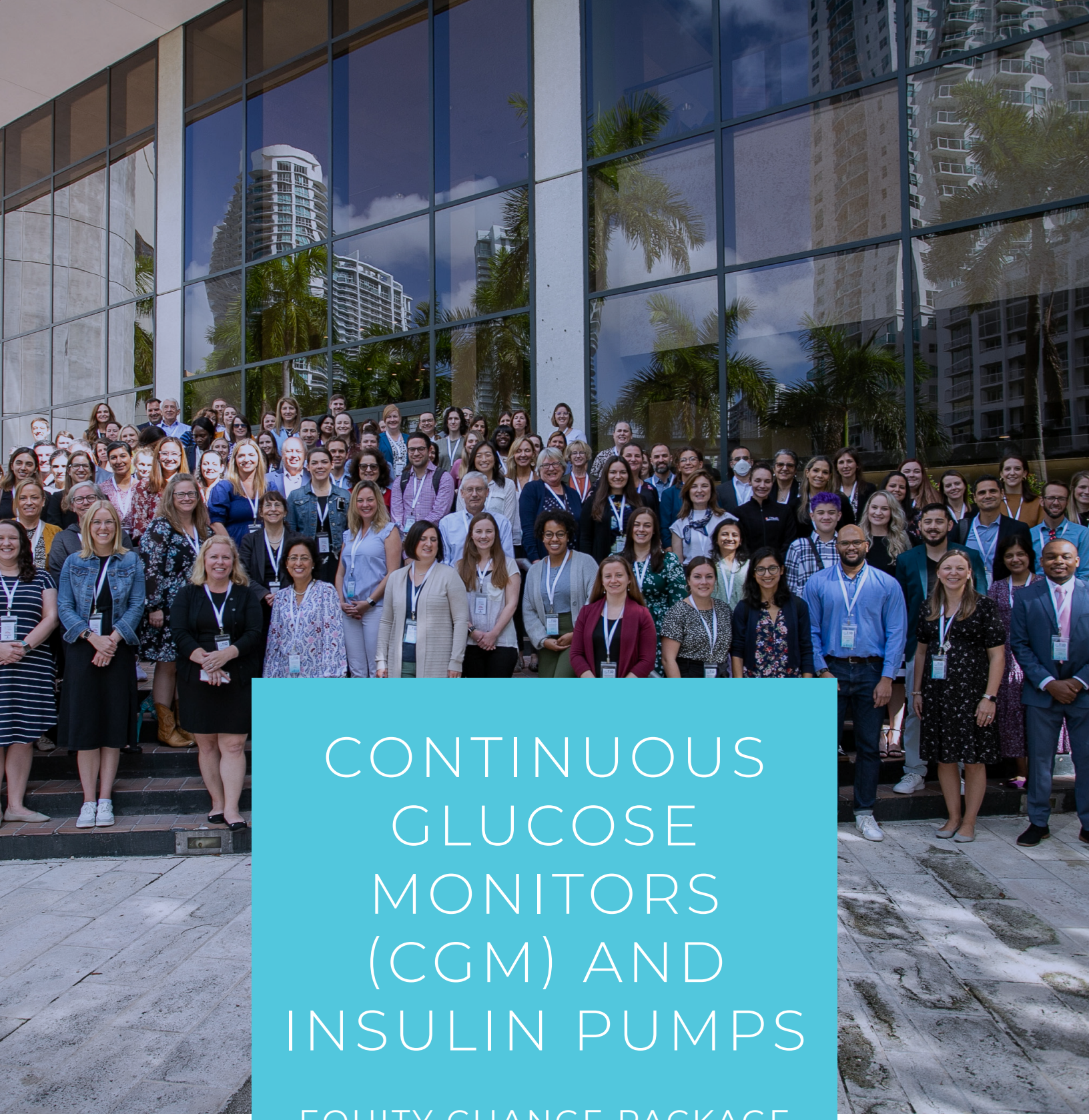

CONTINUOUS GLUCOSE MONITORS (CGM) AND INSULIN PUMPS

EQUITY CHANGE PACKAGE

JANUARY 2023

T1D Exchange

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INTRODUCTION

A Change Package is a document that describes the improvement methodology for a clinical or operational process[1].

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[1]. This Device Health Equity change package represents shared learning from seven diabetes centers, members of the T1D Exchange Quality Improvement Collaborative[2]. This document aims to summarize lessons learned, provide examples, and share results from a pilot equity-focused quality improvement multi-site project.

HOW TO USE THIS CHANGE PACKAGE

A change package can be used by hospital administrators, clinicians, and other healthcare stakeholders who seek ideas for changes to improve equitable access to diabetes technology. 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]. It is best used in combination with other quality improvement methodology and relevant skills.

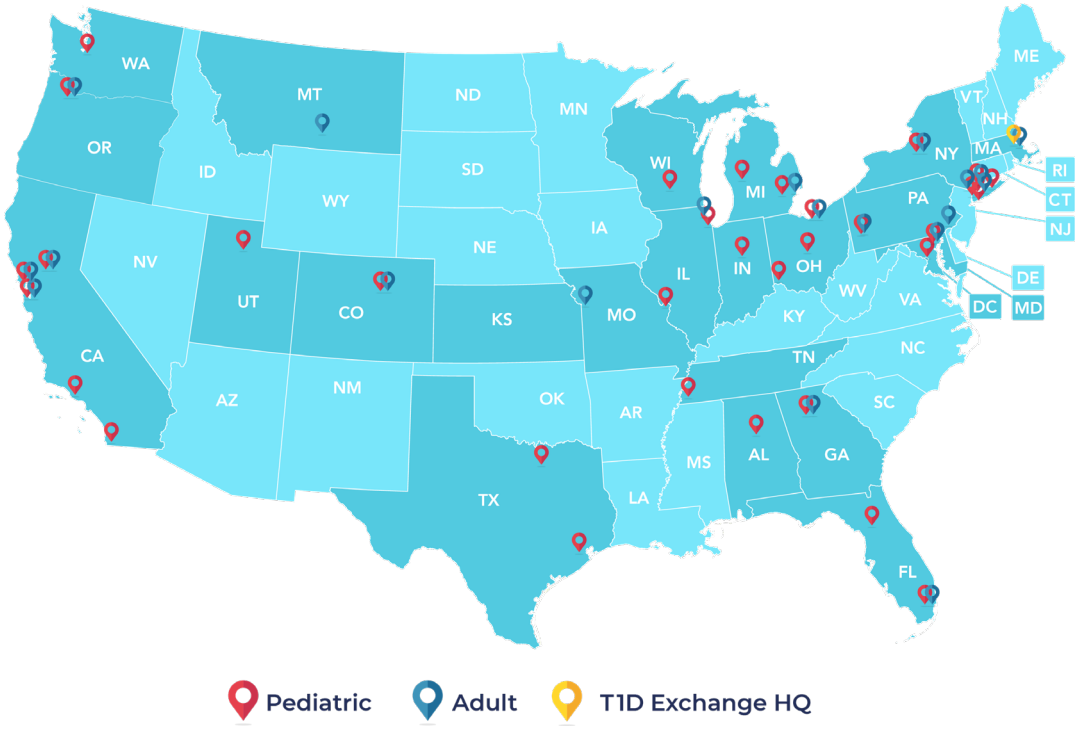
Clinical sites should consider the following to ascertain readiness to change:

- 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 own unique skills to map existing clinical processes, identify potential failures and opportunities
- Organizational willingness to try small tests of change (PDSA cycles); adapt what works and abandon/quickly learn lessons from what doesn't
- 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 type 1 diabetes (T1D). The T1D Exchange Quality Improvement Collaborative (T1DX-QI) has 54 pediatric and adult endocrinology center sites with 70,000+ patient data. (Figure 1). 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.[1,4]

FIGURE 1 MAP OF T1D EXCHANGE PARTICIPATING CENTERS



CGM & INSULIN PUMP EQUITY PROJECT

The project was led by T1D Exchange, using the T1DX-QI Health Equity Framework[5]. The ideas in the change package were developed by the participating centers' faculty, team members, and patient advisors. It includes test ideas employed by seven participating sites and their experiences.

T1D Exchange QI Collaborative Equity Framework

Participating centers utilized the T1DX-QI Health Equity Framework to plan and test interventions[5]. The following components of the T1DX-QI Health Equity Framework were implemented during the project: baseline analysis for disparities, identifying pain points in the processes, identifying contributing factors to disparities, brainstorming improvement ideas, and testing interventions using the Plan-Do-Study-Act cycles.

FIGURE 2 T1D EXCHANGE EQUITY FRAMEWORK

DIABETES DEVICES

The introduction of diabetes devices such as insulin pumps and continuous glucose monitors (CGMs) in the management of type 1 diabetes (T1D) has improved patients' care and glycemic outcomes[6–7]. Studies have demonstrated that CGM and insulin pumps improve glycemic control and long-term outcomes in pediatric and adult patients[8–12]. These devices have improved quality of life, have reduced diabetes distress, resulted in high patient satisfaction, and are cost-effective[13–15]. There are significant inequities in diabetes technology use by race/ethnicity and socioeconomic status despite its documented benefits[16]. When compared to non-Hispanic white patients, Non-Hispanic Black and Hispanic patients use diabetes technology less frequently[17,18]. Individuals from high SES and non-Hispanic white groups were more likely to be started on insulin pumps within the first year of diagnosis when compared to those who were Non-Hispanic Black, Hispanic, or of lower SES[19]. The attitudes, assumptions, and behaviors of providers have been identified as some of the factors contributing to health disparities[20–22]. These biases are likely to impact diagnosis and treatment decisions at all levels of care including diabetes technology recommendations[23–25]. Studies have demonstrated a disconnect between providers' perceived barriers to diabetes technology use and those experienced by persons with T1D[26]. Additionally, perceived discrimination, cultural congruence, and limited English proficiency likely exacerbate this disconnect between providers and patients[27–28].

METHODOLOGY/STUDY DESIGN

STUDY METHODOLOGY

This study was deemed non-human subject research by the Western Institutional Review Board. The study was conducted among seven diabetes clinics in the T1D Exchange Quality Improvement Network (five pediatric and two adult centers). In the first phase of the study, providers participated in a virtual training module on health inequities and implicit bias. The training was followed by a second phase where participating sites applied the T1DX-QI Health Equity Framework to reduce disparities through an extensive review of their baseline data and testing specific changes using a series of rapid cycles to increase prescription and adoption of CGM and insulin pumps among non-Hispanic Black (NHB) and Hispanic populations. (Figure 3) Aggregate data were collected monthly from November 2020 to June 2022.

