HCL in People on Dialysis

ABCD-DTN 2025

Dr Sufyan Hussain MA MB Bchir MRCP PhD

Adjunct Reader, King's College London

Consultant Physician in Diabetes, Guy's and St Thomas' NHS Foundation Trust

Joint Vice-chair, Association of British Clinical Diabetologist's Diabetes Technology Network

Board member, International Diabetes Federation Europe & European Diabetes Forum

ABCD DTN 2025 @sugarydoc

Sufyan Hussain @sugarydoc

collaborate · evolve · support

Disclosures

I have delivered non-promotional continuing medical education activities, consultancy and advisory boards for

Insulet, Medtronic, Tandem, Roche, Abbott UK, Dexcom, Vertex, Menarini, Theras, Sanofi, Lilly

I am a PI on the FORWARD (VX20-880-101) trial and our institution has received unrestricted educational and research grants funding from Abbot UK and Insulet.

I have unpaid roles in the following organisations which may receive industry sponsorship:

Association of British Clinical Diabetologist, Diabetes Technology Network (vice-chair)

International Diabetes Federation Europe (board member)

European Diabetes Forum (board member)

INNODIA (Expert Input Group on beta cell replacement)

AI tools used for illustration only

I have > 30 years of personal experience of living with diabetes

Summary:

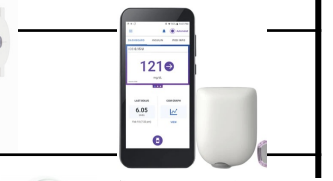
Novel therapies and AI technologies in the management of Type 1 Diabetes

HCL in Dialysis –background & theory

HCL in Dialysis – cases

HCL in Dialysis – key takeaways

Commercial Closed Loops

	Medtronic 780G	Tandem Control IQ	Cam APS	Omnipod 5
Pump				
CGM				
Target	5.5 (default), 6.1 or 6.7 mmol/L	Range 6.1-8.9 mmol/L daytime; 6.1-6.7 mmol/L overnight; 7.8-8.9 mmol/L activity	Personalised target: 4.4-11.0 mmol/L – default 5.8 mmol/L	Personalised target: 6.1mmol/l- 8.3 mmol/L
Variables	Active insulin time I:C ratio	I:C ratio Insulin sensitivity factor Basal rates	I:C ratio	I:C ratio Insulin sensitivity Factor Active insulin time
Insulin delivery	Basal insulin adjusted every 5 minutes	Basal insulin adjusted only if SG predicted to exit range	Basal insulin set to zero: extended bolus given every 10-12 minutes	Basal insulin adjusted every 5 minutes
Connectivity	Minimed Mobile and Carelink Connect App Carelink	Glooko	CAMAPS FX App – Android only Glooko	Glooko
CE license (age)	>7 years	>6 years	>1 years (Dexcom G6) ≥ 4 years (Libre 3) Pregnancy	>2 years

Nb also
Open-source (DIY) HCL systems

Griffin TP, Gallen G, Hartnell S, Crabtree T, Holloway M, Gibb FW, Lumb A, Wilmot EG, Choudhary P, Hussain S. UK's Association of British Clinical Diabetologist's Diabetes Technology Network (ABCD-DTN): Best practice guide for hybrid closed-loop therapy. *Diabet Med.* 2023 Jul;40(7):e15078. doi: 10.1111/dme.15078. Epub 2023 Apr 10.

Received: 18 January 2023 | Accepted: 28 February 2023

DOI: 10.1111/dme.15078

DIABETIC Medicine

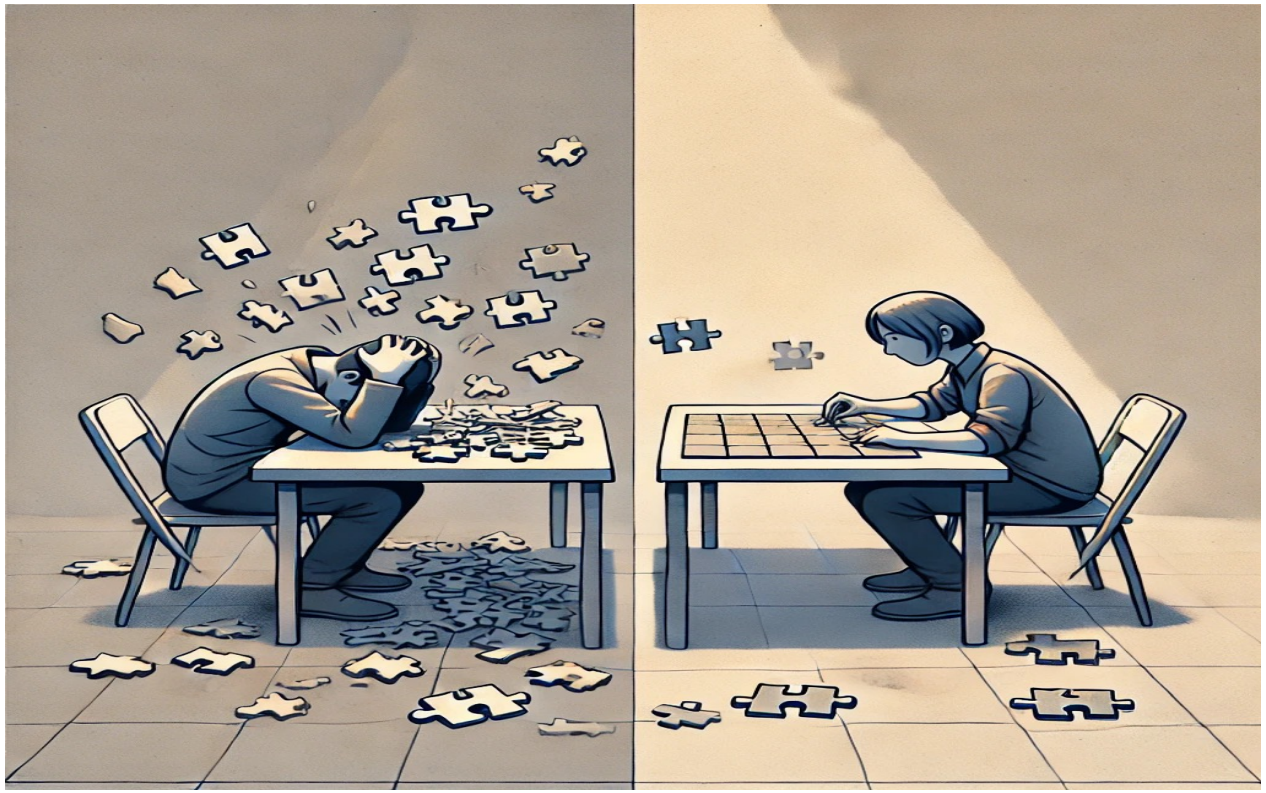
POSITION STATEMENT

UK's Association of British Clinical Diabetologist's Diabetes Technology Network (ABCD-DTN): Best practice guide for hybrid closed-loop therapy

Tomás P. Griffin[1,2,3,4] | Geraldine Gallen[5] | Sara Hartnell[6] | Thomas Crabtree[7,8] | Melissa Holloway[9] | Fraser W. Gibb[10] | Alistair Lumb[11,12] | Emma G. Wilmot[7,8] | Pratik Choudhary[1,2] | Sufyan Hussain[13,14]

Griffin, TP, et al. Diabet Med. 2023; 40:e15078. doi:10.1111/dme.15078

What is complex for me may not be complex for you!



What's complex for me

Haemodialysis
Gastroparesis
Severe mental health and behavioural challenges
Extreme insulin resistance
High-dose steroid use
Visual and manual dexterity issues
Altered physiology – gastrointestinal, insulin absorption, liver metabolism

Evidence in these scenarios

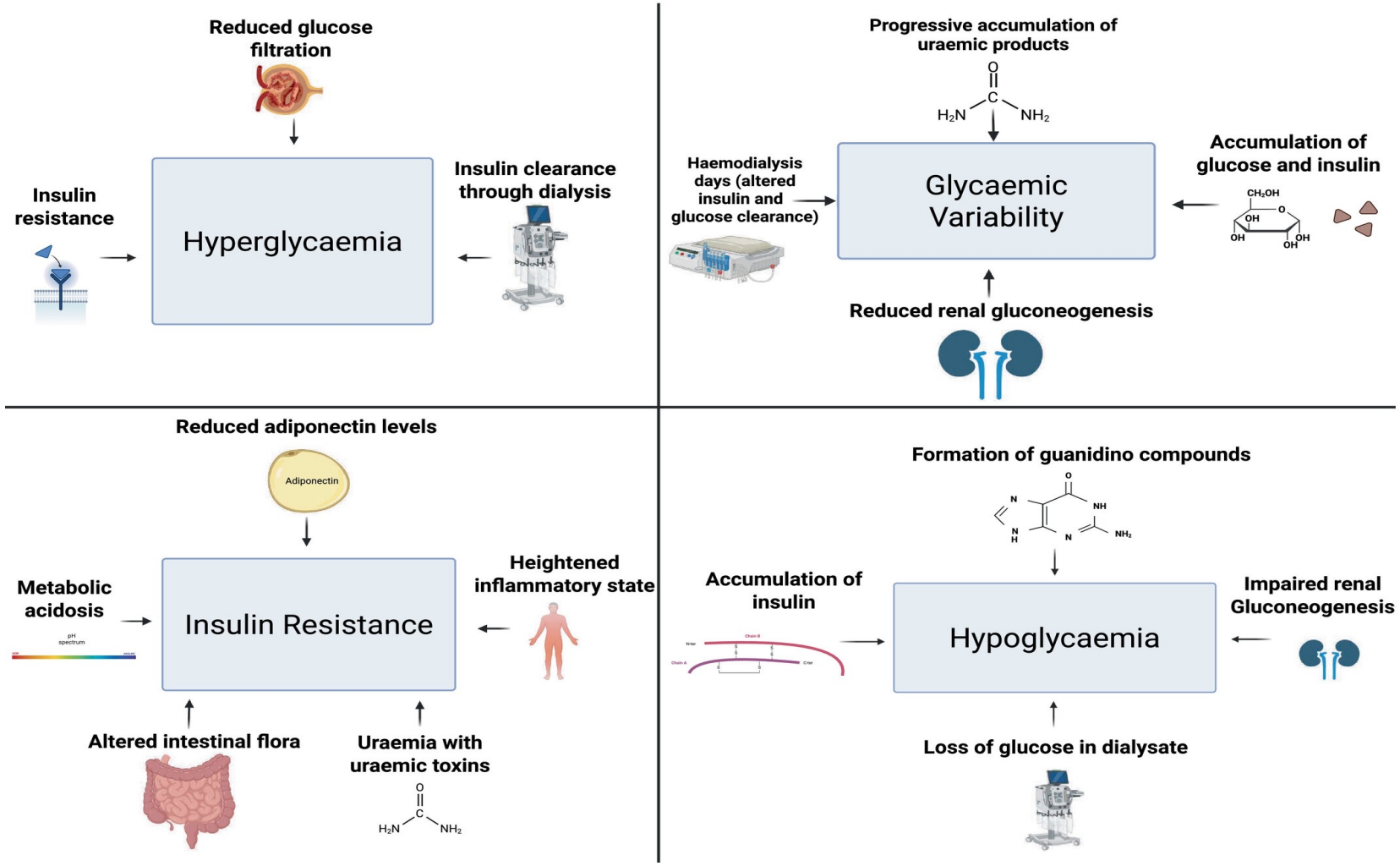
- Limited
- Trials and pivotal studies
  - Majority industry supported
  - Those with extensive complications and higher levels of glycaemia often excluded
  - Bias towards more engaged and motivated

Real-world evidence

- Access and uptake of technology influenced by social determinants of health
  - Insurance driven → higher income
  - Public systems → ”inverse care law”
- HCL : built on principle of “ONE SIZE FITS ALL (or most)”

