MCT2D Learning Community Monthly Call

Navigating CGMs

To receive CME/CE credit

TEXT 66613 to 833-256-8390

(by 1:00 PM on December 12)

Complete the evaluation online by December 25

at https://beaumont.cloud-cme.com

For assistance, email CHEcme@corewellhealth.org

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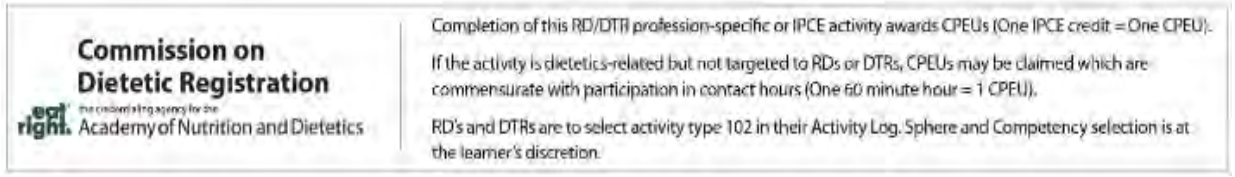
Dietetic CPEU:



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Disclosure

The following speakers and/or planning committee members have identified the following relevant financial relationship(s) with ineligible companies. All other individuals involved with this activity have no relevant financial relationships with ineligible companies to disclose.

- Lauren Oshman, M.D. (Course Co-Director): Stocks in publicly traded companies or stock options, excluding diversified mutual funds – Abbott, AbbVie, Johnson & Johnson, Merck & Co.

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Continuous Glucose Monitors: Tips and Tricks for Type 2 Diabetes

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MCT2D
MICHIGAN COLLABORATIVE FOR TYPE 2 DIABETES

Disclosures

Dr. Mizokami-Stout:

- Funding from NIH NIDDK K23 Career Development Award
- Content Expert for MCT2D

Objectives

- Understand the benefits and limitations of glucose monitoring in type 2 diabetes mellitus (T2DM)
- Briefly discuss the different types of continuous glucose monitoring (CGM) devices
- Understand CGM data output
- Briefly discuss CGM coverage in Michigan
- Work through a few CGM case studies

Objectives

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Benefits of Glucose Self-Monitoring in T2DM

- ~25% of 37.3 million (11.3%) Americans with T2DM use insulin
  - Only 39% monitor blood sugar by capillary glucose at least once a day
- Clear benefits of glucose self-monitoring in insulin-requiring T2DM
  - Adjust insulin
  - Prevent hypoglycemia
  - Monitor in illness or exercise
- Possible benefits for non-insulin requiring T2DM

Glycemic Benefits
- Reduced HbA1c for T2D on insulin

Safety Benefits
- Reduced hypoglycemia

Behavioral Benefits
- Improved internal motivation
- Increased self-confidence

Cardiometabolic Benefits
- Weight loss
- Increased physical activity

https://www.cdc.gov/diabetes/data/statistics-report/index.html
Harris et al, *Diabetes Care*, 2001
Young *JAMA Internal Medicine* 2017
Diabetes Technology, ADA Standards of Care in Diabetes, *Diabetes Care,* 2023
McAndrew et al, Science of Diabetes Self-Management and Care, 2013; 39(3):397.

Limitations of Traditional Glucose Monitoring

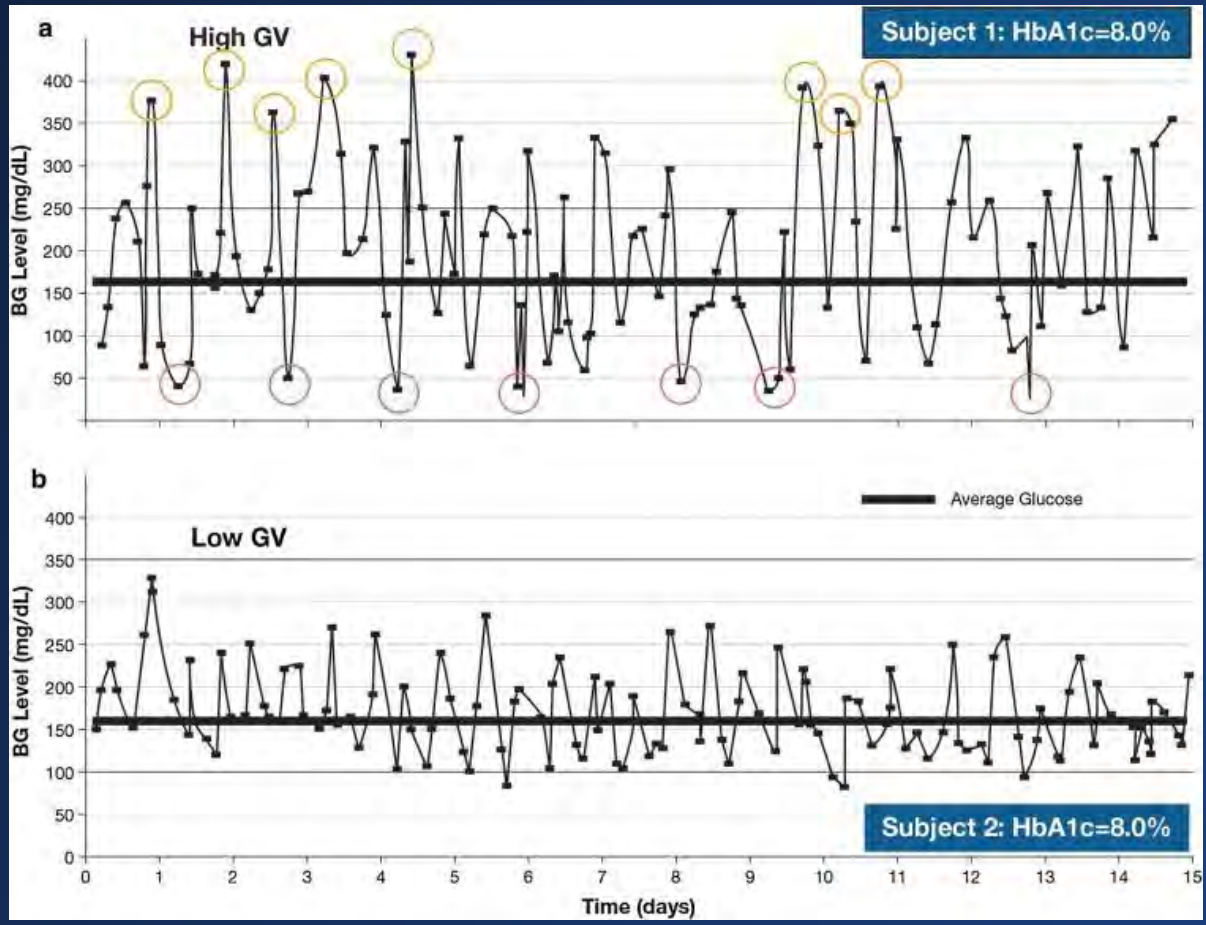
Capillary Glucose Monitoring (Fingerstick)	Hemoglobin A1c (A1c)
Invasive, painful, unpleasant and burdensome	Corresponds to estimated average glucose over the past ~3 months
Required several times per day for multiple daily injections	Does not account for glycemic variability and frequent hypoglycemia
Does not provide a comprehensive picture	Inaccurate in patients with conditions that affect red blood cell turnover or recent transfusions
Challenges acquiring the necessary testing strips	Genetic polymorphisms affecting red blood cell lifespan and hemoglobin glycation

Erbach et al, *J Diabetes Sci Technol*, 2016
Bergenstal RM et al, *Ann Intern Med*, 2017
Bergenstal RM and Beck RW, *JAMA Opthalmology*, 2019

The Importance of Glucose Variability: A Tale of Two A1c Values

- These graphs show the differences in glucose variability for two patients with an **A1c of 8%.**

- Subject 1 is at substantially higher risk of life-threatening hypoglycemia.



Ajjan et al. *Adv Ther*. 2019;36(3):579-596.

Evolution of Glucose Monitoring

Evolution of Glucose Monitoring Technology

mid 1800s — Attempt to quantify glucose in urine

1908 — Commercialisation of urine glucose testing using copper reagent

1945 — Clinitest utilised copper reagent tablet to ease testing

1965 — Destrostix - blood glucose test strip was introduced

1970 — Innovation of the first glucose meter

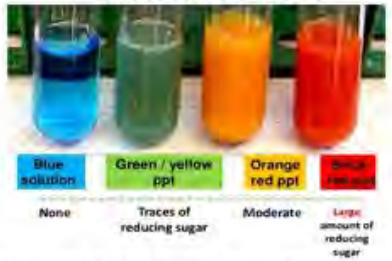
1980s — Advanced meters and strips require less blood for testing

1999 — Continuous glucose monitoring (CGM) was first approved by FDA

https://digital.sciencehistory.org/works/3dz5cja/viewer/b5k3gfn

www.freestyle.abbott/us-en/home.html

Benedict's Test



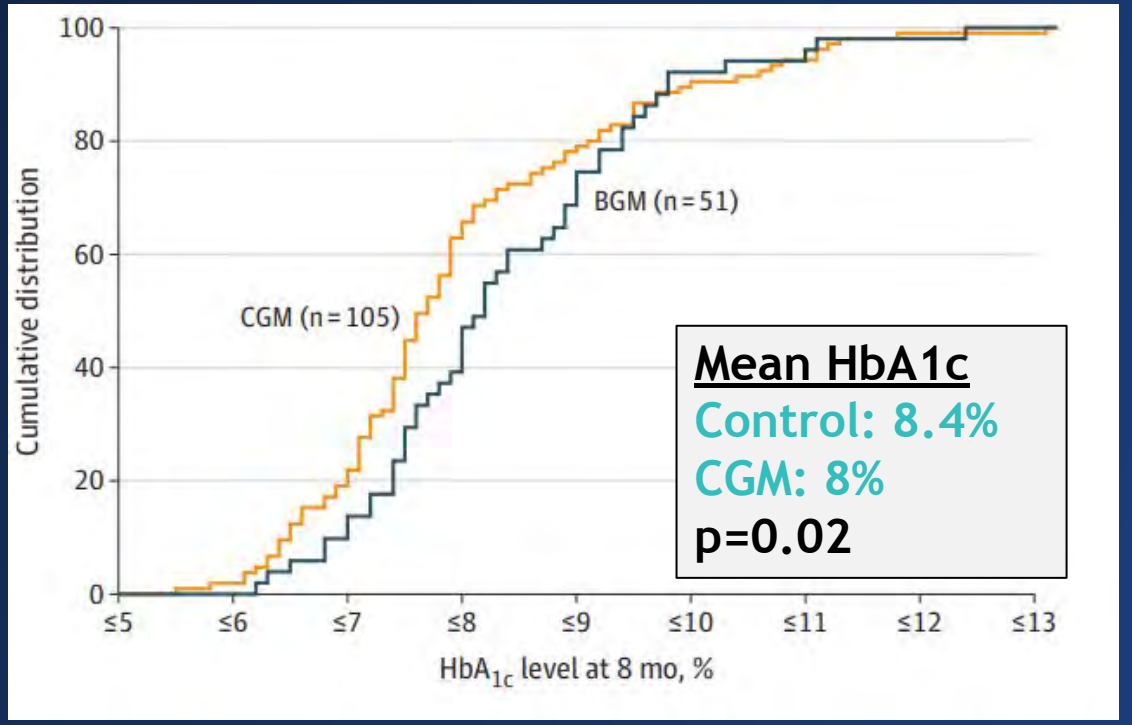
https://microbiologyinfo.com/benedicts-test-principle-composition-preparation-procedure-and-result-interpretation

By Christidy at https://commons.wikimedia.org/w/index.php?curid=4076166

CGM in T2DM: MOBILE Trial
Glycemic Benefits in Basal Insulin Users

- Multicenter RCT, conducted in primary care practices
- N=175 adults with T2DM on basal insulin therapy
- Intervention: CGM versus usual Care
- Outcome: Hemoglobin A1c (HbA1c) at 8 months

Cumulative Distribution of HbA1c at 8 months



Martens et al, JAMA, 2021

CGM in T2DM: MOBILE Trial
Glycemic Benefits in Basal Insulin Users

Table 2. Glycemic Outcomes[a]

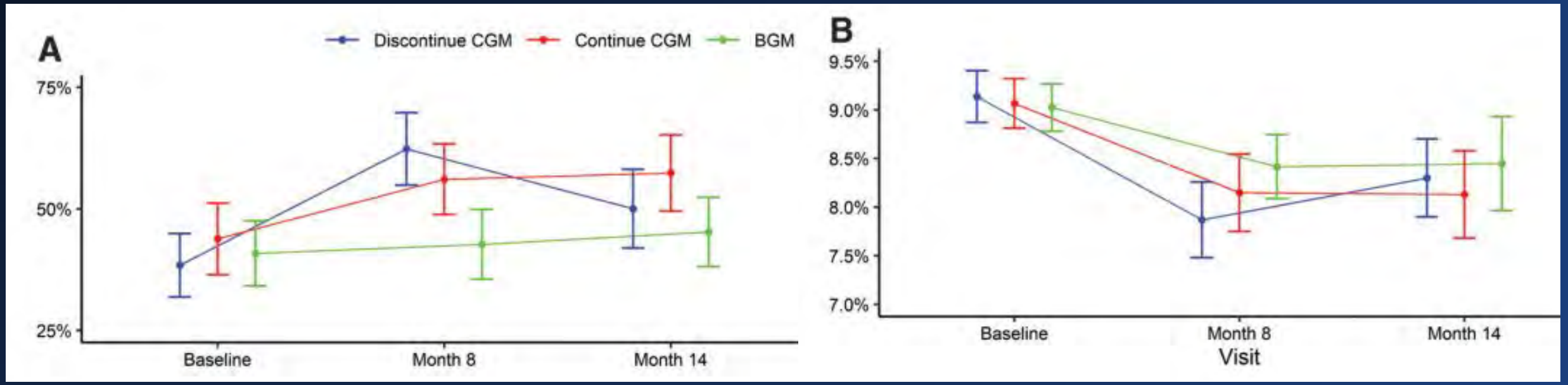
	Mean (SD)					
	Baseline		8 mo			
	Continuous glucose monitoring	Blood glucose meter monitoring	Continuous glucose monitoring	Blood glucose meter monitoring	8-mo Risk-adjusted difference, % (95% CI)	*P* value[b]
Primary outcome[c]						
No.	115	58	105	51		
HbA_{1c} level, %	9.1 (1.0)	9.0 (0.9)	8.0 (1.4)	8.4 (1.3)		.02
Change from baseline, %			−1.1 (1.5)	−0.6 (1.2)	−0.4 (−0.8 to −0.1)	
Key secondary outcomes[d]						
No.	114	59	93	53		
% Time in range of 70-180 mg/dL	40 (26)	40 (25)	59 (25)	43 (26)	15 (8 to 23)	<.001
% Time >250 mg/dL[e]	26 (22)	25 (21)	11 (11)	27 (24)	−16 (−21 to −11)	<.001
Mean glucose, mg/dL	209 (48)	206 (45)	179 (43)	206 (53)	−26 (−41 to −12)	<.001

Martens et al, JAMA, 2021

CGM in T2DM: MOBILE Trial
Glycemic Effects of Discontinuing CGM

Loss of Time-in-Range Gains after CGM Discontinuation

Loss of HbA1c Gains after CGM Discontinuation



Martens et al, JAMA, 2021

CGM in T2DM: IMMEDIATE Trial
Glycemic Benefits in Non-Insulin Users

- Multicenter, open-label RCT
- N=116 adults with T2DM on at least one non-insulin diabetes medication with baseline A1c ≥7.5%
- **Intervention**: CGM plus self-management education versus self-management education alone
- **Outcome**: % Time-in-Range at 16 weeks

TABLE 2 CGM metrics between the isCGM + DSME and the DSME arms at follow-up

	isCGM + DSME	DSME	Adjusted mean difference (95% CI)	Adjusted *P* value
n	51	48		
% TIR (3.9-10.0 mmol/L)	76.3 ± 17.4	65.6 ± 22.6	−9.9 (−17.3 to −2.5)	**.009**
% time in the tight glycaemic range (3.9-7.8 mmol/L)	50.3 ± 21.9	40.4 ± 23.1	−8.5 (−16.6 to −0.3)	**.042**
% TAR (> 10.0 mmol/L)	21.2 ± 18.1	30.7 ± 24.5	8.1 (0.5 to 15.7)	**.037**
% TBR (< 3.9 mmol/L)	1.9 ± 3.5	3.0 ± 6.5	1.3 (−0.8 to 3.3)	.218
% TBR level 2 (< 3.0 mmol/L)	0.6 ± 2.3	0.9 ± 3.1	0.3 (−0.8 to 1.4)	.553
Mean glucose (mmol/L)	8.1 ± 1.5	8.8 ± 2.4	0.6 (−0.2 to 1.3)	.123
SD (mmol/L)	2.2 ± 0.6	2.4 ± 0.6	0.2 (−0.1 to 0.4)	.113
CV (%)	27.3 ± 6.9	28.1 ± 7.1	0.7 (−2.2 to 3.5)	.650
Number of hypoglycaemic events	1 (0.0, 5.0)	0.5 (0.0, 5.3)		
Number of nocturnal hypoglycaemic events	0 (0.0, 2.5)	0 (0.0, 4.0)		
Number of level 2 hypoglycaemic events	0 (0.0, 1.0)	0 (0.0, 1.0)		

Mean HbA1c
Control: 8.1%
CGM: 7.6%
p=0.048

Aronson et al. *Diabetes, Obesity, and Metabolism,* 2023

CGM in T2D with Low Carb Nutrition Coaching: A Quality Improvement Study

- Quality improvement study conducted in primary care practices
- N=382 adults with T2DM and HbA1C > 7.5% (goal <7%)
- Intervention: CGM and low-carb nutrition counseling versus usual care
  - n=61 (of possible 185) participated in intervention
- Outcome: A1c at 12 months

Nutrition Education and Counseling

- We discussed the relationship between carbohydrate intake, blood glucose, and insulin.
- We identified 3 main ways that blood glucose can be lowered: food, medication, exercise.
- We discussed the key sources of carbohydrate in the diet: fruits and juice, starchy vegetables and legumes, grains, dairy, and pure sugar (soda, desserts, candy).
- I recommended the goal of gradually reducing carbohydrate intake to <100g net carb per day to improve blood glucose control.
- I recommended starting by choosing a lower-carbohydrate breakfast such as eggs in place of breakfast cereal or toast.
- We discussed carbohydrate counseling using nutrition labels (see below).

