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What's New With Diabetes Technology in 2019?

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Disclosures – Aaron Neinstein MD
(2012 onward)

Research Support
- Cisco Systems, Inc
- Commonwealth Fund

Advisor (Compensated)
- Steady Health

Advisor (Uncompensated)
- Tidepool

Consulting
- Nokia Growth Partners
- WebMD/Medscape
- Grand Rounds
- GLG

Disclosures – Marlene Bedrich

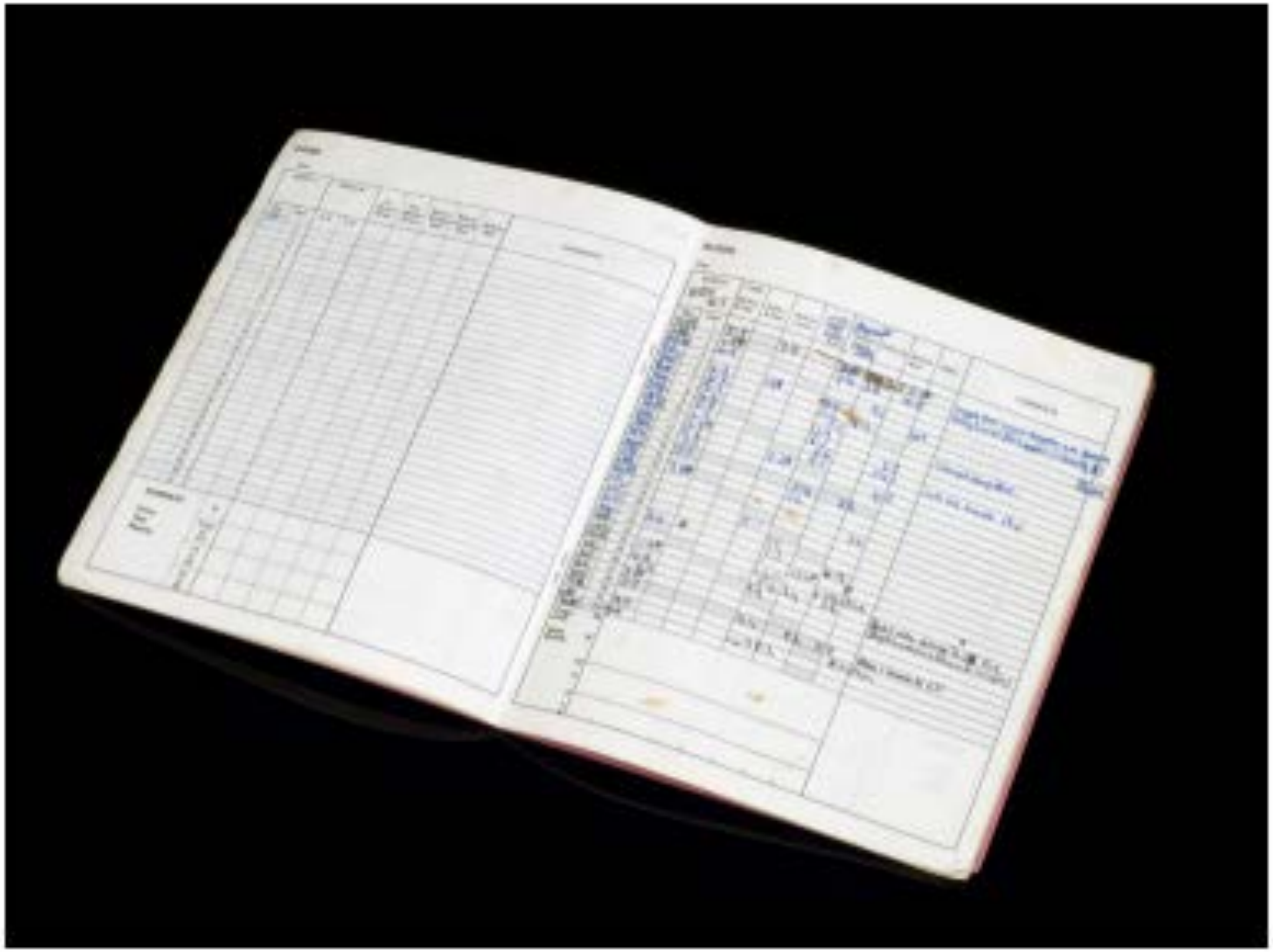
- Nothing to Disclose

Which diabetes technologies have you heard about?
What are you most interested in?

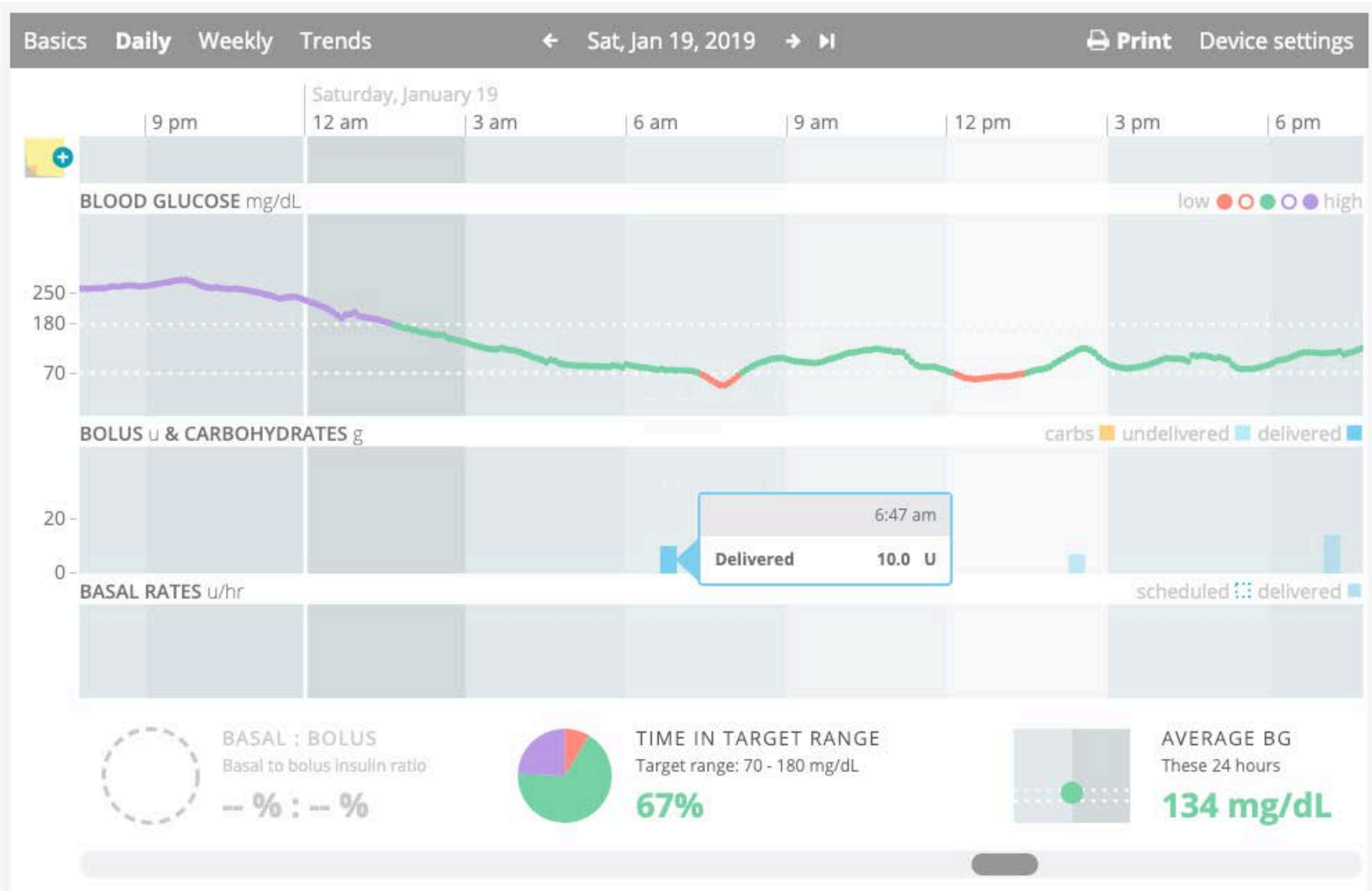
What's new? What's different?

- Connected insulin pens
- CGM: Dexcom G6, Abbott Freestyle Libre, Eversense
- Digital coaching services
- Closed loop insulin delivery

