Diabetes Technologies Workshop:
Integrating Guidance, Gadgets & Gizmos

Kerstin Stephens, MHS, PA-C, CDCES
University of Kansas Health System
Cray Diabetes Center, Division of Endocrinology

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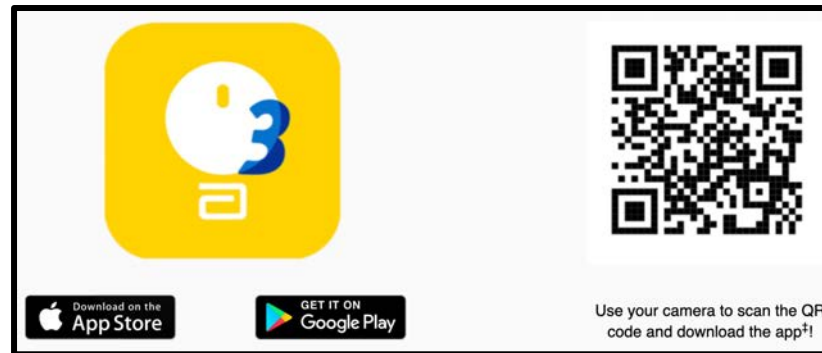Yale Medicine, Endocrine & Metabolism Division

AAPA – Nashville
May 22, 2023

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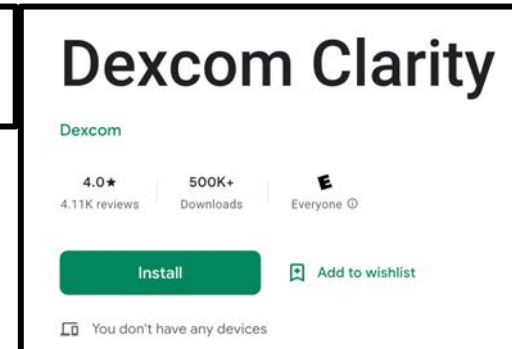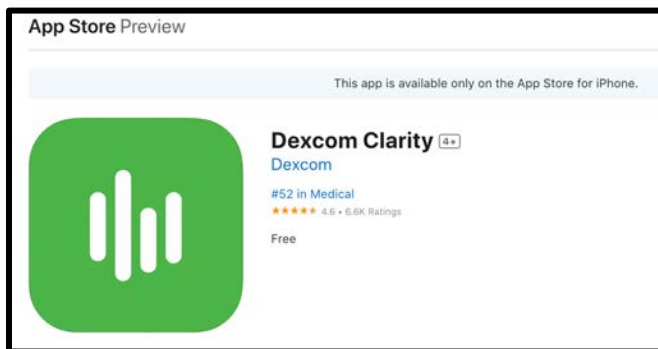THE UNIVERSITY OF
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Workshop Apps Required on Smartphones

Participants: BEFORE THE SESSION

1. Download "Freestyle Libre 3" app to your smartphone

2. Download Dexcom Clarity app to your smartphone

Faculty

Kerstin Stephens, MHS, PA-C, CDCES

- University of Kansas Health System, Cray Diabetes Center, Division of Endocrinology
- kstephens2@kumc.edu

Jonathan Weber, MA, PA-C, DFAAPA

- Assistant Professor of Internal Medicine & Director of Didactic Education Yale School of Medicine Physician Associate Program
- Yale Medicine, Endocrine & Metabolism Division, Yale Diabetes Center
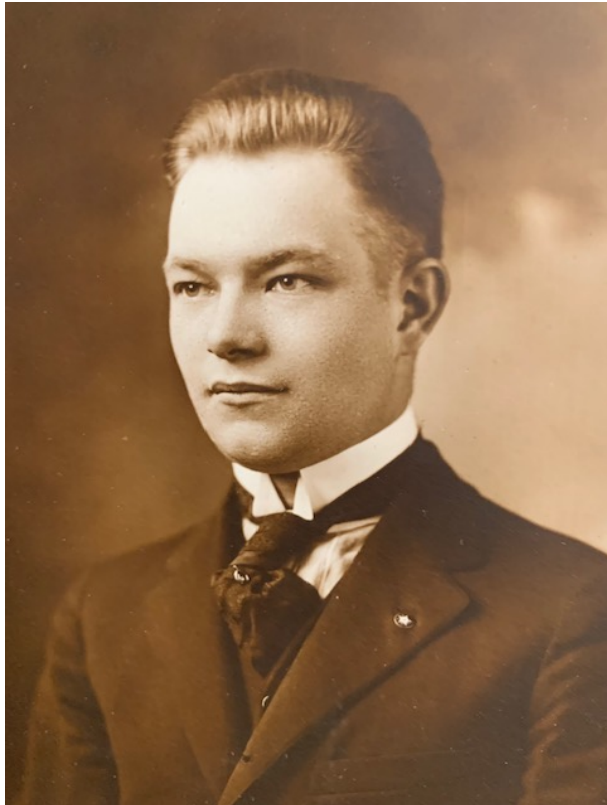- jonathan.weber@yale.edu

Disclosures

- We have no relevant relationships with ineligible companies to disclose within the past 24 months.

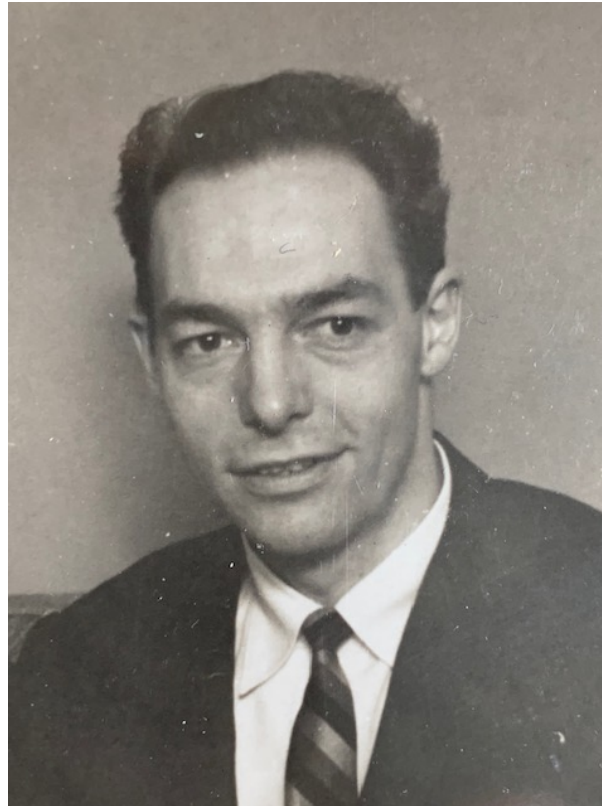- JW moonlights as pancreas - 24/7/365 x 33+ years

  Patient Perspective ⟷ *Provider Perspective*

Dedications

William Frederick Weber, 26
(T1DM 1923)

William Walter Weber, 26
(T1DM 1957)

Jonathan Merritt Weber, 26
(T1DM 1989)

Pre-Session Survey

1. How do you obtain blood glucose (BG) data in patient visits?
   A. From Handwritten BG logs or flowsheets
   B. From BG meter
   C. From CGM reader or smart phone app
   D. From BG meter download report
   E. From Cloud-based CGM platform download report
   F. All the above

Pre-Session Survey

2. What barriers limit integration of BGM & CGM data downloading into your practice?

   A. Unclear on analysis of BGM or CGM reports
   B. Unclear on use of BGM or CGM data platforms
   C. Unclear on reimbursement
   D. Lack of health center support
   E. Lack of time
   F. All the above
   G. None of the above

Didactic & Workshop Plan – (240 min)

- #1 – Setting the Stage & Scope of Problem
- #2 – Hx & Spectrum of BG Devices & CGM Emergence
- #3 – Apply CGMs
    - Dexcom G7 CGM demo review & application
    - Libre3 CGM demo review & application
- #4 – CGM Integration into Primary Care
- #5 – BG Meter Review, Utilization & "3-minute Drill"
    - Patients check their own & their partners BG
    - Review meter data – "3 Minute Drill"
- #6 – Downloading & Reviewing BGM & CGM
    - Processes & challenges of implementation
    - CGM data platforms & AGP report orientation
- #7 – Case Intro & Work on Cases 1-11
- #8 – Case Review & Discuss
- #9 – Next Steps, Tips & Summary
- #10 – Q&As, CGM sensor return plan & Clean-up
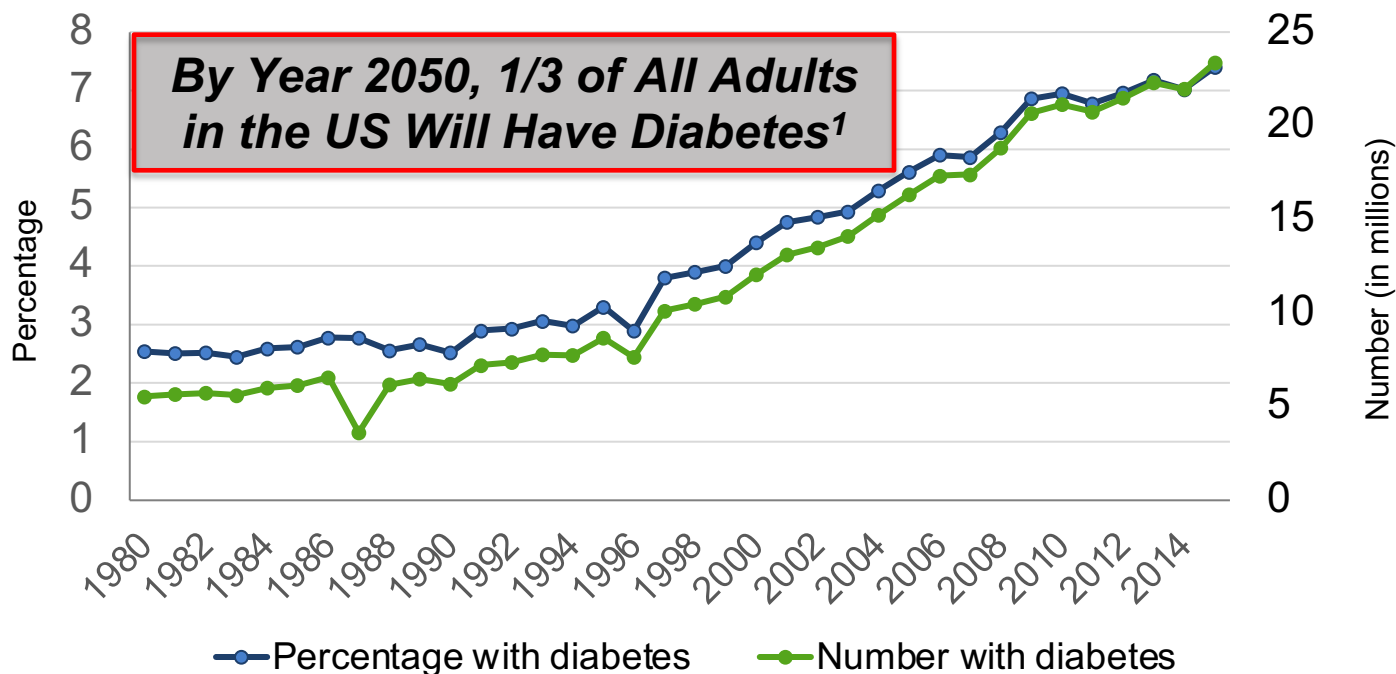
Session Objectives

At the end of the presentation, the participant will be able to:

1. Review ADA/EASD consensus guidelines for glycemic targets and use of diabetes technologies

2. Compare and contrast the technological spectrum of glucose data collection and insulin delivery options

3. Discuss strategies to improve access to and use of glucose monitoring and insulin delivery devices

4. Analyze and interpret glycemic trends using ambulatory glucose profile (AGP) reports

5. Formulate treatment plans using ambulatory glucose profile (AGP) data in case-based scenarios

6. Explore strategies for integrating the use of ambulatory glucose profile (AGP) reports into your practice

Why should we care?

Scope of the Diabetes Epidemic

Number and Percentage of US Population With Diagnosed Diabetes, 1980-2015

By Year 2050, 1/3 of All Adults in the US Will Have Diabetes[1]

Percentage with diabetes —— Number with diabetes

[1]CDC's Division of Diabetes Translation 2016. United States Diabetes Surveillance System available at: http://www.cdc.gov/diabetes/data

Distribution of Endocrinologists/Diabetologists & PCPs in US[1]

US Counties with ≥ 1 Pediatric or Adult Endocrinologist/Diabetologist

US Counties with ≥ 1 Primary Care Provider
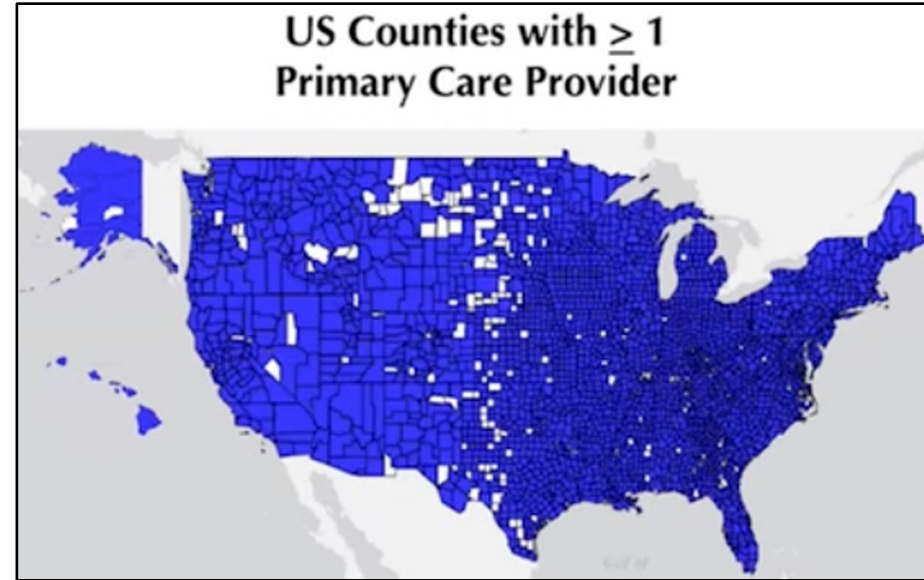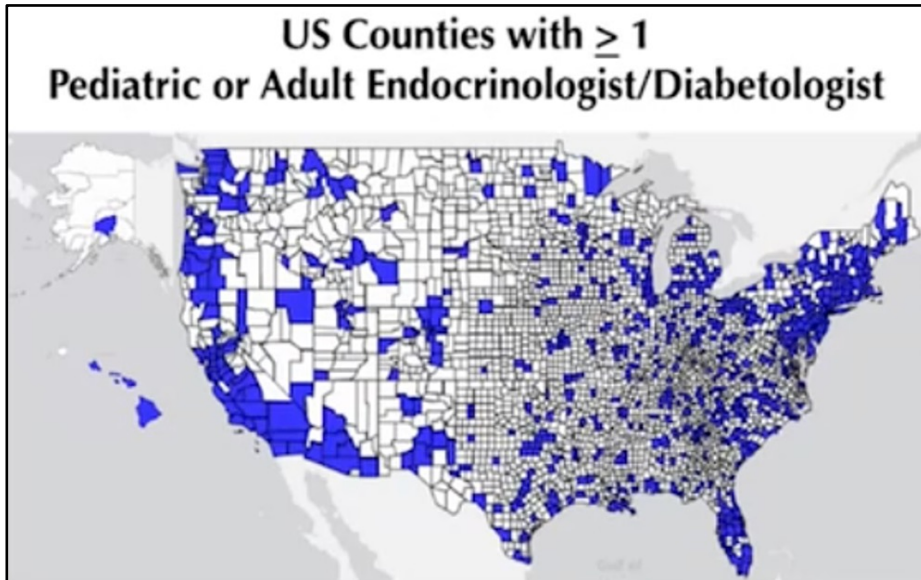
Total PCPs in the US[2]:
PAs: ~20%
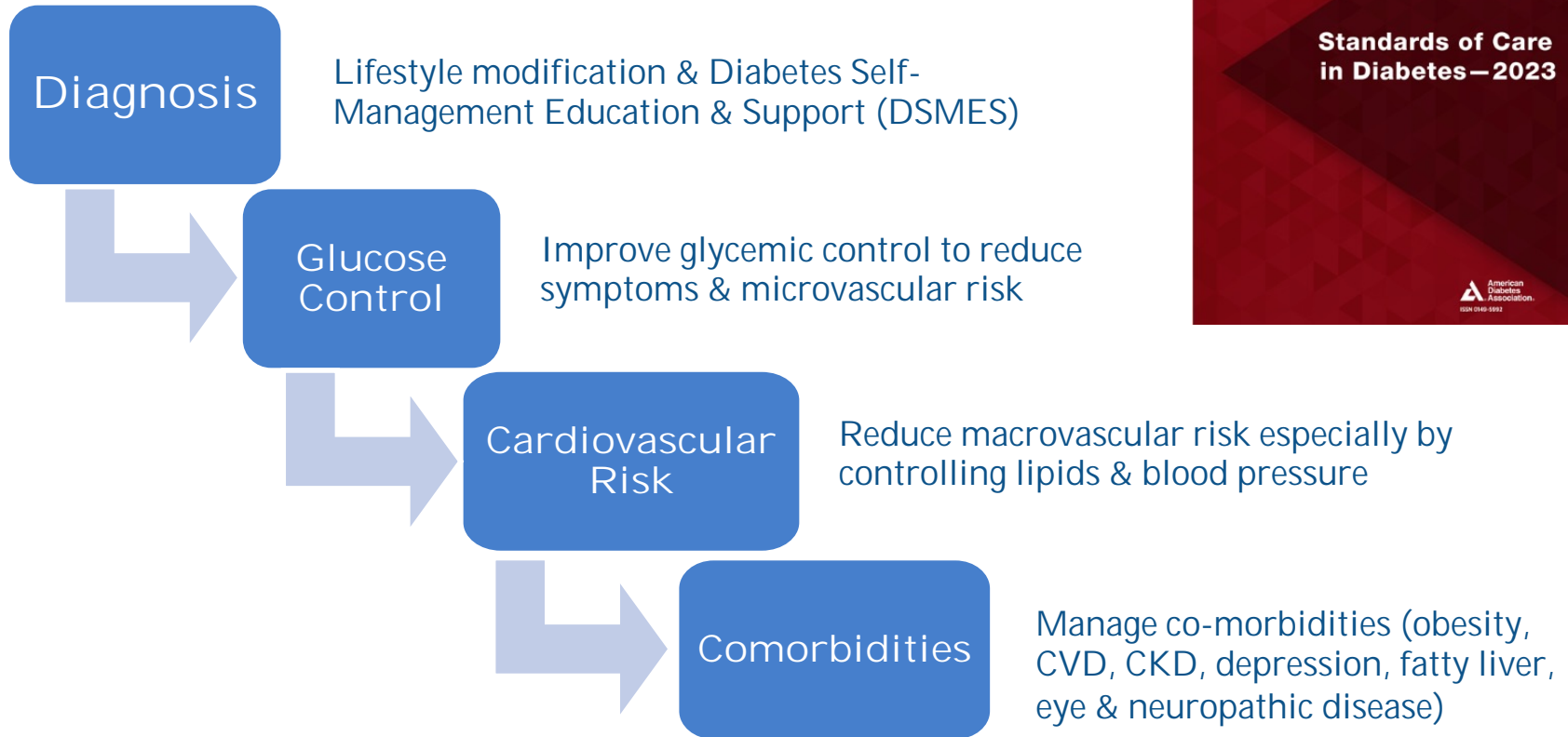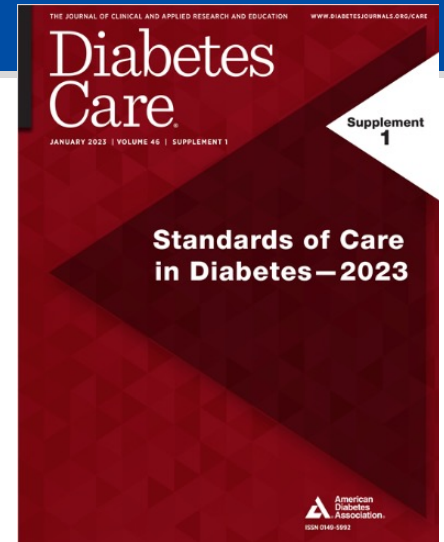**NPs: ~30%**
MD/DOs: ~50%

➤ 90% of all diabetes management occurs in primary care.[3]

➤ Early intervention can reduce rates of complications, reduce costs & improve long-term quality of life.[3]

[1]Oser SM et al.. Diabetes Technologies: We Are All in This Together. Clin Diabetes. 2020 Apr;38(2):188-189.
[2]Petterson S et al. The State of Primary Care in the United States: A Chartbook of Facts and Statistics. Jan 2018.
[3]Mechanick JI et al. Dysglycemia-based Chronic Disease: An American Association of Clinical Endocrinologists Position Statement. Endocr Pract. 2018;24(11):995-1011.