The patient was given a symptom log and shown how to record any potential adverse effects of a low carbohydrate diet (e.g. Muscle cramps, headache, fatigue). The patient was instructed to contact the RD with any questions or if symptoms persisted.

Griauzde et al, *JMIR*, 2022

CGM in T2DM: Summary of the Evidence

- RCT data demonstrate consistent benefits in glycemic control (↓ A1c, ↑ time in range), hypoglycemia reduction, and treatment satisfaction in insulin requiring T2DM
  - A1c reduction of 0.3-0.4%
  - Glycemic improvements are lost if CGM devices are discontinued
  - **Diabetes guidelines support use of CGM in insulin users**

- Appears to be beneficial for improved glycemic control in non-insulin requiring type 2 diabetes but RCT data is limited
  - **Diabetes guidelines do not yet recommend for non-insulin users**

- Observational studies demonstrate improvements in glycemic control, quality-of-life, acute diabetes events, and all-cause hospitalizations

Beck et al, Annals of Internal Medicine, 2017
Martens et al, JAMA, 2021

Aleppo et al, Diabetes Care, 2021
Diabetes Technology, ADA Standards of Care, 2023

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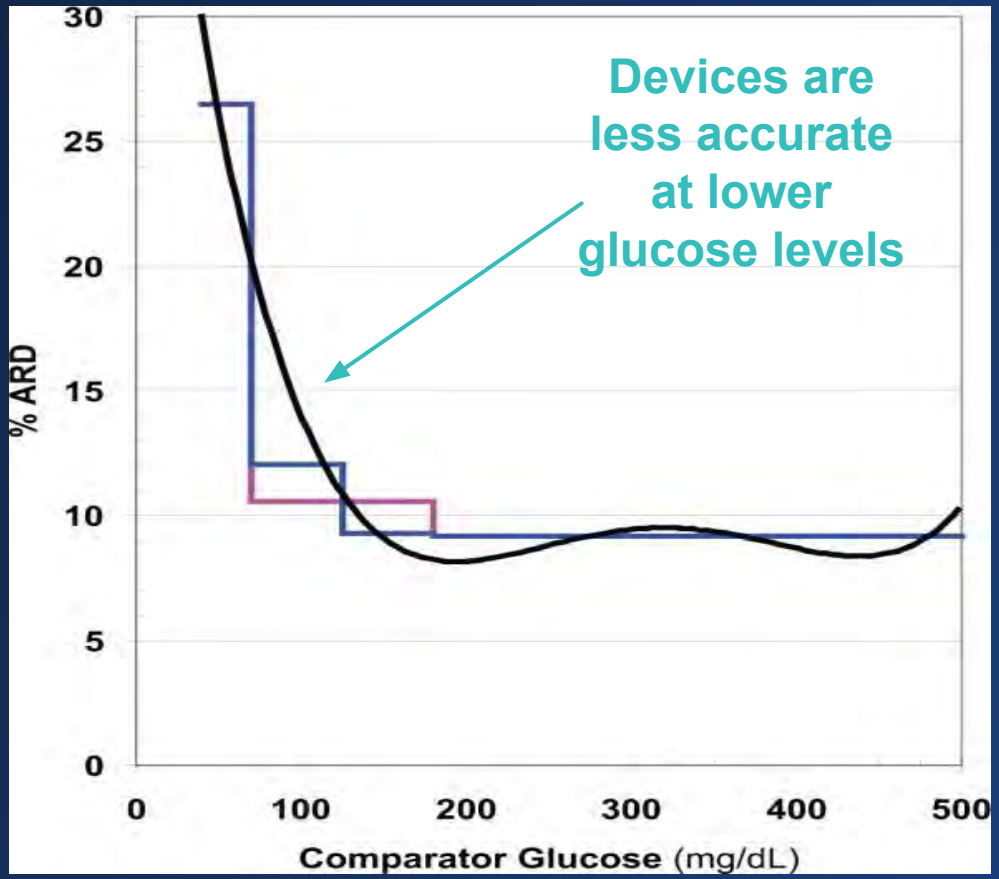
Accuracy: Mean Absolute Relative Difference

- MARD compares glucometer/CGM derived glucose values to true blood glucose measurements
- Lower values (%) = better accuracy
- MARD <10% = “good”
- Devices have different MARD % for varying glucose ranges



Heinemann et al, J Diabetes Sci Technol, 2020.
Rodbard D. J Diabetes Sci Technol. 2014

Accuracy: CGM versus Common Brand Glucometers

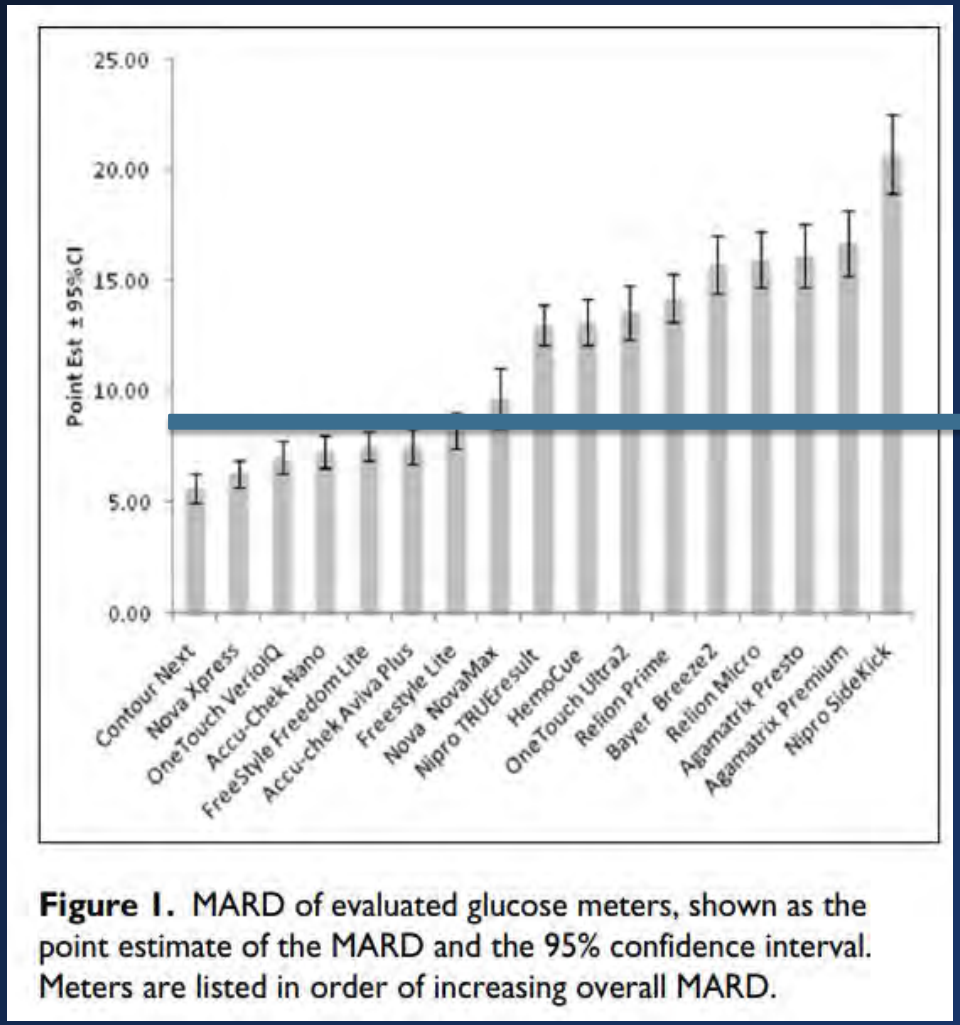


Figure 1. MARD of evaluated glucose meters, shown as the point estimate of the MARD and the 95% confidence interval. Meters are listed in order of increasing overall MARD.

MARD of Personal CGM devices

Ekhlaspour L et al, *J Diabetes Sci Technol*, 2017.

Personal CGM Devices

- Consists of sensor, +/- transmitter, and receiver:
  - Sensor: places subcutaneously, worn for 10-14 days, measures interstitial glucose every 5-15 minutes
  - +/- Transmitter: sends data (usually Bluetooth) to receiver
  - Receiver: either phone or separate “reader” device to view data, provides a clear picture of wearer’s glucose over the entire day and night, downloadable by user or clinician for longer-term trends

- Other features:
  - Alarms for hyper- and hypoglycemia
  - Data share with family members
  - Arrow system
  - User-input logbook for food, exercise, medications

Types of Personal CGM Devices

Dexcom systems (G6 and G7)

Freestyle Libre systems (14-day, Libre 2 and Libre 3)

Guardian Connect system

Eversense CGM system

www.Dexcom.com
www.freestyle.abbott/us-en/home.html

www.Medtronic.com
www.ascensiadiabetes.com

Types of Personal CGM Devices

Dexcom systems (G6 and G7)

- **10 days**
- Optional calibration
- Finger-stick glucose check required for back up
- Pairs with phone or receiver
- Real time CGM
- MARD 9%
- **Pairs with pumps**
- **$$$ expensive** if paying out of pocket or copay (e.g., 20% copay)
- Cash: ~$210 coupon price per month

www.Dexcom.com

Types of Personal CGM Devices

Freestyle Libre systems (14-day, Libre 2 and Libre 3)
www.freestyle.abbott/us-en/home.html

- **14 days**
- Optional calibration
- Finger-stick glucose check required for back up
- Pairs with phone or receiver
- Real time (Libre 3) or intermittent (Libre 2)
- MARD 9%
- **Does not pair with pumps (yet)**
- **$$ less expensive** if paying out of pocket or copay (e.g., 20% copay)
- Cash: ~$140 coupon price per month

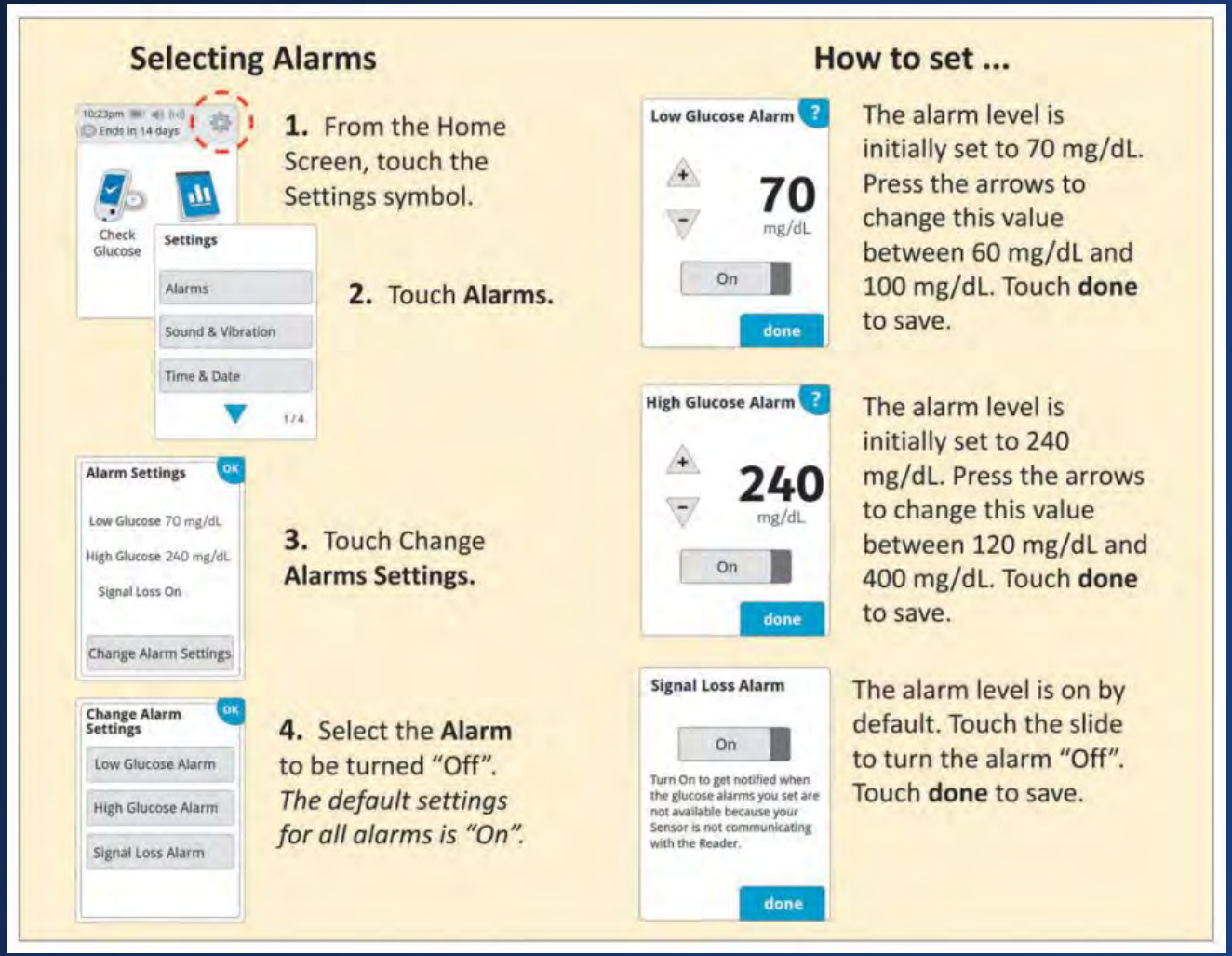
Interfering Medications

Dexcom			Libre		
Medication	**Generation Affected**	**CGM Error**	**Medication**	**Generation Affected**	**CGM Error**
Acetaminophen (Higher than max doses)	G6	Falsely elevate sensor glucose	**Ascorbic Acid (Vitamin C)**	Libre 2	Falsely elevate sensor glucose
Hydroxyurea	G6	Falsely elevate sensor glucose	Salicylates (Aspirin)	Libre 14-day	Falsely lower sensor glucose

https://www.dexcom.com/en-us/interference
https://www.freestyle.abbott/us-en/safety-information.html
https://diatribe.org/what-you-shouldnt-take-when-wearing-continuous%C2%A0glucose-monitor

CGM Alarms

- All CGMs except the Freestyle Libre 14-day have optional alarms for hypo- and hyperglycemia
- Alarm fatigue is a well-recognized phenomenon
- Clinicians should work with patients to personalize alarm thresholds



Miller E and Midyett LK, *DTT*, 2021.
Shivers JP, *J Diabetes Sci Technol,* 2013.