Monitoring glucose and insulin in 1989

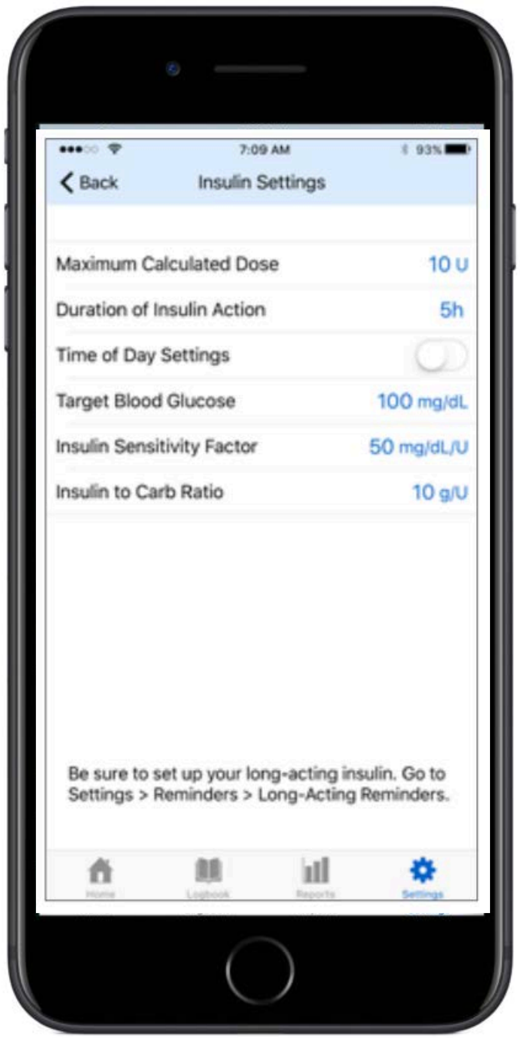


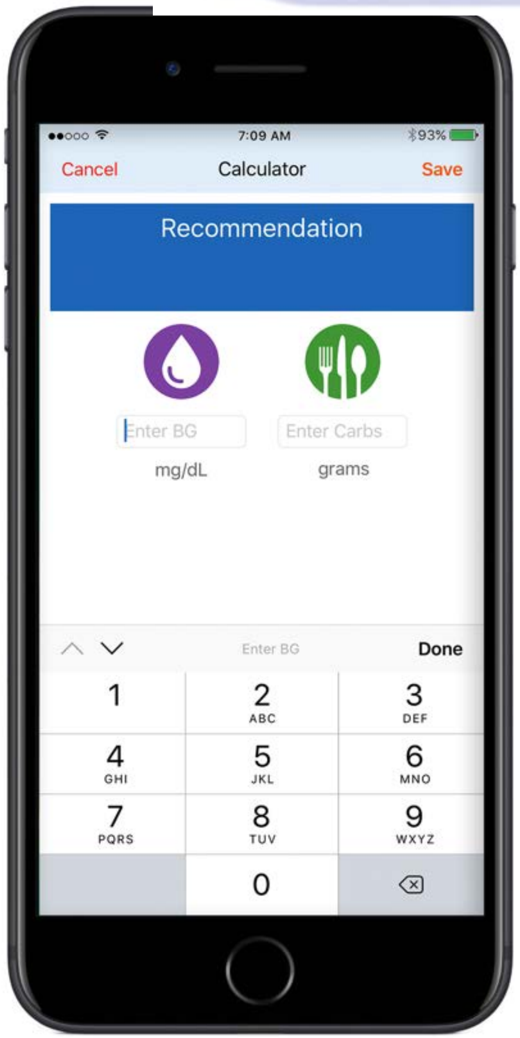
Monitoring glucose and insulin in 2019

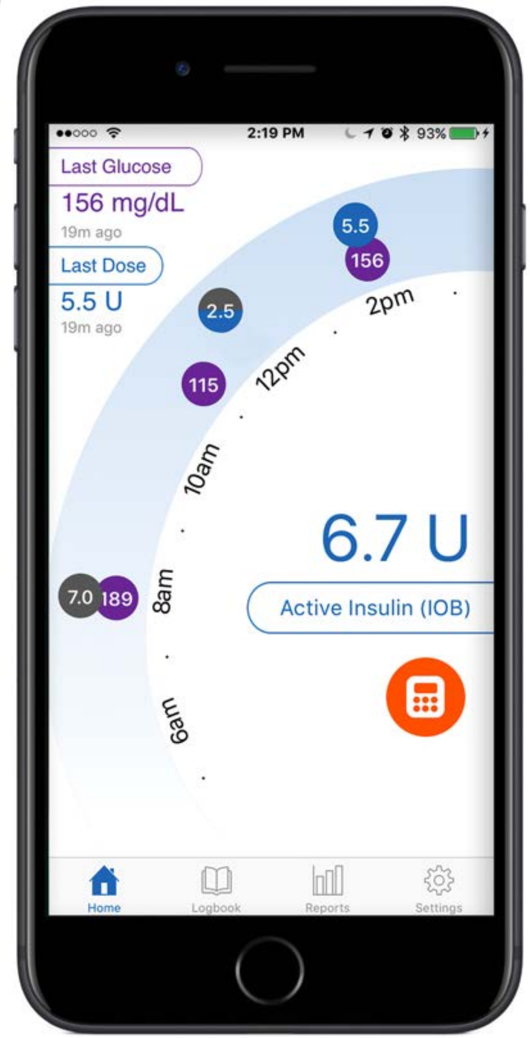


Connected Insulin Pens

Companion InPen







Novo – Coming 2019

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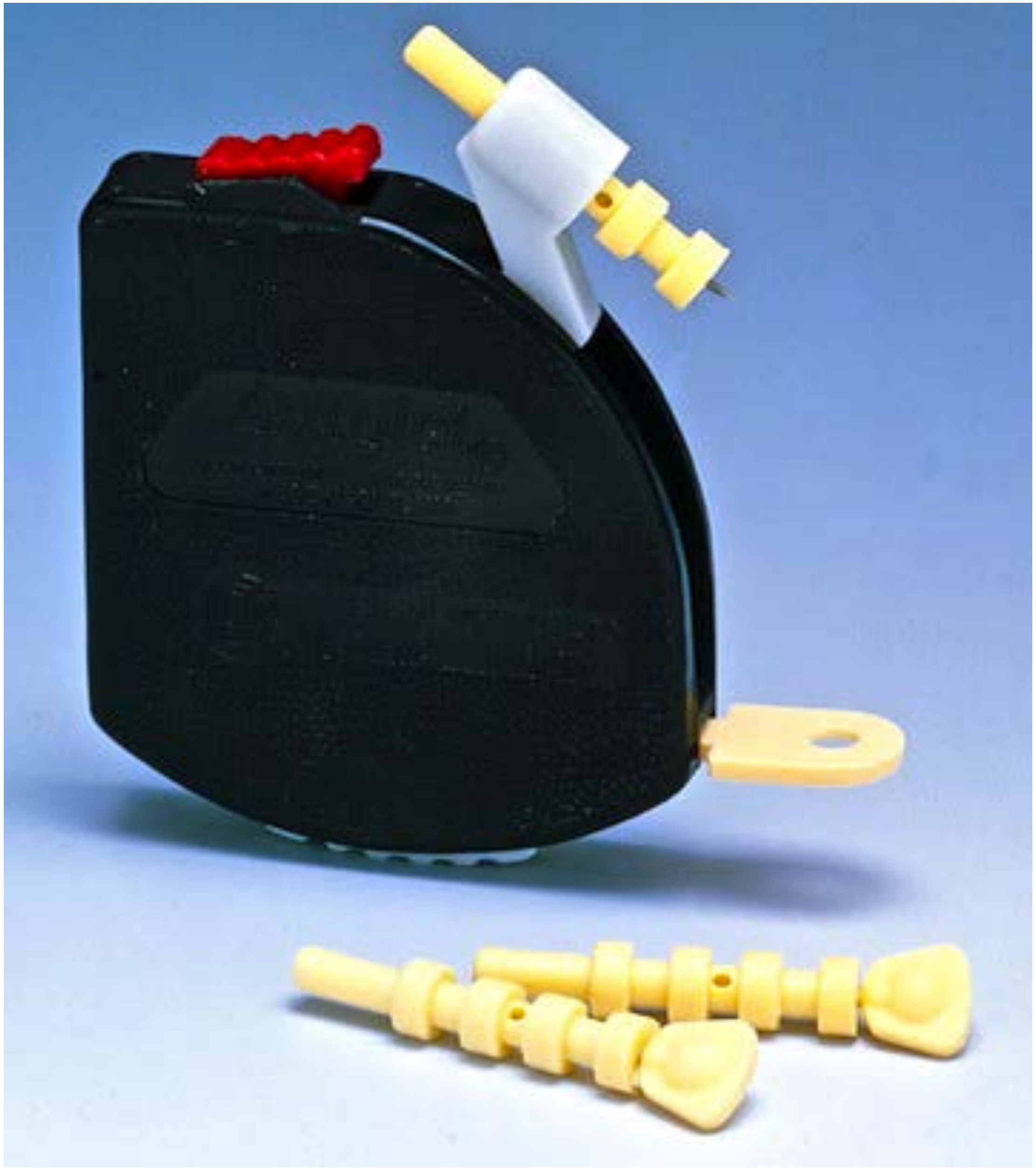
What can happen now (without smart pens)?

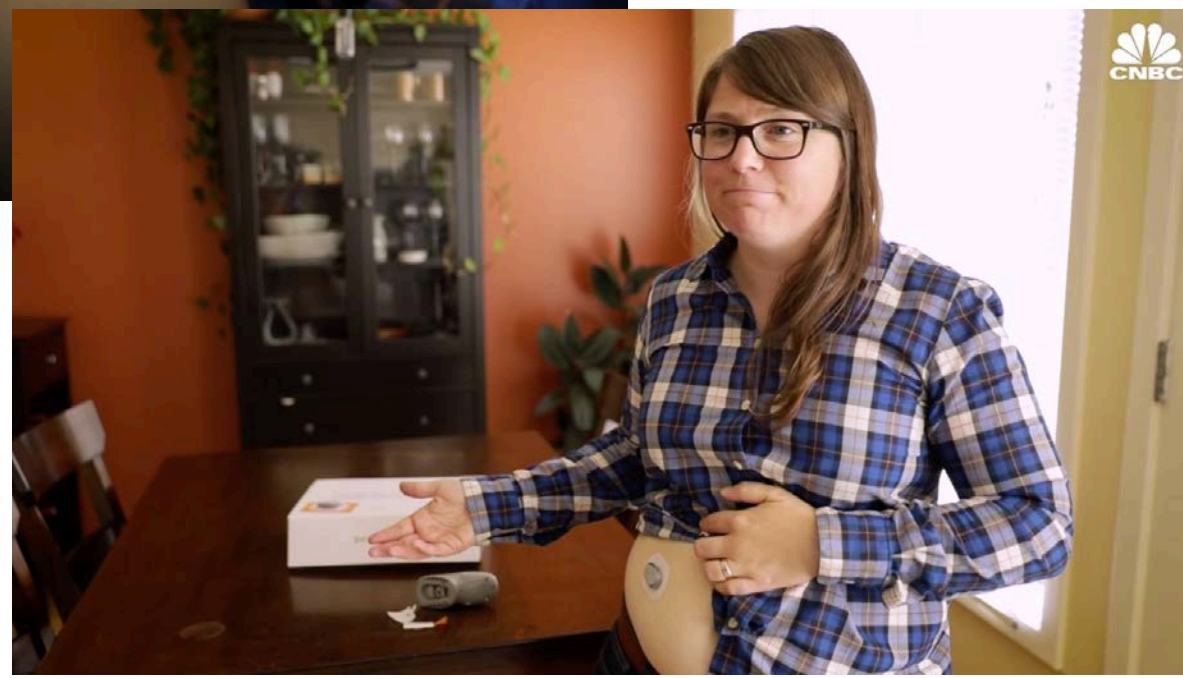
- Missed doses
- Duplicate doses
- Stacked doses
- Erroneous dose calculations
- Inadequate regimen
- Fixed insulin doses despite different meals
- Clinical inertia
- Wasted clinic visits

Continuous Glucose Monitoring

Historical Perspective – “Life Changers”

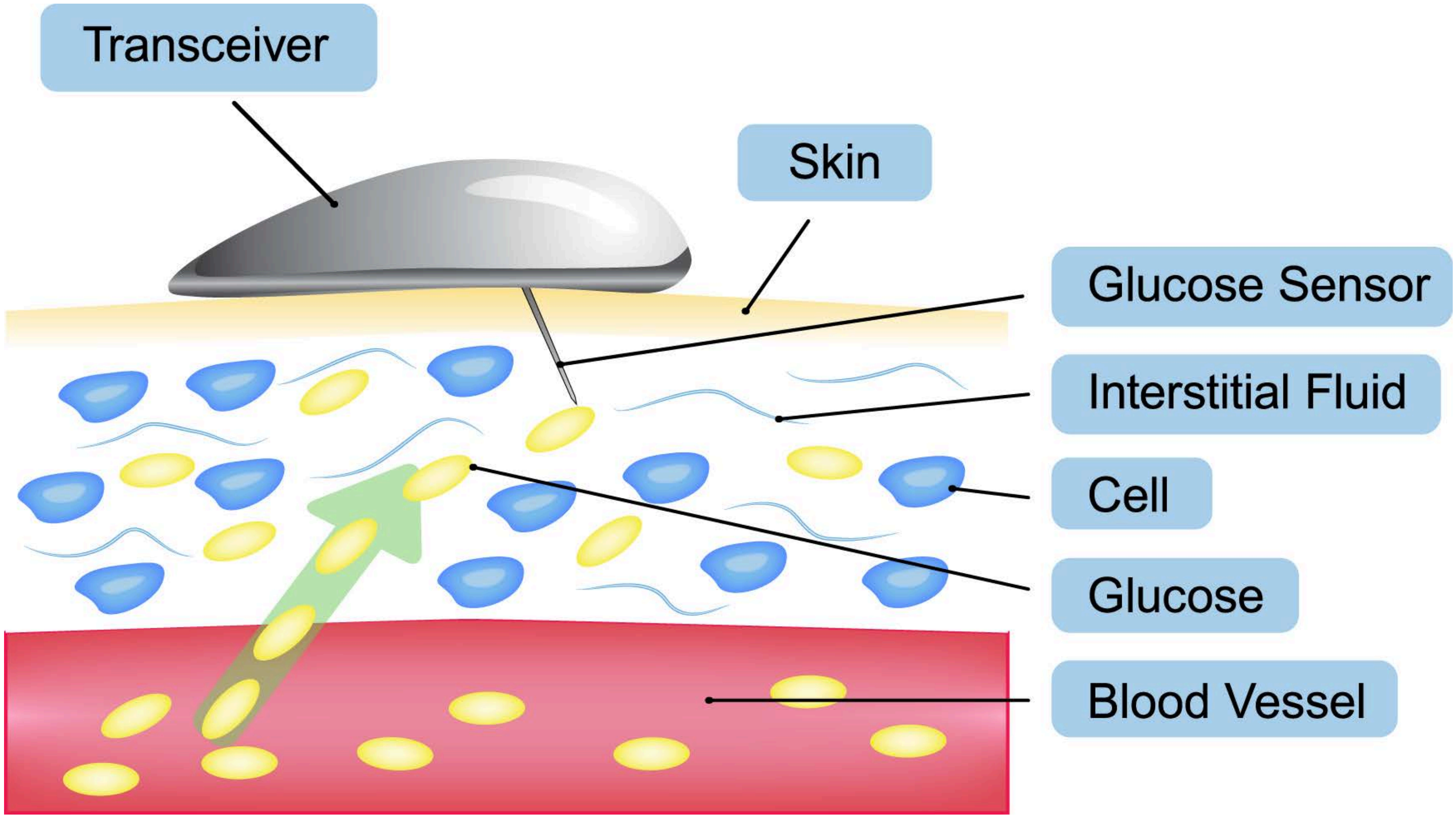
1. Home glucose monitoring – fingersticks – 1970s-1980s
2. Continuous glucose monitoring - 1999
3. Closed loop insulin delivery - 2017





https://www.cnbc.com/video/2018/05/12/dexcom-g6-latest-diabetes-monitor-doesnt-need-blood.html

Continuous Glucose Monitoring

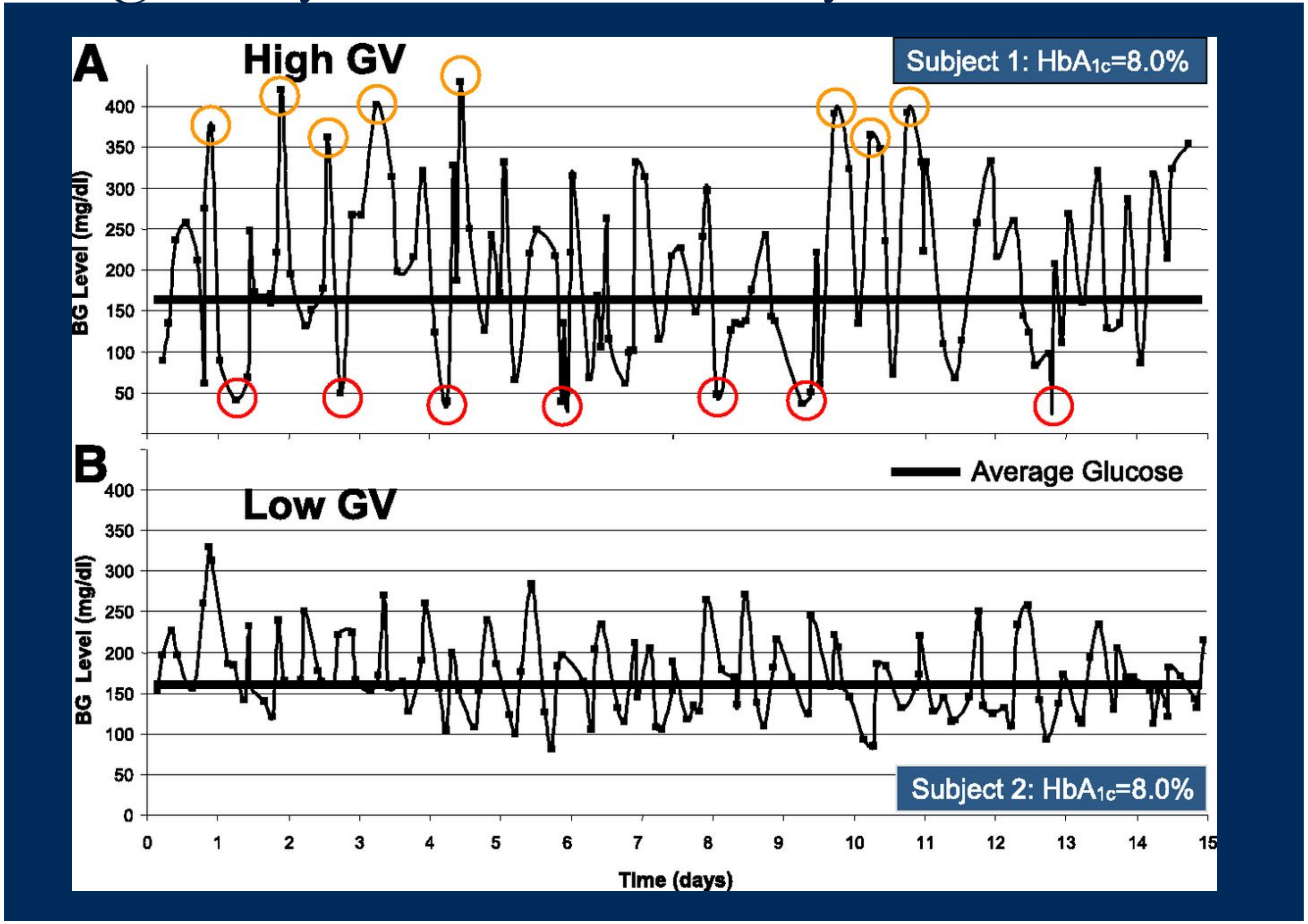


http://www.texasdiabetes.com/benefits-of-continuous-glucose-monitors-cgms/

Measurements of glucose control

	Hemoglobin A1c	Fingerstick BG	CGM
Benefits	• Gold standard for predicting risk of diabetes complications	• Real-time feedback • Better accuracy than CGM (theoretically)	• Real-time feedback • Alarms/alerts • Glucose trends
Drawbacks	• Unreliable in pregnancy, anemia, other situations. • No guidance for daily therapy adjustments. • No detailed glucose trends.	• Painful • Not cheap • Single point in time • Depends on decision to test • Real-world accuracy is variable	• Cost • Object on body

Thinking "Beyond A1c" – Glycemic Variability



Fifteen-day glucose traces of two subjects with identical A1c of 8.0% but different degrees of glycemic variability.

