



# Higher Engagement With a Digital DSMES + CGM Program Is Associated With More Robust Improvements in Glycemic Control

Jeanean B. Naqvi, PhD

Co-Authors: Jenna Napoleone, PhD, MPH; Sean R. Zion, PhD; Ashley Berthoumieux, MS, RD; Hyun Jung Lee, PhD; Timothy C. Dunn, PhD; Carolyn B. Jasik, MD; Sarah Linke, PhD, MPH

→ June 21, 2025

# Presenter Disclosure

**Employee:** Dr. Naqvi is a salaried employee of Omada Health, Inc.

**Research Support:** This research was supported by Omada Health, Inc and Abbott Diabetes Care, Inc.

**Stock/Shareholder:** Dr. Naqvi receives stock options for Omada Health, Inc.

# DSMES



DSMES<sup>1</sup>



CGM



Chrvala et al., 2016, *Patient Educ Couns*

Fonda et al., 2016, *J Diabetes Sci Technol*;  
Jiao et al., 2022, *Endocrinol Diab Metab*

# DSMES



# CGM



# &

Chrvala et al., 2016, *Patient Educ Couns*

Fonda et al., 2016, *J Diabetes Sci Technol*;  
Jiao et al., 2022, *Endocrinol Diab Metab*

**We need more clinical trial data  
on the benefits of integrating  
digital DSMES with continuous  
CGM for type 2 diabetes  
management.**

*Allen et al., 2008, Diabetes Res Clin  
Pract; Aronson et al., 2023, Diabetes  
Obes Metab; Aleppo et al., 2023,  
JAMA Netw Open; Zahedani et al.,  
2023, NPJ Digital Medicine*



A man with short grey hair, wearing a grey t-shirt and red plaid shorts, stands on a wooden balcony. He is looking down at a smartphone in his hands. A small brown cup sits on the balcony railing in front of him. The background shows a lush green landscape with trees and a distant view of a valley. The balcony has a wooden railing and a wooden chair is visible in the background.

# Study Objective:

Determine whether higher levels of engagement with the digital DSMES + CGM integrated solution are associated with better clinical outcomes

