Integrating diabetes tech for better health outcomes

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Conflict of Interest: Financial Disclosures

Lindsay Schlichting, BSN, RN, CDCES Tandem –Certified Pump Trainer (Independent Contract)

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Objectives:

Highlight	Benefits and evidence for integrating diabetes technology into practice
Describe	How insulin pumps work and how they are programmed to deliver insulin
Describe	Components that are needed to successfully introduce and support patients on diabetes technology in Primary Care

The possible future of Diabetes The prevalence of diagnosed diabetes is projected to increase in the U.S. from 22.3 million (9.1% of the total population) in 2014, to 39.7 million (13%) in 2030, and to 60.6 million (17%) in 2060

If current trends continue the CDC estimates that 1 in 3 Americans will develop diabetes in their lifetime





- Poverty:
 - Higher prevalence, A1c, mortality
 - More DKA, higher A1c in T1D
- Low educational attainment:
 - Higher incidence, prevalence, and mortality of T2D
- No health insurance/ low access to care:
 - Higher risk of undiagnosed diabetes
 - Lower diabetes care quality
- No sidewalks/ polluted neighborhoods:
 - Higher incidence and prevalence of diabetes
 - Worse diabetes outcomes
- Low neighborhood cohesion/ low social support:
 - Higher incidence of diabetes
 - Increased diabetes mortality and complications

Reviewed by Hill-Briggs et al. 2020 Diabetes Care online Nov 2, 2020; https://doi.org/10.2337/dci20-0053

Healthy People 2030, Social Determinants of Health. https//health.gov/healthypeople/objectives-and-data/social-determinants-health;

A day in the life...

What didn't we list?

Don't

forget!

- 1. Anything fun
- 2. Family obligations
- 3. Work obligations
- 4. Dependent care



"Currently, primary care providers (PCPs) deliver clinical care to ~90% of individuals with type 2 diabetes, and this proportion is likely to increase over time "



Diabetes Technology Integration



Technology is rapidly evolving and has become an integral component of diabetes care

People with diabetes and clinicians are harnessing a variety of technologies to improve clinical outcomes and quality of life, including:

- 1. Connected BG meters
- 2. CGM
- 3. Insulin pumps with or without automated insulin delivery
- 4. Data sharing platforms
- 5. Telehealth
- 6. Remote monitoring
- 7. Smartphone apps
- 8. Smart Insulin Pens

Diabetes tech use is associated with improved outcomes, especially when the individual using tech is supported, knowledgeable, and actively engaged with their care







t:slim X2 with Control-IQ



1210

Omnipod 5



Omnipod DASH™







Dexcom CLARITY

FreeStyle Libre 2













InPen

Tempo Personalized **Diabetes Management** Platform







BigFoot Unity

MiniMed™ 770G System

MiniMed™ 630G System

9







Tidepool



Eversense



Freestyle Libre 3



CalorieKing

Trends in diabetes management among U.S. adults: 1999-2018



- ~50% are meeting generally recommended glucose targets
- ~20% of patients are meeting all 3 targets (glucose, b/p, cholesterol



Fang M, et al. Trends in diabetes management amount U.S. adults: 1999-2018. N Engl J Med 2021; 384:2219-2228: DOI: 10.1056/NEJMsa2032271

Evidence for diabetes technology

Insulin delivery

- RCTs demonstrate a modest improvement in A1C
- Observational studies, registry data, and meta-analysis suggest improvement in glucose metrics
 - Reduced rates of severe hypoglycemia
- Pump use may reduce DKA risk and complications
- Treatment satisfaction and quality of life measures may improve
- AID systems may reduce A1C and improve TIR
 - May also reduce risk of exercise-related hypo
 - Psychosocial benefits
 - Preferred (over non-automated pumps) in individuals with T1D

American Diabetes Association, 7. Diabetes Technology: *Standards of Care in Diabetes—2023. Diabetes Care* 1 January 2023; 46 (Supplement_1): S111–S127. <u>https://doi.org/10.2337/dc23-S007</u>

Evidence for diabetes technology

Glucose monitoring

Real-time CGM	Intermittently-scanned CGM
Multiple RCTs have been done (results largely positive)	RCT data is more limited
Reduction in A1C	Reduction in hypoglycemia
Reduction in episodes of hypoglycemia	Improved treatment satisfaction
Benefits seen in adults of all ages	Increased frequency of "testing"
Data in children less consistent but still reduced hypoglycemia (which reduced hypo concerns and diabetes distress)	Mixed results on study endpoints (A1C reduction, rates of hypo or severe hypoglycemia)

ADA: CGM is the standard of care for T1D and T2D on intensive insulin therapy.

