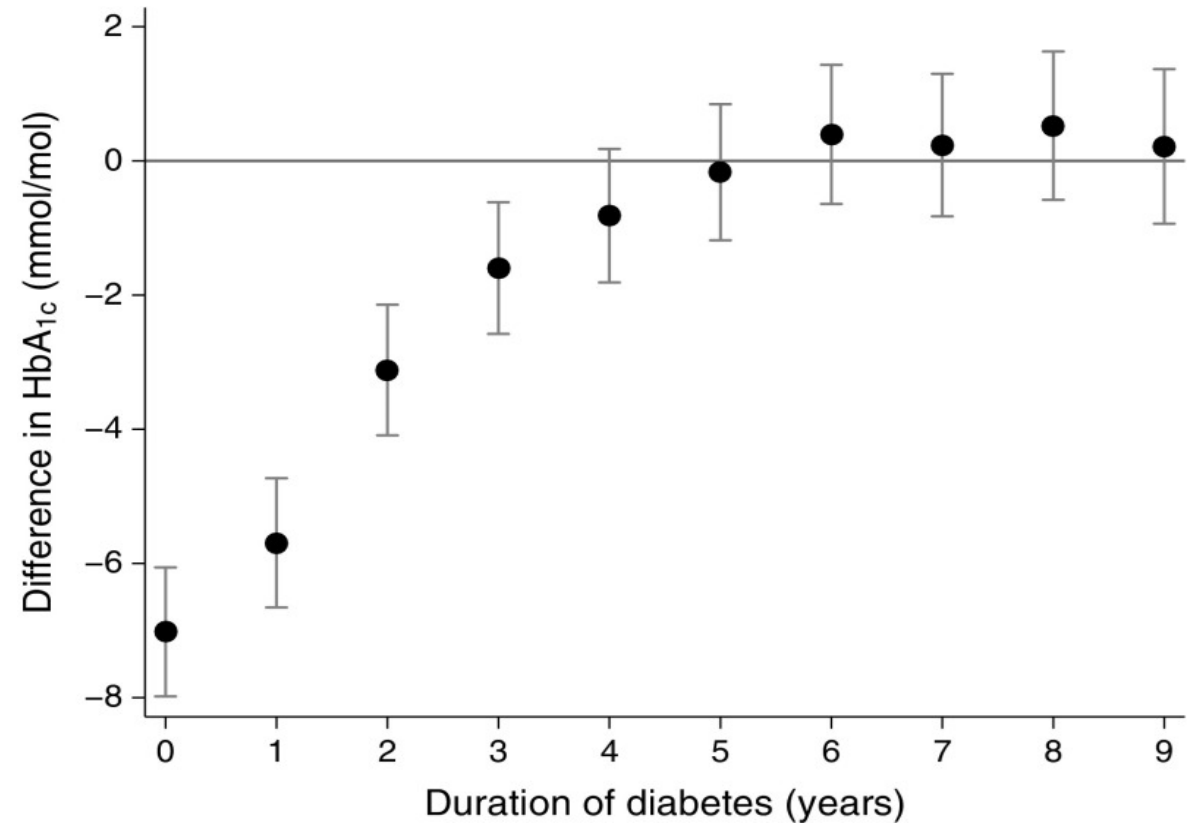
Nirantharakumar (2018) Diabetologia

Benefits of CGM

Improved A1c

Fewer DKA episodes

Less severe hypoglycemia

Improved quality of life

Component of hybrid closed loop systems

Demeterco-Berggren (2023) *Clin Diabetes;* Foster (2019) *Diab Technol Ther;* Hilliard (2019) *Diab Technol Ther*

Images from thenounproject.com

Early CGM use in T1D associated with lower A1c

- Initiating CGM within 6 months results in short-term A1c improvement in adults and youth (single center studies)

- CGM initiation at diagnosis is feasible resulting in sustained use and lower A1c up to 12 months (n=124 youth, single center)

- Initiating CGM within 12 months results in sustained A1c improvement up to 7 years, however only 25% of participants included at end-point (n=396 youth and adults, single center)

Shah (2018) *J Diab Sci Technol;* Patton (2019) *Diab Tech Ther;* Prahalad (2020) *Diab Care;* Prahalad (2022) *J Clin Endo Metab;* Champakanath (2022) *Diab Care*

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Methods

- Age ≤18 years diagnosed between 2019-2020 who have A1c data from diagnosis to 36 months

- CGM user groups:<3 mo, 3-6 mo, 6-12 mo, 12-36 mo, non-CGM

- Outcome: HbA1c values from diagnosis to 36 months

- Individual variables: Demographics and diabetes management data; contextual variables: center size (?)