# Methods

# Participants

## Inclusion Criteria

Age  $\geq$  18 years old

Self-reported diagnosis of T2D

HbA1c  $\geq$  8.0%

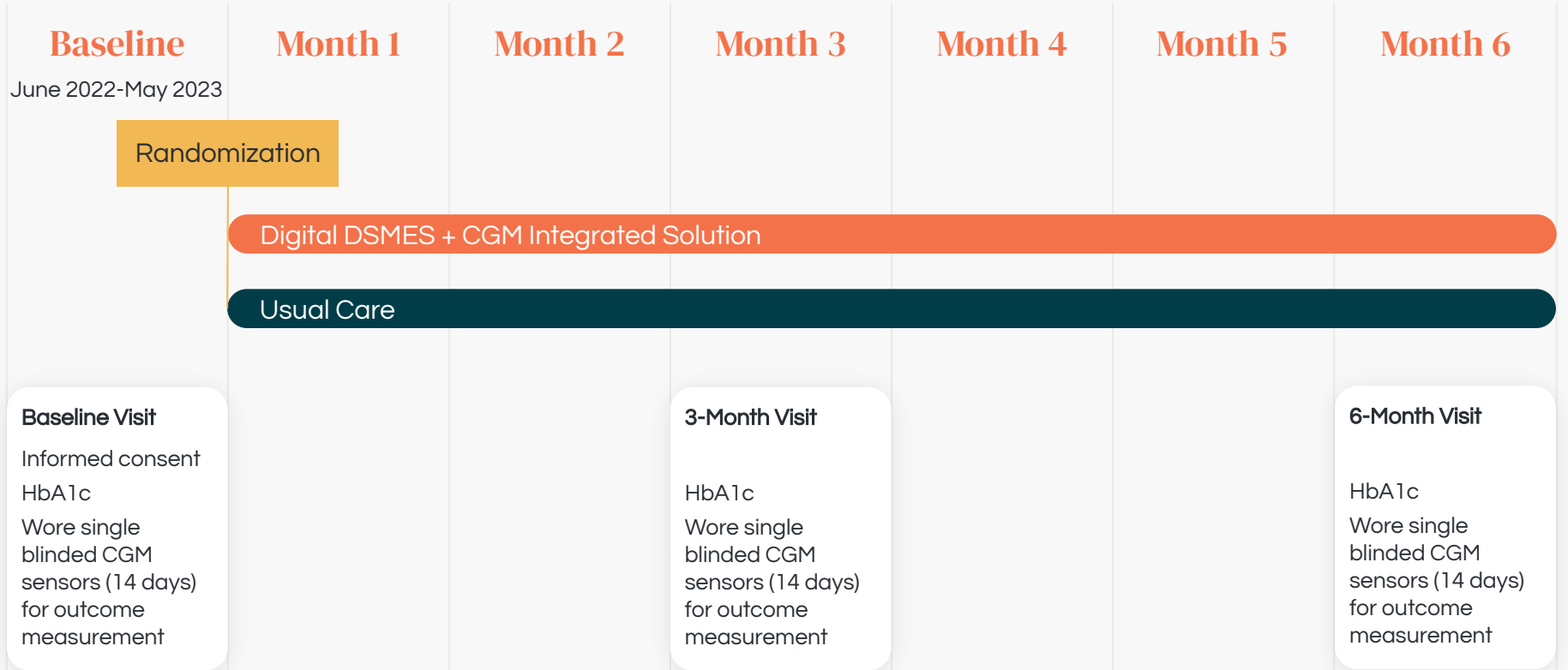
On treatment regimen:

- Diet and exercise alone
- Basal insulin
- Oral glucose lowering medication or non-insulin injectable medications
- Combination of basal insulin and oral medication

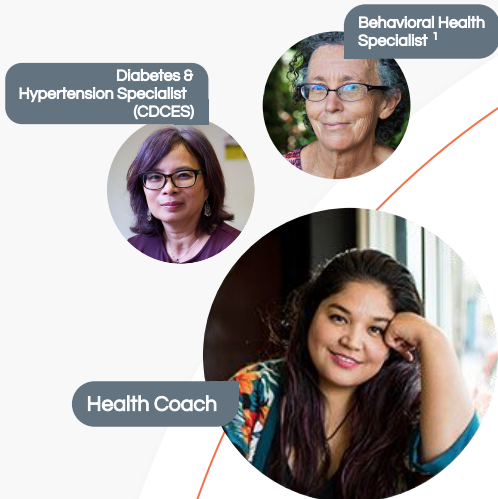
Analysis includes only those who enrolled in the integrated solution (n=42)



# Study Timeline



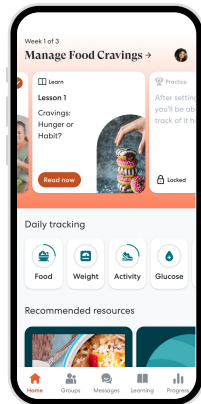
# Digital DSMES Program



Care Team



Omada for Diabetes



Mobile App + Web Portal




Connected Devices + Program Tools



1. Behavioral Health Specialists operate behind the scenes with other members of the care team and do not have a member-facing role.

