

Essentials for Integrating Diabetes Technology into the Clinical Paradigm: The DCES at a Technology Champion

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What is a Diabetes Technology Champion?

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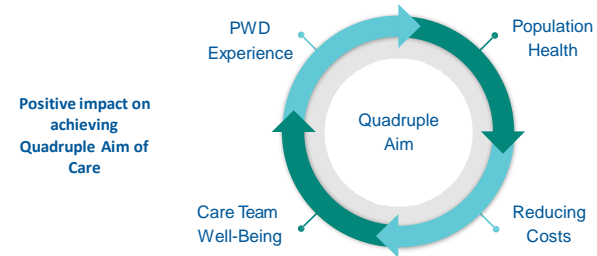
What is a Technology Champion?

Technology champions lead efforts to integrate technology into the clinical paradigm to improve outcomes and quality of care. They design systems that motivate stakeholders to work together to achieve shared goals.

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Benefits



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How does Technology Utilization Impact Health Outcomes?

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Diabetes Technology and Outcomes: T1DX

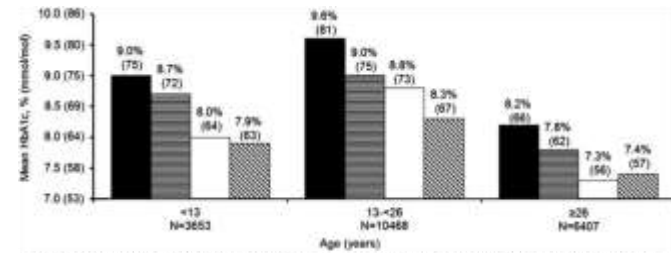
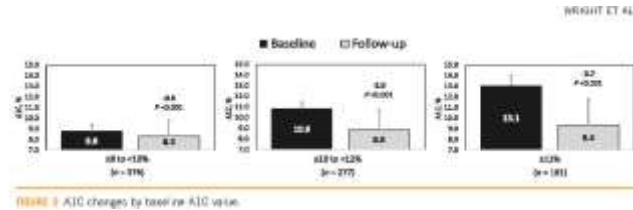


FIG. 3. Mean HbA1c by technology use in 2016-2018. Solid black represents injection only. Horizontal stripes represent pump only. Solid white represents injection+CGM. Diagonal stripes represent pump+CGM. Foster et al, 2019

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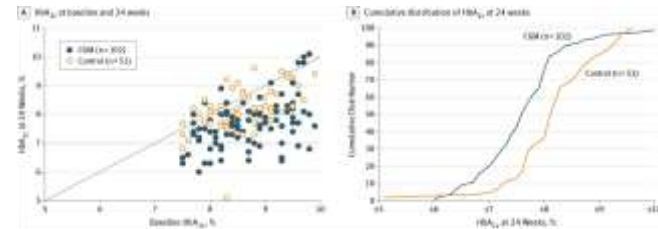
Diabetes Technology and Outcomes: Flash CGM and T2D



Use of Flash Continuous Glucose Monitoring Is Associated With A1C Reduction in People With Type 2 Diabetes Treated With Basal Insulin or Noninsulin Therapy
 Eugene E. Wight, Matthew S.D. Kerr, Ignacio J. Reyes, Yelena Nabutovsky, Eden Miller
 Diabetes Spectrum May 2021, 34 (2) 184-189; DOI: 10.2337/ds20-0069

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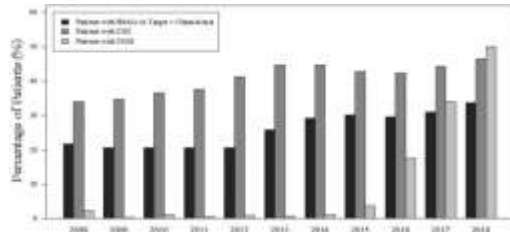
Diabetes Technology and Outcomes: DIAMOND



Beck et al, 2017

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Diabetes Technology and Outcomes: SWEET



Gerhardsson, et al 2021

Diabetes Technology and Outcomes: SWEET
 The SWEET Project 10-Year Results: Improved HbA1c Associated with Improved HbA1c and Increased Use of Diabetes Technology in Youth with Type 1 Diabetes

What are the Barriers to Technology Adoption and Durable Use?