Boris Kovatchev, and Claudio Cobelli Dia Care 2016;39:502-510

2016 FDA Guidance on Home BG Meter Accuracy

- 95% of BG meter values must be within 15% of true lab value
- 99% of BG meter values must be within 20% of true lab value

- Therefore, if lab-measured glucose is 100 mg/dl:
  - BG meter has to be within 15 mg/dl (85-115 mg/dl) 95% of time
  - BG meter has to be within 20 mg/dl (80-120 mg/dl) 99% of time

NUMBER AND PERCENT OF VALUES WITHIN SPECIFIED ERROR LIMITS

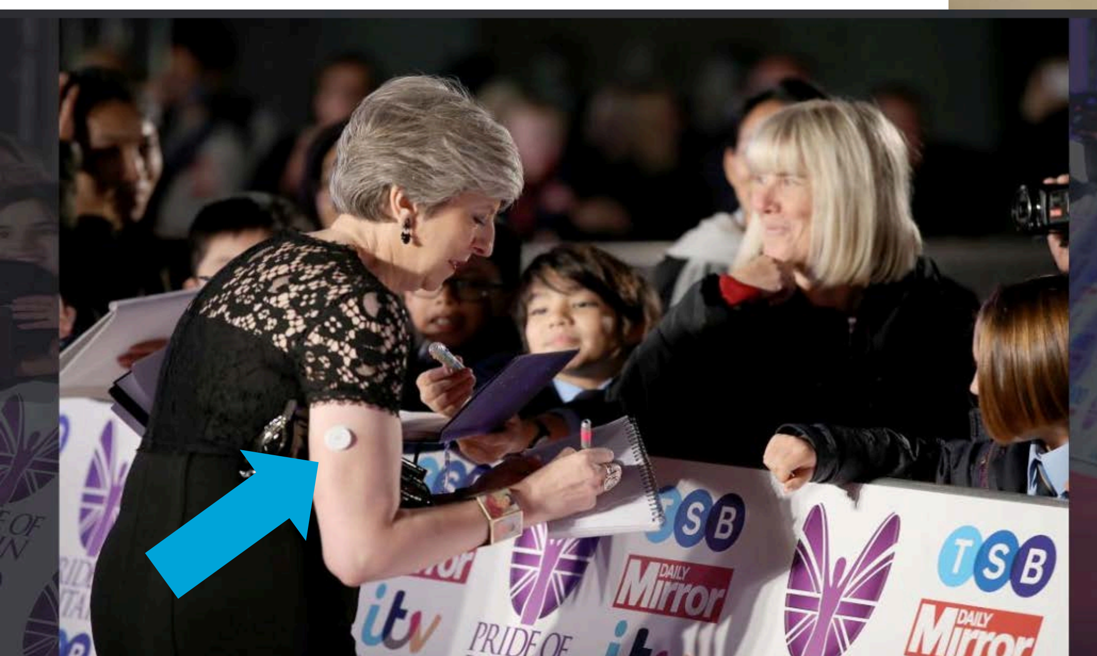
Brand	Blood Glucose Monitor	Test Strip	Valid Trials	Within +/- 5%		Within +/- 10%		Within +/- 15%†		Within +/- 20%		>20%	
				Distance from the Reference Value*									
Bayer	Contour Next	Contour Next	312	212	68%	302	97%	311	100%	311	100%	1	0.3%
Roche	ACCU-CHEK AVIVA Plus	ACCU-CHEK AVIVA Plus	311	161	52%	272	87%	306	98%	311	100%	0	0.0%
Arkray	Walmart ReliOn Confirm (Micro)	ReliOn Confirm/micro	317	167	53%	276	87%	307	97%	314	99%	3	0.9%
Agamatrix	CVS Advanced	CVS Advanced	318	172	54%	272	86%	307	97%	317	100%	1	0.3%
Abbott	FreeStyle Lite	FreeStyle Lite	312	95	30%	238	76%	298	96%	306	98%	6	1.9%
Roche	Accu-Chek Smart View	ACCU-CHEK SmartView	320	133	42%	251	78%	305	95%	317	99%	3	0.9%
Arkray	Walmart ReliOn Prime	ReliOn Prime	312	121	39%	224	72%	288	92%	305	98%	7	2.2%
LifeScan	OneTouch Verio	OneTouch Verio	319	139	44%	239	75%	294	92%	315	99%	4	1.3%
Prodigy	Prodigy Auto Code	Prodigy No Coding	312	135	43%	229	73%	282	90%	304	97%	8	2.6%
LifeScan	OneTouch Ultra2	OneTouch Ultra	311	127	41%	230	74%	280	90%	302	97%	9	2.9%
Abbott	Walmart ReliOn Ultima	ReliOn Ultima	319	140	44%	241	76%	285	89%	302	95%	17	5.3%
Bayer	Contour Classic	Contour	320	109	34%	215	67%	284	89%	313	98%	7	2.2%
Omnis Health	Embrace	Embrace No Code	319	116	36%	230	72%	282	88%	308	97%	11	3.4%
HDI/Nipro	True Result	TrueResult	318	81	25%	188	59%	279	88%	311	98%	7	2.2%
HDI/Nipro	True Track	TrueTrack	205	57	28%	112	55%	167	81%	186	91%	19	9.3%
BioSense Medical	SolusV2	SOLUS	320	59	18%	148	46%	244	76%	297	93%	23	7.2%
Diabetic Supply of Suncoast	Advocate Redi-Code +	Advocate	319	66	21%	148	46%	241	76%	288	90%	31	9.7%
Philosys, Inc.	Gmate Smart	Gmate	320	82	26%	159	50%	226	71%	267	83%	53	16.6%

*When reference value is <100 mg/dL, then distance is absolute mg/dL rather than %.

†The percentage of data points within +/- 15% distance from the Reference Value is the same as the percentage of data points for Trials Within Protocol Limits in the Overall Results Table.

https://www.diabetestechnology.org/surveillance.shtml

The PM wore the patch as she arrived at the Pride of Britain awards last night
IMAGE: GETTY - CONTRIBUTOR

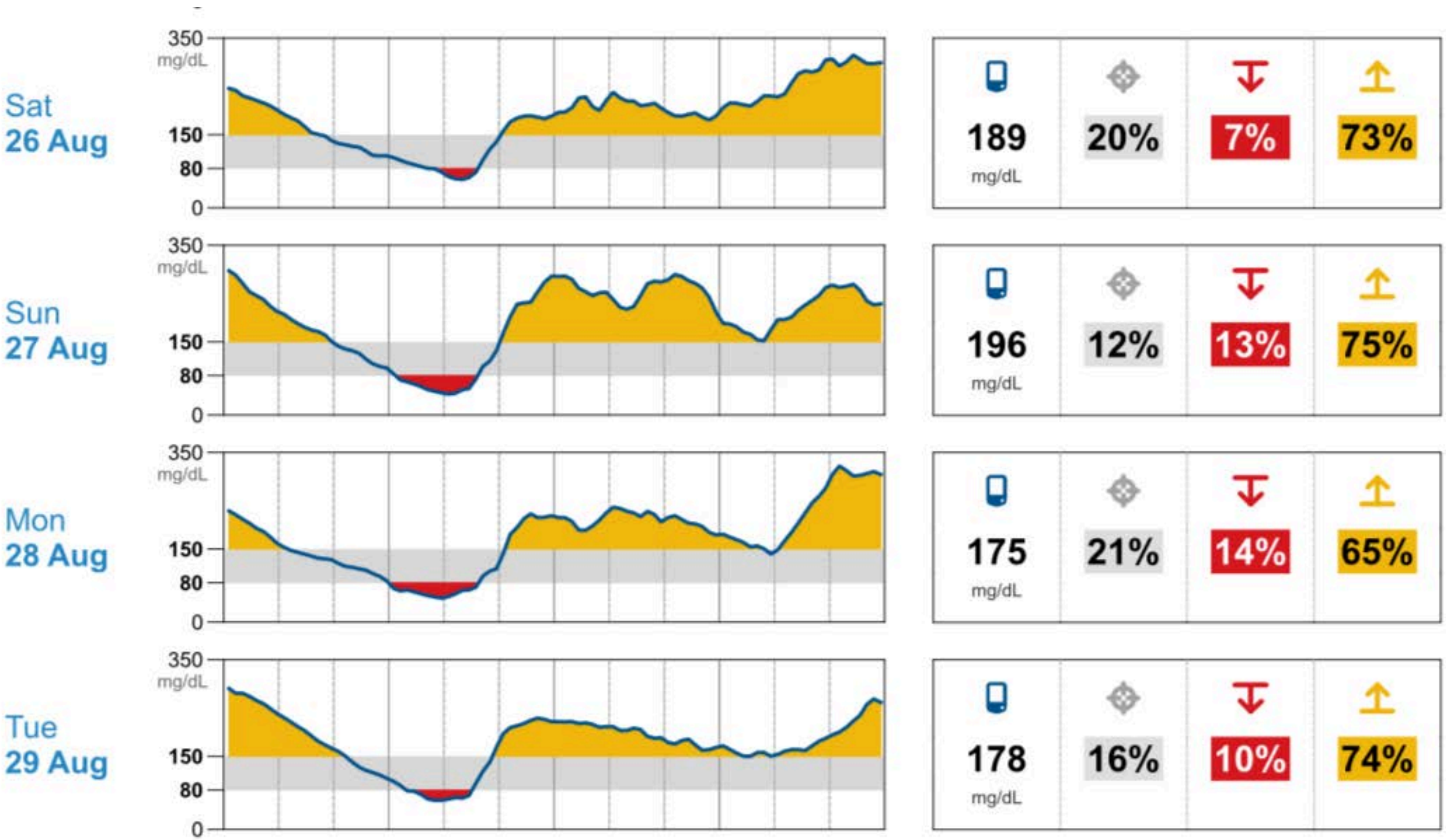


The PM wore the patch as she arrived at the Pride of Britain awards last night
IMAGE: GETTY - CONTRIBUTOR


Daily Graph
(mmol/L)
21
15
9
3
00:00
12:00
24:00
30 Dec
Tuesday
FreeStyle Libre

Case 1: 54 yr old man with hx kidney transplant

NPH insulin once daily, repaglinide with meals



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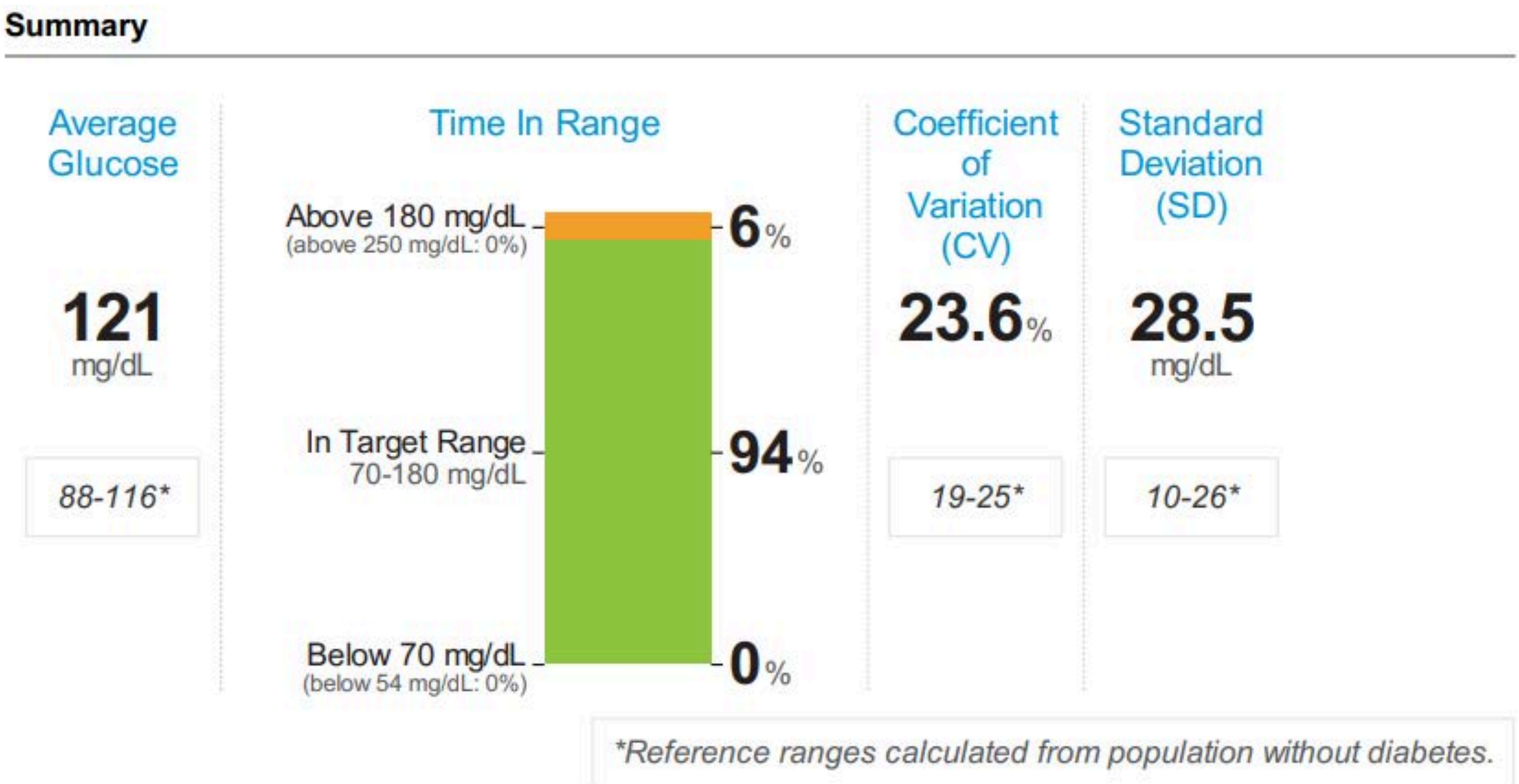
Case 2: 70 yo man with T2D on Metformin

