T1D Exchange


# CONTINUOUS GLUCOSE MONITORS *(CGM)* EQUITY CHANGE PACKAGE FOR TYPE 2 DIABETES

*APRIL 2025*

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# INTRODUCTION

**A Change Package is a document that describes the improvement methodology for a clinical or operational process.**

It includes a collection of ideas and resources that have a high likelihood of resulting in system improvements. These ideas have either been tested by a Learning Collaborative, sourced from literature, or developed by experts in the field. The change package is intended to be a pragmatic guide of best practices, testable ideas, tools, and strategies that can be adapted to a new setting, thereby accelerating implementation.

This type 2 diabetes *(T2D)* CGM Equity change package represents shared learning from three adult diabetes centers and members of the T1D Exchange Quality Improvement Collaborative*(1,2)*. This document aims to summarize lessons learned, provide examples, and share results from a T2D CGM equity-focused quality improvement multi-site project.

## How to use this change package

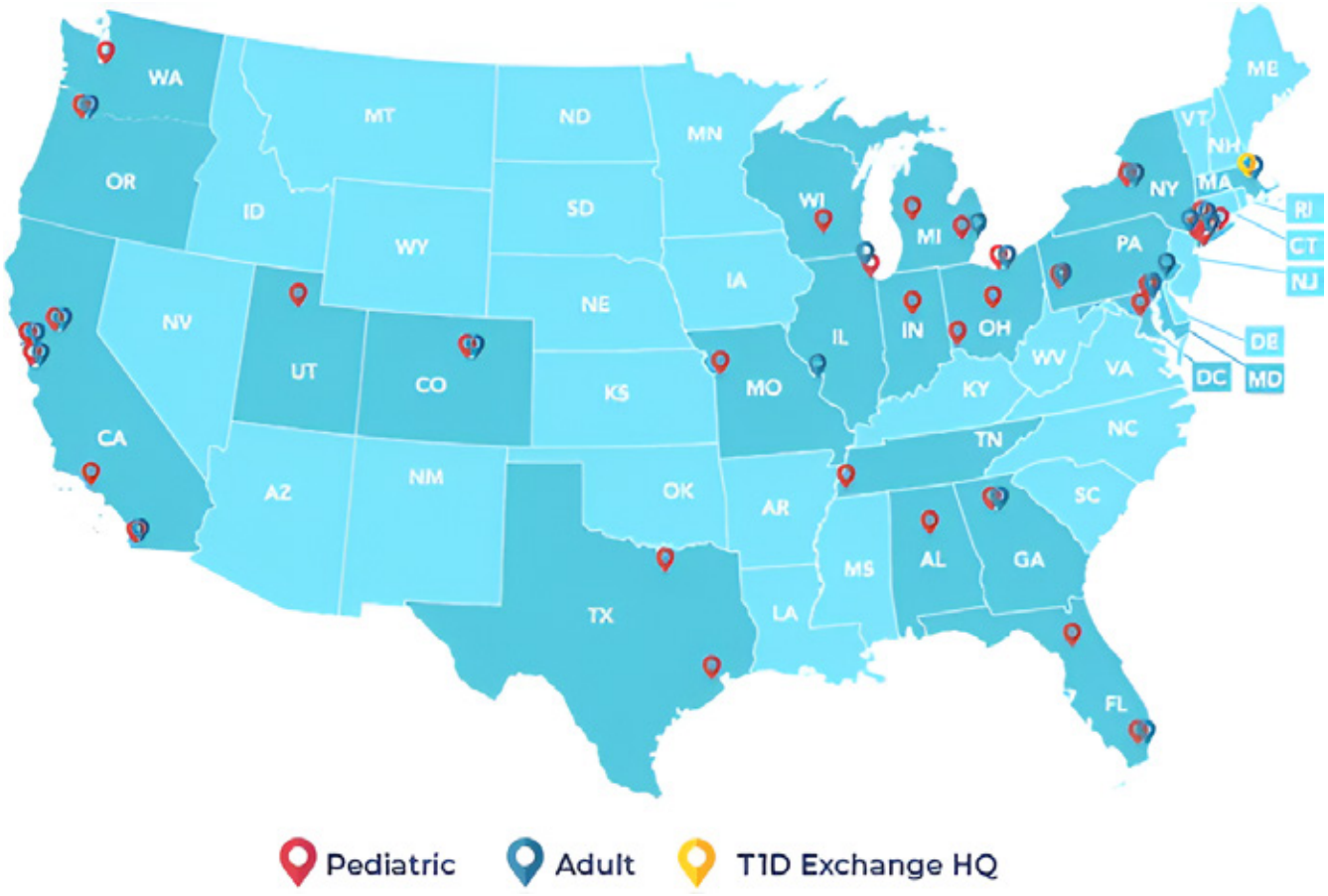
This change package can be used by hospital administrators, clinicians, and other healthcare stakeholders who seek ideas for changes to improve equitable access to Continuous Glucose Monitors *(CGM)* and other diabetes technologies. To use this change package, review the different tested change ideas with your improvement team and select ideas that can be adapted to your organization. Change ideas outlined can be tested quickly using the Institute of Healthcare Improvement Model for Improvement*(3)*. A change package is best used in combination with other quality improvement methodologies and relevant skills. Clinical centers should consider the following to ascertain readiness to change:

- Alignment with the organization's goals and leadership support.
- A motivated multi-disciplinary team and a change champion.
- The relevance of the project and the desire to implement change.
- Development of specific, measurable, achievable, realistic, time-bound aims.
- Team members with their unique skills to map existing clinical processes identify potential failures and opportunities.
- Organizational willingness to try small tests of change (Plan-Do-Study-Act (PDSA) cycles); adapt what works and abandon or quickly learn lessons from what does not
- A team member with analytic capabilities to measure and display data.
- Infrastructure to spread successful interventions to eligible clinic populations and sustain them over time.

# BACKGROUND

The T1D Exchange is a Boston-based nonprofit with a mission to improve the outcomes of people with diabetes. The T1D Exchange Quality Improvement Collaborative *(T1DX-QI)* has 62 pediatric and adult endocrinology centers across the US *(Figure 1)* with 200,000+ patient data. T1DX-QI has the largest registry of patients with T1D in the US. In designing the Collaborative, the T1D Exchange mobilized endocrinologists, parents/patients with T1D, informational technology experts, diabetes educators and other clinical staff, quality improvement experts, and others to design broad "interventions" that can result in the highest impact for patients and lead to improved organizational quality improvement culture*(2)*. Participating organizations receive quality improvement guidance from the T1DX-QI Improvement Coaches*(1)*.

**Figure 1: Map of T1D Exchange participating centers**

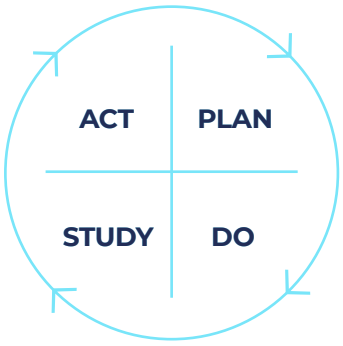


## CGM IN T2D Equity Project

Continuous glucose monitoring *(CGM)* is well established for managing type 1 diabetes *(T1D)* and has shown benefits in improving glycemic control and reducing hypoglycemia. Most published studies have demonstrated the value of continuous glucose monitors *(CGM)* in type 1 diabetes management*(4)*. CGM has demonstrated benefits for glycemia and quality-of-life outcomes for those with T2D as well and is recommended by clinical practice guidelines*(5)*. However, significant disparities exist in CGM adoption among People with Type 2 Diabetes *(PwT2D)* despite their known benefits*(6,7)*. Some barriers create gaps in the adoption of CGM among PwT2D. These barriers can be mental and physical; such as not wanting to wear a medical device due to its perceived effects on daily activities, physical pain from sensor insertion, and possible skin reactions at the site of adhesion*(8)*. Other barriers can be financial or caused by insurers' denial of medical devices*(9)*. Due to the cost of these devices, insurance-related barriers may have a more pronounced effect on low-income and historically disadvantaged populations.