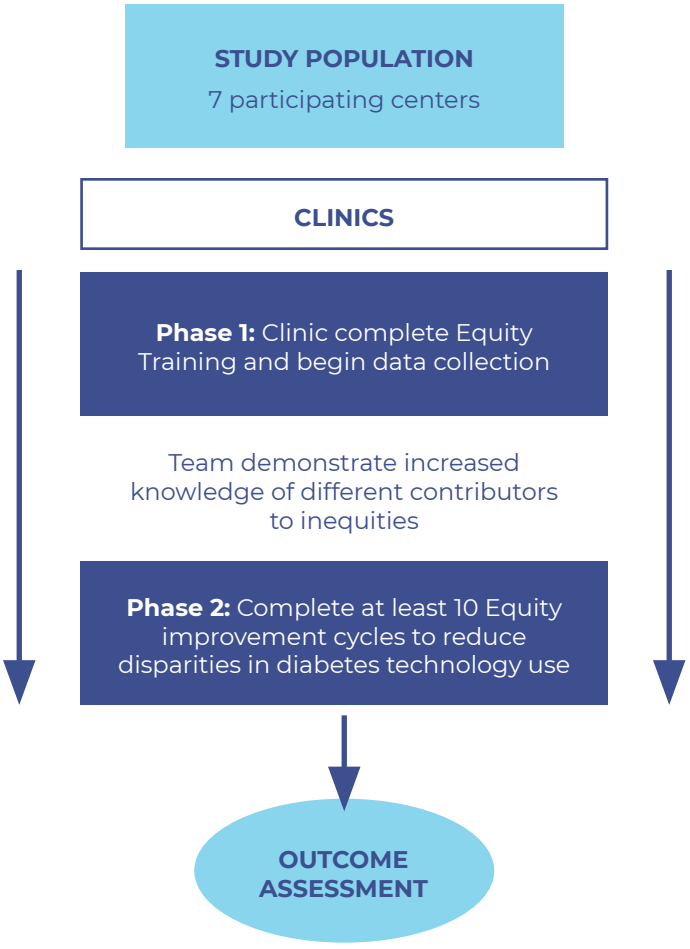
BASELINE DATA ANALYSIS

Baseline data were collected between November 2020 through June 2021. The data were analyzed and stratified by race and ethnicity.

At baseline, the median CGM use was 58% among non-Hispanic White (NHW) patients, 49% among NHB patients, and 48% among Hispanic patients. The difference in the median between NHW and NHB patients was 9% and the difference between NHW and Hispanic patients was 10%.

At baseline the median pump use for NHW was 45%, 17% for NHB, and 26% for Hispanic patients. The difference in the median between NHW and NHB patients was 28% and the difference between NHW and Hispanic patients was 19%.

FIGURE 3: STUDY PROCESS FLOW



PROCESS MAPS

Process map is a tool that help to understand and visualize complex systems and support the adaptation of improvement interventions (29,30). All seven participating sites shared their team's process maps with the coordinating center. The process maps were different for all participating sites, but there were a few similarities in their clinical workflows. Recurring themes were categorized into tier 1, tier 2 for the CGM group, and tier 3 pain points was added for the pump group. This was based on how common the occurrence was with tier 1 being the most common and tier 3 being least common. For the CGM group, tier 1 pain points include confusion about which pharmacy or supplier to send CGM prescriptions: providers not being aware of CGM approval or denial and lag time between prescription and initiation of paperwork. For the pump group, tier 1 pain points include communication issues among pump vendors, patients, and providers; insurance denials; and multiple and complex paperwork requirements. Figures 4 and 5 outline all pain points identified.

FIGURE 4 PAIN POINTS CONTRIBUTING TO INEQUITABLE CGM USE

Tier 1	Finding out specific pharmacy/DME covered by insurance	Providers not aware when CGM has been approved or denied	Lag time between prescription and initiation of paperwork
Tier 2	Need for multiple electronic prescription	High burden of complex paperwork/ insurance denials	Language barrier for non-English speakers

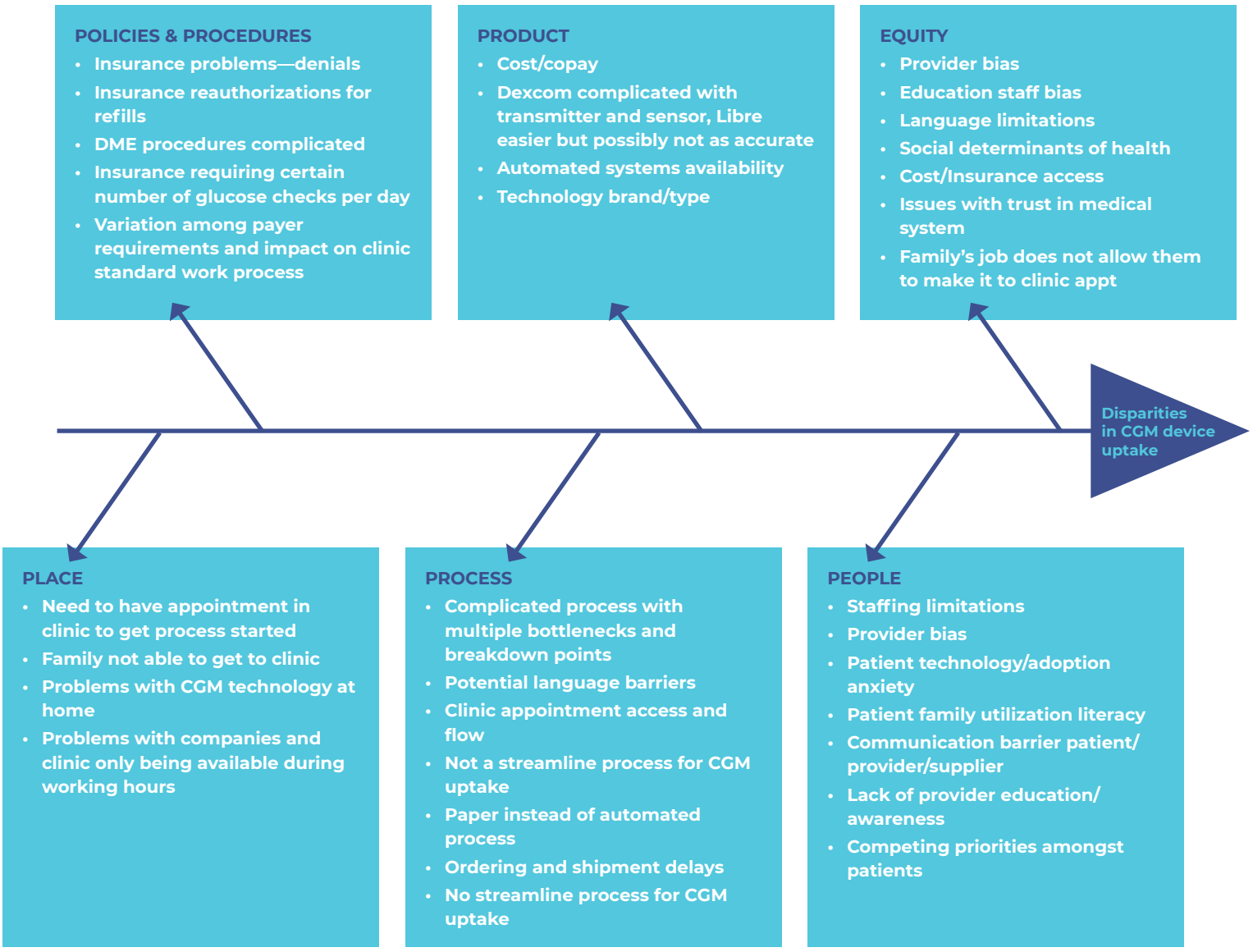
FIGURE 5 PAIN POINTS CONTRIBUTING TO INEQUITIES IN PUMP UPTAKE

Tier 1	Difficulty contacting patients for pump classes, visits, and shipment of device	Communication to and from pump vendors to clinic/patients	Insurance issues/ denials	Stringent guidelines/ multiple paperwork for patients on public insurance
Tier 2	Language barrier/Lack of interpreter/materials not in other languages	Provider bias in offering pumps	Multiple visits/travel cost/missed school/ work	Staffing challenges/ staff turnovers
Tier 3	Lack of standardized screening tools to assess pump readiness	Provider concerns about pump safety	Patient refusal/ believes/want nothing attached to their body	Out of pocket cost for uninsured or underinsured patient

FISHBONE

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 (30,31). The Equity Framework described a fishbone with an equity component (5). The participating sites used a fishbone with an equity lens to identify the root causes of disparities in CGM and insulin pump use. (Figure 6).

FIGURE 6 CGM EQUITY FISHBONE



KEY DRIVER DIAGRAM

FIGURE 7 EQUITY PROJECT KDD (CGM)

