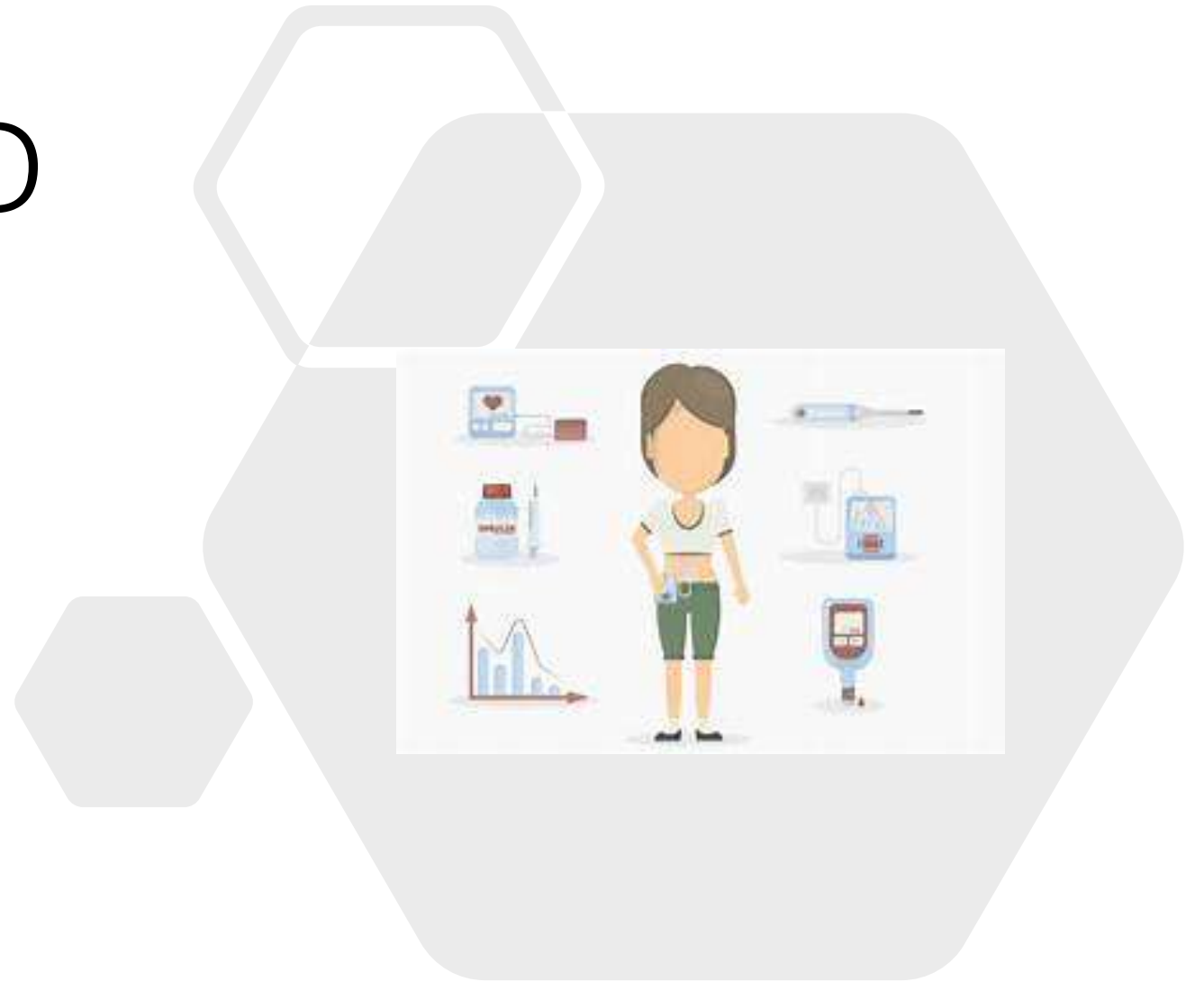


DIABETES AND TECHNOLOGY 2021

Is it worth it



Relationships with commercial interests:

Grants/Research support NOVONORDISK; SANOFI

Speaker's bureau/honoraria:DEXCOM; ANIMAS; MEDTRONIC; ELI LILLY
NOVORDISK; BI ; SANOFI; Abbott

Consulting/Advisory Board:SAME AS ABOVE

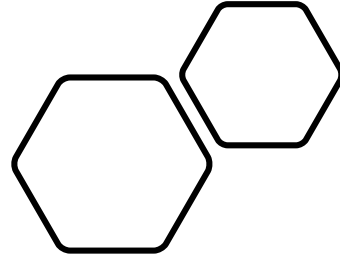
Other/Patents

TECHNOLOGY AND DIABETES



[This Photo](#) by Unknown Author is licensed under [CC BY-NC](#)

DIABETES TECHNOLOGY WHAT A FAMILY DOCTOR SHOULD KNOW



- Flash monitoring; CGM our new world
- Connectivity to your clinic for a virtual experience
- Insulin pumps basic
- Retinal cameras
- SMART PENS

