

Overcoming Barriers to Diabetes Technology in Youth with Type 1 Diabetes and Public Insurance

Hazel Scarlett*

Editorial office, International Journal of Innovative Research in Science, Engineering and Technology, Brussels, Belgium

Corresponding Author*

Hazel Scarlett

Editorial office, International Journal of Innovative Research in Science,

Engineering and Technology, Brussels

Belgium

E-mail: innovativeresearch@scienceresearchpub.org

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Abstract

Continuous Glucose Monitoring (CGM), insulin pumps, and automated insulin administration are all examples of advances in diabetes technology that can help type 1 diabetes patients improve their glycemic control (T1D). However, diabetes technology utilization is lower in kids with government insurance, and this difference is rising in the United States. Effective treatments and policies to promote fair care are desperately needed. The following are the two goals of this case series: (1) Describe how the CGM Time in Range Program (CGM TIRPs) helped children on public insurance overcome challenges to CGM and deliver asynchronous remote glucose monitoring, and (2) advocate for better CGM coverage by public insurance. We explain how six young people with T1D who had public insurance were able to receive and maintain CGM with the help of the program. Three juveniles were able to utilize persistent CGM wear to secure insurance coverage for automated insulin administration devices, and three youths were able to increase their participation with the care team while on CGM and the remote monitoring protocol. CGM TIRPs assisted these teenagers in lowering their hemoglobin A1c and increasing their time in range (TIR). Despite the benefits, the expansion of CGM TIRPs is hampered by strict CGM approval requirements and complicated post-approval patient protocols for receiving shipments. These cases highlight the potential for combining diabetes technology and asynchronous remote monitoring to support the continued use and provide education to improve glycemic control for youth with T1D who are covered by public insurance, as well as the need to lower barriers to obtaining CGM coverage through public insurance. Long-term use of diabetes technology, such as continuous glucose monitoring (CGM) and insulin pumps, improves glycemic outcomes in children and adolescents with type 1 diabetes (T1D), lowering the risk of short- and long-term problems. The American Diabetes Association (ADA) increased the recommendation of CGM usage to all persons with diabetes who use rapid-acting insulin in 2021, while the International Society of Pediatric and Adolescent Diabetes (ISPAD) released new guidelines in 2018 that urge CGM use. Diabetes technology usage is lower in lower socioeconomic class (SES) kids in the United States, and the difference between the highest and lowest SES groups has expanded in the last decade. The gap might be attributed, at least in part, to public insurance limits on CGM coverage. Our research focuses on California Children's Services (CCS) public insurance coverage, which is a Medicaid supplement for children in California who have specific chronic health problems, such as diabetes. For CGM approval, adolescents with CCS must show four or more daily self-monitored blood glucose (SMBG) tests for a month, a criterion that does not exist for privately insured youth. These rules create structural impediments to kids on public insurance adopting technology, contributing to the inequality.

The goal of this case series is to (1) describe the success stories of the CGM Time in Range Program (CGM TIRPs), which removed barriers to diabetes technology adoption and provided asynchronous remote glucose monitoring for youth on public insurance, and (2) advocate for better CGM coverage by public insurance to improve diabetes care and as a gateway to Automated Insulin Delivery (AID). While larger-scale research on the problem is continuing, this case series underlines the urgent need to address systemic obstacles generating disparities in access to diabetes technologies.