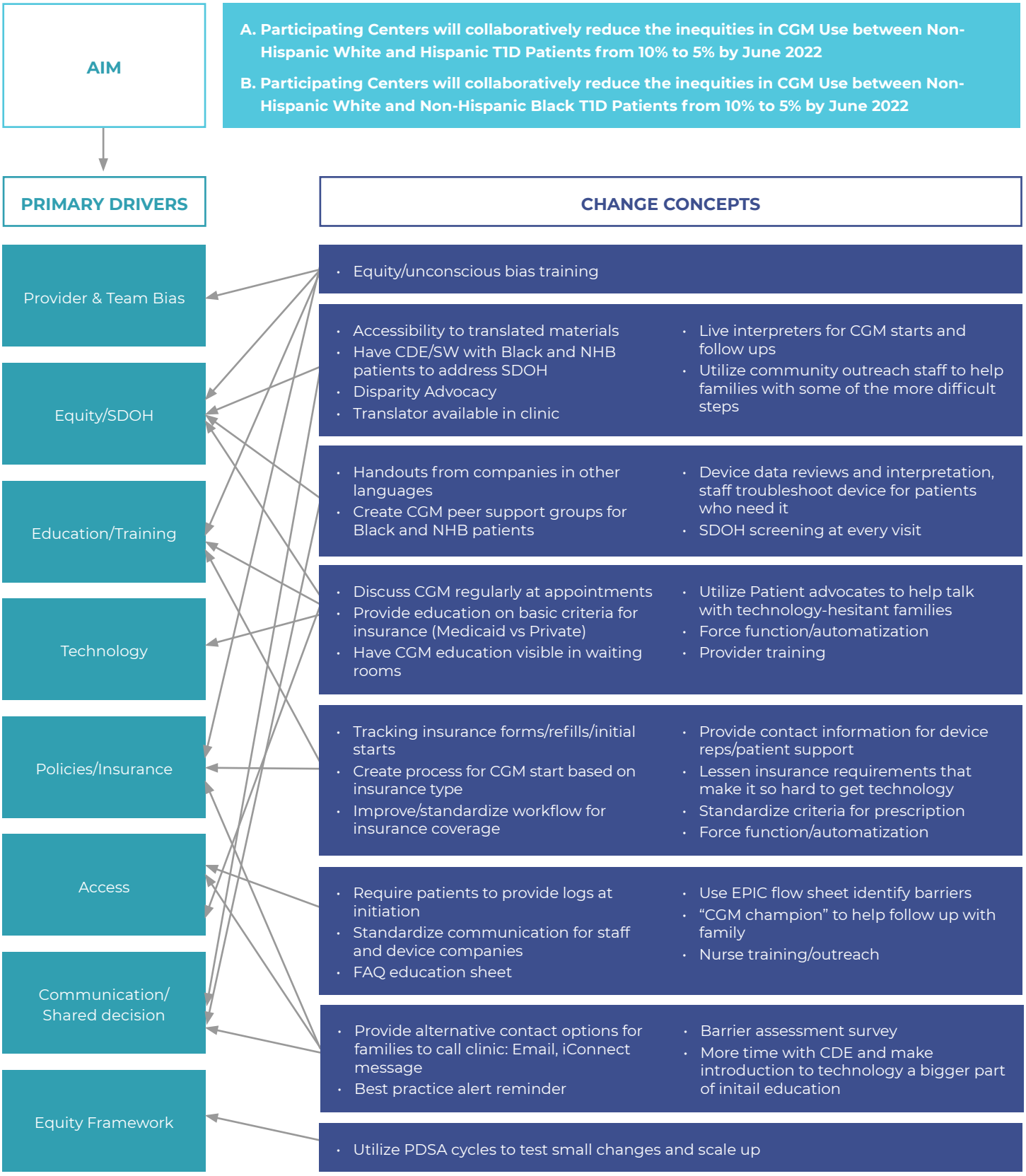
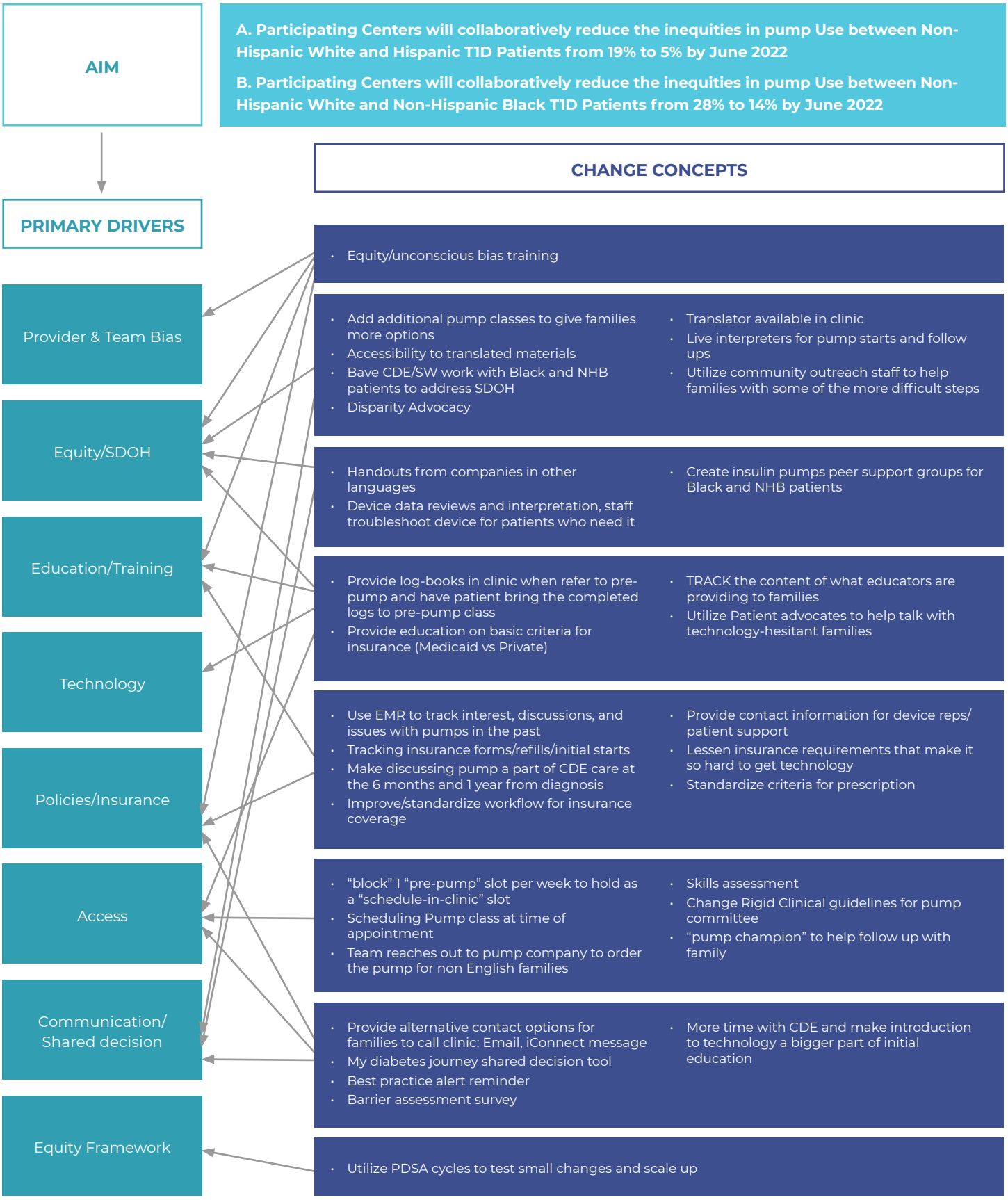


FIGURE 8 EQUITY PROJECT KDD (INSULIN PUMPS)



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[30].

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 (Figures 7 & 8) to collaboratively reduce the inequities in pump use and CGM use between NHW and Hispanic and between NHW and NHB T1D Patients. The center column lists primary drivers that are essential components for the aim to be accomplished. The following drivers were identified for improving access to CGM and insulin pumps for NHB and Hispanic patients:

1. Provider & Team Bias
2. Social Determinants of Health
3. Education/Training
4. Technology
5. Policies & Insurance
6. Access
7. Communication/Shared Decision-Making

PARTICIPATING CENTERS

SITE 1
Cincinnati Children's Hospital Medical Center, University of Cincinnati
Cincinnati, Ohio
(Pediatric)

SITE 2
Emory University, Children's Healthcare of Atlanta, Georgia
(Pediatric)

SITE 3
Nationwide Children's Hospital, Ohio State University
Columbus, Ohio
(Pediatric)

SITE 4
Le Bonheur Children's Hospital, University of Tennessee
Memphis, Tennessee
(Pediatric)

SITE 5
University of Alabama at Birmingham, Alabama
(Pediatric)

SITE 6
Albert Einstein College of Medicine/ Montefiore Medical Center
Bronx, New York
(Adult)

SITE 7
SUNY (State University of New York) Upstate, Joslin Center
Syracuse, New York
(Adult)

PROJECT INTERVENTIONS AND KEY LEARNINGS

Interventions to improve access to CGM and insulin pumps among NHB and Hispanic patients with type 1 diabetes can reliably be implemented with significant results. The team customized the implementation of elements reflected in key drivers to meet the resources of the clinical care environment in which they operate. The tables below outline the interventions tested, tools, results, and challenges for centers that tested them.

DRIVER 1: PROVIDER & TEAM BIAS

INTERVENTIONS	TOOLS/RESULT/CHALLENGES	CENTERS WHO TESTED
CGM & Pump Group Conducted Two sessions of equity/ unconscious bias training Evaluated Provider Bias using the Diabetes Provider Bias Tool.	Online course content for Unconscious Bias Training https://we.intentionallyact.com/courses/5536734/content https://dsl.richmond.edu/panorama/redlining/#loc=5/39.1/-94.58 https://opportunityatlas.org/ https://drive.google.com/file/d/1AfO2Munae5NK4OYyfmoY9F-CO3dl0Vqy/view?usp=sharing https://easyretro.io/publicboard/i5gCK1GusTOSw9s8mK8vyrq42Cz1/ae3364b9-2d04-424b-8d45-544facda264e Participants completed a Pre-training survey with Diabetes Provider Implicit Bias (D-PIB) tool. https://t1d.iad1.qualtrics.com/jfe/form/SV_3dDlCjXyrL7ytOS Results from the assessment can be found here https://www.liebertpub.com/doi/abs/10.1089/dia.2022.0042	Sites 1, 2, 3, 4, 5, 6, 7

DRIVER 2: SOCIAL DETERMINANT OF HEALTH SCREENING/EQUITY

CGM & PUMP GROUPS

INTERVENTIONS	TOOLS/RESULT/CHALLENGES	CENTERS WHO TESTED
Provide SDOH screening at every visit Provide Social work referral for positive screens Revised Social Work workflow to make the process more efficient	SDOH screener can be found here https://trello.com/c/RIOOESz3/26-cchmc-sdoh-screener Social work workflow can be found here https://trello.com/c/6cnezvSr/31-nch-sw-workflow https://trello.com/c/6cnezvSr/31-nch-sw-workflow Social work questionnaire referral https://trello.com/c/xvhZai6Y/25-cchmc-social-worker-questionnaire Provide resources for positive screens https://trello.com/c/8YL1pGkb/28-nch-sdoh-resources	Site 1, 3, 5, 7
Provide translation services in the clinic and during telehealth visits Provide translation materials and classes in other languages	Hospital interpreter program to connect families to interpreters https://trello.com/c/xlzrRV4Q/30-nch-interpreter-services Implemented social work follow-up for positive screens in Spanish https://trello.com/c/61ZTOqnI/29-nch-sdoh-resources-spanish	Site 2
Implemented Social work screening in Spanish	A challenge noted was an increasing demand for interpreters	Site 5
Transportation screening		

DRIVER: EDUCATION/TRAINING

INTERVENTIONS	TOOLS/RESULT/CHALLENGES	CENTERS WHO TESTED
Standardize CGM workflow to address pain points and make the process more efficient Standardize criteria and educational documents for CGM initiation for providers and patients	https://trello.com/c/ZWOwBu55/3-process-maps https://trello.com/c/Vm30TFKT/32-joslin-resources	Site 1, 6, 7
	https://trello.com/c/ZWOwBu55/3-process-maps	Site 3
Translation of materials and classes into other languages	https://trello.com/c/xlzrRV4Q/30-nch-interpreter-services	Site 1, 3, 4, 6, 7
Provide routine CGM patient education		
Place information about CGM on the media in the waiting room to make information accessible to patients while they are waiting	https://trello.com/c/Vm30TFKT/32-joslin-resources	Site 7
Virtual CGM education for our <5year old new onsets, but available for all patients Created CGM Survey to understand patients' perspectives on CGM	CGM survey https://trello.com/c/Kl1MgMaf/22-tennessee-cgm-survey	Site 4

table is continued on next page

INTERVENTIONS	TOOLS/RESULT/CHALLENGES	CENTERS WHO TESTED
Standardize criteria for pump initiation for providers and patients		Site 2, 4, 5, 6
Assisted families in obtaining pumps and reaching out to suppliers on behalf of patients		Site 4, 5
Created a survey to determine staff's perception of who should be eligible for an insulin pump	https://trello.com/c/Kl1MgMaf/22-tennessee-cgm-survey Challenges in reaching patients to set up pump training	Site 4
Provided pump flyers before pump classes	https://trello.com/c/qEOJbAKK/35-choa-flyer-spanish https://trello.com/c/7ehsqC4F/34 choa-flyer-english	Site 2
Called patients before pump classes to reduce the no-show rate.		Site 2
Created additional slots to make follow-up closer after pump class		Site 5
A site created "Golden tickets" to schedule pre-pump classes for Medicaid and high-risk patients	https://trello.com/c/Ni1dVOu0/36-uab-golden-ticket High no-show rate for pump classes	
Provider education to discuss patient eligibility and prescription practices for pumps and provider CGM/Pump technology education		Site 2, 4, 6