IS VIRTUAL MEDICINE HERE TO STAY

A) YES

B) NO

TOOLS FOR VIRTUAL MEDICINE

- DO YOU USE PLATFORMS FOR YOUR DIABETES PATIENT; SO YOU CAN SEE THEIR DATA
- A) YES
- B) NO

HAVE YOU HEARD OF

- DEXCOM CLARITY
 - A) YES
 - B) NO
- LIBREVIEW
 - A) YES
 - B) NO
- TIDE POOL
 - A) YES
 - B)NO

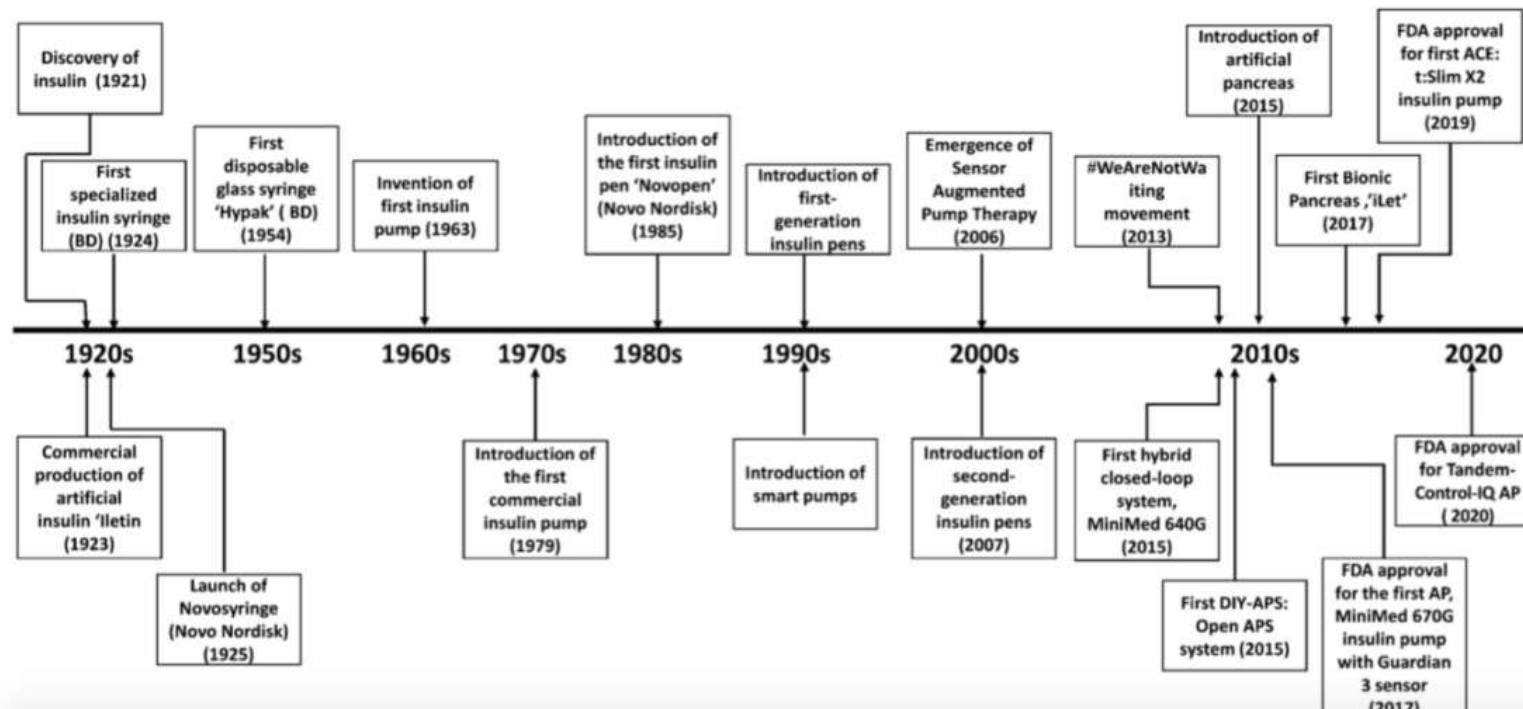
WOULD YOU BE INTERESTED IN LEARNING MORE ABOUT THESE PLATFORMS

- A) YES
- B) NO TAKES TOO MUCH TIME
- C) TEACH ME ABOUT IT AND MAYBE WOULD INCORPORATE IT

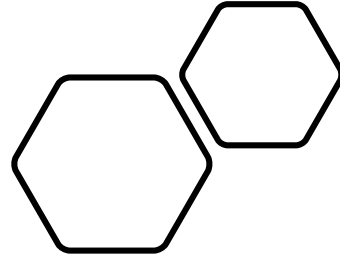
HOW MANY PATIENTS A WEEK DO YOU SEE TYPE 1 DIABETES OR TYPE 2 DIABETES

- A) 0 TO 5
- B) 5 TO 10
- C) 10 TO 15
- D) OVER 15

Diabetes Technology Timeline



DIABETES
TECHNOLOGY
WHAT A FAMILY
DOCTOR
SHOULD KNOW



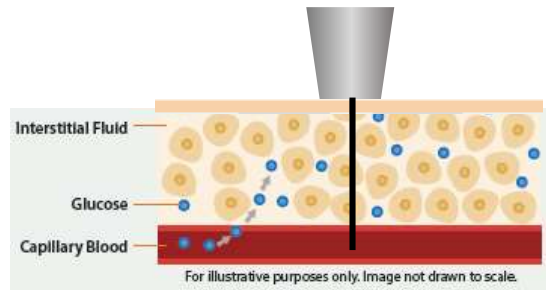
- **Flash monitoring;CGM our new world**
- Connectivity to your clinic for a virtual experience
- Insulin pumps basic
- Retinal cameras
- SMART PENS

A close-up photograph of a person's arm. The person is holding a smartphone in their left hand, which displays a green screen with a large white number '170' and the unit 'mg/dL'. A white, circular, adhesive sensor is attached to the person's right arm. The background is blurred, showing what appears to be a blue and white patterned fabric.

Technology

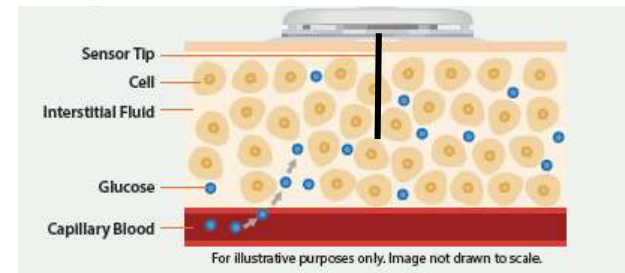
**FREESTYLE LIBRE: THIS DEVICE
MEASURES YOUR BLOOD SUGAR
WITHOUT USING A NEEDLE**

CAPILLARY GLUCOSE VS. INTERSTITIAL GLUCOSE



CAPILLARY GLUCOSE:

- Insertion through the skin – with steel lancet – approximately 2.5 to 3.5 mm with pressure to reach the capillary blood system
- Capillary blood absorbed from the skin by test strip
- Technique can affect results









INTERSTITIAL GLUCOSE:

- Insertion through the skin – approximately 4 mm
- Metal inserter – leaves after inserted
- Small plastic filament in the interstitial fluid to obtain glucose sample
- 90-degree insertion lasting 14 days

KEEP THIS IN MIND – Interstitial Fluid is a “DIFFERENT” sample source.

A growing body of evidence supports use of the FreeStyle Libre system in people with T1DM and T2DM

 ↓ HbA1c	 ↓ Hypoglycemia	 ↑ TIR	 ↓ Hospitalizations	 ↑ QoL and satisfaction	 ↓ Absentessim
<p>T1DM: SELFY¹ T2DM: Yaron et al.²</p> <p>T2DM: REFER meta-analysis⁵ T1DM & T2DM: Evans et al. meta-analysis⁶</p> <p>T1DM: UK Edinburgh⁷ T1DM & T2DM: Swedish NDR⁸, FLARE⁹, ABCD¹⁰</p>	<p>T1DM: IMPACT³ T2DM: REPLACE⁴ T1DM/T2Dm: Jangam et al Lang et al.</p>	<p>T1DM: SELFY¹, IMPACT³</p> <p>T1DM & T2DM: ADC Device Data analysis (increased TIR associated with increased scan frequency)¹¹</p>	<p>Acute events T1DM: UK Edinburgh⁷, FUTURE¹² T2DM: US MarketScan¹³ T1DM & T2DM: ABCD¹⁰, RELIEF¹⁴</p> <p>Diabetes-related T1DM & T2DM: FLARE⁹</p> <p>All-cause T2DM: US MarketScan¹³</p>	<p>T1DM: SELFY¹, IMPACT³ T2DM: REPLACE⁴, Yaron et al.²</p> <p>T1DM: UK Edinburgh⁷, FUTURE¹² T1DM & T2DM: FLARE⁹, ABCD¹⁰, Al Hayek et al.¹⁵</p>	<p>T1DM: FUTURE¹², T1DM & T2DM: FLARE⁹</p>

 **Clinical trial**
 **Meta-analyses**
 **RWE**

RWE = real-world evidence; T1DM = type 1 diabetes mellitus; T2DM = type 2 diabetes mellitus

1. Campbell F et al. "Outcomes of using flash glucose monitoring technology by children and young people with type 1 diabetes in a single arm study." *Pediatr Diabetes* 2018;(7):1294-1301. doi: 10.1111/peidi.12735; 2. Yaron M et al. "Effect of Flash Glucose Monitoring Technology on Glycemic Control and Treatment Satisfaction in Patients With Type 2 Diabetes." *Diabetes Care* 2019;42(7):1178-84. doi.org/10.2337/dc18-0166; 3. Bolinder J et al. "Novel glucose-sensing technology and hypoglycaemia in type 1 diabetes: a multicentre, non-masked, randomised controlled trial." *Lancet* 2016;388(10057):2254-63. doi.org/10.1016/S0140-6736(16)31535-5; 4. Haak T et al. "Flash Glucose-Sensing Technology as a Replacement for Blood Glucose Monitoring for the Management of Insulin-Treated Type 2 Diabetes: A Multicenter, Open-Label Randomized Controlled Trial." *Diabetes Ther* 2017;8(1):55-73. doi: 10.1007/s13300-016-0223-6; 5. Kröger J et al. "Three European Retrospective Real-World Chart Review Studies to Determine the Effectiveness of Flash Glucose Monitoring on HbA1c in Adults with Type 2 Diabetes." *Diabetes Ther* 2020;11(1):83-95. doi: 10.1007/s13300-019-00720-0; 6. Evans M et al. "The Impact of Flash Glucose Monitoring on Glycaemic Control as Measured by HbA1c: A Meta-analysis of Clinical Trials and Real-World Observational Studies." *Diabetes Ther* 2020;11(1):83-95. doi: 10.1007/s13300-019-00720-0; 7. Tyndall V et al. "Marked improvement in HbA1c following commencement of flash glucose monitoring in people with type 1 diabetes." *Diabetologia* 2019;62(8):1349-56. doi: 10.1007/s00125-019-4894-1; 8. Eg-Olofsson K et al. "Sustainable HbA1c decrease at 12 months for adults with Type 1 and Type 2 Diabetes using the FreeStyle Libre® system: a study within the National Diabetes Register in Sweden." Presented at 80th Scientific Sessions of the American Diabetes Association; June 12-16, 2020; Virtual (74-LB); 9. Fokkert M et al. "Improved well-being and decreased disease burden after 1-year use of flash glucose monitoring (FLARE-NL4)." *BMI Open Diabetes Res Care* 2019;7(1). doi: 10.1136/bmjdr-2019-000809; 10. Deshmukh H et al. "Effect of Flash Glucose Monitoring on Glycemic Control, Hypoglycemia, Diabetes-Related Distress, and Resource Utilization in the Association of British Clinical Diabetologists (ABCD) Nationwide Audit." *Diabetes Care* 2020. doi: 10.2337/dc20-0738; 11. Dunn TC et al. "Real-world flash glucose monitoring patterns and associations between self-monitoring frequency and glycaemic measures: A European analysis of over 60 million glucose tests." *Diabetes Res Clin Pract* 2018;137:37-46. doi: 10.1016/j.diabres.2017.12.015; 12. Charleer S et al. "Quality of Life and Glucose Control After 1 Year of Nationwide Reimbursement of Intermittently Scanned Continuous Glucose Monitoring in Adults Living With Type 1 Diabetes (FUTURE): A Prospective Observational Real-World Cohort Study." *Diabetes Care* 2020;43(2):389-97. doi: 10.2337/dc19-1610; 13. Bergenstal RM et al. "FreeStyle Libre® System Use Is Associated with Reduction in Inpatient and Outpatient Emergency Acute Diabetes Events and All-Cause Hospitalizations in Patients with Type 2 Diabetes." Presented at: Presented at 80th Scientific Sessions of the American Diabetes Association; June 12-16, 2020; Virtual (69-OR); 14. Roussel R. "Dramatic Drop in Ketoacidosis Rate after FreeStyle Libre System Initiation in Type 1 and Type 2 Diabetes in France, Especially in People with Low Self-Monitoring of Blood Glucose (SMBG): A Nationwide Study." Presented at: Presented at 80th Scientific Sessions of the American Diabetes Association; June 12-16, 2020; Virtual (68-OR); 15. Al Hayek AA et al. "Acceptability of the FreeStyle Libre Flash Glucose Monitoring System: The Experience of Young Patients With Type 1 Diabetes." *Clin Med Insights Endocrinol Diabetes* 2020;13:1-7. doi: 10.1177/117955142091012