Keywords: Insulin • Continuous Glucose Monitoring • (CGM) • Hemoglobin

Introduction

Pediatric endocrinologists and Clinical Diabetes Care and Education Specialists (CDCES) classified the six juveniles in this case series as having CCS and being unable to fulfill CCS criteria for CGM coverage or having inconsistent CGM coverage. The kids were enrolled in CGM TIRPs, an IRB-approved clinical research initiative that helps kids with T1D and public insurance start and maintain CGM usage. We were able to give CGM supplies for the first several weeks because to philanthropic financing, while clinic personnel aided families in obtaining insurance coverage for further supplies. The program also aided families with obtaining insurance coverage for insulin pumps and AID systems provided they satisfied the CCS criterion to qualify for an insulin pump, which involves CGM wear for at least one month. According to a previously published protocol from the 4T study, CDCES remotely evaluated youths' CGM data weekly and offered diabetes education and dosage modifications as appropriate. Hemoglobin A1c (HbA1c) levels were also checked quarterly as part of normal treatment. Youth 1 is a 14-year-old guy with T1D who has been on SMBG and MDI insulin for the past four years. Before CGM TIRPs, his HbA1c was 12.1 percent. His family was predominantly Spanish-speaking, had limited awareness of diabetes, and was not comfortable utilizing cellphones as barriers to diabetes control. He disliked testing his blood glucose with fingersticks, and his team was concerned that he was bolusing insulin without checking his blood glucose. In addition, due to her concern about nocturnal hypoglycemia, his mother attempted to keep bedtime glucose above the goal range (>200 mg/dL). He was able to get and maintain CGM with the use of CGM TIRPs. In comparison to SMBG, he enjoyed using the sensor and began taking insulin more frequently. The CGM data assuaged his mother's fears about hypoglycemia, allowing him to spend more time in a target range. With CGM TIR 65, his HbA1c improved to 7.1 percent after seven months of CGM TIRPs. Youth 2 is a 20-year-old woman who has had T1D and Hashimoto thyroiditis for the past five years. She despised SMBG checks and had difficulty maintaining constant insulin doses. Before CGM TIRPs, her HbA1c was in the range of 9.3–14%. Her diabetic treatment has been neglected by her father, who lives with her. She received school nurse assistance to guarantee consistent insulin shots as a high school student. She no longer has access to a school nurse since graduating from high school. She has trouble getting diabetic supplies from the pharmacist regularly, and she has trouble bolusing correctly. She can provide long-acting insulin consistently. She is more active in her diabetes care after enrolling in CGM TIRPs, and she discusses CGM data and diabetes management with CDCES through the remote monitoring program regularly. Her HbA1c improved to 7.1 percent six months after starting CGM TIRPs, with CGM TIR 53 percent. It will be difficult for her to maintain CGM coverage once she has graduated from CCS insurance at the age of 21. Before CGM TIRPs, Youth 3 was an 18-year-old female with T1D for four years and an HbA1c consistently >14 percent. The mother of the adolescent had a history of substance misuse and homelessness, and she died shortly after the adolescent was diagnosed with T1D. Because this adolescent's family speaks largely Spanish, she oversees communications with insurance companies and medical equipment providers.

She no longer has access to school nurse help to encourage regular SMBG and boluses after graduating from high school. Her HbA1c improved progressively to 6.3 percent nine months after enrolment in CGMTIPs, with a CGM TIR of 82 percent. She was taken off CGM for a short time owing to a device malfunction and running out of supplies too soon. Youth 4 is a 17-year-old female with T1D who has struggled with disordered eating for the past nine years. She has been unable to manage her diabetes at home for several years due to a lack of help and supervision. She was solely responsible for SMBG, insulin dose, and diabetic supplies. Before CGM TIPs, she was occasionally on CGM with an AID system, but she had multiple supply interruptions owing to problems navigating the healthcare system to acquire refills. When she was off CGM and returned to the open-loop, her HbA1c varied from 12–13 percent, but it improved to 9–10 percent on the AID system before CGM TIPs. Her CGM TIR was all over the place, ranging from 19 to 65 percent.

She developed healthcare navigation skills, such as understanding when and how to contact device makers when equipment malfunctioned, thanks to coaching from CDCES through CGM TIPs, which allowed her to continue access to supplies. Her last HbA1c was 7.7%, and her CGM TIR was 62 percent, and she now utilizes her AID system regularly. Youth 5 is a 15-year-old boy who has had T1D for five years and also has asthma, eosinophilic esophagitis, and celiac disease. His HbA1c was >14 percent before CGM TIPs, and he had nine critical care hospitalizations for Diabetic Ketoacidosis (DKA) in the previous two years. The diabetes care of this adolescent was complicated by a lack of secure housing and co-occurring anxiety and sadness. Family impediments to navigating the healthcare system, according to the clinical team, were insufficient health literacy and communication abilities. SMBG, insulin dosages, and clinic visits were not as regular as they should have been. As a result of the CGM TIPs, he was able to start CGM and, later, an AID system.