CGM Devices: Setting Expectations

CGM devices CAN:

- Measure interstitial glucose in near real time
- Alarm for low and high blood sugars
- Demonstrate glucose trends over time

CGM devices CANNOT:

- Give insulin (that's a pump!)
- Tell a patient what to do with a high or low blood sugar
  - We need to equip patients to respond to the readings

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CGM Data: Patient Perspective

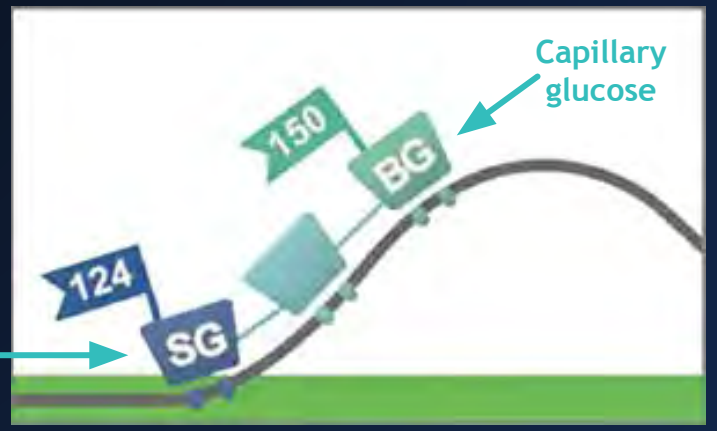
Real time interstitial glucose value

Glucose trend over past few hours

Arrow

https://www.umassmed.edu/dcoe/diabetes-education/pumps_and_cgm/

CGM Arrow System



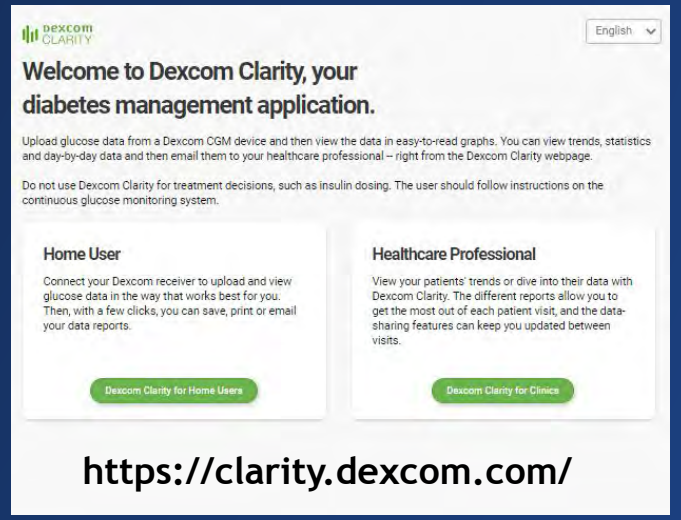
- CGM devices measure interstitial glucose, which "lags" behind capillary (blood) glucose.
- Arrow systems help user to determine where blood glucose is headed.

→	**Constant:** Your glucose is steady (not increasing/decreasing more than 1 mg/dL each minute)
↗	**Slowly rising:** Your glucose is rising 1-2 mg/dL each minute
↑	**Rising:** Your glucose is rising 2-3 mg/dL each minute
↑↑	**Rapidly rising:** Your glucose is rising more than 3 mg/dL each minute
↘	**Slowly falling:** Your glucose is falling 1- 2 mg/dL each minute
↓	**Falling:** Your glucose is falling 2-3 mg/dL each minute
↓↓	**Rapidly falling:** Your glucose is falling more than 3 mg/dL each minute
no arrow	**No Rate of Change Information:** The Receiver cannot always calculate how fast your glucose is rising or falling

www.medtronicdiabetes.com
Pettus et al. *Diabetes Technology & Therapeutics*. 2014

CGM Data: Clinician Perspective

- Patients can always access their own data and send this to you via a “Portal” type system as a PDF file
- Otherwise, each brand of CGM has their own downloading software
  - Freestyle Libre: LibreView
  - Dexcom: Dexcom Clarity
- Easiest to have each clinic have a “Practice” account



How to Pull a Dexcom Clarity Report

If patients are using their phone as their receiver:

- Patient downloads the Dexcom Clarity app; register and login
- Patient must authorize sharing and generate a 12-digit “Sharecode” □ share with clinic
- Clinician uses “Sharecode” to in Dexcom Clarity webpage (no need for separate Dexcom Clarity account)

If patients are using a separate reader as a receiver:

- Create Dexcom Clarity “Practice” account
- Send invitation through Practice account to link patient data
- Patient must upload receiver at home to view most recent data

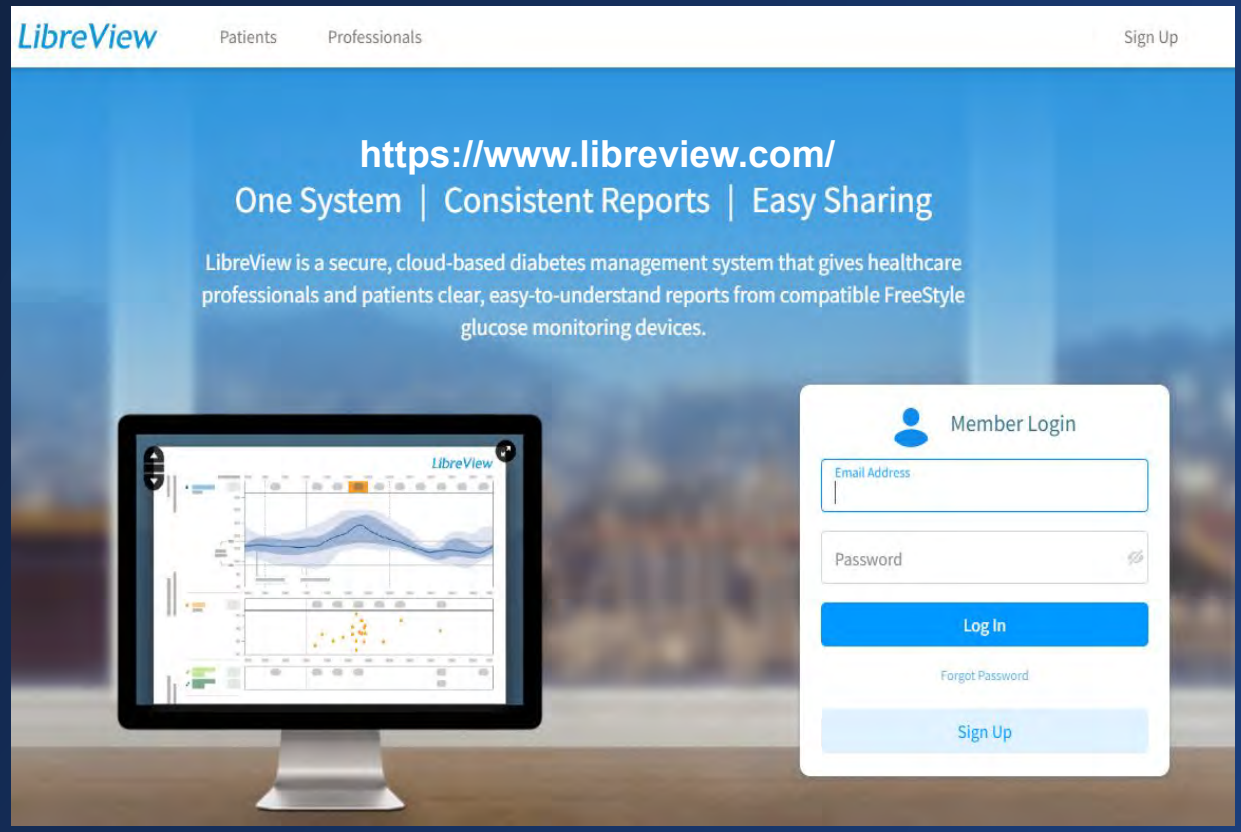
https://clarity.dexcom.com/

How to Pull a LibreView Report

- Create “Practice” account
- Invite patient using Practice account: 2 options
  - Send invitation through Practice account OR
  - Provide Practice “code”
- Login to “Practice” account
- Type patient’s name in search bar and view patient data

If a patient uses:

- Phone: data syncs automatically
- Reader: patient must upload at home to view most recent data



Glucose Management Indicator (GMI)

- Estimate of A1c based on CGM-derived mean glucose
- Goal <7-8% based on comorbidities
- Need at least 10-14 days of CGM data
- **Benefits:**
  - Potentially more accurate in patients with conditions that affect red blood cell turnover
- **Concerns:**
  - Subject to same problem as A1c in terms of glucose variability
  - Validated mostly in type 1 diabetes populations, may be less accurate in T2DM

Table 1—GMI calculated for various CGM-derived mean glucose concentrations

CGM-derived mean glucose (mg/dL)	GMI (%)*
100	5.7
125	6.3
150	6.9
175	7.5
200	8.1
225	8.7
250	9.3
275	9.9
300	10.5
350	11.7

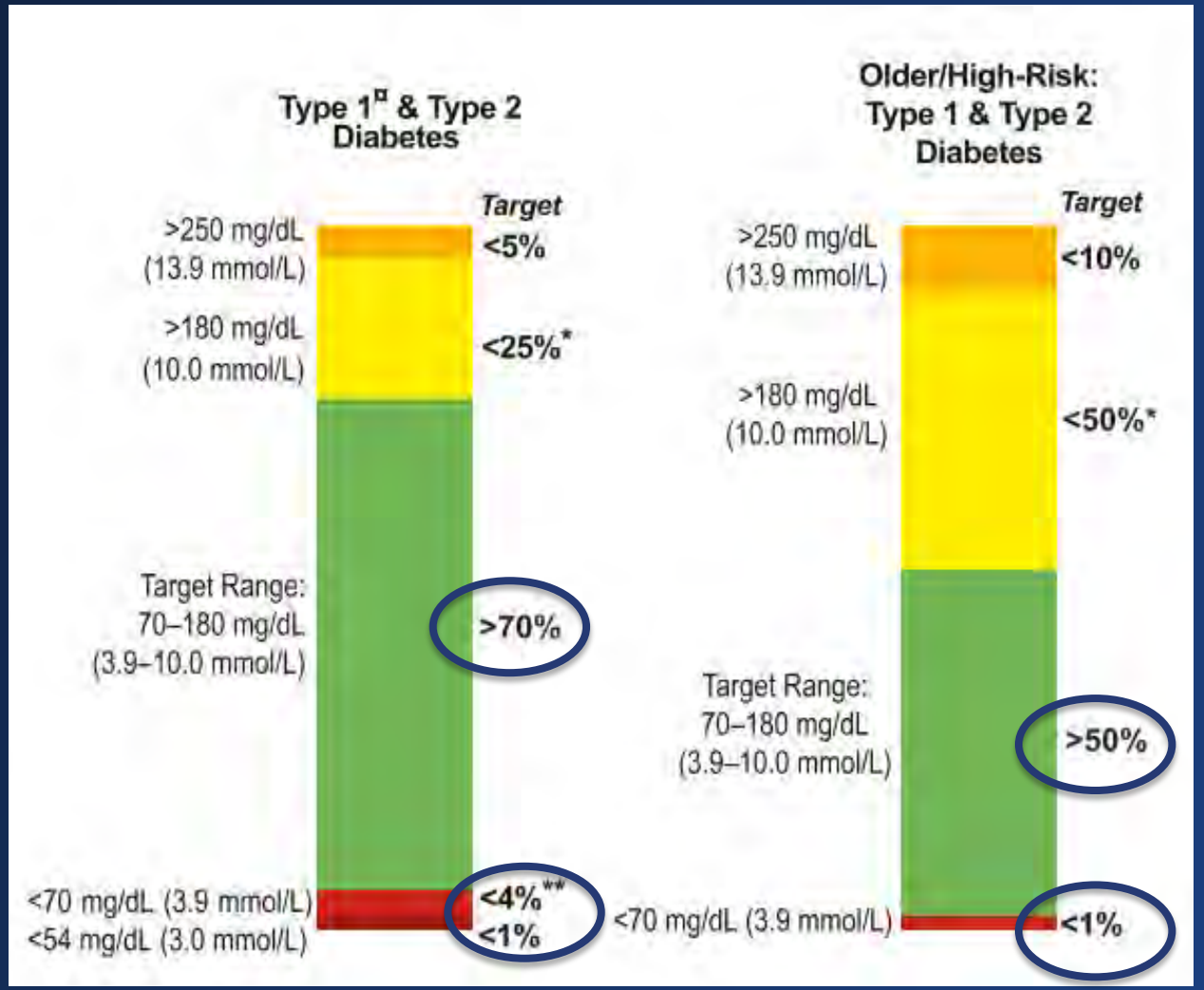
Bergenstal et al. *Diabetes Care*. 2018.
Fang et al. *Clin Chem*. 2023.

Time in Range (TIR)

- % of readings that fall into a certain glucose range

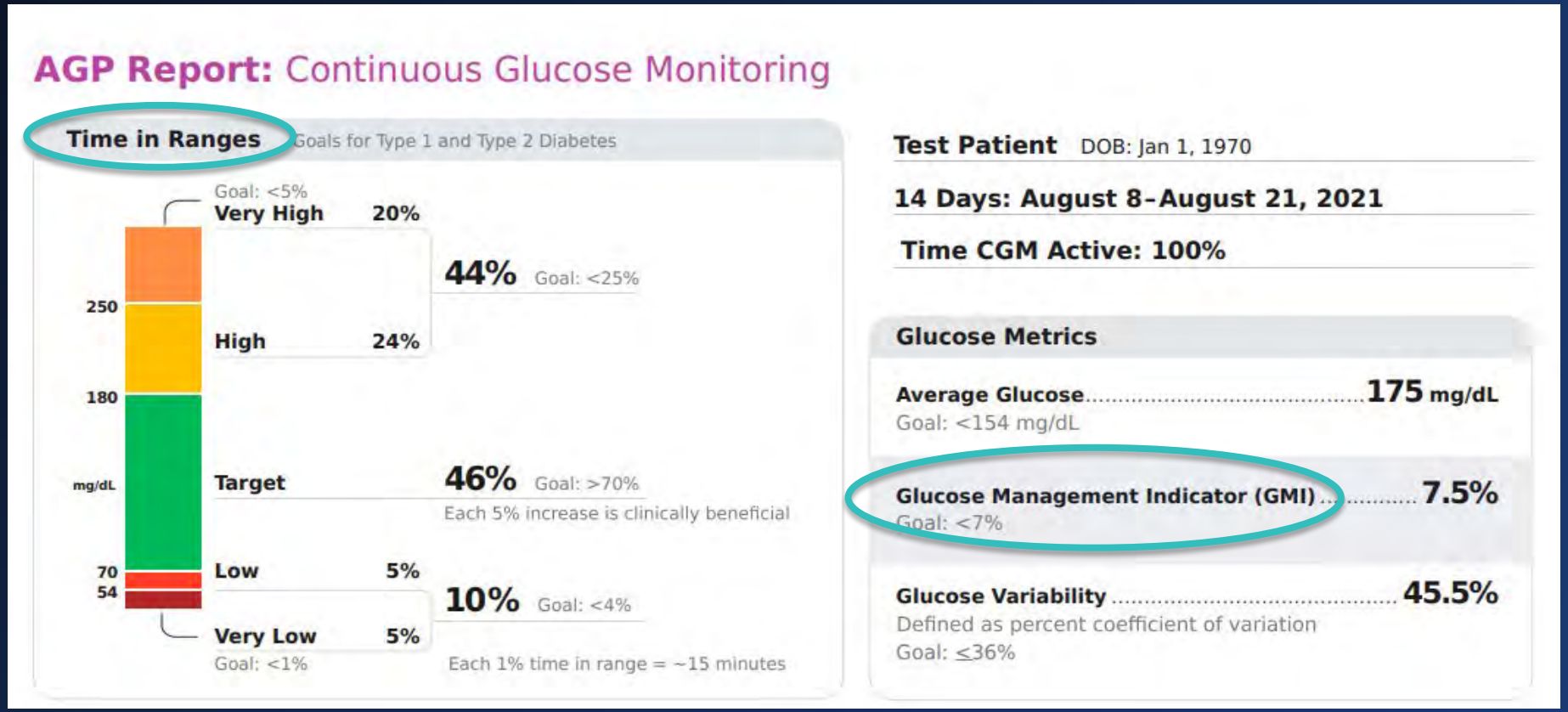
- Time in range definitions (non-pregnant populations):
  - **Time above range:** >180 mg/dL
  - **Time in target range:** 70-180 mg/dL
  - **Time below range:** <70 mg/dL

- Time in range/A1c correlations:
  - TIR of 70% is ~A1c 7%
  - TIR of 50% is ~A1c 8%
  - TIR increase of 10% corresponds to ~A1c decrease of 0.6%