- Diabetes diagnosis approx. 2-3 years ago, no complications
- Coronary artery disease, multiple stents
- A1c 7.3% on 500mg Metformin BID
- A1c 6.5% on 1000mg Metformin BID and decreased dessert
- Never does fingersticks

Case 2: 70 yo man with T2D on Metformin

A1c 6.5% - 7.3%

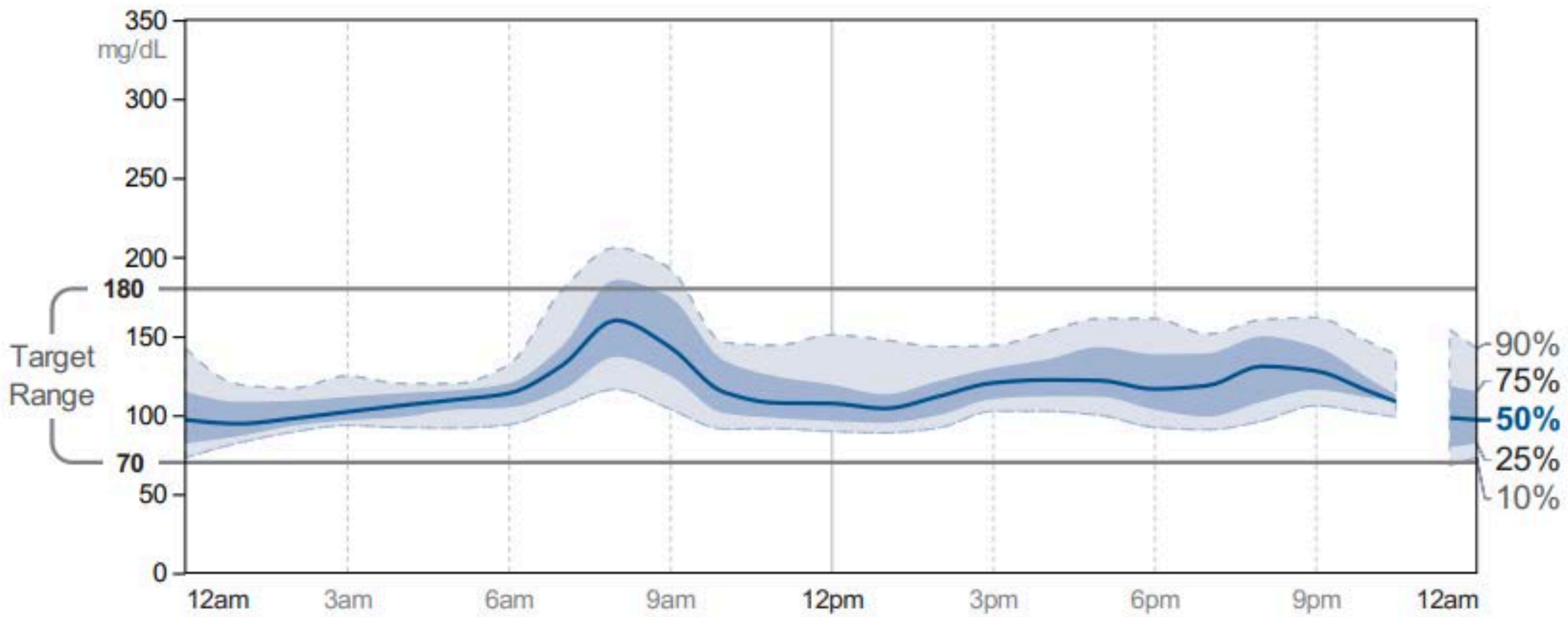


Case 2: 70 yo man with T2D on Metformin

A1c 6.5% - 7.3%

Ambulatory Glucose Profile

Curves/plots represent glucose frequency distributions by time regardless of date



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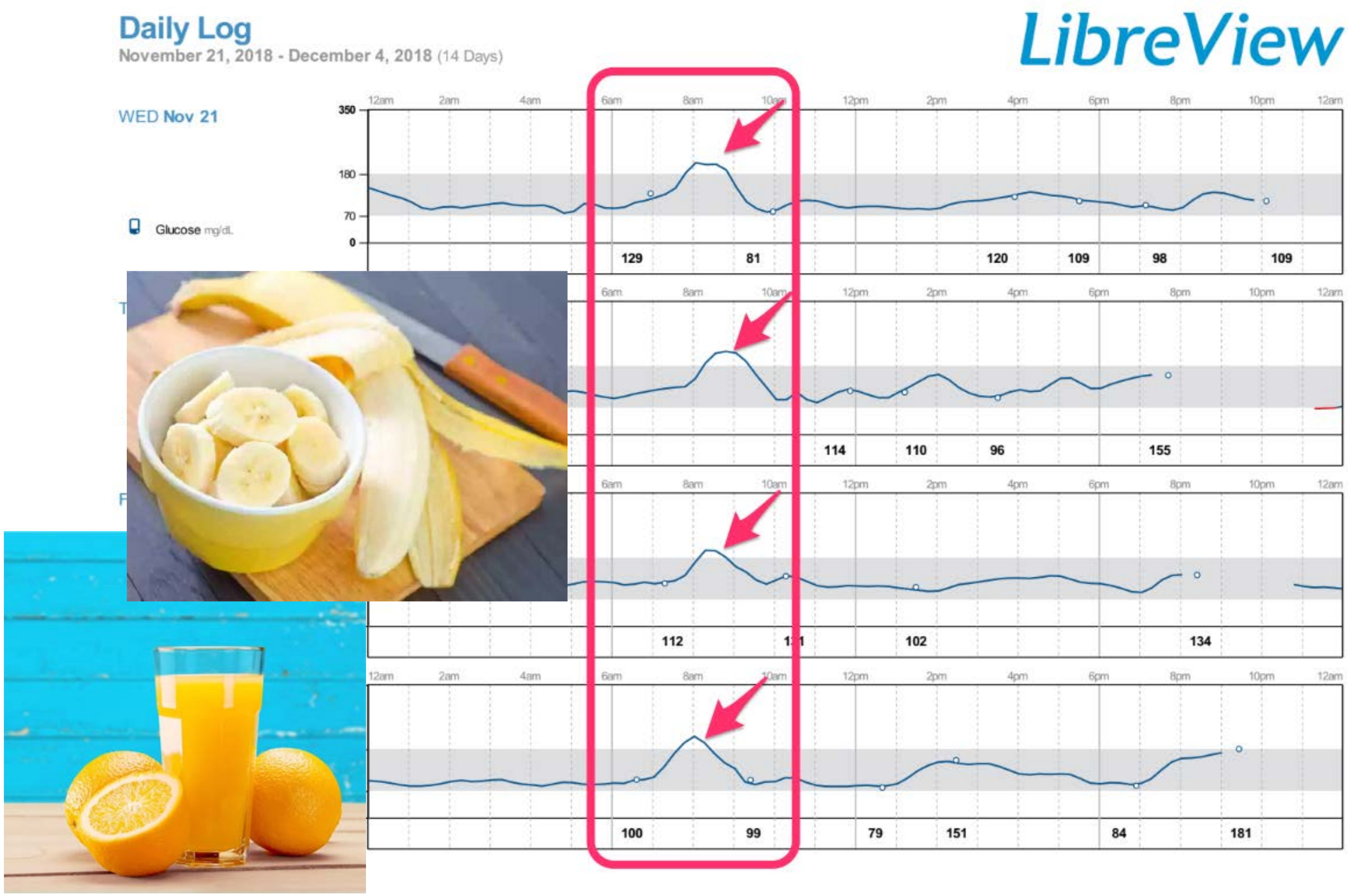

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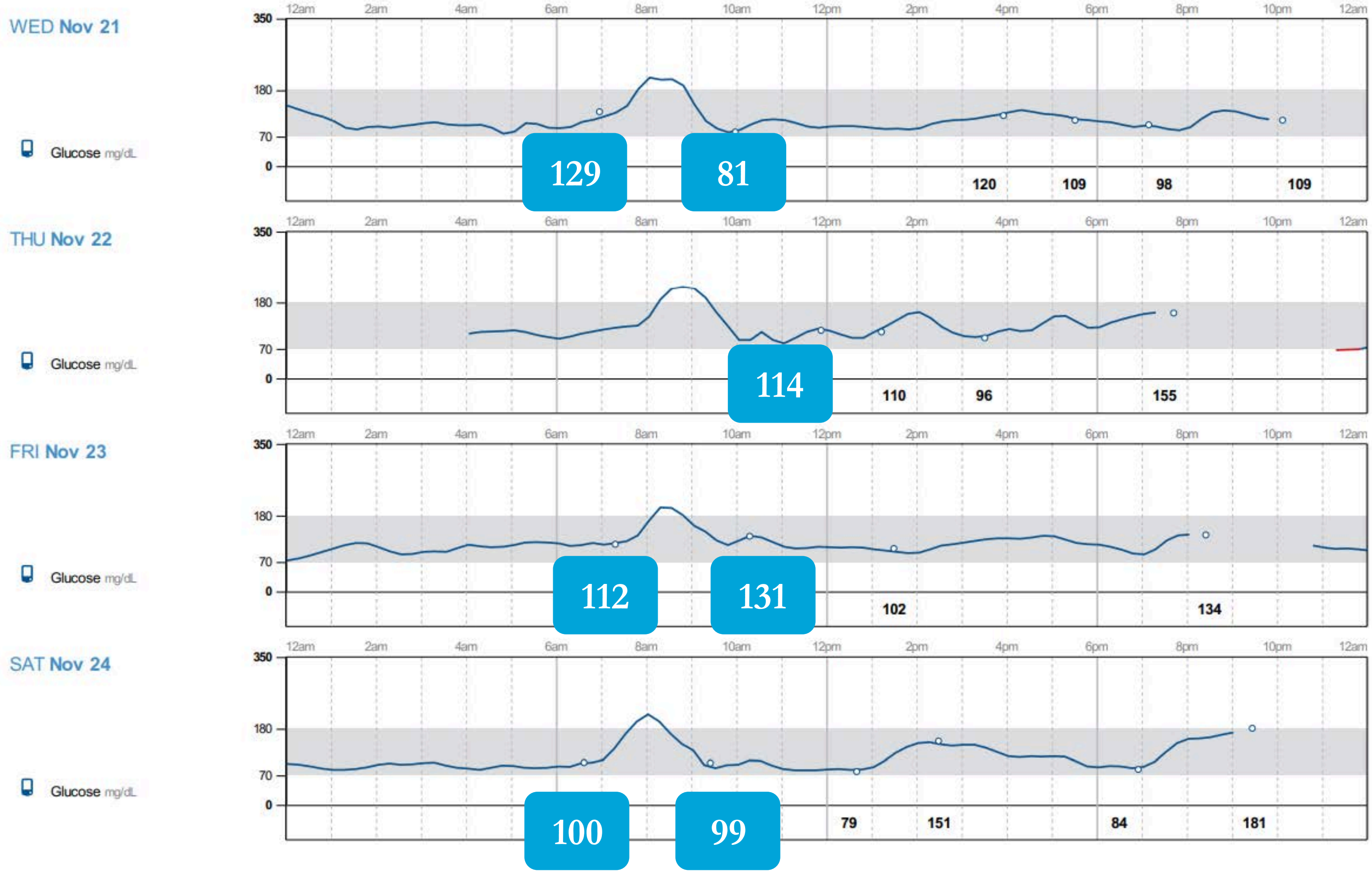
Case 2: 70 yo man with T2D on Metformin

Pre and Post Meal BGs Miss Spike



Freestyle Libre Access and Cost

- Medicare coverage
  - Requires 4x fingerstick per day & 4x insulin injections per day
  - Available via Medicare DME suppliers (eg Edgepark Medical Supplies, Byram Healthcare, Solara Medical Supplies, Edwards Health Care Services, Better Living Now, and Mini Pharmacy)
- Cash prices at retail pharmacies
  - Reader - $70-100 (one time purchase)
  - 14 day sensor - ~$60 each
- Private insurance – Available at retail pharmacies – "Capped" at $75/coinsurance/month – No prerequisite requirements (typically)

- One option, maybe more useful than strips: Use 1 sensor every 90 days – $240/year cash, or $20/mo for 14 days out of every 90 days

2018 Endocrine Society Guidelines - CGM

Real-time continuous glucose monitors in adult outpatients

6.1 We recommend real-time CGM (RT-CGM) devices for adult patients with T1DM who have A1c levels above target and who are willing to use these devices on a nearly daily basis. (1|⊕⊕⊕○)
6.2 We suggest RT-CGM devices for adult patients with well-controlled T1DM who are willing to use these devices on a nearly daily basis. (2|⊕⊕⊕○)
6.3 We suggest short-term, intermittent RT-CGM use in adult patients with T2DM (not on prandial insulin) who have A1c levels >7% and are willing and able to use the device. (2|⊕⊕○○)

Annals of Internal Medicine ORIGINAL RESEARCH

Continuous Glucose Monitoring Versus Usual Care in Patients With Type 2 Diabetes Receiving Multiple Daily Insulin Injections

A Randomized Trial

Roy W. Beck, MD, PhD; Tonya D. Riddlesworth, PhD; Katrina Ruedy, MSPH; Andrew Ahmann, MD; Stacie Haller, RD, LD, CDE; Davida Kruger, MSN, APN-BC; Janet B. McGill, MD; William Polonsky, PhD; David Price, MD; Stephen Aronoff, MD; Ronnie Aronson, MD; Elena Toschi, MD; Craig Kollman, PhD; and Richard Bergenstal, MD; for the DIAMOND Study Group*

79 subjects per group; mean age 60 years; mean A1c 8.5%

At 24 weeks…

	CGM Group	Control (Blinded CGM) Group	P values
Mean A1c	7.5%	7.9%	0.005
Fingersticks	2.9/day	3.8/day	<0.001
Time per day <70 mg/dL	4 minutes	12 minutes	
QoL metrics	No difference		

Digital Coaching Apps and Tools

Digital Diabetes Prevention & Treatment Programs

Company	Populations	Business Model	Key Attributes / Differentiators
Omada Health	Prediabetes; T2D; Obesity; Htn	Direct to Consumer, Health Plan, Employers	Digital coaching in small groups with connected devices, focused on weight loss
Canary Health	Prediabetes; T2D; Obesity	Health Plan, Employers	Prog 1 – 6 wks online workshops Prog 2 – Coaching, lessons
Livongo / Retrofit	T2D; Htn; Obesity	Direct to Consumer, Health Plan, Employers	Connected meter, unlimited strips, personalized insights, and live support after out-of-range reading
Onduo	T2D	Health Plan, Employers	"Virtual diabetes clinic" Food photo image recognition
Virta Health	T2D	Direct to Consumer, Health Plan, Employers	Extreme low-carb (keto) diet $500 to start; $370/mo (12 mo); $199/mo (ongoing)
OneDrop	T2D; T1D	Direct to Consumer	All-in-one program with meter, test strips, and mobile remote coaching
MySugr	T2D; T1D	Direct to Consumer	All-in-one program with meter, test strips, and mobile remote coaching

Omada Health – 3 year data

Table 2A Changes from baseline in body weight and A1c for participants who completed four or more lessons (n=187)

	Weight change (lb)		Weight change (%)		A1c change	
Time point	Mean (SE)*	p Value	Mean (SE)*	p Value	Mean (SE)*	p Value
16 weeks	−11.1 (0.7)	<0.0001	−5.0 (0.3)	<0.0001	+0.03 (.06)	0.55
1 year	−10.0 (0.8)	<0.0001	−4.7 (0.4)	<0.0001	−0.38 (.07)	<0.0001
2 years	−8.3 (1.4)	<0.0001	−4.2 (0.8)	<0.0001	−0.43 (.08)	<0.0001
3 years	−6.7 (2.0)	0.0009	−3.0 (0.9)	0.0009	−0.31 (.09)	0.0008

*Adjusted mean and SE values from linear mixed models. At baseline, these participants had an adjusted mean (SE) weight of 221.4 (3.5) lb and an adjusted mean (SE) A1c of 5.99 (0.08).