## T1D Exchange QI Collaborative Equity Framework

Participating centers utilized the T1DX-QI Health Equity Framework*(10)* to plan and test interventions. The following components of the T1DX-QI Health Equity Framework were implemented during the project: baseline analysis for disparities, identifying pain points in the clinical processes, identifying contributing factors to disparities, brainstorming improvement ideas, and testing interventions using the Plan-Do-Study-Act *(PDSA)* cycles, and analyzing results.




**Step 1**
Review program/project baseline data for existing disparities

**Step 2**
Build an equitable project team

**Step 3**
Develop equity-focused goals

**Step 4**
Identify inequitable processes/pathways

**Step 5**
Identify how sociodeterminants are contributing to the current outcome

**Step 6**
Brainstorm possible improvements

**Step 7**
Use the decision matrix with equity as a criterion to prioritize improvement ideas

**Step 8**
Test out one small change at a time

**Step 9**
Measure and compare results with predictions to identify inequitable practices or consequences

**Step 10**
Celebrate small wins and repeat the process

Figure 2: T1D Exchange Equity Framework

# STUDY METHODOLOGY

This study was deemed non-human subject research by the Western Institutional Review Board. The study was conducted among three adult diabetes centers in the T1D Exchange Quality Improvement Network. Participating centers applied the T1DX-QI Health Equity Framework to increase CGM use equitably among PwT2D. Participating centers tested changes using a series of PDSA cycles to increase the prescription of CGM among PwT2D. Centers shared monthly data with the coordinating center. Aggregate data were collected monthly from January 2023 through December 2024.

## Process maps

A process map is a tool that helps to understand and visualize complex systems and supports the adaptation of improvement interventions *(11)*. All participating centers shared their team's process maps with the coordinating center. A sample process map from a participating center is below *(Figure 4)*. The process maps were different for all participating centers, but there were a few similarities in their clinical workflows. Recurring pain points were categorized into tier 1 and tier 2. This was based on how common the occurrence was with tier 1 being the most common and tier 2 being least common. Tier 1 pain points include providers being responsible for determining which patients will most benefit from personal CGM, scheduling visits with diabetes educators, confusion about which pharmacy or durable medical equipment *(DME)* supplier to send CGM prescriptions to, providers not being aware of CGM approval and/or denial and lag time between prescription and initiation of paperwork. Tier 2 pain points include insurance denials, transportation barriers, and communication issues with patients *(Figure 5)*.

**Figure 3: Process Map Showing Pain Points**

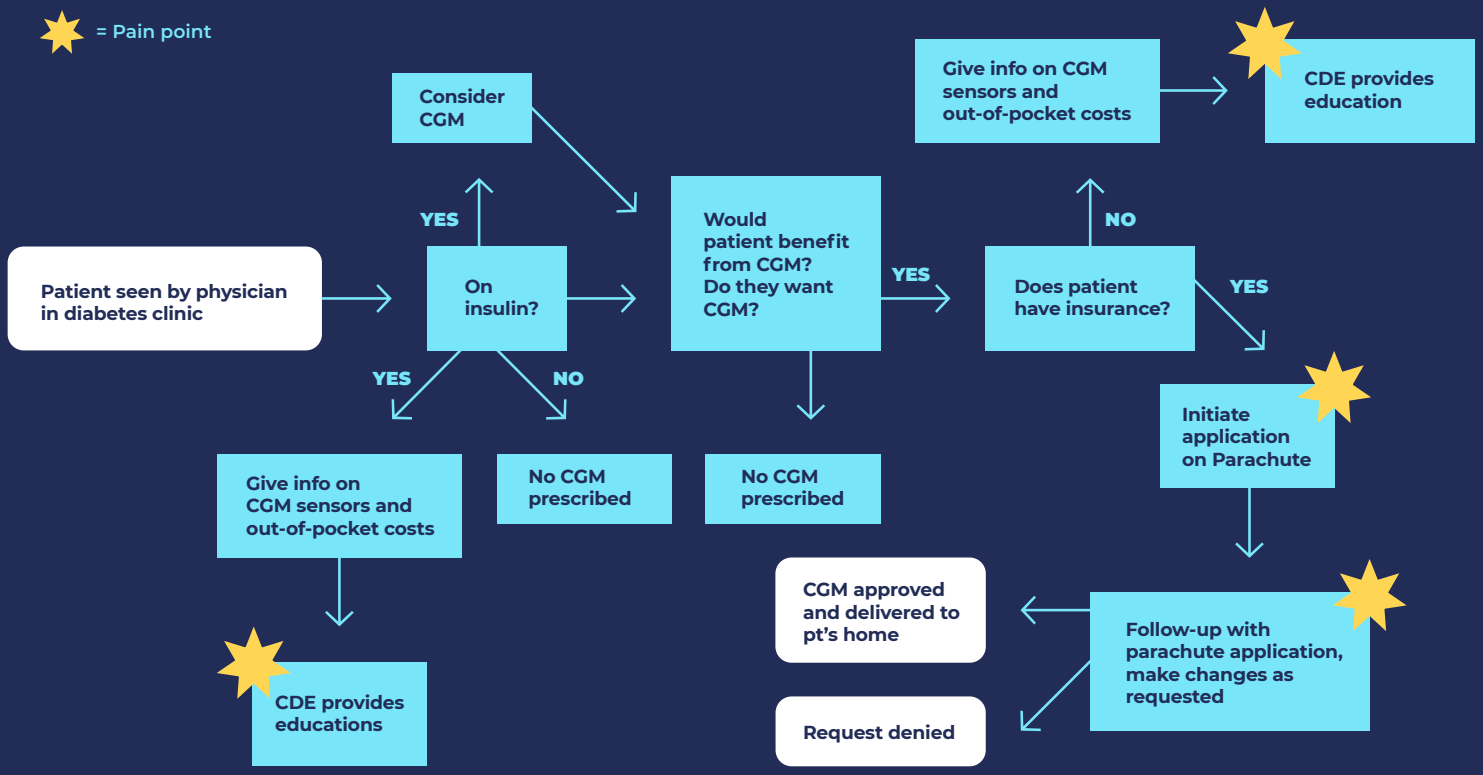
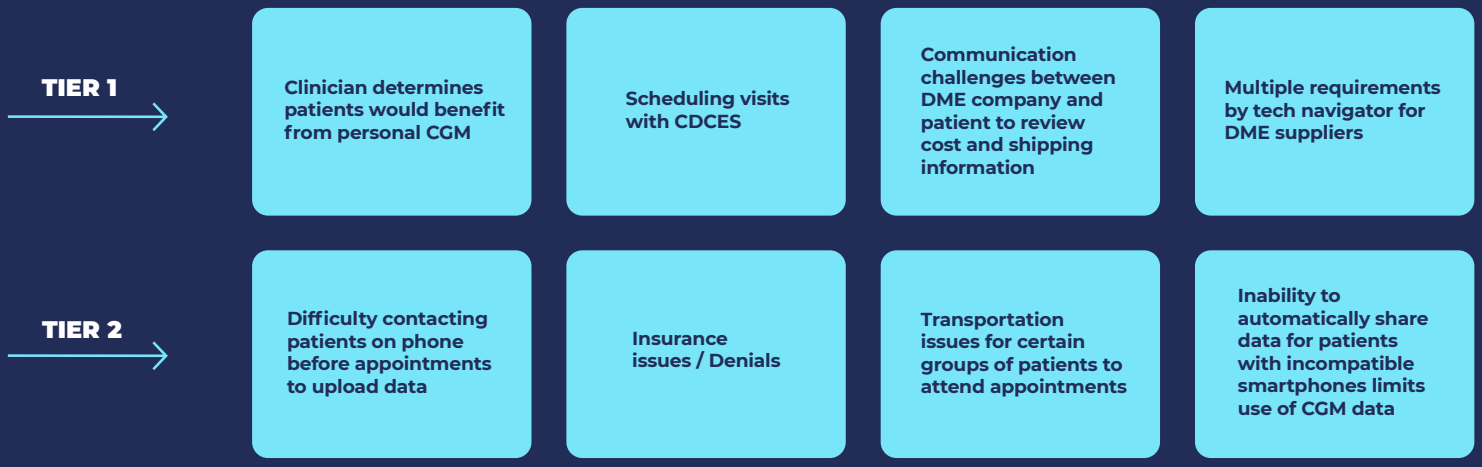