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Proactive Management of Type 2 Diabetes

Diagnosis

Lifestyle modification & Diabetes Self-Management Education & Support (DSMES)

Glucose Control

Improve glycemic control to reduce symptoms & microvascular risk

Cardiovascular Risk

Reduce macrovascular risk especially by controlling lipids & blood pressure

Comorbidities

Manage co-morbidities (obesity, CVD, CKD, depression, fatty liver, eye & neuropathic disease)

ADA 2023 Standards of Care: https://diabetesjournals.org/care/issue/46/Supplement_1

Comprehensive Goals Of Diabetes Management

- Set glycemic targets to reduce microvascular & macrovascular CVD events
  - A1C targets
  - Ambulatory Glucose Profile targets
    - BGM – Fasting, pre-meal & post-meal glycemia goals
    - CGM – "Time in Range" & glucose variability goals

- Consider T2DM therapies in view of pathogenesis
  - Lifestyle Interventions
  - Pharmacologic interventions aimed at:
    - Minimizing hypoglycemia
    - Controlling glycemic variability to maximize "Time in Range"

- Consider therapies for prevention or management of comorbidities
  - CVD, HTN, CHF – aspirin, anti-platelet, antihypertensive agents
  - DKD – RAAS agents
  - Dyslipidemia – statins, ezetimibe, fibrates, fenofibrates, Icosapent ethyl, PCSK9 inhibitors

SMBG = Self-Monitoring of Blood Glucose
CGM = Continuous Glucose Monitoring
RAAS = Renin-Angiotensin-Aldosterone System

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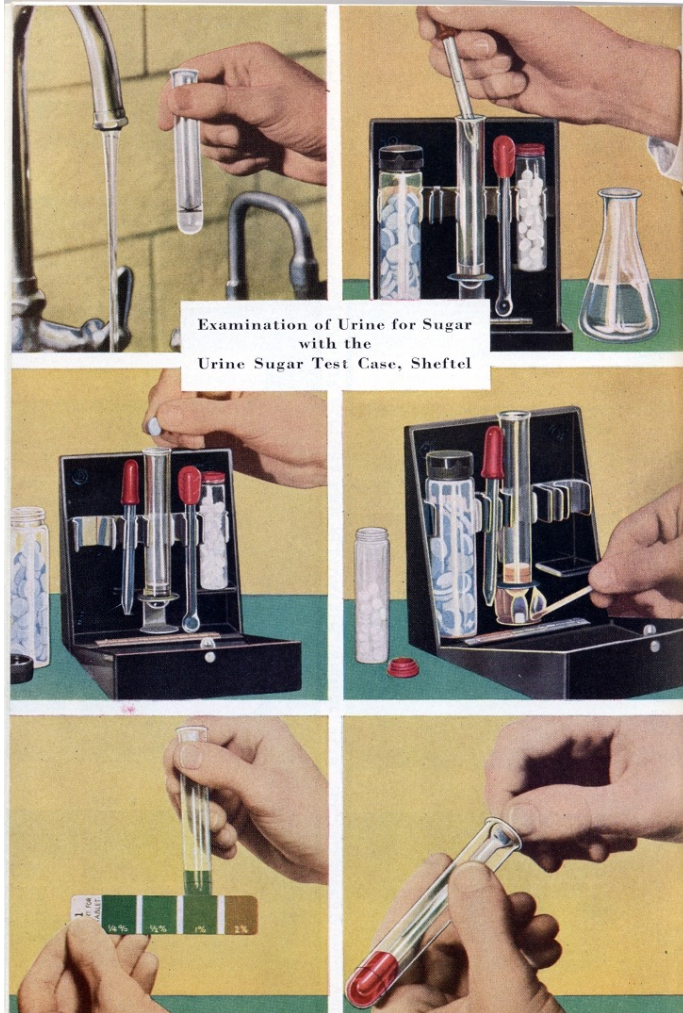THE UNIVERSITY OF
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Clarke SF, Foster JR. A history of blood glucose meters and their role in self-monitoring of diabetes mellitus. Br J Biomed Sci 2012;69:83–93

How Far We've Come…
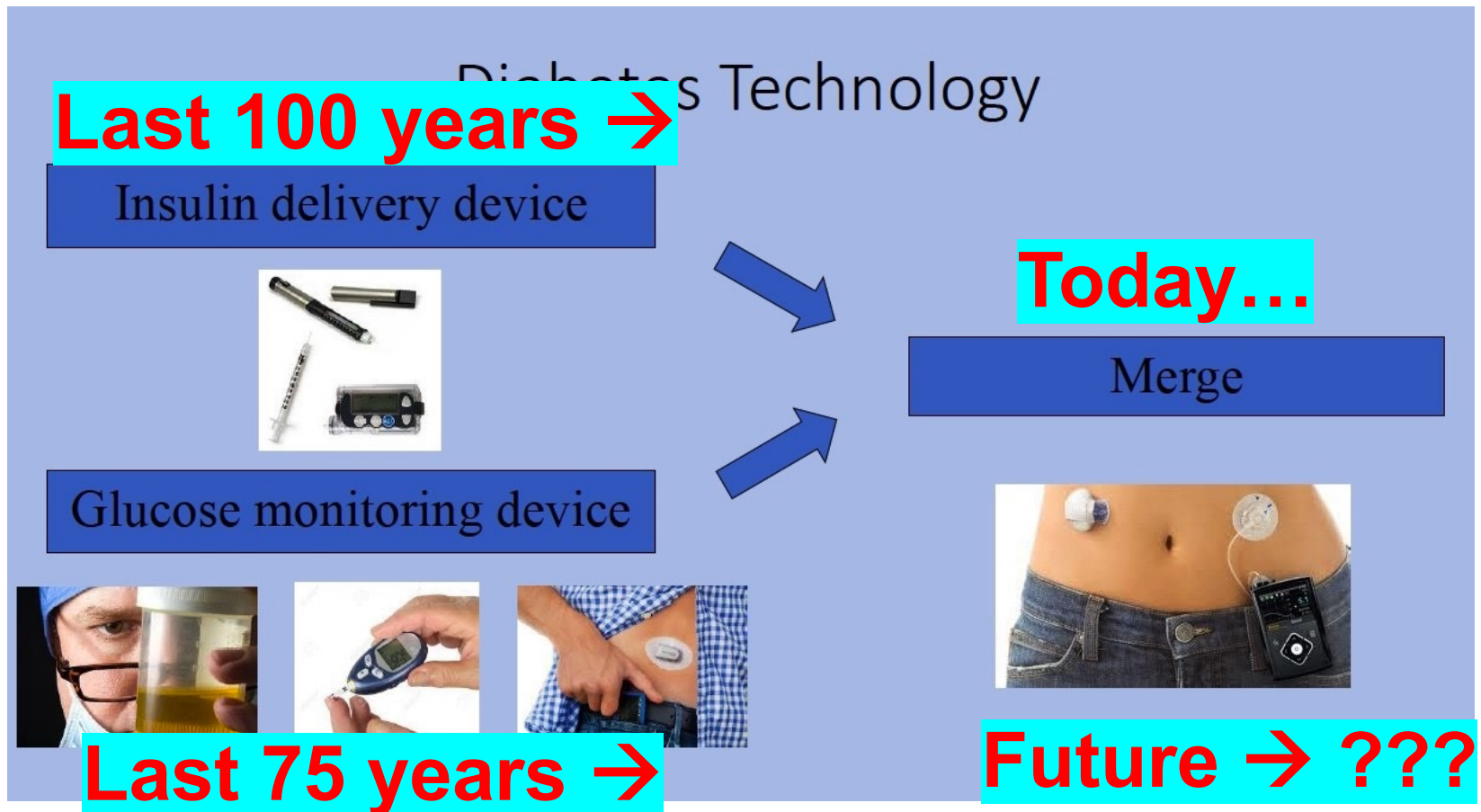

Clarke SF, Foster JR. A history of blood glucose meters and their role in self-monitoring of diabetes mellitus. Br J Biomed Sci 2012;69:83–93

Last 100 years →

Diabetes Technology

Insulin delivery device

Today…

Merge

Glucose monitoring device

Last 75 years →

Future → ???

Dovc K, Battelino T. Evolution of Diabetes Technology. *Endocrinol Metab Clin North Am*. 2020;49(1):1-18. doi:10.1016/j.ecl.2019.10.009
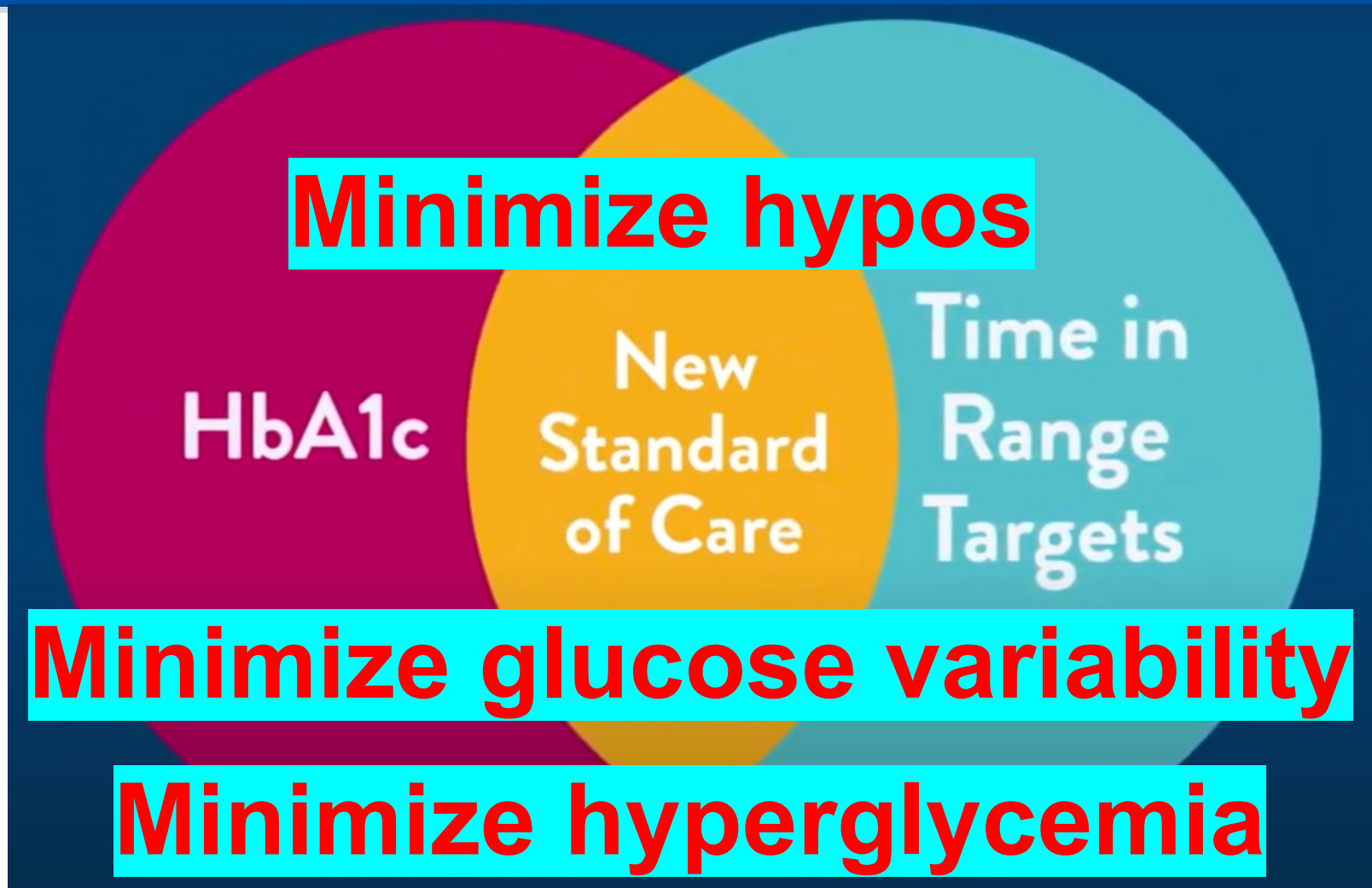
Why Use Technology?

- Improved glycemic control
- Reduction in hypoglycemia
- More information on daily fluctuations
- Potential improvement in quality of life

CGMs reduced time in hypoglycemia with 1st SENSOR placement!
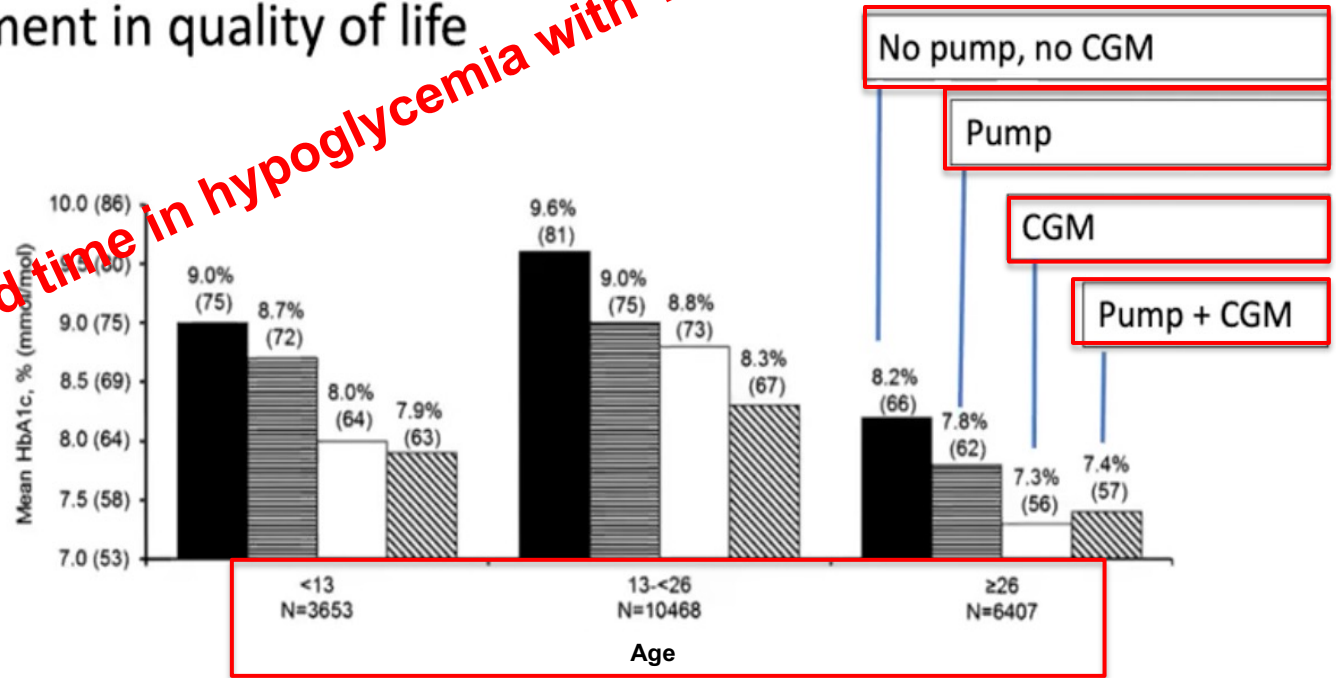
Foster NC, Beck RW, Miller KM, et al. State of Type 1 Diabetes Management and Outcomes from the T1D Exchange in 2016-2018 [published correction appears in Diabetes Technol Ther. 2019 Apr;21(4):230]. *Diabetes Technol Ther*. 2019;21(2):66-72. doi:10.1089/dia.2018.0384

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New Standards of Care

Minimize hypos

Minimize glucose variability

Minimize hyperglycemia

HbA1c

New Standard of Care

Time in Range Targets
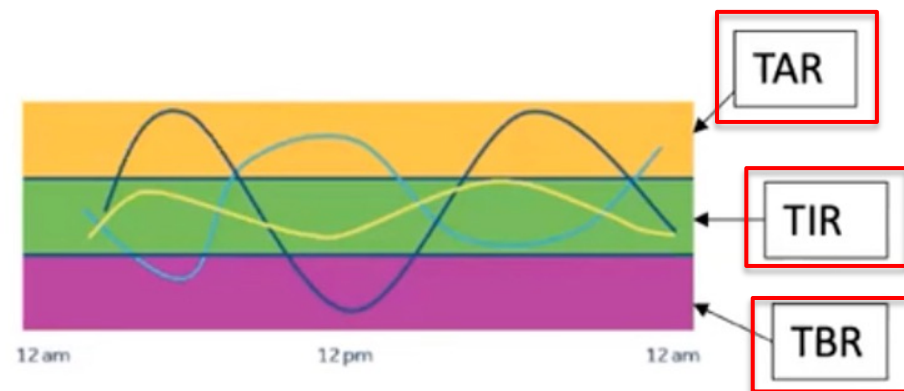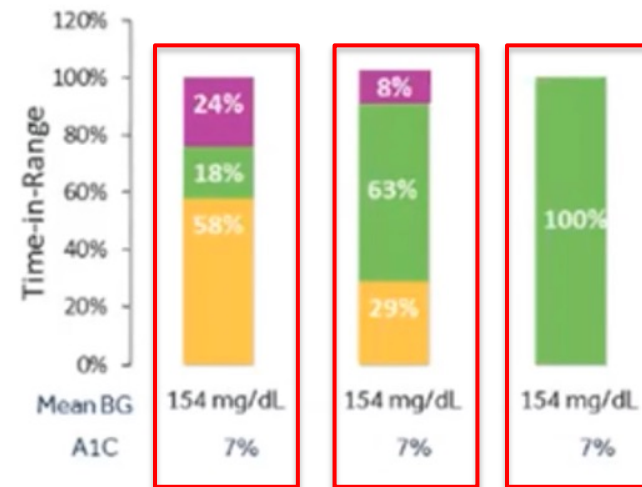
Limitations of Hemoglobin A1c

- Unable to reflect acute glycemic excursions

- A1c may be inaccurate in a range of physiologic and pathologic conditions

- Does not provide time-specific blood glucose data

Ambulatory Glucose Profile →

7-14-30 day profile of BG trends

Glycemic Targets for Patients with Diabetes[1,2,3]

Patient Characteristics	Reasonable HbA$_{1c}$ Goal, %	Recommended Blood Glucose % for TIR or TBR
Nonpregnant adults aged <65 years with type 1 or 2 diabetes	<7.0	>70% of TIR 70-180 mg/dL <4% of TBR ≤69 mg/dL
Healthy adults aged ≥65 years with diabetes and few coexisting chronic illnesses	7.0-7.5	Fasting preprandial goal: 80-130 mg/dL Peak postprandial: <180 mg/dL
Adults aged ≥65 years with diabetes and multiple coexisting chronic illnesses	<8.0	>50% of TIR 70-180 mg/dL <1% of TBR ≤69 mg/dL

TBR, time below range; **TIR**, time in range

[1]ADA.Glycemic Targets. Diabetes Care 2023 Jan 1;46(Suppl 1):S97-S110.
[2]ADA.Older Adults. Diabetes Care 2023 Jan 1;46(Suppl 1):S216-S229.
[3]Battelino T et al. Clinical targets for continuous glucose monitoring data interpretation: recommendations from the International Consensus on Time in Range. Diabetes Care. 2019;42(8):1593-1603.