Disparities Exist in Technology Utilization

Diabetes Care 2017;40(11):2157-2162

A Decade of Disparities: Technology Use and HbA_{1c} in Pediatric Type 1 Diabetes: A Transatlantic Comparison

ORIGINAL ARTICLE

Racial–Ethnic Disparities in Technology Use Among Young Adults

Shikant Agarwal, MD, MPH, Clyde Schechter, Jeffrey Gonzalez, PhD,^{1,2} and Judith A. Lora

DCES PRACTICE PAPER

Technology Disparities and Therapeutic Inertia
A Call to Action for the Diabetes Care and Education Specialist

Diabetes Care 2017;40(11):2157-2162

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Disparities in Access = Disparities in Outcomes?

Diabetes Care 2023;46(2):391-398 | <https://doi.org/10.2333/dci.22-0277>

Effect of CGM Access Expansion on Uptake Among Patients on Medicaid With Diabetes Diabetes Care

Cohort
Retrospective cohort of 3,056 regional patients on Medicaid with diabetes. Full diabetes available for CGM prescription.

Methods
CGM fit rate (newly initiated by medication possession ratio [MPR]) and pre-CGM vs. post-CGM A1C were compared. Median duration of observation 334 days.

Outcome
Type 2 diabetes: n = 2,784
Type 1 diabetes: n = 242

CGM Prescribed n = 448
CGM Dispensed n = 422

Type 2 diabetes

	Type 2	Type 1	P < 0.001
CGM fit rate	14.2	18.9	
CGM MPR	11.9	16.2	

Type 2 diabetes

	MPR	Median A1C	Median Duration	95% CI	P < 0.001
CGM Prescribed	14.9	8.8	334	8.7-8.9	
CGM Dispensed	14.2	8.8	334	8.7-8.9	

Conclusion: Expansion of CGM use barriers (cost, insurance, disparities in CGM access) and future HbA_{1c} in adults with type 2 diabetes.

Al et al. Effect of CGM access expansion on uptake among patients on Medicaid with diabetes. Visual abstract by @ShikantAgarwal and @ClydeSchechterMD

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Technology Gatekeeping Still Exists

Implicit Bias:
Race or
Ethnicity



Addala et al., 2021, Odugbesan et al., 2022; Fitzgerald, 2017

Implicit Bias:
Insurance
Type



Implicit Bias:
Diagnosis
Type



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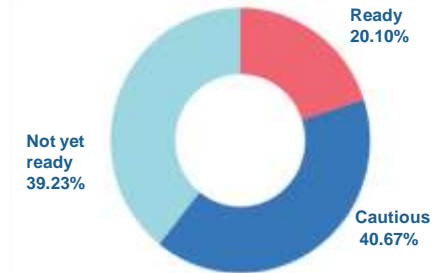
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HCP Readiness is Variable in Technology Adoption

- Survey of 209 Diabetes Specialists (Physician in specialty care + CDCES)
- Readiness to Promote CGM Adoption

Tanenbaum ML, Adams RN, Lanning MS, et al. Using Cluster Analysis to Understand Clinician Readiness to Promote Continuous Glucose Monitoring Adoption. *J Diabetes Sci Technol*. 2018;12(6):1108-1115. doi:10.1177/1932296818786486

Source: [Using Cluster Analysis to Understand Clinician Readiness to Promote Continuous Glucose Monitoring Adoption\(nid.gov\)](https://www.nidDKD.org/using-cluster-analysis-to-understand-clinician-readiness-to-promote-continuous-glucose-monitoring-adoption/)



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“Our inability or unwillingness to offer diabetes technology to every person with diabetes, and to provide appropriate education, training and support will exacerbate disparities and inequities in care and outcomes.”

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What do the Clinical Guidelines Say About “Gatekeeping”?