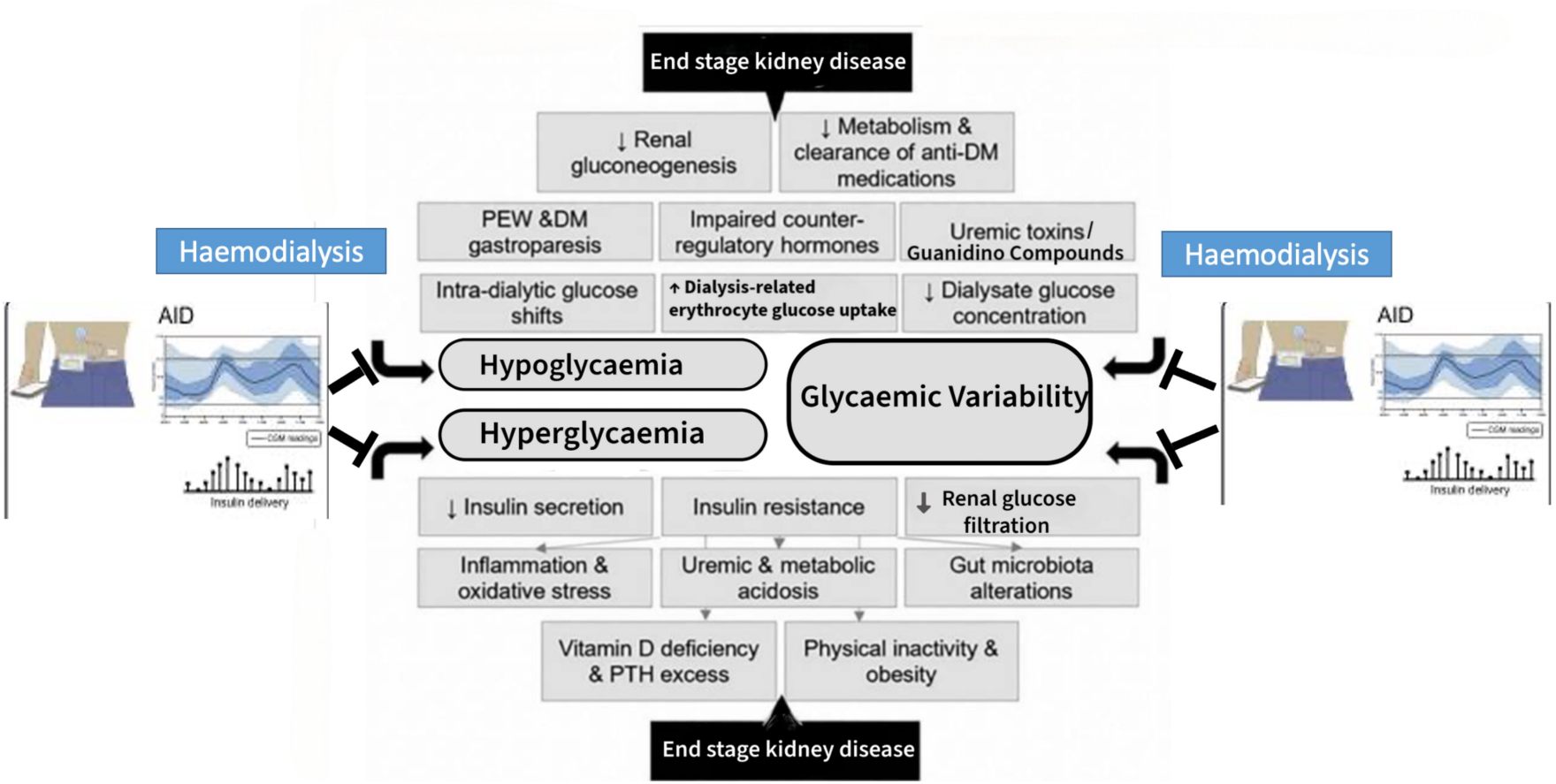
Peacock et al. A systematic review of Commercial Hybrid Closed-Loop Automated Insulin Delivery Systems. Diabetes Ther (2021) 14:839-866

Using automated insulin delivery to address the clinical challenges of glycemic management in people with type 1 diabetes and kidney failure on maintenance hemodialysis



J of Diabetes Invest, Volume: 16, Issue: 11, Pages: 2027-2032, First published: 19 August 2025, DOI: (10.1111/jdi.70141)

Contributors to challenges faced by ESKD on AID



Adapted from Galindo R, Diabetologia 2024; Pavlou et al. Dialysis meets devices: The use of automated insulin deliery in end stage kidney disease. AJP 2025 - Under review

Mitigating features of AID against pathophysiological challenges of ESI

Pathophysiological challenges in ESKD	AID mitigating feature
• **Increased risk of hypoglycaemia**	• *Automatic suspension of insulin delivery upon detection of impending hypoglycaemia* • *Low glucose alarms helpful in nocturnal hypoglycaemia or cases of impaired hypoglycaemia awareness* • *Algorithms can be adjusted to prevent hypoglycaemia on dialysis days by altering glucose target or by using "activity/exercise mode"*
• **Impaired insulin clearance**	• *Most systems allow adjustment of active insulin time*
• **Increased insulin resistance** • **High glucose variability**	• *Automatic adjustment of basal insulin and correction bolus delivery factor at every few minutes based on CGM and pump data.* • *Healthcare professionals can access AID data illuminating discernible patterns in insulin requirements glucose variability, allowing for meaningful intervention thereby reducing the risk of clinical inertia due to the complexity of glycaemic profile*

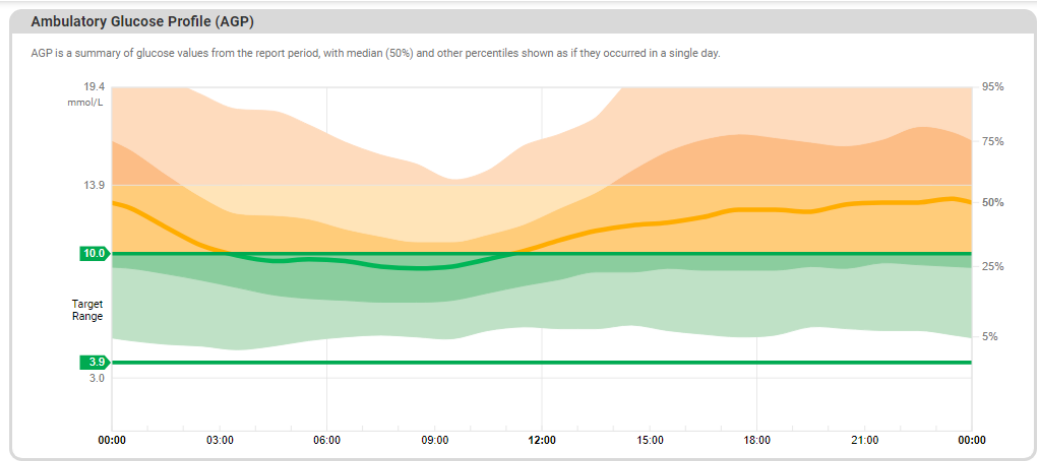
Abbreviations: ESKD=End stage kidney disease, AID= Automated insulin delivery, CGM= Continuous glucose monitor

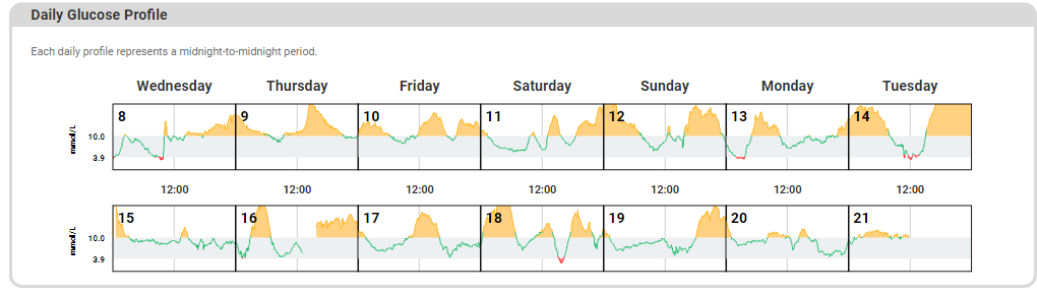
Panagiotis Pavlou

Pavlou et al. Dialysis meets devices: The use of automated insulin deliery in end stage kidney disease. AJP 2025 - Under review

Haemodialysis– Pre-HCL

- 35 y/o Sub-continental Asian female
- Type 1 diabetes - SPK in 2016
- Pancreas graft failed in 2017, kidney failed in 2022
- Pre-pump MDI and Dexcom G6
- TDD 16.5 units
- Pre pump data:
  - Time in range 31%
  - Time High 33% and V High 35%
  - Time below range 0%



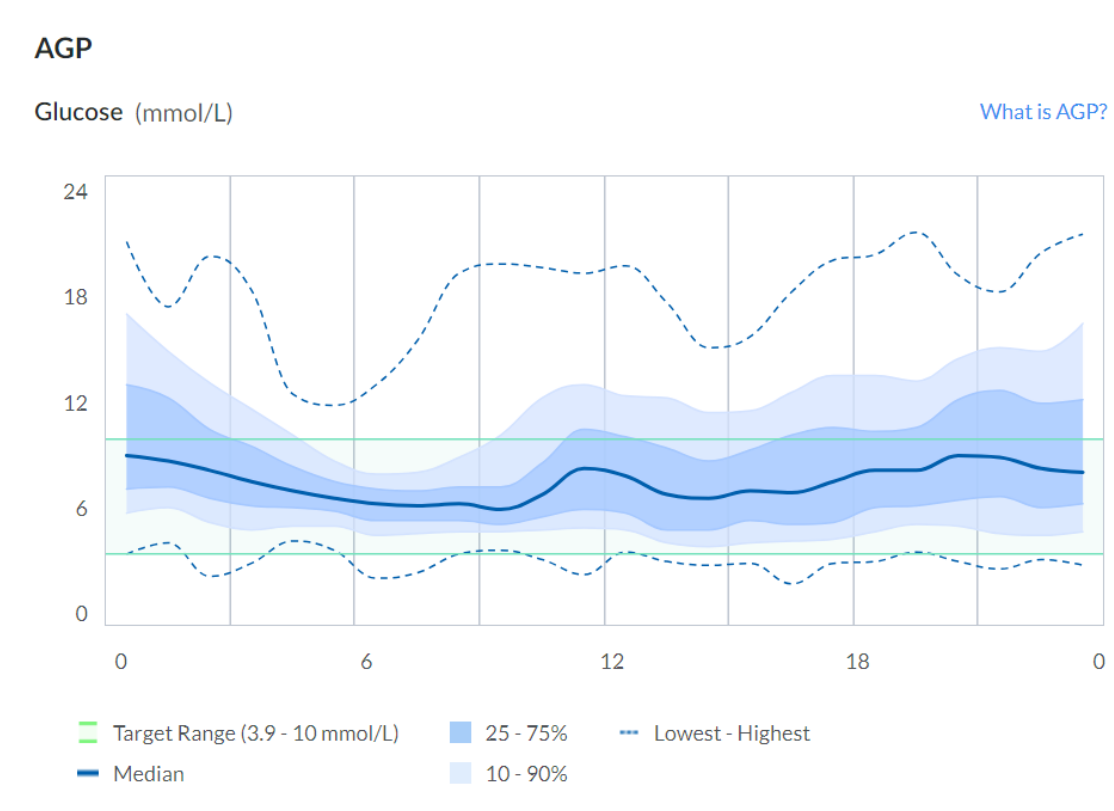


Becky Hyslop
Thomas Johnson

Dr Janaka Karalliedde

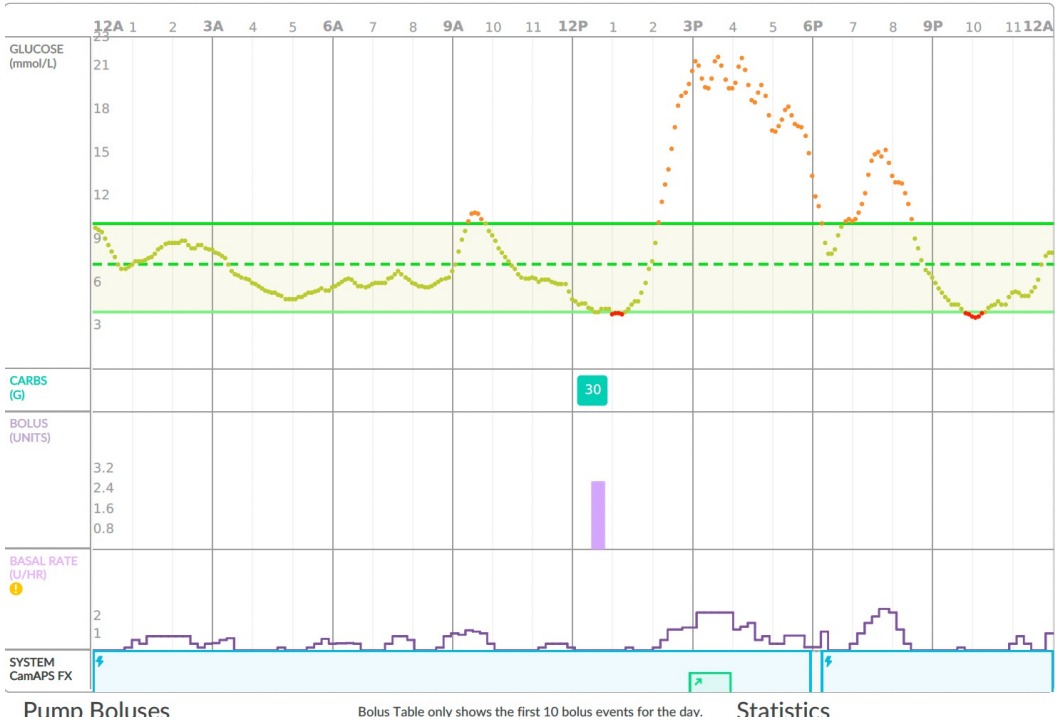
Post-HCL: CamAPS FX

- Glucose target gradually reduced to 6.5 mmol/L (117 mg/dl)
- Time in range 59%, Low 2%, High 22%, V High 17%
- GMI 7.1%
- Reduced glucose variability
  - still 39.5%
- **More hypoglycaemia**
- TDD 12.9 units



Post-HCL: CamAPS FX

- Algorithm tended to over-correct highs (delayed lows)
- Cautious use of Boost function – risk of delayed hypos
- Fear of hypos/ bolus- omitted/ delayed bolus
- Connectivity issues



- Consider using activity mode (ease off) prior to/during dialysis sessions
- Reduce bolus prior to dialysis
- Increased target?