Continuous Glucose Monitoring (CGM)

- Subcutaneous glucose sensor → transmitter → display
- Measures glucose levels every 5 minutes
- PROFESSIONAL DEVICES
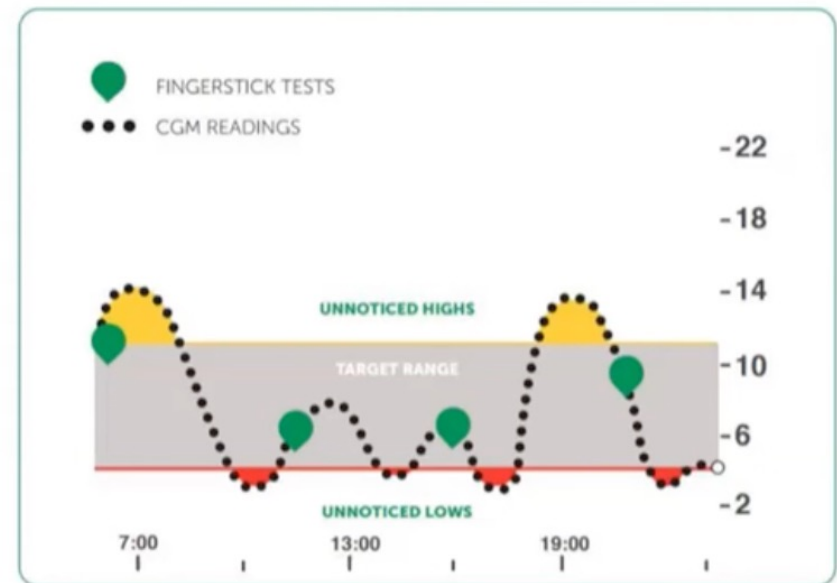 - Owned by clinic
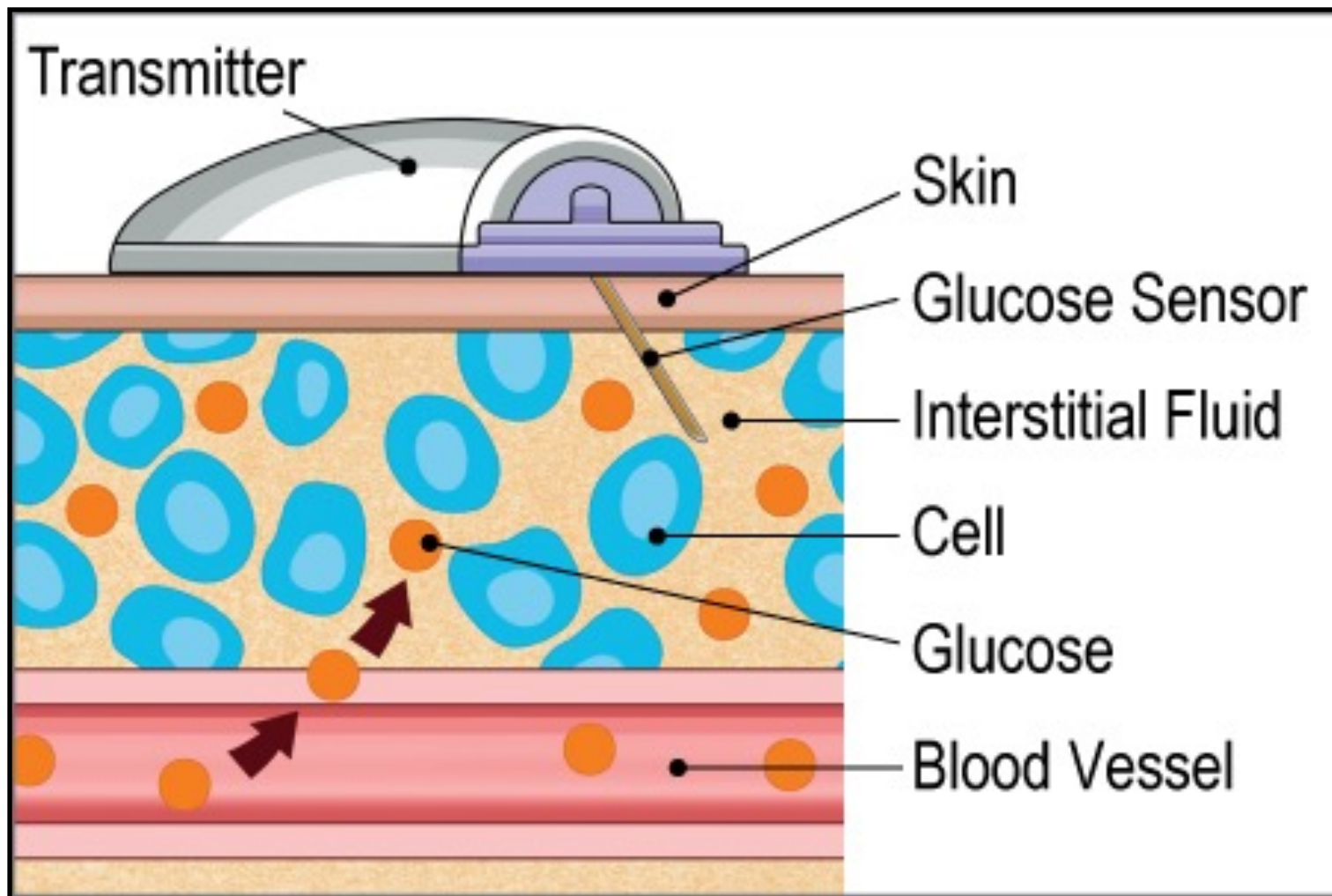 - Retrospective or Real-Time

- PERSONAL DEVICES:
  - Intermittently scanned or real-time

Ambulatory Glucose Profile

Continuous Glucose Monitoring (CGM)

Benefits of CGM

Provides hundreds of sensor glucose measurements daily

Permits real-time biofeedback about BG patterns to patients

Empowers patients to become more engaged & proficient in self-management

Types of CGMs

Type of CGM	Description
rtCGM	Measures & stores BG levels continuously w/o prompting; patient-owned
isCGM with & w/o alerts	Measures BG levels continuously but requires scanning for data storage; patient-owned
Professional CGM	Placed by provider & worn for discrete time (7-14 days); patient may be blinded or visible to data while wearing; data used to assess patterns/trends; CGM clinic-owned

CGM: continuous glucose monitor
rtCGM: real-time CGM
isCGM: intermittently scanned CGM

ADA 2023 Standards of Care: https://diabetesjournals.org/care/issue/46/Supplement_1
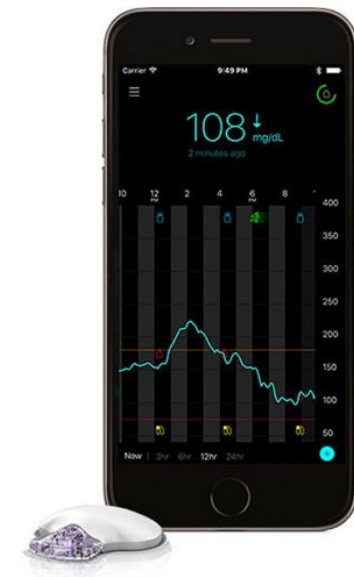
3 Common CGM systems

Dexcom G6 & G7

Abbott Freestyle Libre 2 & 3
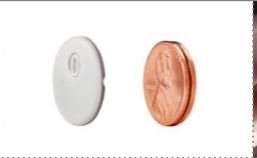
Medtronic Guardian 3 CGM System

CGM Feature Comparisons

	Freestyle Libre 2	Dexcom G6	Medtronic Guardian 3	Freestyle Libre 3	Eversense	Dexcom G7
Calibration (Finger Sticks Required)	No	No	Yes	No	Yes	No
Length of Wear	14 days	10 days	7 days	14 days	90 day sensor + charge transmitter qd	10.5 days
Alarms for High or Low BG	Yes	Yes	Yes	Yes	Yes	Yes
Receiver	Yes	Yes	No	No	No	Yes
Smart Phone Sharing	Yes	Yes	Yes	Yes	Yes	Yes
Easy Insertion	Yes	Yes	Somewhat	Yes	No	Yes
FDA approved site	Arm	Abdomen	Arm & Abdomen	Arm	Arm	Arm
Medicare coverage	Yes	Yes	No	Yes	No	Yes

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Anatomy of the Ambulatory Glucose Profile (AGP)

GLUCOSE STATISTICS AND TARGETS

December 7, 2019 - December 20, 2019	14 Days
% Time CGM is Active	97%

Ranges And Targets For	Type 1 or Type 2 Diabetes
Glucose Ranges Target Range70-180mg/dL	**Targets** % of Readings (Time/Day) Greater than 70%(16h 48min)
Below 70 mg/dL	Less than 4% (57min)
Below 54 mg/dL	Less than 1% (14min)
Above 180 mg/dL	Less than 25% (6h 0min)
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	141 mg/dL
Glucose Management Indicator (GMI)	6.7 %
Glucose Variability	31.6%

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

TIME IN RANGES

Very High >250 mg/dL	1% (14min)
High 181-250 mg/dL	18% (4h 19min)
Target Range 70-180 mg/dL	78% (18h 43min)
Low 54-69 mg/dL	3% (43min)
Very Low <54 mg/dL	0% (0min)

AMBULATORY GLUCOSE PROFILE (AGP)

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

Blood Glucose log sheet...versus AGP...?

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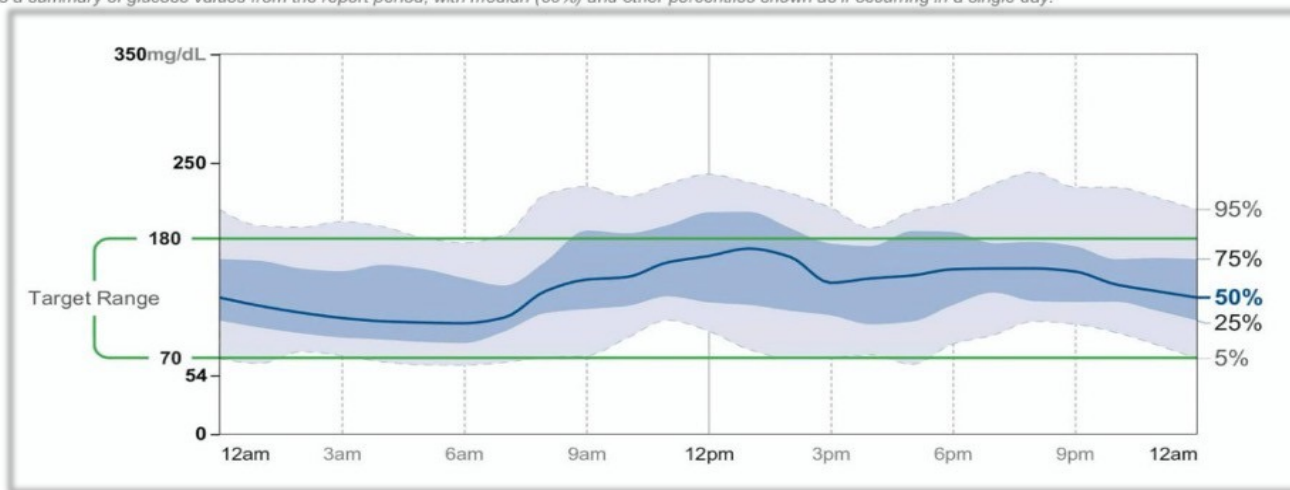Each 5% increase in time in range (70-180 mg/dL) is clinically beneficial.

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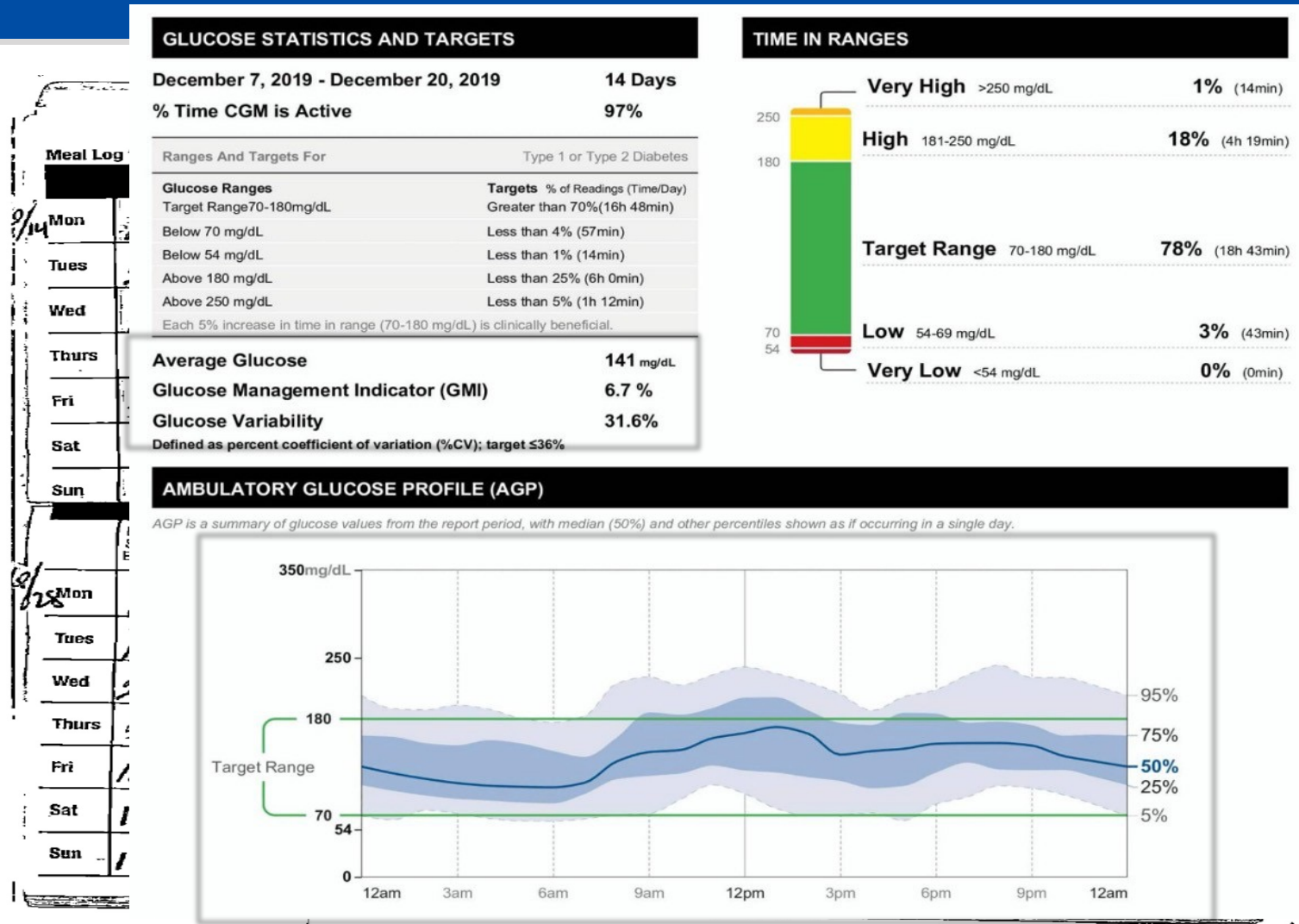|	
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Meal Log

9/14 Mon, Tues, Wed, Thurs, Fri, Sat, Sun

12/28 Mon, Tues, Wed, Thurs, Fri, Sat, Sun

Systematic Approach to BGM/CGM reports

Minimize

- Hypoglycemia
- Glucose variability
- Hyperglycemia

Priorities

- Reduce hypoglycemia (TBR)
- Increase Time in Range (TIR)

ADA Systematic Approach to Patients with Diabetes

Engage & Explore

Screen & Monitor

Use Technology

Customize

Support & Follow

ADA 2023 Standards of Care: https://diabetesjournals.org/care/issue/46/Supplement_1
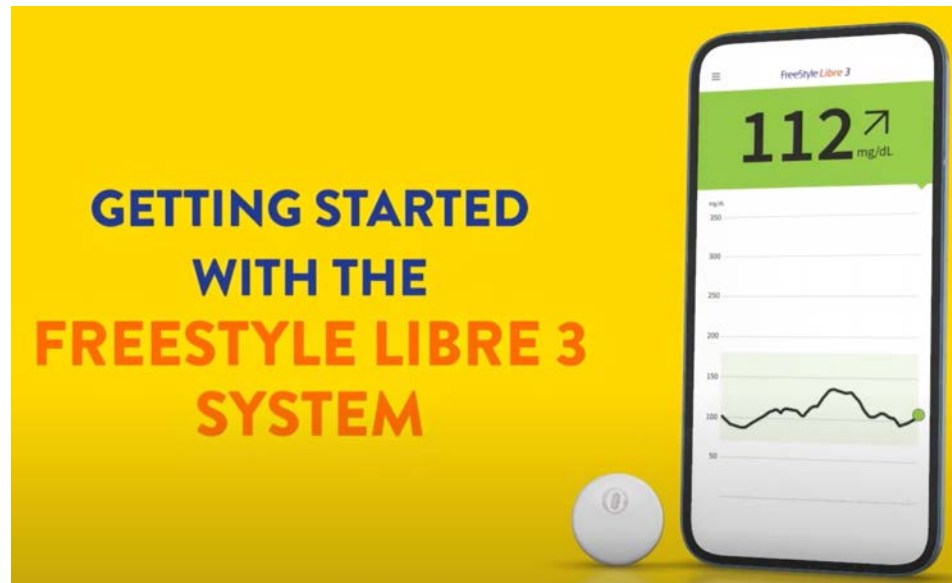
Dexcom G7 CGM Application

- How to apply the Dexcom G7 Sensor:
  https://www.youtube.com/watch?v=KLbBidcY4IA

- How to set up smartphone app & pair sensor:
  https://www.youtube.com/watch?v=eHKFDyrd-Ls

Libre 3 CGM Sensor Application & App Set Up

- How to apply the Libre 3 Sensor:
  https://www.youtube.com/watch?v=CRDitmOoIOc

- How to set up Libre 3 smartphone application & pair sensor:
  https://www.youtube.com/watch?v=wUL5r9sDnDs

Dexcom G6 CGM Application

- How to apply?
- English: https://www.youtube.com/watch?v=dBOgdsfeM-A
- Spanish: https://youtu.be/TNvXX41DND8

Libre 2 CGM Sensor Application

How to apply the Libre 2 Sensor:

https://www.youtube.com/watch?v=pHZIr1dprYw

Which patients might benefit from CGM use?

☑ Using multiple daily injection (MDI) insulin therapy

☑ Not meeting A1c and/or time in range (TIR) goals

☑ Frequent hypos and/or wide glucose variability

☑ Low to no motivation for BG meter use

Adolfsson P et al. European Endocrinology. 2018;14(1):24–29

BGM vs CGM Comparisons

BG Meter

- Measures serum blood glucose (SBG)
- Finger pricks = 2-10+/day
- Drop of blood
- Measures SBG in moment of time
- Must wake up for nighttime testing
- Time consuming
- Test kit required
    - Strips, lancets, meter
- Inconvenient & unpleasant to bring along & use in public

CGMs

- Measures interstitial fluid (ISF) glucose
- Most don't feel sensors

rt CGM

- Sensors continuously measure Every 5 min = 288/day
- Receiver collects/trends data
- Glucose trends monitored day or night
- Low & high glucose alerts*

isCGM*

- Self-scans = 2-10+/day
- Scanned sensor holds data for 8 hours & Reader records for 90 days
- Scans take 1 second & can be done anytime in public

*Low & high glucose alerts now available in isCGM

42 yo with T2DM on MDI therapy presents for follow-up

- Did not bring a BG log or meter → **No AGP**
- Reports the following perceived BG readings for "several months":
  - FBG: 110-120's range
  - PM pre-meal: 120-150's range

- DM Rx:
  - Insulin Glargine 30 units at HS
  - Insulin Lispro 8 units with meals

- Data: A1c: 9.2%

HbA1c & Estimated Average BG
5% – 90 mg/dL
6% - 120 mg/dL
7% - 150 mg/dL
8% - 180 mg/dL
9% - 210 mg/dL
10% - 240 mg/dL
11% - 270 mg/dL
12% - 300 mg/dL
13% - 330 mg/dL
14% - 360 mg/dL

- What's the best next step for patient's diabetes management?

What's the best next step for patient's diabetes management?

- DM Rx:
  - Insulin Glargine 30 units at HS
  - Insulin Lispro 8 units with meals

A. Increase insulin glargine by 20%
B. Increase insulin lispro with meals by 20%
C. Recommend the patient wear a professional CGM for 1 week
D. Continue the same diabetes regimen as patient is likely non-adherent

Professional CGM – Use for a Purpose

- Identifying and correcting glucose patterns
- Use when:
  - When either rtCGM or isCGM is not available
  - Patient prefers shorter experience
  - Evaluate periods of hypoglycemia to make medication dose adjustments

"Use of professional…CGM should always be coupled with analysis and interpretation for the patient, along with education…to adjust medication and change lifestyle behaviors."

ADA 2023 Standards of Care: https://diabetesjournals.org/care/issue/46/Supplement_1

Assist Patients to be Successful with CGM use

- Advise to scan or check CGM frequently
  - But not intensely!

- Set alerts/alarms to be useful & not overwhelming

- May need to occasionally check BG to confirm hypoglycemia, calibrations or CGM sensor/transmitter function

Tips for Effective Review of the AGP[1] – Part 1

- ## Make sure there are adequate data for decision-making[2]
  - ➢ 14 days of CGM data correlate well with 3 months of CGM data
  - ➢ At least 70% or ~10 days of CGM wear adds confidence data are reliable indicators

- ## Mark directly on the profile sheet:
  - ➢ Insulin type(s), dose times with doses marked directly under the curve
  - ➢ Usual times for waking (W), breakfast (B), lunch (L), dinner (D), and bedtime (BT).
  - ➢ Activity/exercise or snacking times (if routine) marked below the curve

- ## Ask patient to describe & explain what they see & why.

- ## Look for patterns of low glucose readings.