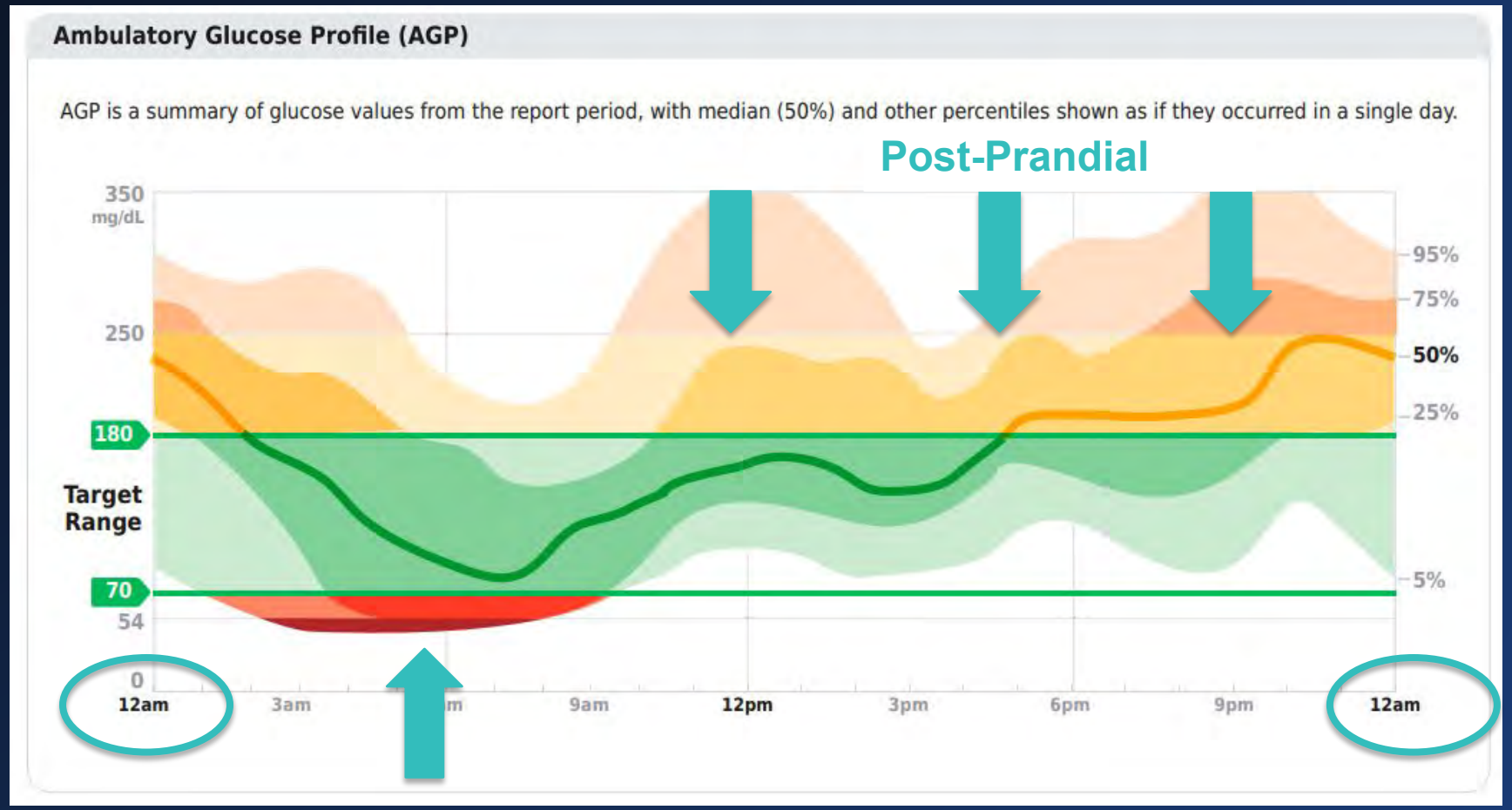
Battelino et al, *Diabetes Care*, 2019.
Beck et al, *JDST*, 2019.

Ambulatory Glucose Profile (AGP): Summary



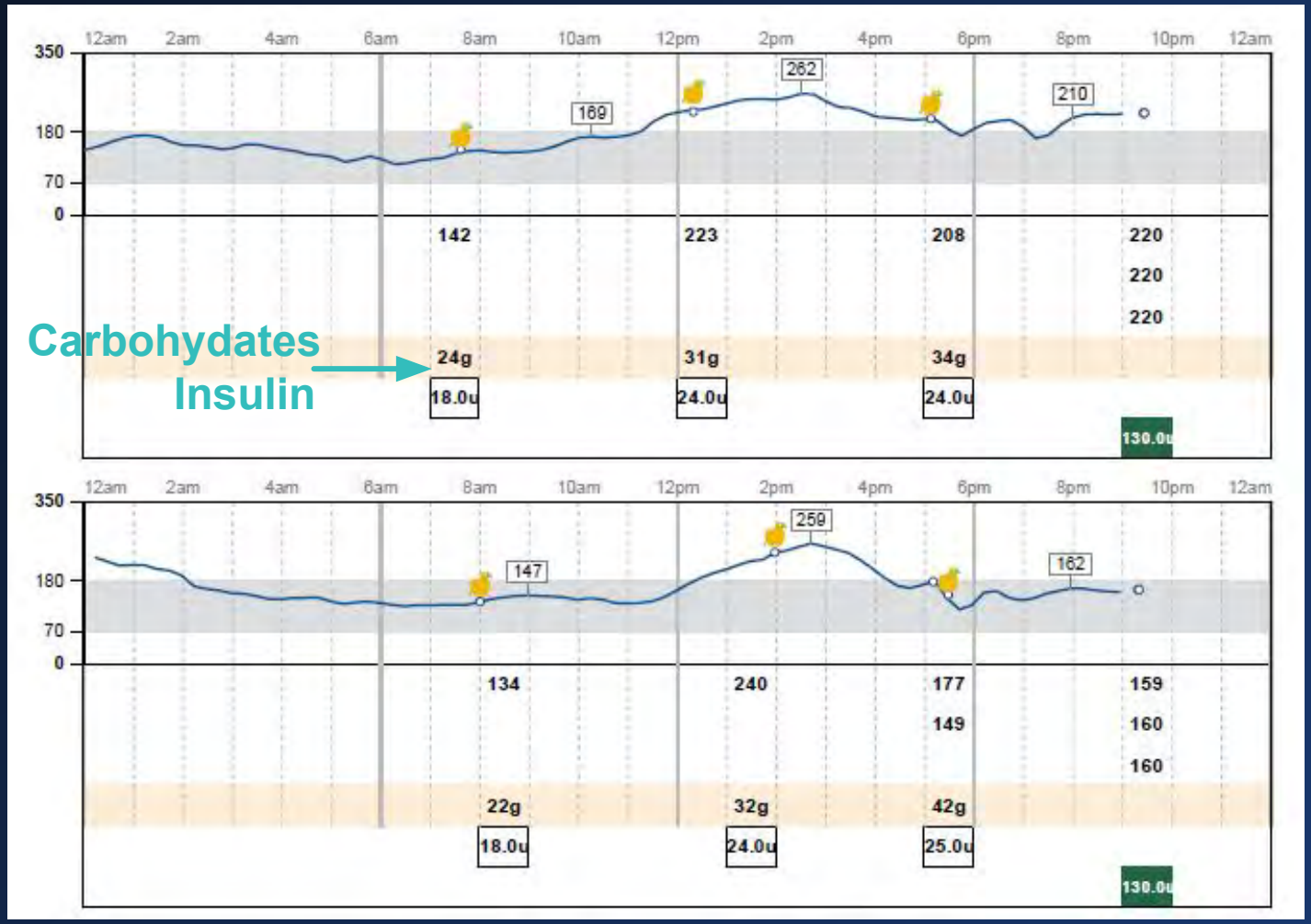
Glycemic Targets, ADA Standards of Care, *Diabetes Care*, 2023.

Ambulatory Glucose Profile (AGP): Trendline



Glycemic Targets, ADA Standards of Care, *Diabetes Care,* 2023.

CGM Daily Logs



Billing for CGM Interpretation

95251	**CGM Interpretation** Ambulatory CGM of interstitial tissue fluid via a subcutaneous sensor for a minimum of 72 hours; analysis, interpretation, and report	Physician (MD, DO), NP, PA, or clinical nurse specialist	Maximum of once per month	Not required to have a face-to-face visit

- Billing code 95251 = 0.7 RVUs
- Must report on a minimum of 72 hours of CGM data
- Can only be billed once per month
- Must be performed by an MD, DO, PA or NP
- Does not require a face-to-face visit (i.e. can be done if patient requests data review via a patient portal)
- Most insurances cover this but patient may get stuck paying out of pocket if they have a high deductible plan and have not yet met deductible

https://pro.aace.com/cgm/toolkit/billing-codes

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CGM Coverage in Michigan

- General coverage criteria (document in your notes to ensure coverage):
  - **Diagnosis**
  - **Insulin use**
  - **Fingerstick requirements**
- Durable medical equipment (DME) versus pharmacy benefit
- **Medicaid:** All type 1 diabetes DME (Meridian - Healthy Living) and pharmacy benefit; insulin-using type 2 diabetes with prior authorization
- **Medicare:** Insulin-users or has history of severe hypoglycemia, DME only
- **Commercial:** Varies from plan to plan, try pharmacy first as DME often has # of insulin injection requirements and fingerstick requirement
  - Coverage guide: https://www.mct2d.org/resource-library/medications-and-cgm-coverage-by-payer-in-michigan-quick-reference-guide

How to Prescribe CGM

- **Pharmacy:** Send in like a regular prescription
  - Sensors +/- transmitter (Dexcom G6)
  - Reader device if not using smart phone or smart phone not compatible

- **Durable Medical Equipment**
  - Patient must contact insurance preferred DME company
  - DME company faxes CGM order request
  - Complete order form alone with most recent chart note addressing diabetes
  - Need the 3 elements:
    - ✔ Diagnosis
    - ✔ Number of insulin injections
    - ✔ Frequency of fingerstick blood glucose checks

CGM Coverage DotPhrase

Patient has a diagnosis of type 2 diabetes with a current medication regimen that includes

- Insulin {1-4} injection(s) per day
- 3 or more oral diabetes medications
- ***

Patient

- has no issues with hypoglycemia.
- has recurrent severe hypoglycemia (below 54 mg/dl)
- had at least one hypoglycemic event characterized by altered mental and/or physical state requiring third party assistance, details
- ***

Patient's medication regimen requires frequent review for possible adjustment based on self-testing results.

We plan for visits at least every 6 months to monitor compliance with recommended diabetes treatment plan.

It is my recommendation that the patient would benefit from a continuous glucose monitor based on

- Frequent adjustments by patient to the insulin regimen
- Uncontrolled blood glucose as evidenced by fluctuating numbers
- Suspected postprandial hyperglycemia
- Nocturnal hypoglycemia
- Hypoglycemia unawareness
- Recent hospital/emergency room visit for seizures/hypoglycemic event
- Coexistent morbidity that poses unusual challenge with concomitant fluctuating blood glucose levels
- ***

The following are pertinent to this patient:

- Has demonstrated an understanding of how the technology works (or plans to if new start).
- Has shown motivation to use the device correctly and consistently.
- Is adherent to use of the Continuous Glucose Monitor and Diabetes treatment plan (or is expected to if new start).
- Can use the device to recognize alerts and alarms (or plans to if new start).
- It has been recommended that @he@ consider attending education/training on continuous glucose monitoring use, or self-teaching, as appropriate.

Your Name

Source: Pam Milan, Kim Miazek, Steve Fried

ePrescribing for DME

- Online platform to speed and simplify electronic prescribing of durable medical equipment.
- *May not be available for all payers.*
- MCT2D member practices report Parachute saves time when submitting prior authorization requests for CGMs
- We have no ties, financial or otherwise, to the maker of this product/tool.

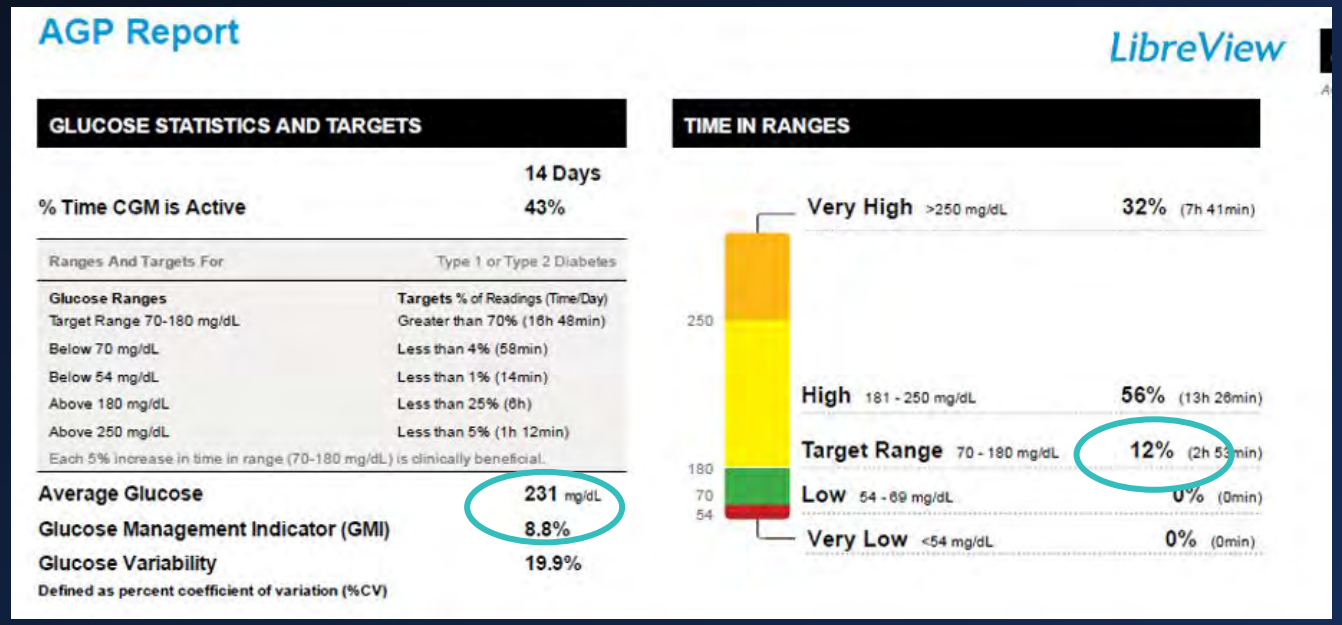
https://www.parachutehealth.com/

Objectives

- Understand the benefits and limitations of glucose monitoring in type 2 diabetes mellitus (T2DM)
- Briefly discuss the different types of continuous glucose monitoring (CGM) devices
- Understand CGM data output
- Briefly discuss CGM coverage in Michigan
- **Work through a few CGM case studies**

Case 1

Ms. S is a 59 yo woman with a 25 year history of type 2 diabetes. She was previously on basal insulin but was able to stop insulin after going on a low-carb diet. She is on max tolerated oral/non-insulin therapy (metformin 1000 mg twice daily, glimepiride 8 mg daily, pioglitazone 15 mg daily, Jardiance 25 mg daily, and Trulicity 1.5 mg weekly) with A1c values in the ~7% range. She endorses more family stress recently and has had difficulty adhering to her low carb diet.



AGP Report

LibreView

GLUCOSE STATISTICS AND TARGETS

	14 Days
% Time CGM is Active	43%

Ranges And Targets For	Type 1 or Type 2 Diabetes
Glucose Ranges	Targets % of Readings (Time/Day)
Target Range 70-180 mg/dL	Greater than 70% (16h 48min)
Below 70 mg/dL	Less than 4% (58min)
Below 54 mg/dL	Less than 1% (14min)
Above 180 mg/dL	Less than 25% (6h)
Above 250 mg/dL	Less than 5% (1h 12min)

Each 5% increase in time in range (70-180 mg/dL) is clinically beneficial.