DRIVER: TECHNOLOGY

INTERVENTIONS	TOOLS/RESULT/CHALLENGES	CENTERS WHO TESTED
Discuss CGM regularly at the clinic		Site 1, 3, 4, 6, 7
Provide early access to CGM at T1D diagnosis		Site 4
Provided starter kits to patients (CGM Trial Program)		Site 1
Increase communication with DME companies through Weekly reports by DME companies to help the education team to follow up with patients and improve CGM uptake.	Weekly reporting by DME companies helped to know if the order is a refill or a new sensor.	Site 6, 7
Utilized DME to complete new and refill CGM authorization, provides weekly updates on approvals, and track authorization process. Admin staff sends update to providers when devices are delivered to patients		Site 6
Utilized pump company representative to improve post insulin pump class process and efficiency and as a resource for insulin pump initiation		Site 4,5
Standardized criteria for insulin prescription		Site 3
Increase patient engagement on Mychart to improve patient-provider communication. Messages and information such as pump flyers are shared through Mychart	https://trello.com/c/jbbaZXnP/37-choa-mychart	Site 2
Utilize device company representative to provide patient education and device troubleshooting.		Site 4, 5

DRIVER: POLICIES/INSURANCE

INTERVENTIONS	TOOLS/RESULT/CHALLENGES	CENTERS WHO TESTED
Standardize workflow for public vs private insurance	Multiple paperwork requirement for patients on public insurance	Site 1, 2,3, 4, 5, 6, 7
CGM and Pump Advocacy letter to appeal to Medicaid for fewer insurance barriers for their patients Bypass the pump committee to reduce barriers to getting on pumps	Currently, publicly insured patients require 6 weeks of glucose data with insulin dose and carbs are also documented. This is not required by the patients with private insurance. Sample CGM Advocacy letter: https://trello.com/c/yEDEfKRG/42-sample-medicaid-advocacy-letter The pump committee decides who gets on the pump	Site 5 Site 4
Loosen A1c guidelines for patients who qualify for pumps.	Site 4 prescribed pumps for patients with A1c>9% which was not the usual practice	Site 4

DRIVER: SHARED DECISION-MAKING

INTERVENTION	TOOLS/RESULT/CHALLENGES	CENTERS WHO TESTED
Discuss CGM regularly at the clinic		Site 1, 3, 6, 7
Get patient input on treatment decisions in real-time using a shared decision-making tool 'My diabetes journey'	"My diabetes Journey" encourages open dialogue in the clinic. "My diabetes Journey" works well with some patients, less well with others. Seen as "another paper". Can be missed in the paperwork given to the provider. It may increase rates of referral to pump training in patients who are less self-directed in their treatment discussions 'My Diabetes journey" was previously used by the team to increase equitable CGM use https://www.liebertpub.com/doi/abs/10.1089/dia.2021.0511?casa_token=bjTn5e-U2yUAAAAA:Qv08DCADqlwT-Ch1AcV8FgO5K1KCt2c96MQbpKPF0-3l2kv-kRuP4mwoIu3uJLejvfHMMKs8X9w3mbU	Site 4, 5

RESULTS

The results below are from the seven sites that participated in the scheduled monthly calls and completed at least ten rapid improvement cycles (Plan-Do-Study-Act cycles).

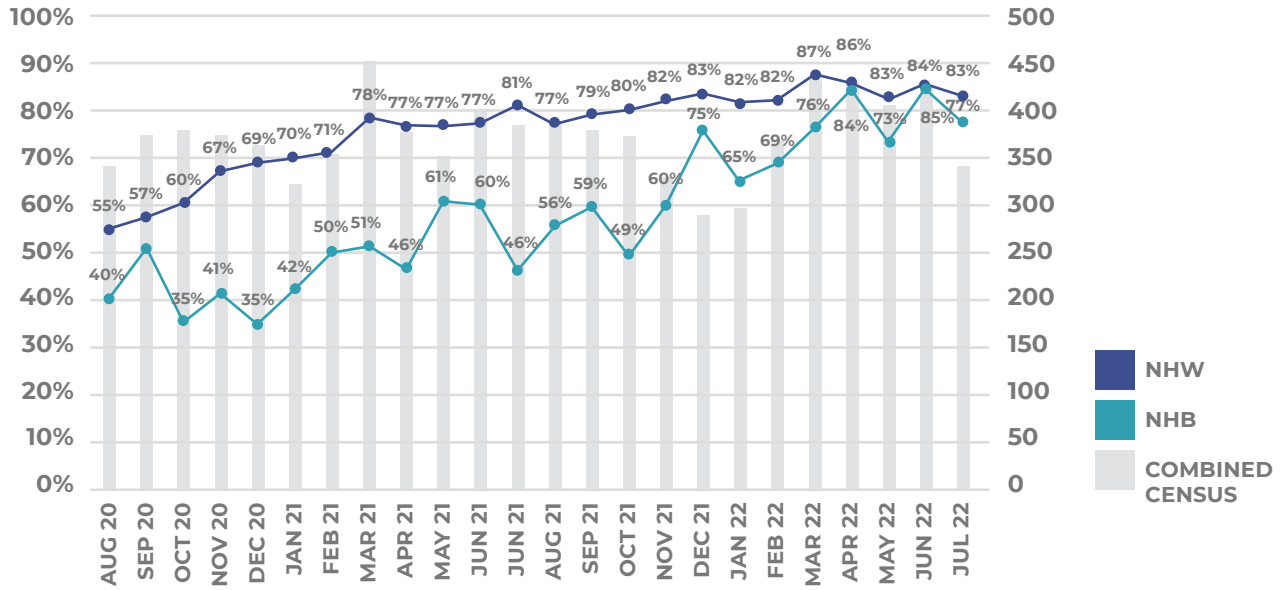
NATIONWIDE CHILDREN HOSPITAL

Nationwide Children's Hospital (NCH) is one of the nation's largest children's hospitals and pediatric research institutes. They have 2000+ patients with T1D with half on public insurance. NCH was interested in reducing the inequity of CGM and insulin pump technology access/ utilization. Baseline data showed inequity in both CGM and insulin pump use. NCH implemented new processes to increase the adoption and prescription of CGM and insulin pumps in their clinic. The following interventions were tested to increase CGM and pump use:

- Standardize criteria and educational documents for CGM and pump initiation for providers and patients
- Ongoing CGM and pump patient education
- Verbal translation services available in the clinic and during telehealth visits
- Translation of pump supplier instructions
- Measure and assess staff availability & allocation for pump class with feedback to management
- Early access to CGM at diagnosis through the "Inpatient Program"
- Implemented SDOH screening

Following a series of rapid PDSA cycles, the team is beginning to see an increase in the uptake for both CGM and pump for all racial groups. There was a 12% increase in the median for the NHW population, a 19% increase in the median for the NHB population, and a 15% reduction in the gap between NHW and NHB groups. See Figure 9 below.

FIGURE 9 NON-HISPANIC WHITE VS NON-HISPANIC BLACK



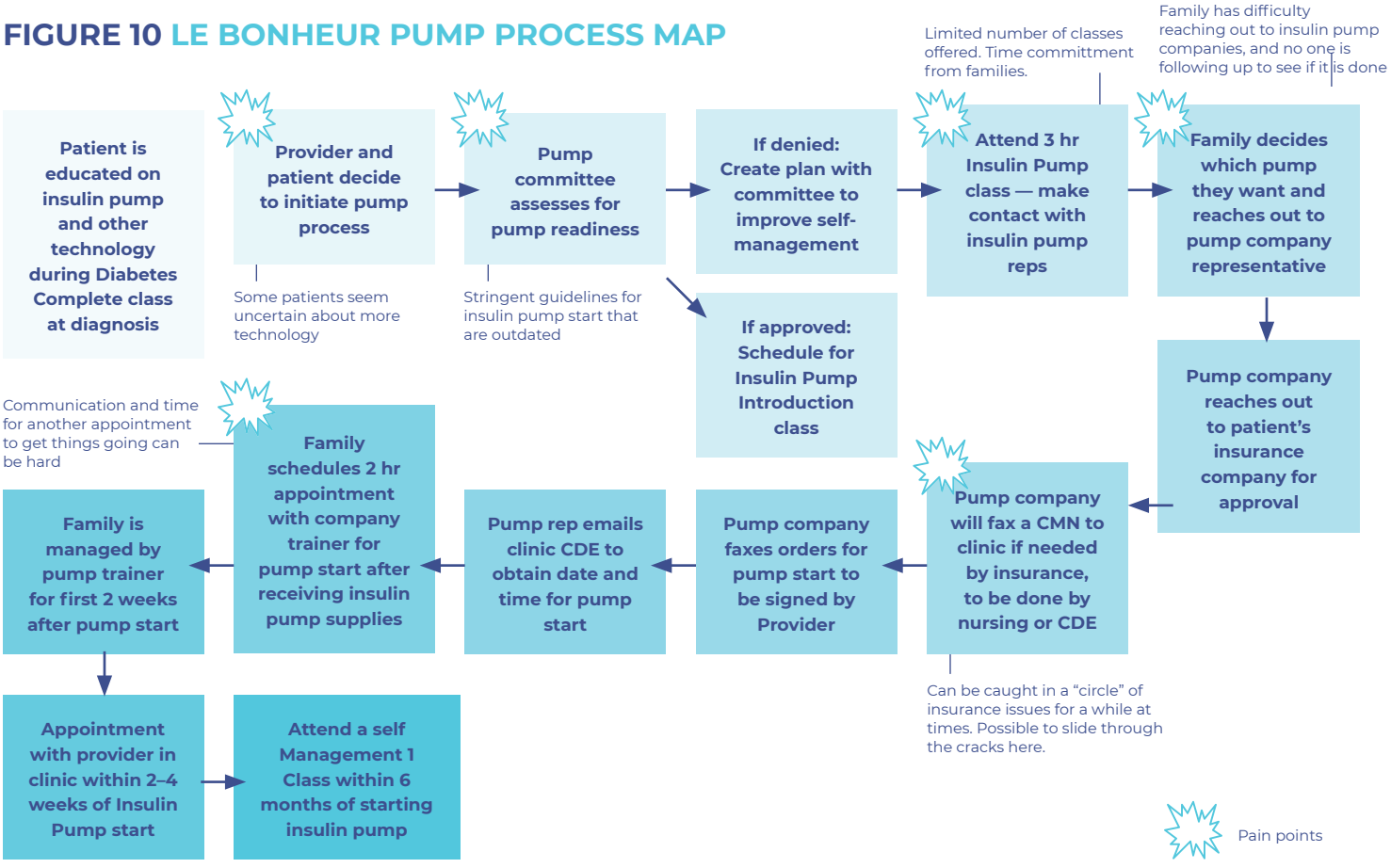
LE BONHEUR CHILDREN'S HOSPITAL, TENNESSEE

Le Bonheur Children's Hospital is one of the nation's top hospitals and it is an academic partner with the University of Tennessee. Pediatric Endocrinology serves 400+ patients with T1D with 60% on public insurance. The team was interested in increasing the use of CGM and pumps in their NHB and Hispanic patients. Before the project, there were strict guidelines guiding the prescription of insulin pumps at the center. The staff perception is that a patient with A1C >9% should not be on a pump, and the existing pump committee decides who gets on the pump. Since this was not a universal standard, the team wanted to test out changes to lessen these guidelines and increase buy-in from providers. The team mapped out a detailed process and identified multiple pain points. This is represented in Figure 10 below.