[1]Bergenstal RM. ADA Clinical Compendia 1 August 2018; 2018 (1): 20–23.
[2]Riddlesworth TD et al. Diabetes Technol Ther 2018;20:314–316

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Tips for Effective Review of the AGP[1] – Part 1

Pre-meal bolus insulin
3u   6u   ← 8u →

Basal insulin
22u

[1]Bergenstal RM. ADA Clinical Compendia 1 August 2018; 2018 (1): 20–23.
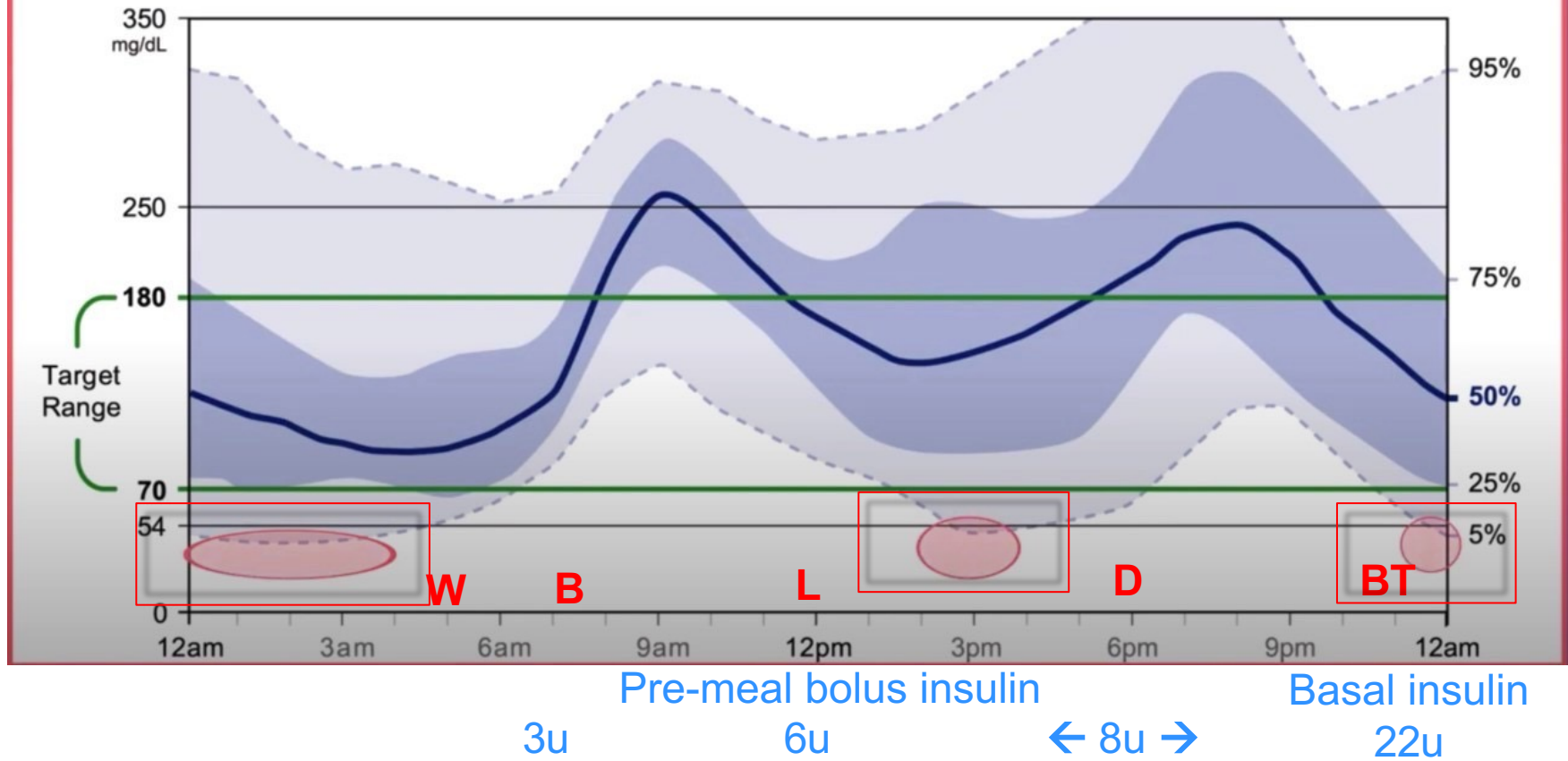
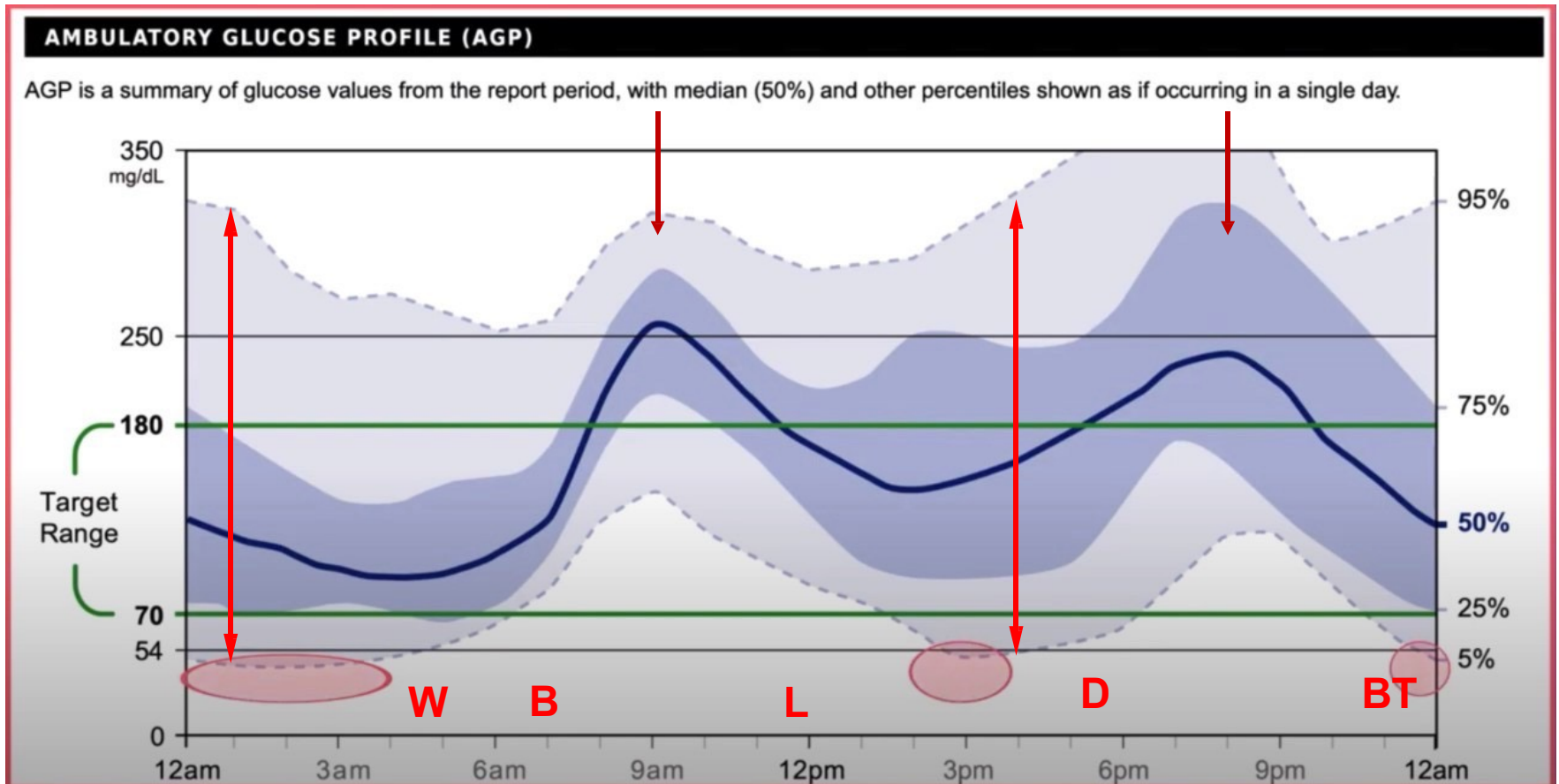[2]Riddlesworth TD et al. Diabetes Technol Ther 2018;20:314–316

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Basal insulin
22u

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CGM Tracing: Patient with T2DM on MDI

Sensor Data (mg/dL)

Legend: 1/4/08, 1/5/08, 1/6/08, 1/7/08, 1/8/08, 1/9/08, 1/10/08, Avg.

Glucose Variability →→→

Glucose Variability →→→→→

Notable Hypoglycemia

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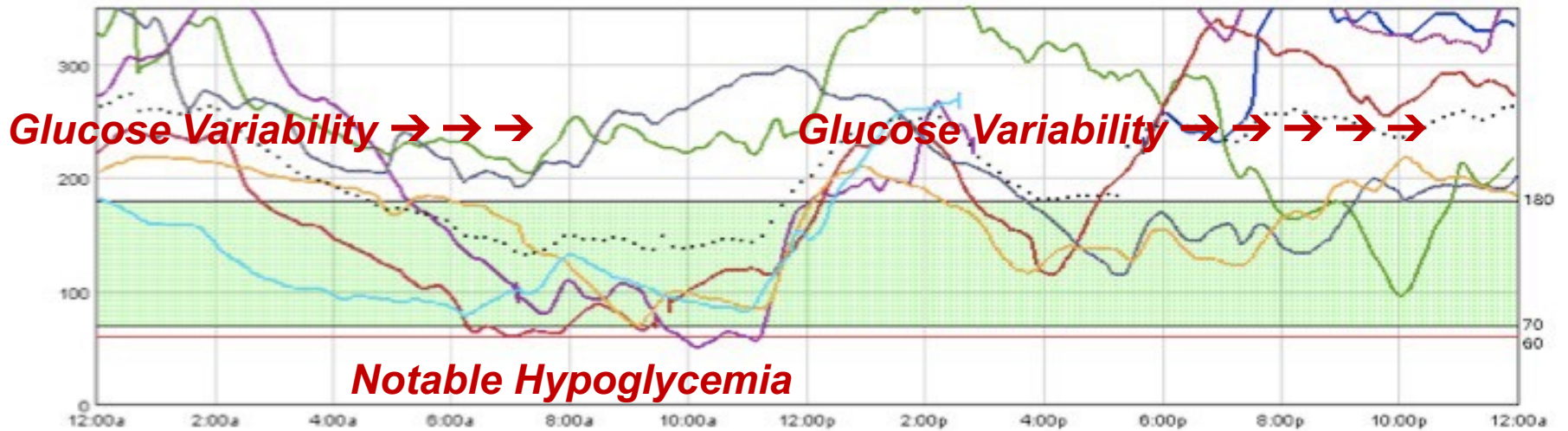
Follow-up: Patient with T2D after MDI Adjustments

Sensor Data (mg/dL)

Daily Snapshot AGPs

DAILY GLUCOSE PROFILES

Each daily profile represents a midnight-to-midnight period.
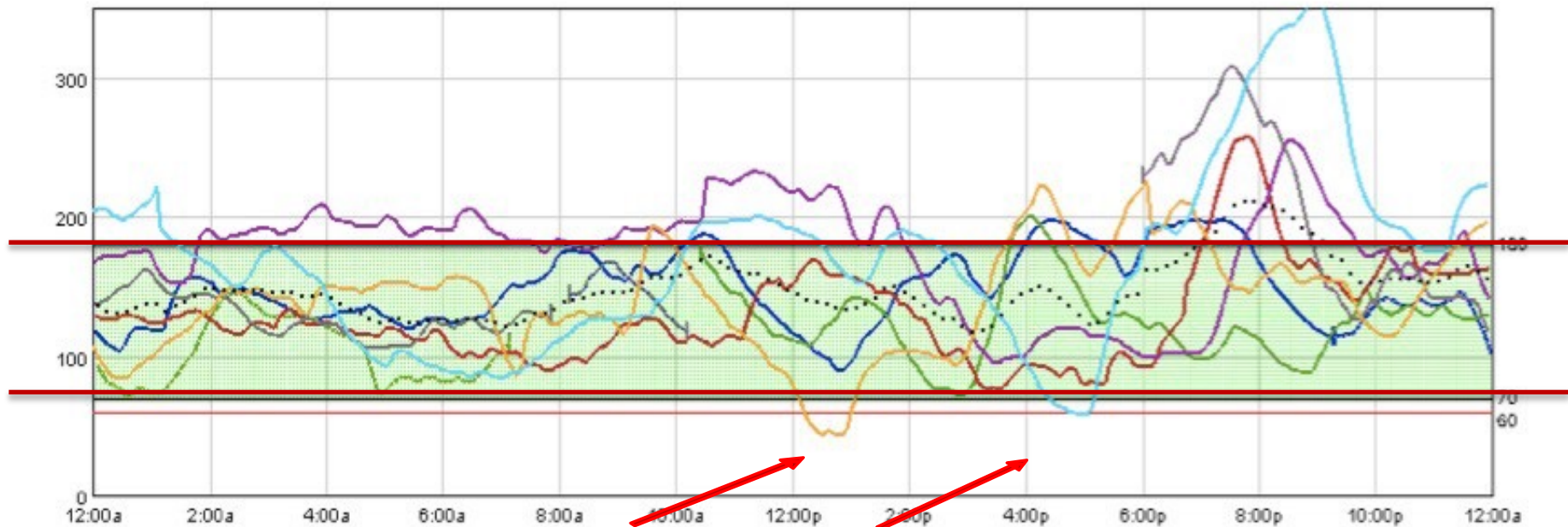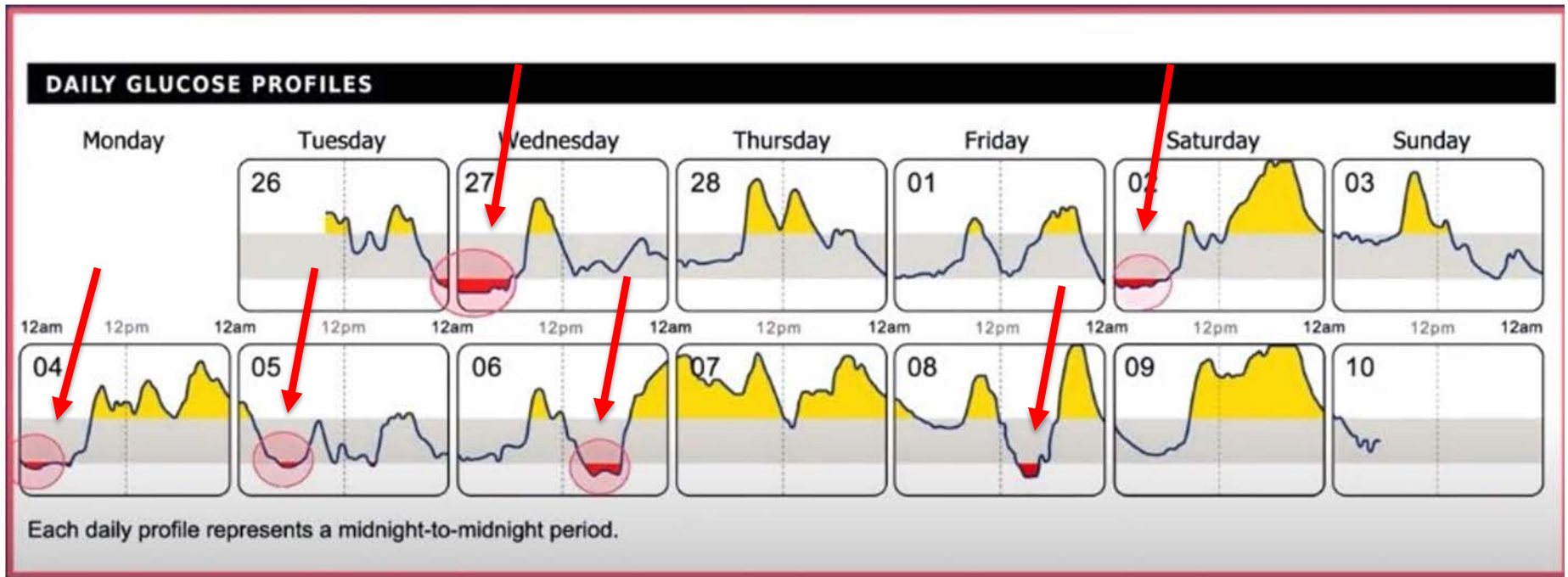
54 yo with new T2DM & initial A1c of 11.8% Rx'd on metformin & low-dose basal insulin presents for f/u
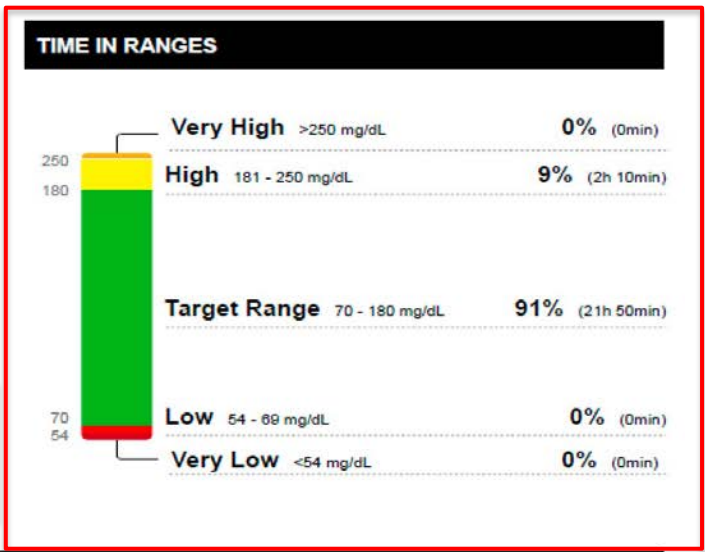
GLUCOSE STATISTICS AND TARGETS

July 16, 2022 - July 29, 2022	14 Days
% Time CGM is Active	92%

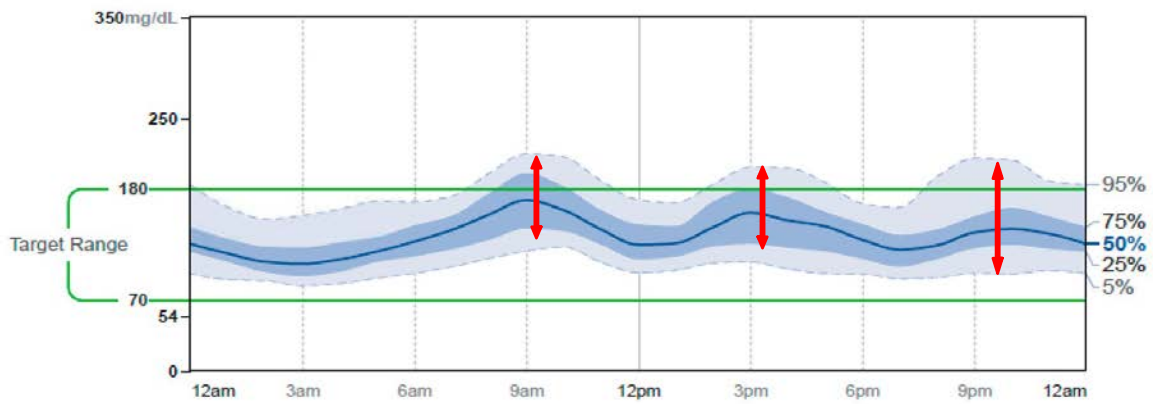| Ranges And Targets For	Type 1 or Type 2 Diabetes
Glucose Ranges	**Targets % of Readings (Time/Day)**
Target Range 70-180 mg/dL	Greater than 70% (16h 48min)
Below 70 mg/dL	Less than 4% (58min)
Below 54 mg/dL	Less than 1% (14min)
Above 180 mg/dL	Less than 25% (6h)
Above 250 mg/dL	Less than 5% (1h 12min)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

Average Glucose	135 mg/dL
Glucose Management Indicator (GMI)	6.5%
Glucose Variability	22.5%
Defined as percent coefficient of variation (%CV); target ≤36%	

TIME IN RANGES

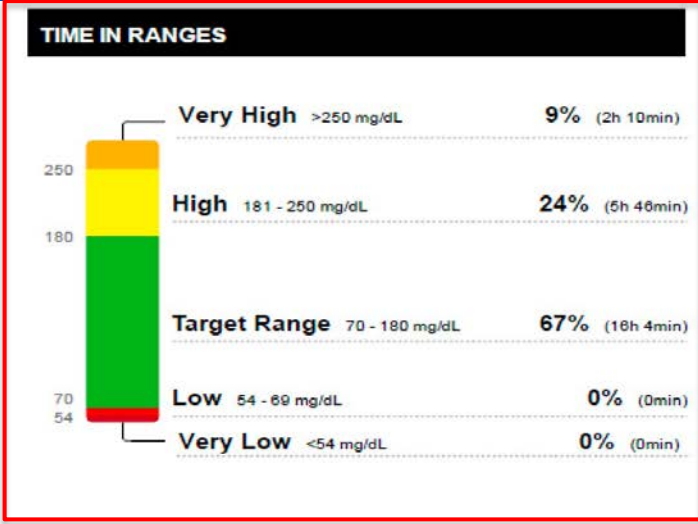| **Very High** >250 mg/dL	0% (0min)
High 181 - 250 mg/dL	9% (2h 10min)
Target Range 70 - 180 mg/dL	91% (21h 50min)
Low 54 - 69 mg/dL	0% (0min)
Very Low <54 mg/dL	0% (0min)

AMBULATORY GLUCOSE PROFILE (AGP)