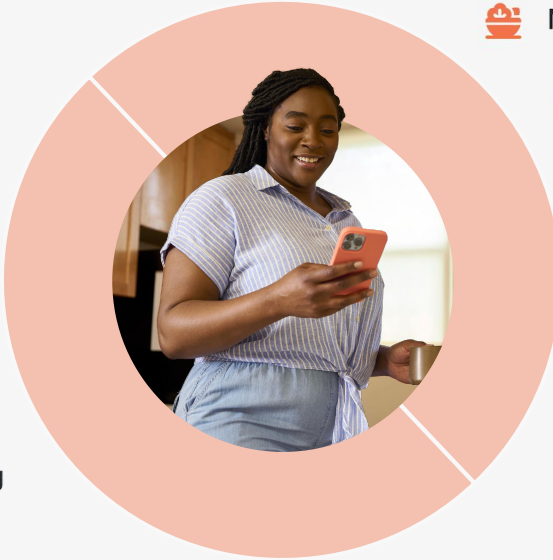
# Digital DSMES Program

 SMART goals & recommendations

 Medication adherence support


 Behavior change loop

 Biometrics tracking



 Nutrition + activity coaching

 Personal paths

 Online peer groups

 Topic-based communities

# CGM

Received 14-day CGM sensors  
to cover



**6 months**

of continuous wear



# Statistical Approach

## Mixed effects models

- **Predictor:** Standardized Total Engagement Score
- **Outcomes:** HbA1c, TIR, TAR, mean glucose, mean SD glucose, GMI
- **Covariate:** Number of weeks enrolled in the digital DSMES + CGM condition
- **Fixed effects** : Timepoint, Standardized Total Engagement Score, and Timepoint x Standardized Total Engagement Score interaction
- **Random effects** : Random intercept for participants and random slope for continuous time

Simple slopes were performed to compare slopes of outcomes over time between individuals with lower engagement (-1 SD), average engagement, and higher engagement (+1 SD)

# Statistical Approach

## Mixed effects models

- **Predictor:** Standardized Total Engagement Score
- **Outcomes:** HbA1c, TIR, TAR, mean glucose, mean SD glucose
- **Covariate:** Number of weeks enrolled in the digital DSME program
- **Fixed effects :** Timepoint, Standardized Total Engagement Score, Standardized Total Engagement Score interaction
- **Random effects :** Random intercept for participants and time

Sum of total number of action-oriented engagements, such as:

- Meals tracked
- Weigh-ins
- Messages sent to health coach
- Days with CGM readings

Standardized by subtracting the mean and dividing by the SD for ease of interpretation

Simple slopes were performed to compare slopes of outcomes over time between individuals with lower engagement (-1 SD), average engagement, and higher engagement (+1 SD)