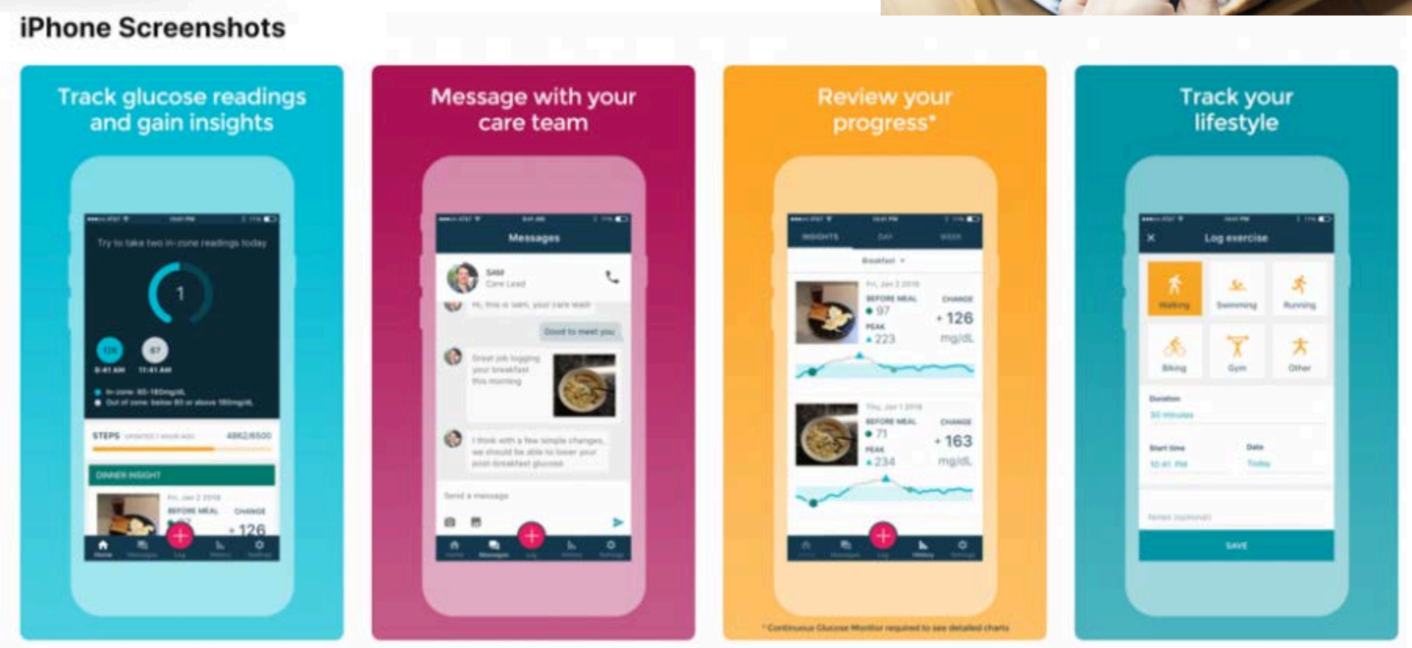
Table 2B Changes from baseline in body weight and A1c for participants who completed nine or more lessons (n = 155)

	Weight change (lb)		Weight change (%)		A1c change	
Time point	Mean (SE)*	p Value	Mean (SE)*	p Value	Mean (SE)*	p Value
16 weeks	−11.6 (0.7)	<0.0001	−5.2 (0.3)	<0.0001	+0.03 (.06)	0.62
1 year	−10.2 (0.9)	<0.0001	−4.9 (0.5)	<0.0001	−0.40 (.07)	<0.0001
2 years	−8.3 (1.4)	<0.0001	−4.3 (0.8)	<0.0001	−0.46 (.08)	<0.0001
3 years	−6.3 (2.1)	0.0024	−2.9 (1.0)	0.0024	−0.33 (.09)	0.0005

*Adjusted mean and SE values from linear mixed models. At baseline, these participants had an adjusted mean (SE) weight of 219.8 (3.9) lb and an adjusted mean (SE) A1c of 6.02 (0.08).

Sepah SC et al. Engagement and outcomes in a digital Diabetes Prevention Program: 3-year update. BMJ Open Diab Res Care 2017.

Onduo – Virtual Diabetes Clinic



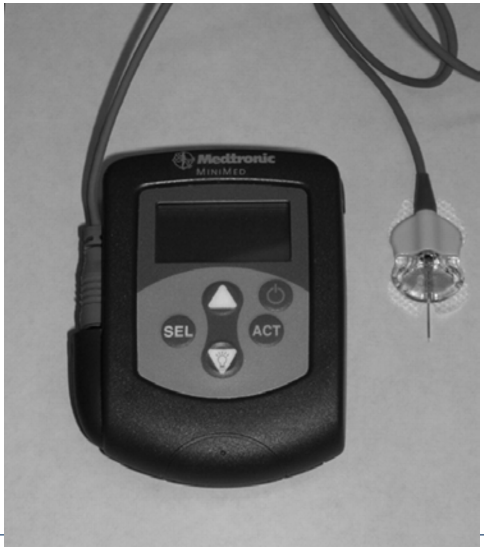
https://diatribe.org/onduo-delivers-diabetes-clinic-and-coaching-your-smartphone

CGM in Type 1 Diabetes

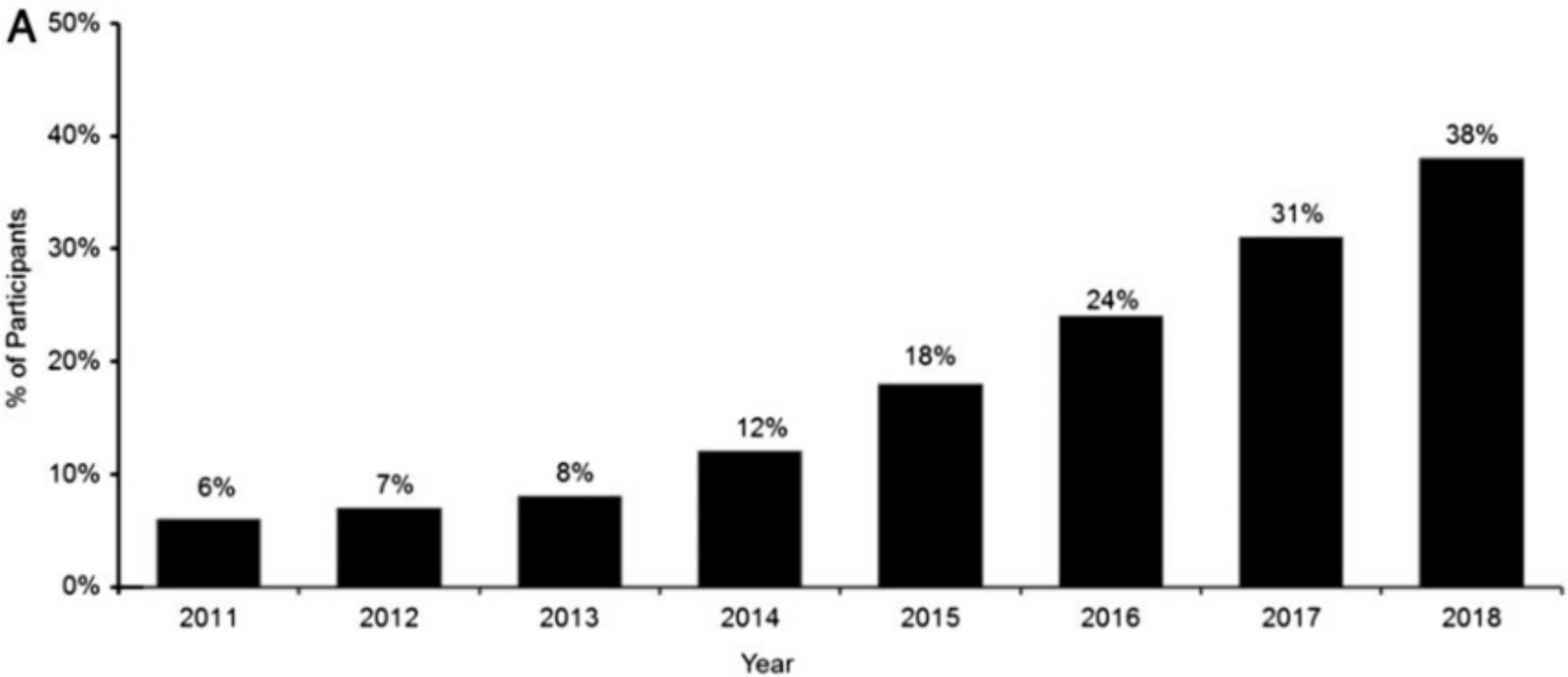
Historical Perspective

1983 – First insulin pump

1999 – First continuous glucose monitor



T1D Exchange: CGM Use Over Time



Foster NC et al. State of Type 1 Diabetes Management and Outcomes from the T1D Exchange in 2016-2018. Diabetes Technology & Therapeutics. 2019 Feb.

Why are more people interested in CGM?

1999 vs 2019

- Bulky
- Painful insertion
- Expensive
- Poor accuracy
- Multiple calibrations
- <3 day wear
- Data trapped

- Slimmer
- Easier to insert
- Increasing coverage
- Improved accuracy
- No calibrations
- 10+ day wear
- Data liquidity

1999

2019

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“

In 2019, every person with type 1 diabetes (who is willing to do so) should have a continuous glucose monitor

Endocrine Society Guidelines… Translated

CGM Comparison

Sensor	G5	G6	FreeStyle Libre	Enlite 2	Guardian 3	Eversense
Company	Dexcom	Dexcom	Abbott	Medtronic	Medtronic	Senseonics
Insertion	Applicator	Applicator	Applicator	Applicator	Applicator	Surgery
Sensor Life	7 days +	10 days	14 days	6 days	7 days	90 days
Calibration	2 / day	None	None	2 / day	2-4 / day	2 / day
Cost						
Receiver	Smartphone or Device	Smartphone or Device	Smartphone or Device	Receiver	Smartphone	
MARD	9%	9%	9.4%	13.6%	9.1-10.6%	8.5%
Alerts	Yes	Yes	No	Yes	Yes	Yes
Choose for…	None	Most T1D	T2D on insulin; T1D not wanting Dexcom; Other T2D?	None	670G only	T1D not wanting CGM visible 24/7

CGM: Real time vs Intermittent Scan?

Real-Time CGM

- Intensive Insulin
- Freq hypo / nocturnal hypo
- Hypo unawareness
- Physically active
- Caregiver following remotely
- Closed-loop

Intermittent Scan CGM

- Educational tool
- T2D not on insulin
- T2D well-controlled on insulin
- Looking for a transition
- Low risk of hypo
- Cannot afford rtCGM

Adolfsson P, Parkin CG, Thomas A, Krinelke LG. Selecting the Appropriate Continuous Glucose Monitoring System - a Practical Approach. Eur Endocrinol. 2018 Apr;14(1):24–9.

How to read CGM data

Step 1: The Basics

CGM Key Metric for Data Analysis	Targets, Action
Data sufficiency	10-14 days
CGM use	>70%
Standard deviation	<33% of mean sensor glucose value
Percent time in range (70-180 mg/dL)	>70%
Percent time in hypoglycemia	<3%
Percent time in hyperglycemia	<25%

Aleppo G, Webb K. Continuous Glucose Monitoring Integration in Clinical Practice: A Stepped Guide to Data Review and Interpretation. J Diabetes Sci Technol. 2018 Nov 19;2018:1932296818813581.