Glucose - Time In Range

- 13% Very High > 13.9 mmol/L
- 22% High 10.1-13.9 mmol/L
- 64% Target Range 3.9-10 mmol/L
- 1% Low 3-3.8 mmol/L
- 0% Very Low < 3 mmol/L

Summary

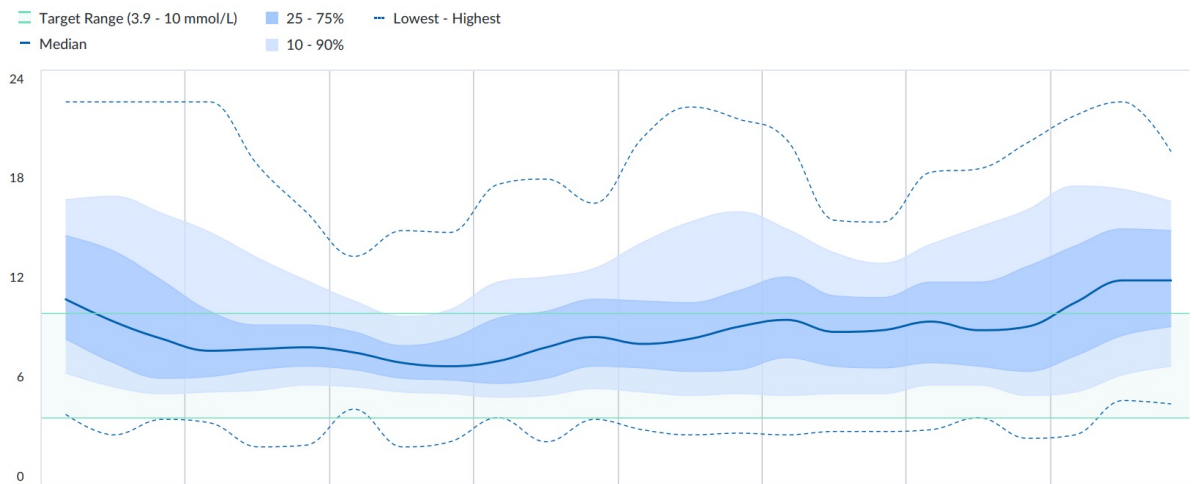
GMI
7.4% (56.9 mmol/mol)

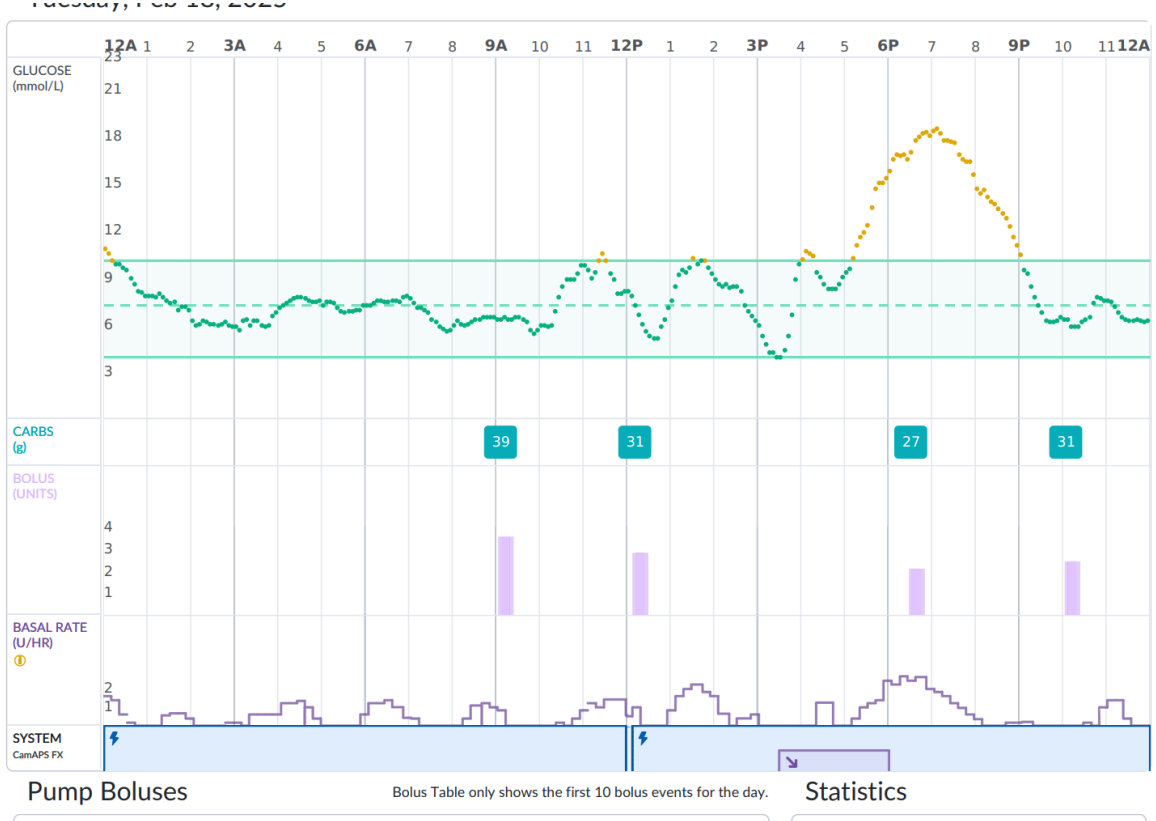
Average
9.4 mmol/L

% Time CGM Active
93.9% (28.2 days)

SD	3.7 mmol/L
CV	39.2%
Median	8.6 mmol/L
Highest	22.3 mmol/L
Lowest	2.2 mmol/L

Ambulatory Glucose Profile (AGP)





Pump Boluses

Bolus Table only shows the first 10 bolus events for the day.

Statistics

Challenges of HCL in Dialysis

- Advanced complications
- High likelihood of other advanced complications – gastroparesis, advanced eye disease
- Potentially mental health issues
- Increased duration of insulin action
- Hypos are more challenging to treat
- HCL algorithms are not developed with PwD on dialysis
- Sensor accuracy?
- Very little guidance out there for using them in patients receiving haemodialysis

Haemodialysis with visual impairment

77 y/o White Caucasian Male

Type 1 diabetes from age 17

PMH of End-Stage Renal Failure

SPK in 2015 – both grafts failed in 2021

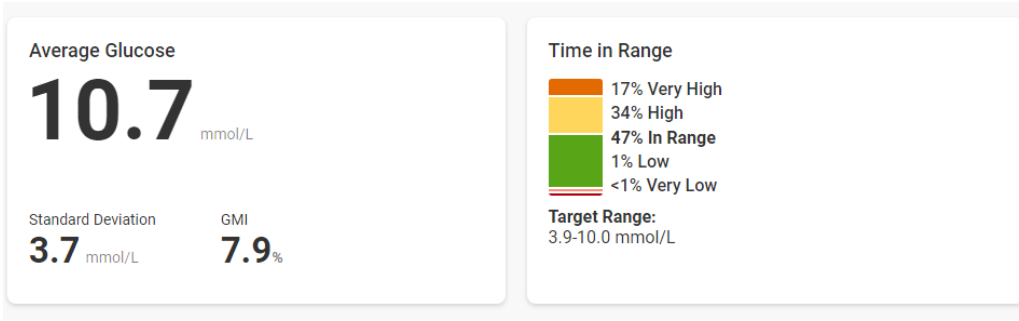
- Haemodialysis: M / W / F

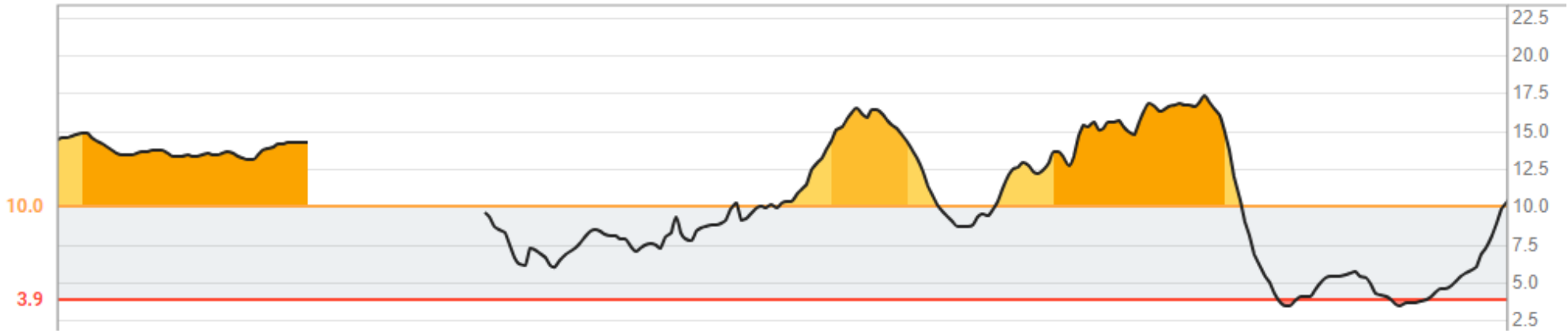
MDI and CGM, Dexcom G6

Impaired hypo-awareness and severe hypoglycaemia history

Impaired vision and dexterity issues

Previously trialled Tandem T:slim X2 Insulin pump X



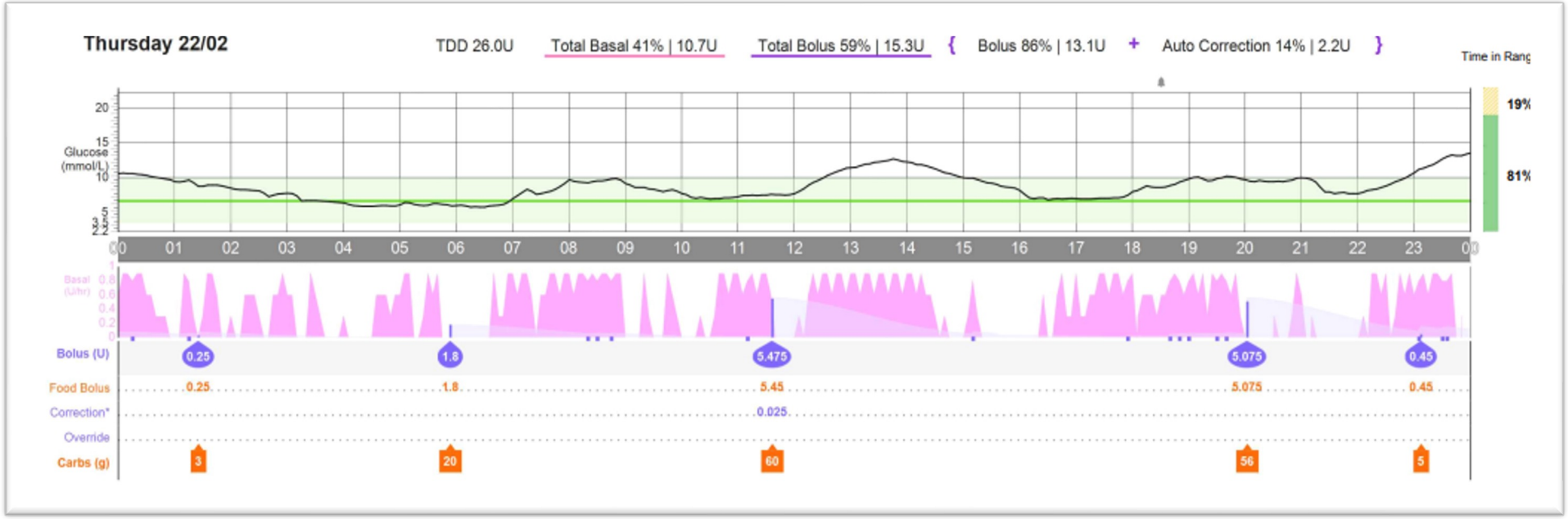


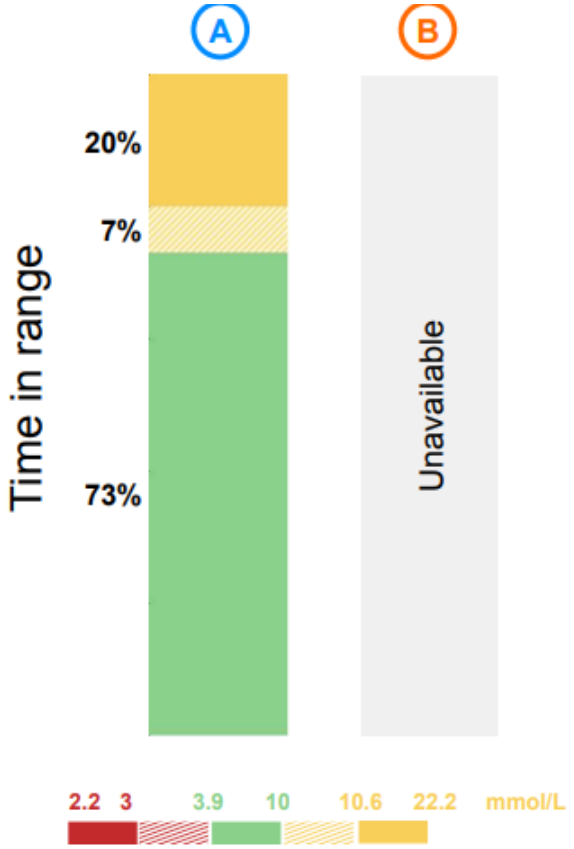
Post-HCL - Medtronic 780G

Improved time in range (73%)