To increase equitable access to insulin pumps, the team tested the following interventions locally:

- Lessened guidelines to offer insulin pumps to patients with A1c >9%
- Developed a pump initiation survey for families
- Utilized pump company representatives to improve post insulin pump class process and efficiency
- Standardized follow-up guidelines after insulin class: phone calls vs in-person follow-ups
- Provider education sessions for staff
- Created an Insulin pump binder for the nurses with troubleshooting tips, sick day rules, device settings guide, etc. to help clinic staff during clinic appointments and phone calls

FIGURE 10 LE BONHEUR PUMP PROCESS MAP



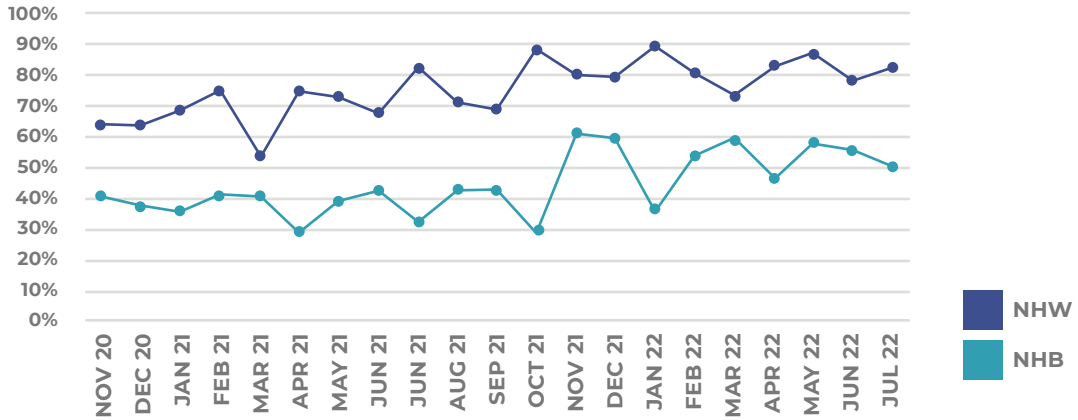
There has been an increase in the median uptake of insulin pumps among non-Hispanic Black patients by 6%.

The team also tested the following interventions to increase equitable access to CGM:

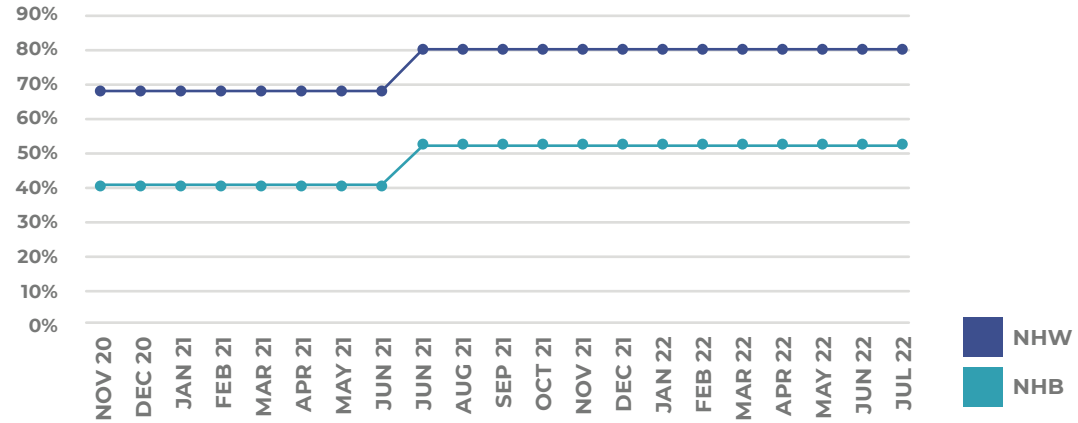
- Discussed CGM regularly at clinic appointments
- Created CGM start folders with important information for families based on insurance
- Appointed CGM champions to assist families to troubleshoot and to communicate with DME companies
- Used My Diabetes Journey to promote shared decision between patients and providers
- Created a CGM survey for families to understand patient's perspective

Following series of rapid changes outlined above, there was a 10% increase in median CGM use among NHW patients and 11% increase among NHB patients. (Figure 11)

FIGURE 11
TENNESSEE CGM USE BY RACE/ETHNICITY



TENNESSEE CGM USE BY RACE/ETHNICITY (MEDIAN)



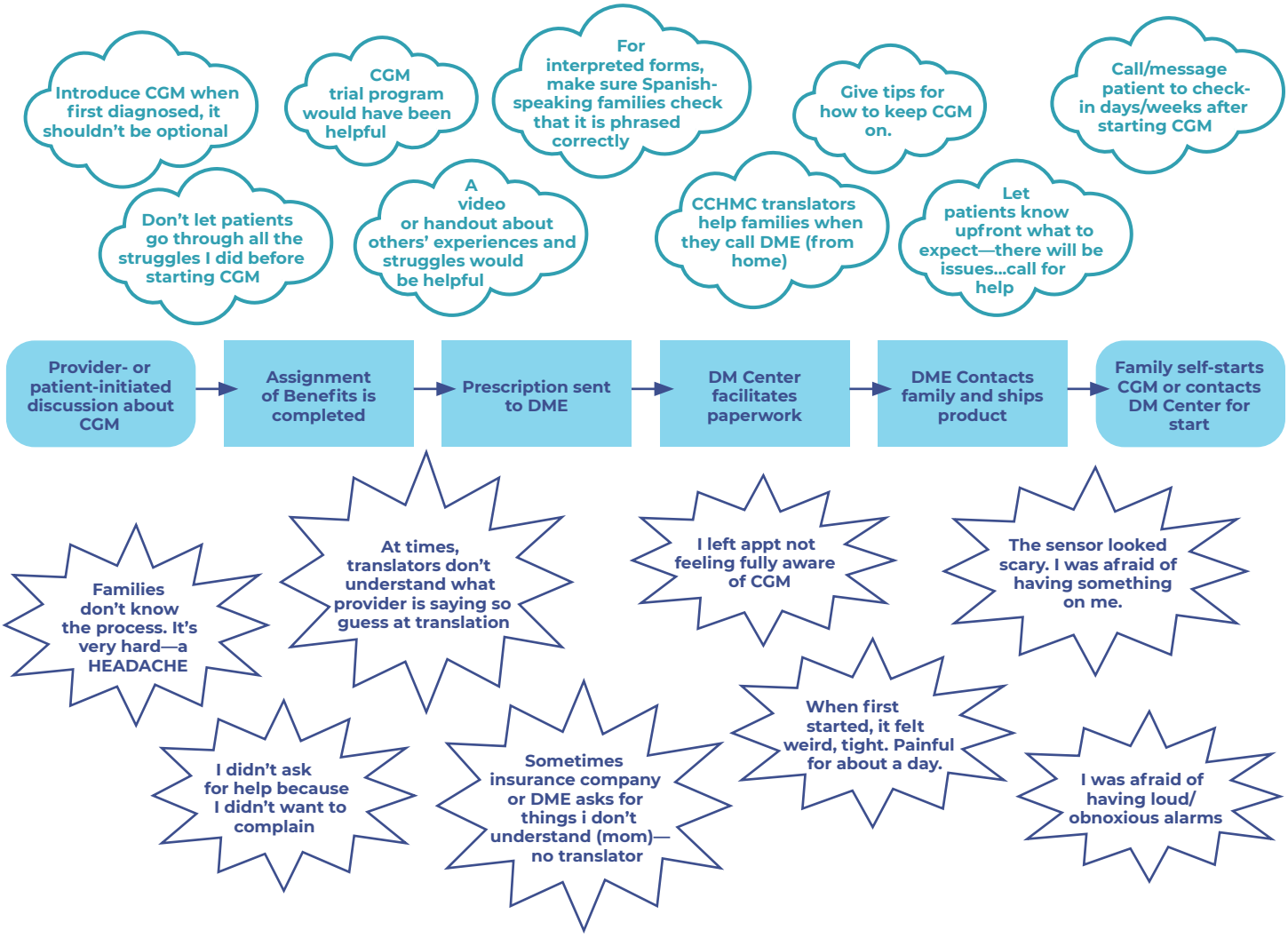
CINCINNATI CHILDREN'S HOSPITAL MEDICAL CENTER (CCHMC)

Cincinnati Children's Hospital is an academic center founded in 1883 in the greater Cincinnati area. The Diabetes Center provides comprehensive care to 2200+ T1D patients with an average of 200+ new onset annually. CCHMC was interested in increasing equitable access to CGM for their patients. The team and patient/parent advocates outlined their process, barriers, and change ideas (Figure 12)

The team tested and scaled the following interventions:

- Automated weekly report mailed to CDCES indicating NHB and Hispanic patients who do not have CGM
- CDCES meeting with patients not on CGM during their visit to discuss patients' current barriers to starting CGM,