GLUCOSE STATISTICS AND TARGETS

July 2021 - 4 August 2021

14 Days

Time Sensor is Active

77%

Changes And Targets For

Type 1 or Type 2 Diabetes

Glucose Ranges

Target Range 3.9-10.0 mmol/L

Targets % of Readings (Time/Day)

Greater than 70% (16h 48min)

Below 3.9 mmol/L

Less than 4% (58min)

Below 3.0 mmol/L

Less than 1% (14min)

Above 10.0 mmol/L

Less than 25% (6h)

Above 13.9 mmol/L

Less than 5% (1h 12min)

Each 5% increase in time in range (3.9-10.0 mmol/L) is clinically beneficial.

Average Glucose

7.2 mmol/L

Glucose Management Indicator (GMI)

6.4% or 47 mmol/mol

Glucose Variability

21.4%

Defined as percent coefficient of variation (%CV); target $\leq 36\%$

TIME IN RANGES



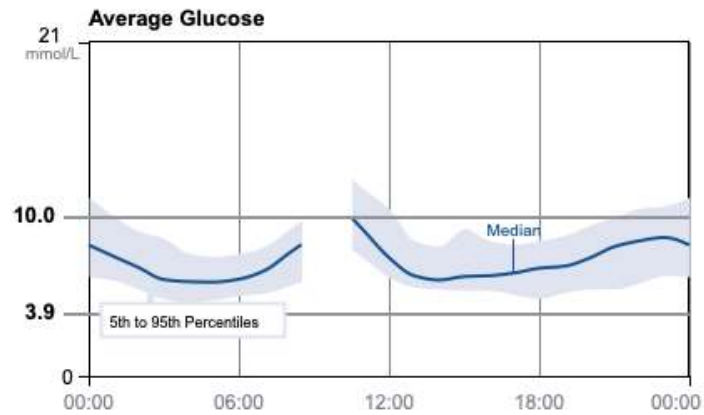
AMBULATORY GLUCOSE PROFILE (AGP)

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.

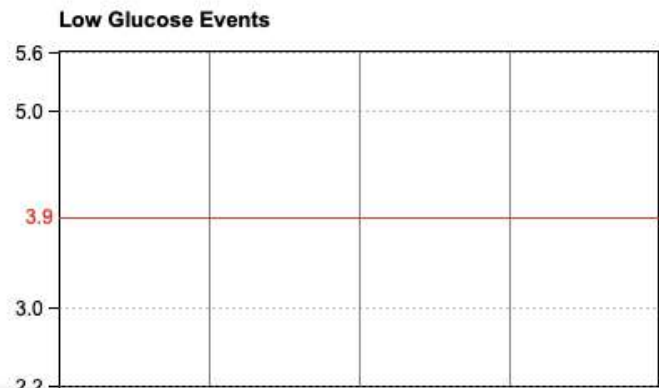
Glucose

GMI 6.4 % or 47 mmol/mol

AVERAGE GLUCOSE	7.2 mmol/L
% above target	5 %
% in target	95 %
% below target	0 %



LOW GLUCOSE EVENTS	0
Average duration	0 Min



Carbs

DAILY CARBS grams/day

INSULIN

RAPID-ACTING INSULIN units/day

Meal

Correction

User Change

Manual

LONG-ACTING INSULIN units/day

Total Daily Insulin units/day

Comments

• Gaps found in the insulin data. 14 days

in this reporting period have no recorded

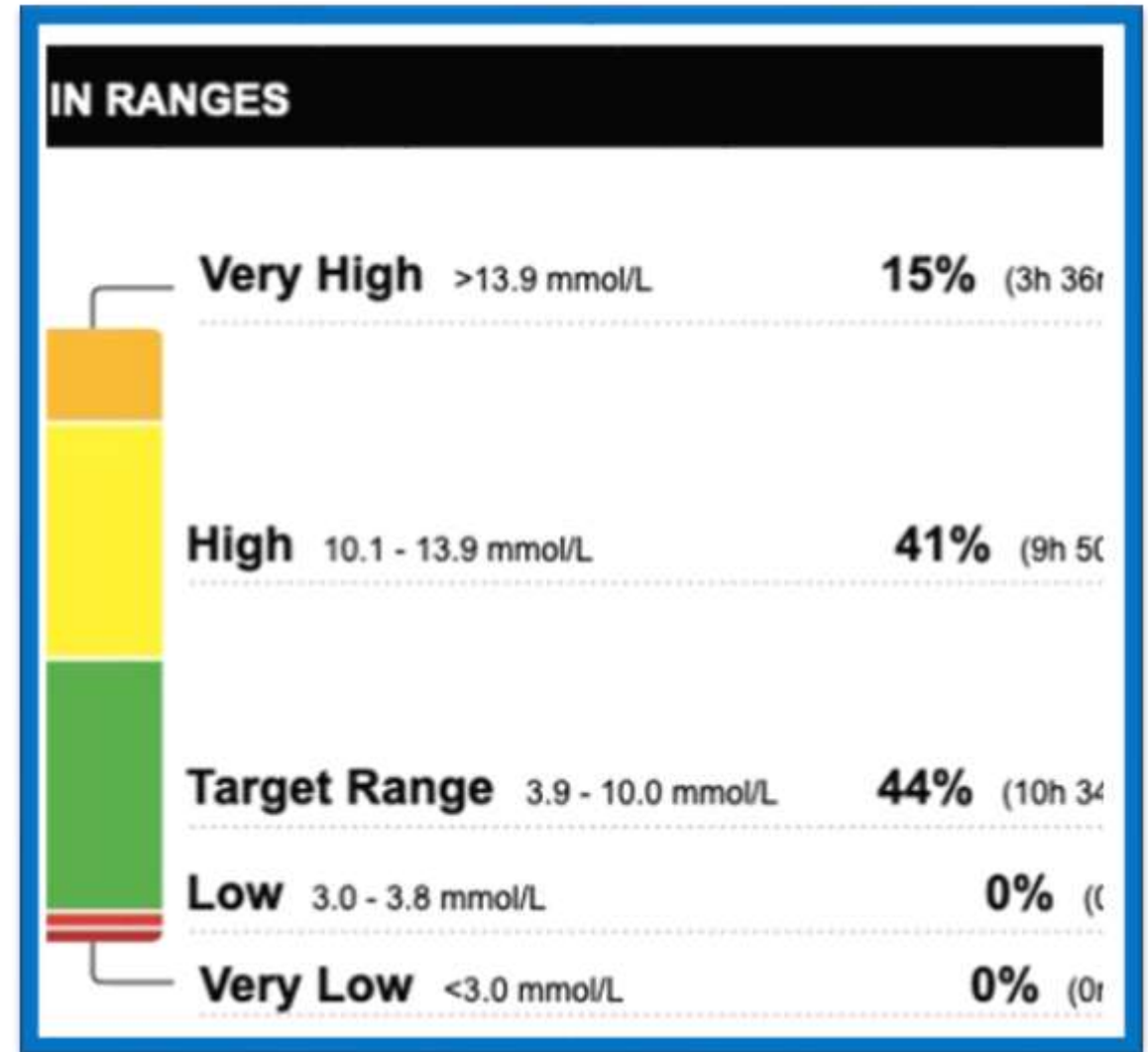
insulin events.