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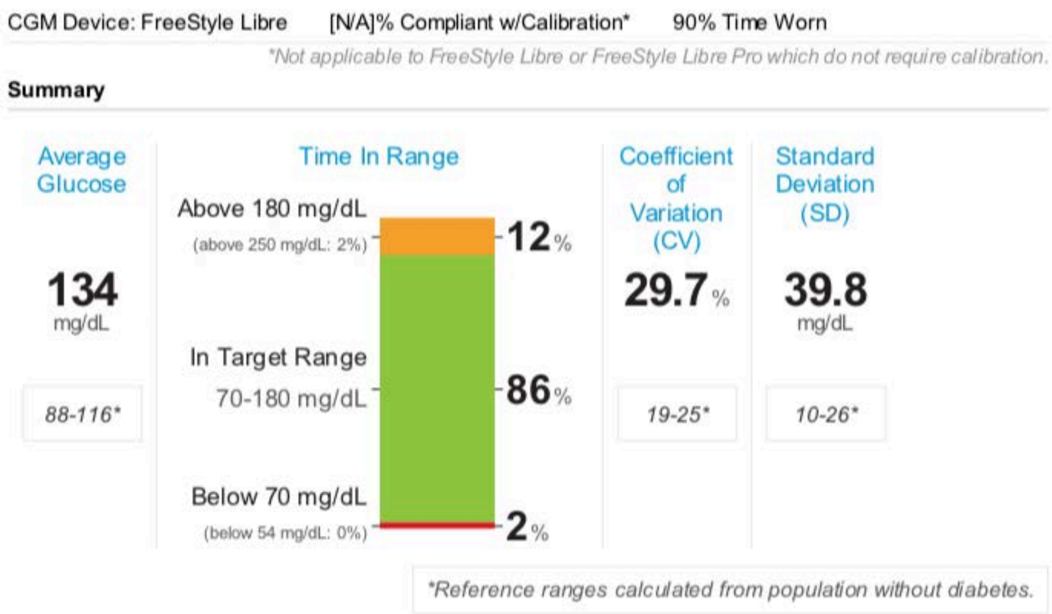


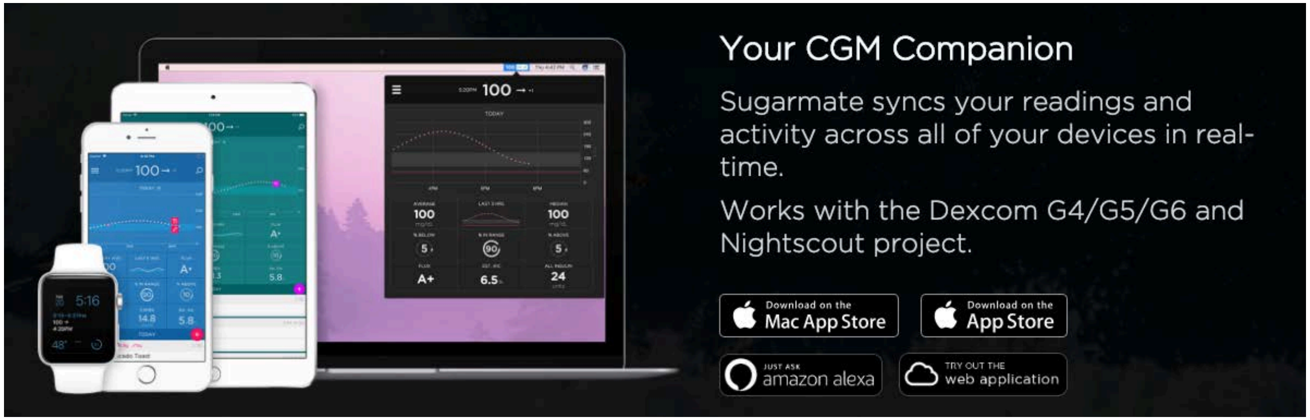
Aleppo G, Webb K. Continuous Glucose Monitoring Integration in Clinical Practice: A Stepped Guide to Data Review and Interpretation. J Diabetes Sci Technol. 2018 Nov 19;2018:1932296818813581.

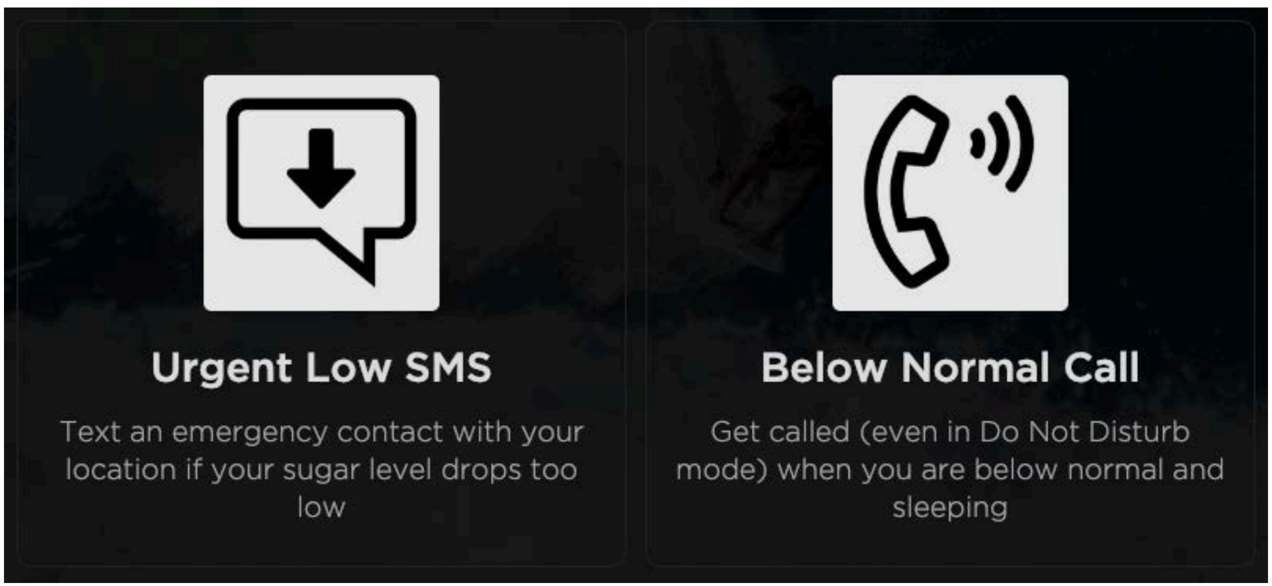
Table 2. Rate of Change Trend Arrows in FDA-Approved CGM Systems and Integrated Insulin Pump Systems.

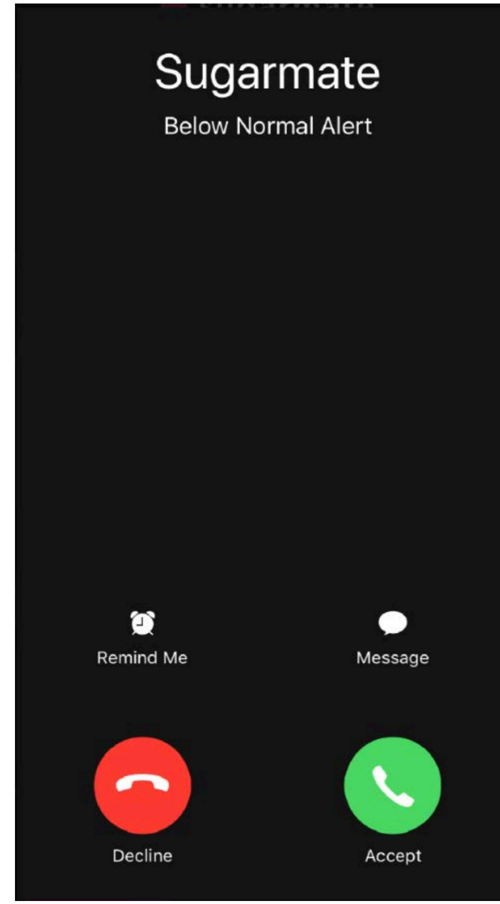
	Medtronic MiniMed Enlite 2 (530G)	Medtronic MiniMed Guardian 3 (670G) Enlite 2 (630G) Guardian Connect	Dexcom G4 Platinum G5, t:slim X2 G6, t:slim X2-Basal IQ	FreeStyle Libre	Senseonics Eversense
↑↑↑	N/A	Glucose is rising at a rate of ⩾3 mg/dL per minute	N/A	N/A	N/A
↑↑	Glucose is rising at a rate of 2 mg/dL or more per minute	Glucose is rising at a rate of ⩾2 but <3 mg/dL per minute	Glucose is rapidly rising >3 mg/dL per minute	N/A	N/A
↑	Glucose is rising at a rate of 1 to 2 mg/dL per minute	Glucose is rising at a rate of ⩾1 but <2 mg/dL per minute	Glucose is rising 2-3 mg/dL per minute	Glucose is rising quickly (>2 mg/dL per minute)	Very rapidly rising glucose levels, rising at a rate more than 2 mg/dL per minute
↗	N/A	N/A	Glucose is slowly rising 1-2 mg/dL per minute	Glucose is rising (1-2 mg/dL per minute)	Moderately rising glucose level, rising at a rate between 1 mg/dL and 2 mg/dL per minute
→	N/A	N/A	Steady; glucose is not increasing/decreasing >1 mg/dL per minute	Glucose is changing slowly (<1 mg/dL per minute)	Gradually rising or falling glucose levels, falling or rising at a rate between 0 and 1 mg/dL per minute
↘	N/A	N/A	Glucose is slowly falling 1-2 mg/dL per minute	Glucose is falling (1-2 mg/dL per minute)	Moderately falling glucose levels, falling at a rate between 1 mg/dL and 2 mg/dL per minute
↓	Glucose is falling at a rate of 1 to 2 mg/dL per minute	Glucose is falling at a rate of ⩾1 but <2 mg/dL per minute	Glucose is falling 2-3 mg/dL per minute	Glucose is falling quickly (>2 mg/dL per minute)	Very rapidly falling glucose levels, falling at a rate more than 2 mg/dL per minute
↓↓	Glucose is falling at a rate of 2 mg/dL or more per minute	Glucose is falling at a rate of ⩾2 but <3 mg/dL per minute	Glucose is rapidly falling >3 mg/dL per minute	N/A	N/A
↓↓↓	N/A	Glucose is falling at a rate of ⩾3 mg/dL per minute	N/A	N/A	N/A

Aleppo G, Webb K. Continuous Glucose Monitoring Integration in Clinical Practice: A Stepped Guide to Data Review and Interpretation. J Diabetes Sci Technol. 2018 Nov 19;2018:1932296818813581.

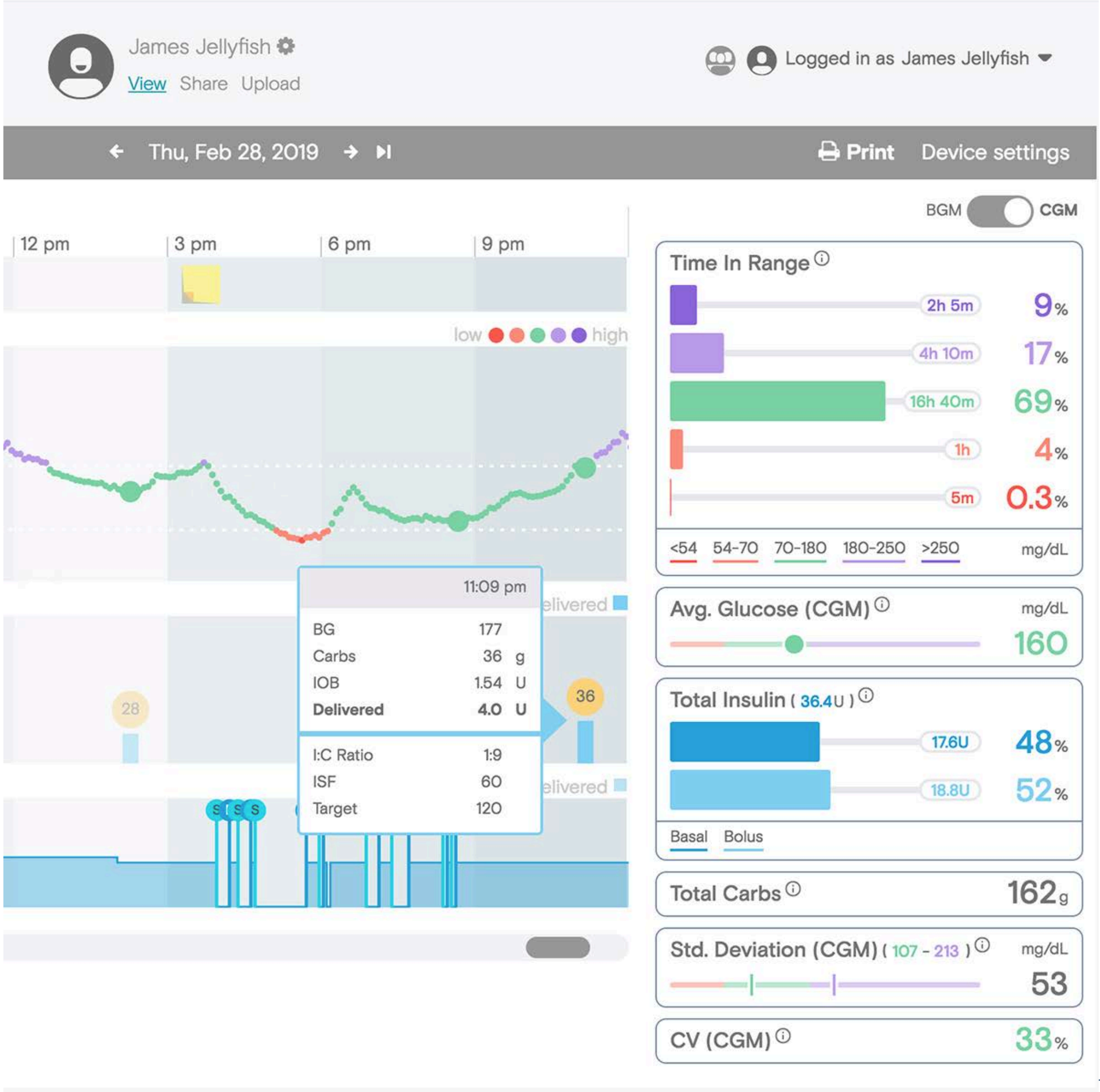
sugarmate


Your CGM Companion
Sugarmate syncs your readings and activity across all of your devices in real-time.
Works with the Dexcom G4/G5/G6 and Nightscout project.
Download on the Mac App Store
Download on the App Store
JUST ASK amazon alexa
TRY OUT THE web application


Urgent Low SMS
Text an emergency contact with your location if your sugar level drops too low
Below Normal Call
Get called (even in Do Not Disturb mode) when you are below normal and sleeping


Sugarmate
Below Normal Alert
Remind Me
Message
Decline
Accept

Tidepool



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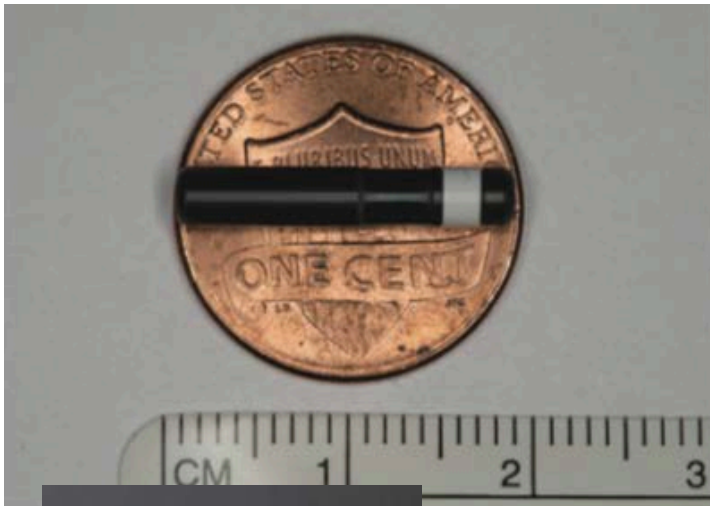
Senseonics - Eversense Implantable CGM