The left screenshot shows the title page of a document titled "Professional Competencies for Diabetes Technology Use in the Care Setting" published by the American Association of Diabetes-Care and Education Specialists. The authors listed are Douglas P. Finkel, MD, MPH, BC-ADM, Lisa Kurland Hill, MS, MSJ, Jane Jeffrey Scales, and Alyson S. Hughes, PhD.

The right screenshot shows the title page of "ISPAD Clinical Practice Consensus Guidelines 2022: Diabetes technologies: Glucose monitoring" published by the International Society for Pediatric and Adolescent Diabetes (ISPAD). The authors listed are Gregory F. Ross, MD, PhD, Robert L. Anderson, MD, PhD, David J. Taniguchi, MD, PhD, and M. Saeed Zaki, MD, PhD.

“Encourage uptake and refrain from having youth and families “earn” the right to use devices.”

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What are the Barriers to Becoming a Diabetes Technology Champion?

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Personal Barriers

- Lack of training
- Unfunded time
- Fear of failing
- Communication
- Standing in the clinic or organization

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Organizational Barriers

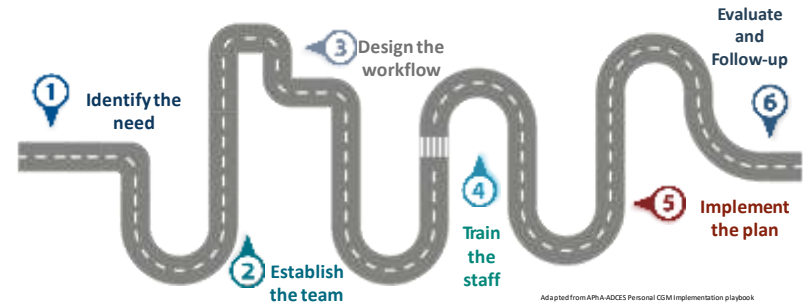


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Getting Started: Try a Pilot!

Step-by-step roadmap is crucial



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Workflow is Central to Your Success

A Case Study for CGM

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The Year: 2016

The Place: Gainesville, FL

- CGM training exclusively provided in conjunction with pump starts
- No Process for Training on CGM
- No education materials



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First a CGM Pilot and then a Clinic-wide Program

2016



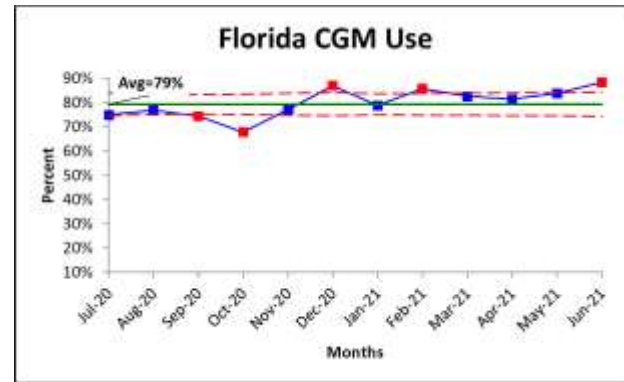
7%

2019

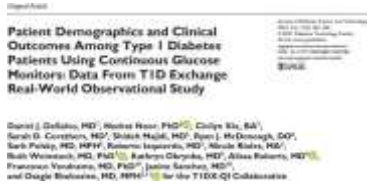


75%

25



Diffusion of Knowledge Takes Time! Current Adoption Rates in the T1D Exchange QIC



- First appeared in the clinical guidelines in 2018
- By 2023, 48% of PwD in large centers used CGM (n=11469)
 - Non-Hispanic White (50%), Non-Hispanic Black (18%), Hispanic (38%)
 - Private insurance (57.2%), public insurance (33.3%)
 - CGM users had lower median HbA1c (7.7%) compared to nonusers (8.4%).
 - Rates of DKA and severe hypoglycemia were significantly higher in nonusers

Chiang JL, Mazzei DM, Garvey KC, Hood KK, Laffel LM, Weinzimer SA, Wolfsdorf J, Schatz D. Type 1 Diabetes in Children and Adolescents: A Position Statement by the American Diabetes Association. *Diabetes Care*. 2018;Sep;41(9):2026-2044. doi: 10.2337/dci180023.