Figure 4: Pain Points Contributing to Inequitable CGM Use

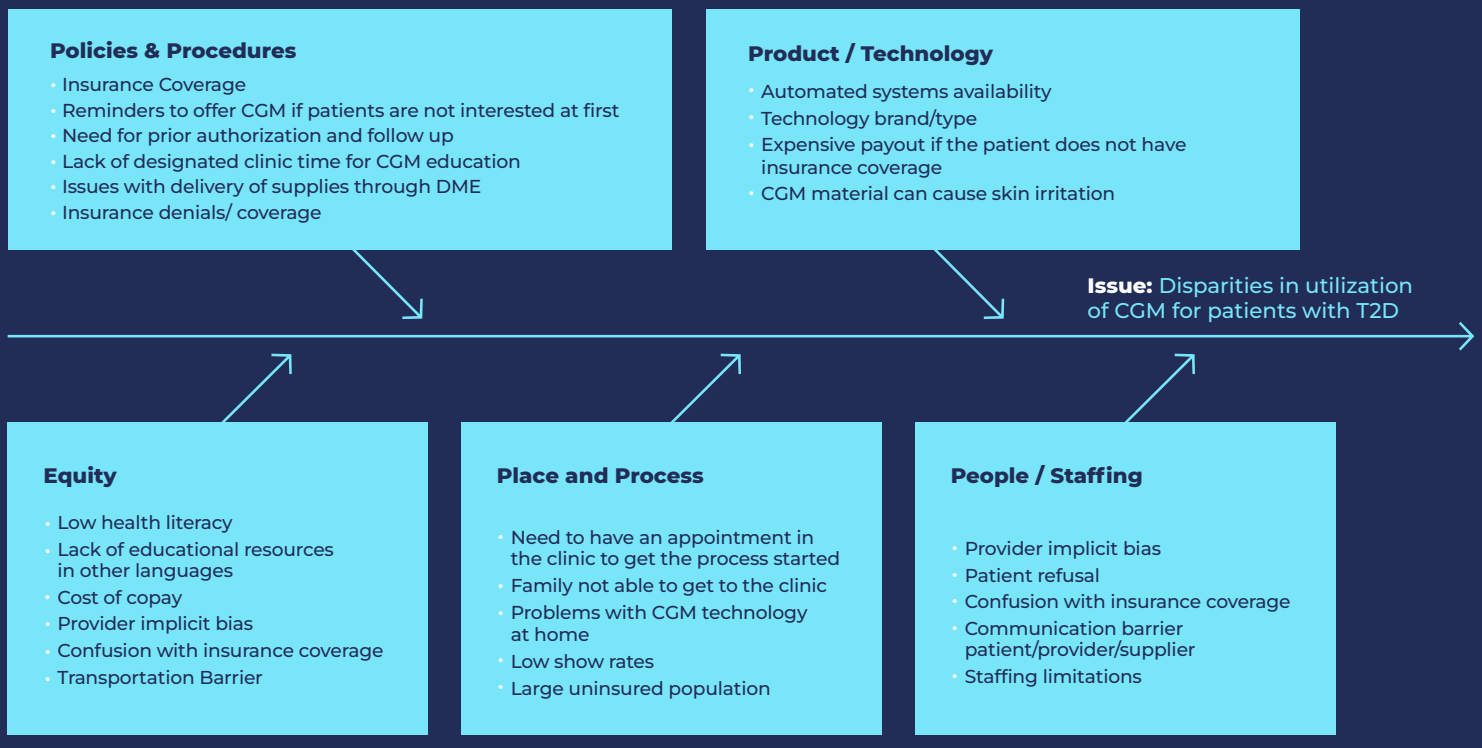



## Fishbone Diagram

The Fishbone Diagram, also known as the cause-and-effect diagram, is a quality improvement tool used to identify the contributing factors of an issue. It is a useful tool for brainstorming causes and potential solutions to a problem*(12)*.

The Equity Framework describes a Fishbone with an equity component*(10)*. The participating centers used a Fishbone with an equity lens to identify the root causes of disparities in CGM use among PwT2D *(Figure 5)*.

Figure 5: T2D CGM Equity Fishbone



# Key Driver Diagram (KDD)

A Key Driver Diagram *(KDD)* is a Quality Improvement tool that teams use as a guide to increase the chance of success during their QI journey *(13)*. This diagram is a pictorial illustration of the relationship between the aim statement of the project, the primary drivers that contribute directly to achieving the aim, and the change ideas that influence the primary drivers. The participating centers created a KDD *(Figure 6)* to collaboratively increase CGM use among PwT2D equitably. The center column lists primary drivers that are essential components for the aim to be accomplished. The following drivers were identified for increasing CGM prescriptions.