AGP is a summary of glucose values from the report period, with median (50%) and other percentiles shown as if occurring in a single day.
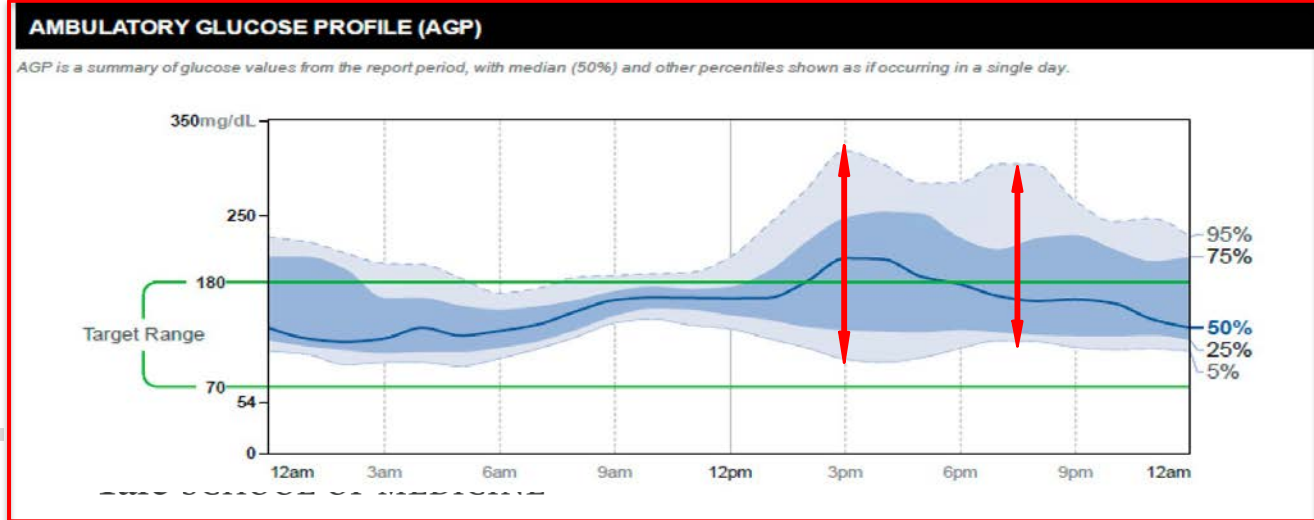
No CGM Data Download Report? No problem!
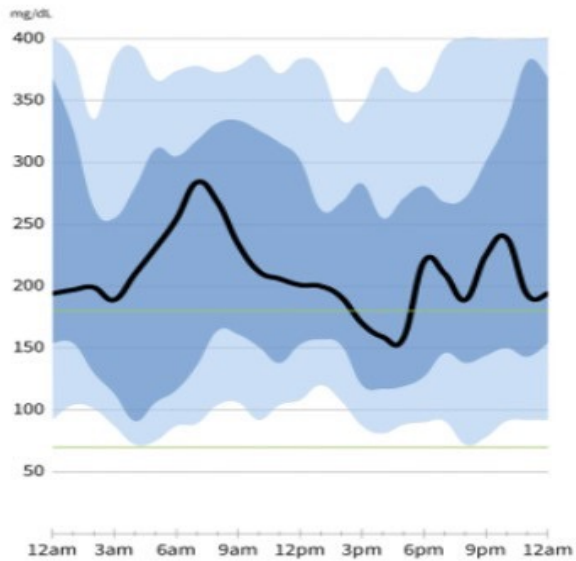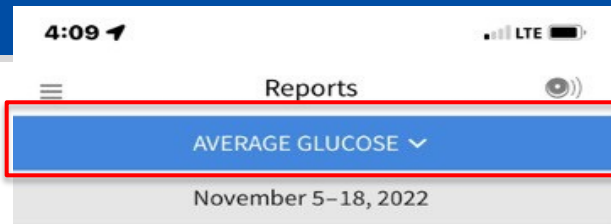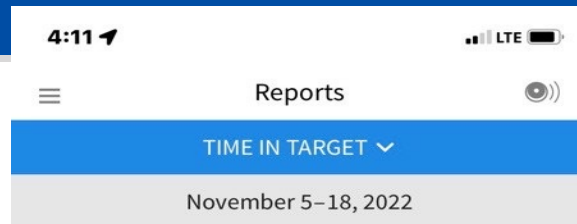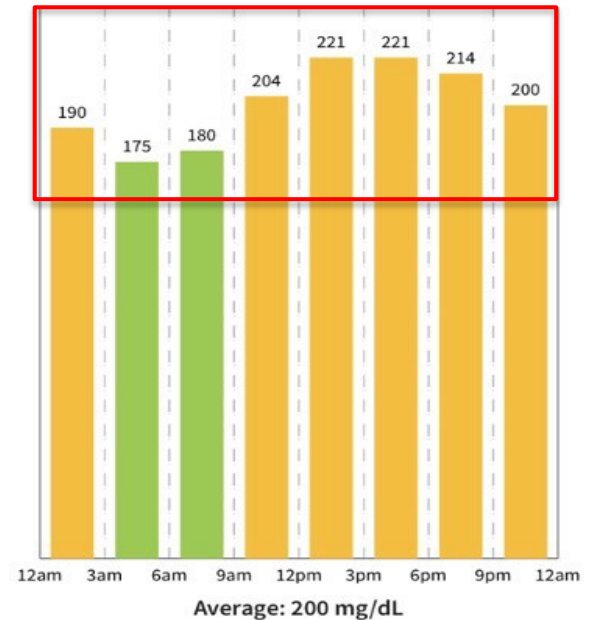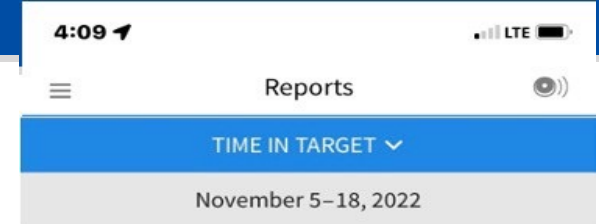
CGM Use Prevalence & Access Challenges[1,2]

- CGM use is estimated 15% of people with T1DM in the US

- Access has progressed with new Medicare coverage rules

- Access challenges remain:
  - Access/Rising Costs
  - Patient education
  - Therapeutic inertia
  - Variation in provider practices

[1]Cefalu WT, Kaul S, Gerstein HC, et al. Cardiovascular Outcomes Trials in Type 2 Diabetes: Where Do We Go From Here? Reflections From a *Diabetes Care* Editors' Expert Forum. *Diabetes Care*. 2018;41(1):14-31.
[2]Gerard SO, Ritchie J. Challenges of Inpatient Glycemic Control. *J Nurs Care Qual*. 2017;32(3):267-271.

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Blood Glucose Meter Use | Serum vs ISF glucose

- An estimated **70%** of patients using diabetes medications purchased SMBG strips[1]

- BG meters measure serum glucose (SG) & CGMs measure interstitial fluid (ISF) glucose

- SG readings are more accurate & are ~5-10 min ahead of ISF readings

- When SG levels decrease, ISF readings **may be higher** than SG readings (& vice versa)

[1]Kjome RL, Granas AG, Nerhus K, Roraas TH, Sandberg S. The prevalence of self-monitoring of blood glucose and costs of glucometer strips in a nationwide cohort. *Diabetes Technol Ther*. 2010;12(9):701-705.

Approach to Patients with BG meters

- Invite patients to review their BG data with you

- Consider the "3-minute drill"
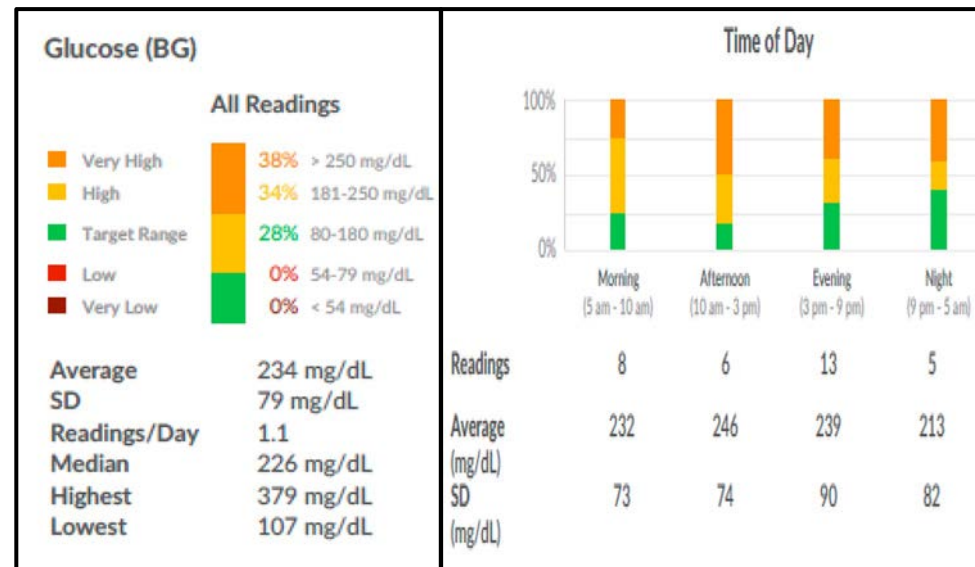
- BG meter data logs usually appear on meter after power up
  - ➢ 7 – 14 – 30 – 90-day averages
  - ➢ Percent TBR, TIR, & TAR
  - ➢ Pre-meal average histograms
  - ➢ Most meters don't usually show 14-day composite AGP….YET!

Blood Glucose Meter | App Integration

- Some BG meters have enhanced storing & tracking abilities

- Consider using meters that integrate with smartphone apps or sync with meter websites

- Allows for increased:
  - Patient involvement
  - Ease of data sharing
  - Ease of data access

- Meter & Paired App Examples:
  - One Touch Reflect (OT Reveal)
  - Contour Next Gen (Contour Diabetes)
  - Accu-Check Guide (mySugr)

90 Day Overview

In Range 72%

14   297   104

3% Low   25% High

150 mg/dL AVERAGE   415 READINGS   4.6 READINGS/DAY

You have 3 patterns

Recent Events

Today

10:20 PM   104 mg/dL

7:08 PM   138 mg/dL
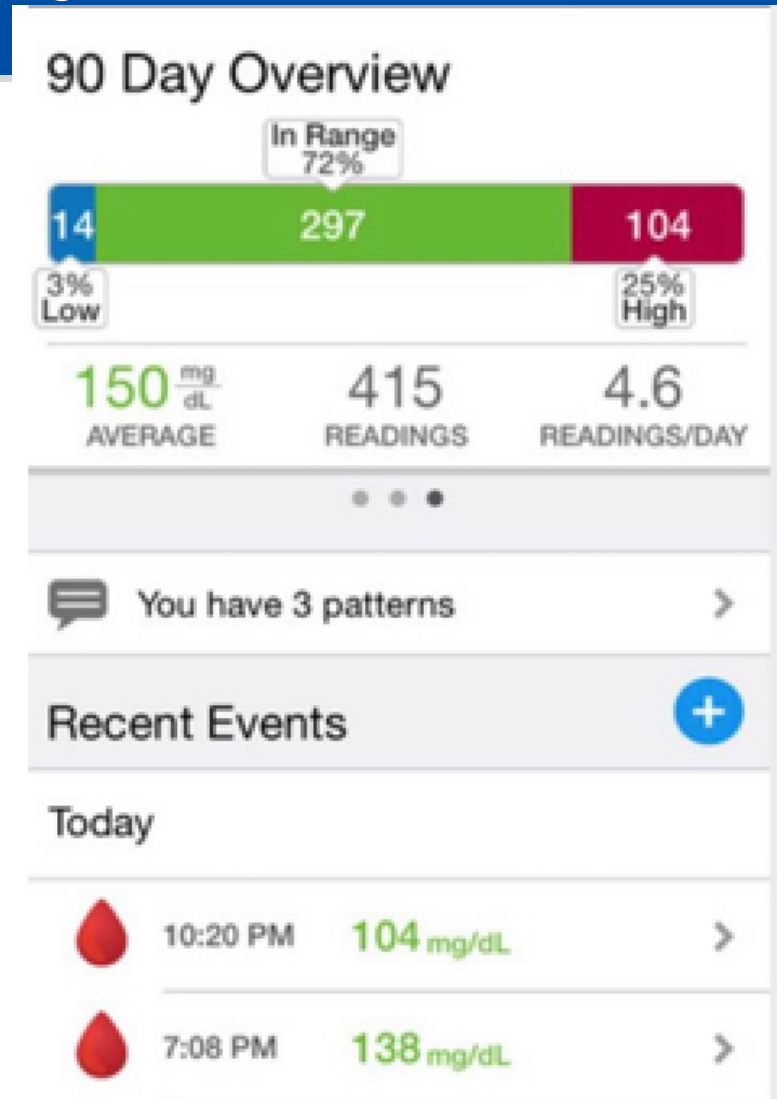
Oct 29, 2022 - Nov 11, 2022 (14 days)
Today: November 11, 2022

38yo with T2DM on basal/bolus MDIs using BGM 4-6x/day

Glucose (BG)

	All Readings	Before Meal	After Meal
Very High	40% > 250 mg/dL	0% > 250 mg/dL	0% > 250 mg/dL
High	27% 181-250 mg/dL	0% 131-250 mg/dL	0% 181-250 mg/dL
Target Range	24% 80-180 mg/dL	0% 80-130 mg/dL	0% 80-180 mg/dL
Low	7% 54-79 mg/dL	0% 54-79 mg/dL	0% 54-79 mg/dL
Very Low	2% < 54 mg/dL	0% < 54 mg/dL	0% < 54 mg/dL

	All Readings	Before Meal	After Meal
Average	228 mg/dL	- mg/dL	- mg/dL
SD	104 mg/dL	- mg/dL	- mg/dL
Readings/Day	4.1	-	-
Median	219 mg/dL	- mg/dL	- mg/dL
Highest	451 mg/dL	- mg/dL	- mg/dL
Lowest	48 mg/dL	- mg/dL	- mg/dL

Time of Day

	Morning (5 am - 10 am)	Afternoon (10 am - 3 pm)	Evening (3 pm - 9 pm)	Night (9 pm - 5 am)
Readings	12	17	22	6
Average (mg/dL)	237	211	211	320
SD (mg/dL)	113	89	107	82
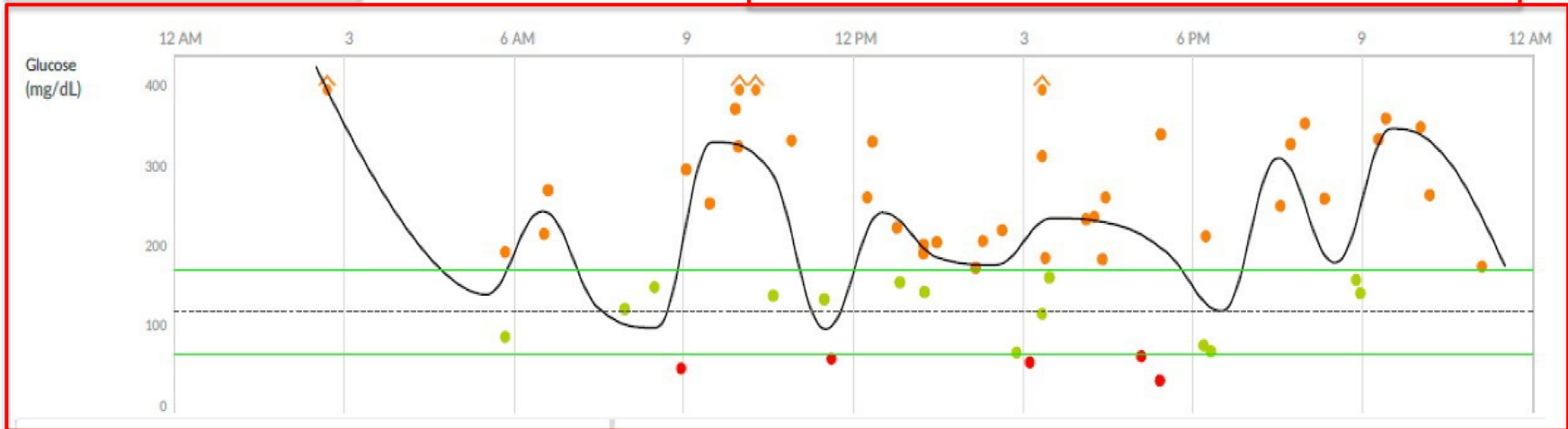
Assessment: Inconsistent delivery of pre-meal bolus insulin

GLUCOSE (BG)

228 mg/dL Average	104 mg/dL Standard Deviation	4.1 Readings/Day	2% Very Low <54 mg/dL	7% Low 54-79 mg/dL	24% Target Range 80-180 mg/dL	27% High 181-250 mg/dL	40% Very High >250 mg/dL

62 yo with Type 2 on MDI basal/bolus therapy

- Takes: Metformin 1g BID, Lantus 20 units QD, Humalog 6/4/12 units TID at B/L/D: Hands you a blood glucose logbook:

AGP:
TBR: <70
TIR: 70-180
TAR: >180

39 Readings
TBR: 0%
TIR: 48.7%
TAR: 51.3%

Est A1c?
~9%

Pre-meal Avg:
AM: 180
Early PM: 163
Late PM: 187

BG Meters: Common Pitfalls & Quick Fixes

- BG meter is not set for correct date & time
  - ➢ Hand to "Crackerjack" MA to set correctly

- Patient doesn't know how to access reports on smartphone
  - ➢ Ask for permission to give it a go yourself
  - ➢ Use as a "teaching moment" to encourage self-management

- Patient forgets BG meter or CGM receiver in car or at home
  - ➢ *"Always bring your BG meter or CGM receiver to clinic visits!"*

- Provider LACK OF CONFIDENCE (LOC) in meter operations
  - ➢ Overcome LOC by getting comfortable with "basic button pushing"
  - ➢ Integrate the "3-minute Drill"

The "3-minute drill"

Clinic Processes to Address Diabetes Standards of Care

How do you do all this in 20–25-minute visits?

1. Facility support is required to implement highest standards of care for patients with diabetes

2. Utilize a systematic approach to patient encounters

3. Smart phrases!

How to Implement in Your Practice?

Recommend utilizing a diabetes care team & reviewing roles

Become familiar & comfortable with most common devices used

Ensure patients know usernames & passwords for online accounts

Each patient started on technology should be added to clinic's portal account for data access & shareability

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Clinic Support – Yale Diabetes Center Team

Administrative Staff
Medical Assistants
Nurses
Dieticians
Clinicians

Clinic Support – Cray Diabetes Self-Management Center
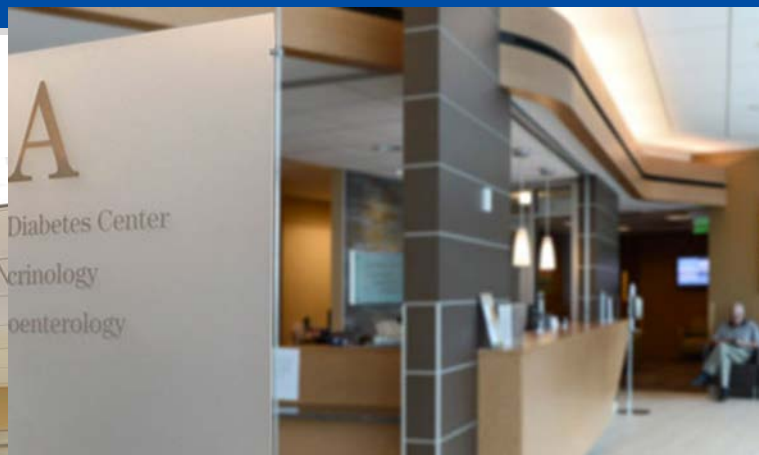
Clinic Support – "Crackerjack" Medical Assistants

MA manages BGM/CGM downloads & creates reports
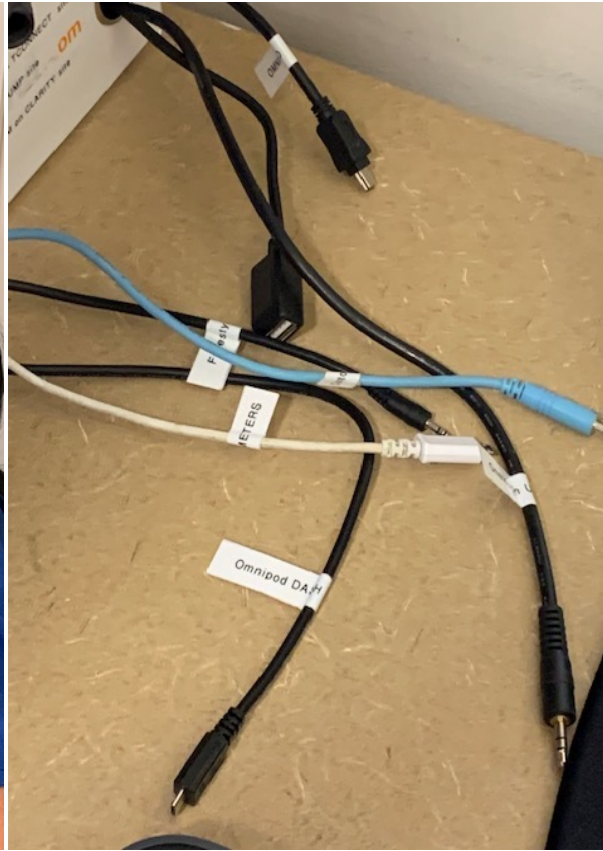
MA has device connections & BG/CGM platform apps

MA obtains POC A1c

BG Meter & CGM Downloads – Links for Software Access

- LibreView website: (CGM)
  - Provider link: https://provider.freestyle.abbott/ca-en/home/libreview.html
  - Professional link: https://pro.libreview.io/support

- Dexcom CLARITY for Healthcare Professionals: (CGM)
  - Provider link: https://clarity.dexcom.com/professional/

- Medtronic CareLink Quick Reference Guide: (CGM)
  - Provider link: https://CareLink.Medtronic.com

- Glooko Remote Patient Management Software (BG meters)
  - Provider link: https://glooko.com/providers/
  - BG meter compatibility link: https://glooko.com/compatibility/

- TIDEPOOL – (BG Meters & CGMs)
  - Provider link: https://provider.tidepool.org/
  - BG & CGM compatibility link: https://www.tidepool.org/devices

Strategy 1 - Integrating CGM into Clinic Operations

BG meter or CGM data receiver given to MA

MA downloads BGM/CGM data report during VS check

MA gives data report to provider for visit

VS assessment + BG data download = 5-7 minutes of total clinic visit

Strategy 2: Clinic Accounts & Integration into Visits

Benefits of Using Professional CGM Accounts

- Access BG data reports from anywhere with an internet connection
- Access consistent, easy-to-read reports
- Optimize treatment plans by remote monitoring & collaboration with care team

Steps to Create Professional CGM Accounts:

- Clinic Manager creates Professional Accounts
- Sends invitations to clinicians & support staff for access
- Patients must register to "share data" on clinic account
- Patients BG data is uploaded manually or automatically

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Clinic Views of Professional Accounts

Search Patients

Glucose Reports

First Name	Last Name	Date of Birth	Last Available Data	Average Glucose…	Average Scans/Vie…	% In Target
			12/30/2022	149	3	77
			4/10/2023	106	6	95
			2/17/2023	227	3	38
			1/17/2023	152	1	76
			Today	139	8	91
			2/18/2022	163	16	72
			2/23/2023	182	8	50
			5/24/2022	134	10	80
			3/15/2022	250	4	21
			2/2/2023	166	2	69
			2/16/2023	137	13	97
			7/30/2022	147	2	79
			Today	171	9	46
			3/30/2023	168	3	50
			Today	151	9	79

GLUCOSE STATISTICS AND TARGETS

February 4, 2023 - February 17, 2023 — 14 Days
Time CGM Active: 61%

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 45.9%
Defined as percent coefficient of variation (%CV)

TIME IN RANGES

Very High >250 mg/dL — 36% (8h 38min)
High 181 - 250 mg/dL — 24% (5h 46min)
Target Range 70 - 180 mg/dL — 38% (9h 7min)
Low 54 - 69 mg/dL — 2% (29min)
Very Low <54 mg/dL — 0% (0min)

AMBULATORY GLUCOSE PROFILE (AGP)

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

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Clinic Views of Professional Accounts

Search by Patient Name or ID

Add new patient

Export all data

PATIENT NAME	DOB	PATIENT ID	LAST UPLOADED	DATA SHARING
			Apr 17, 2023	✖ Off
				✖ Off
			Jul 28, 2022	✔ On
			Apr 29, 2023	✔ On
			Apr 29, 2023	✔ On
			Mar 25, 2022	✔ On
			Apr 29, 2023	✔ On
			Feb 21, 2022	✔ On
			Oct 18, 2021	✖ Off
			Apr 29, 2023	✔ On

Time in Ranges Goals for Type 1 and Type 2 Diabetes

Each 5% increase in the Target Range is clinically beneficial.
Each 1% time in range = about 15 minutes per day

16% Very High
Goal: <5%
29% High

45%
Goal: <25%

55% In Range
Goal: >70%

0% Low
0% Very Low
Goal: <1%

0%
Goal: <4%
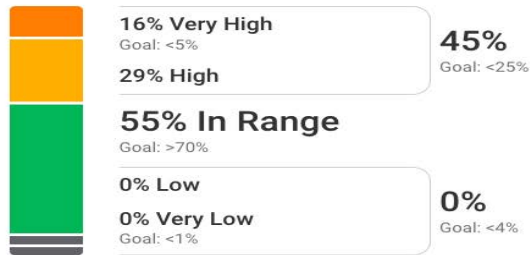
Target Range: 70-180 mg/dL
Very High: Above 250 mg/dL
Very Low: Below 54 mg/dL

Glucose Metrics

Average Glucose		
Goal: <154 mg/dL		182 mg/dL
GMI		
Goal: <7%		7.7%
Coefficient of Variation		
Goal: <36%		37.4%
Time CGM Active		95.5%

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.