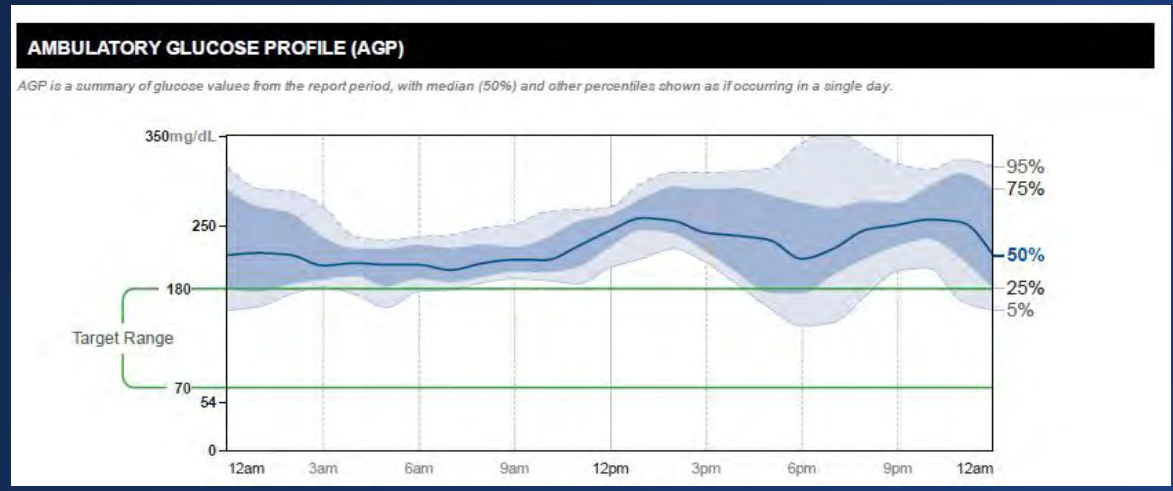
Average Glucose	231 mg/dL
Glucose Management Indicator (GMI)	8.8%
Glucose Variability	19.9%

Defined as percent coefficient of variation (%CV)

TIME IN RANGES

250
180
70
54

Very High	>250 mg/dL	32% (7h 41min)
High	181 - 250 mg/dL	56% (13h 26min)
Target Range	70 - 180 mg/dL	12% (2h 53min)
Low	54 - 69 mg/dL	0% (0min)
Very Low	<54 mg/dL	0% (0min)

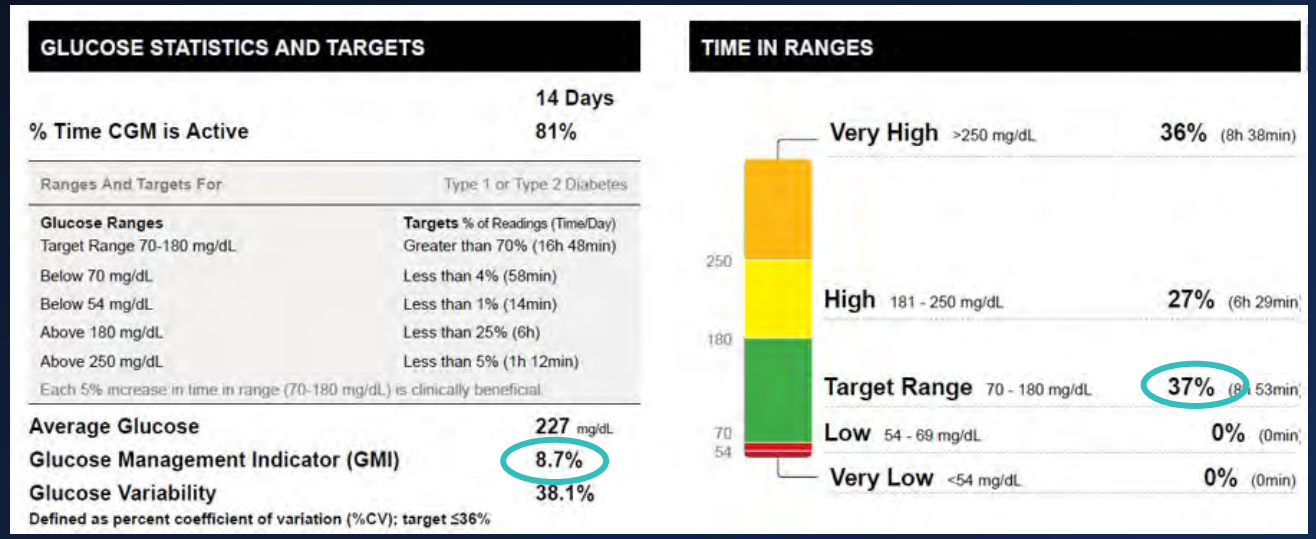


Plan:

- **Start Lantus 15 unit nightly**
- **Referral to Social Work**

Case 2

Ms. H is a 59 yo woman with a 20 year history of type 2 diabetes and obesity. Her A1c is typically in the 6-7% range on metformin 1000 mg twice daily and Ozempic (semaglutide) 1 mg weekly (max-tolerated doses). She messaged into the Portal reporting higher blood sugars on her CGM since starting on a 5-day course of prednisone for an upper respiratory infection.



GLUCOSE STATISTICS AND TARGETS

	14 Days
% Time CGM is Active	81%

Ranges And Targets For	Type 1 or Type 2 Diabetes
Glucose Ranges	**Targets** % of Readings (Time/Day)
Target Range 70-180 mg/dL	Greater than 70% (16h 48min)
Below 70 mg/dL	Less than 4% (58min)
Below 54 mg/dL	Less than 1% (14min)
Above 180 mg/dL	Less than 25% (6h)
Above 250 mg/dL	Less than 5% (1h 12min)

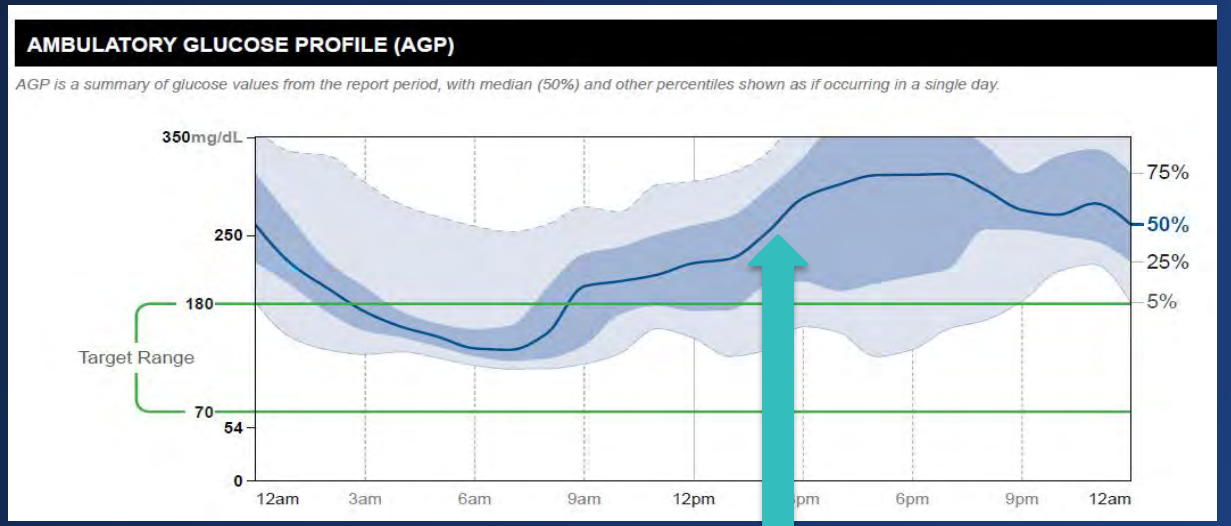
Each 5% increase in time in range (70-180 mg/dL) is clinically beneficial

Average Glucose	227 mg/dL
Glucose Management Indicator (GMI)	8.7%
Glucose Variability	38.1%

Defined as percent coefficient of variation (%CV); target ≤36%

TIME IN RANGES

Very High	>250 mg/dL	36% (8h 38min)
High	181 - 250 mg/dL	27% (6h 29min)
Target Range	70 - 180 mg/dL	37% (8h 53min)
Low	54 - 69 mg/dL	0% (0min)
Very Low	<54 mg/dL	0% (0min)



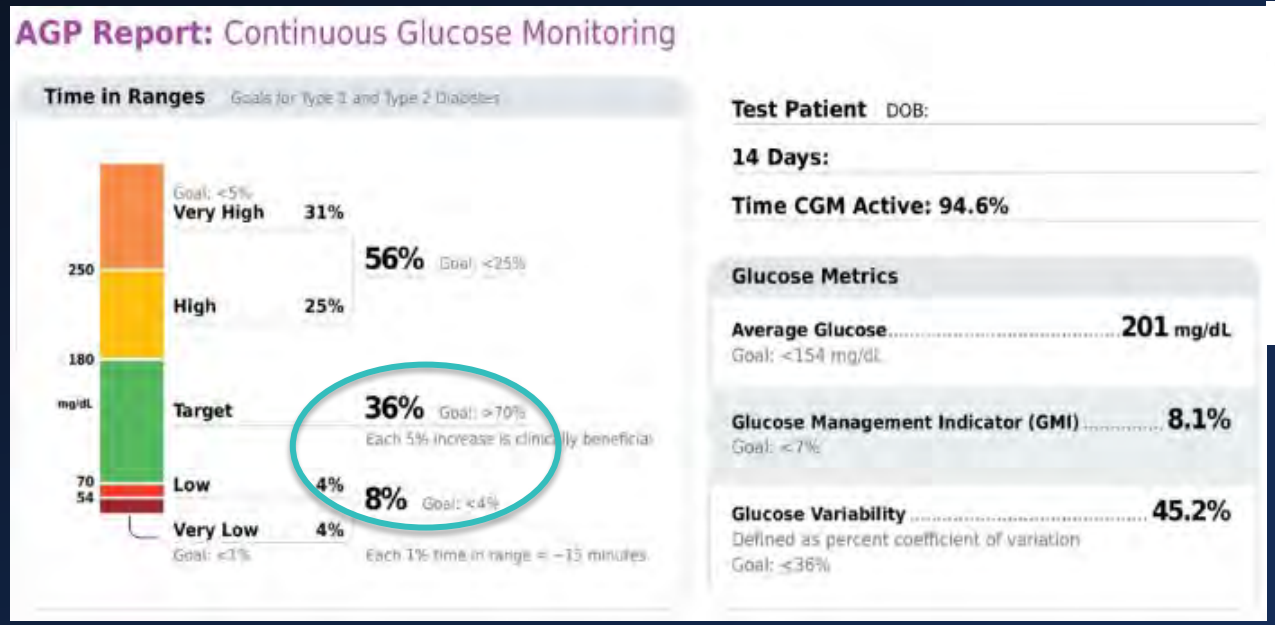
Steroid-induced hyperglycemia

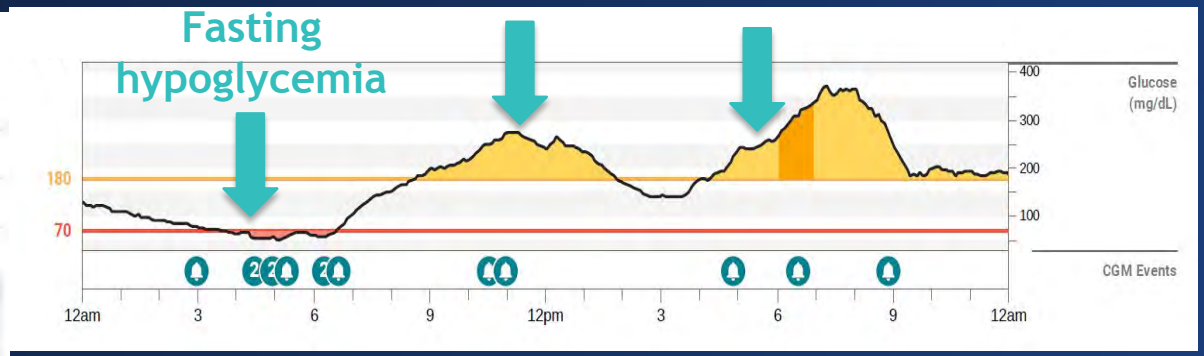
Plan:

- **Continue metformin and Ozempic at max-tolerated dose**
- **Start glipizide 5 mg every morning while on prednisone to cover steroid-induced hyperglycemia**

Case 3

Mr. J is a 72 yo man with an 18 year history of type 2 diabetes, stage III CKD, and CAD s/p CABG. He is on Metformin 1000 mg BID, Ozempic 0.5 mg weekly, and Lantus 60 units nightly. He presents for a routine visit, denying any recent hypoglycemia.





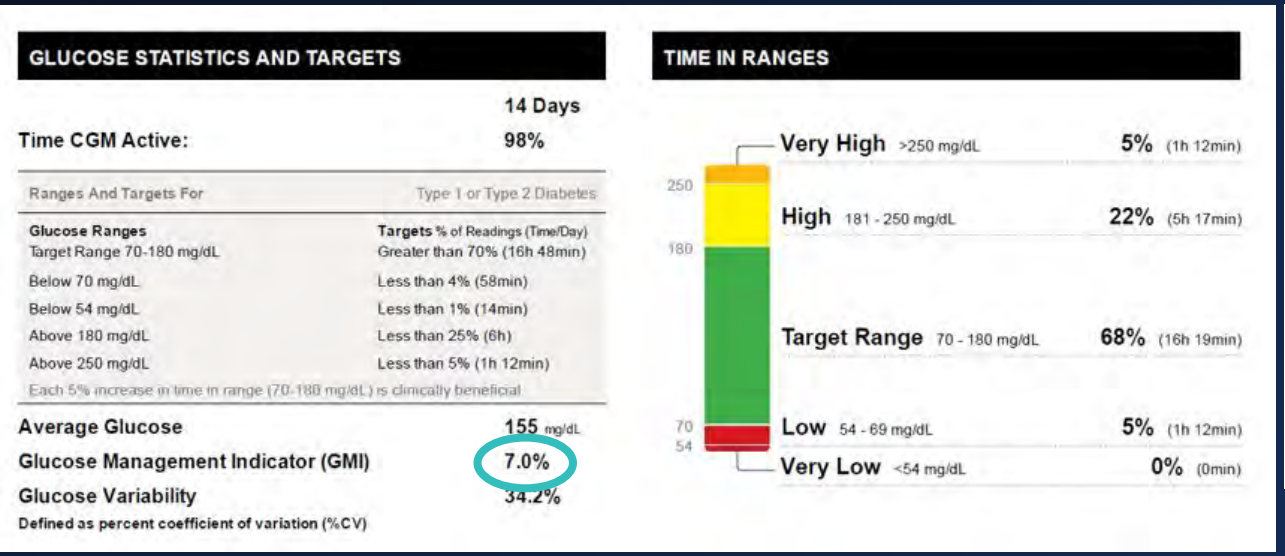
Plan:

- **Continue metformin**
- **Reduce Lantus (glargine) to 50 units (~20%)**
- **Titrate Ozempic (semaglutide) to max tolerated dose**
- **Add Jardiance (empagliflozin)**
- **Follow-up in 1 month to see if additional post-prandial coverage is needed**

Bergenstal et al, *J Diabet Sci Technol*, 2022.

Case 4

Mr. Z is a 64 yo man with a 25 year history of type 2 diabetes c/b microalbuminuria and pancreatitis presenting for follow-up. He is co-managed in Primary Care where he was advised to eat cheese to prevent overnight lows. He is wondering if there are alternative foods to eat as he is tired of “having to eat so much cheese.” His current regimen is: Metformin 1000 mg daily, Jardiance (empagliflozin) 25 mg daily, Lantus (glargine) 30 units nightly, and Novolog (aspart) 10 units with meals.