**1. Provider Education // 2. Patient Education // 3. Improve Clinic Process // 4. Address inequities // 5. Partner with Vendors and Payors //**

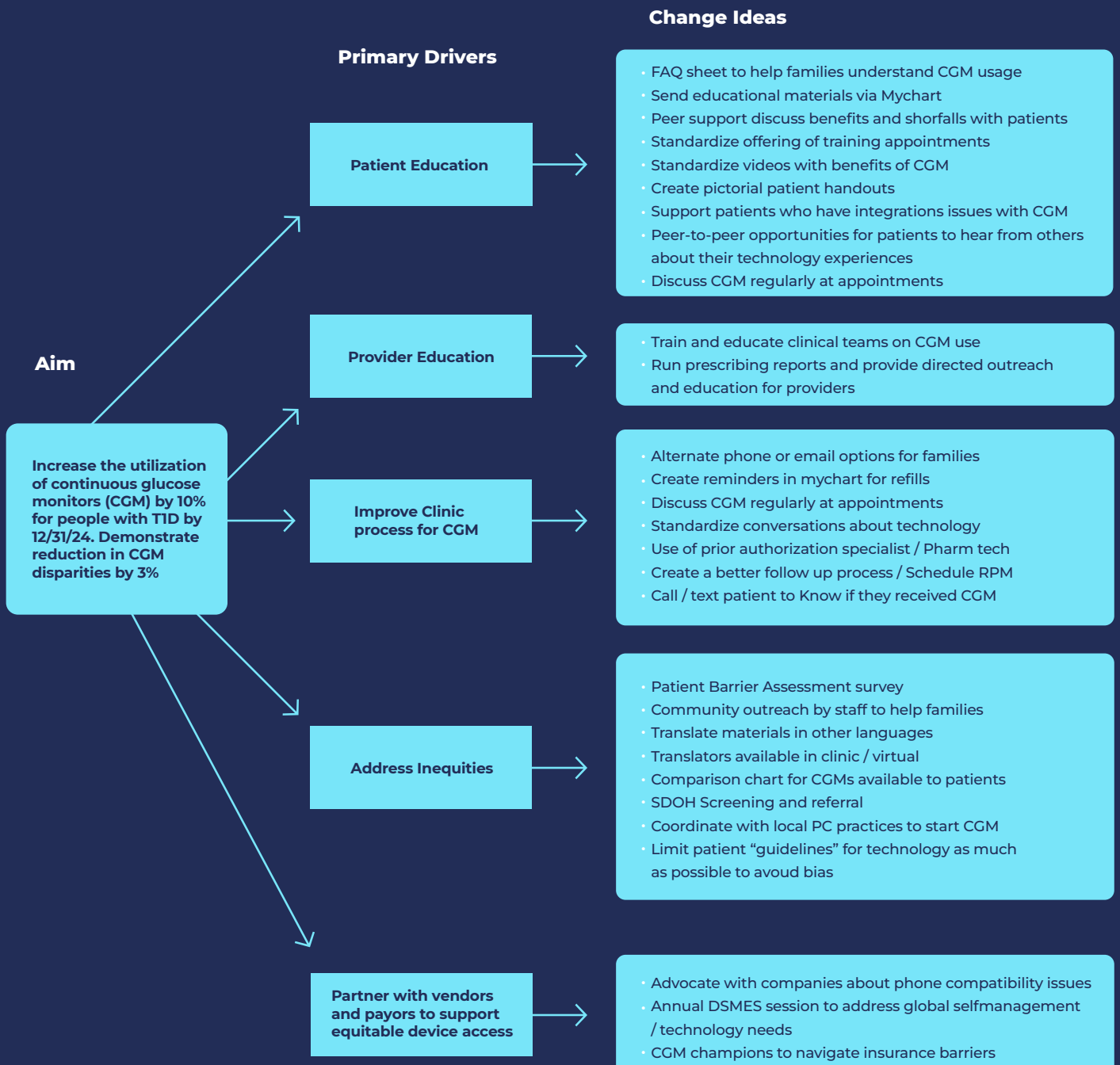


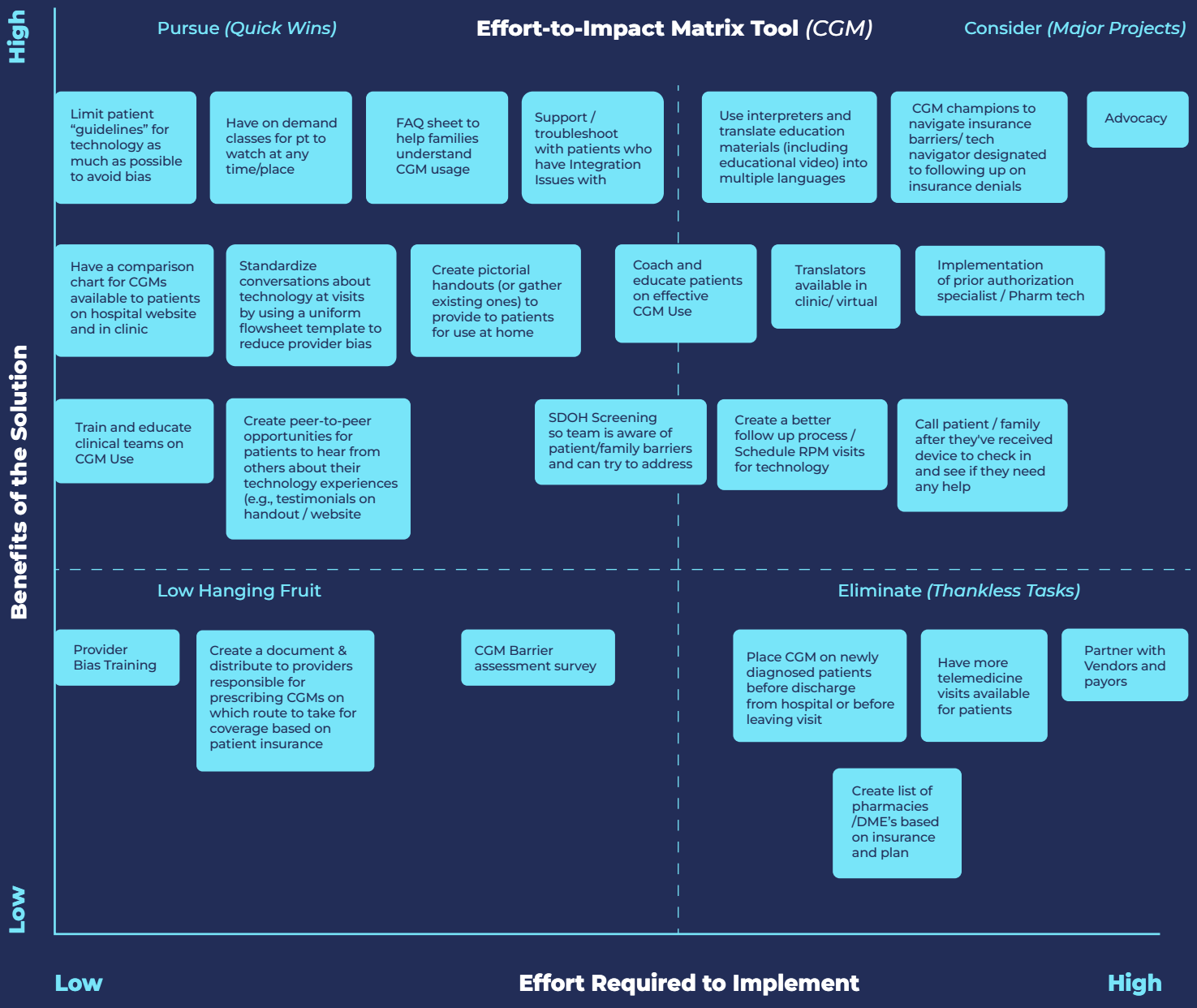

Figure 6: T2D CGM Equity Project Key Driver Diagram

# Effort-to-Impact Matrix (Pick Tool)

The Effort-to-Impact Matrix is a tool that helps Quality Improvement teams prioritize ideas by evaluating the effort required versus the potential impact*(14)*. It categorizes strategies into four quadrants, such as low-effort, low-impact *(e.g., use of CGM posters)*, and high-effort, low-impact strategies, which may demand significant effort but result in minimal improvements in patient outcomes *(e.g., mailing postcards to patients)*.