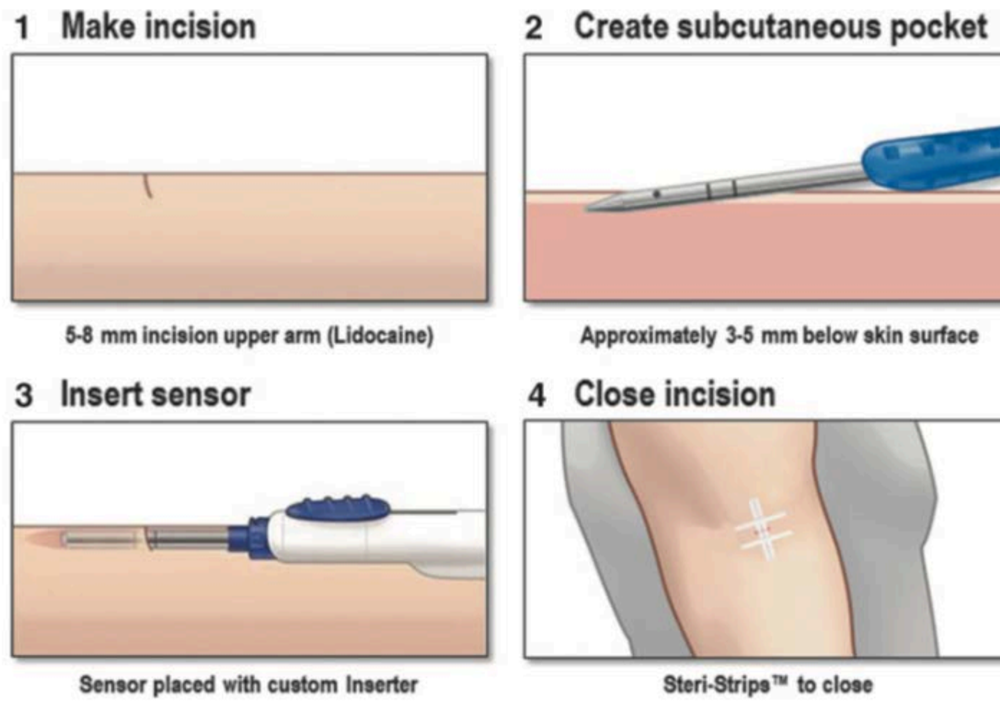


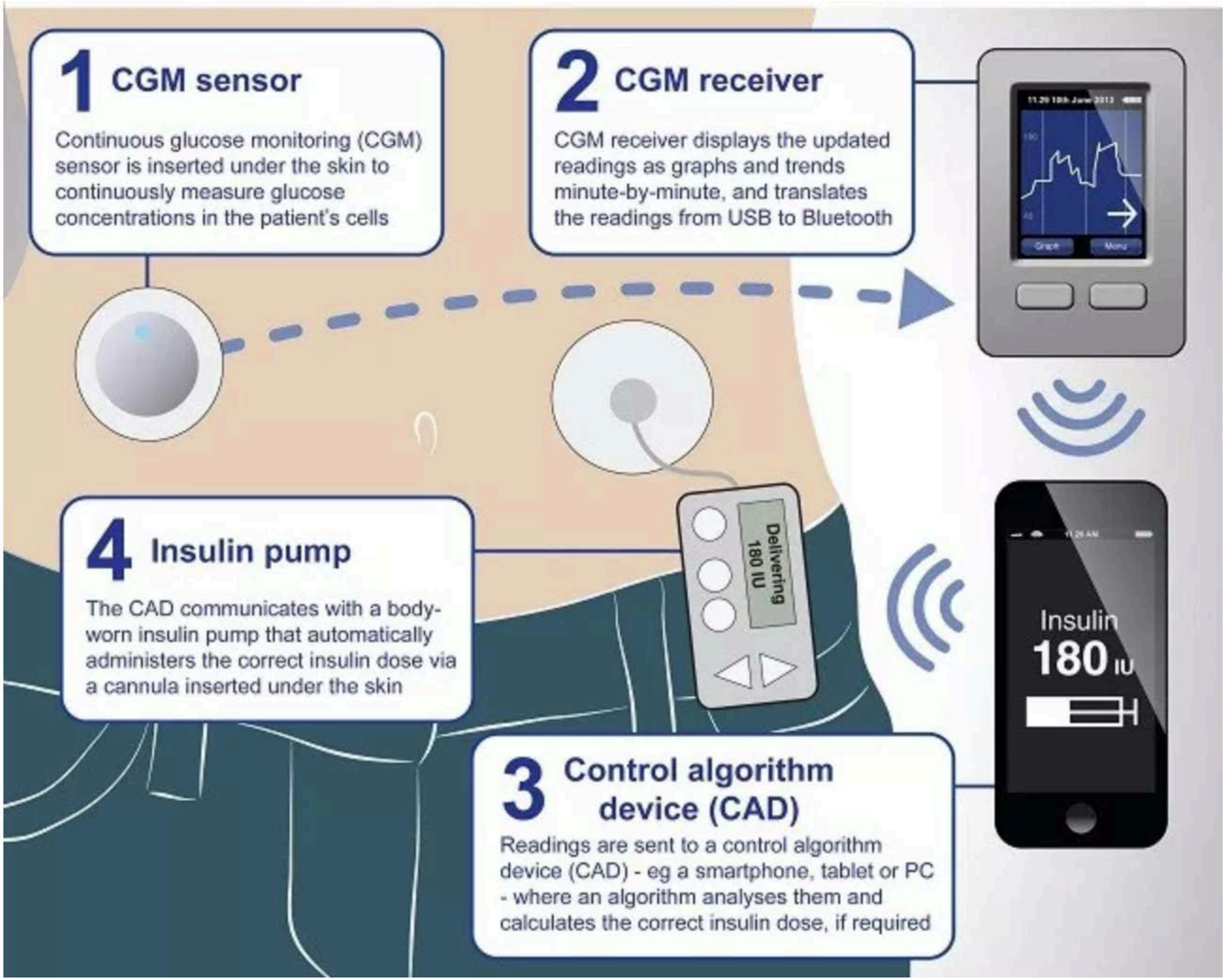
FIG. 2. Eversense sensor insertion procedure.

https://www.healthline.com/diabetesmine/first-review-eversense-implantable-cgm-diabetes%2312#1

Type 1: Closed Loop Insulin Delivery

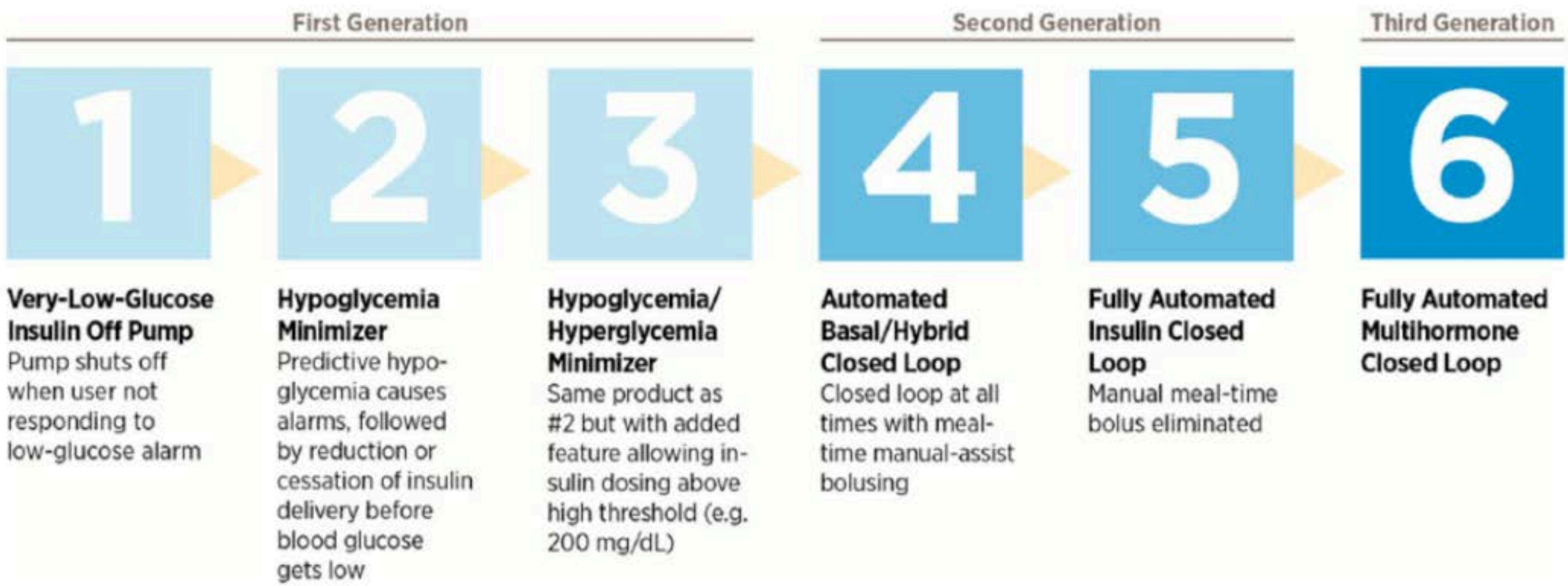
Insulin Pump Comparison Table

Pump	t:slim x2	670G	Omnipod
Company	Tandem	Medtronic	Insulet
Tubing vs Patch	Tubing	Tubing	Patch
Automation	Basal suspend	Hybrid closed-loop	None
Software Updatable	Yes	No	No
Device	Color touchscreen	Color screen w/ buttons	Separate controller device
Receiver	Smartphone or Device	Smartphone or Device	Smartphone or Device
CGM Integration	Yes (Dexcom)	Yes (Medtronic)	No



https://www.healthline.com/diabetesmine/artificial-pancreas-what-you-should-know#2

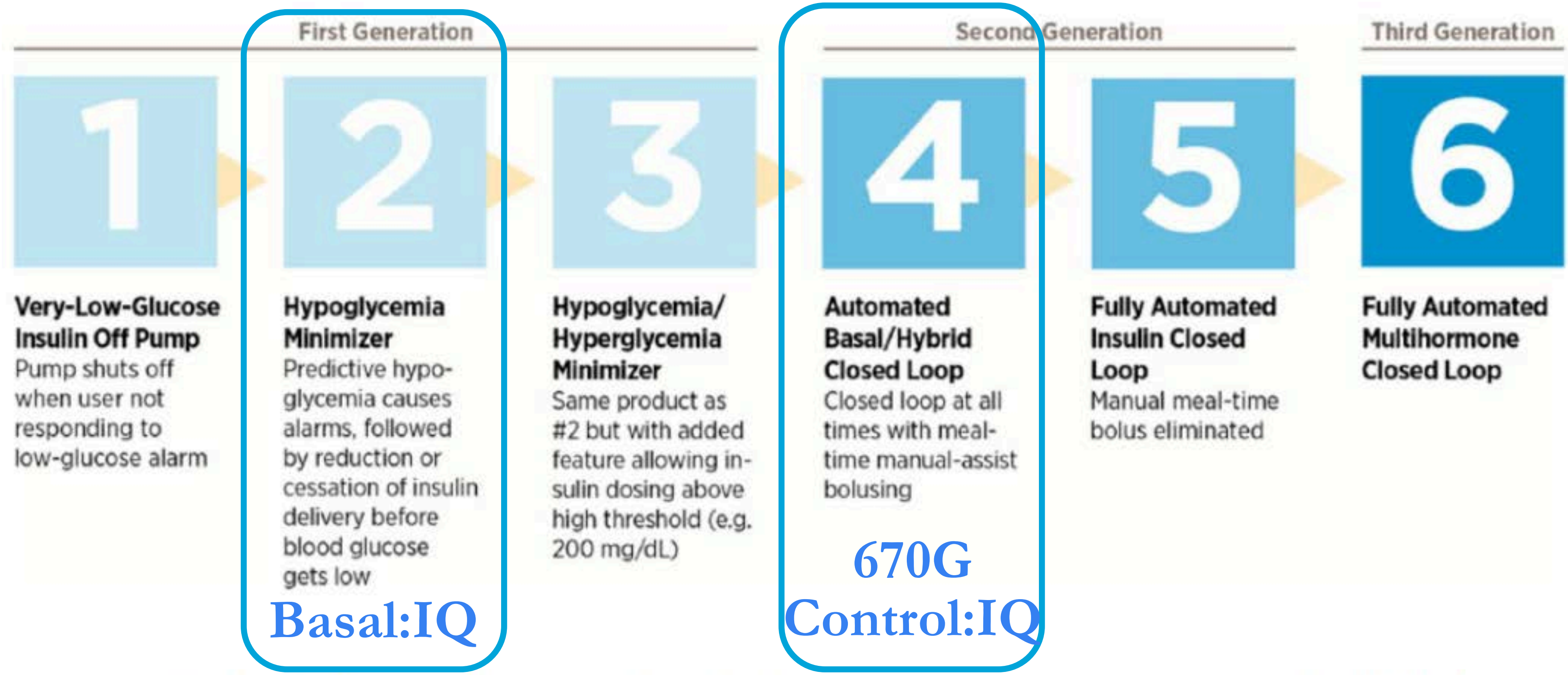
Stages of Artificial Pancreas Development



The 6 developmental stages of artificial pancreas device systems (copyright JDRF).

Trevitt S et al. Artificial Pancreas Device Systems for the Closed-Loop Control of Type 1 Diabetes: What Systems Are in Development? J Diabetes Sci Technol. 2016 May.

Stages of Artificial Pancreas Development



The 6 developmental stages of artificial pancreas device systems (copyright JDRF).

Trevitt S et al. Artificial Pancreas Device Systems for the Closed-Loop Control of Type 1 Diabetes: What Systems Are in Development? J Diabetes Sci Technol. 2016 May.