DeSilva DJ, Noor N, Xie C, Corathers SD, Majidi S, McDonough RL, Pokby S, Izquierdo R, Roles N, Weinstock R, Obyrna K, Roberts A, Vendrame F, Sanchez J, Ebekezien O. Patient Demographics and Clinical Outcomes Among Type 1 Diabetes Patients Using Continuous Glucose Monitors: Data From T1D Exchange Real-World Observational Study. *J Diabetes Sci Technol*. 2023;Mar;17(2):322-328. doi: 10.1177/19322968211046783.

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Net Collection Rates (Baseline 2015)

CPT Code*	Type of Insurance	Net Collection Rate
95250	Private	100%
95250	Public (Medicaid)	0%
95251	Private	N/A
95251	Public (Medicaid)	N/A

*95249 (personal CGM) was not available

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Net Collection Rates 2019

CPT Code	Type of Insurance	Net Collection Rate
95249	Private	80.3%
95249	Federal/Military	94.9%
95249	Public (Medicaid)	80.2%
95250	Private	N/A
95250	Federal/Military	98.1%
95250	Public (Medicaid)	0%
95251	Private	91.1%
95251	Federal/Military	97.2%
95251	Public (Medicaid)	87.3%

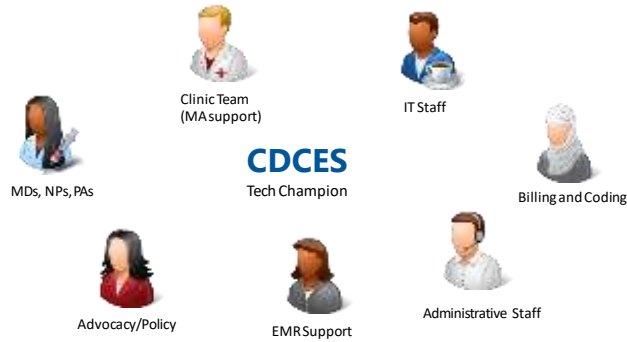
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The
Journey



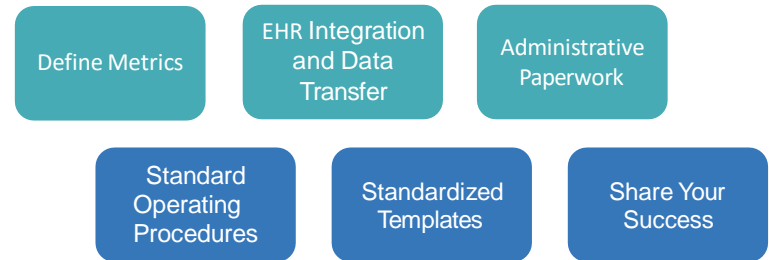
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Identify the Team



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Building a Process



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Which Metrics?

QI Metrics in Total T1D population: implementation schedule

Stage 1: Monitoring	Stage 2: Insulin Management	Stage 3: Self Management
A1c	Time in Range ⁽¹⁾	Adjusting insulin doses between visits ⁽²⁾
CGM use ⁽³⁾	Timing of insulin bolus ⁽⁴⁾	Reviewing data/baselin management between visits ⁽⁵⁾
BG Check X4 ⁽⁶⁾	Bolus IX among pump ⁽⁷⁾	Additional PRDs
Pump use ⁽⁸⁾ & MDI use ⁽⁹⁾	DKA events ⁽¹⁰⁾ DKA admissions ⁽¹¹⁾	Bolus IX among MDI ⁽¹²⁾
Depression Screening ⁽¹³⁾	LTPU (follow up based on days between visits and care) ⁽¹⁴⁾	
	Documented transition plan from pods to adult care ⁽¹⁵⁾	
	SDOH Screenings ⁽¹⁶⁾	

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Which Metrics?