Low-effort, high-impact strategies should be pursued first for quick wins. This framework aids in making strategic decisions to focus on actions that maximize impact while minimizing unnecessary effort. The participating centers created an Effort-To-Impact-Matrix *(Figure 7)* to prioritize interventions to increase CGM use among PwT2D equitably.

**Figure 7: Effort-to-Impact Matrix Tool**



## T2D CGM Equity Project Results

T1DX-QI has previously utilized the T1DX-QI Framework to increase CGM use among people with type 1 diabetes in a pilot project*(15)*. Across five centers, there was an increase in CGM use by 7% in non-Hispanic whites, 12% in non-Hispanic Blacks, and 15% in Hispanic PwT1D median CGM use. The gap between non-Hispanic White and non-Hispanic Black PwT1D decreased by 5% *(15)*.

The results below are from the three centers that participated in the scheduled monthly calls and completed at least ten rapid improvement cycles *(Plan-Do-Study-Act cycles)*. We thoughtfully applied the T1DX-10-Step Equity Framework to implement this project. Participating centers tested and scaled interventions using rapid PDSA cycles, and successful changes were scaled and sustained.

## Boston Medical Center, Boston

Boston Medical Center *(BMC)* is an academic medical center in Boston and the largest safetynet hospital in New England with >70% of patients coming from historically underserved groups including those who are publicly insured. Approximately 60% of patients are Black, approximately 10% Hispanic, and over 30% have non-English language preferences. BMC is an affiliate of Boston University Chobanian & Avedisian School of Medicine. BMC's adult diabetes program is recognized by the American Diabetes Association with a mission to improve health and quality of life for patients through diabetes management, education, support, advocacy, and research. The team was interested in increasing equity in CGM use for PwT2D. The team tested the following interventions.

- **The use of CGM Educational Videos:**

  The team created a CGM educational video that includes benefits, tips, and tricks and a brief overview of features. The video was uploaded on BMC's website and the team provided QR codes in the examination room for patients and providers to access videos. Videos were recorded in English, Spanish, and Haitian Creole, the 3 most common languages spoken by patients of the clinic.The team also publicized the availability of videos during faculty grand rounds.

- **Use of CGM Poster in clinic:**

  The team created English and Spanish language colorful CGM posters which were displayed in clinic waiting rooms to promote patient awareness of and curiosity about CGM, as well as encourage them to discuss it with the diabetes care team.

- **Technology Navigator and Pharmacy Prior Authorization Support:**

  The team implemented the use of a technology navigator and pharmacy prior authorization support to help clinicians and patients complete necessary insurance paperwork and assist them with CGM supply through.

- **Diabetes Website:**

  The team updated their diabetes website with patient education materials. Patients are encouraged to visit websites. **https://www.bmc.org/diabetes/diabetes-education https://www.bmc.org/diabetes/diabetes-educational-videos.**

- **Insurance Reference Table:**
  The team developed an insurance eligibility reference table to assist clinicians in determining insurance coverage and streamline the CGM prescription process. This reference table was made available in exam rooms and used by faculty when precepting the fellows' clinic. It provides a list of common insurance types (Medicaid, Medicare, Commercial) and details the criteria required for CGM coverage for each.

- **Barrier assessment questionnaire:**
  The team developed a questionnaire to assess additional barriers to CGM prescription and distributed it to all clinicians in the practice. Inclusive of endocrinologists, endocrinology fellows, nurses, registered dietitians, nurse practitioners, and clinical pharmacists. This identified future interventions for subsequent testing in PDSA cycles including in-service education for registered dietitians.

BMC increased overall CGM use among PwT2D by 14% *(Figure 8)* and increased CGM use among non-Hispanic Blacks and Hispanics by 15% and 16% respectively over 24 months *(Figure 9, 10)*.