For what type of person is 670G right?
(adapted from Gary Scheiner)

Benefit Least		**Benefit Most**
Tight	BG Control Sought	Conservative
Doer	Work Involvement	Delegator
Erratic	Preferred Lifestyle	Structured
Averse	Technical Ability	Savvy
Variable	Basal Pattern	Flat

Gary Scheiner - http://integrateddiabetes.com/670g-and-me-insights-and-incites-on-medtronics-latest-system/

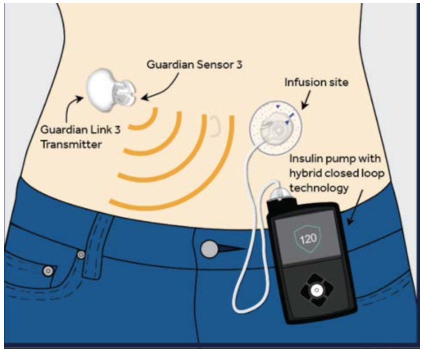
670G: Who does what?

- Clinician-Set
  - Carb ratio
  - Active insulin time
  - Manual mode settings
- Algorithm-Determined
  - Auto basal
  - Insulin sensitivity factor
  - Auto mode targets
- Patient
  - Fingerstick calibrations
  - Input carbohydrates
  - Announce exercise
  - Input fingersticks for correctional boluses

Learnings over 1-2 years with 670G

1. Diabetes “work effort” does not decrease. It changes.
2. You can reduce highs and lows, especially reduced fear of nocturnal hypoglycemia.
3. The algorithm doesn’t really “learn” you. It adapts to past 6 days.
4. System target is conservative.
5. You lose a lot of flexibility. To some, control.
   - No manual boluses, no extended boluses, no temp basals
   - System chooses sensitivity factors / correction. You change carb ratios.
6. Guardian sensors can be unreliable.

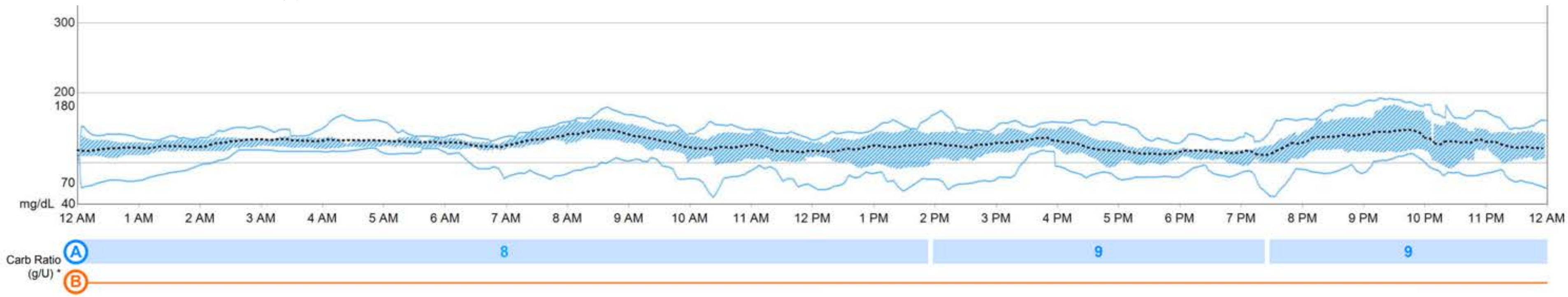
It still takes a lot of work and patient input, but, most of the time you have to “let go”

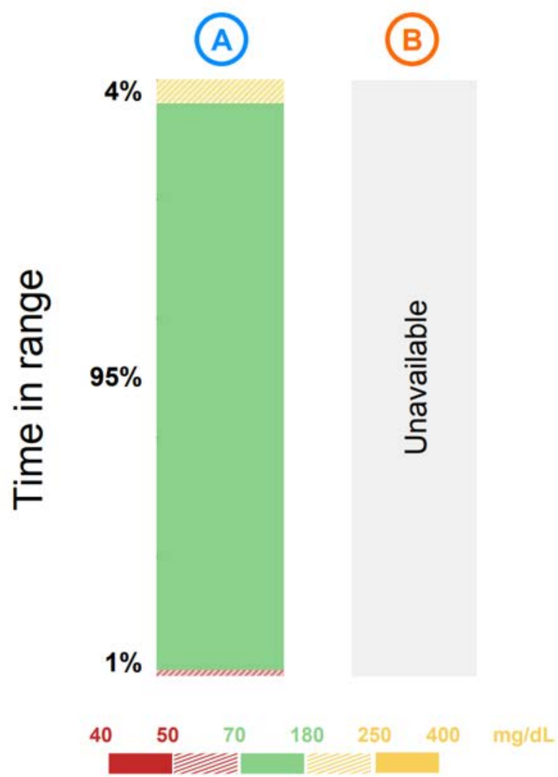


Here is what 670G use looks like…

UCSF

Here is what 670G use looks like…

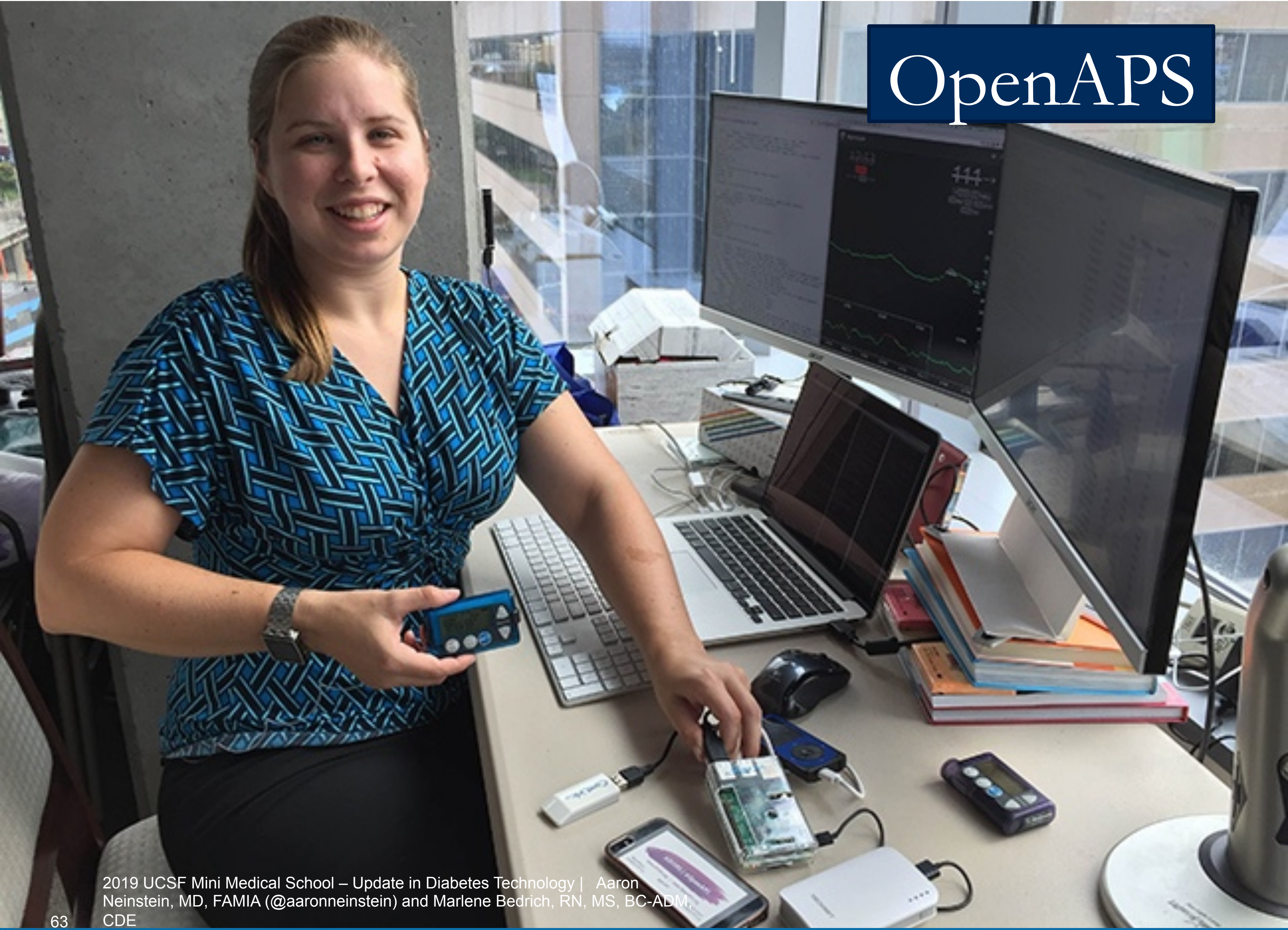




Statistics

Statistics	A
Auto Mode (per week)	88% (6d 04h)
Manual Mode (per week)	12% (20h)
Sensor Wear (per week)	86% (6d 01h)
Average SG ± SD	127 ± 26 mg/dL
Estimated A1C	6.0%
Average BG	127 ± 34 mg/dL
BG / Calibration (per day)	4.8 / 4.2
Total daily dose (per day)	33 units
Bolus amount (per day)	23U (70%)
Auto Basal / Basal amount (per day)	10U (30%)
Set Change	3
Reservoir Change	3
Meal (per day)	7.7
Carbs entered (per day)	229 ± 50g
Active Insulin time	2:30 hrs

UCSF



2019 UCSF Mini Medical School – Update in Diabetes Technology | Aaron Neinstein, MD, FAMIA (@aaronneinstein) and Marlene Bedrich, RN, MS, BC-ADM, CDE

Source: Dana Lewis

Loop

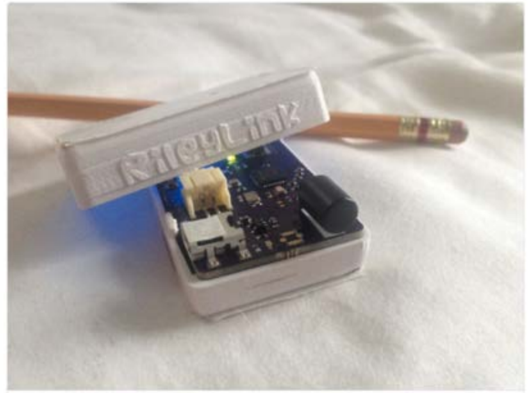
Ali Mazaheri
@AliMazaheri

Follow

First day at school with Loop @loudnate @ps2 @bewestisdoing

8:07 AM - 24 Aug 2016

3 28



Howard Look
@howardlook

Follow

Ready for the first day of school with Loop and RileyLink. Thanks @loudnate @ps2 @OpenAPS

7:48 AM - 15 Aug 2016

4 27

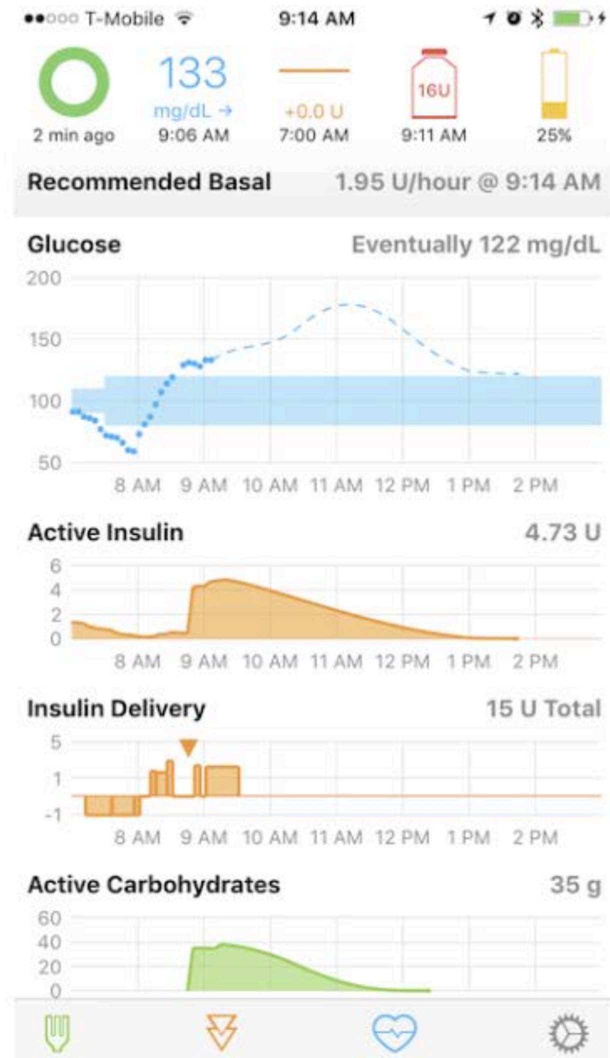
Katie DiSimone
@kdisimone

Follow

Today we started #Loop. Tested it last night with a not-low-carb meal and wow! I could cry happy tears @loudnate @ps2 THANK YOU

5:39 AM - 22 Sep 2016

4 15



https://www.diabettech.com/looping-a-guide/what-is-it/

What else is coming in Closed Loop?

Vendor	Status
Tandem Control:IQ	Clinical trials ongoing
Insulet – Omnipod Horizon	Clinical trials ongoing
Tidepool Loop	• JDRF announced Open Protocol Automated Insulin Delivery in Oct 2017 • Dexcom G6 received FDA approval in March 2018 as an "interoperable CGM" • "Mix and match" closed-loop communicating via open protocols - Omnipod is initial pump manufacturer
Bionic Pancreas iLet	Pivotal study testing dual hormone system (insulin & glucagon) expected 2019
Bigfoot Biomedical	• Looking to be a comprehensive "service" rather than a device • Will include CGM (Abbott Libre), pens, pump, meter

Give it a shot.
Klue and T1D.

Klue's Artificial Intelligence Platform for Type 1 Diabetes.

The next step towards a fully autonomous artificial pancreas system......

Sign up!

KLUE

Summary

- Think ”Beyond A1c"
- Who *should* get CGM: All T1D, many T2D, some w risk factors
- Who *is* getting CGM: Not enough people with T1D (<40%)
- Digital care: Lots of options for connected mobile coaching
- Closed Loop Insulin Delivery: More options… coming.

Predictions for 2020…

For type 2 diabetes / metabolic syndrome

- Fingersticks start to disappear
- CGM use outside of diagnosis of diabetes
- Increasing virtual care and coaching options

For type 1 diabetes

- Increasingly ubiquitous CGM
- Closed loop options expand from 1 to 3

Predictions for 2025…

For type 2 diabetes / metabolic syndrome

- Fingersticks are gone
- Many use CGM – smaller, cheaper, easier
- Ubiquitous virtual care and remote coaching

For type 1 diabetes

- Fingersticks are gone
- Long-lasting CGM
- Fully autonomous closed-loop insulin delivery
- Interoperable Closed Loop systems
- A1c largely disappears