Dr Kader's clinical experience on telemedicine

Dr Kader's perspective

- **TELEMEDICINE:**

- Since march 2020
- is our new reality
- Libre view has been a game changer
- Our patients can upload from home environment and can connect with us at any time
- At appointment we go over time in range



Dr Kader's perspective on improvement of HbA1c

- Mr G
- Poor control for years
- On basal and oral agents
- Disinterested in diabetes
- A1c over 11 percent

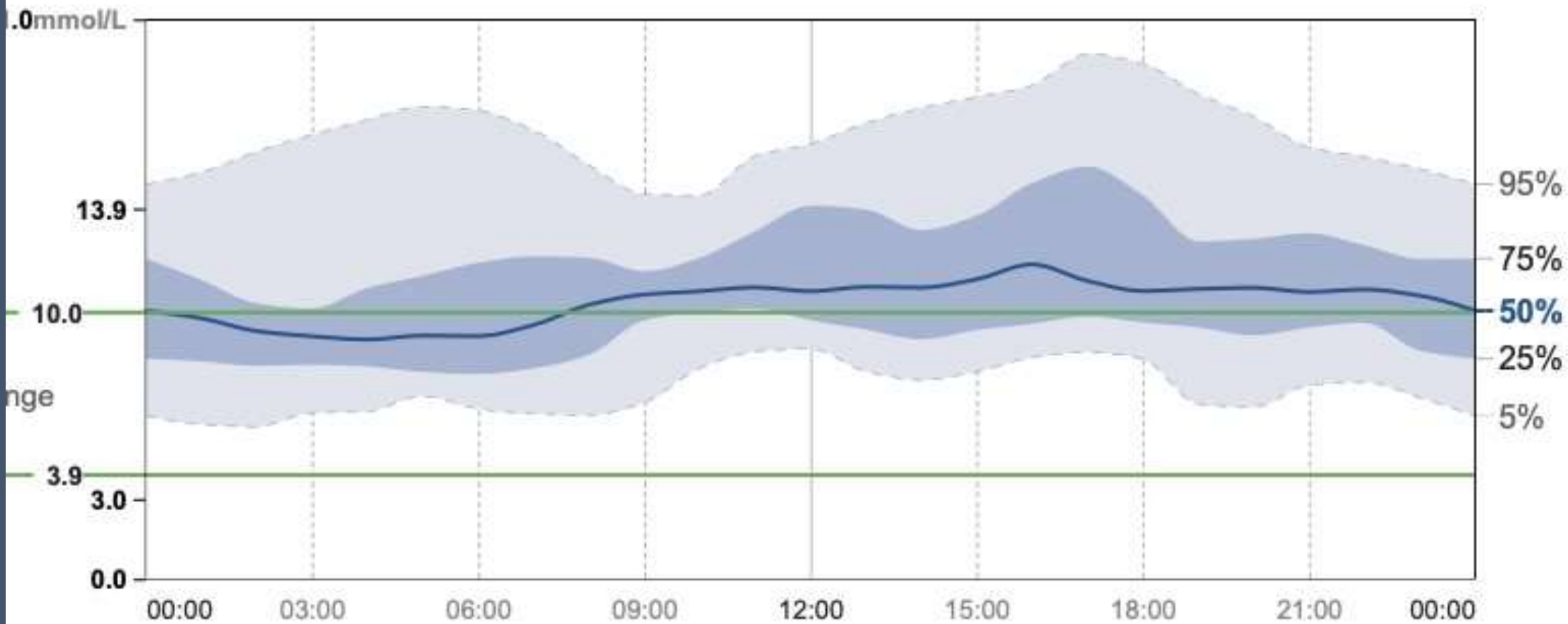
* The case study provided is not intended to be used for medical diagnosis or treatment or as a substitute for professional medical advice. Individual symptoms, situations and circumstances may vary.

Proprietary and confidential — do not distribute



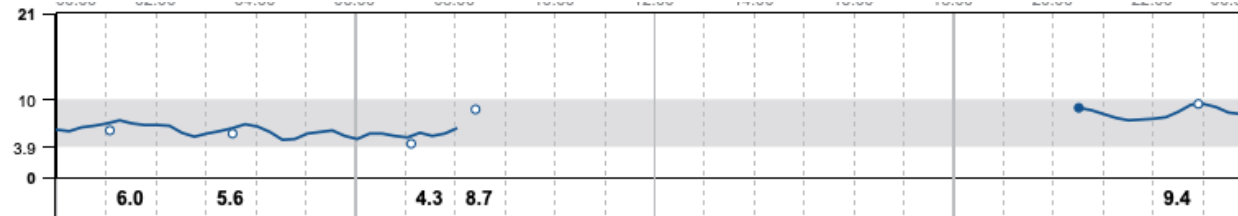
TIME IN RANGES





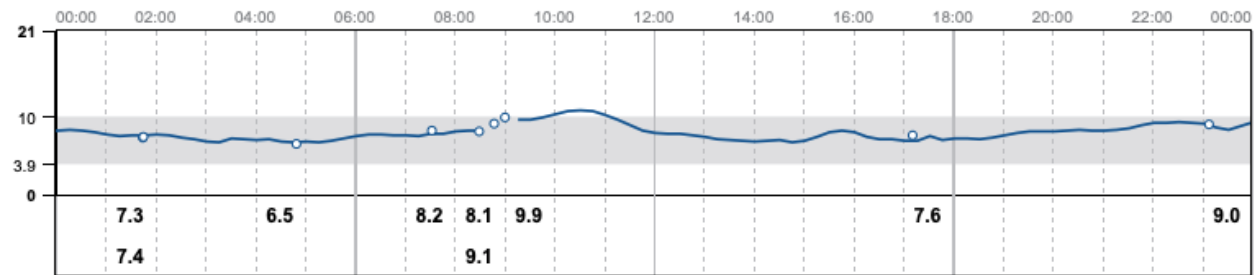
THU 22 Jul

Glucose mmol/L



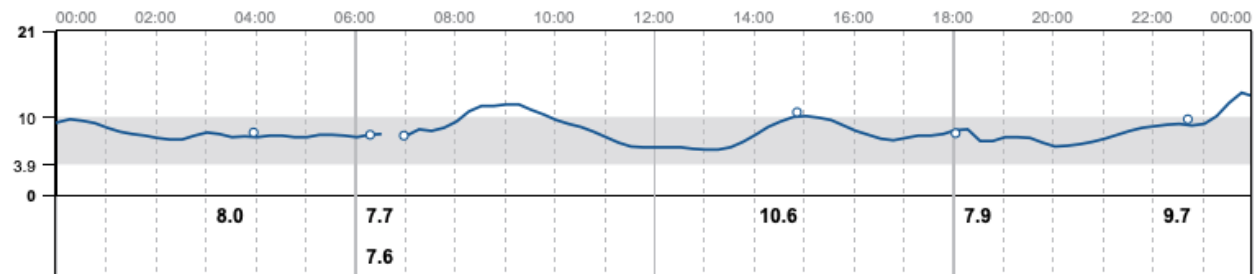
FRI 23 Jul

Glucose mmol/L



SAT 24 Jul

Glucose mmol/L



SUN 25 Jul



What changes your glucose readings?

Food



Activities



Medication



Illness



Stress



Alcohol



How does food change your glucose?