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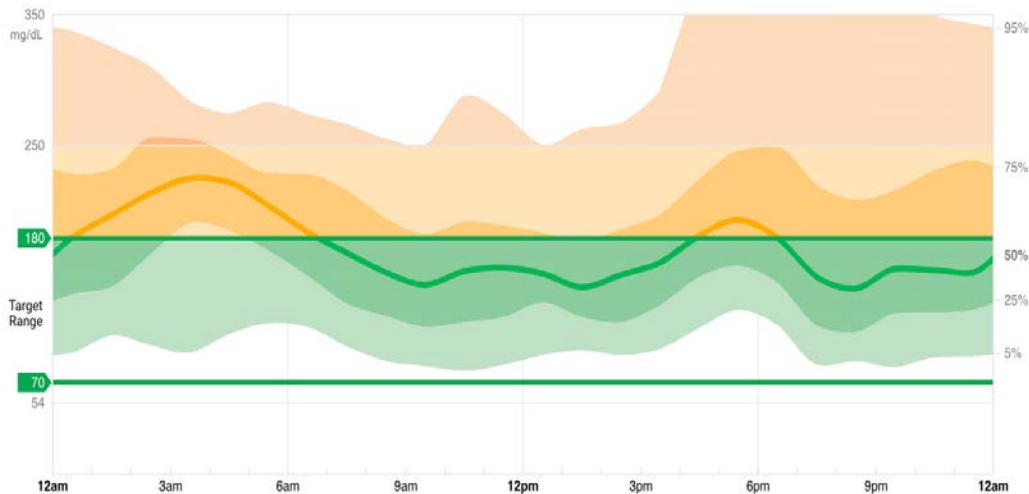
Deeper Dives into AGP Reports
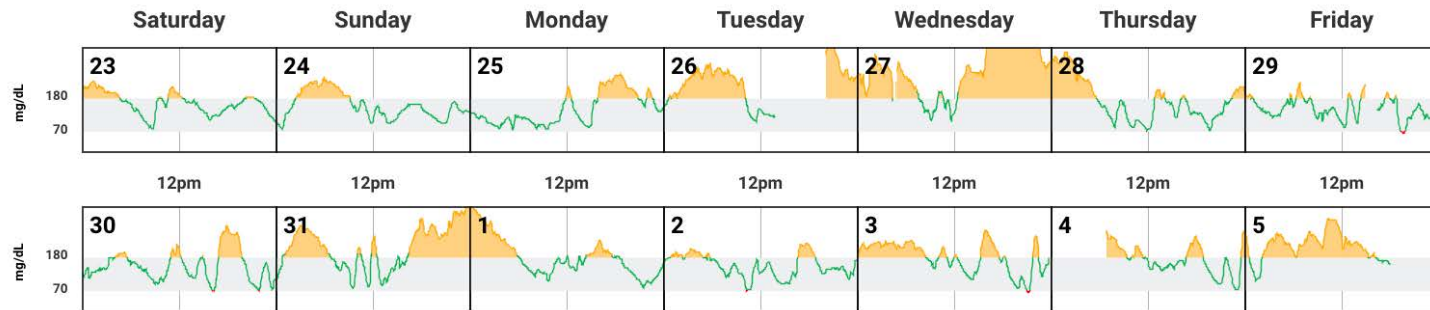
Challenges to Diabetes Technology Implementation

Increased clinical staff time for downloading data

Education required to learn analysis & interpretation skills for CGMs & insulin pumps

Different software interfaces for each company

Disparities in CGM Use in Historically Marginalized Populations

Potential factors driving disparities

> Lack of access to quality care

> Physician shortages

> Restrictive insurance eligibility criteria

> Implicit bias among health care professionals

Potential solutions

> Lead advocacy efforts to expand CGM coverage

> Expand care team, increase visit time & use telehealth services

> Reject assumptions based on literacy, language, SES, race.

> Individualize care & coordinate f/u after device initiation

Isaacs D, Bellini NJ, Biba U, Cai A, Close KL. Health Care Disparities in Use of Continuous Glucose Monitoring. *Diabetes Technol Ther.* 2021;23(S3):S81-S87. doi:10.1089/dia.2021.0268

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Good News on Medicare Coverage…

New Medicare Coverage Make CGMs More Accessible

- July 18, 2021: Medicare permanently eliminated requirement of 4x/day fingerstick in order to qualify for CGM coverage

- If looking for a CGM for Medicare patients, there is now a simplified, <u>fingerstick-free approval process</u> for coverage

- Out-of-pocket costs for CGM will depend on a few factors, like what Medicare benefit plans look like & where device is secured

- Check for Diabetes DME distributors in your area or call (1-800-MEDICARE) to determine cost

EVEN BETTER & NEW News on CMS Coverage for Basal Insulin[1]

- Medicare expands CGM coverage to more with T2DM
  - Based on evidence of benefit found in the MOBILE study

- Coverage is expanded to those:
  - who take even a <u>single dose of basal insulin daily</u>
  - who experience "problematic" hypoglycemia EVEN IF they don't take insulin

- Hypoglycemia is defined as:
  - History of > one level 2 event (glucose < 54 mg/dL)
  - OR
  - AT LEAST one level 3 event (< 54 mg/dL requiring assistance)

[1]Glucose Monitor – CMS Policy Article: https://www.cms.gov/medicare-coverage-database/view/article.aspx?articleid=52464&ver=49&contractorName=all&sortBy=updated&bc=13
[2] Martens T et al. Effect of Continuous Glucose Monitoring on Glycemic Control in Patients With Type 2 Diabetes Treated With Basal Insulin: A Randomized Clinical Trial. JAMA. 2021;325(22):2262–2272. doi:10.1001/jama.2021.7444

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CGM Free Trial Programs & Benefits Checks

- Freestyle Libre:
  https://www.freestyle.abbott/myfreestyle/program

- Dexcom G6:
  https://www.dexcom.com/get-started-cgm/119

  - Wait a few seconds…for a pop-up!
    - Interested in a free Dexcom G6 sample?
    - Our 10-day trial empowers you to make more informed decisions and delivers a new level of diabetes management.

- Medtronic Guardian 3:
  https://www.medtronicdiabetes.com/guardian-connect-trial

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Didactic & Workshop Plan – (240 min)

- #1 – Setting the Stage & Scope of Problem
- #2 – Hx & Spectrum of BG Devices & CGM Emergence
- #3 – Apply CGMs
  - Dexcom G7 CGM demo review & application
  - Libre3 CGM demo review & application
- #4 – CGM Integration into Primary Care
- #5 – BG Meter Review, Utilization & "3-minute Drill"
  - Patients check their own & their partners BG
  - Review meter data – "3 Minute Drill"
- #6 – Downloading & Reviewing BGM & CGM
  - Processes & challenges of implementation
  - CGM data platforms & AGP report orientation
- #7 – Case Intro & Work on Cases 1-11
- #8 – Case Review & Discuss
- #9 – Next Steps, Tips & Summary
- #10 – Q&As, CGM sensor return plan & Clean-up

Workshop Cases

- Work with your partner on cases

- Apply systematic approaches to BGM & CGM reports
  - Adequate data?
    - 14 days of data or at least 70% or ~10 days of CGM wear
  - Mark directly on the profile sheet:
    - Insulin type(s) & dose times under the curve
    - Usual times for waketime (W), breakfast (B), lunch (L), dinner (D) & bedtime (BT).
  - Look for patterns of low & high glucose readings.

- You'll have 40 minutes before case review

Case 1

62 yo with a PMH of T2DM, CAD s/p CABG, s/p Heart transplant, HTN, HLD, Stage 3a CKD (eGFR 53)

DM Rx:

- Insulin degludec 35 U at HS (basal insulin)
- Insulin lispro 0u/5u/12u for B/L/D pre-meals (bolus insulin)
- Empagliflozin 10mg daily (SGLT2i)

Glucose Monitoring:

- Uses DexCom G6 CGM

VS / Data:

- 120/68
- Chol 150 | LDL 70 | TG 110 – HDL 54 | eGFR 53 (all > 1 year ago)

Glucose

Average Glucose

159 mg/dL

Standard Deviation
45 mg/dL

GMI
N/A

Time in Range
- 2% Very High
- 31% High
- **66% In Range**
- <1% Low
- 0% Very Low
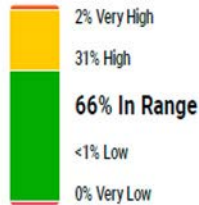
Target Range:
70-180 mg/dL

Sensor Usage

Days with CGM data
79%

11/14

Avg. calibrations per day
0.0

Top Patterns

(1) Steven's best glucose day was September 24, 2020
Steven's glucose data was in the target range about 89% of the day.

This graph shows your data averaged over 14 days

ABOVE HIGH THRESHOLD
75TH PERCENTILE
AVERAGE
15TH PERCENTILE
BELOW LOW THRESHOLD
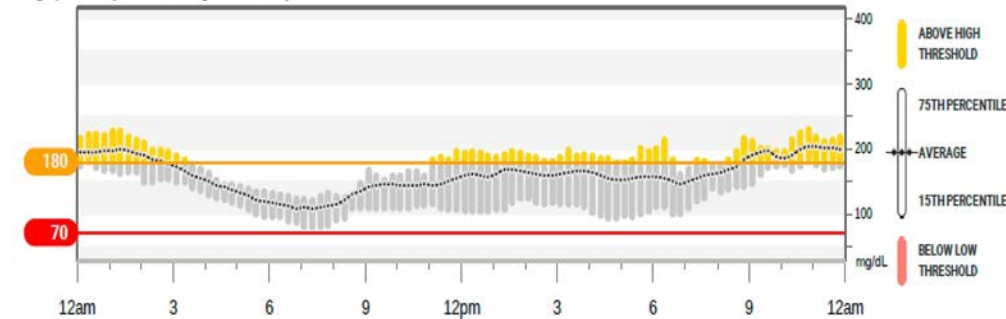
Glucose Data Report:

Date of Interpretation:	10/6/2021
Data period:	9/23/21-10/6/2021
Readings:	~4000
Mean BG (mg/dL):	159
Range BG mg/dL):	68-204
% Hyperglycemia (>180):	____%
% at Target (70-180):	____%
% Hypoglycemia (<70):	____%

Average BG (mg/dL) values by meals:

AC Breakfast (FBG):	____
AC Lunch:	____
AC Dinner:	____
HS:	____

Assessment:
1.
2.

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Lab Results		
Component	Value	Date
HGBA1C	6.7	10/07/2021
HGBA1C	6.4	06/18/2021
HGBA1C	8.7 (H)	03/16/2021

Assessment:
*T2DM – controlled vs. not controlled?
A1c –
AGP –
1.

2.

Plan:
- **T2DM:**

1.
2.
3.
4.
5.
- **CKD:**

1.
- **CVD:**

1.
RTC in 3 months

Case 2

62 yo with a PMH of T2DM, CAD, Obesity (BMI 33), Kidney stones & UTIs.

DM Rx:

- Glipizide XL 10mg daily before PM meal (SU)
- Metformin XR 2000mg daily (Biguanide)
- Pioglitazone 30mg daily (TZD)

DM Rx Intolerances/Contraindications:

- Empaglifozin - UTI's (SGLT2i)
- Previously tried semaglutide (GLP-1) x 1 week but stopped after mild GI upset

Glucose Monitoring:

- Using Libre isCGM

Data:

- Weight: 150 kgs | 330lbs | BMI 33kg/m2

Case 2 – isCGM Data period: 9-8-21 to 10-7-2021

Assessment:
1.
2.
3.

Case 2 – Assessment/Plan

Component	10/7/2021	3/26/2021	1/22/2021
HbA1C, POC 4.0 - 6.0 %	10.1	7.6	7.0

Assessment:

T2DM –

1.

2.

3.

4.

Plan:

- **T2DM:**

1.
2.
3.
4.
5.
6.

- **RTC in 3 months**

Case 2 – 3 Month Follow-up: 12-23-21 to 1-21-2021

Assessment:
1.
2.
3.

Case 2 – 3 Month Follow-up

HPI: Patient reports "improved BG numbers" & 5lb weight loss.

Component	1/21/2022	10/7/2021	3/26/2021
A1C, POC 4.0 - 6.0 %	7.7	10.1	7.6

Assessment:

T2DM –
1.
2.
3.
4.
5.

Plan:
- **T2DM:**
  1.
  2.
  3.
  4.
  5.
  6.
  7.
  RTC in 3 months

Case 3

60 yo with a PMH of T2DM, HTN, HLD, PE/DVT & Obesity.

DM Rx:

- Metformin XR 2000mg daily
- Insulin glargine 60 units in PM (basal)
- Insulin lispro 5 units with meals PLUS BG correction by sliding scale
  - Sliding Scale: 2 units/50mg/dL > 150

Glucose Monitoring:

- Using rtCGM

FHx:

- Father: MI/CAD (62)

Case 3 – rtCGM Data period: 12-17-20 to 1-15-2021
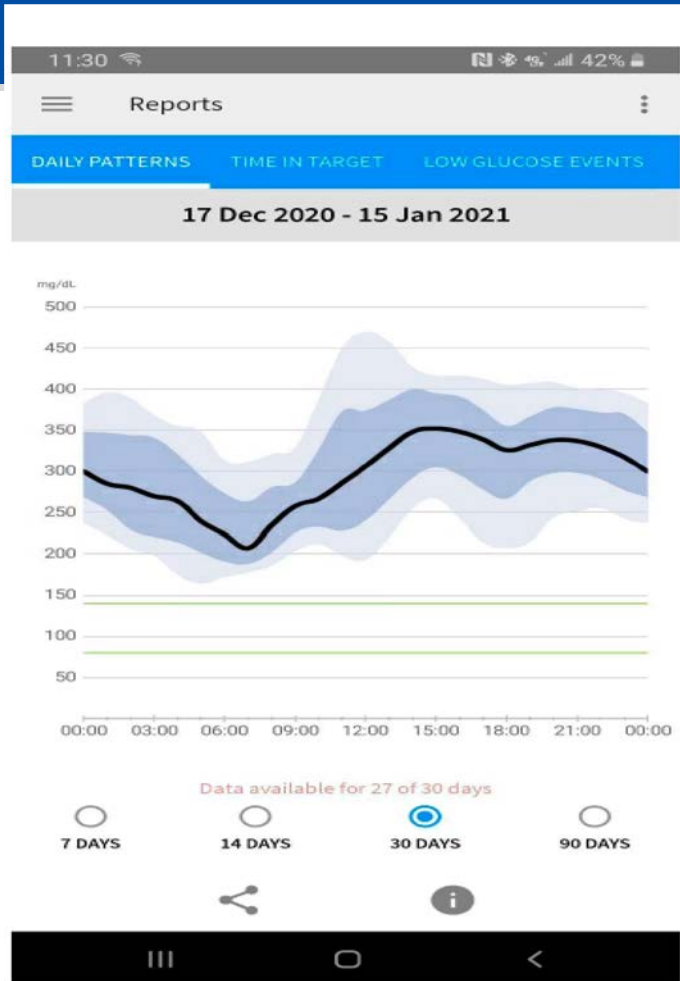
Assessment:
1.
2.
3.

Case 3 – Assessment/Plan

Component	1/14/2021	10/26/2020	9/02/2020
A1C, POC 4.0 - 6.0 %	11.1	10.5	9.9

Assessment:

T2DM –
1.
2.
3.
4.

Plan:
- **T2DM:**
   1.
   2.
   3.
   4.
   5.
   6.

- **RTC in 3 months**

BBC: Basal-Bolus-Correction insulin; MTF: Metformin

Case 3 – 8 Month Follow-up: 9-22-21 to 10-5-21

GLUCOSE STATISTICS AND TARGETS

September 22, 2021 - October 5, 2021 — **14 Days**

% Time CGM is Active — **57%**

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 — **157** mg/dL

Glucose Management Indicator (GMI) — **7.1%**

Glucose Variability — **33.2%**
Defined as percent coefficient of variation (%CV); target ≤36%

TIME IN RANGES

Very High >250 mg/dL — **5%** (1h 12min)

High 181 - 250 mg/dL — **23%** (5h 31min)

Target Range 70 - 180 mg/dL — **71%** (17h 3min)

Low 54 - 69 mg/dL — **1%** (14min)

Very Low <54 mg/dL — **0%** (0min)

Daily Average

12am	2am	4am	6am	8am	10am	12pm	2pm	4pm	6pm	8pm	10pm	12am
157	163	167	156	125	118	145	175	179	152	179	181	158

Assessment:

1.
2.
3.

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SLIDE 88
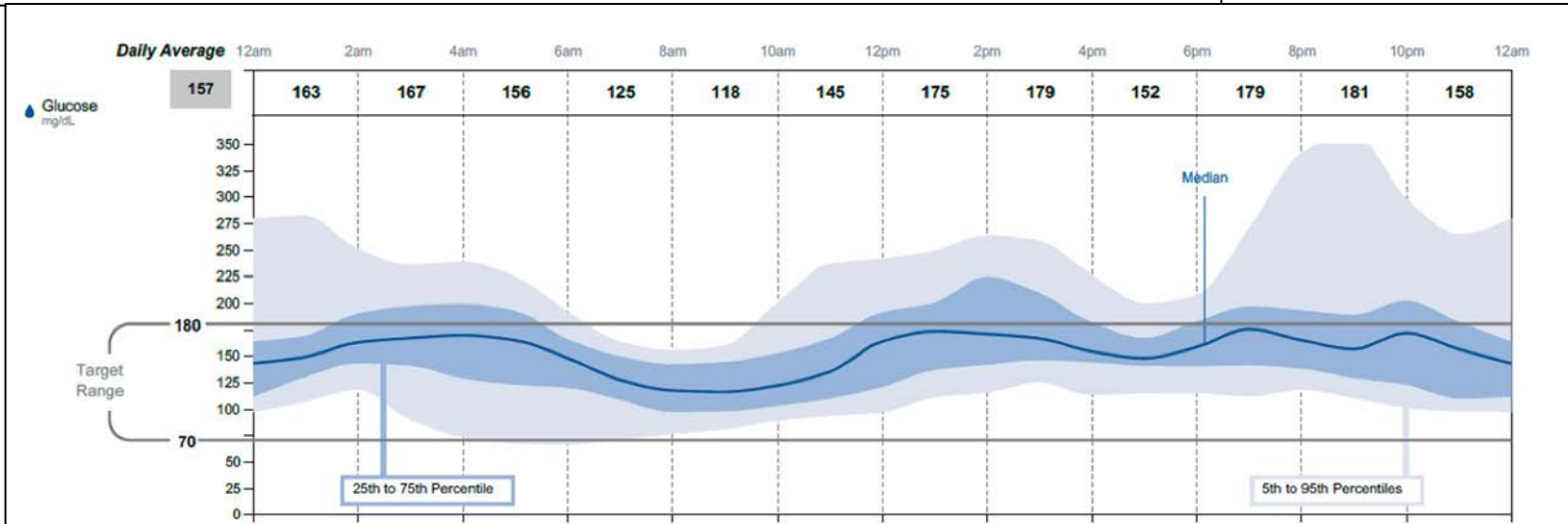
Case 3 – 8 Month Follow-up

Component	11/16/2021	1/14/2021
A1C, POC 4.0 - 6.0 %	7.8	11.1

Assessment:
T2DM –

1.
2.
3.
4.
5.