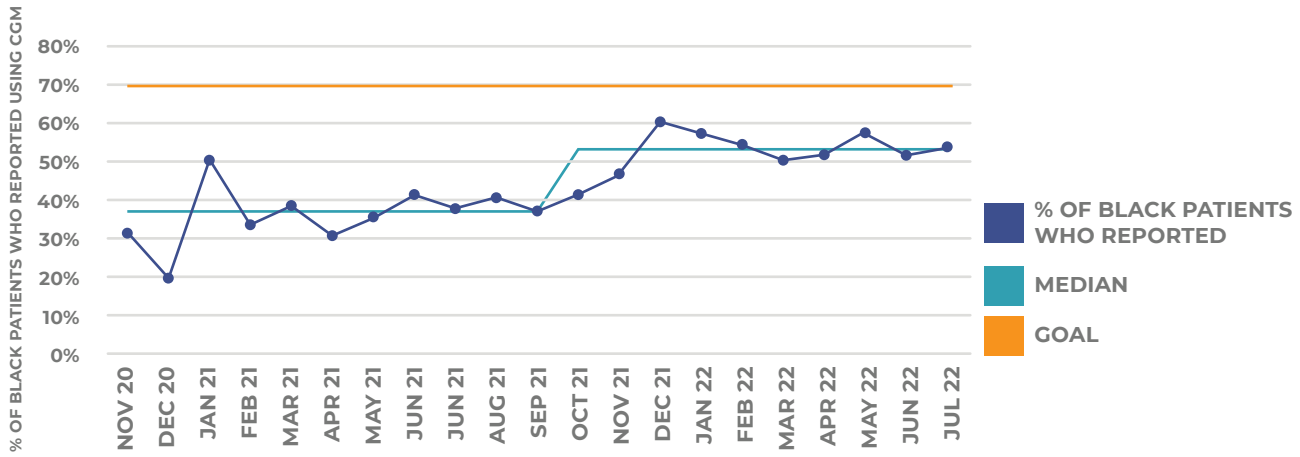
FIGURE 12 CGM PROCESS: BARRIERS AND CHANGE IDEAS



- CDE provides education/troubleshooting as needed
- Standardized workflow to utilize CGM coordinator, financial counselor, insurance navigator, communication coordinator
- Regular barrier assessment & social determinants of health screening
- Expanded the CGM trial program to provide starter kits to patients

Following a series of PDSAs, the CCHMC team saw an increase of 17% from baseline in the use of CGM for NHB patients (figure 13).

FIGURE 13 % OF BLACK PATIENTS* WHO REPORTED USING CGM DURING REPORTING MONTH



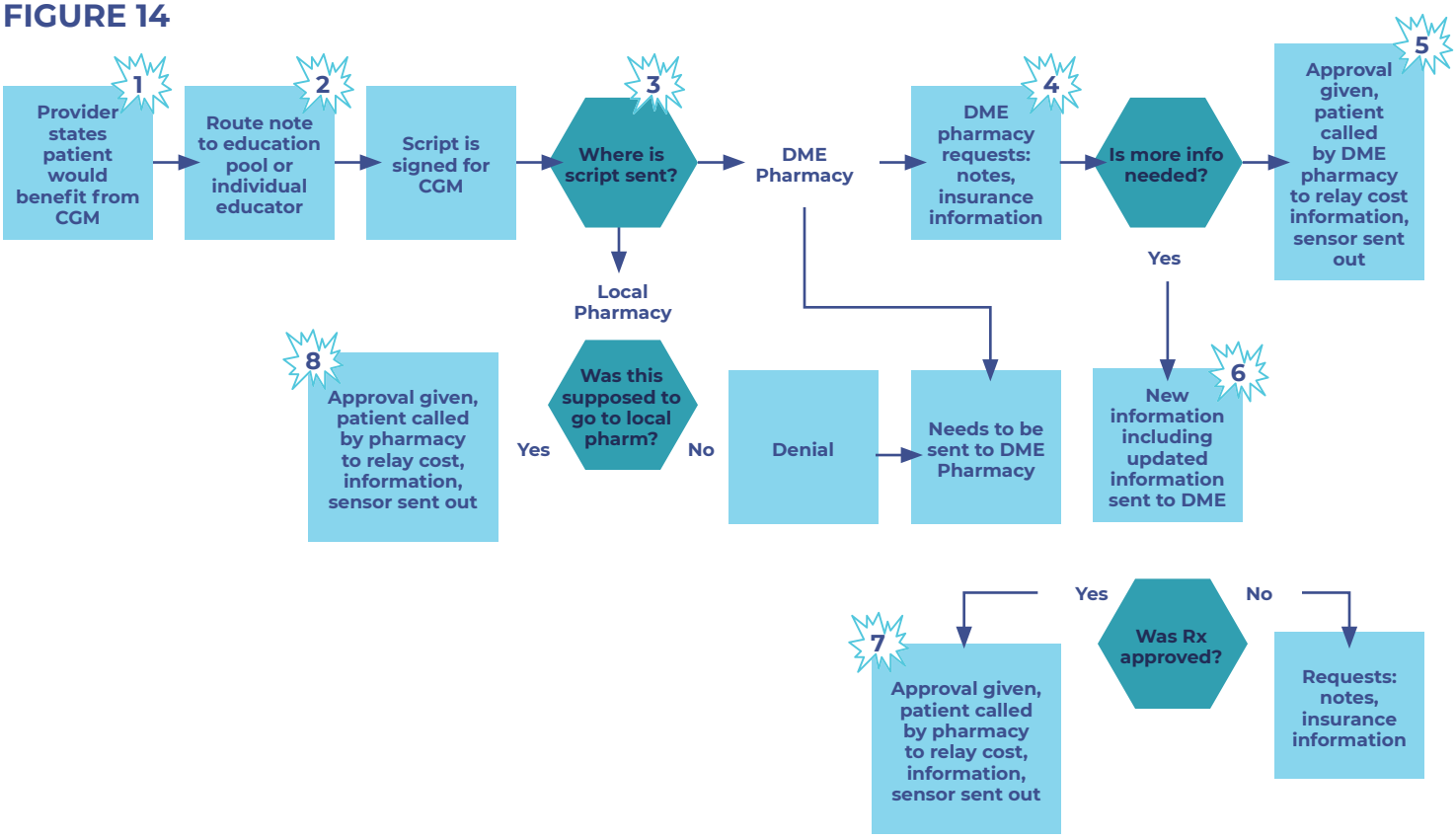
SUNY UPSTATE MEDICAL UNIVERSITY

The Joslin Diabetes Center at the SUNY Upstate Medical University in Syracuse is an affiliate of the Joslin Diabetes Center. They provide care to the largest number of patients with diabetes in the Central New York area and were interested in reducing inequities in CGM use. The team shared their process and identified multiple pain points in their workflow that contributes to inequities in CGM use (Highlighted in figure 14)

The team reviewed their CGM process to promote equitable CGM access for their patients. They tested the following interventions:

- Streamlined the process for sending the initial message or script from providers to educators so that the CGM script can be sent correctly to either DME or local pharmacy
- Increased screening for barriers to care/SDOH and social worker involvement in addressing identified issues, in collaboration with CDCES and provider.
- Improved ability to track ordering and receipt of CGM devices through weekly reports from several DME companies.
- Developed educational materials for patients with input from patient advisors.
- Improved CGM education process (including visit checklists and better scheduling process) to ensure standardized and equitable training
- Created a generic smart phrase for all educators
- Created a FAQ document with educators and patients input

FIGURE 14



The pre-intervention median CGM use among NHB patients was 34%, and 44% among NHW. Following a series of rapid PDSA cycles, the median use increased to 65% in NHB patients and to 72% among NHW patients. The proportion of NHB patients who are not on CGM decreased from baseline of 64% to 29%. (Figures 15 and 16).

FIGURE 16 SUNY NHB PATIENTS NOT USING CGM

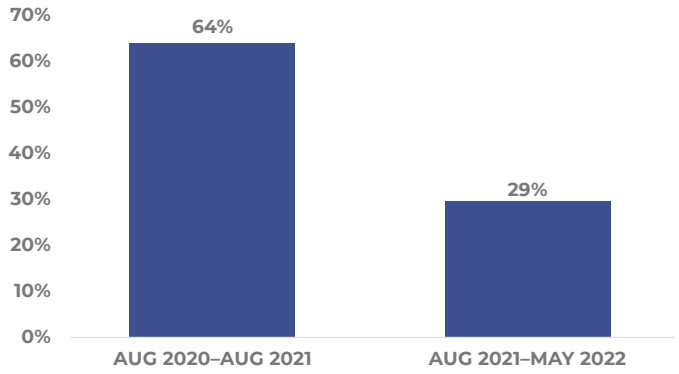
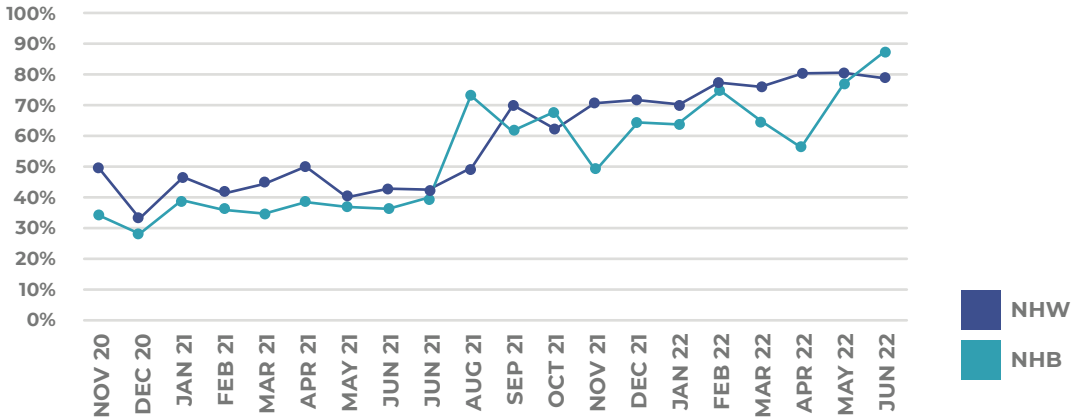
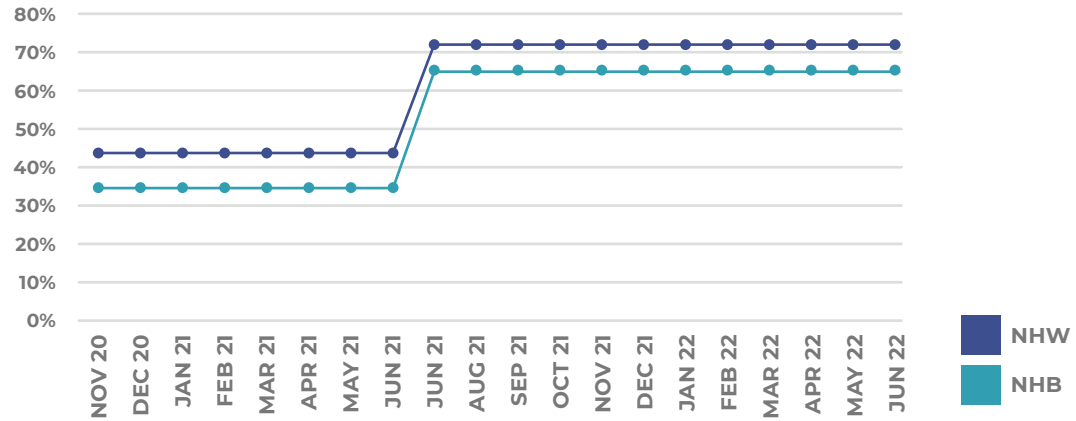