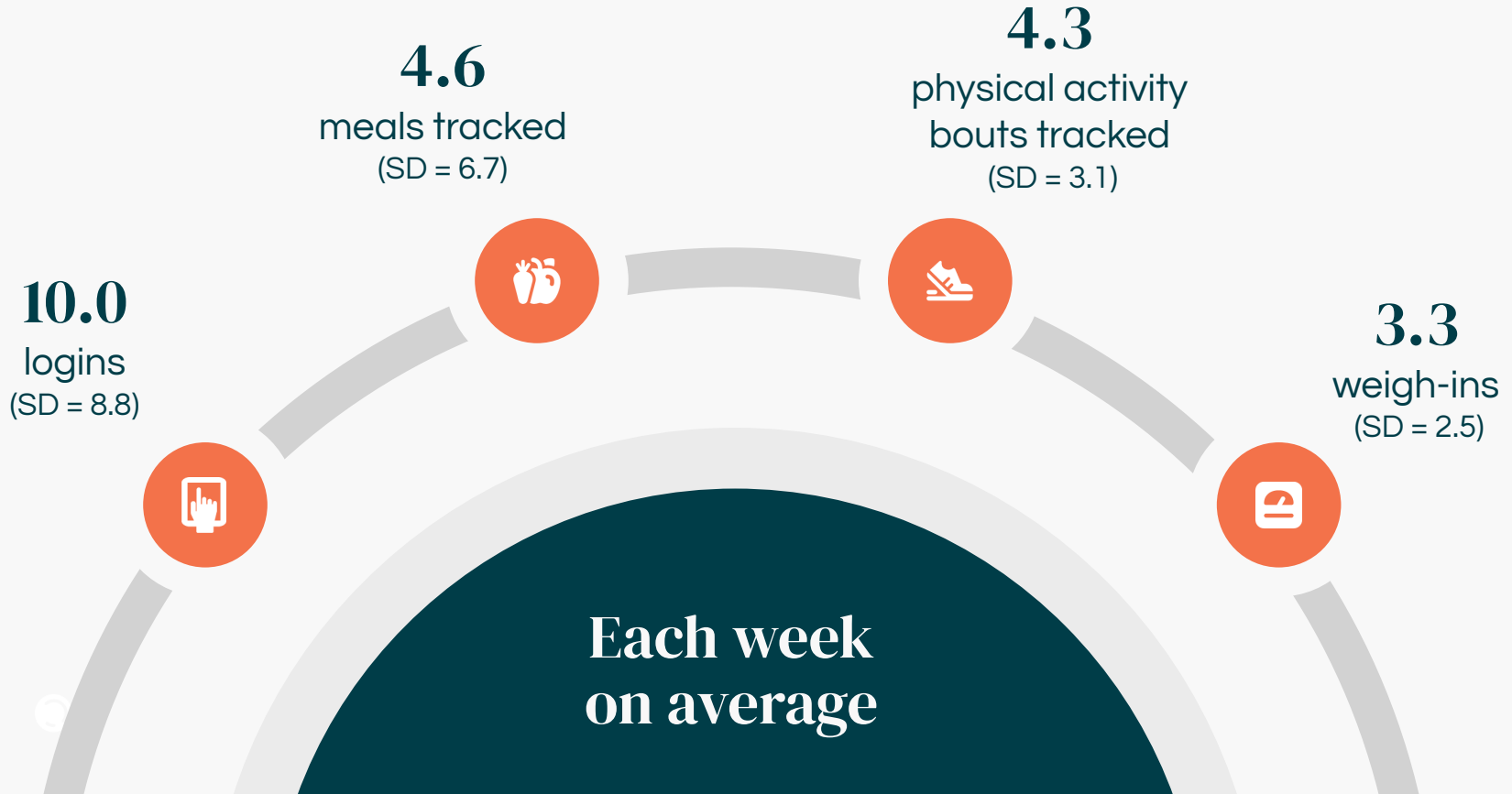
# Results

# Participants

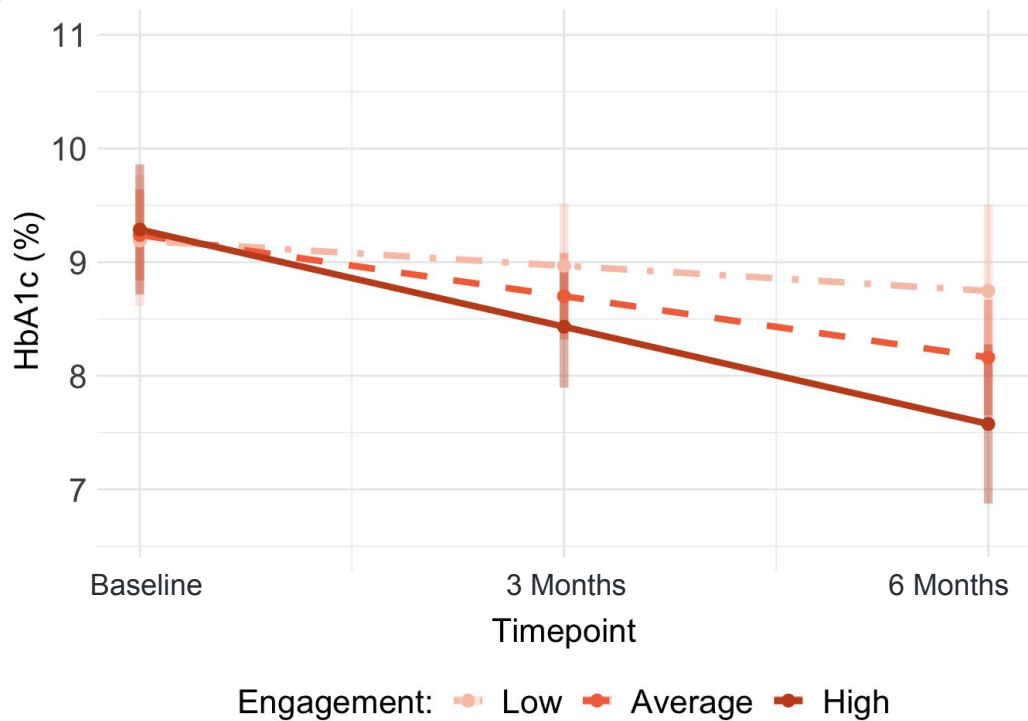


	n=42
<b>Age; M (SD)</b>	51.33 (10.54)
<b>Sex: Female; n (%)</b>	29 (69.0%)
<b>Race/Ethnicity; n (%)</b>	
White	23 (54.8%)
Black/African American	10 (23.8%)
Hispanic/Latino/Spanish	4 (9.5%)
Another Race	5 (11.9%)