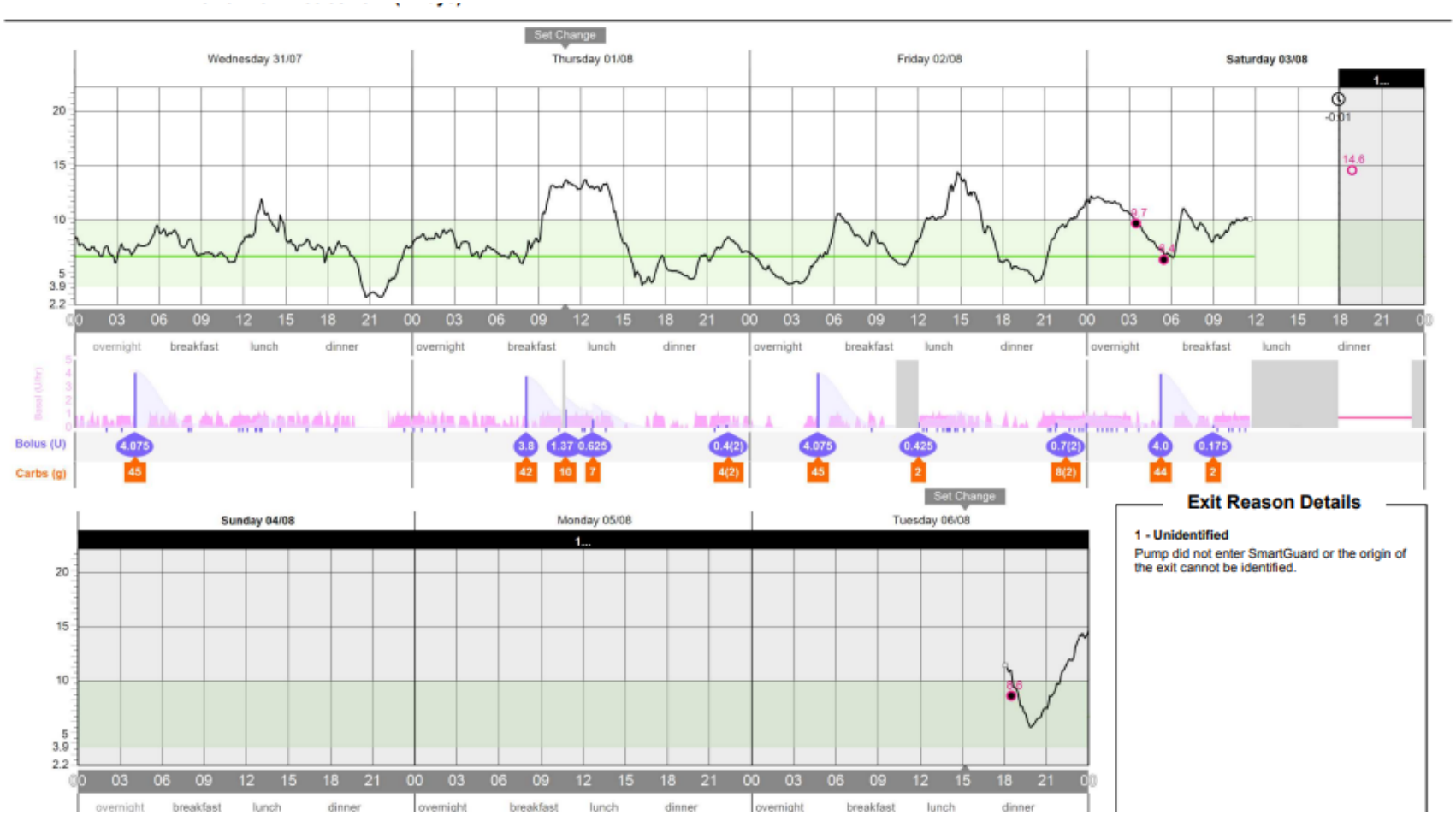
Reduced hypoglycaemia (0%)

Reduced glucose variability





- Sensor issues
- Post haemo-dialysis lows
- Challenges with adaptive basal when insulin sensitivity alters
- Active insulin time (vs duration of insulin action*)



*Walsh, Heinemann. JDST 2014 *DOI: 10.1177/193229681351431*

HDx - Pre HCL data

49 years old

Background
Type 1 diabetes, diagnosed in 2007.
On haemodialysis for end-stage renal disease.
Co-morbidities:
- Nonalcoholic fatty liver disease
- Chronic diarrhoea
- Hyponatraemia
- Lymphoedema
- Gastroparesis
- Mixed anxiety and depressive disorder
- Low back pain

Diabetic Complications:
- Proteinuric nephropathy
- Quiescent proliferative retinopathy
- Macular oedema
- Diabetic peripheral neuropathy
- Heel ulcer
- Diabetic foot ulcer

51 mmol/mol (March 2025)

Started on Medtronic insulin pump on 27/05/2025.

Medication
Alfacalcidol
Amlodipine
Atorvastatin
Creon (Pancreatin)
Descovy (Emtricitabine/Tenofovir)
Duloxetine
Eplerenone
Furosemide
GlucoRx
Metoclopramide
Ramipril
Sumatriptan

AGP Report

20 February 2025 - 5 March 2025 (14 Days)

LibreView

GLUCOSE STATISTICS AND TARGETS

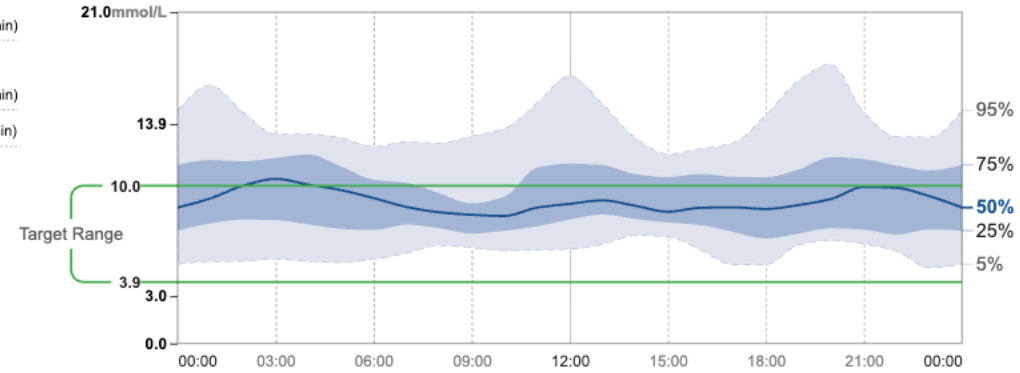
20 February 2025 - 5 March 2025	**14 Days**
Time Sensor Active:	**93%**

Ranges 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	**9.3** mmol/L
Glucose Management Indicator (GMI)	**7.3% or 56 mmol/mol**
Glucose Variability	**27.9%**

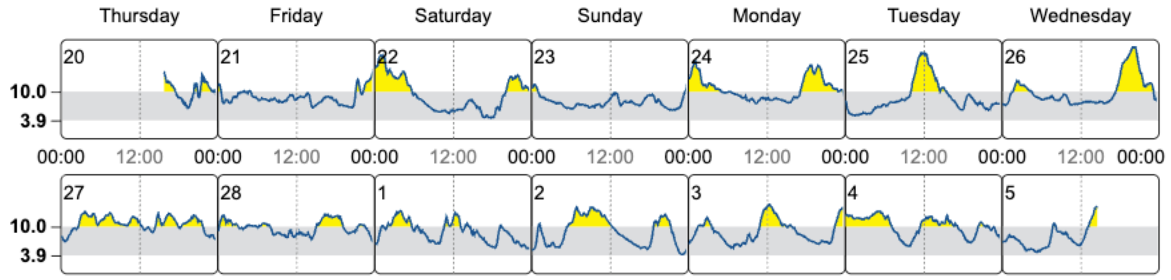
Defined as percent coefficient of variation (%CV); target ≤36%

TIME IN RANGES



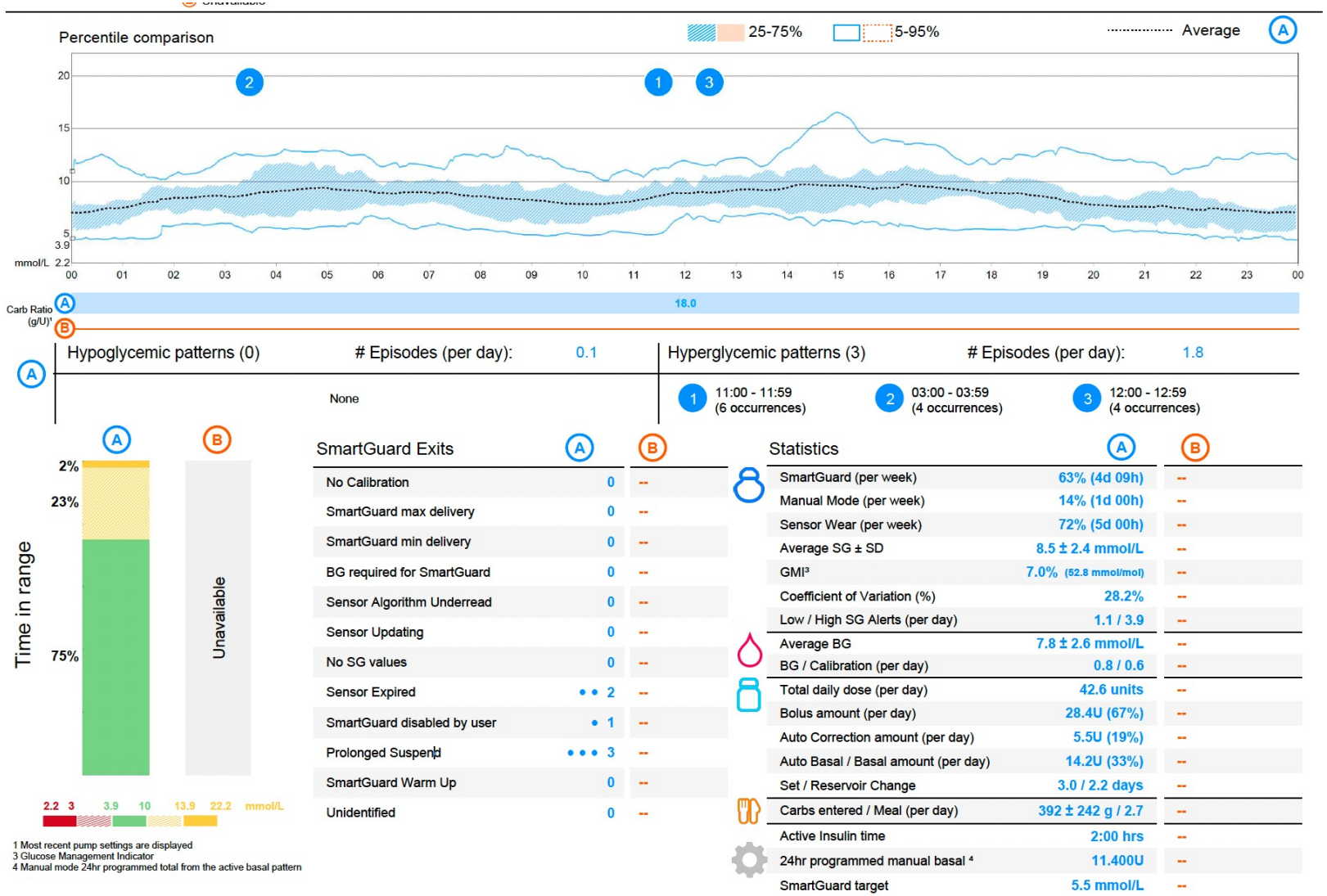
DAILY GLUCOSE PROFILES

Each daily profile represents a midnight to midnight period with the date displayed in the upper left corner.