Clinical Outcomes

- Year 1-2 Metric: CGM Use (Durability)
- Year 3-4 Metric: Active CGM Time, Time in Range
- Year 5 Metric: Change in HbA1c, Equity/Disparities
- Ancillary: Satisfaction, Reduction in Hypoglycemia, Skin Integrity

Sustainability Outcomes

- Net Collection Rates for Placement, Education, and Interpretation
 - Private and Public Insurance
- Grant Funding
 - Universal CGM during COVID Pandemic (Equity/Access) and Beyond
- Medicaid Coverage for

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Standard Operating Procedures



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EHR: Simplified Referrals and Backend Workflow



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EHR: Standardized EHR Templates



CGM Placement AND Education

EHR: Standardized Templates -- Interpretation



CGM Interpretation Template (AGP pasted into note)

EHR: Instruction Templates



Template Instructions for CGM Users that Can Be Customized and are available in the patient portal for easy access

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Data Transfer: Which Platform?

Carelink
Dexcom Clarity
Glooko
LibreView
t:connect Portal
Tidepool



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Objective Data Must Be Available!!

Create a process to login/access and review data

- No clinic account
 - Document individual username and passwords for login
- Shared clinic-wide login
- HCP Portal: Individual staff accounts with administrator

Practice Requirements

- Is risk assessment required at your Institution?
- Who can install software on computers?
- Privacy

Most
Clinic
Portals
Are
Free!

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Wouldn't it be easier if data automatically flowed to the EHR?!



The Integration of Continuous Glucose Monitoring Data into the Electronic Health Record (iCoDE) Project is a consortium whose purpose is to facilitate efficient uploading and integration of continuous glucose monitor (CGM) data into the Electronic Health Record (EHR).

The two goals of the iCoDE project are to:

- 1) develop technical specifications to integrate CGM data into the EHR and
- 2) develop workflows and guidelines to facilitate data integration efforts

<https://www.diabetestechology.org/icode/>

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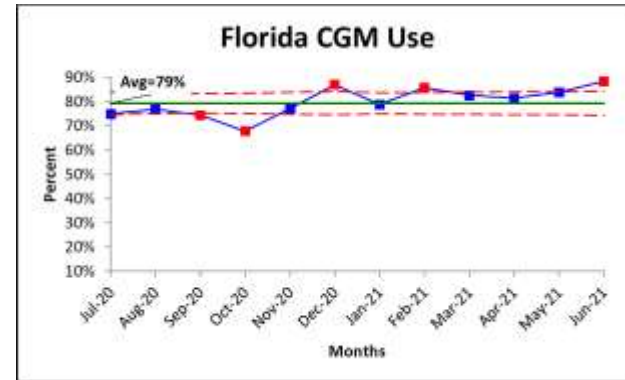
EHR: EPIC Flowsheets to collect metrics

Continuous Glucose Monitoring (CGM)	
Start Date	
Device	
Model	
Supply Details (CGM)	
Average CGM wear from start to days	
Total in range over 18 days	
A1c	
Start	
Model	
Lancet Site	
Complication Screening	
Last Eye Exam	
Last Dental Exam	
Last Pk. Blind	
Last TSH	
Last Lipids	
Last Urine Albumin	

- CGM Use
- Time in Range
- Active CGM Wear Time

Data entered into the chart in a flowsheet can easily be extracted!

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Flowsheet Data Populates Templates

```

Continuous Glucose Monitoring (CGM) Interpretation:
@PATIENT@ (LUFF AND PEGS DOES DOESN'T 3384) @CARE@ changes the sensor every *** days and reported placing the CGM sensor in @RHS@ ***
@PCIDNA@21E7910A090 11@
***OVP AGP paste here
I reviewed more than 72 hours of continuous data and my interpretation based on review of the CGM data is that average CGM wear time over 14 days was ***

```

Anastasia uses a Dexcom G6 CGM. She changes the sensor every 10 days and reported placing the CGM in her arms. Time in range over 14 days was 57%.