FIGURE 15
SUNY CGM USE BY RACE/ETHNICITY



SUNY CGM USE BY RACE/ETHNICITY (MEDIAN)



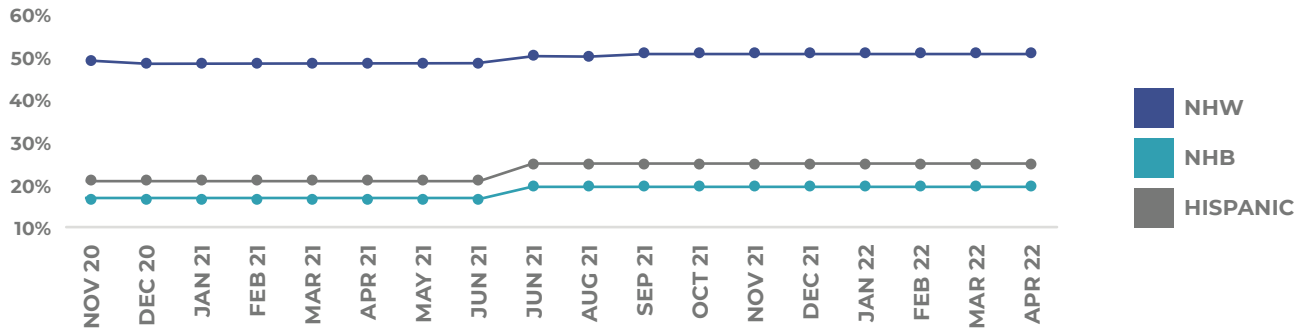
CHILDREN HEALTHCARE OF ATLANTA

Children Healthcare of Atlanta (CHoA) is one of the largest pediatric clinical care providers in the country and the leading pediatric endocrinology program in Georgia. CHoA is an affiliate of the Emory University School of Medicine. The team was interested in increasing pump use for their Black and Hispanic patients and in closing the disparity gap between NHW, NHB, and Hispanic patients. They tested the following interventions:

- Provided pump flyers with basic pump information to patients before pump prep to set expectation and improve patient's understanding of the technology
- Revised the pump start scheduling process
- Provider bias education
- Tested elimination of saline start
- Created pump request letter for each pump type in EPIC
- Increase Mychart utilization to improve communication with the patients

The median pump use increased by 3% and 4% respectively for Black and Hispanic patients (figure 17).

FIGURE 17 ATLANTA PUMP USE BY RACE



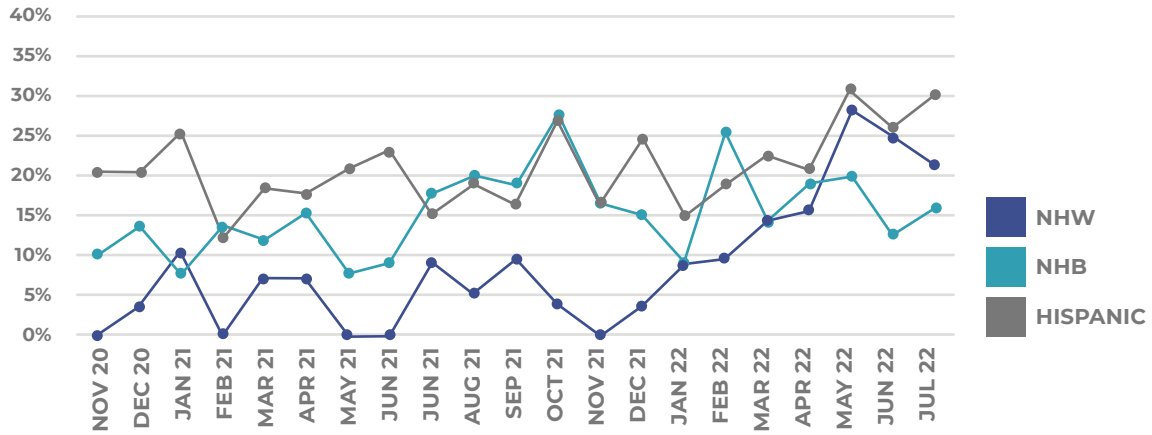
ALBERT EINSTEIN-MONTEFIORE MEDICAL CENTER

Montefiore Medical Center is affiliated with the Albert Einstein College of Medicine and is in the Bronx, NY. The Division of Endocrinology at Montefiore Medical Center is one of the largest in the New York metropolitan area, serving a diverse and underserved population of 1,500 adults with T1D, with over 90% of patients on public insurance. Einstein-Montefiore tested the following interventions to increase equitable use of CGM and Pump use across their practice:

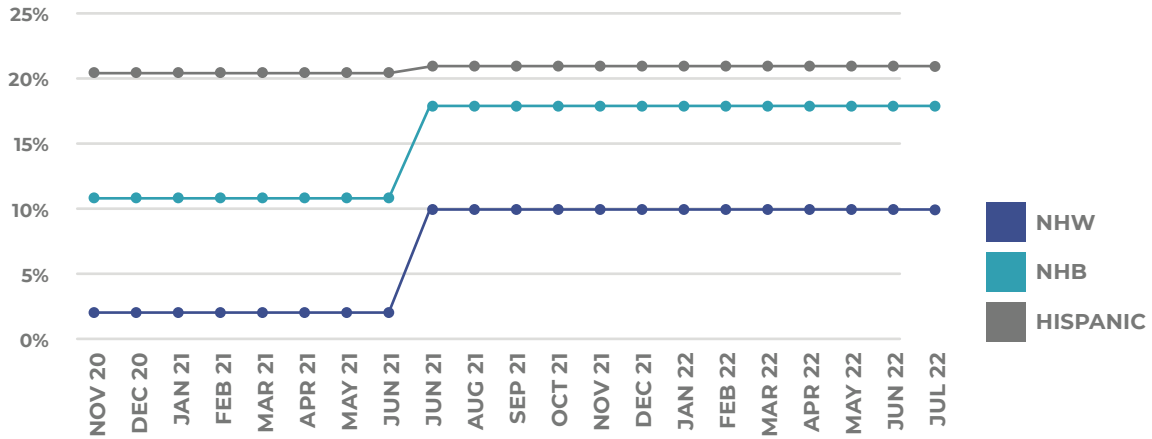
- CGM
- Provider CGM Tech education
- Provider bias training
- Standardized CGM prescription workflow across multiple clinical sites

FIGURE 18

MONTEFIORE PUMP USE BY RACE/ETHNICITY



MONTEFIORE PUMP USE BY RACE/ETHNICITY (MEDIAN)



- Partnership with certain DME's who participated with managed Medicaid plans with weekly progress reporting
- Provider CGM technology introductory conversation role-playing activity
- Nurse Training on CGM in-clinic placement
- Device trials for CGM
- Patient information access and onboarding support
- Pump
- Provider pump education and case-based learning
- Loosening of carb counting and HbA1c criteria for prescription
- Pump policy development
- Partnership with pump companies for better post-initiation follow-up
- Use of dummy pumps as trials and hands-on pump introduction conversations

Montefiore team showed improvement in both CGM and Insulin pump use across all racial groups. Figure 20 below shows a 7% increase in median pump use among NHB patients, 8% increase among NHW patients and a 2% increase among Hispanic patients. (Figure 18)

UNIVERSITY OF ALABAMA

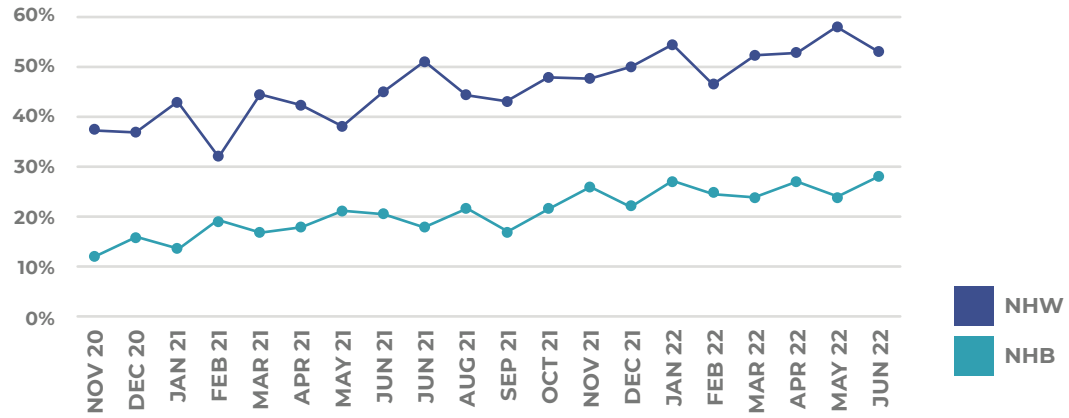
The Division of Pediatric Endocrinology and Diabetes at Children's of Alabama at The University of Alabama at Birmingham provides comprehensive care for 1600+ patients with T1D, with almost half of the patients on public insurance. The University of Alabama tested the following interventions to increase equitable access to insulin:

- Standardize requirements for patients to begin pump
- Advocacy to Medicaid
- Use the "My diabetes Journey tool" to promote shared decisions about insulin pumps in the clinic
- Standardized Pump education process
- Social work screening for transportation

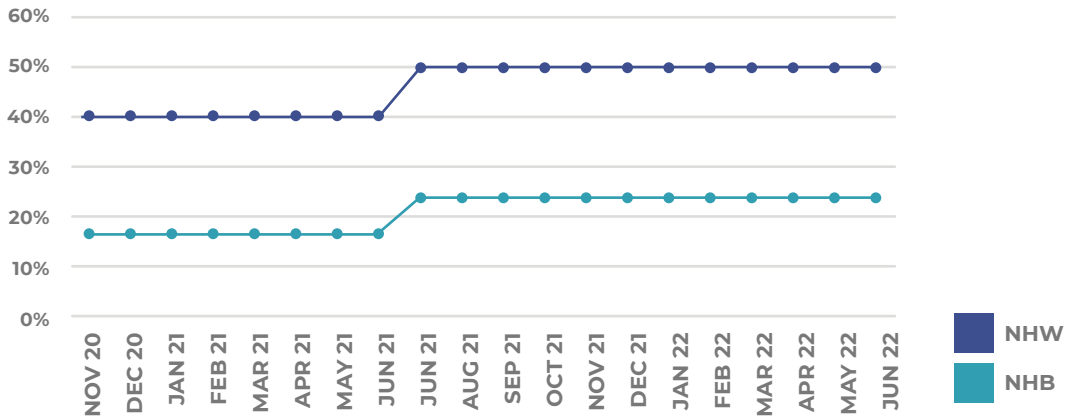
Alabama team showed a 10% increase in median pump use among NHW patients and a 7% increase among NHB patients. (Figure 19)