Source: Battelino, Tadej, et al. "Clinical Targets for Continuous Glucose Monitoring Data Interpretation: Recommendations From the International Consensus on Time in Range." Diabetes Care, American Diabetes Association, 7 June 2019, https://doi.org/10.2337/dci19-0028.

780G


Percentile comparison
25-75%
5-95%
Average
A
20
15
10
5
3.9
mmol/L 2.2
00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 00
Carb Ratio (g/U)¹
18.0
Hypoglycemic patterns (0)
Episodes (per day): 0.1
None
Hyperglycemic patterns (3)
Episodes (per day): 1.8
1 11:00 - 11:59 (6 occurrences)
2 03:00 - 03:59 (4 occurrences)
3 12:00 - 12:59 (4 occurrences)
Time in range
2%
23%
75%
Unavailable
2.2 3 3.9 10 13.9 22.2 mmol/L
SmartGuard Exits
No Calibration 0
SmartGuard max delivery 0
SmartGuard min delivery 0
BG required for SmartGuard 0
Sensor Algorithm Underread 0
Sensor Updating 0
No SG values 0
Sensor Expired 2
SmartGuard disabled by user 1
Prolonged Suspend 3
SmartGuard Warm Up 0
Unidentified 0
Statistics
SmartGuard (per week) 63% (4d 09h)
Manual Mode (per week) 14% (1d 00h)
Sensor Wear (per week) 72% (5d 00h)
Average SG ± SD 8.5 ± 2.4 mmol/L
GMI³ 7.0% (52.8 mmol/mol)
Coefficient of Variation (%) 28.2%
Low / High SG Alerts (per day) 1.1 / 3.9
Average BG 7.8 ± 2.6 mmol/L
BG / Calibration (per day) 0.8 / 0.6
Total daily dose (per day) 42.6 units
Bolus amount (per day) 28.4U (67%)
Auto Correction amount (per day) 5.5U (19%)
Auto Basal / Basal amount (per day) 14.2U (33%)
Set / Reservoir Change 3.0 / 2.2 days
Carbs entered / Meal (per day) 392 ± 242 g / 2.7
Active Insulin time 2:00 hrs
24hr programmed manual basal ⁴ 11.400U
SmartGuard target 5.5 mmol/L
1 Most recent pump settings are displayed
3 Glucose Management Indicator
4 Manual mode 24hr programmed total from the active basal pattern

AIT 2 hours

Glu target 5.5

Pre-HCL

48 yo Male originally from South Africa

Background
Type 1 diabetes since 2007
End-stage renal disease secondary to type 1 diabetes, now on haemodialysis.
HIV.
Gastroparesis.
Haemodialysis is undertaken on Mondays, Wednesdays, and Fridays

Past Medical History
Admission for peritonitis, which prompted a switch from peritoneal dialysis to haemodialysis in January 2024.
History of bilateral pneumonia, syphilis, and pleural effusion.

Diabetes History & Management
Pre-transplant insulin regimen included Levemir 22 units twice daily and NovoRapid, with Dexcom G7 monitoring.
Utilised Dexcom from 2024 to August 2024 prior to commencing hybrid closed-loop therapy.
Reviewed Omnipod 5 data from on and before 17/01/2025.

HbA1c (mmol/mol)
August 2024: 98

Medications
Alfacalcidol
Amlodipine
Aprepitant
Atorvastatin
Dolutegravir/TDF 50 mg
Dorzolamide
Doxazosin
Folic acid
Furosemide
Irbesartan
Lamivudine
Ondansetron
Quinine
Salbutamol
Senna
Sertraline
Sevelamer
Sildenafil

Dialysis-Related Medications
Mircera injections
Dalteparin

Pre-HCL

Dexcom G6 + MDI

dexcom | captūrAGP v5.0

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

51% Very High	Goal: <5%	77% Goal: <25%
26% High		
23% In Range	Goal: >70%	
0% Low		0% Goal: <4%
<1% Very Low	Goal: <1%	

Target Range: 3.9-10.0 mmol/L
Very High: Above 13.9 mmol/L
Very Low: Below 3.0 mmol/L

Emile Cupido

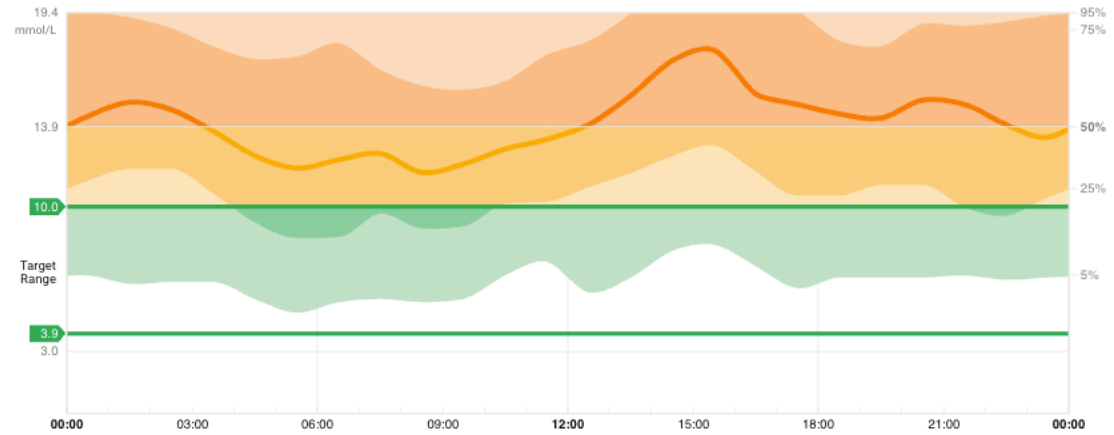
DOB: 3 March 1977

Glucose Metrics

Average Glucose Goal: <8.5 mmol/L	14.4 mmol/L
GMI Goal: <7%	9.5%
Coefficient of Variation Goal: <36%	35.8%
Time CGM Active	99.1%

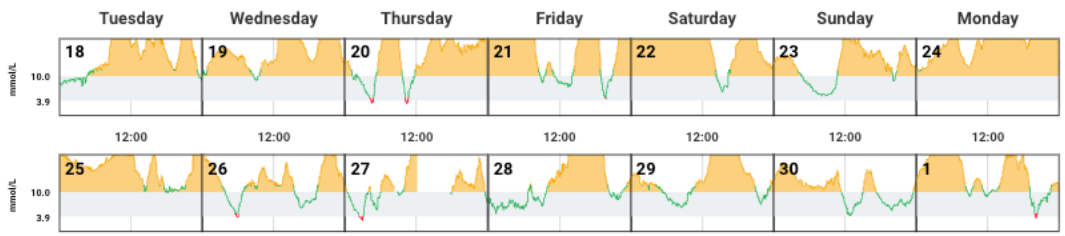
Ambulatory Glucose Profile (AGP)

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

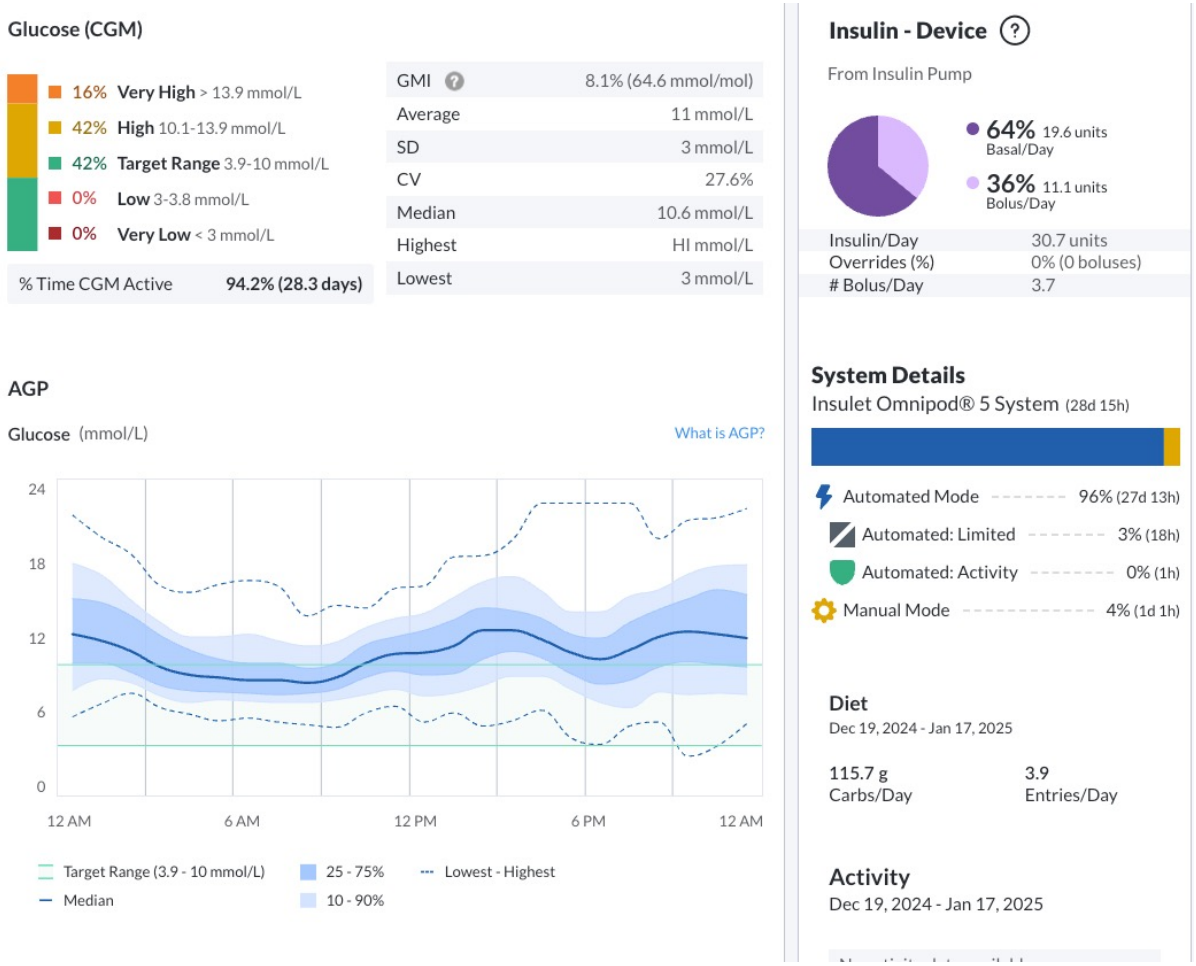


Daily Glucose Profile

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

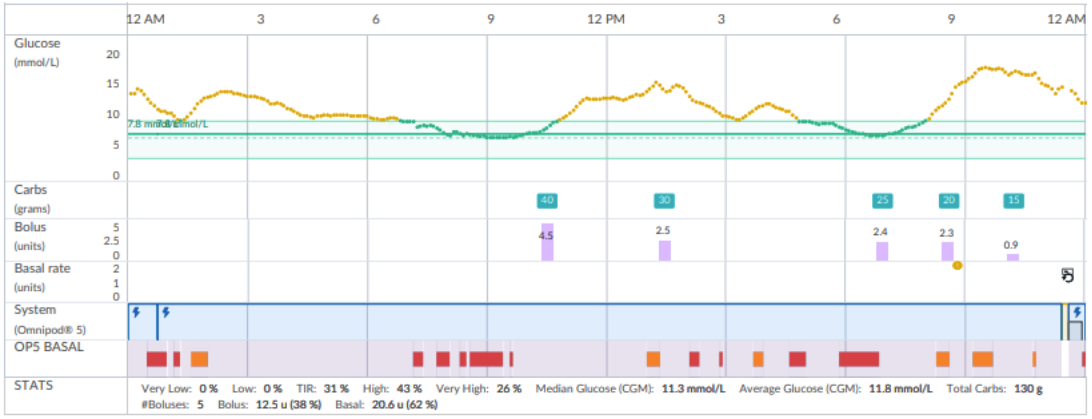


Started on OP5

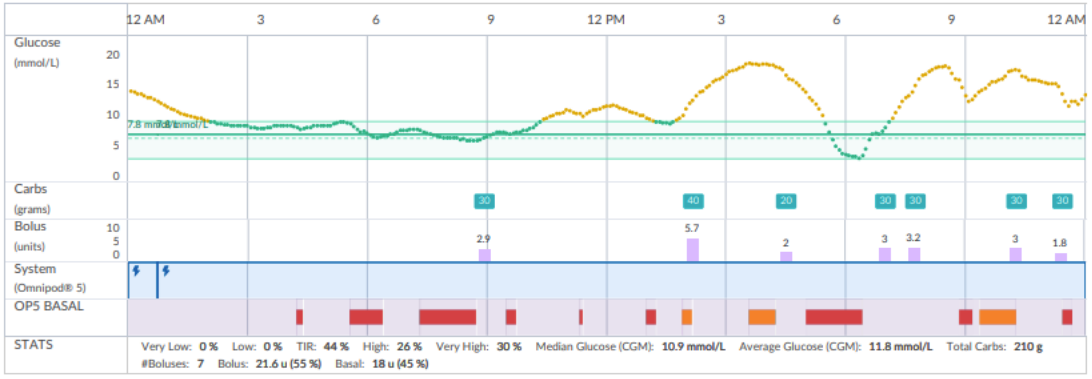


OP5 with HDx MWF

Tuesday, January 14, 2025



Monday, January 13, 2025



Sunday, January 12, 2025

Insulet Omnipod® 5 System

Device 1 of 1

Controller Device: -
Serial Number: 06040000-000051368

General

Active Insulin Time	4 hours

Basal

Max Basal Rate	1.7 U/hour
Temporary Basal Enabled	ON
Active basal program	Basal 1