[AGP pasted here]

I reviewed more than 72 hours of continuous data and my interpretation based on review of the CGM data is that the average CGM wear time over 14 days was 92%. [Additional specific interpretation here]

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Paperwork, Prior Authorizations and Pain Points

Create a Prior Authorization Process

- CoverMyMeds, SureScripts, Others
- Build checks into your system

Assess the process to reduce inefficiencies

- Avoid duplicated efforts and angry staff!
- Train back up staff

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What will Improve my Likelihood of Success?

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Strategies to Achieve Buy In

- Identify a fellow champion in your setting
- Share the evidence
- Provide an “on body” experience
 - Include the diabetes care team + staff + other interested parties
 - “Wear and Share”
 - Utilize internal and external experts
- Determine metrics, create a pilot workflow
 - Start with a pilot to demonstrate feasibility, acceptability, and efficacy
 - Internal and external grant funding

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Strategies to Keep People on Board

- Encourage and reward consistent use of clinical processes (SOP, EHR templates, referrals)
 - Update as needed
- Make sure the devices software works
- Review metrics and update to reflect progress
- Thank your team!
- Share your success
- Remember that leaders can be found at all levels in an organization

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This process can be applied to the diabetes technology that best meets the need of people with diabetes in your practice setting.

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Finally, keep in mind:

“If you didn’t document it, it didn’t happen.”

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Share Your Success! Present and Publish



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What Resources are available to me?

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danatech from ADCES

The screenshot shows the danatech website with a purple header. The main content area features a navigation bar with links for "Glycemic Monitoring", "Insulin Pumps & AID", "Medicine Delivery", "Apps & Digital Therapeutics", and "Training & Education". Below the navigation is a large illustration of a person at a computer with various icons floating around. To the right of the illustration is a section titled "TRAINING & EDUCATION" with the sub-heading "TECH FOCUSED CE CREDIT OPPORTUNITIES". Under this heading, there are three columns of text describing different training programs, including "Danatech Online Training: Developed & Automated Insulin Delivery Systems: Continued Advancement in Telemedicine Insulin Delivery", "Connected Insulin Delivery: Devices and Clinical Application of Data Certificate Program", and "Putting Continuous Glucose Monitoring (CGM) Use Incentive Certificate Program".

<https://www.diabeteseducator.org/danatech/home>

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Panther Program

PANTHER
Diabetes Technology
Encyclopedia

HOME | ABOUT US | DEVICE INFO | SUBSCRIPTION | CONTACT

Get to the gist of what you need to know.

Essential resources and guidance for health care professionals working with diabetes technology.

- [Patient Care Clinic Tools](#)
- [Device Comparison Chart](#)
- [Skin Solutions](#)
- [Device Info Sheets](#)

OMNIPOD 5

FIRST BOOK IN UNDERSTANDING DIABETES
Original author: Dr. H. Peter Chase, MD

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Diabeteswise.org

Diabeteswise.org

Check Us! | Screen | Device Finder | Why Us | Resources

Helping You Find The Right Diabetes Devices For Your Life.

NEW UPDATES

Explore our Priorities

NEW Device Finder

Spanish Version

NEW UPDATES

Explore our Priorities

NEW UPDATES

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Consensus CGM Targets

Diabetes Care, Volume 43, August 2020

1399



Clinical Targets for Continuous Glucose Monitoring Data Interpretation: Recommendations From the International Consensus on Time in Range