GLUCOSE STATISTICS AND TARGETS

	14 Days
Time CGM Active:	98%

Ranges And Targets For	Type 1 or Type 2 Diabetes
Glucose Ranges	**Targets** % of Readings (Time/Day)
Target Range 70-180 mg/dL	Greater than 70% (16h 48min)
Below 70 mg/dL	Less than 4% (58min)
Below 54 mg/dL	Less than 1% (14min)
Above 180 mg/dL	Less than 25% (6h)
Above 250 mg/dL	Less than 5% (1h 12min)

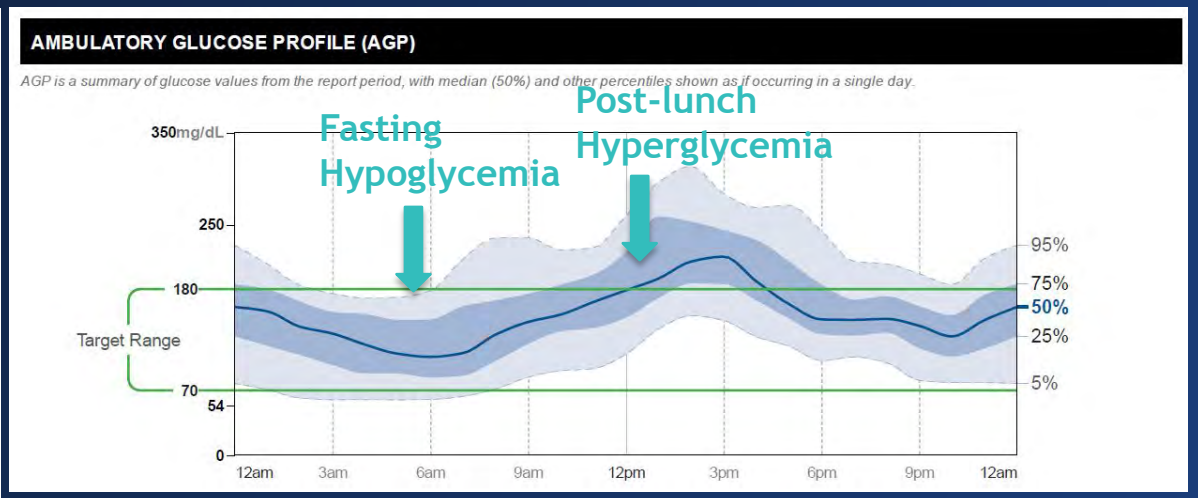
Each 5% increase in time in range (70-180 mg/dL) is clinically beneficial

Average Glucose	155 mg/dL
Glucose Management Indicator (GMI)	7.0%
Glucose Variability	34.2%

Defined as percent coefficient of variation (%CV)

TIME IN RANGES

Very High	>250 mg/dL	5%	(1h 12min)
High	181 - 250 mg/dL	22%	(5h 17min)
Target Range	70 - 180 mg/dL	68%	(16h 19min)
Low	54 - 69 mg/dL	5%	(1h 12min)
Very Low	<54 mg/dL	0%	(0min)

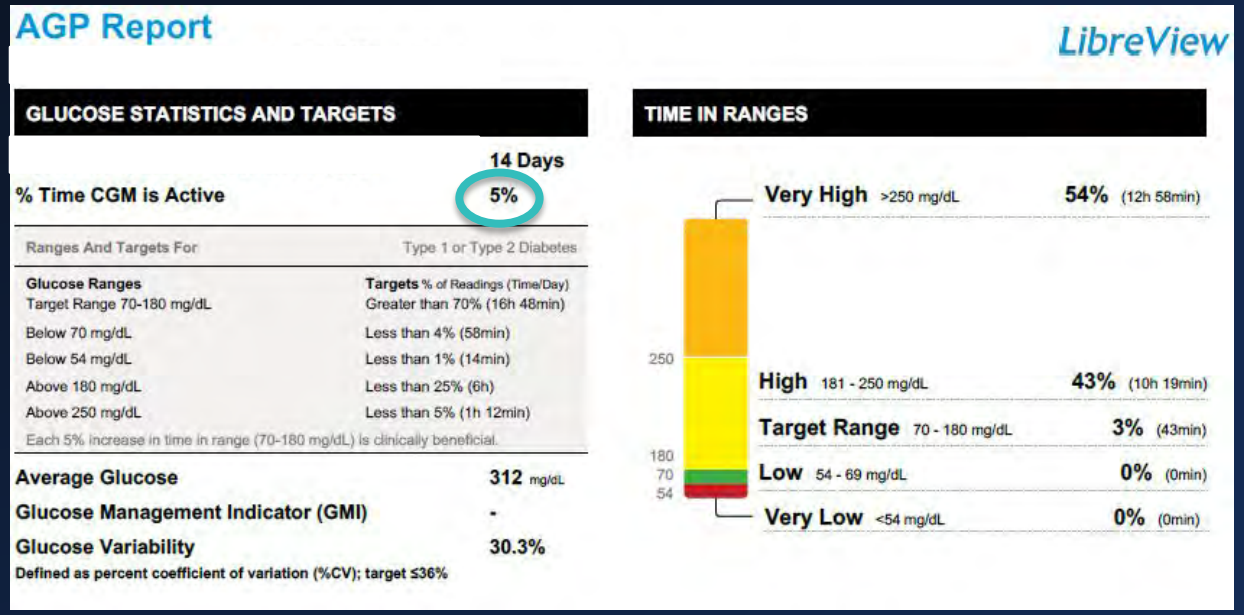


Plan:

- **Continue metformin and Jardiance (empagliflozin)**
- **Reduce Lantus (glargine) to 26 units(~10%)**
- **Dietary counseling to reduce carbs with lunch or increase Novolog (aspart) to 12 units with lunch**

Case 5

Ms. Y is a 56 yo woman with a 12 year history of type 2 diabetes c/b proliferative diabetic retinopathy, stage III CKD, obesity and depression. She is on U500 50 units twice daily and Ozempic 2 mg weekly. She reports difficulty with CGM sensors adhering to her skin.



AGP Report

LibreView

GLUCOSE STATISTICS AND TARGETS

	14 Days
% Time CGM is Active	5%

Ranges And Targets For	Type 1 or Type 2 Diabetes
Glucose Ranges Target Range 70-180 mg/dL	**Targets** % of Readings (Time/Day) Greater than 70% (16h 48min)
Below 70 mg/dL	Less than 4% (58min)
Below 54 mg/dL	Less than 1% (14min)
Above 180 mg/dL	Less than 25% (6h)
Above 250 mg/dL	Less than 5% (1h 12min)

Each 5% increase in time in range (70-180 mg/dL) is clinically beneficial.

Average Glucose	312 mg/dL
Glucose Management Indicator (GMI)	-
Glucose Variability	30.3%

Defined as percent coefficient of variation (%CV); target ≤36%

TIME IN RANGES

250
180
70
54

Very High	>250 mg/dL	**54%** (12h 58min)
High	181 - 250 mg/dL	**43%** (10h 19min)
Target Range	70 - 180 mg/dL	**3%** (43min)
Low	54 - 69 mg/dL	**0%** (0min)
Very Low	<54 mg/dL	**0%** (0min)

Plan:

- **Suggestions to improve CGM sensor adhesion**
- **See back in 2 weeks for adjustments**
- **Ensure she has adequate mental health resources**

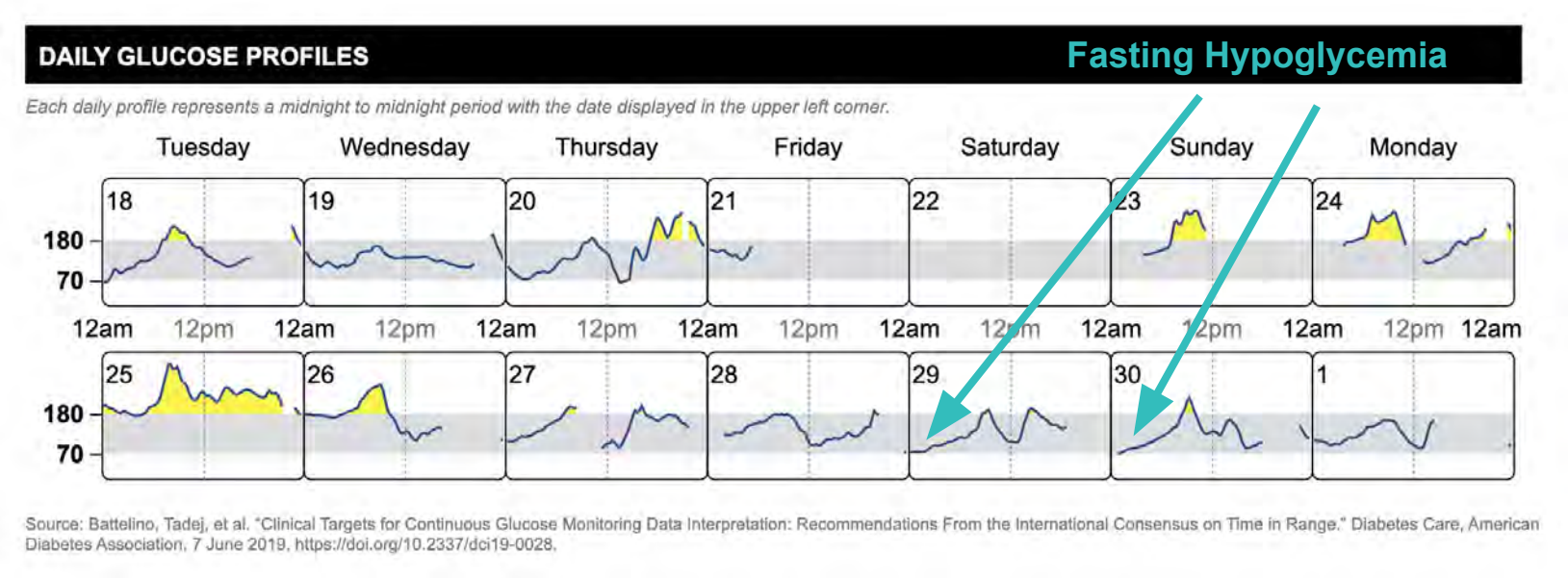
Challenges with Adhesion and Skin Irritation

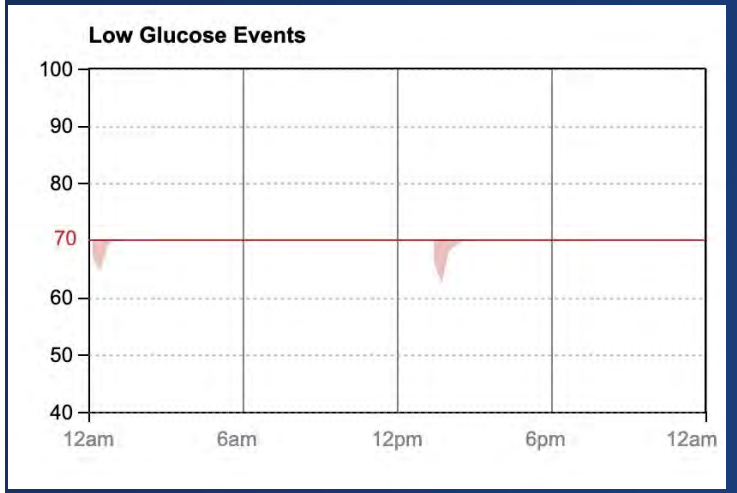
- Nearly 50% of patients experience challenges with wearable diabetes devices, including problems with adhesion and skin irritation.
- Frequent site rotation and use of adhesive removal wipes (Uni-Solve, Detachol) as a first step
- **Troubleshooting adhesion challenges:**
  - Prepping skin prior to sensor placement:
    - Liquid adhesives (Mastisol)
    - Adhesive wipes (IV Prep, Skin Tac)
  - Patches, dressings, tapes:
    - Transparent film barriers (Tegaderm, Flexigrid, Hypafix)
    - External wraps (Coban)
    - Tapes: (Hy-Tape, Hypafix)
  - Protective sleeves: Often available on Amazon, Etsy
- **Medications to lessen skin irritation:**
  - Topical antihistamine sprays (Benadryl)
  - Nasal steroid solutions (Flonase)
- **Last ditch effort:** Switch type of CGM device

Tanenbaum et al, *Diabetes Care*, 2017.
Englert et al, *J Diabetes Sci Technol*, 2014.
www.Amazon.com

Case 6

Ms. C is a 72 yo woman with a 20 year history of type 2 diabetes with A1c 8.9% and obesity BMI 46 on 30 units Glargine, 10 units Novolog qAC, Semaglutide 2.0 mg SQ weekly, and metformin 1000 mg BID. She returns to you two days after bariatric surgery and has stopped her Ozempic 2 weeks prior to surgery.



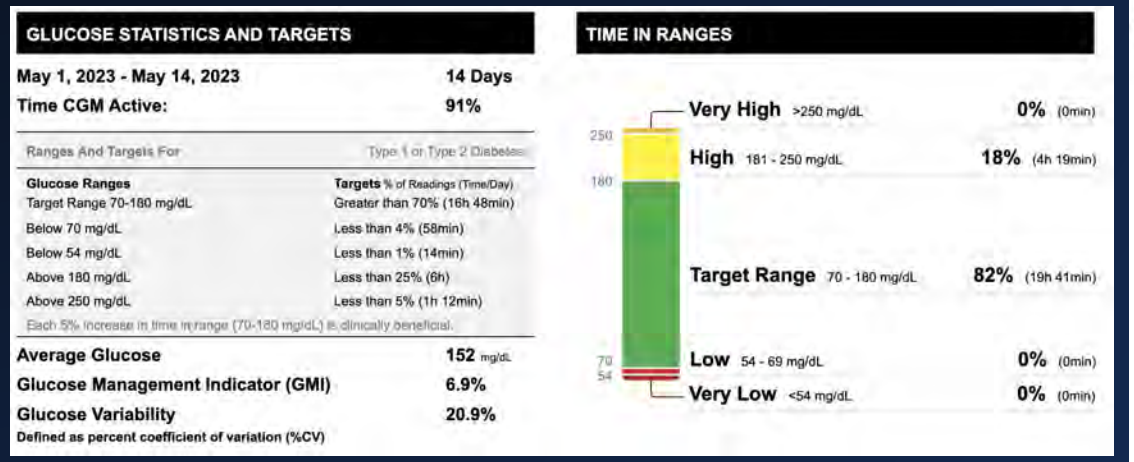


Plan:

- **Continue off Ozempic.**
- **Stopped mealtime insulin and cut Lantus to 26 units.**
- **Instructed to call if hypoglycemia and message me weekly to adjust Lantus.**

Case 7

Ms. P is a 60 yo woman with a 15 year history of type 2 diabetes with A1c 7.8% and obesity BMI 35 on Metformin 1000 mg BID and Semaglutide 2.0 mg SQ weekly. She lost an initial ~6 lb with addition of semaglutide 2 years ago.



GLUCOSE STATISTICS AND TARGETS

May 1, 2023 - May 14, 2023	14 Days
Time CGM Active:	91%

Ranges And Targets For Type 1 or Type 2 Diabetes

Glucose Ranges	Targets % of Readings (Time/Day)
Target Range 70-180 mg/dL	Greater than 70% (16h 48min)
Below 70 mg/dL	Less than 4% (58min)
Below 54 mg/dL	Less than 1% (14min)
Above 180 mg/dL	Less than 25% (6h)
Above 250 mg/dL	Less than 5% (1h 12min)

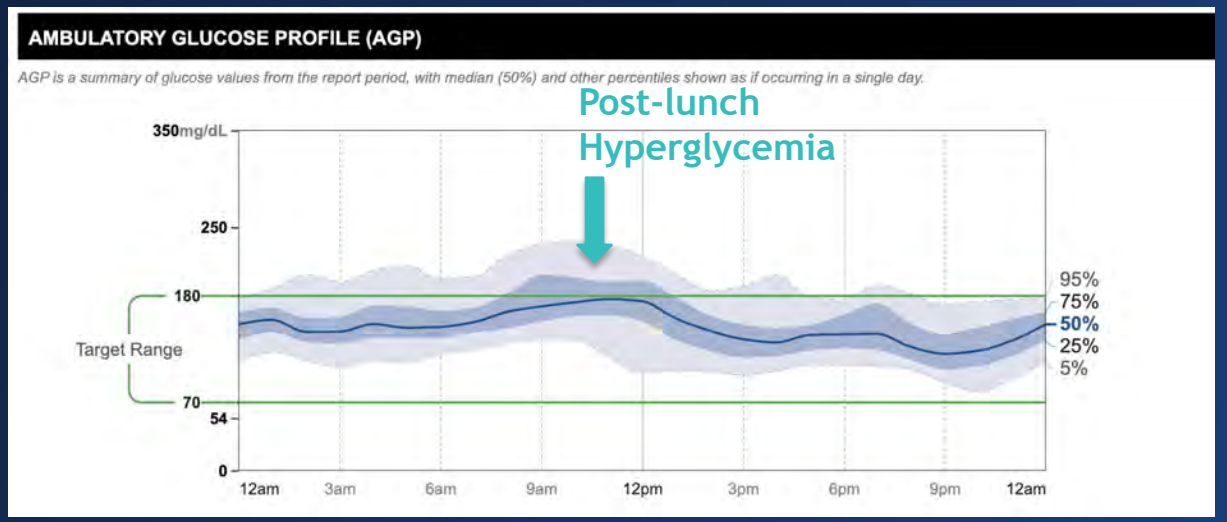
Each 5% increase in time in range (70-180 mg/dL) is clinically beneficial.