FIGURE 19

ALABAMA PUMP USE BY RACE/ETHNICITY



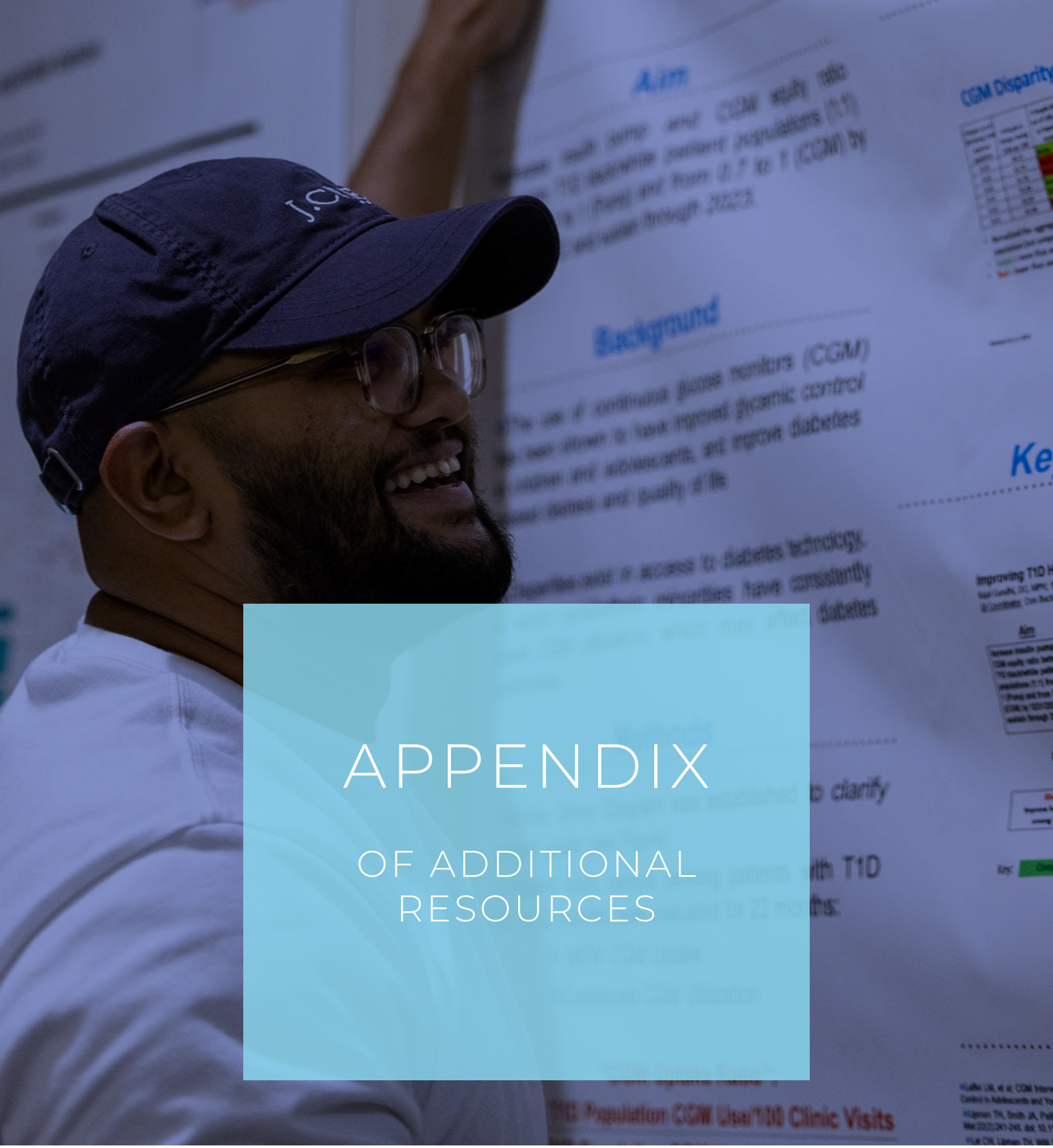
ALABAMA PUMP USE BY RACE/ETHNICITY (MEDIAN)



SUMMARY

We thoughtfully applied the T1DX-10-Step Equity Framework to 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 complicated, 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 and insulin pump use
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 multi-disciplinary team members are a valuable tool for sharing improvement ideas and to foster learning
4. Ensuring patient/parent participation is important in brainstorming change ideas, and to understand barriers and contributors to inequities
5. Staff turnover, burnout, and staff shortages limit the ability of clinical sites to scale up interventions
6. Timely data reporting and a dedicated and engaged QI team accelerate the success of QI projects



APPENDIX

OF ADDITIONAL RESOURCES

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REFERENCES

1. Ori Odugbesan MD MPH, et al. T1D Exchange. Improving glycemic management for high-risk T1D patients Change Package. Boston, MA; March 2021.
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. IHI
4. Prahalad P, Rioles N, Noor N, et al. T1D exchange quality improvement collaborative: Accelerating change through benchmarking and improvement science for people with type 1 diabetes. Journal of Diabetes. 2022;14(1): 83-87.doi:10.1111/1753-0407.13234
5. 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).
6. Jelena Kravarusic and Grazia Aleppo, "Diabetes Technology Use in Adults with Type 1 and Type 2 Diabetes," Endocrinology and Metabolism Clinics 49, no. 1 (2020): 37–55.
7. Lyons, S. K., Ebekozien, O., Garrity, A., et al.: Increasing insulin pump use among 12-to 26-year-olds with type 1 diabetes: Results from the T1D Exchange Quality Improvement Collaborative. Clinical Diabetes 39, no. 3 (2021): 272–77.
8. Addala, A., Auzanneau, M., Miller, K., et al.: A decade of disparities in diabetes technology use and HbA1c in pediatric type 1 diabetes: A transatlantic comparison.," Diabetes Care 44, no. 1 (2021): 133–40.
9. Karter, A. J., Parker, M. M., Moffet, H. H., et al., Association of Real-time Continuous Glucose Monitoring with Glycemic Control and Acute Metabolic Events Among Patients with Insulin-Treated Diabetes.," JAMA 325, no. 22 (June 8, 2021): 2273–84.
10. Noor, N., Ebekozien, O., Levin, L., et al: Diabetes technology use for management of type 1 diabetes is associated with fewer adverse COVID-19 outcomes: Findings from the T1D Exchange COVID-19 Surveillance registry. Diabetes Care, 44(8), e160–e162.
11. David Rodbard, "Continuous Glucose Monitoring: A Review of Recent Studies Demonstrating Improved Glycemic Outcomes," Diabetes Technology & Therapeutics 19, no. S3 (2017): S-25.
12. Laffel, L. M., Kanapka, L. G., Beck, R. W., et al: Effect of continuous glucose monitoring on glycemic control in adolescents and young adults with type 1 diabetes: A randomized clinical trial.," JAMA 323, no. 23 (2020): 2388–96.

13. Richard R. Rubin and Mark Peyrot, "Treatment Satisfaction and Quality of Life for an Integrated Continuous Glucose Monitoring/Insulin Pump System Compared to Self-Monitoring plus an Insulin Pump," Journal of Diabetes Science and Technology 3, no. 6 (2009): 1402–10.
14. Mark Peyrot and Richard R. Rubin, "Patient-Reported Outcomes for an Integrated Real-Time Continuous Glucose Monitoring/Insulin Pump System," Diabetes Technology & Therapeutics 11, no. 1 (2009): 57–62.
15. Grando, M. A., Bayuk, M., Karway, G., et al: Patient perception and satisfaction with insulin pump system: Pilot user experience survey. Journal of Diabetes Science and Technology 13, no. 6 (2019): 1142–48.
16. Majidi, S., Ebekozien, O., Noor, N., et al: Inequities in health outcomes in children and adults with type 1 diabetes: Data from the T1D Exchange Quality Improvement Collaborative. Clinical Diabetes 39, no. 3 (2021): 278–83.
17. Agarwal, S., Kanapka, L. G., Raymond, J. K., et al: Racial-ethnic inequity in young adults with type 1 diabetes. The Journal of Clinical Endocrinology & Metabolism 105, no. 8 (2020): e2960–69.
18. Ebekozien, O., Agarwal, S., Noor, N., et al: Inequities in diabetic ketoacidosis among patients with type 1 diabetes and COVID-19: Data from 52 US clinical centers. The Journal of Clinical Endocrinology & Metabolism, 106, no. 4 (2021): e1755–62.
19. Scott, A., O'Cathain, A., & Goyder, E. Socioeconomic disparities in access to intensive insulin regimens for adults with type 1 diabetes: A qualitative study of patient and healthcare professional perspectives. International Journal for Equity in Health, 18, no. 1 (2019): 1–13.
20. Agarwal, S., Crespo-Ramos, G., Long, J. A., et al: "I didn't really have a choice": Qualitative Analysis of Racial-Ethnic Disparities in Diabetes Technology Use Among Young Adults with Type 1 Diabetes. Diabetes Technology and Therapeutics, no.ja(2021).
21. Walker, A. F., Hood, K. K., Gurka, M. J., et al: Barriers to Technology Use and Endocrinology Care for Underserved Communities with Type 1 Diabetes. Diabetes Care,2021.
22. FitzGerald, C., & Hurst, S. Implicit bias in healthcare professionals: A systematic review. BMC Medical Ethics 18, no. 1 (2017): 1–18.
23. Hall, W. J., Chapman, M. V., Lee, K. M., et al: Implicit racial/ethnic bias among health care professionals and its influence on health care outcomes: A systematic review. American Journal of Public Health, 105, no. 12 (2015): e60–76.
24. Chapman, E. N., Kaatz, A., & Carnes, M: Physicians and implicit bias: How doctors may unwittingly perpetuate health care disparities. Journal of General Internal Medicine, 28, no. 11 (2013): 1504–10.
25. Addala, A., Hanes, S., Naranjo, D., et al: Provider implicit bias impacts pediatric type 1 diabetes technology recommendations in the United States: Findings from The Gatekeeper Study. Journal

of Diabetes Science and Technology, 2021, 19322968211006476.

26. Tanenbaum, M. L., Adams, R. N., Lanning, M. S., et al: Using cluster analysis to understand clinician readiness to promote continuous glucose monitoring adoption. Journal of Diabetes Science and Technology, 12, no. 6 (2018): 1108–15.
27. Hill-Briggs, F., Adler, N. E., Berkowitz, S. A., et al: Social determinants of health and diabetes: A scientific review. Diabetes Care, 44 no. 1 (2021): 258–79.
28. Valenzuela, J. M., Seid, M., Waitzfelder, B., et al: Prevalence of and disparities in barriers to care experienced by youth with type 1 diabetes. The Journal of Pediatrics, 164, no. 6 (2014): 1369–75.
29. 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
30. 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
31. 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