<b>Education: &lt; 4-year college degree; n (%)</b>	21 (50.0%)
<b>Household income; median</b>	\$50,000 - \$74,999

# Descriptives: Individual Engagement Metrics



# HbA1c (%)



## Change from T1 to T3

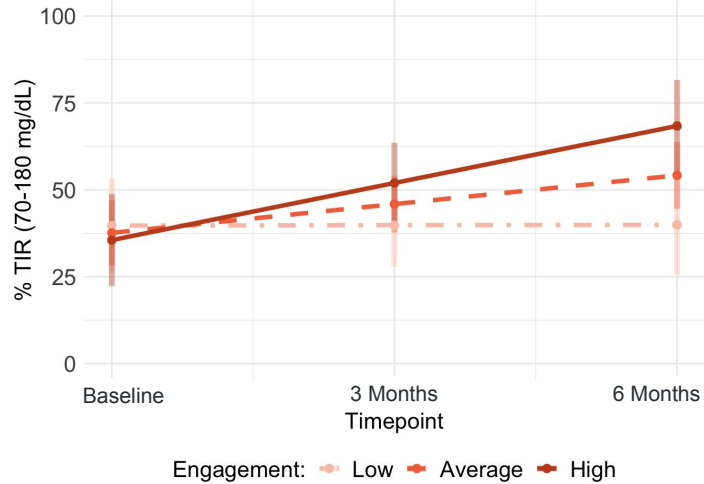
Lower Engagement (-1 SD)      Average Engagement      Higher Engagement (+1 SD)