Diabetes Care. 2019;42:1599–1603 | <https://doi.org/10.2337/19-0028>

Tadej Battelino,¹ Thomas Danne,²
Richard M. Bergenstal,³
Stephanie A. Amet,⁴ Roy Beck,⁵
Tobias Deister,⁷ Emmanuel Bos,⁶
Bruce A. Buckingham,⁸ William T. Cefalu,⁹
Kelly J. Glass,¹⁰ Claudio Cobelli,¹²
Evel Dossou,¹³ J. Hans DeVries,^{12,14}
Kim C. Donaghue,¹⁵ Klomen Dozi,¹
François J. Doyle III,¹¹ Jettih Gang,¹¹
Günther Grünberger,¹⁶ Susan Hawley,¹⁷
Lutz Heinemann,¹⁸ Yi B. Hsu,¹⁹
Roman Hovorka,²⁰ Weidong Jia,²¹
Olga Kordonouri,²² Boris Kovatchev,²³
Aoran Kowalik,²⁴ Lutz Lang,²⁵
Bruce Levine,²⁶ Alexander Mikovics,²⁷
Charles Mathis,²⁸ Helen E. Murphy,²⁹

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Consensus Automated Insulin Delivery Recommendations



Consensus Recommendations for the Use of Automated Insulin Delivery Technologies in Clinical Practice

Moshe Phillip, Revital Nimri, [...], and Tadej Battelino

Endocr Rev. 2023 Apr; 44(2): 254–280.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9985411/>

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J Diabetes Educ. 2021 Aug;46(4):329-334. doi: 10.1177/107824272110280113.

Technology Integration: The Role of the Diabetes Care and Education Specialist in Practice

Diana Iuvone¹, Carl M. Cox², Kathy Schwab³, Terence A. Chan⁴, Justine Krasner⁵, Mary Jo Mason⁶, Deborah A. Greenwood⁷, Anastasia Albanese-Cresci⁸

Article reuse guidelines: [sagepub.com/journalsPermissions.nav](https://www.sagepub.com/journalsPermissions.nav)
PMID: 32780083 DOI: 10.1177/107824272110280113

Abstract

Purpose: Technology is rapidly evolving. People with diabetes and clinicians are using blood glucose meters, continuous glucose monitors, data-sharing platforms, and applications to improve clinical outcomes.

A Framework for Optimizing Technology-Enabled Diabetes and Cardiometabolic Care and Education: The Role of the Diabetes Care and Education Specialist

Dorothy A. Greenwood¹, Fran Russell², Laurence Scott³, Kirtin Shah⁴, Dana Hoover⁵, Malvika N. Purohit⁶

Article reuse guidelines: [sagepub.com/journalsPermissions.nav](https://www.sagepub.com/journalsPermissions.nav)
PMID: 32780807 DOI: 10.1177/107824272110280113

Abstract

Purpose: The purpose of this article is to present a framework diabetes and cardiometabolic care and education using a team approach to leverage the expertise of the diabetes care and education specialist.



Reference Guide for Integrating Continuous Glucose Monitoring into Clinical Practice

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PMID: 32780807 DOI: 10.1177/107824272110280113

AACE Guidelines on Advanced Technologies



Abstract
The purpose of this document is to provide a framework for the use of advanced technologies in the management of diabetes. This document is intended to serve as a reference for clinicians and patients. The document is organized into several sections, including an overview of advanced technologies, a discussion of the benefits and risks of these technologies, and a list of resources for further information. The document is intended to be used as a guide for clinicians and patients in making decisions about the use of advanced technologies in the management of diabetes.

<https://marlin-prod.literatumonline.com/jb-assets/Health%20Advance/journals/eprac/EPRAC180.pdf>

ADCES Diabetes Technology Competencies



Table 1. Scope Statement

Diabetes technology use requires the skills of the healthcare providers (HCPs). Knowledgeable, skilled and well-prepared HCPs are required for optimal use of technology. Diabetes care teams need to be able to select, implement, and maintain technology effectively, to their respective roles and settings. This report has the goal to define technology competencies for HCPs. The following technology knowledge-related competencies are included in Table 1.

Table 1. Scope 1: Staff Knowledge

Competency	Knowledge
1.1	Identify the types of diabetes technology available and their uses in the care setting.
1.2	Identify the types of diabetes technology available and their uses in the care setting.
1.3	Identify the types of diabetes technology available and their uses in the care setting.
1.4	Identify the types of diabetes technology available and their uses in the care setting.
1.5	Identify the types of diabetes technology available and their uses in the care setting.
1.6	Identify the types of diabetes technology available and their uses in the care setting.
1.7	Identify the types of diabetes technology available and their uses in the care setting.
1.8	Identify the types of diabetes technology available and their uses in the care setting.
1.9	Identify the types of diabetes technology available and their uses in the care setting.
1.10	Identify the types of diabetes technology available and their uses in the care setting.