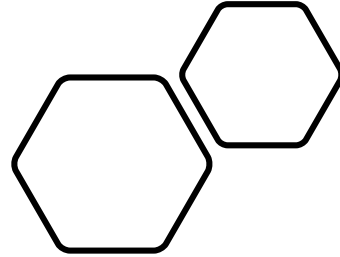


Carbohydrates have the **biggest** impact on your readings

Follow a healthy eating plan

society (reference)	Recommendations
ADA ⁵⁵	<p>When used properly, real-time continuous glucose monitors in conjunction with multiple daily injections and continuous subcutaneous insulin infusion [A], and other forms of insulin therapy [C] are a useful tool to lower and/or maintain A1C levels and/or reduce hypoglycemia in adults and youth with diabetes.</p> <p>Use of professional CGM and/or intermittent real-time or intermittently scanned CGM can be helpful in identifying and correcting patterns of hyperglycemia and hypoglycemia, and improving A1C levels in people with diabetes on noninsulin, as well as basal insulin regimens. [C]</p>
AACE ⁵⁶	<p>CGM devices should be considered for patients with T1D and T2D who are on intensive insulin therapy to improve HbA1c levels and reduce hypoglycemia (Grade B), early reports suggest that even patients not taking insulin may benefit from CGM (Grade D).</p>
The Endocrine Society ^{57,58}	<p>We suggest short-term, intermittent rtCGM 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 ⊕⊕○○)</p>
<p>ADA level A evidence—high-level, clear evidence from well conducted, generalizable RCT, ADA level C evidence—supportive evidence from well-conducted studies. AACE grade B evidence is intermediate level, while D means not evidence based. Endocrine society level of evidence 2 ⊕⊕ means weak, low-quality evidence.</p>	
<p>AACE: American Association of Clinical Endocrinologists; ADA: American Diabetes Association; T1D: type 1 diabetes</p>	

DIABETES TECHNOLOGY WHAT A FAMILY DOCTOR SHOULD KNOW



- Flash monitoring;CGM our new world
- **Connectivity to your clinic for a virtual experience**
- Insulin pumps basic
- Retinal cameras
- SMART PENS





DEXCOM CLARITY

DEXCOM CLARITY



Welcome to Dexcom CLARITY for Healthcare Professionals

English ▾

 Dexcom Uploader for receivers needs updating. [Update now.](#)

Login with your Dexcom CLARITY Healthcare Professional account

Login

[Forgot your username?](#)

[Forgot your password?](#)

Need to register your clinic? [Register Now](#)

[Click here to return to your clinic's Patient List.](#)

Print Reports Download Reports Export Help



Overview Patterns Data Compare Statistics AGP Settings

14 days Sat Oct 5, 2019 - Fri Oct 18, 2019

1 Nighttime Highs 2 Best Day

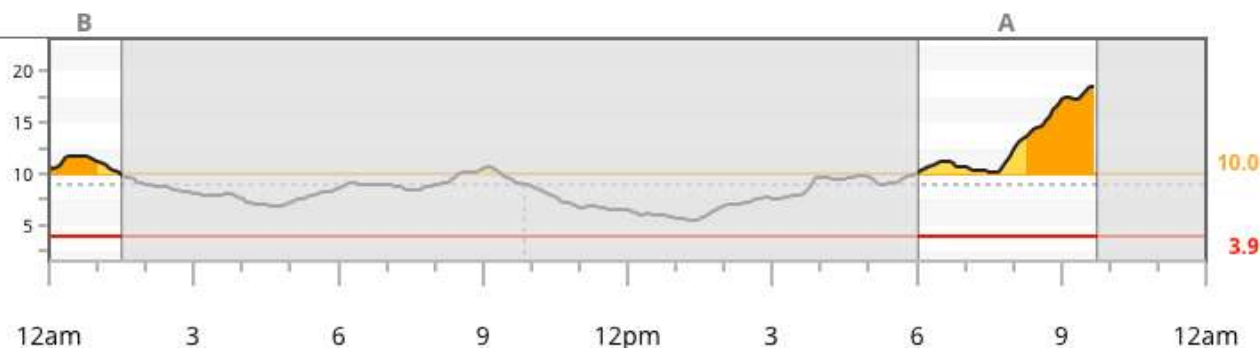
1 Harlan had a pattern of nighttime highs

Harlan had a pattern of significant highs between 8:15 PM and 1:05 AM. 13 high events contributed to this pattern. None of the contributing events were rebound highs.

Fri, Oct 18, 2019

Glucose (mmol/L)

A: 6:00 PM-9:45 PM
B: 12:00 AM-1:30 AM



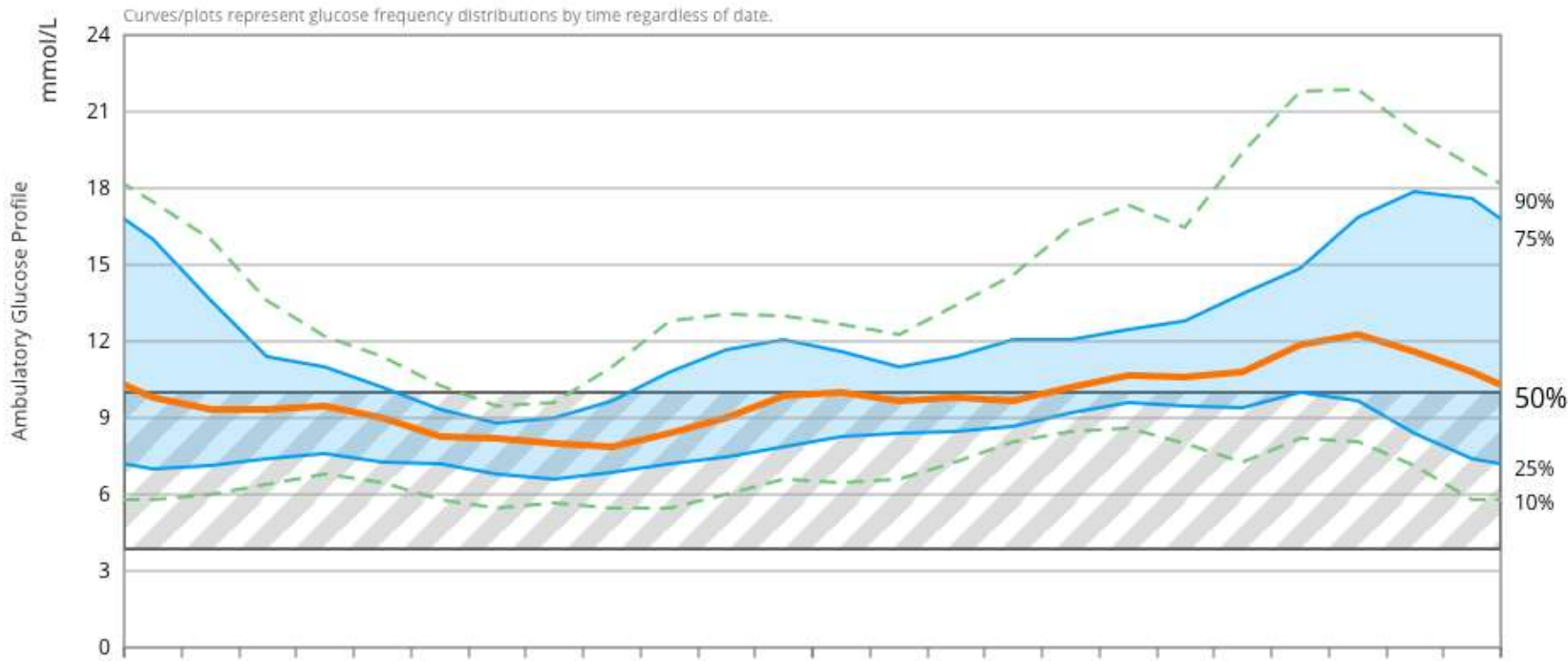
Thu, Oct 17, 2019

B

14 days | Sat Oct 5, 2019 - Fri Oct 18, 2019

Glucose Statistics	Avg Glucose mmol/L	Estimated HbA1c	Very Low < 3.0 mmol/L	Low < 3.9 mmol/L	In Target Range 3.9 - 10.0 mmol/L	High > 10.0 mmol/L	Very High > 13.9 mmol/L	Coefficient of Variation	SD mmol/L	% Time CGM Active
	10.2 Glucose Exposure	8.1%	0.5%	1.1%	54.8% Glucose Ranges	44.1%	12.9%	35.4% Glucose Variability	3.6	95.9% Data Sufficiency

CGM | 50% - Median | 25/75% - IQR | 10/90% | Target Range



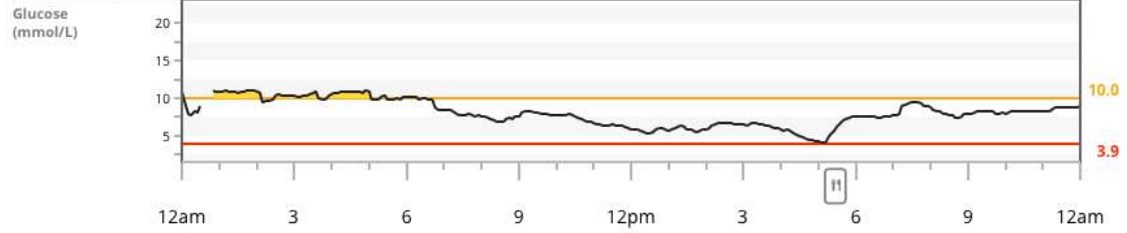
14 days | Mon Oct 7, 2019 - Sun Oct 20, 2019