American Diabetes Association, 7. Diabetes Technology: *Standards of Care in Diabetes*—2023. *Diabetes Care* 1 January 2023; 46 (Supplement_1): S111–S127. <u>https://doi.org/10.2337/dc23-S007</u>

Evidence for diabetes technology

Flash CGM Is Associated With Reduced Diabetes Events and Hospitalizations in Insulin-Treated Type 2 Diabetes

Richard M Bergenstal,¹ Matthew S D Kerr,² Gregory J Roberts,² Diana Souto,³ Yelena Nabutovsky,² and Irl B Hirsch⁴



Effect of Continuous Glucose Monitoring on Glycemic Control in Patients With Type 2 Diabetes Treated With Basal Insulin: A Randomized Clinical Trial

CGM

CGM sensors are small, disposable devices applied to the surface of the skin

CGM measures interstitial glucose at regular intervals 24 hours/day via a small wire inserted under the skin during sensor application









Glucose enters your bloodstream firs before it enters the interstitial fluid.

Ambulatory glucose profile (AGP)

- AGP is a 1-page standardized report
- Snapshot of glucose levels (typical day)
 - Big picture view of DM self-management
 - Need a min. 5 days of data
- Cloud-based data management platform
 - · Upload glucose from Reader/receiver OR
 - · Share glucose data
 - with HCP through app

AGP

14 Days Fri Apr 21, 2023 - Thu May 4, 2023 🖍

🖶 🛃 🖹

Dexcom capturAGP*5.0 @

Time in Ranges Goals for Type	1 and Type 2 Diabetes	Patient 004
ach 5% increase in the Target Range is clinicall ach 1% time in range = about 15 minutes per da	y beneficial. 19	DOB: January 1, 2000
18% Very High _{Goal: <5%}	52%	Glucose Metrics
34% High	Goal: <25%	Average Glucose Goal: <154 mg/dL
47% In Range Goal: >70%		GMI
1% Low	1%	Goal: <7%
<1% Very Low Goal: <1%	Goal: <4%	Coefficient of Variation Goal: <36%
get Range: 70-180 mg/dL y High: Above 250 mg/dL y Low: Below 54 mg/dL		Time CGM Active

Ambulatory Glucose Profile (AGP)

AGP is a summary of glucose values from the report period, with median (50%) and other percentiles shown as if they occurred in a single day.



Daily Glucose Profile

Each daily profile represents a midnight-to-midnight period.



What's an insulin pump?





Dr. Arnold Kadish (1963) with first insulin pump.

History of Insulin Pumps

You've come a long way, baby!

MULTIPLE PUMP OTPTIONS

FDA-approved pump options from 3 manufacturers:

Medtre

Tandem t:slim X2 w/Control IQ ®



Medtronic 630*G*, 670*G*, 770*G*, 780*G*[®]



Omnipod Classic (Eros), Dash , Omnipod 5 Small electronic medical device worn externally on the body that delivers insulin <u>24 hours a day</u>

Infusion site attached to the body with adhesive

Small cannula under the skin delivers insulin continuously

Infusion set/reservoir (or Pod) is changed every 2-3 days

Pumps are designed and approved to use U-100 rapid-acting insulin only (HumaLog[®], NovoLog[®], Apridra[®], Fiasp[®], and Lyumjev[®])



All pumps deliver rapid-acting insulin in two ways:

1. <u>Basal rate</u>: continuous, hourly infusion of insulin that keeps blood glucose stable between meals and overnight