**Figure 8: BMC % of T2D Patients on CGM**

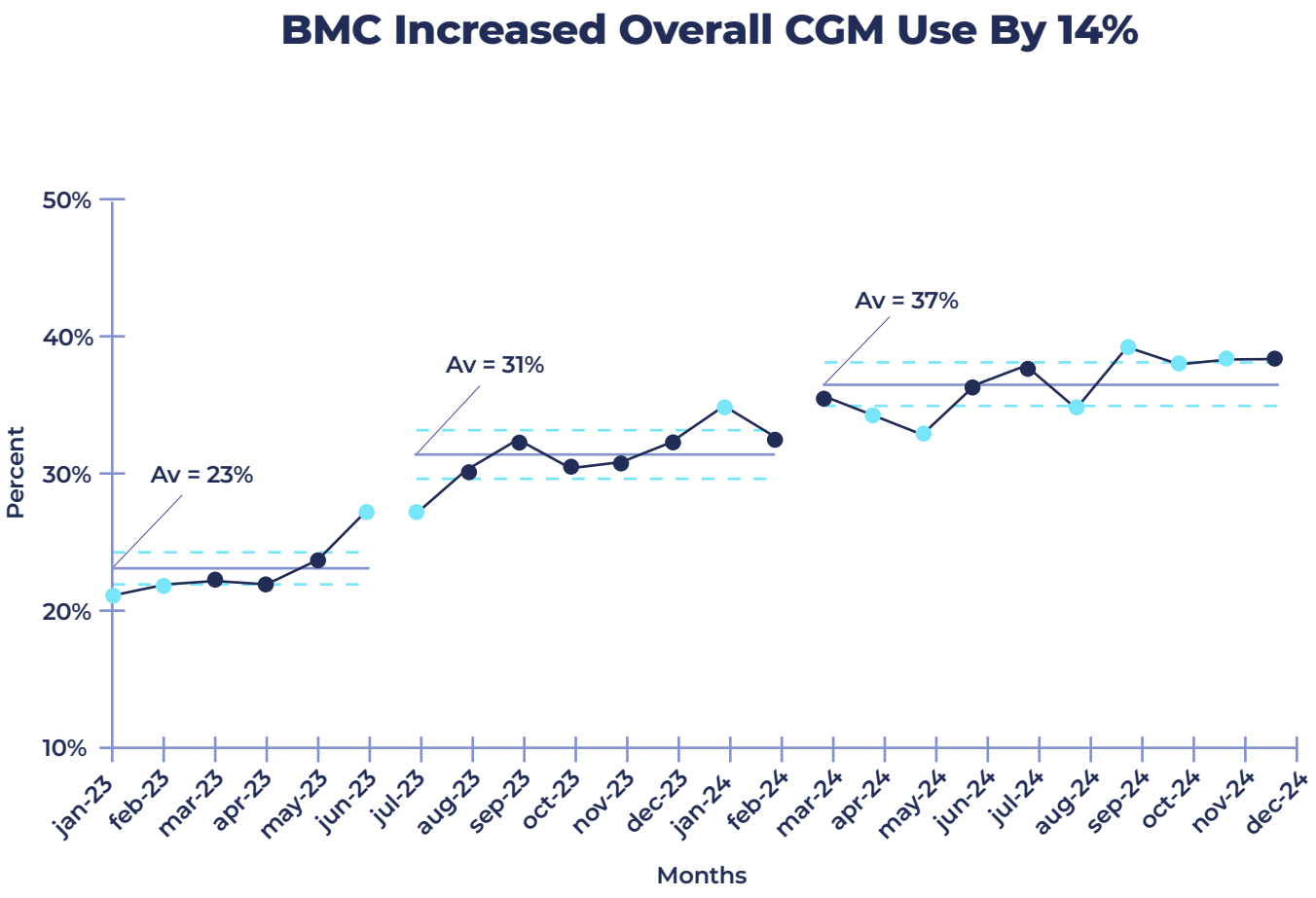


Figure 9: BMC % of T2D NHB Patients CGM Use

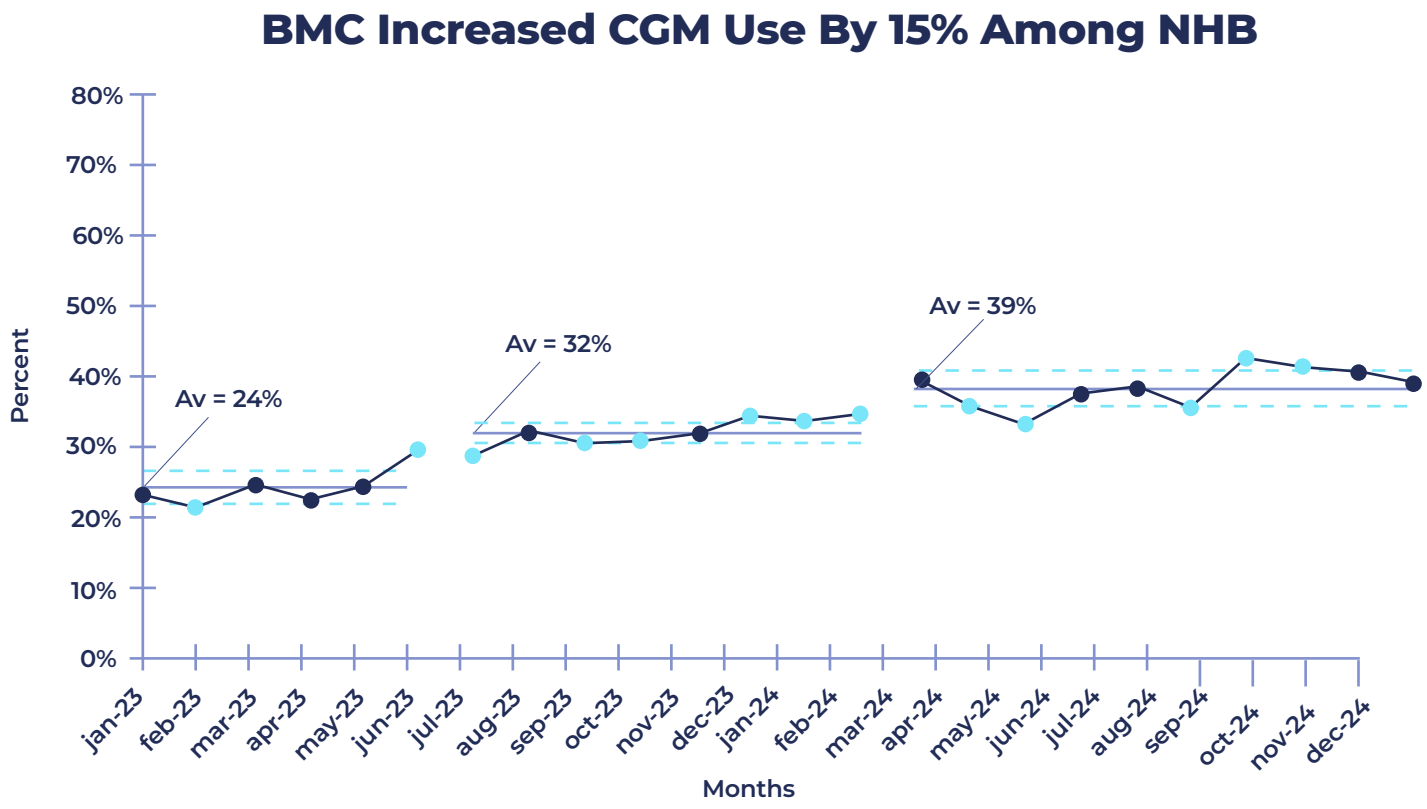
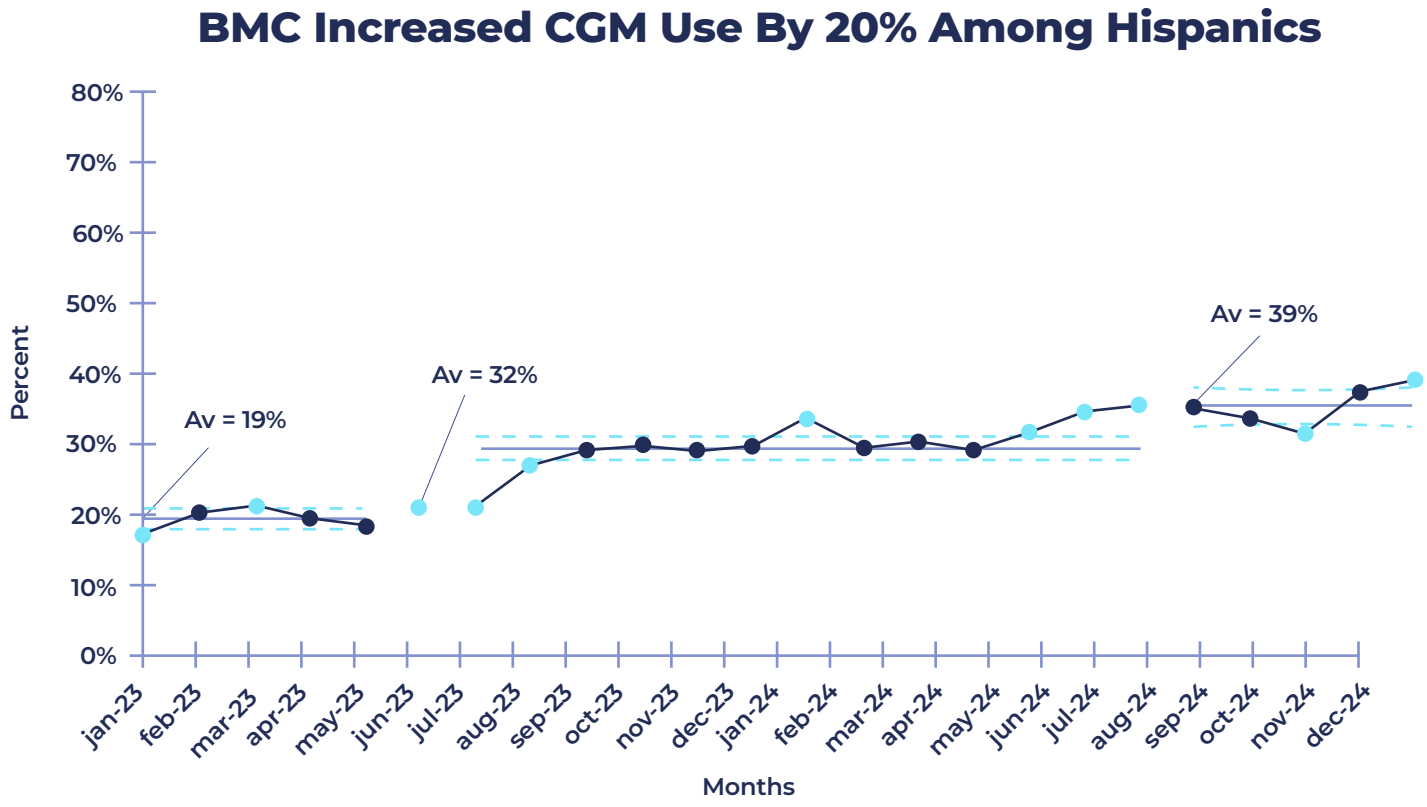