Fri, Oct 18, 2019



11 12:18 PM

Thu, Oct 17, 2019



11 5:05 PM

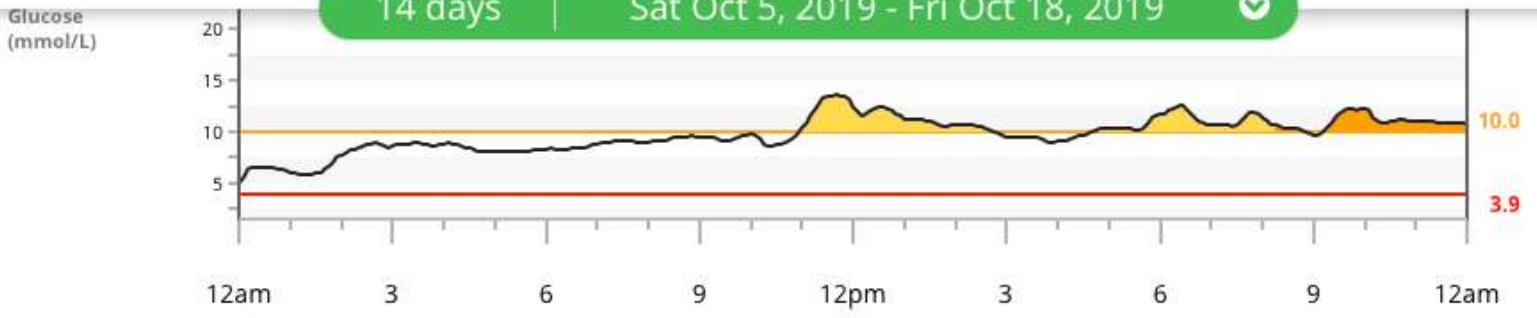
[Click here to return to your clinic's Patient List.](#)

Print Reports Download Reports Export Help

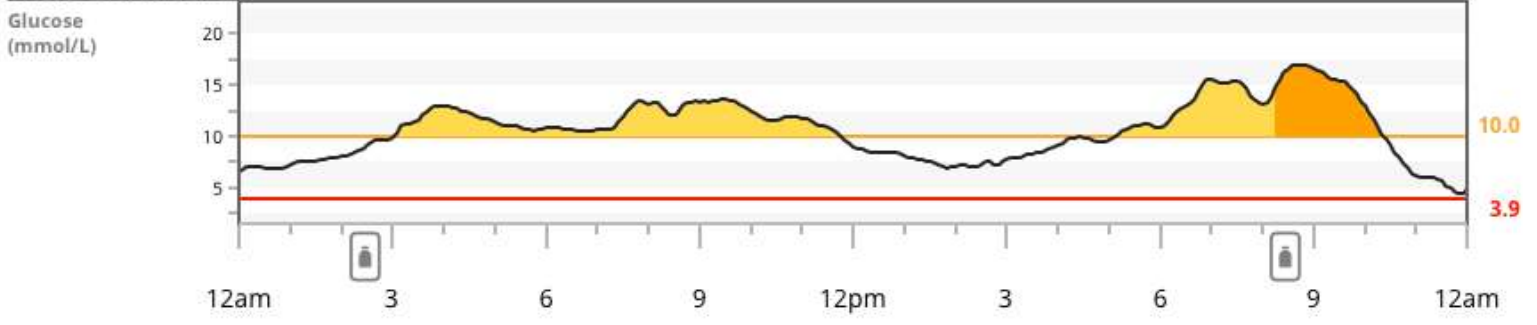


Overview Patterns **Data** Compare Statistics AGP Settings

14 days Sat Oct 5, 2019 - Fri Oct 18, 2019



Wed, Oct 16, 2019





One System | Consistent Reports | Easy Sharing

LibreView is a secure, cloud-based diabetes management system that gives healthcare professionals and patients clear, easy-to-understand reports from compatible FreeStyle glucose monitoring devices.



Member Login

Email Address

tina.kader@lmc.ca
From this website

Other Passwords for libreview.com...

Log In

[Forgot Password](#)

[Sign Up](#)

One System | Consistent Reports | Easy Sharing

LibreView is a secure, cloud-based diabetes management system that gives healthcare professionals and patients clear, easy-to-understand reports from compatible FreeStyle glucose monitoring devices.



Member Login

Email Address

tina.kader@lmc.ca

Password

••••••••••



Log In

[Forgot Password](#)

[Sign Up](#)

LibreView


Search Patients

LibreView

Upload a Device

- 1 Connect the device to your computer with the correct cable
- 2 Choose upload option below

The LibreView Device Drivers software is required to upload a device. [Download the LibreView Device Drivers software](#)



Create 1-Time Report

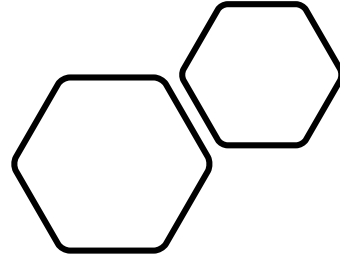
Upload a device to view and print a report now.

OR

Create Report Linked to Patient

Upload a device and link to a patient to save the data for viewing at any time.

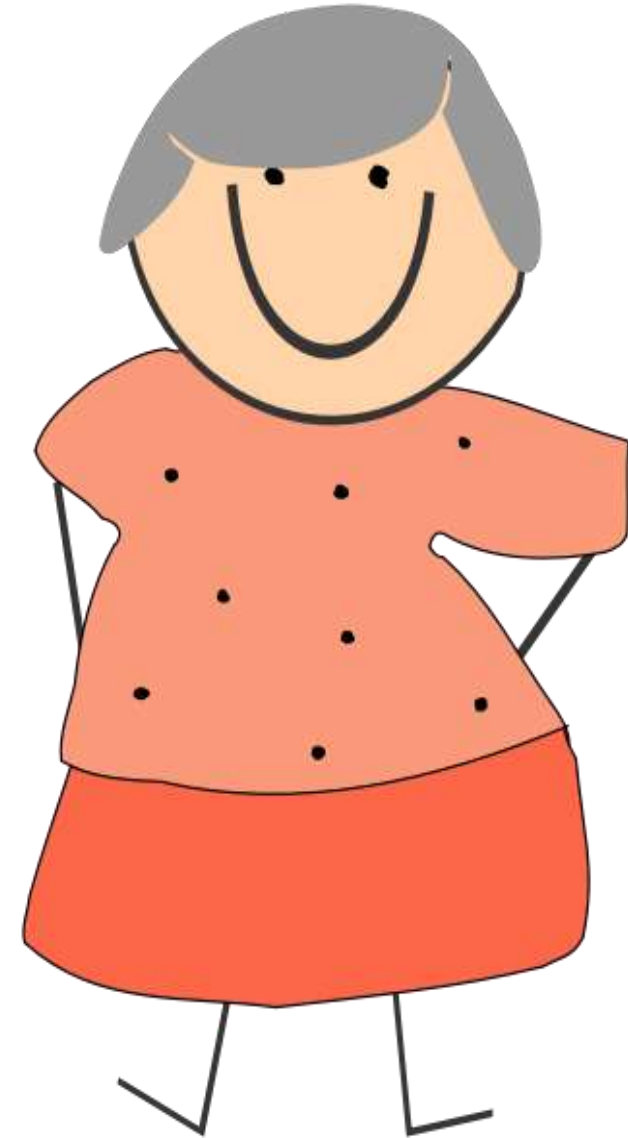
DIABETES
TECHNOLOGY
WHAT A FAMILY
DOCTOR
SHOULD KNOW



- Flash monitoring; CGM; our new world
- Connectivity to your clinic for a virtual experience
- **Insulin pumps basic**
- Retinal cameras
- SMART PENS

Type 1 diabetes 50 years

- Poor control
- Failed pancreas transplant
- On Medtronic 670 ; doing well
- Switched to tandem
- Severe hypo ; hyper
- Neurogenic bladder
- obesity



Pumps available



[This Photo](#) by Unknown Author is licensed under [CC BY-NC-ND](#)



[This Photo](#) by Unknown Author is licensed under [CC BY-NC-ND](#)