2. <u>Bolus function</u>: can deliver additional insulin before eating and/or to correct high blood sugar- amount calculated using programmed pump settings



TIME

https://www.medtronicdiabetes.com/treatments/insulinpump-therapy

Courtesy: Cleveland Clinic

Automated Insulin Delivery (AID) AKA "hybrid closed loop"

- **Pump** is integrated with CGM system
- Pumps can operate in "manual mode" or "auto mode"
- ☑ All 3 pumps have <u>basal</u> insulin auto-adjustment
- All 3 pumps have adjustable BG targets
- Only T:slim X2 and Medtronic 780G have "autobolus" feature
- Announced bolus for meal/snacks is still <u>crucial</u>
- No currently available pump is fully automated
- A small sub-set of patients may use a "DIY" AID pump (not FDA-approved)
- 2 4th insulin pump is currently under FDA review



Insulin pump parts

Infusion set/ cannula

- Infusion sets attach to the body and connect user to the pump
- Different insertion angles and tubing and cannula lengths are available depending on pump type
- Should be changed every 2-3 days







2.0ml



Fills with 200-300 units of u-100 insulin

Should be changed every three days (when sets are also changed)

Data Analysis : Pumps

AGP Bolus/ Basal Split Automation





Data Analysis : Pumps Log books Set changes Total Daily Dose Settings





May 10 2023 - Wednesday



Possible Disadvantages of Diabetes Technology Product/Supply management

Data Management

Risk site infection

Cost (device, supplies, batteries)

Being attached to a device

Constant reminder of having diabetes

Time demands

Increased risk of DKA (Pump)

Data Overwhelm

Technology fragmentation

Expectations vs. Reality

Expectation

- Pumps eliminates the need to self-manage diabetes
- Pumps are an artificial pancreas
- Pumps cure diabetes



Reality

- Pumps are an alternative way to deliver insulin
- Pumps require different types of daily self-care and management
- Some pumps can provide partial automation for insulin delivery, but user still needs to request bolus to address food and/or high BG
- Pumps are tools and user engagement is what typically drives success

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

Denver Health CGM Research

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

Kevin Ni; Carolyn A. Tampe; Kayce Sol; Douglas B. Richardson; Rocio I. Pereira

https://diabetesjournals.org/care/article/46/2/391/148067/Effe ct-of-CGM-Access-Expansion-on-Uptake-Among

Cohort	Methods	Type 2 vs. type 1 diabetes						
Retrospective cohort of 3,036 regional patients on Medicaid with diabetes. Full subsidies available for CGM prescription. 53% Hispanic 20% non-Hispanic Black (NHB) 19% non-Hispanic White (NHW)	CGM fill rate measured by medication possession ratio (MPR) and pre- CGM vs. post-CGM A1C were compared. Median duration of observation 324 days.			Type 2	Type 1			
		Mear	MPR	0.72	0.78	P = 0.0	6	
		A1C change (%)		-1.2	-0.19	P < 0.0	P < 0.001	
		Type 2 d	liabetes			a		
Outcome	CGM CGM	U	NHW	Hispani Englisi	ic Hisp h Spar	anic rish	NHB	
Prescribed Dispensed		MPR	0.79	0.70	0.3	74	0.70	P=0.27
Type 2 diabetes: $n = 2,794 \rightarrow$ Type 1 diabetes: $n = 242 \rightarrow$	$n = 448 \longrightarrow n = 422$ $n = 180 \longrightarrow n = 169$	AA1C % (95% CI)	-1.0 (-1.6 to -(-1.3).3) (-2.0 to -	-1	.3 10 -0.4) (~;	-1.2 2.0 to -0.	P = 0 68

Conclusion: Elimination of CGM cost barriers can reduce racial/ethnic disparities in CGM uptake and reduce HbA, in adults with type 2 diabetes. Ni et al. Effect of CGM access expansion on uptake among patients on Medicaid with diabetes. Visual abstract by @KevinChenNi and @RocioPereiraMD1

CONCLUSIONS

CGM uptake disparities can largely be overcome by eliminating CGM cost barriers. CGM use was associated with improved HbA_{1c} across all major racial/ethnic groups, highlighting broad CGM appeal, utilization, and effectiveness across an underprivileged patient population.