Bolus

Min BG for Bolus Calc	3.9 mmol/L
Extended Bolus	ON
Reverse Correction	ON
Max Bolus	8 U

Basal

Basal 1 **Active**

12:00 AM (24 hr)	0.7 Units/hr
Total	16.8 Units

Insulin : Carb Ratios

Profile **Active**

12:00 AM (24 hr)	10 g/Unit

Sensitivity (ISF, Correction)

Profile **Active**

12:00 AM (24 hr)	3.2 mmol/L

BG Target Range

Profile **Active**

12:00 AM (24 hr)	7.8 mmol/L (+0/-0)

BG Correction Threshold

Profile **Active**

12:00 AM (24 hr)	7.8 mmol/L

Current status

HbA1c (mmol/mol)

August 2024: 98

October 2024: 51

January 2025: 57

NB- urgent eye screening!

Post-simultaneous pancreas-kidney (SPK) transplant 8 months ago

Off all insulin therapy following successful SPK transplant.

HbA1c (mmol/mol)

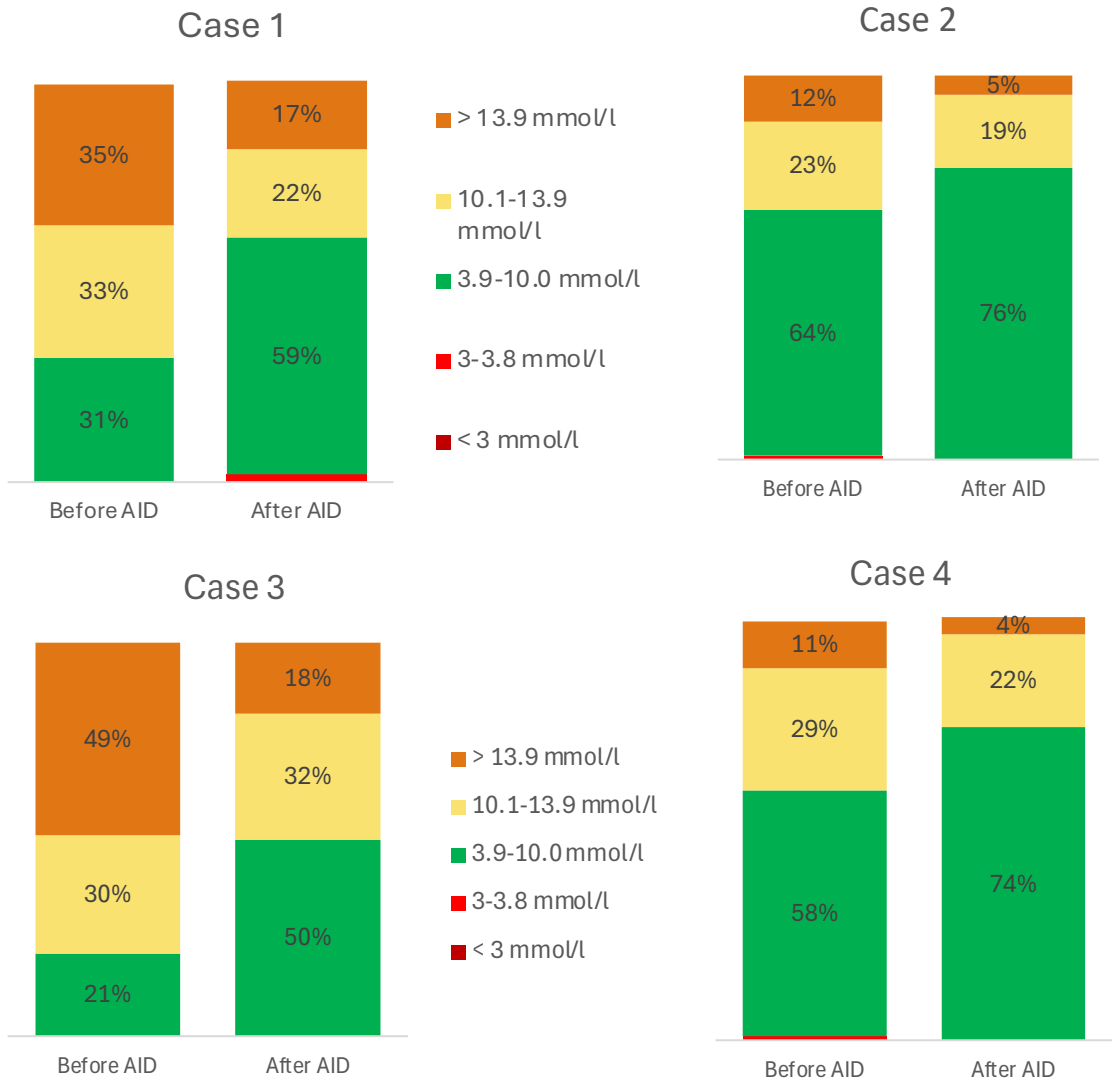
July 2025: 32

September 2025: 33

Haemodialysis and HCL

Case series of 4 adults with T1D on haemodialysis

- 3 on Medtronic 780G
- 1 on CamAPSFx
- Improvement in glycaemic metrics and positive feedback

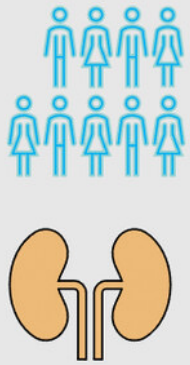


Chaudhry, K., Hyslop, R., Johnston, T., Pender, S., Hussain, S., & Karalliedde, J. (2024). *Diabetes Research and Clinical Practice*, 111800

Using automated insulin delivery to address the clinical challenges of glycaemic management in people with type 1 diabetes and kidney failure on maintenance haemodialysis

Study Population

We studied 9 individuals (5 women, 4 men) with T1D and ESKD, all on a stable thrice-weekly haemodialysis regimen. Participants were recruited from specialist multidisciplinary diabetes clinics at three university hospitals in London.



The mean age was 39.9 years (range 33–50), mean T1D duration of 30.7 years (range 17–48). All had prior experience with diabetes technology (CGM and/or insulin pump therapy). Median follow up was 7 months.

Methods

- Initiated one of several commercially available AID systems: Medtronic 780G (with Guardian 4 sensor), Tandem T-Slim (with Dexcom G6), and Omnipod 5 (OP5) (with Dexcom G6 or Freestyle Libre 2+)
- Pre-AID and post-AID data were obtained from CGM, electronic health records (EHR) and/or pump downloads
- The primary outcome was change in time in range (TIR) (3.9-10 mmol/L) following AID initiation

Key Results

- Improvement in mean time in TIR with AID from 39.7 (±17.1) % to 59.8 (±18.1) % (p = 0.001)
- Mean glucose reduced from 13.1 (±2.4) mmol/L to 9.8 (±1.9) mmol/L (p = 0.0002).
- Glucose variability improved from 39.8 (±3.8) % to 33.8 (±6.5) % (p = 0.01).
- Dialysis-day TIR increased from 32.7 (±17.7) % to 62.3 (±14.9) % (p = 0.002).
- HbA1c improved from 78.6 (±12.8) mmol/mol to 56.1 (±8.5) mmol/mol (p = 0.003)
- Mean time below range (TBR) (< 3.9 mmol/L) fell from 4.0 (±5.4) % to 1.4 (±1.3) % (P = 0.1)
- AID was safe and well tolerated

↑ TIR (+20.1%)

↑ TIR on dialysis days (+59.6%)

↓ Mean glucose (-3.3 mmol/L)

Pavlou, P., et al ., *Using automated insulin delivery to address the clinical challenges of glycemic management in people with type 1 diabetes and kidney failure on maintenance hemodialysis.* Journal of Diabetes Investigation, 2025

Peritoneal dialysis?

- **44yo with 23 y T1D**
- **Past Medical History**
  - Type 1 diabetes mellitus with multiple complications:
  - Diabetic macular oedema
  - End-stage renal failure (on peritoneal dialysis)
  - Autonomic neuropathy
  - Gastroparesis
  - Quiescent proliferative retinopathy (previous pan-retinal photocoagulation and vitrectomy)
  - Peripheral nerve disease
  - Essential hypertension
  - Gastro-oesophageal reflux
  - Hypercholesterolaemia
  - Obesity
  - Recurrent painful ophthalmoplegic neuropathy
  - Posterior vitreous detachment
  - History of transient cerebral ischaemia (2019)

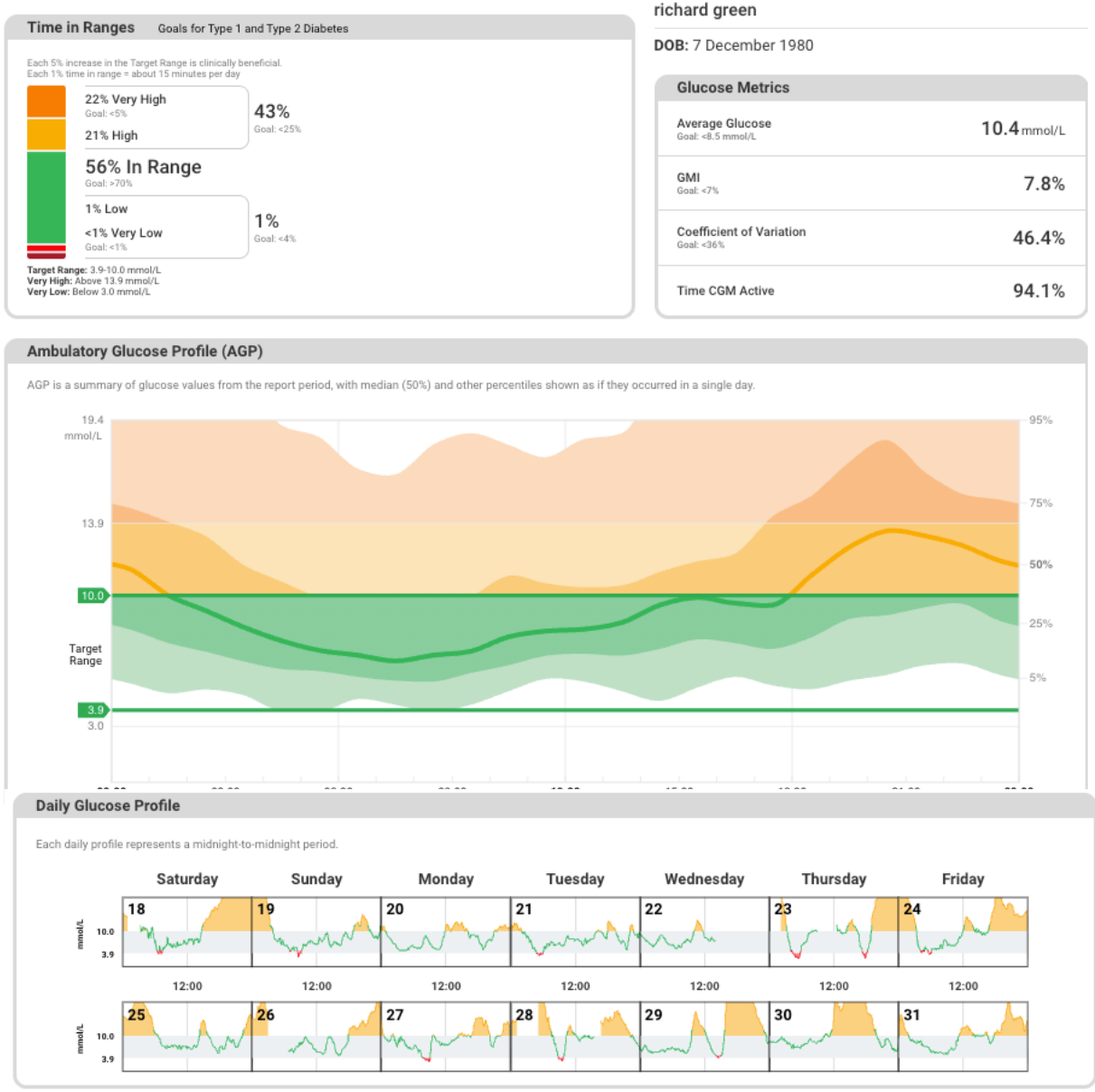
Current Medications

- Doxazosin 2 mg
- Loperamide 2 mg
- Metoclopramide
- Bisoprolol
- Losartan
- Atorvastatin
- Indapamide
- NovoRapid insulin
- Sildenafil
- Alprostadil
- Hydrocortisone
- Clopidogrel
- Renavit one tablet daily