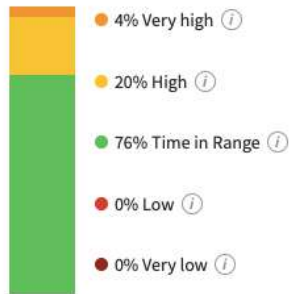


[This Photo](#) by Unknown Author is licensed under [CC BY-NC-ND](#)

Glucose data type **CGM** BG

Export to Excel Print to PDF

CGM Time CGM active: 38%

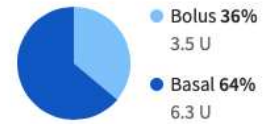


Target range: 4.0-10.0 mmol/L

Time in Range	76%
Average	8.4 mmol/L
Standard deviation	2.6 mmol/L

Show details

Insulin



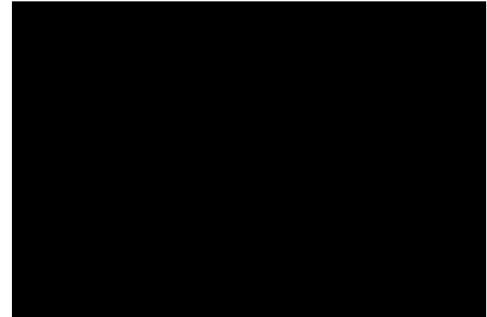
Average daily dose 9.8 Units

Standard deviation 11.6

Show details

CGM over time

Bi-hourly By day



She has had hypo
Hyper admissions
Plan was to get her 1 year without being admitted
Seizures when low

TIME IN RANGE

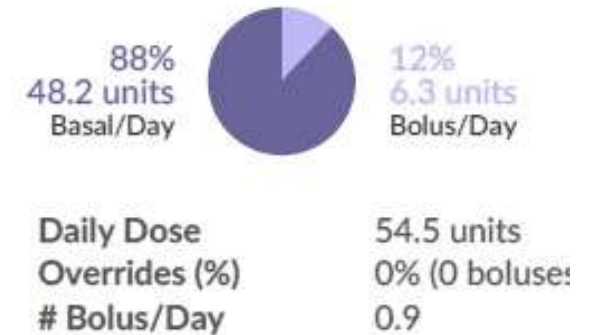
Glucose (CGM)

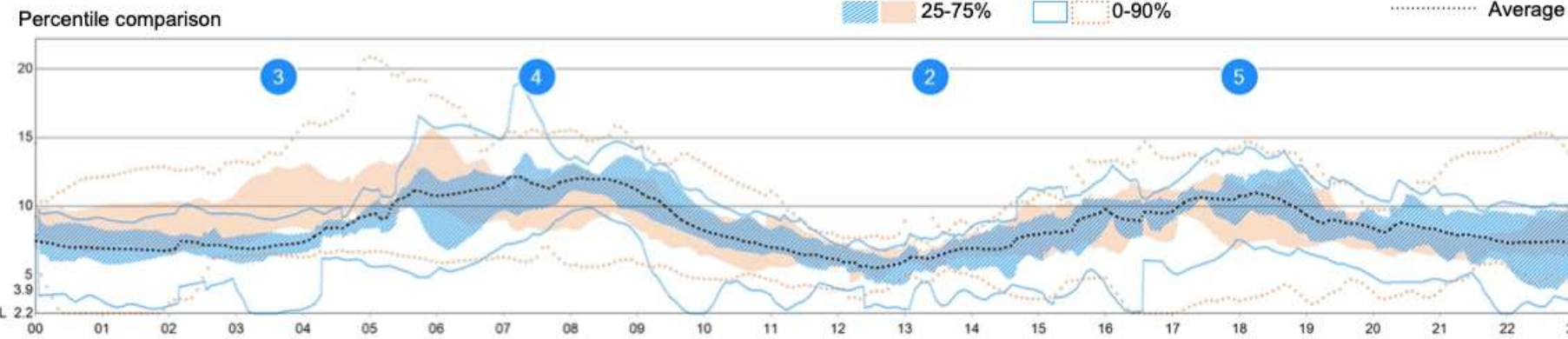


% Time CGM Active 98.9% (13.5 days)

GMI	N/A
Average	134 mg/dL
SD	39 mg/dL
CV	29.4%
Median	130 mg/dL
Highest	263 mg/dL
Lowest	LO mg/dL

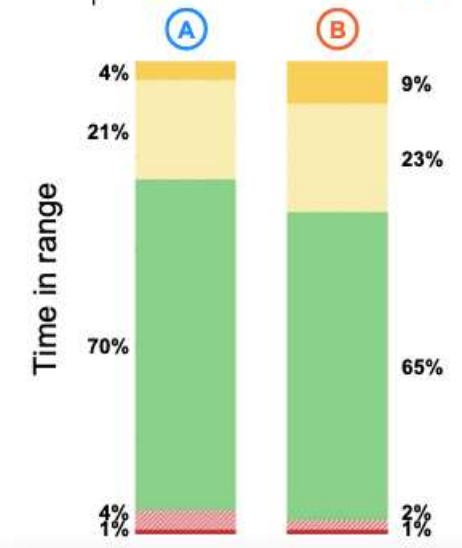
Insulin





Carb Ratio (g/U)	23.0	22.0	23.0	26.0	20.0
	23.0	22.0	23.0	26.0	20.0

Hypoglycemic patterns (6)**	# Episodes (per day): 0.8	Hyperglycemic patterns (2)	# Episodes (per day): 0.1
1 21:39 - 02:07 (5 occurrences) 2 12:23 - 14:22 (2 occurrences) 3 03:00 - 04:15 (1 occurrences)		4 05:30 - 09:30 5 17:10 - 18:50	

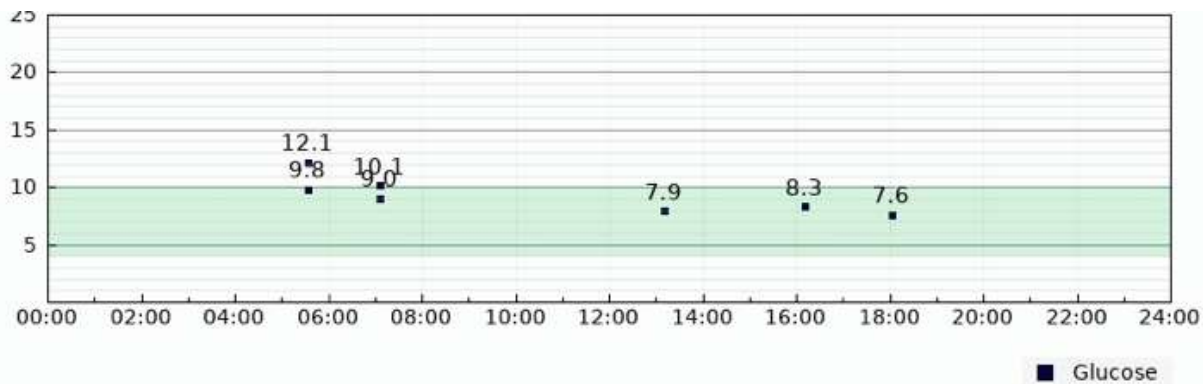


Auto Mode Exits

	A	B
No Calibration	0	0
High SG Auto Mode Exit	1	7
Auto Mode max delivery	1	0
Auto Mode min delivery	0	0
BG required for Auto Mode	0	1
Sensor Algorithm Underread	1	1
Sensor Updating	0	0
No SG values	0	0
Sensor Expired	0	0
Auto Mode disabled by user	5	5
Alarms	0	0

Statistics

	A	B
Auto Mode (per week)	86% (6d 00h)	93% (6d 1h)
Manual Mode (per week)	14% (1d 00h)	7% (12h)
Sensor Wear (per week)	85% (5d 23h)	93% (6d 1h)
Average SG ± SD	8.4 ± 2.9 mmol/L	9 ± 3.4 mmol/L
GMI***	6.9% (52.3 mmol/mol)	7.2% (55.2 mmol/mol)
Coefficient of Variation (%)	34.4%	37.4%
Low / High SG Alerts (per day)	8.5 / 1.5	5.8 / 3.5
Average BG	10 ± 4.4 mmol/L	9.9 ± 4.1 mmol/L
BG / Calibration (per day)	11.1 / 4.1	11.4 / 3.9
Total daily dose (per day)	25 units	28 units
Bolus amount (per day)	7U (28%)	8U (29%)
Auto Basal / Basal amount (per day)	18U (72%)	20U (71%)
Set Change	Every 1.8 days	Every 2.6 days