Plan:

- **T2DM:**

  1.
  2.
  3.
  4.
  5.
  6.

  RTC in 3 months

BBC: Basal-Bolus-Correction insulin; MTF: Metformin

Case 4 - 42 yo with T2DM on MDI therapy here for f/u

- Did not bring a BG log or meter
- Reports the following perceived BG readings for "several months":
  - FBG: 110-120's range
  - PM pre-meal: 120-150's range

- DM Rx:
  - Insulin Glargine 30 units at HS
  - Insulin Lispro 8 units with meals

- Data: POC A1c: 9.2%

Assessment:
1.
2.
Plan:
1.

HbA1c & Estimated Average BG
5% – 90 mg/dL
6% - 120 mg/dL
7% - 150 mg/dL
8% - 180 mg/dL
9% - 210 mg/dL
10% - 240 mg/dL
11% - 270 mg/dL
12% - 300 mg/dL
13% - 330 mg/dL
14% - 360 mg/dL

FBG: Fasting blood glucose; AGP: Ambulatory Glucose Profile

Case 4 - 42 yo with T2DM returns for Professional CGM review

Fri Sep 10, 2021 - Thu Sep 23, 2021   (13.6 days)

Avg Glucose mg/dL	Very Low <54 mg/dL	Low <70 mg/dL	In Target Range 70 - 180 mg/dL	High >180 mg/dL	Very High >250 mg/dL	Coefficient of Variation	SD mg/dL	% Time CGM Active
226	0.0%	0.0%	36.1%	63.9%	37.6%	35.4%	80	95.0%
Glucose Exposure		Glucose Ranges				Glucose Variability		Data Sufficiency
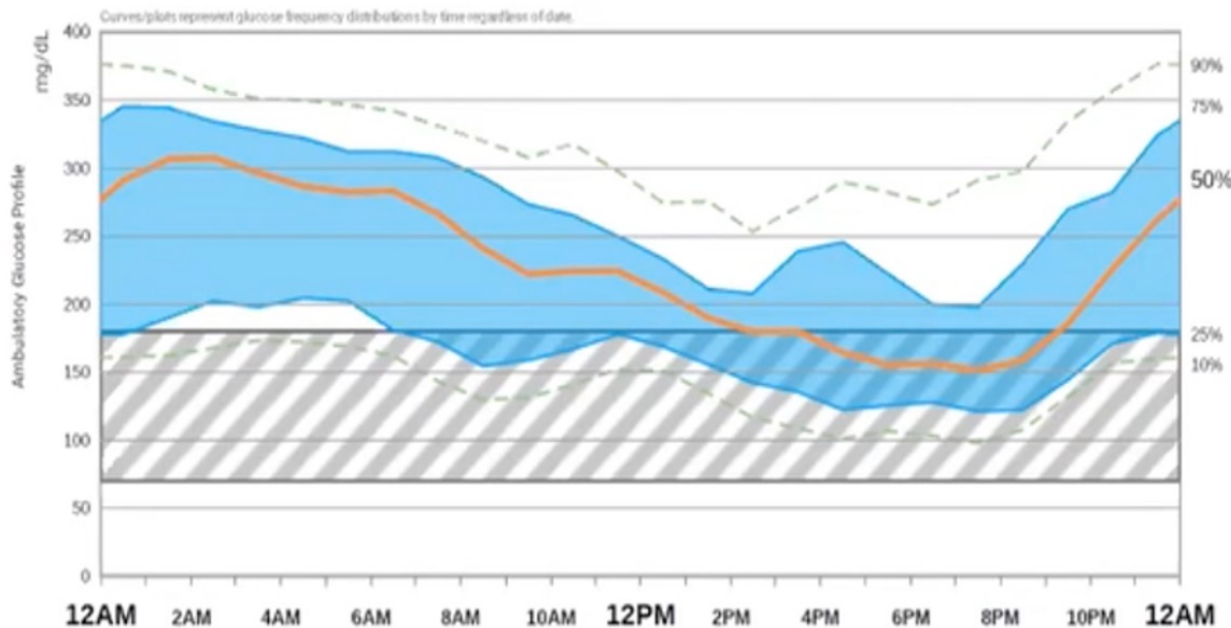
AGP Assessment:
1.
2.
3.
4.

Patterns Assessment:
1.
2.
3.
4.

Plan:
1.
2.

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Case 5

- 58 yo with PMH of T2DM (x 3 yrs), Overweight (BMI 26kg/m^2|64 kg) presents for f/u & reports persistent symptomatic hyperglycemia.
- DM Meds:
  - Metformin XR 500mg twice daily before meals
- FamHx: Brother with T1DM
- Data: BG 395 & Udip NEG for ketones
- POC A1c & trends:

Lab Results

Component	Value	Date
HGBA1C	13.8 (H)	11/28/2021
HGBA1C	6.1	09/13/2021
HGBA1C	6.2	03/15/2021
HGBA1C	5.8	09/14/2020

Glucose (BG)

All Readings

■ Very High		100%	> 250 mg/dL
■ High		0%	181-250 mg/dL
■ Target Range		0%	70-180 mg/dL
■ Low		0%	54-69 mg/dL
■ Very Low		0%	< 54 mg/dL

Average	366 mg/dL
SD	69 mg/dL
Readings/Day	0.4
Median	353 mg/dL
Highest	513 mg/dL
Lowest	276 mg/dL

Assessment:
1.
2.
3.

Time of Day

	Morning (5 am - 10 am)	Afternoon (10 am - 3 pm)	Evening (3 pm - 9 pm)	Night (9 pm - 5 am)
Readings	3	2	1	7
Average (mg/dL)	442	388	308	335
SD (mg/dL)	69	18	0	56

Glycemia Report:

Date of Interpretation:	12/3/2021
Data period:	11/20/21-12/3/2021
Readings:	_____
Mean BG (mg/dL):	_____
Range BG mg/dL):	_____
% Hyperglycemia (>180):	_____
% at Target (70-180):	_____
% Hypoglycemia (<70):	_____

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Case 5 – Assessment and/or Other Suspicions?

Assessment:

1. _____

         a. A1c trend:

         b. AGP:

         c. Other salient info:

2. Suspicions for etiologies of hyperglycemia:

  a.

  b.

  c.

Case 5 – Plan for Significantly Changed A1c & AGP

Assessment:
1. _____

Plan:

1.

2.

3.

4.

5.

6.

7.

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MTF - Metformin

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SLIDE 95

Case 5 – One Month Follow-up via Telehealth

Data:

- POC A1c now 11.3%
- DM Rx: MTF XR 1000mg 2x daily & Lantus 20 units daily (up-titrated between visits)
- BG Meter readings presented by patient:

	Pre-Meals & HS (mg/dL)
Breakfast	232,136,198,183,170, **(Lantus 17->20)**,**153,138,108,141**
Lunch	205,195,162,198,171,104,215, **(Lantus 17->20)**,**141,140,150**
Supper	272,200,198, **(Lantus 17->20)**,**104,140**
Bedtime	272, **(Lantus 17->20)**,**162,104,141**

- Labs: NL range C-peptide & NEGATIVE auto-antibodies

AGP from BG Readings:

- _____

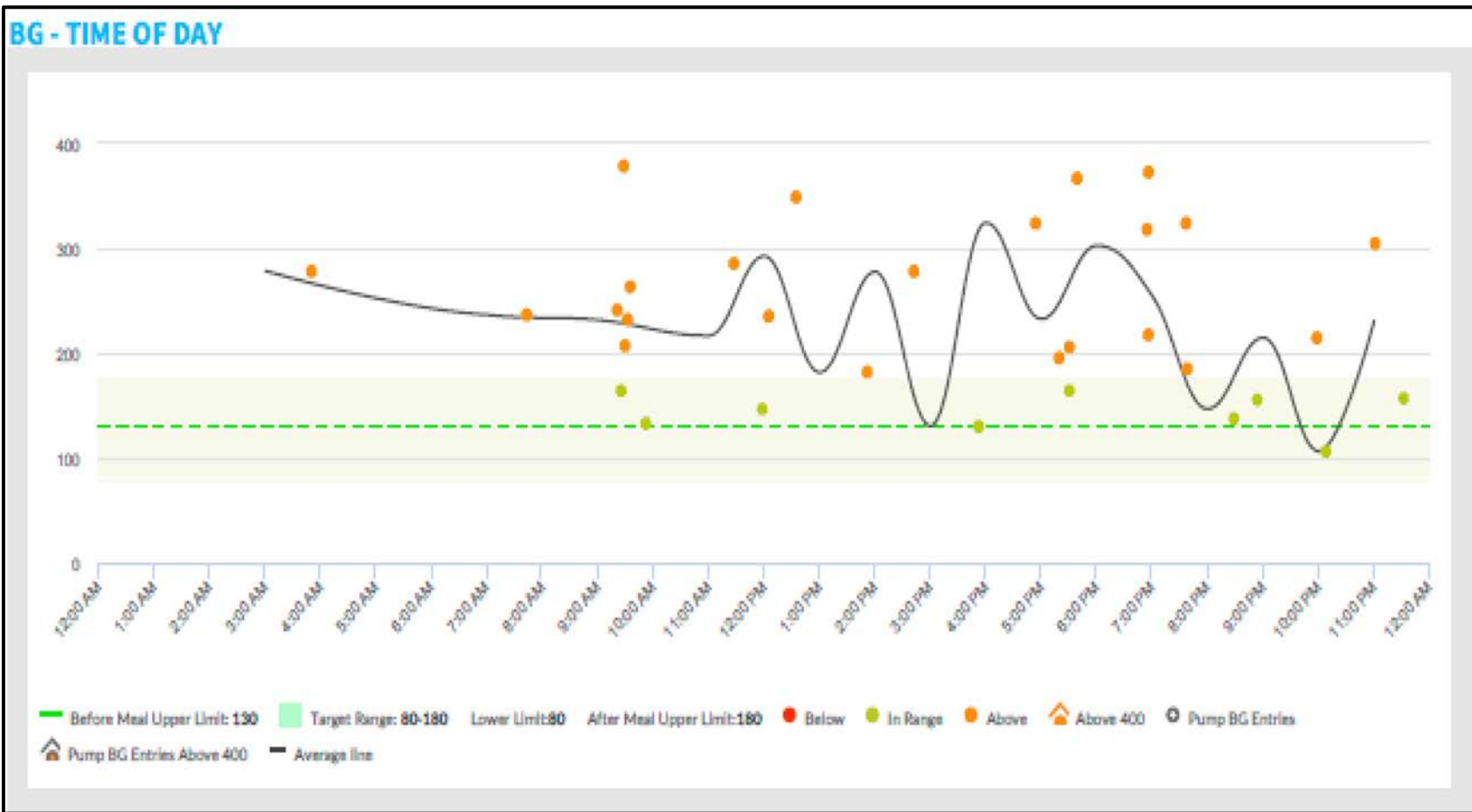Assessment:

- _____

Plan:

1.
2.
3.
4.

Case 6

- 62yo with T2DM ('20), NICVD & BMI of 38. Complains she's only lost a few pounds after multiple unsuccessful attempts at lifestyle changes including stricter BG monitoring, activity & diet changes.

- DM Meds:
  – Metformin XR 2000mg twice daily before meals

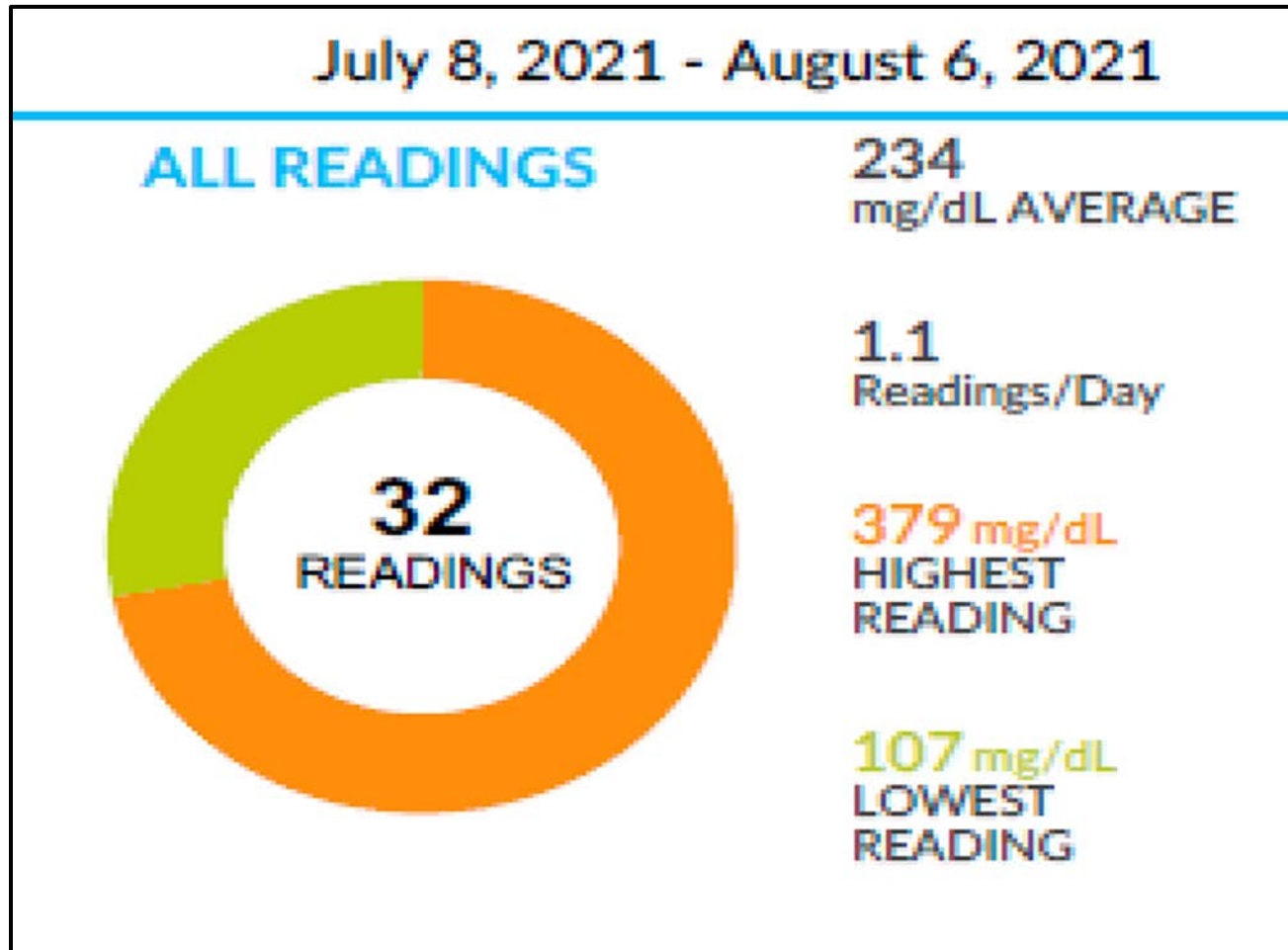- Data: A1c trends (A1c drawn ~1 month before visit; Goal of A1c 6-7%):

Lab Results

Component	Value	Date
HGBA1C	7.8	09/15/2021
HGBA1C	7.9	03/10/2021
HGBA1C	7.3	09/02/2020
HGBA1C	7.7 (H)	07/10/2020
HGBA1C	8.3 (H)	04/30/2020
HGBA1C	12.0 (H)	02/10/2020

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Case 6 - AGP

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AGP: Ambulatory Glucose Profile

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SLIDE 98

Case 6 - AGP

AGP: Ambulatory Glucose Profile
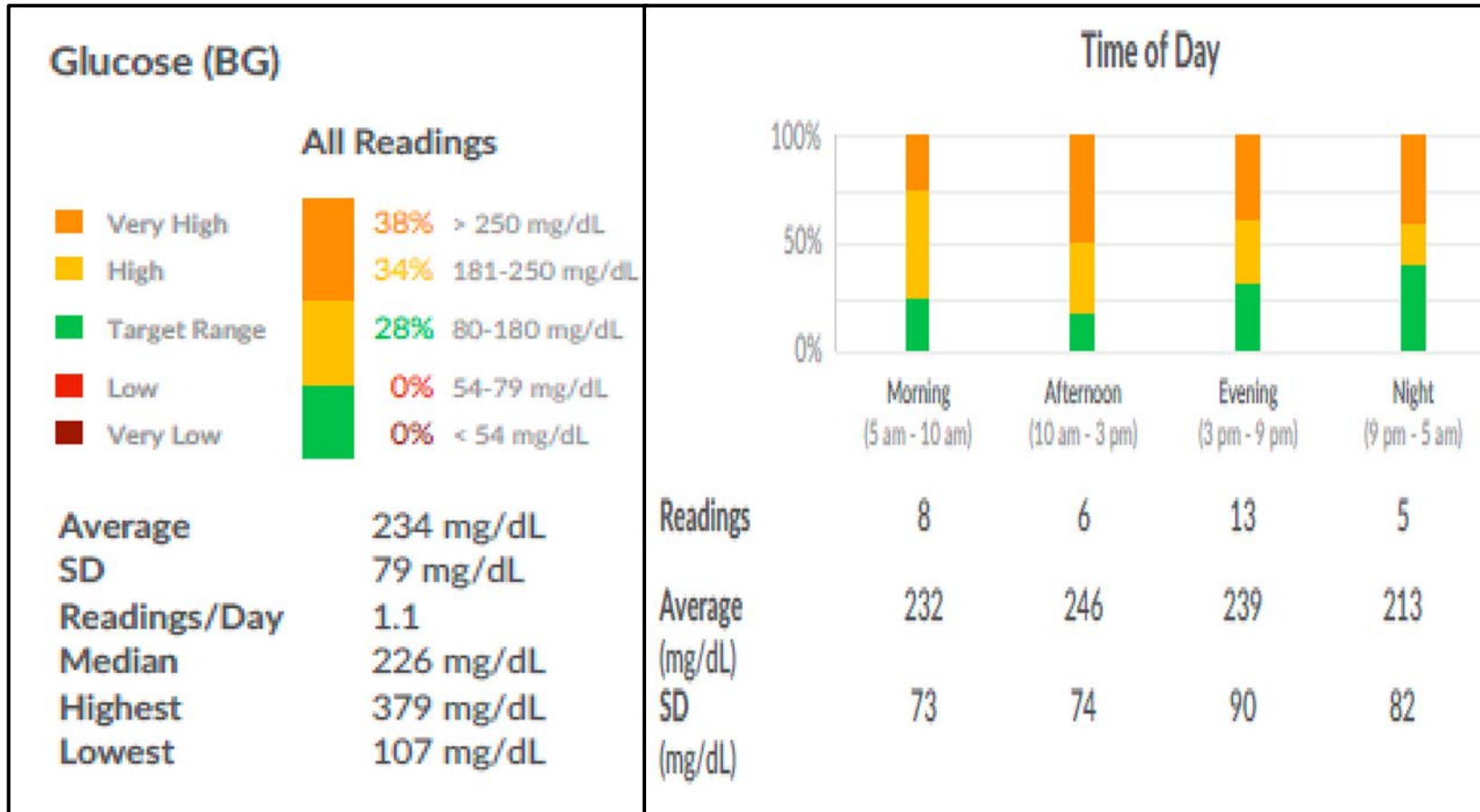
Case 6 - AGP

Case 6 – A/P: Above goal A1c, AGP & weight

Assessment:

Plan:

Case 6 - 3 Month Follow-up

DM Meds:

- Metformin XR 2000mg twice daily before meals
- Ozempic (Semaglutide) 0.5mg sc weekly

Lifestyle Vitals:

- Using smartphone pedometer & averaging 5-7 K steps/day
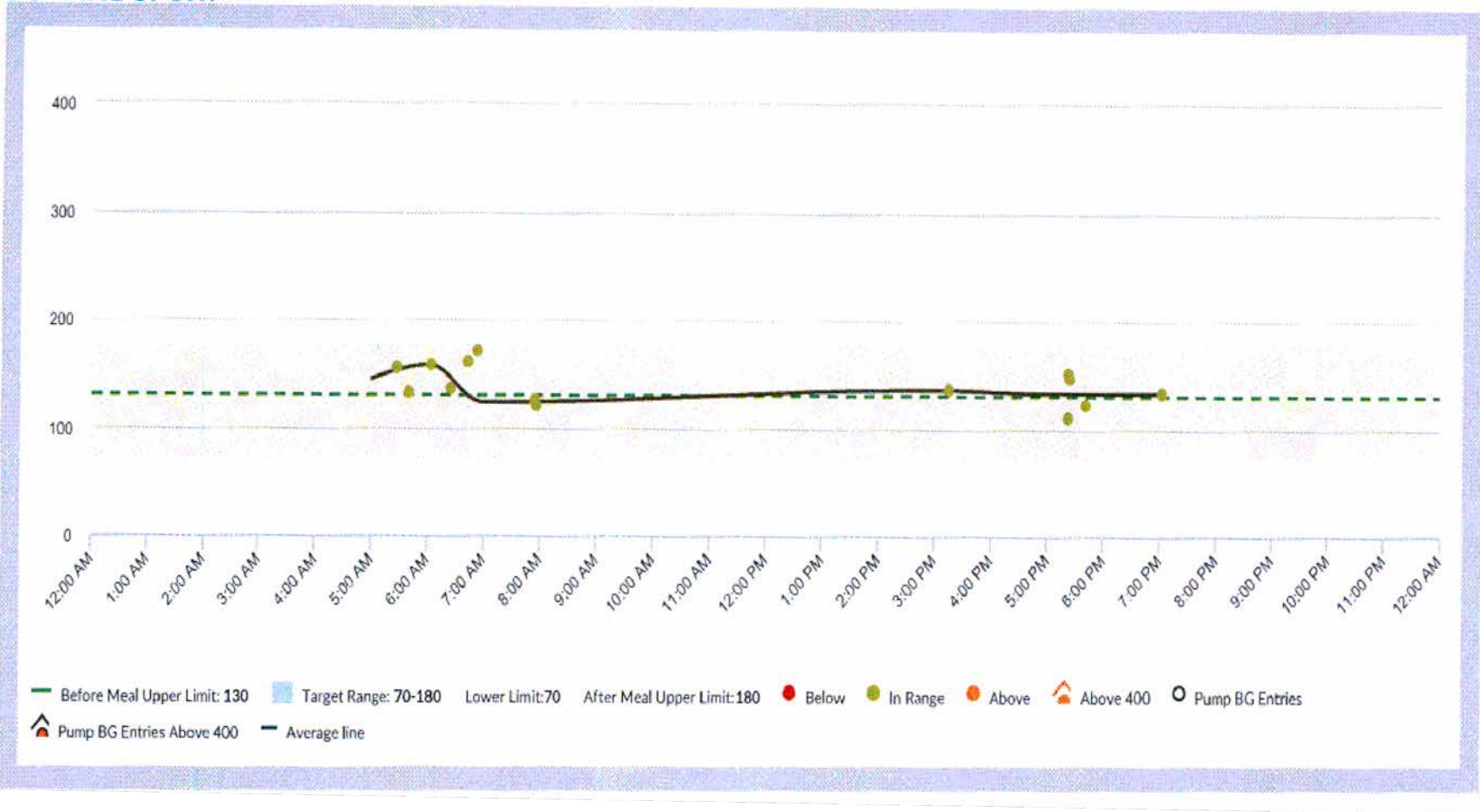- Maintaining small portion sizes & healthier nutrient balance