Recent History & Investigations

- **Ophthalmology:**
- Mild recurrence of macular oedema in 2023 and 25

- **Renal:**
- PDx April 2025
- SPK list
- switch to daytime dialysis (four times a day)
- **Diabetes/General:**
- HbA1c trend:
- 25/03/2025: 55 mmol/mol
- 17/12/2024: 57 mmol/mol
- 18/06/2024: 60 mmol/mol
- 16/02/2024: 60 mmol/mol
-On MDI and Dexcom
- Started tandem insulin pump 26/04/2025.



HCL

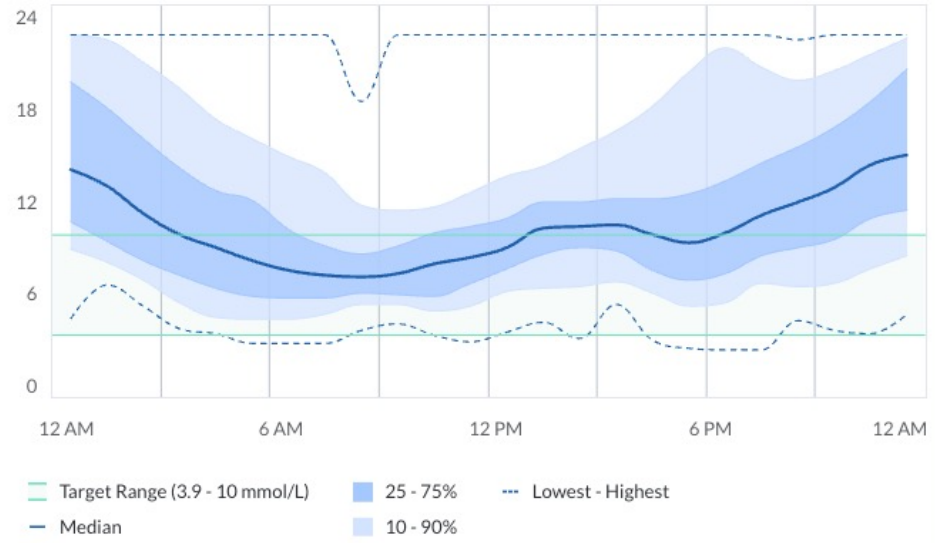
Glucose (CGM)

24% **Very High** > 13.9 mmol/L	
26% **High** 10.1-13.9 mmol/L	
49% **Target Range** 3.9-10 mmol/L	
1% **Low** 3-3.8 mmol/L	
0% **Very Low** < 3 mmol/L	
% Time CGM Active	**96.5% (29 days)**

GMI	8.1% (64.8 mmol/mol)
Average	11.1 mmol/L
SD	4.7 mmol/L
CV	42.9%
Median	9.9 mmol/L
Highest	HI mmol/L
Lowest	2.9 mmol/L

AGP

Glucose (mmol/L) What is AGP?



Insulin - Device

From Insulin Pump

66% 36.6 units Basal/Day

34% 18.7 units Bolus/Day

Insulin/Day	55.3 units
Automatic Bolus/Day	14.8 units (27%)
Overrides (%)	14% (52 boluses)
# Bolus/Day	12.8
# Automatic Bolus/Day	11.1

System Details

Tandem t:slim X2 (29d 2h)

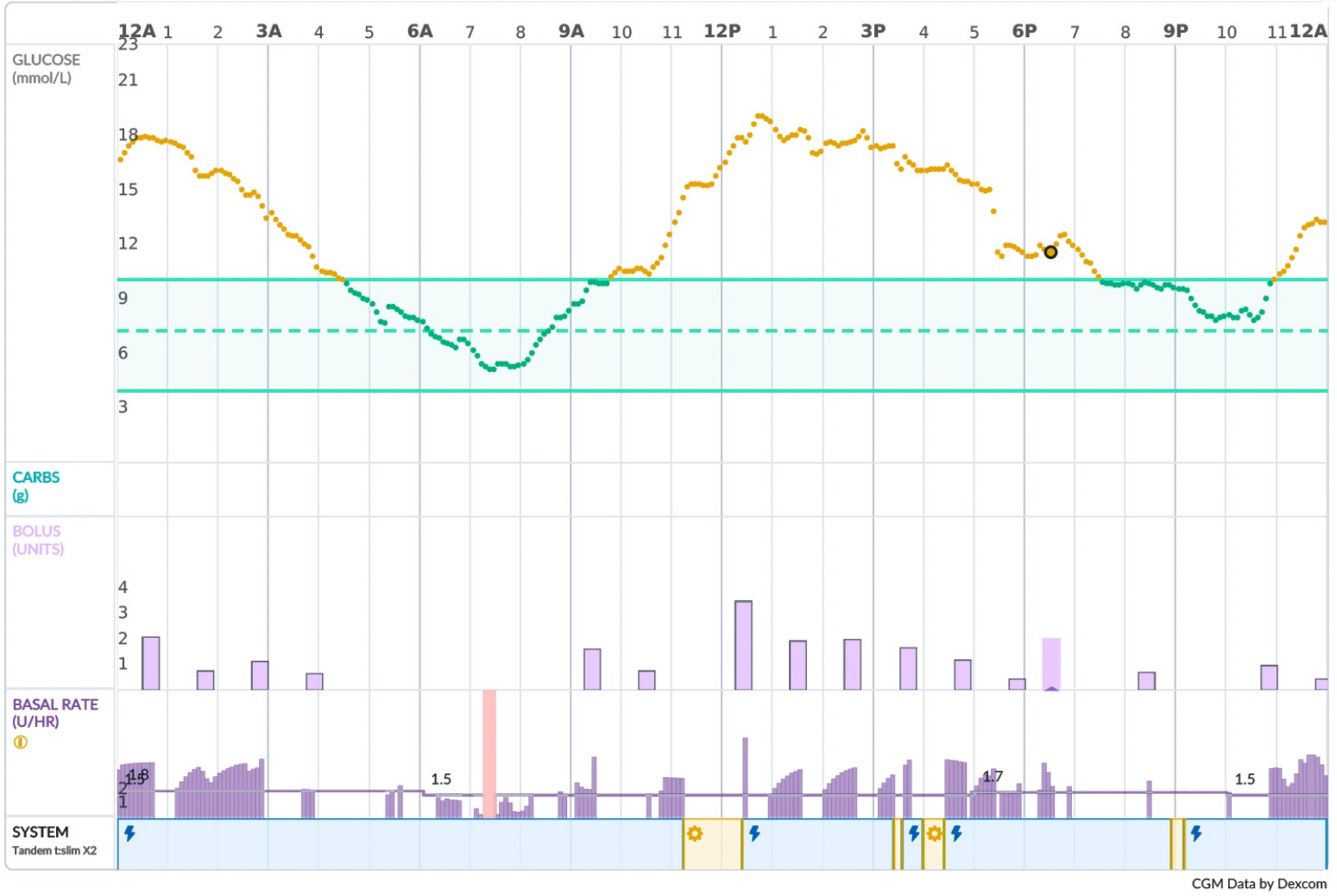
Control-IQ	92% (26d 20h)
Activity - Sleep	0%
Activity - Exercise	0%
Manual	8% (2d 6h)

LGS/PLGS

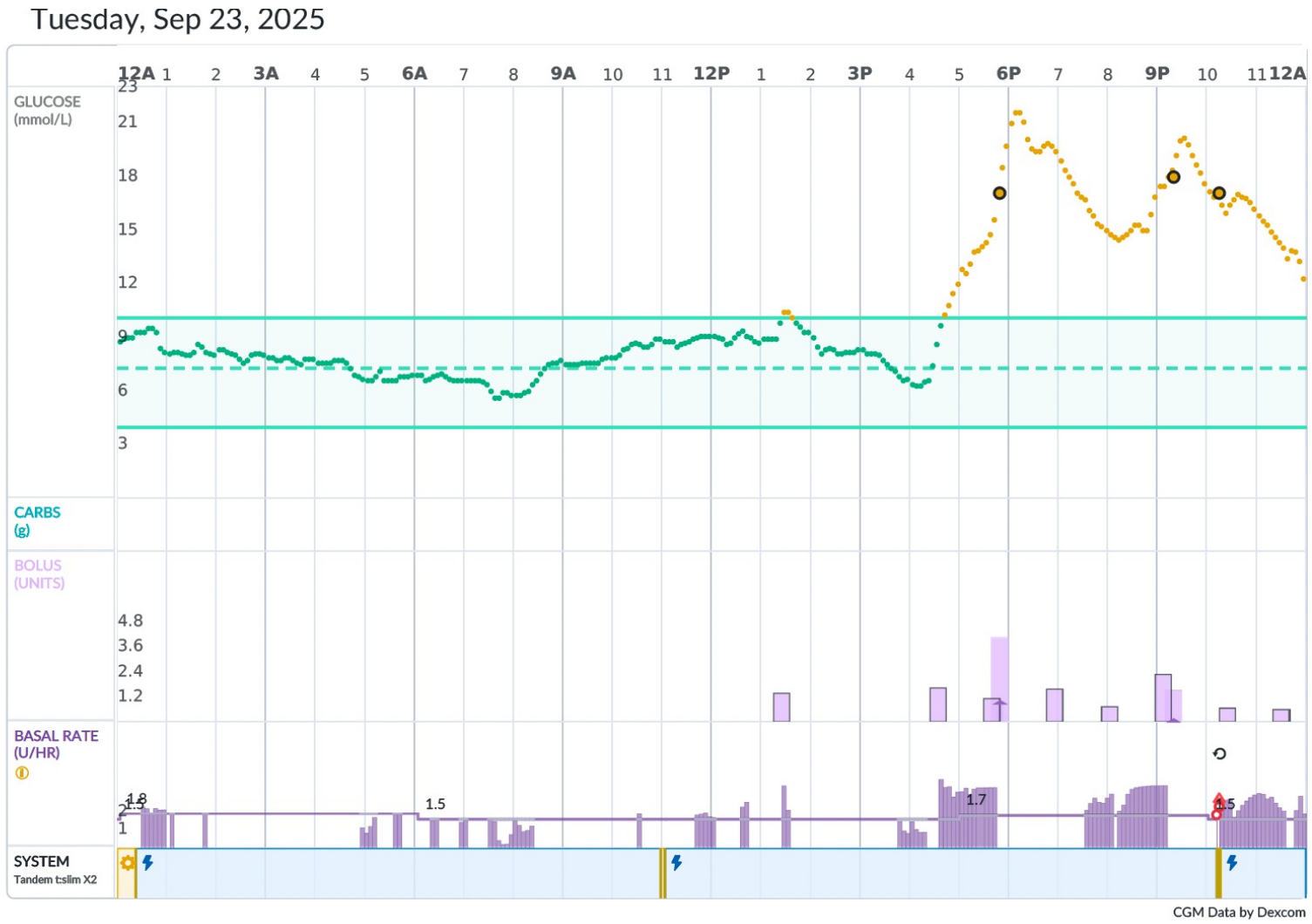
Time Suspended/Day	53m
Avg Suspensions/Day	2.4
Avg Suspension/Time of Day	Morning - 36% Afternoon - 11% Evening - 19% Night - 34%

Show more

Difficult!