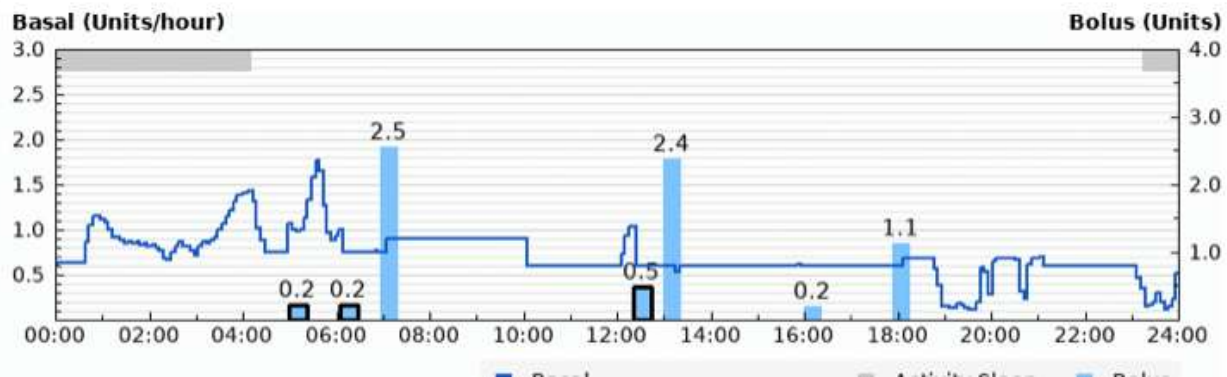


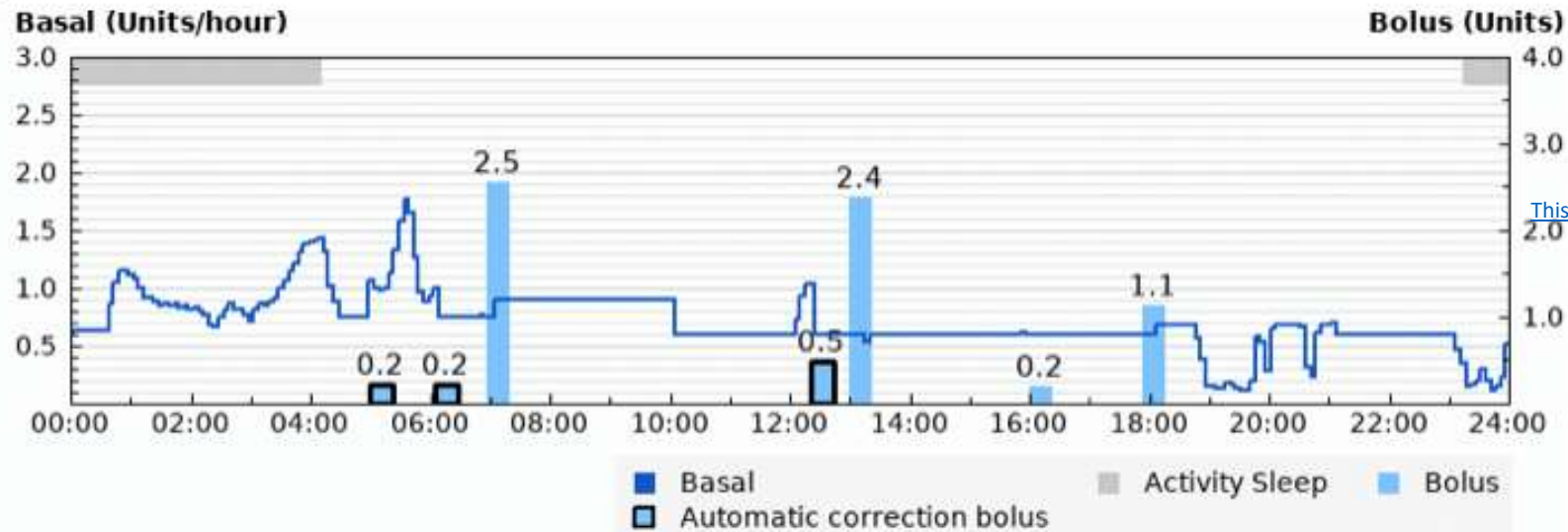
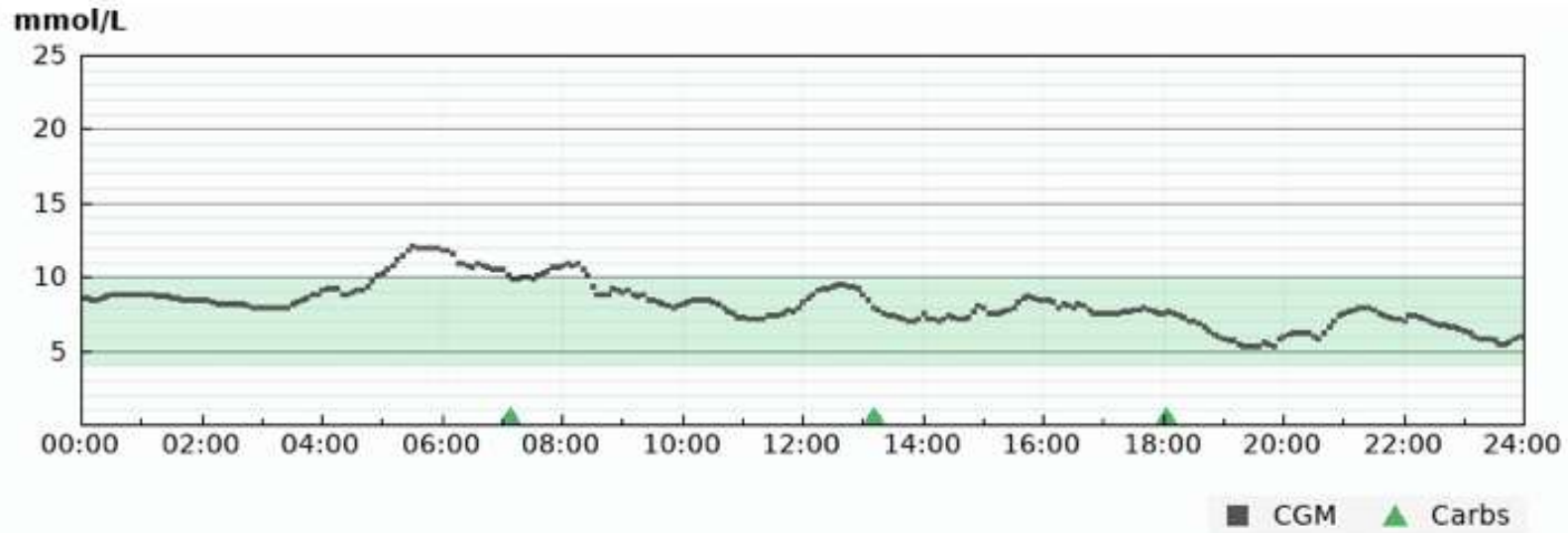
Basal

Time	U/h
00:02	0.625
00:37	0.862
00:42	1.044
00:47	1.153
00:52	1.148
00:57	1.113
01:02	1.079
01:07	0.992
01:12	0.915
01:17	0.834



[This Photo](#) by Unknown Author is licensed under [CC BY-SA-NC](#)

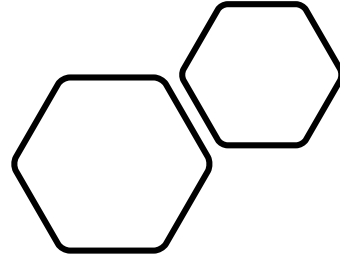




[This Photo](#) by Unknown Author is licensed under [CC BY-SA](#)



DIABETES
TECHNOLOGY
WHAT A FAMILY
DOCTOR
SHOULD KNOW

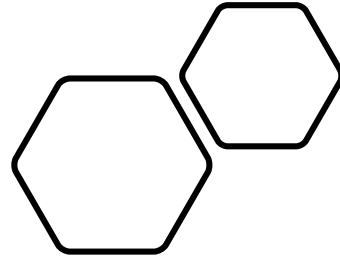


- Flash monitoring; our new world
- Connectivity to your clinic for a virtual experience
- Insulin pumps basic
- Retinal cameras
- SMART PENS

RETINOPATHY DETECTION AT OFFICE VISIT



DIABETES TECHNOLOGY WHAT A FAMILY DOCTOR SHOULD KNOW



- Flash monitoring; CGM our new world
- Connectivity to your clinic for a virtual experience
- Insulin pumps basic
- Retinal cameras
- **SMART PENS**