Outpatient CGM timeline : Foundation & Vision





<u>Stakeholders</u>: Leadership, Nursing Education, PharmDs, Endocrinology, Clinic RNs, Providers, Pharmacy, EMR

Outpatient Timeline: Experiment, Support & Evaluate



Outcomes:

- Standardization
- Continuous Education Cycle
- Evaluation
- Expansion of teams involved





Step 1: Assemble your team





Step 2: Patient & Staff Education/Support at Denver Health

Who's eligible?



How to get CGM for Commercial Insurance Patients (cuanschutz.edu)

Prepare for CGM



Eligibility Freestyle Libre: October 2022: See CGM Insurance Detail and DME for more detail

Insurance	Coverage	PAR	Pharmacy
Denver Health Medicaid	Dx Diabetes -Yes Libre 2 or 3	No	Denver Health
Denver Health Medicare	Dx Diabetes- Yes Libre 2 or 3	Yes	Denver Health – Pharmacy or Mail Order Pharmacy
			**For Elevate patients have a deductible and price coverage will vary, plan may prefer Dexcom
Denver Health High Point/POS Plans	<u>Dx diabetes:</u> Yes : On three or more injections a day	No	Send to any pharmacy – patient copay will vary depending on plan / deductible
CO Medicaid • When searching for smart texts unclick favorites to see system lists	Only FSL2(Libre 2or Libre 3) For Insulin dependent Adults and Children Type 1 and Type 2 (on basal/ bolus insulin) Covered for 6 months Use smart text DH AMB CGM COVERAGE (Colorado Medicaid) to document the following	Yes	No. Byers Pharmacy , CCS Medical. Ascentus US Med See Tipsheet <u>CGM Insurance</u> <u>Detail and DME</u>
	 Injecting insulin 3+ per day or on 	1	

Diabetes Education	CGM	RPM
G0108, G0109 – Recognized programs	95249, 95259, 95251	99091,99453,994 54,99457,99458
Payment is low per 30 minutes and a Limited number of units per year allowed	**Incident to for medicare, Some commercial payers allow those with NPI to Bill	**Incident to billed every 30 days and requires patient consent
Used for BGM, CGM, Insulin Instruction and pump training DCES can provide	Low if any Co-pay	May apply to Co- pay/deductible

Billing Codes



Newer RPM Codes

Code	Definition	Frequency	Who can perform	Who can billl	Approx \$ (based on 2020 medicare rates)
99453	RPM-Set up and patient education	Once per device- bill first before 99454	Clinical staff- general supervision	MD/DO/ ND/NP/ PA	\$21
99454	Supply of device with monthly transmission	Monthly must transmit at least 16 days	Clinical staff- general super vision	MD/DO/ ND/NP/ PA	\$64
99458	Additional 20 minutes and may go up to 60 minutes	Monthly	Clinical staff- general supervision	MD/DO/ ND/NP/ PA	\$44
99457	RPM communication with patient caregiver- 20 minutes	Monthly	Clinical staff- general super vision	MD/DO/ ND/NP/ PA	\$55

Reimbursement For a complete guide to billing and coding check out

Dana on Diabeteseducator.org



Lessons Learned Gather stakeholders as a first step

Patients love their diabetes devices

Patients who've struggled with MDI can be successful

Tech support requires time

Fragmentation = burnout

The importance of champions

Standardization

Know your why!



Reflections on diabetes tech in practice



Resources

Know your reps: Insulet, Medtronic, Tandem, Abbot & Dexcom, Tidepool, Glooko, etc!

Take Courses: Making Diabetes Technology Work | American Diabetes Association- Great new program offered by ADA!

Download Simulation Apps

Diabeteswise.org

Pantherprogram.org

Coverage:



Omnipod Simulation App

Making Diabetes Technology Work



Catalog

Making Diabetes Technology Work

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Questions????







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