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The ADCES Diabetes Technology Competencies

- A comprehensive set of role-based competencies designed for:
 - Health care professionals
 - Diabetes care and education specialists
 - Other members of the multidisciplinary care team
 - Staff
- The competencies can be utilized to initiate and support sustained use of diabetes technology to achieve improved outcomes

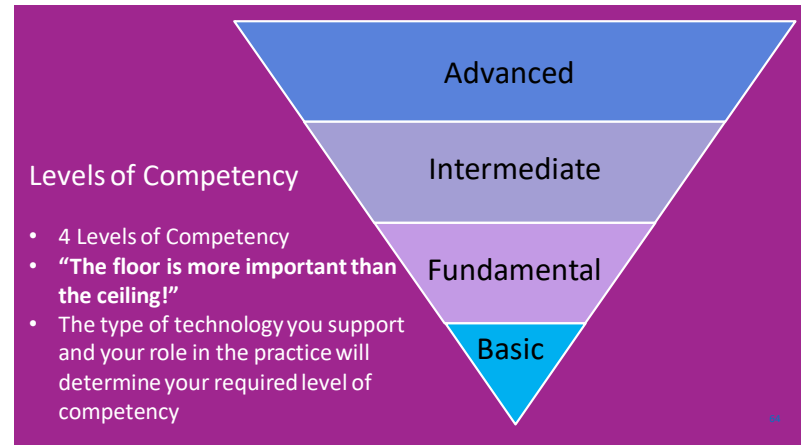


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Diabetes Technology Competency Domains

Domain 1:	Staff Knowledge
Domain 2:	Device Data
Domain 3:	Glycemic Targets and Diabetes Management
Domain 4:	Patient Education, Preparation for Onboarding, and Durability of Use
Domain 5:	Clinical Processes, Billing, Coding
Domain 6:	Psychosocial
Domain 7:	Schools and Camps

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Setting Matters

- The setting where diabetes care and education is provided informs the level of competency required
- Not ALL settings can support ALL diabetes technologies or ALL aspects of diabetes technology support (yet!)
 - This is OK!**

Settings
Pediatric and Adult Specialty Care (Endocrinology Practices)
Pediatric and Adult Primary Care
Other Settings (Schools, Camps, Long-term Care Facilities, etc.)

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Example: Automated Insulin Delivery

Role	Competency Level	Example
Prescriber	Advanced	Demonstrate working knowledge of automated insulin insulin delivery system algorithms and the predicted effect of changes to device settings on glycemic outcomes (3.44)
CDCES	Advanced	Demonstrate ability to set up and change settings in insulin pumps and automated insulin delivery systems
Psychologist	Intermediate	Evaluate technology-specific and general diabetes burnout potential with ongoing surveillance (6.32)
Clinic Manager	Fundamental	Create and utilize a streamlined process for obtaining technology supplies (5.24)
Call Center Staff	Basic	Demonstrate knowledge of glucose meters, CGMs, insulin pumps, and AID systems, including individual components (e.g., pump, infusion set, cartridge, etc.) for patient scheduling and optimizing visits (1.10)

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Summary

- Being a technology champion contributes improved quality of care for PWD
- The DCES is well positioned to be champion and lead initiatives to increase access and optimize the use of technology in diabetes management regardless of practice setting
- The development of an effective work plan which addresses the needs of the organization and PWD is key to success
- Continuing education and support is critical for long term success

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References

1. Patil SP, Albanese-O'Neill A, Yehi K, Seley JJ, Hughes AS. Professional Competencies for Diabetes Technology Use in the Care Setting. *Sci Diabetes Self Manag Care.* 2022;48(5):437-445. doi: 10.1177/26350106221120889.
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