Figure 10: BMC % of T2D HIS Patients CGM Use



## Grady Memorial Hospital, Atlanta

Grady Memorial Hospital is the public safetynet hospital for the city of Atlanta. The hospital serves a large proportion of low-income patients, and the majority of these patients are publicly insured or uninsured. Affiliated with Emory University School of Medicine, the Grady Diabetes Center is the largest outpatient diabetes center in the Southeast, providing diabetes care and education for nearly 14,000 people with diabetes. Over 80% of those who are getting care at Grady's Diabetes Center self-identify as NHB and approximately 1/3 are uninsured. The team tested the following interventions to increase CGM use among PwT2D:

- **CGM screening questionnaire:**

  The team developed a one-page CGM screening questionnaire. The questionnaire is used to assess if a patient is currently using CGM or interested in doing so. It also asks about insurance coverage, insulin usage, and the ability to pay out of pocket for CGMs. The CGM Screener was translated into Spanish for Spanish-speaking patients. The screener is reviewed with the patient by the provider who signs the screener.

- **Clinic Flow:**

  The CGM Screener was integrated into normal clinic operations. The CGM Screener was given to all new patients and established patients at pre-specified times *(two 3-month intervals per year)*. The triaging medical assistant would encourage the patient to fill out the CGM Screener while waiting for the provider. And the providers integrated reviewing these with the patient as part of their routine visit. These CGM Screeners were then collected and reviewed by the QI Team to select patients interested in CGM classes.

- **In-person CGM classes:**

  The team developed a basic and advanced CGM curriculum for patients interested in using CGMs. These classes were led by CDCES clinic staff and provided bimonthly. The curriculum was revised with multiple iterations after input from patients and staff. It was created to allow for easy replication by staff in other departments/clinics moving forward. Knowledge was assessed using pre- and post-testing.

- **CGM Insurance Access Map:**

  The team created a "CGM insurance access map" to streamline the CGM prescription process. It describes the step-by-step process of how CGMs are ordered by various insurance plans, provides a comprehensive list of insurance types with details of specific CGM options covered by each insurance plan, the most effective DME companies to use, and helps providers to determine what type of CGMs to prescribe depending on the patient's insurance. These access maps require routine updating, which was done by the Diabetes Center staff, specifically the PharmD and RD who were both part of the QI team.

## University of Pittsburgh Medical Center (UPMC), Pittsburgh

UPMC is an academic medical center and operates community, and specialty hospitals with more than 8,000 licensed beds, and 800 clinical locations including outpatient sites and doctors' offices. The Division of Endocrinology includes more than thirty clinicians across 9 clinical sites and serves approximately 1,700 adults with type 2 diabetes each month. The population of adults with type 2 diabetes seen at UPMC includes approximately 66% Black adults and 25% white adults, with approximately 2% Hispanic or Latino. Approximately 60% of these patients are commercially insured, the majority by UPMC Health Insurance, as this is an integrated health system; approximately 20% have Medicare and 20% have Medicaid. The team tested the following interventions:

- **CGM FAQ sheet:**

  The team created a CGM FAQ sheet to answer quick questions patients may have about CGM.

- **CGM Posters:**

  The team created CGM Posters and placed them in strategic locations throughout the clinic to educate patients on potential benefits and eligibility for CGM. Medical Assistants direct eligible T2D patients to posters and the FAQ sheet during visits.

- **CGM screening questionnaire:**

  The team revised the one-page CGM screening questionnaire used by a participating center to assess if a patient is currently using CGM or is interested in using it.

- **Use of Electronic Health Record (EHR):**

  The team uses the EHR system to capture CGM on the quality dashboard. The team plans to use this to facilitate targeted outreach to patients and their providers to promote CGM uptake.

- **Diabetes technology navigator:**

  This member of the team handles DME orders and insurance forms for CGM, advises providers on eligibility and coverage, places correct orders to appropriate DME suppliers based on coverage.

- **The team provides ongoing translation services:**

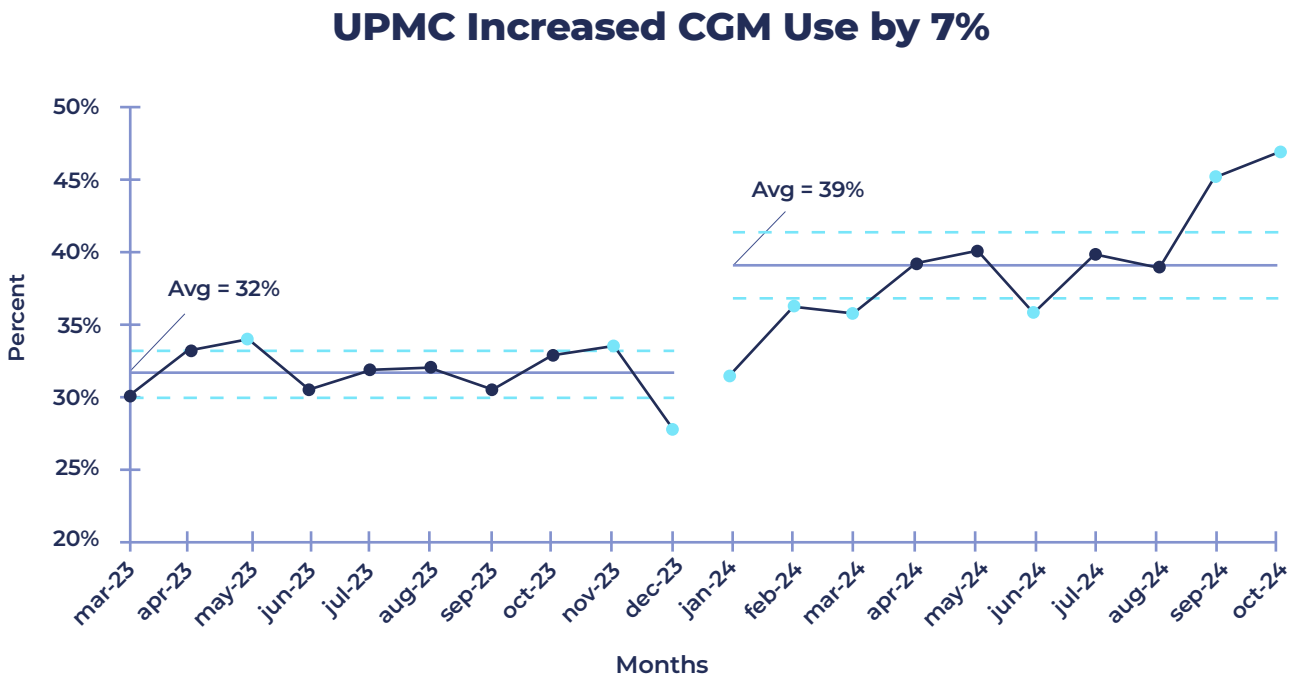
  Service is available in-person with prior requests or virtually via phone for both telemedicine and in-person visit.