**-0.44%**

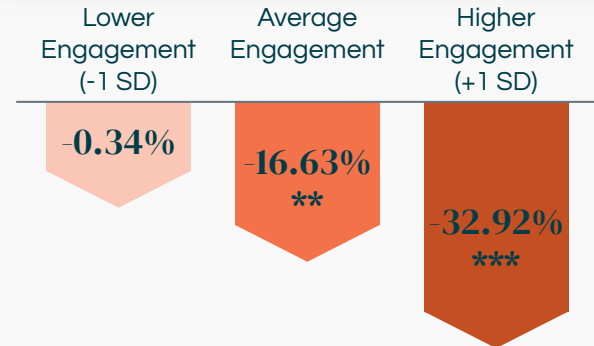
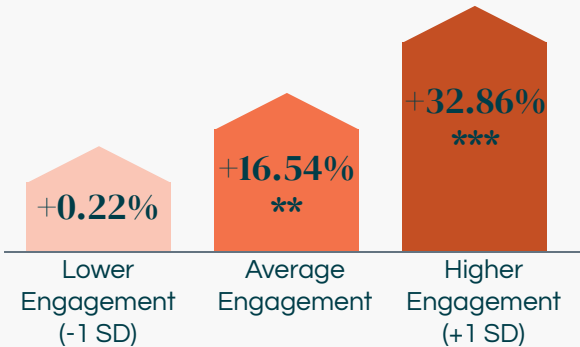
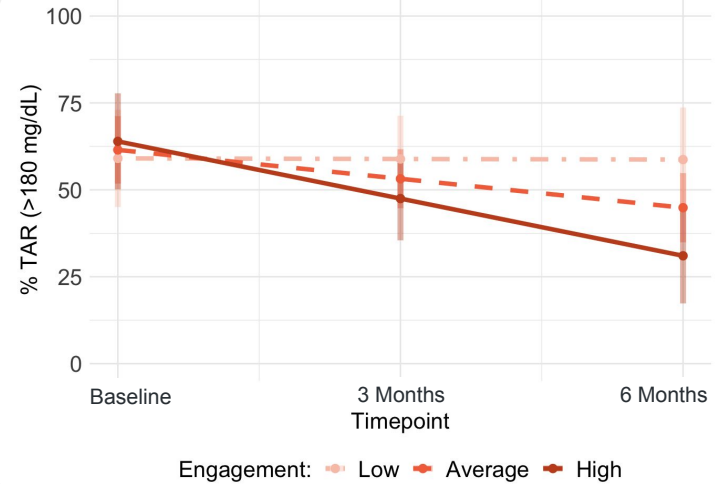
**-1.08%**  
**\*\*\***

**-1.71%**  
**\*\*\***

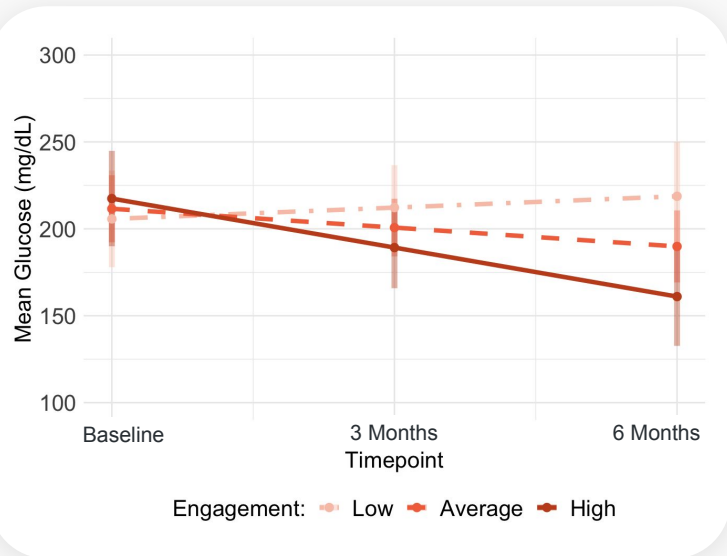
## % TIR (70-180 mg/dL)



## % TAR (>180 mg/dL)



## Mean Glucose (mg/dL)



**+13.02  
mg/dL**

Average  
Engagement

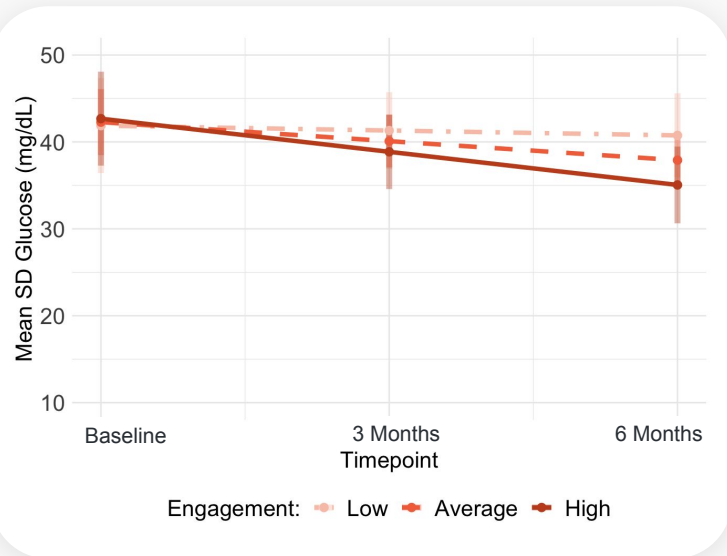
Higher  
Engagement  
(+1 SD)