Average Glucose	152 mg/dL
Glucose Management Indicator (GMI)	6.9%
Glucose Variability	20.9%

Defined as percent coefficient of variation (%CV)

TIME IN RANGES

Very High	>250 mg/dL	0%	(0min)
High	181 - 250 mg/dL	18%	(4h 19min)
Target Range	70 - 180 mg/dL	82%	(19h 41min)
Low	54 - 69 mg/dL	0%	(0min)
Very Low	<54 mg/dL	0%	(0min)

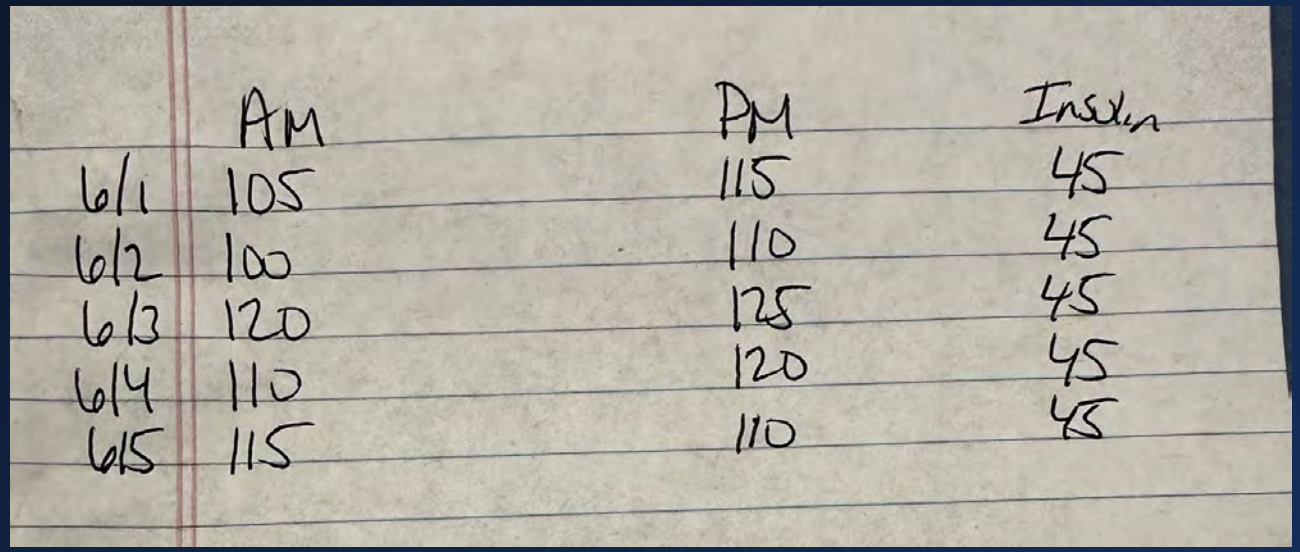


Plan:

- **Patient lost only 3% body weight with Semaglutide 2.0.**
- **Agrees to switch to Tirzepatide.**
- **Plans to continue CGM and dietary adjustments to guide titration.**

Case 8

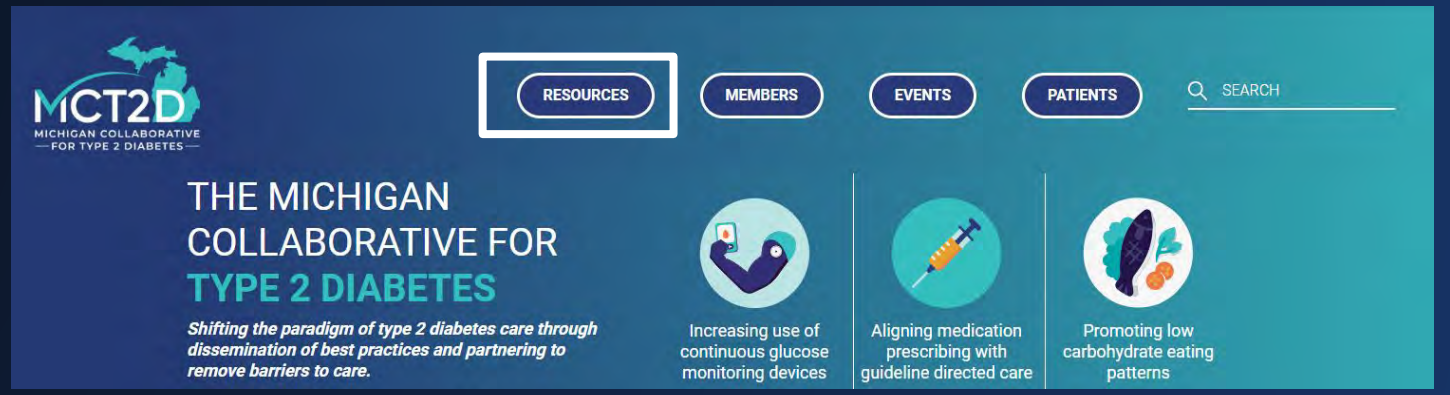
Mr. H is a 51 yo man with a 13 year history of type 2 diabetes with A1c of 9.2% and obesity BMI 31 on metformin 1000 mg BID, Jardiance 25 mg daily, Ozempic 2 mg weekly, and Lantus 45 units nightly. He didn't bring a glucometer to download but brought a handwritten logbook from blood sugars over the past few days. He saw a commercial about the Libre 3 CGM and feels like a CGM would help him to make better dietary choices. He tried calling his insurance to ask about CGM coverage and had to hang up after waiting for an hour on hold. He has HAP insurance and wants to know if can get a CGM prescription today.



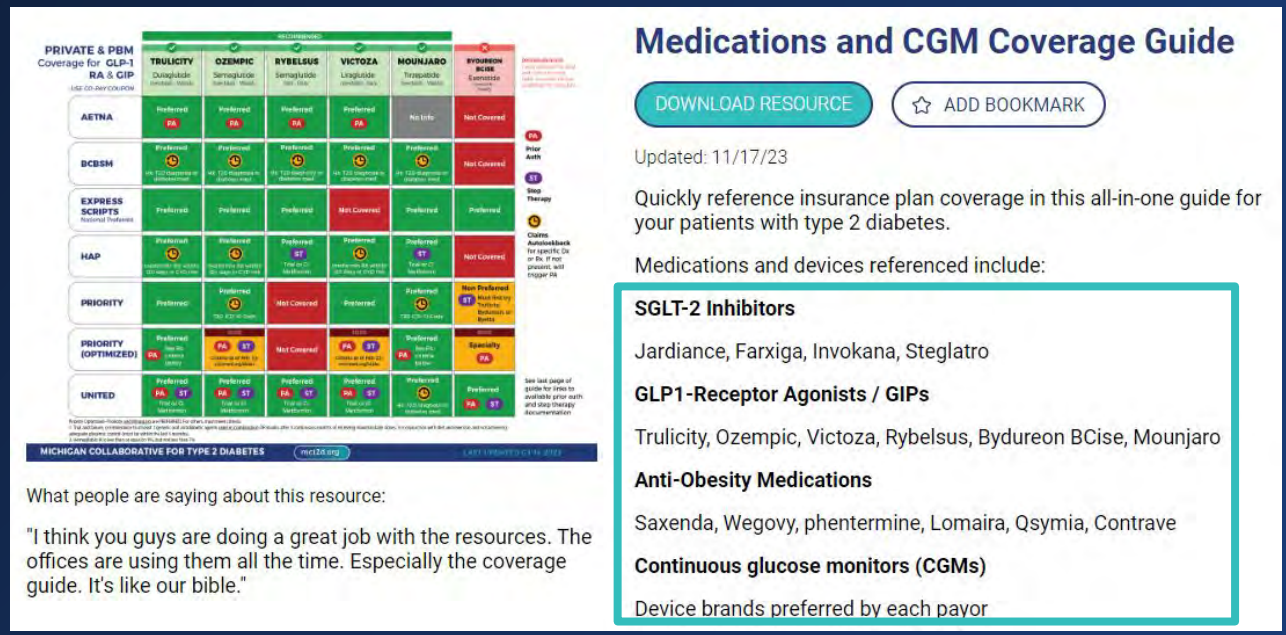
	AM	PM	Insulin
6/1	105	115	45
6/2	100	110	45
6/3	120	125	45
6/4	110	120	45
6/5	115	110	45

Plan:

- **Consult the Michigan Collaborative for Type 2 Diabetes (MCT2D) CGM coverage guide**
- **Prescribe CGM through preferred pharmacy**
- **Direct to MCT2D patient resources for CGM training materials**
- **Follow-up in 4 weeks to download and review blood sugars**



MCT2D Tools: Coverage Guide



mct2d.org/resource-library

MCT2D Tools: Coverage Guide

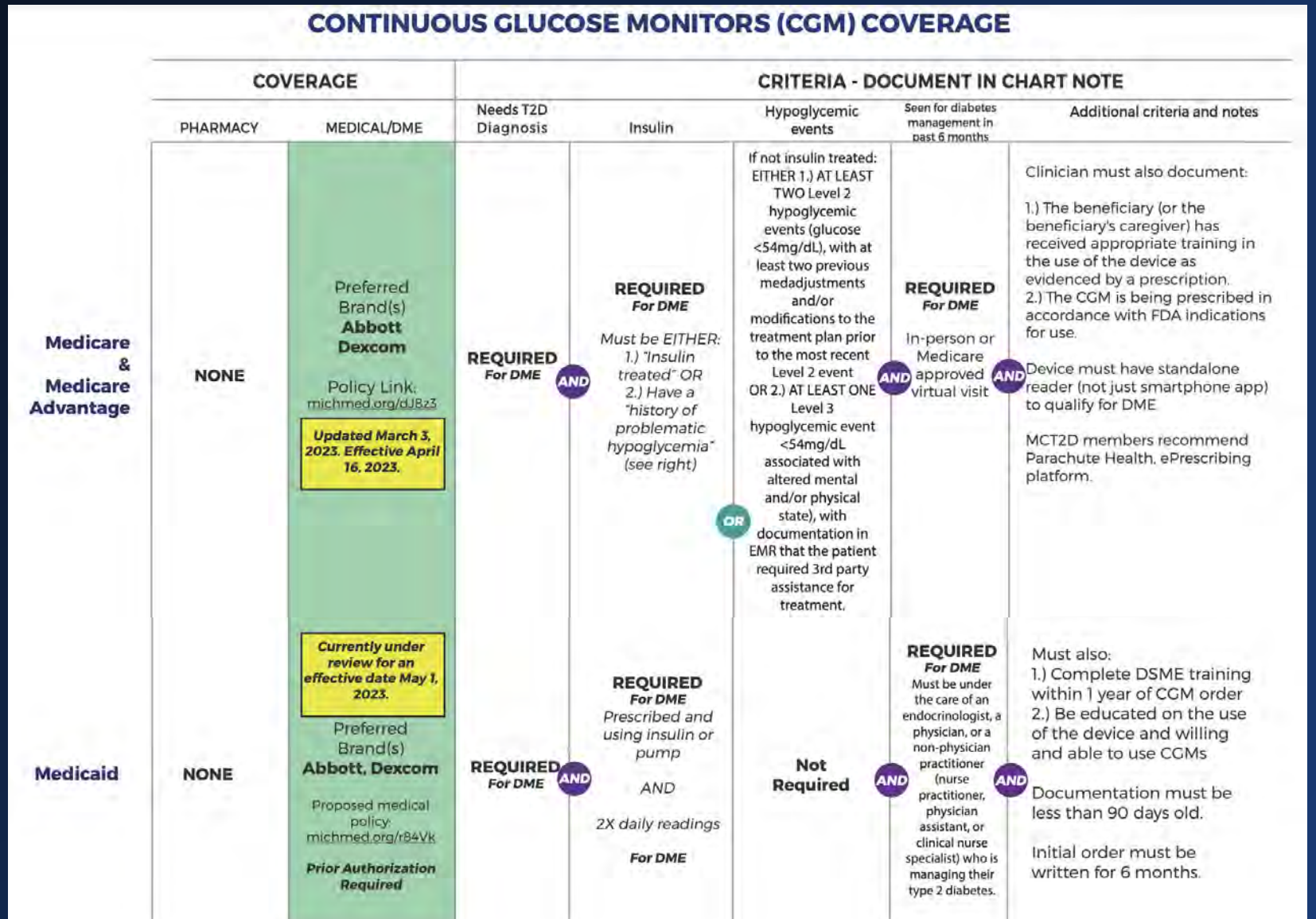
mct2d.org/resource-library

CONTINUOUS GLUCOSE MONITORS (CGM) COVERAGE

	COVERAGE		CRITERIA - DOCUMENT IN CHART NOTE				
	PHARMACY	MEDICAL/DME	Needs T2D Diagnosis	Insulin	Hypoglycemic events	Seen for diabetes management in past 6 months	Additional criteria and notes
Aetna	**NONE**	Preferred Brand(s) **Dexcom** Policy Link: https://michmed.org/3xAqb	**REQUIRED** ***For DME*** AND	**REQUIRED** ***For DME*** *Needs 3+ daily insulin injections or pump*	AND **REQUIRED** ***For DME*** Including hypoglycemic unawareness **OR "not meeting glycemic targets"**	**Not Required** ***For DME*** But may be required for continued use (see right)	***For continued use, must document EITHER*** a.) Experiencing improved glycemic control or decreased hypoglycemia episodes while using a CGM b.) Are being assessed every six months by the prescriber for adherence to their CGM regimen and diabetes treatment plan.
BCBSM *Consult Individual Plans*	Preferred Brand(s) **Dexcom** *receiver & transmitter at $0 cost share* **Abbott** ***Have a pharmacy carveout? Refer to your carve out plan company's coverage criteria.***	**See DME Criteria (right)**	**REQUIRED** ***For DME & PHARMACY*** AND	**REQUIRED** ***For DME ONLY*** *Needs 3+ daily insulin injections or pump AND "not meeting glycemic targets"*	OR **REQUIRED** ***For DME only*** *Have recurrent, unexplained, severe hypoglycemia (generally blood glucose levels <50 mg/dL) OR "impaired awareness of hypoglycemia that puts the patient or others at risk"*	AND **REQUIRED** ***For DME*** *In-person or virtual*	**For pregnant patients:** *Have poorly controlled insulin requiring diabetes, includes unexplained hypoglycemic episodes, hypoglycemic unawareness, suspected postprandial hyperglycemia, and recurrent diabetic ketoacidosis.* ***DME criteria only***
HAP *Commercial and Medicare Advantage plans*	Preferred Brand(s) **Dexcom Abbott Freestyle Libre** *$0 copay if through Pharmacy Advantage or patient's pharmacy*	**NONE**	**REQUIRED** ***For Pharm*** AND	**REQUIRED** ***For Pharm*** *Must be treated with insulin OR Treated with 3+ non-insulin products AND has uncontrolled HgBA1c*	**Not Required**	**Not Required**	**Use PREFERRED VENDOR** *Pharmacy Advantage (800) 456-2112, M-F, 8 a.m. to 6 p.m. https://www.pharmacyadvantagerx.com/index.cfm*

MCT2D Tools: Coverage Guide

mct2d.org/resource-library

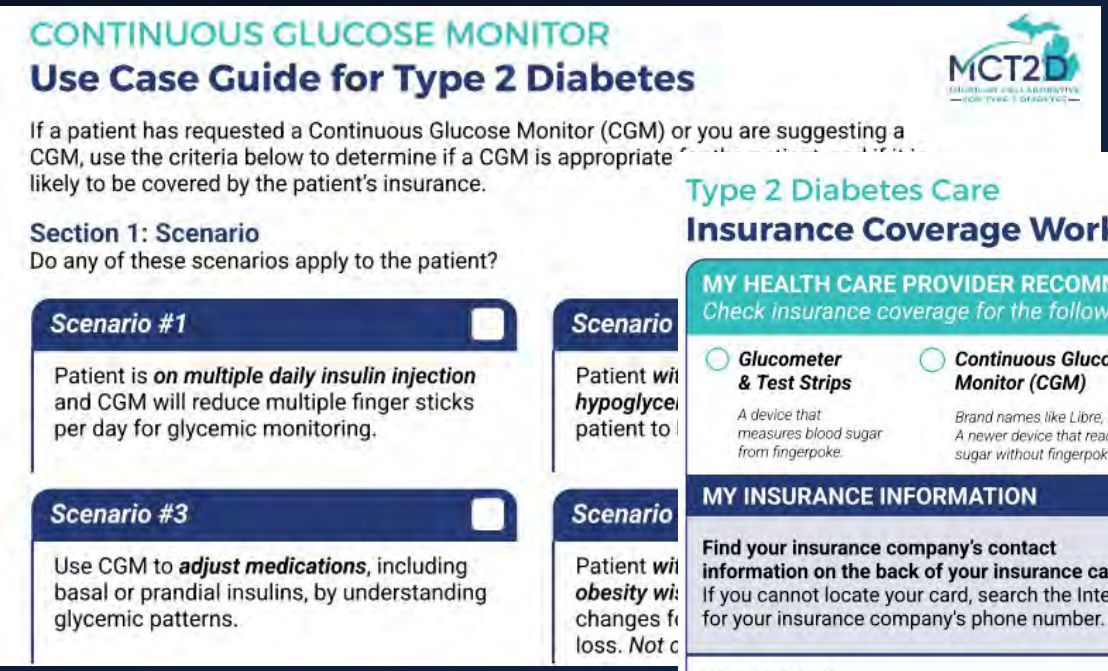


CONTINUOUS GLUCOSE MONITORS (CGM) COVERAGE

	COVERAGE		CRITERIA - DOCUMENT IN CHART NOTE					
	PHARMACY	MEDICAL/DME	Needs T2D Diagnosis	Insulin	Hypoglycemic events	Seen for diabetes management in past 6 months	Additional criteria and notes	
Medicare & Medicare Advantage	**NONE**	Preferred Brand(s) **Abbott Dexcom** Policy Link: michmed.org/dJ8z3 ***Updated March 3, 2023. Effective April 16, 2023.***	**REQUIRED** *For DME*	**REQUIRED** *For DME* *Must be EITHER: 1.) "Insulin treated" OR 2.) Have a "history of problematic hypoglycemia" (see right)*	If not insulin treated: EITHER 1.) AT LEAST TWO Level 2 hypoglycemic events (glucose <54mg/dL), with at least two previous medadjustments and/or modifications to the treatment plan prior to the most recent Level 2 event OR 2.) AT LEAST ONE Level 3 hypoglycemic event <54mg/dL associated with altered mental and/or physical state), with documentation in EMR that the patient required 3rd party assistance for treatment.	**REQUIRED** *For DME* In-person or Medicare approved virtual visit	Clinician must also document: 1.) The beneficiary (or the beneficiary's caregiver) has received appropriate training in the use of the device as evidenced by a prescription. 2.) The CGM is being prescribed in accordance with FDA indications for use. Device must have standalone reader (not just smartphone app) to qualify for DME MCT2D members recommend Parachute Health. ePrescribing platform.
Medicaid	**NONE**	***Currently under review for an effective date May 1, 2023.*** Preferred Brand(s) **Abbott, Dexcom** Proposed medical policy: michmed.org/r84Vk ***Prior Authorization Required***	**REQUIRED** *For DME*	**REQUIRED** *For DME* *Prescribed and using insulin or pump* *AND* *2X daily readings* *For DME*	**Not Required**	**REQUIRED** *For DME* Must be under the care of an endocrinologist, a physician, or a non-physician practitioner (nurse practitioner, physician assistant, or clinical nurse specialist) who is managing their type 2 diabetes.	Must also: 1.) Complete DSME training within 1 year of CGM order 2.) Be educated on the use of the device and willing and able to use CGMs Documentation must be less than 90 days old. Initial order must be written for 6 months.	