- **The team identified barriers to CGM uptake for T2D patients.**

  After identifying barriers, the team addressed the barriers.

UPMC increased overall CGM use among PwT2D by 12% *(Figure 11).*

**Figure 11: UPMC % of T2D Patients on CGM**



# SUMMARY

We thoughtfully applied the T1DX-10-Step Equity Framework in implementing this project. Participating sites tested and scaled interventions using rapid PDSA cycles, and successful changes were scaled and sustained. Although reducing racial inequities is complex, it is achievable with gradual and consistent changes to processes at all levels of care. The following lessons were learned through the project:

1. Quality Improvement tools were useful in increasing equitable CGM use in T2D
2. Clinic processes and policies are different for participating sites, and interventions can be tailored to the guidelines and procedures in place for successful outcomes
3. Monthly team meetings with multidisciplinary team members are a valuable tool for sharing improvement ideas and to foster learning
4. Staff turnover, burnout, and staff shortages limit the ability of clinical sites to scale up interventions
5. Timely data reporting and a dedicated and engaged QI team accelerate the success of QI projects.

# Appendix A : T1DX-QI Collaborative Clinic Profile

| Clinic | Active PW2D Population | Collaborative Team Members & Roles | Email |
|---|---|---|---|
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| Children's Hospital of Los Angeles, (Pediatric) Los Angeles, CA | 882 | Brian Miyazaki, PI<br>Jenny Min<br>Anne Peters<br>Lily Chao | bmiyazaki@chla.usc.edu<br>hmin@chla.usc.edu<br>apeters@chla.usc.edu<br>Lchao@chla.usc.edu |
| Children's Mercy - Kansas City, (Pediatric) Kansas City, MO | 473 | Mark Clements, PI<br>Ryan McDonough<br>Malisa McEchen<br>Heather Feingold<br>Stephanie Wurtz<br>Jerin Wurtz<br>Emily DeWit<br>Melissa Newmaster<br>Julie Kincheloe | maclements@cmh.edu<br>rjmcdonough@cmh.edu<br>mbmceachen@cmh.edu<br>hfeingold@cmh.edu<br>swurtz@nemvch.org<br>jwein.wurtz@frontierfarmcredit.com<br>eldewit@cmh.edu<br>mnewmaster@cmh.edu<br>jakincheloe@cmh.edu |
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# Appendix A : T1DX-QI Collaborative Clinic Profile

| Clinic | Active PW2D Population | Collaborative Team Members & Roles | Email |
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| Cincinnati Children's Hospital Medical Center (Pediatric), Cincinnati, OH | 3126 | Sarah Corathers, PI Nana Hawa<br>Yaya Jones<br>Larry Dolan<br>Amy Grant<br>Carla Allen<br>Jessica Kichler<br>Amanda Sylvester<br>Justin Masterson<br>Molly Neely | Sarah.corathers@cchcm.org<br>Nana.Jones@cchmc.org<br>larry.dolan@cchmc.org<br>Amy.Grant@cchmc.org<br>Carla.Allen@cchmc.org<br>Jessica.Kichler@cchmc.org<br>Amanda.Sylvester@cchmc.org<br>justin@empathoscompany.com<br>Molly.Neely@cchmc.org |
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# Appendix A : T1DX-QI Collaborative Clinic Profile

| Clinic | Active PW2D Population | Collaborative Team Members & Roles | Email |
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|---|---|---|---|
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|---|---|---|---|
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| Clinic | Active PW2D Population | Collaborative Team Members & Roles | Email |
|---|---|---|---|
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# References


**1.** Weinstock, Ruth S., et al. "T1D Exchange Quality Improvement Collaborative: a learning health system to improve outcomes for all people with type 1 diabetes." *Clinical Diabetes: A Publication of the American Diabetes Association* 39.3 (2021): 251.

**2.** Alonso GT, Corathers S, Shah A et al. Establishment of the T1D Exchange Quality Improvement Collaborative(T1DX-QI). Clin Diabetes. 2020 Apr;38(2):141-151. doi: 10.2337/cd19-0032. Erratum in: Clin Diabetes. 2020Jul;38(3):322. PMID: 32327886; PMCID: PMC7164986.

**3.** Crowl, Ashley, et al. "Accelerating quality improvement within your organization: applying the model for improvement." Journal of the American Pharmacists Association 55.4 (2015): e364-e376.

**4.** Jackson, Melanie A., Andrew Ahmann, and Viral N. Shah. "Type 2 diabetes and the use of real-time continuous glucose monitoring." Diabetes technology & therapeutics 23.S1 (2021): S-27.

**5.** Lu J, Ying Z, Wang P, Fu M, Han C, Zhang M. Effects of continuous glucose monitoring on glycaemic control in type 2 diabetes: a systematic review and network meta-analysis of randomized controlled trials. Diabetes Obes Metab. 2024; 26: 362-372

**6.** Wallia, A., Agarwal, S., Owen, A.L., Lam, E.L., Bailey, S.C., DeLacey, S.E., Pack, A.P., Espinoza, J., Bright, D., Eggleston, A. and Walter, E., 2024. Disparities in continuous glucose monitoring among patients receiving care in federally qualified health centers. JAMA network open, 7(11), pp.e2445316-e2445316

**7.** Park, Cindy, and Quang A. Le. "The effectiveness of continuous glucose monitoring in patients with type 2 diabetes: a systematic review of literature and meta-analysis." Diabetes technology & therapeutics 20.9 (2018): 613-621.

**8.** Zheng, Mingyue, et al. "Barriers and facilitators of diabetes management by continuous glucose monitoring systems among adults with type 2 diabetes: a protocol of qualitative systematic review." BMJ open 11.10 (2021): e046050.

**9.** Kruger, Davida F., and John E. Anderson. "Continuous glucose monitoring (CGM) is a tool, not a reward: unjustified insurance coverage criteria limit access to CGM." Diabetes technology & therapeutics 23.S3 (2021): S-45.

**10.** Ebekozien, O., Odugbesan, O., Rioles, N., et al., Equitable post-COVID-19 care: A practical framework to integrate health equity in diabetes management. JCOM 27, no. 6 (2020).

**11.** Antonacci, G., Lennox, L., Barlow, J. et al. Process mapping in healthcare: a systematic review. BMC Health Serv Res 21, 342 (2021). https://doi.org/10.1186/s12913-021-06254-1

**12.** Shinde, D.D., Ahirrao, S. & Prasad, R. Fishbone Diagram: Application to Identify the Root Causes of Student–Staff Problems in Technical Education. Wireless Pers Commun 100, 653–664 (2018). https://doi.org/10.1007/s11277-018-5344-y

**13.** Picarillo, A.P. Introduction to quality improvement tools for the clinician. J Perinatol 38, 929–935 (2018). https://doi.org/10.1038/s41372-018-0100-4

**14.** Helmke, Sharron. "Where do you start when everything feels urgent? Use an effort-to-impact matrix." The Learning Professional 43.2 (2022): 72-74.

**15.** Odugbesan, Ori, et al. "Increasing continuous glucose monitoring use for non-Hispanic Black and Hispanic people with type 1 diabetes: results from the T1D Exchange Quality Improvement Collaborative Equity Study." Clinical Diabetes 42.1 (2024): 40-48.