Lower  
Engagement  
(-1 SD)

**-21.69  
mg/dL**  
+

**-56.41  
mg/dL**  
\*\*\*

## Mean SD Glucose (mg/dL)



Lower  
Engagement  
(-1 SD)

Average  
Engagement

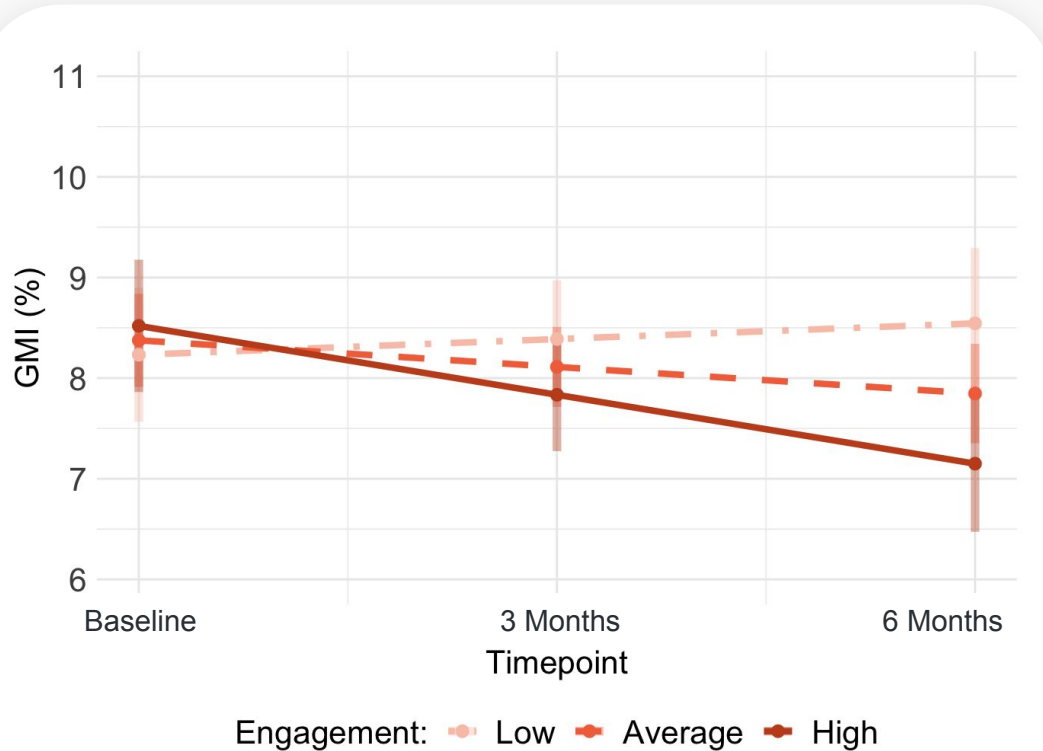
Higher  
Engagement  
(+1 SD)