MCT2D Tools: Other Resources

mct2d.org/resource-library



CONTINUOUS GLUCOSE MONITOR

Use Case Guide for Type 2 Diabetes

If a patient has requested a Continuous Glucose Monitor (CGM) or you are suggesting a CGM, use the criteria below to determine if a CGM is appropriate
likely to be covered by the patient's insurance.

Section 1: Scenario

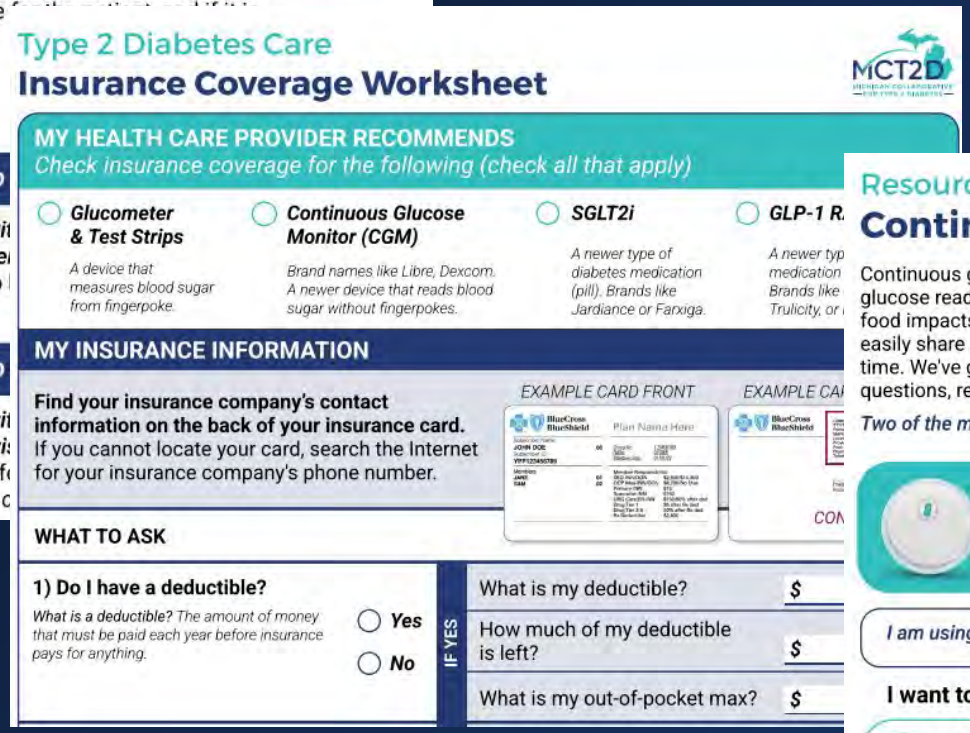
Do any of these scenarios apply to the patient?

Scenario #1

Patient is ***on multiple daily insulin injection*** and CGM will reduce multiple finger sticks per day for glycemic monitoring.

Scenario #3

Use CGM to ***adjust medications***, including basal or prandial insulins, by understanding glycemic patterns.



Type 2 Diabetes Care

Insurance Coverage Worksheet

MY HEALTH CARE PROVIDER RECOMMENDS

Check insurance coverage for the following (check all that apply)

- ***Glucometer & Test Strips*** — *A device that measures blood sugar from fingerpoke.*
- ***Continuous Glucose Monitor (CGM)*** — *Brand names like Libre, Dexcom. A newer device that reads blood sugar without fingerpokes.*
- ***SGLT2i*** — *A newer type of diabetes medication (pill). Brands like Jardiance or Farxiga.*
- ***GLP-1 R***

MY INSURANCE INFORMATION

Find your insurance company's contact information on the back of your insurance card. If you cannot locate your card, search the Internet for your insurance company's phone number.

EXAMPLE CARD FRONT

WHAT TO ASK

1) Do I have a deductible?

What is a deductible? The amount of money that must be paid each year before insurance pays for anything.

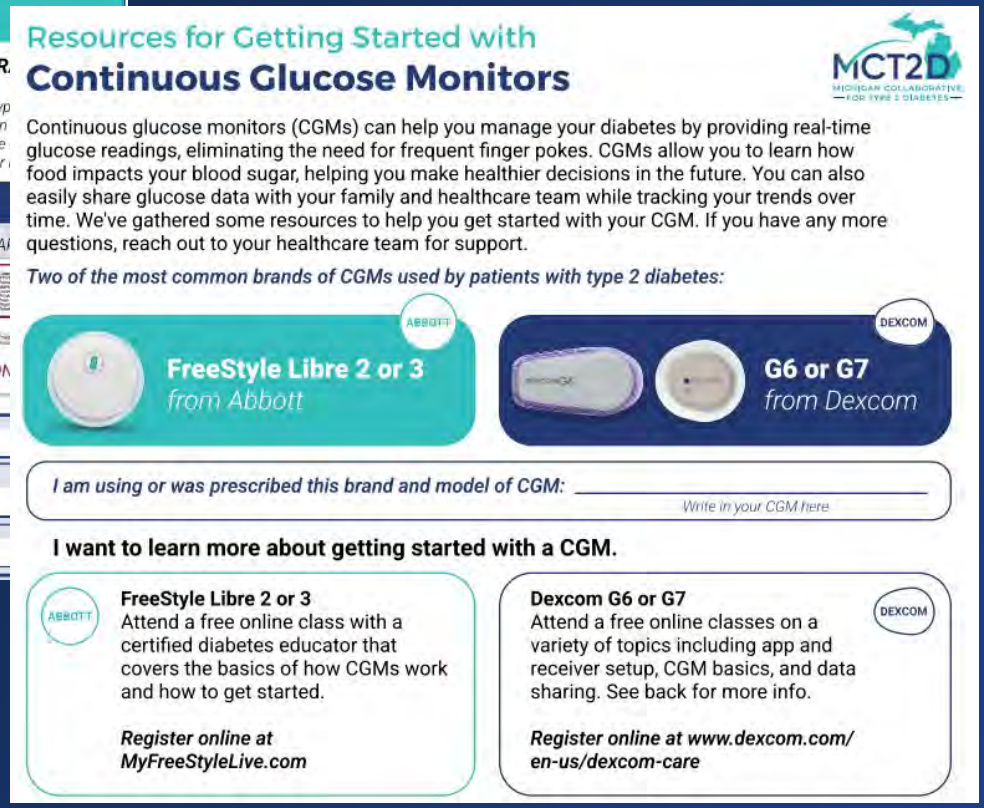
○ *Yes*
○ *No*

IF YES

What is my deductible? $

How much of my deductible is left? $

What is my out-of-pocket max? $



Resources for Getting Started with

Continuous Glucose Monitors

Continuous glucose monitors (CGMs) can help you manage your diabetes by providing real-time glucose readings, eliminating the need for frequent finger pokes. CGMs allow you to learn how food impacts your blood sugar, helping you make healthier decisions in the future. You can also easily share glucose data with your family and healthcare team while tracking your trends over time. We've gathered some resources to help you get started with your CGM. If you have any more questions, reach out to your healthcare team for support.

Two of the most common brands of CGMs used by patients with type 2 diabetes:

FreeStyle Libre 2 or 3 *from Abbott*

G6 or G7 *from Dexcom*

I am using or was prescribed this brand and model of CGM: _____

Write in your CGM here

I want to learn more about getting started with a CGM.

FreeStyle Libre 2 or 3
Attend a free online class with a certified diabetes educator that covers the basics of how CGMs work and how to get started.

Register online at MyFreeStyleLive.com

Dexcom G6 or G7
Attend a free online classes on a variety of topics including app and receiver setup, CGM basics, and data sharing. See back for more info.

Register online at www.dexcom.com/en-us/dexcom-care

Questions?

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Resources

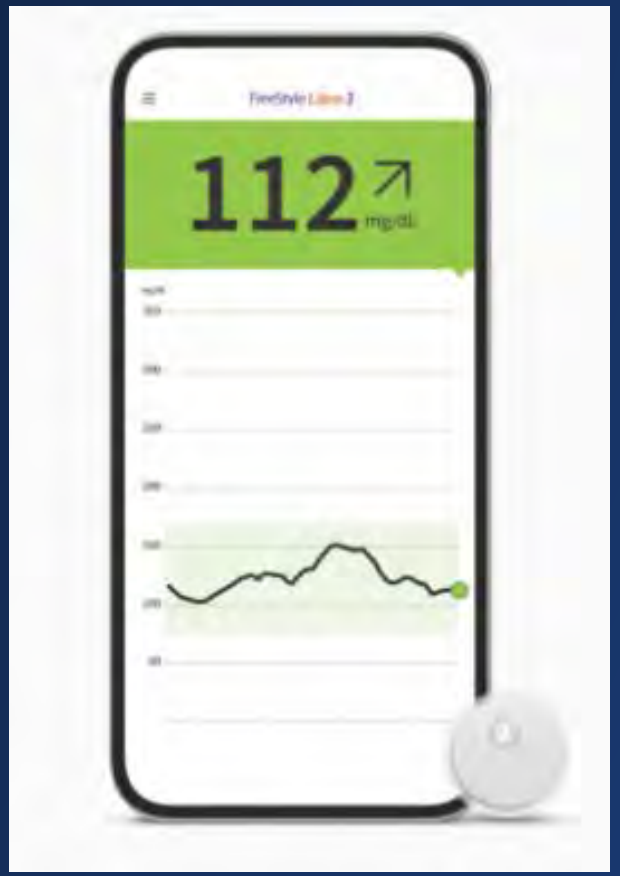
- **Getting started:**
  - https://www.mct2d.org/
  - https://pro.aace.com/cgm/toolkit/agp

- **Specific devices:**
  - https://www.freestyle.abbott/us-en/home.html
  - https://www.dexcom.com/en-us
  - https://www.medtronicdiabetes.com/products/guardian-connect-continuous-glucose-monitoring-system
  - https://www.ascensiadiabetes.com/eversense/get-started-today

- **Guidelines:**
  - **ADA:** https://diabetesjournals.org/care/article/46/Supplement_1/S111/148041/7-Diabetes-Technology-Standards-of-Care-in
  - **AACE:** https://www.sciencedirect.com/science/article/pii/S1530891X22005766?via%3Dihub
  - **Time in Range:** https://diabetesjournals.org/care/article/42/8/1593/36184/Clinical-Targets-for-Continuous-Glucose-Monitoring

Libre 3

- Real-time CGM (sent every 1 minute), 33’ range
- MARD 8.9% overall (7.9% without glycemic challenges)
- All-in-one sensor, 70% smaller than Libre 2
- Worn on back of arm
- 60 minute warm-up
- 14-day sensor
- Apps:
  - FreeStyle Libre 3
- Not yet approved as part of automated insulin delivery systems
- Approved for gestational diabetes and pregnancy
- Newly approved Libre 3 reader
- Not yet covered by Medicare
- Cash price (30-day supply): ~$130 with coupon



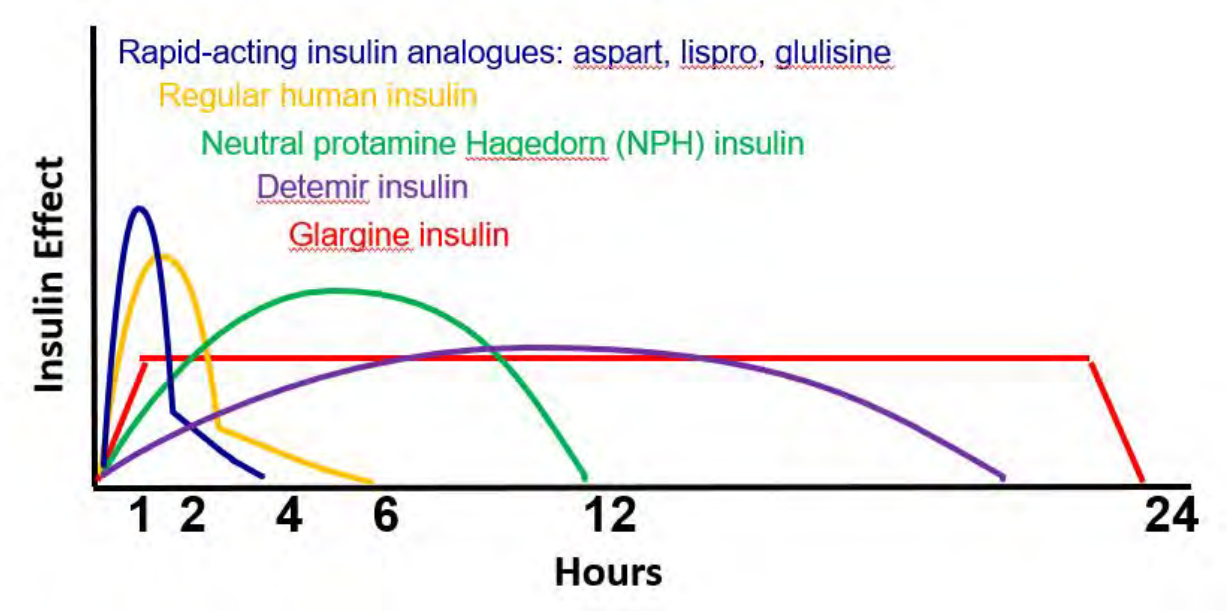
- https://www.dexcom.com/en-us/g7-cgm-system

Dexcom G7

https://www.dexcom.com/en-us/g7-cgm-system

- Real-time CGM (sent every 5 minutes), 20' range
- MARD 8.2% overall
- All-in-one sensor, 60% smaller than G7
- Worn on back of arm
- 30 minute warm-up
- 10-day sensor
  - 12-hour grace period
- Apps:
  - Dexcom Follow – share with up to 10 people
  - Dexcom Clarity
- Not yet approved as part of automated insulin delivery systems
- Approved for gestational diabetes and pregnancy
- Optional receiver
- Covered by Medicare
- Cash price (30-day supply): ~$170 with coupon

NPH for Steroid-Induced Hyperglycemia



- **Steroid duration of action**:
  - Prednisone: 12-36 hours (peaks at 4-6 hours)
  - Methylprednisolone: 12-36 hours
  - Dexamethasone: 24-72 hours (peaks at 8-10 hours)

Low Dose Glucocorticoid dose		High Dose Glucocorticoid dose	
10-39 mg Prednisone/ Prednisolone or 40-159 mg Hydrocortisone or 8-31 mg Methylprednisolone or 1.5-5.9 mg Dexamethasone/ 24 hours		>=40 mg Prednisone/ Prednisolone or >= 160 mg Hydrocortisone or >=32 mg Methylprednisolone or >= 6 mg Dexamethasone /24 hours	
No DM	Type 2 DM	No DM	Type 2 DM
5 units NPH per glucocorticoid dose*	**10 units NPH per glucocorticoid dose***	**10 units NPH per glucocorticoid dose***	**20 units NPH per glucocorticoid dose***

*Full dose NPH given at the same time as glucocorticoid administration *except:*

- Methylprednisolone/ hydrocortisone dosed every 4-6 hours or dexamethasone- NPH given three times per day at 0800, 1600, and 2200. 2200 dose reduced 25%.
- If patient is NPO, start dose at 50%

Figure 3. NPH Treatment for Experimental Group- Initial Starting Dose
Abbreviations: *DM = Diabetes Mellitus; NPH = Neutral Protamine Hagedorn*