Data:

- Wt loss 7lbs
- A1c 6.8%

AGP: (see next 3 pages)

Case 6 – AGP: 3 Month Follow-up

ALL READINGS

141 mg/dL AVERAGE

0.5 Readings/Day

14 READINGS

172 mg/dL HIGHEST READING

111 mg/dL LOWEST READING

Case 6 – AGP: 3 Month Follow-up

Glucose (BG)

All Readings

Very High	0%	> 250 mg/dL
High	0%	181-250 mg/dL
Target Range	100%	70-180 mg/dL
Low	0%	54-69 mg/dL
Very Low	0%	< 54 mg/dL

Average	141 mg/dL
SD	18 mg/dL
Readings/Day	0.5
Median	137 mg/dL
Highest	172 mg/dL
Lowest	111 mg/dL

Time of Day
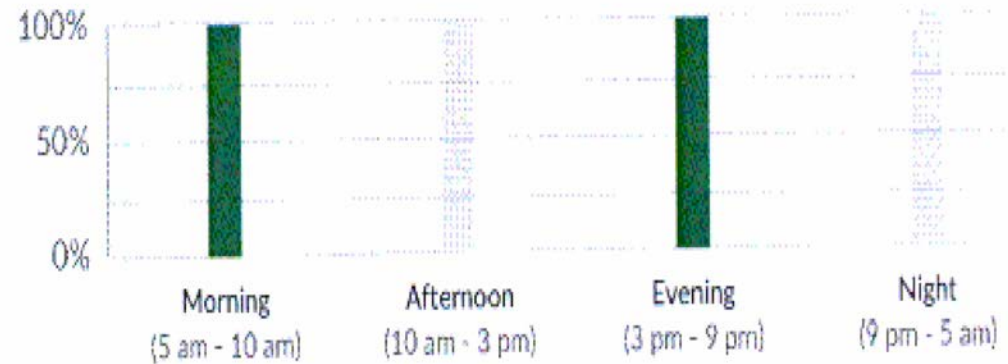
	Morning (5 am - 10 am)	Afternoon (10 am - 3 pm)	Evening (3 pm - 9 pm)	Night (9 pm - 5 am)
Readings	8	-	6	-
Average (mg/dL)	146	-	133	-
SD (mg/dL)	19	-	15	-

DM Meds:

– Metformin XR 2000mg twice daily before meals

– Semaglutide 0.5mg sc weekly

Lifestyle Vitals:

– Using smartphone pedometer & averaging 5-7 K steps/day

– Maintaining small portion sizes & healthier nutrient balance

Data:

– Wt loss: 7lbs

– A1c 6.8% & AGP 100% TIR with checking BG 2x/day

Assessment: _____

Plan:

1.

2.

3.

4.

5.

HPI:

Complains of a warm & itchy rash at CGM site x 1 week. The infusion set was only used for 10 days "as usual". Area started as an itchy area followed by a red rash. Patient denies tenderness, increased warmth or d/c.

On exam, you observe this:

What is most likely reason for rash?

A. Allergic reaction to CGM adhesive

B. Fungal infection

C. Dermatographia

D. Cellulitis

Case 7 – Troubleshooting Skin Reactions

Prevention for Allergic Reactions:
Bandages:
- ➢ Apply hypoallergenic tape as first layer with a "doughnut hole" cut in central area
- ➢ Cut hole the size of the sensor itself
- ➢ Apply CGM sensor so needle go into skin.
- ➢ Sensor adhesive adheres to hypoallergenic tape rather than skin.

Sprays:
- ➢ Apply OTC anti-histamine or steroid spray & let it dry before applying CGM sensors
- ➢ Diphenhydramine allergy spray
- ➢ Fluticasone propionate nasal spray

Treatment for Allergic Reactions:
- ➢ Thin layers of OTC hydrocortisone cream twice daily until the rash clears.

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Practical Next Steps…

- ## Strategic planning & roll out
  - Start small & go slow
  - Identify administrative lead

- ## Create clinic/practice professional accounts
  - Glooko Remote Patient Management (BG meters)
  - TIDEPOOL – (BG meters & CGM data)
  - LibreView (CGM)
  - Dexcom CLARITY (CGM)
  - Medtronic CareLink (CGM)

- ## Invite Patients to share data
  - Patient creates account & shares data with clinic

Acknowledgement & Affirmation

- Identification of Barriers
  - Based on patient's answers to the following questions…
  - What's the hardest thing right now?
  - What do you fear the most right now?

- Use Metaphors to connect – "This is hard…is it impossible?"
  - "Diabetes care is sometimes like trying to manage a 3-ring circus…"
  - "Controlling BG sometimes feels like you're constantly trying to carry a flat baking pan of water without spilling a drop…"

- But…ALWAYS find a reason to give positive reinforcement
  - Underscore successes & reiterate support
  - "I'm in this alliance with you."

Primary Factors Reducing CGM Wear
- ➢ Limited body surface area
- ➢ Ambient temperature & humidity
- ➢ Type & duration of activity

Achieving Satisfactory Adhesion:
- ➢ Involves "Trial & Error"
- ➢ Finding right product for right problem

Techniques to improve wear duration:
- ➢ Comfortable areas & lay flat against skin
- ➢ Abdomen, upper arms, buttocks & thighs
- ➢ Tac-Wipes
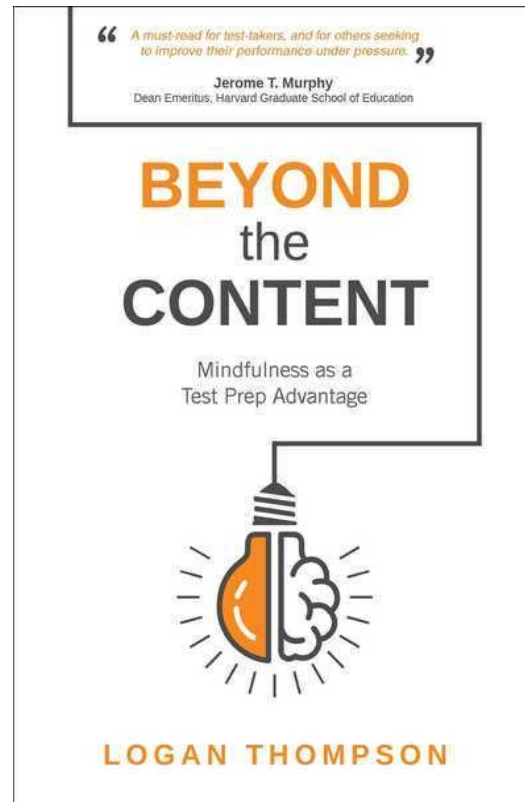- ➢ Occlusive dressings
- ➢ Tapes/Protective Sleeves:

Tips:
- ➢ Don't give up!

Englert K, Ruedy K, Coffey J, et al. Skin and adhesive issues with continuous glucose monitors: a sticky situation. *J Diabetes Sci Technol*. 2014;8(4):745-751. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4764227/
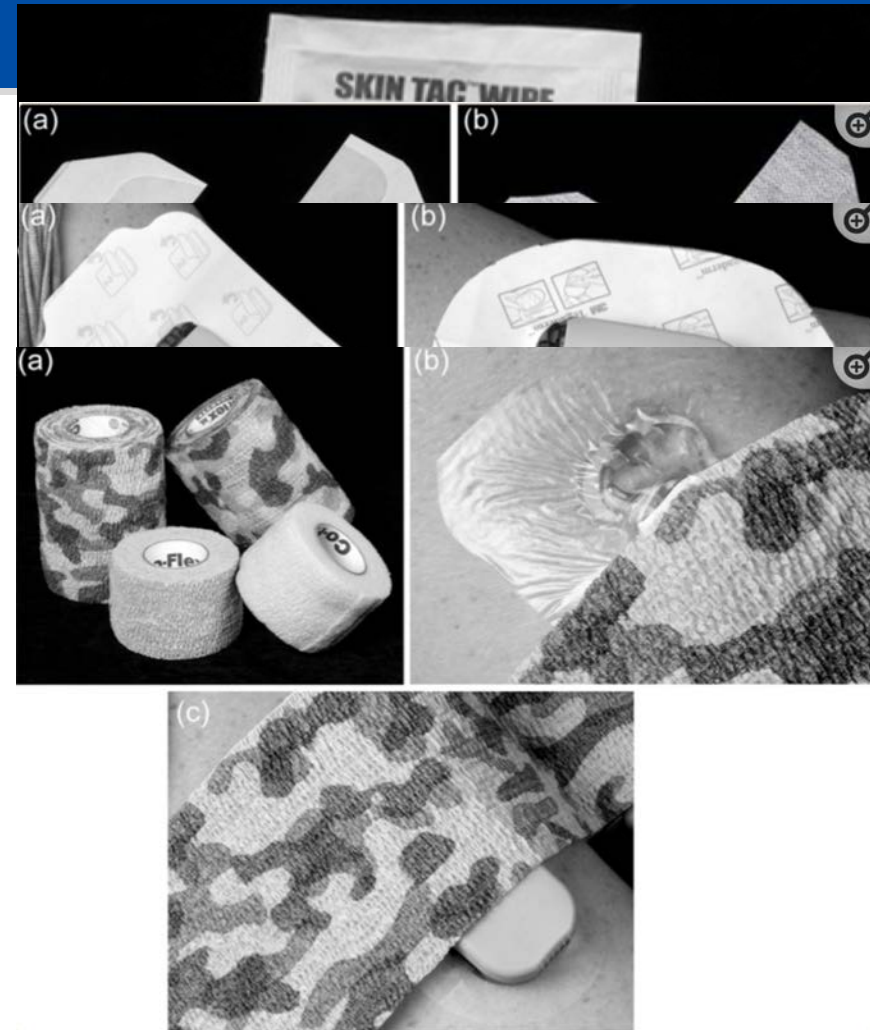
Recognizing the Impact of "Wilson" & "Passengers"

Thompson, Logan. Beyond the Content: Mindfulness as a Test Prep Advantage. 2019. Kaplan Publishing, New York, NY. ISBN: 978-1-5062-4847-9.
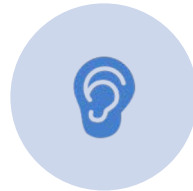
- Naming allows to externalize "fleeting thoughts, feelings" & emotions"

- Helps allow them to be "understandable & workable"

- Some "passengers" are helpful & some are not…

- The NOT so helpful are those that begin to control our behaviors

Five Practices for Promoting Patient-Centered Care[1,2]

Prepare with intention

Listen intently & completely
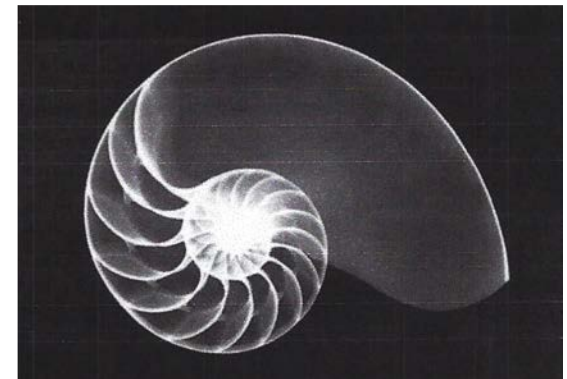
Agree on what matters most

Connect with the patient's story

Explore emotional cues

[1]Sanders L, Fortin AH 6th, Schiff GD. Connecting with patients—the missing links. JAMA. 2020;323(1):33-34
[2]Zulman DM, Haverfield MC, Shaw JG, et al. Practices to foster physician presence and connection with patients in the clinical encounter. JAMA. 2020;323(1):70-81.

JW Chambered Nautilus Approach…

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~~SMBG:~~   **BGM***

-Uses BG meter | Uses Libre CGM | Uses Guardian Link or Dexcom CGM

-Checks BG | Scans 2-4x/day qAC AM & PM & when feeling hypos

-Hypos: 3-4x/wk & mostly in late AM; some to low 50's

	Pre-Meal BG (mg/dL)	2hr PPG (mg/dL)
Breakfast	xx	
Lunch	xx	
Supper	xx	
Bedtime	xx	

*Summary of Revisions: *Standards of Medical Care in Diabetes - 2023 Jan 1;46(Suppl 1):S5-S9*

Glycemia Data Report:

Date of Interpretation:	1/3/2022	
Data period:	xx-1/3/2022	
Readings/Sensor Active %:	xx	
Mean BG (mg/dL):	xx	
Range BG mg/dL):	xx-xx	Previous AGP:
% Hyperglycemia (>180):	xx	40%
% at Target (70-180):	xx	54%
% Hypoglycemia (<70):	xx	6%

Average BG (mg/dL) values by meals:

AC Brkfst (AM Fasting):	xx
AC Lunch:	xx
AC Dinner:	xx
HS:	xx
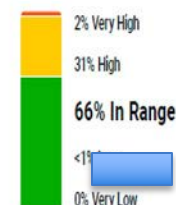
Needed to satisfy billing for 95251 – Interpretation of CGM data

EMR Smart Phrases: —Diabetes Health Maintenance

DM HM

- CVD Risk Reduction: No PMH of CAD, PVD or CVA
  - HTN: BP at goal; on ARB & HCTZ; no routine exercise; activity plan as directed.
  - HLD: FLP UTD & LDL/Tg above goals; increase statin from mod to high intensity

- Neph/CKD Risk Reduction: Cr/GFR: 0.93/110; UACR: UTD & POS. On ACEi.
  - Check UACR at next visit if glycemia improved

- Ophthal: Denies DPR; no complaints/changes in vision. Exam: UTD (Nov '21)
  - Ophthal f/u in 2022

- Pod: No PMH Sensory neuropathy; no complaints; Exam: NL MF screen (Jan '22)
  - Repeat MF screen annually.

DM Complications:

Macrovascular Complications:	Microvascular Complications:

• CAD/MI: none
   • ASCVD Risk: **@ASCVDRISK@**
   • Statin: n/a
• CVA: none
• PVD/PAD: No hx of amputations
	• Neuropathy: none; Sensory
	• Retinopathy: none; DPR
	• Nephropathy: none;+proteinuria
	   • ACEI/ARB/SGLT2: n/a

EMR Smart Phrases: "Lifestyle Vitals" & Interventions

"Lifestyle Vitals" Assessment:

1) Diet Health:
- Do you "eat for fuel" or do you "eat for comfort"?
- How many meals/snacks do you eat in a day?
- Do you skip any meals?
- Do you take any supplements/vitamins?
- How many meals a week to do you eat out?

2) Activity:
- What kinds of activity do you do each week?
- How much activity do you engage weekly?
- What do you think stops you from being active?

Interventions:

1) Diet Health:
- Consider buying healthy snacks
- Increase activity with playing game or watching TV while on treadmill
- Consider home video exercises*
- Encourage spouse to join diet/activity changes
- Discussed role of registered dietician for nutritional guidance/accountability.
- Discussed dietary modifications based on personal and cultural preferences.

2) Activity:
- Discussed ways to incorporate movement/physical activity into daily routine.
- Discussed 1-2 days/week of aerobic activity.
- Discussed progressing to >150 min/wk on 3-5 days/wk, with resistance exercise 2-3 times/wk

*HOME EXERCISE VIDEOS:
1. Canada LEAP Service Youtube Home Exercise Videos: https://www.youtube.com/c/LEAPService
2. Leveraging Exercise to Age in Place (LEAP) is an evidence-based exercise program proven to decrease loneliness and social isolation in older adults as well as decrease fear of falling. https://www.cedars-sinai.org/programs/geriatrics/leap-program.html#

EPIC Smart Phrases & Billing Summary

MyChart Blood Glucose Flowsheet

- Enter in "Orders" to send to patient
- Retrieve in "Episodes" tab

BGM / CGM Ambulatory Glucose Profile:

- BGMCGMAGP
- CGMDOWNLOAD

Diabetes Complications:

- DMCOMPLICATIONSTABLE

CGM Billing Table

- CGMBILLINGTABLE
- 95249 – Personal CGM: Startup & training
- 95250 – Prof. CGM: Startup & training, application, removal & printout
- 95251 – CGM Data Interpretation (Min. 72hrs of data)

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CGM Prescribing

FREESTYLE LIBRE 14 DAY READER
FREESTYLE LIBRE 14 DAY SENSOR KIT

FREESTYLE LIBRE 2 SENSOR KIT
FREESTYLE LIBRE 2 READER

FREESTYLE LIBRE 3 SENSOR DEVICE

DEXCOM G6 TRANSMITTER DEVICE
DEXCOM G6 SENSOR DEVICE
DEXCOM G6 RECEIVER MISC

DEXCOM G7 SENSOR DEVICE
DEXCOM G7 RECEIVER

GUARDIAN CONNECT TRANSMITTER DEVICE
GUARDIAN LINK 3 TRANSMITTER DEVICE
GUARDIAN RT TEST PLUG DEVICE
GUARDIAN SENSOR 3 DEVICE

Trouble-Shooting High Co-Pays, Denials or Other Issues

- For commercial payors, send Rxs to local pharmacy

- For Medicare patients, send Rxs to DME company
  - Check for DME distributors in your area or call (1-800-MEDICARE)

- Parachute Health: https://www.parachutehealth.com/dme-report-2022
  - Enables clinicians to place orders for medical equipment & supplies digitally
  - Patients can receive products faster

- Reach out to your local Abbott, Dexcom or Medtronic reps for guidance on prescribing & patient assistance programs

CGM Billing

Common Billing Codes for Personal & Professional CGM Visits & Services[1]

CPT Code	Type of Service	Provider	Frequency	Encounter Type
95249	Personal CGM (Initial startup & training)	RN, PharmD, CDCES or MA (if within scope) under the supervision of a physician, advanced practitioner, or hospital outpatient department	Once during time the patient owns the device or if transitioning to new device	Face to face visit
95250	Professional CGM (Startup, training, application, removal & printout)	RN, PharmD, CDCES or MA (if within scope) under the supervision of a physician, advanced practitioner, or hospital outpatient department	Maximum once per month	Face to face visit
95251	CGM data interpretation	Physician, NP, PA or CNS	Monthly*	Non-face to face visit
-25 modifier	Separate identifiable service	Physician, NP, PA or CNS	With office visits	Face to face visit

*Time intervals for data analysis reimbursement may vary by payer organization

[1]Miller EM. Using Continuous Glucose Monitoring in Clinical Practice. *Clin Diabetes*. 2020;38(5):429-438. doi:10.2337/cd20-0043

5 Tips for Diabetes Technology & Management

1. Customize selection of glucose monitoring to patient needs

2. Reduce hypoglycemia (TBR) & increase Time in Range (TIR)

3. Consider the "3 Minute Drill"

4. Base "*Individual & Incremental*" management changes on AGP

5. Confirm access to patients' CGM data & accounts

6. Aim to make CGM alerts & alarms actionable

TIR: Time in Range   **AGP**: Ambulatory Glucose Profile

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Diabetes Tech & CGM Summary

Technology improves diabetes outcomes

Personal or Professional CGM systems are available

Change CGM sensors every 10-14 days

Use CGM reader or scan sensor & link to a smartphone app

Monitor remotely & adjust medication without an office visit

CGM billing: Initial/training
• Personal 95249
• Professional 95250
Anal. & Interp. 95251

Post-Session Survey

1. How likely are you to pursue integrating BGM & CGM data integration in your clinic or facility in the next year?
   A. Very unlikely
   B. Not likely
   C. Neutral
   D. Likely
   E. Very likely

Pre-Session Survey

2. What barriers do you perceive that might limit integration of BGM & CGM data downloading into your practice?
    A. Unclear on analysis of BG or CGM reports
    B. Unclear on use of BG or CGM data platforms
    C. Unclear on reimbursement
    D. Lack of health center support
    E. Lack of time
    F. All the above
    G. None of the above

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