**-1.12  
mg/dL**

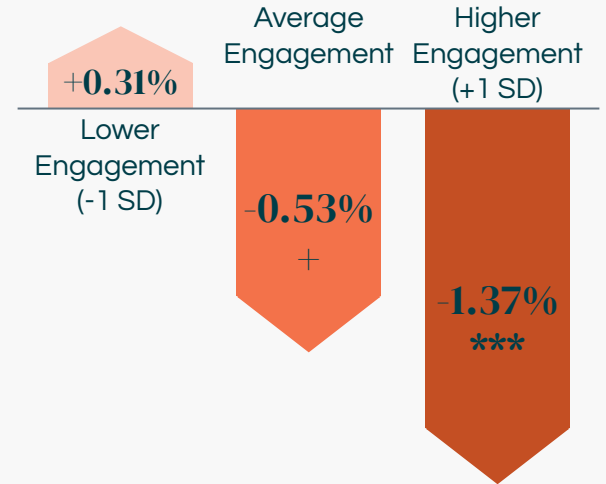
**-4.38  
mg/dL**  
\*

**-7.63  
mg/dL**  
\*\*

# GMI (%)



## Change from T1 to T3



# Discussion

**The DSMES + CGM  
integrated solution led to  
better clinical outcomes  
among members with  
average or high  
engagement.**

**-1.1%**

(12.0 mmol/mol)

reduction in HbA1c

among average engagers  
at 6 months

**-1.7%**

(18.6 mmol/mol)

reduction in HbA1c

among high engagers  
at 6 months

## Strengths

- Decentralized recruitment process + in-home clinician assessment visits → more diverse sample
- Low attrition rate

## Future Directions

- What program aspects kept members most engaged?
- How can we facilitate higher engagement across our population?

The image features a solid orange background. A large white semi-circle is positioned at the bottom, with its flat edge facing upwards. Centered within this white semi-circle is the text "Thank you!" in a dark teal, serif font. The word "Thank" is on the top line, and "you!" is on the bottom line, with the exclamation point being notably large.

**Thank  
you!**

# References

1. Chrvla CA, Sherr D and Lipman RD. Diabetes self-management education for adults with type 2 diabetes mellitus: a systematic review of the effect on glycemic control. *Patient Educ Couns* 2016;99(6):926–943; doi: 10.1016/j.pec.2015.11.003.
2. Fonda SJ, Graham C, Munakata J, et al. The cost-effectiveness of real-time continuous glucose monitoring (RT-CGM) in type 2 diabetes. *J Diabetes Sci Technol* 2016;10(4):898–904; doi: 10.1177/1932296816628547.
3. Jiao Y, Lin R, Hua X, et al. A systematic review: cost-effectiveness of continuous glucose monitoring compared to self-monitoring of blood glucose in type 1 diabetes. *Endocrinol Diab Metab* 2022;5(6):e369; doi: 10.1002/edm2.369.
4. Allen NA, Fain JA, Braun B, Chipkin SR. Continuous glucose monitoring counseling improves physical activity behaviors of individuals with type 2 diabetes: A randomized clinical trial. *Diabetes Res Clin Pract*. 2008;80(3):371-379. doi:10.1016/j.diabres.2008.01.006
5. Aronson R, Brown RE, Chu L, et al. IMpact of flash glucose Monitoring in pEople with type 2 Diabetes Inadequately controlled with non-insulin Antihyperglycaemic ThErapy (IMMEDIATE): A randomized controlled trial. *Diabetes Obes Metab*. 2023;25(4):1024-1031. doi:10.1111/dom.14949
6. Aleppo G, Gal RL, Raghinaru D, et al. Comprehensive Telehealth Model to Support Diabetes Self-Management. *JAMA Netw Open*. 2023;6(10):e2336876. Published 2023 Oct 2. doi:10.1001/jamanetworkopen.2023.36876
7. Zahedani AD, McLaughlin T, Veluvali A, Aghaeepour N, Hosseinian A, Agarwal S, Ruan J, Tripathi S, Woodward M, Hashemi N, Snyder M. Digital health application integrating wearable data and behavioral patterns improves metabolic health. *NPJ Digital Medicine*. 2023 Nov 25;6(1):216. doi:10.1038/s41746-023-00956-y