- Model HbA1c outcomes out to 36 mo by CGM group, adjusting for potential confounders: baseline A1c, use of AID systems, age, sex, insurance type, race and ethnicity, center size

Distribution of individuals by CGM initiation

|	CGM initiation in 3 months (n=4186)	CGM initiation in 3-6 months (n=2038)	CGM initiation in 6-12 months (n=2076)	Non CGM users (n=2773)	P-value
Age at diagnosis (years), Median (IQR)	11.4 (+)	12.3 (+)	13.0 (+)	14.5 (+)	<0.001
Sex (Female)	1903 (45)	968 (47)	1013 (49)	1229 (44)	0.008
Health Insurance Type					<0.001
Public	1196 (29)	724 (36)	795 (38)	1524 (55)	
Private	2553 (61)	1121 (55)	1067 (51)	923 (33)	
Other	437 (10)	193 (9)	214 (10)	326 (12)	
Preferred Language					<0.001
English	3863 (92)	1872 (92)	1931 (93)	2361 (85)	
Spanish	171 (4)	75 (4)	103 (5)	319 (12)	
Other	152 (4)	91 (4)	42 (2)	93 (3)	
Diabetic ketoacidosis at diagnosis (yes)	213 (5)	78 (4)	105 (5)	65 (2)	0.07
Insulin pump use (Yes)	2743 (66)	1467 (72)	1479 (71)	536 (19)	<0.001
Automated insulin delivery system use (yes)	727 (17)	403 (20)	289 (14)	16 (1)	<0.001
HbA1c (%), Median (IQR)	7.4 (+)	7.6 (+)	8.0 (+)	8.5 (+)	<0.001

Analysis of those diagnosed 2017-2023; *N (%); +data pending

Distribution of CGM initiation by race and ethnicity

Percent of children and adolescents within racial
and ethnic groups by CGM initiation group
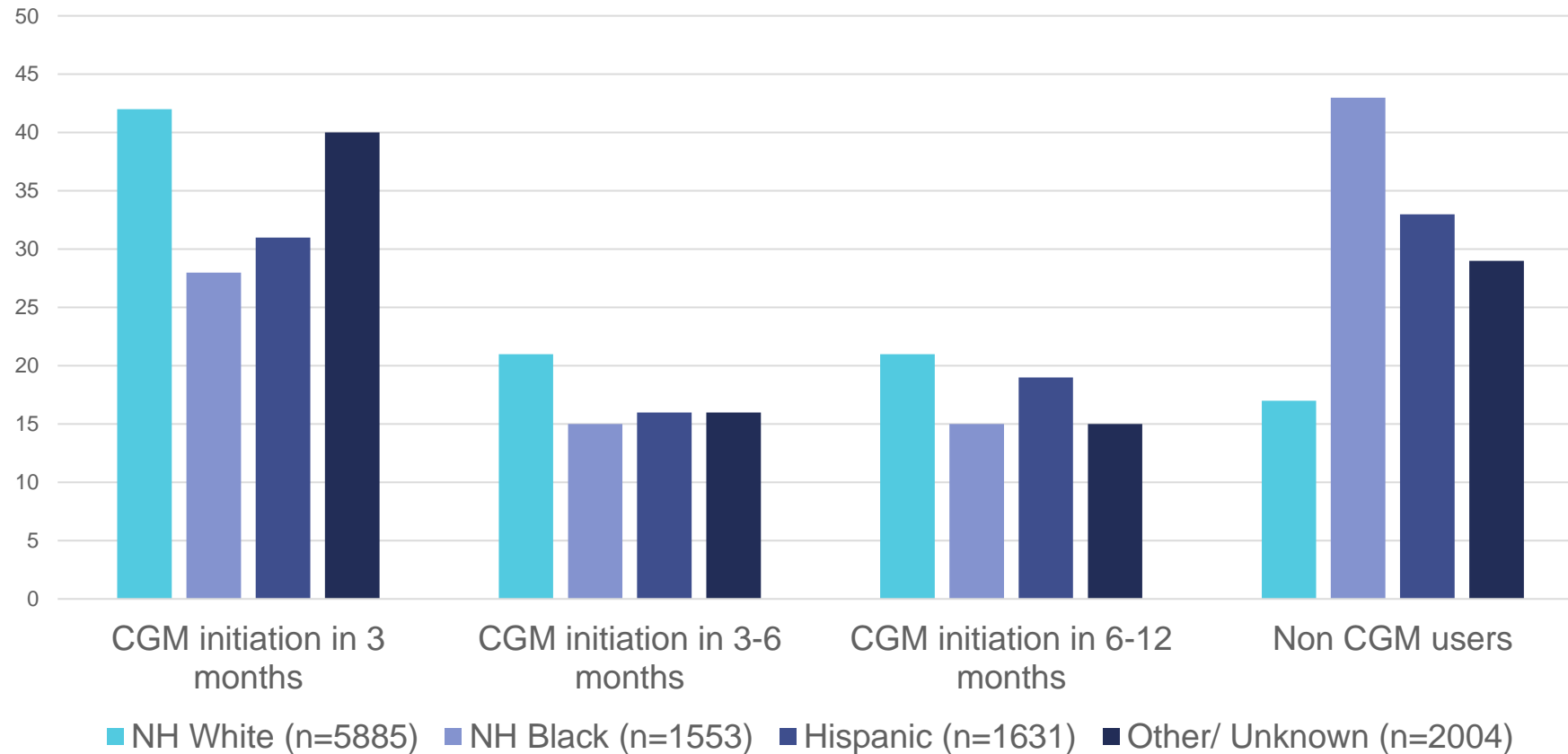
LOESS plot of A1c trajectories by CGM initiation groups
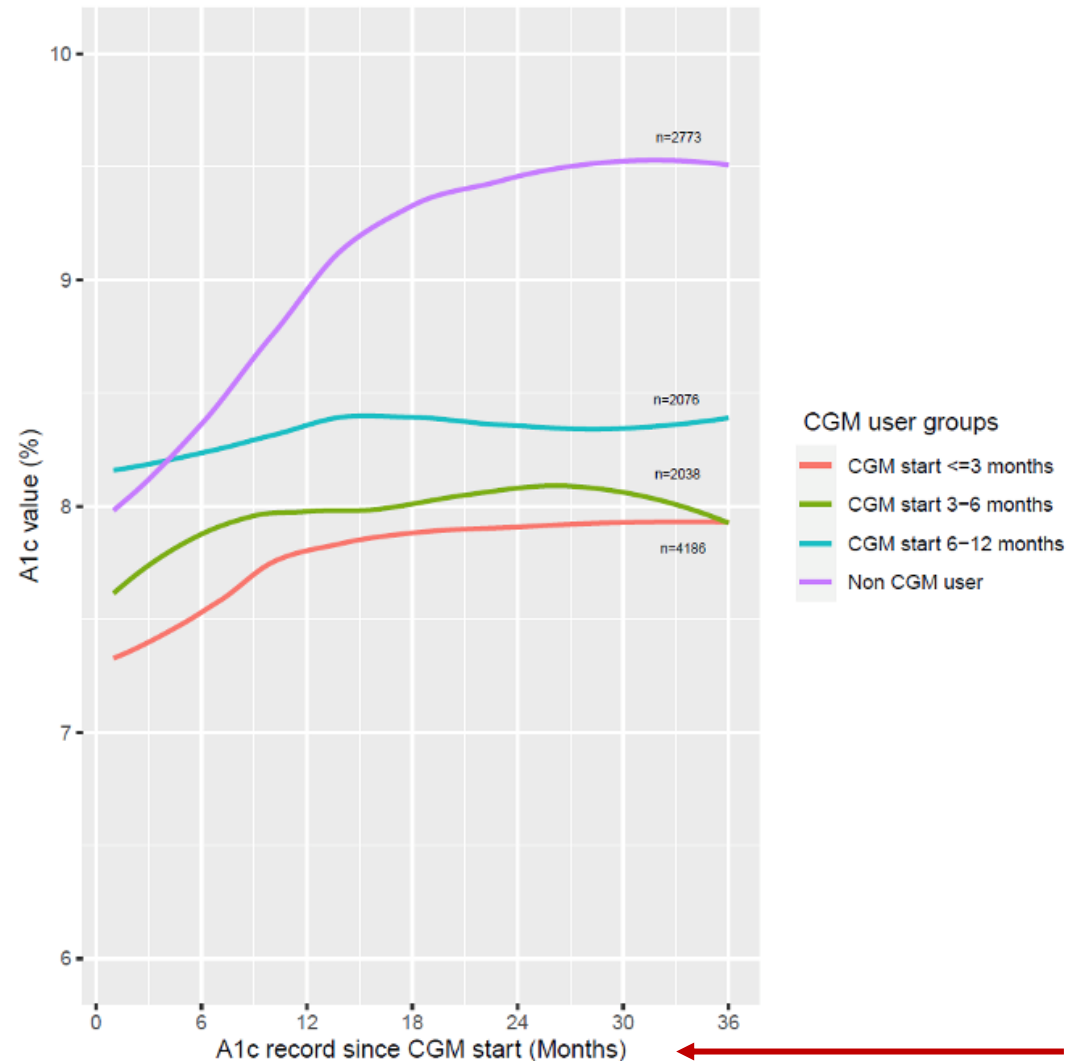
Analysis for manuscript will include controlling for potential confounders:
- A1c at diagnosis
- AID/insulin pump use
- Insurance type
- Preferred language
- Race and ethnicity
- Age at diagnosis
- Center type

Analysis for manuscript will be A1c trajectory from diagnosis

Clinical Implications

- Initiating CGM by 6 months after diagnosis associated with improved A1c at 3 years

- Real-world data reflects disparity in CGM access: CGM users less likely to be non-Hispanic Black or publicly insured

- Barriers include insurance policies and processes, clinical resources, family factors and implicit bias

Limitations

- CGM initiation groups were different at baseline (A1c, sex, age, preferred language, race and ethnicity)

- CGM use was associated with more insulin pump and AID use, independent contributors to improved A1c

- Dataset has gaps – race and ethnicity, insurance type (some unknown)

- CGM metrics were not captured in the dataset so not included in this analysis (e.g. wear time, TIR)

- Flash glucose monitoring (FGM) included as CGM in this dataset

Future Efforts

- Evaluate persistence of glycemic improvement beyond 3 years by CGM group (A1c and TIR)

- Explore CGM timing and time to initiation of automated insulin delivery systems

- Improve access to early CGM use by directing interventions to reduce known disparities, prioritize approaches to address implicit bias, and advocate for early and equitable CGM coverage

Acknowledgements