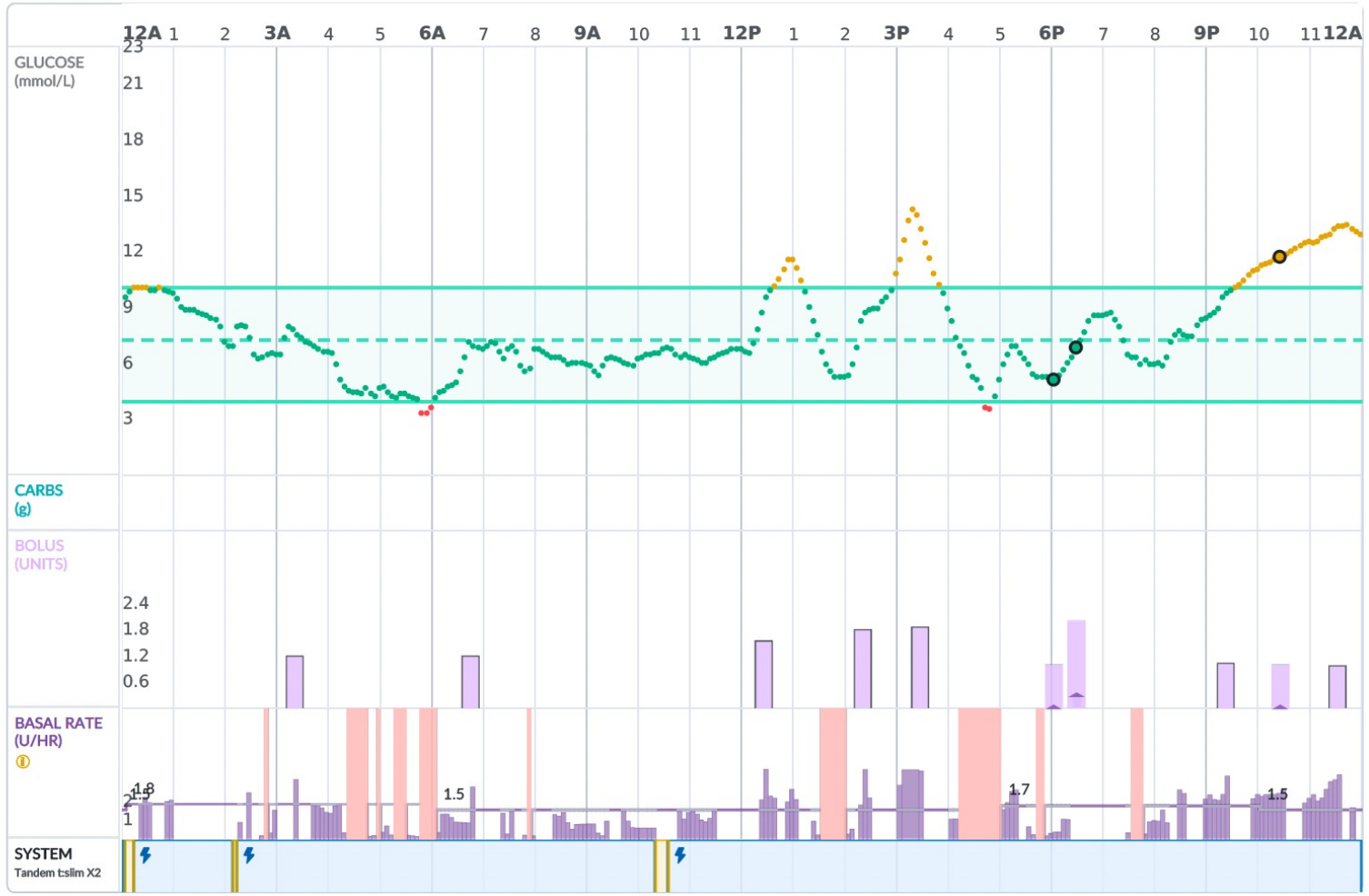

12A 1 2 3A 4 5 6A 7 8 9A 10 11 12P 1 2 3P 4 5 6P 7 8 9P 10 11 12A
GLUCOSE (mmol/L)
23
21
18
15
12
9
6
3
CARBS (g)
BOLUS (UNITS)
4
3
2
1
BASAL RATE (U/HR)
1.8
1.5
1.5
1.7
1.5
SYSTEM
Tandem t:slim X2
CGM Data by Dexcom

Still difficult!



Progress?

Sunday, Oct 12, 2025



CGM Data by Dexcom

Pump Boluses

Bolus Table only shows the first 10 bolus events for the day.

Statistics

HbA1c 14/10/2025: 53 mmol/mol

Profile 1 Active	Basal Units/hr	Sensitivity (ISF, Correction) mmol/L	Insulin : Carb Ratios g/Unit	BG Target Range mmol/L
12:00 AM (6 hr)	1.8	2	10	6.1 (+0/-0)
6:00 AM (5 hr)	1.5	2	10	6.1 (+0/-0)
11:00 AM (6 hr)	1.5	2	10	6.1 (+0/-0)
5:00 PM (5 hr)	1.7	2.5	10	6.1 (+0/-0)
10:00 PM (2 hr)	1.5	2.5	10	6.1 (+0/-0)
Total	38.8 Units			

Learning points: HCL in HDx

HCL is beneficial at increasing TIR in this high risk group of people

However it is not without challenges

Nil adverse events in a high risk population e.g. DKA or severe hypoglycaemia

Freedom from multiple insulin injections

Tips to consider

Conservative treatment targets / AIT settings
Avoid bolus dosing during dialysis sessions

780G

- AIT 4 hours and Glucose target 6.7
- Activity mode may not be needed beyond first few weeks
- Remote connectivity key

CamAPS FX

- Glucose target 7-7.5
- Avoid boost after HDx
- Ease off if concerns first few HDx sessions but avoid (as will not adapt in future)

OP5

Glucose target 7.8-8.3

Control IQ

More experience needed but potential to influence ISF / basal
Profile changes between HDx/Non HDX can be challenging for user group, activity mode consideration if initial concerns
Remote Tandem Diabetes Source needed

Further tips

- MDT teamwork key - with regular input upon initiation
- Capacity and training issues
  - May need 1:1 start
  - Daily contact
  - Review supervised set change
  - Bring back in clinic at 4 wks for review
- Eye assessment
- Close liaison with Renal satellite unit

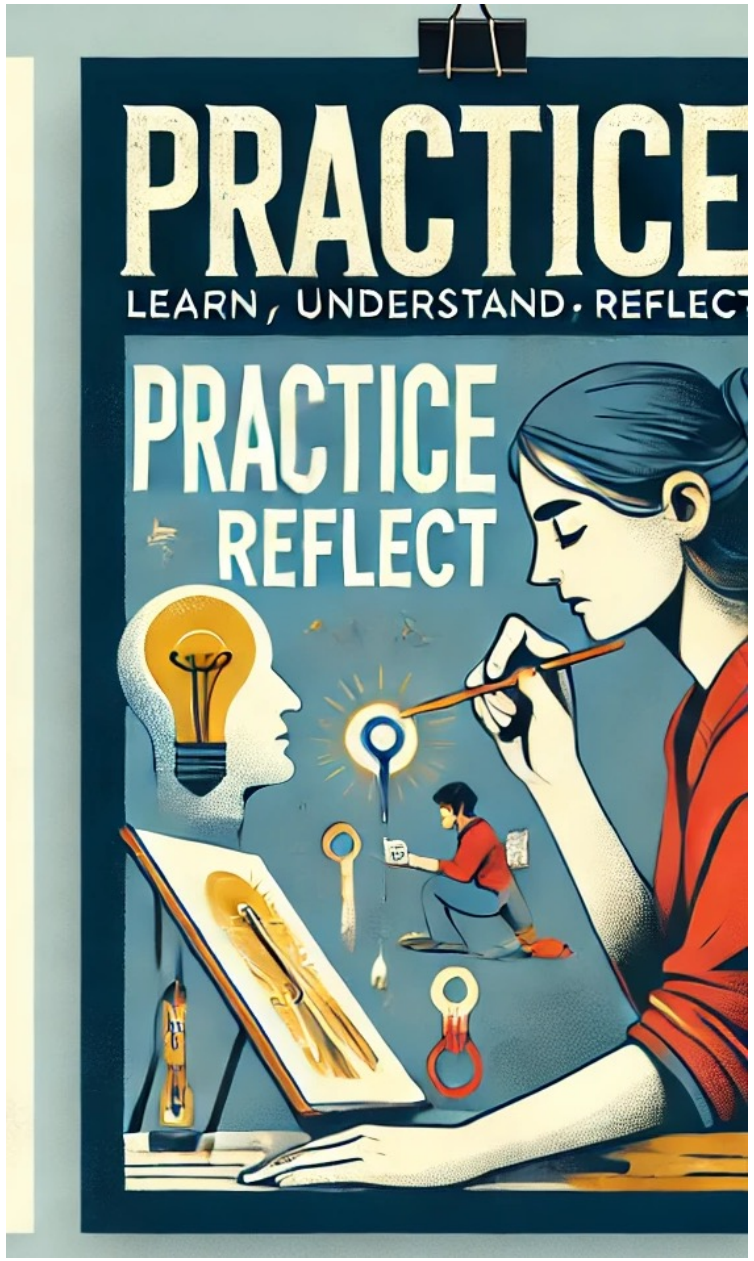
Practical considerations for AID in haemodialysis

- ***Assess suitability:***
  -Before starting dialysis, individuals using AID systems should be assessed to confirm whether AID therapy can be continued safely and to determine if any setting adjustments are needed.
- ***Coordinated Care Plan:***
  -If the patient is considered appropriate to remain on AID therapy, a multidisciplinary diabetes care plan should be created and recorded within the shared electronic medical record.
  -When beginning AID treatment, structured follow-up is essential, typically involving 2–3 contacts per week (face-to-face or virtual) for about the first two weeks. After this initiation phase, appointments can be reduced to weekly as needed. Once therapy has been established for two months, the review schedule may be tailored to individual requirements
  - Consider the presence of diabetes complications such as advanced retinopathy and neuropathy (peripheral and autonomic) which can be exacerbated by rapid fluxes in glycaemic control. Prior to AID initiation ensure the patient is up to date with retinopathy screening and there is no active eye disease which requires treatment. In the context of such complications, initiation of AID may be postponed, or conservative glycaemic treatment goals may need to be adopted. Using an insulin pump in manual mode for the initial period may be a viable strategy, with activation of AID at a later stage to ensure gradual and cautious glycaemic improvement.
- ***Recommendations for AID Use During Dialysis:***
  -Modify blood glucose target, active insulin time and basal profile to more conservative settings when starting dialysis or initiating AID in the context of end-stage kidney disease. SmartGuard™ and SmartAdjust™ provide glucose target options as high as 8.3 mmol/L, Control IQ 8.9 mmol/L and CamAPS™ even higher (up to 11 mmol/L). Glucose target of 8.3 mmol/l at initiation would be suitable in most cases in the context of ESKD.
  -Advise patients to refrain from administering bolus doses during dialysis to due to risk of hypoglycemia.
  -Avoid paracetamol when using Medtronic CGM sensors, as it can interfere with sensor accuracy.
  -Keep the control device (e.g., smartphone) within six meters of the person at all times.
  -If low blood glucose is a concern during dialysis sessions, consider activating temporary modes (activity/exercise/sleep) to increase target glucose levels for a designated time period. Activation 1-2 hours prior to dialysis continuing for 1-2 hours after dialysis (or longer depending on individual susceptibility to hypoglycaemia) could be a viable strategy.

Pavlou et al. Dialysis meets devices: The use of automated insulin deliery in end stage kidney disease. AJP 2025 - Under review

What more is needed? Research studies

- Studies in populations with complications - to aid optimal device design, algorithm development, features and simplicity
- Trials to help demonstrate safety and efficacy for licensing and remuneration
- Guidance and consensus from HCPs
- **Pseudocode from industry to guide use in complex scenarios**



Summary

HCL can offer benefits but need understanding, **teamwork**, adaptations and tailored advice in complex settings

Learn by experience
Discuss cases as teams
Manage as multidisciplinary teams
Share learnings in regional networks

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Prof Lorenzo Piemonti
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Dr Beatrice Pieri
Dr Sofia Peacock
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Prof Tadej Battelino
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KCL collaborators
Prof Tim Tree
Dr Kirsty Winkley
Professor Angus Forbes
Professor Jackie Sturt
Dr Jennifer Pybus
Dr Mark Cote
Professor Prashant Jha

NHS England
Prof Partha Kar

INNODIA
Dr Manuela Battaglia
Giorgia Schena
Laura Moreno-Belmonte

CellT1D@kcl.ac.uk
Sufyan.Hussain@kcl.ac.uk
Sufyan Hussain @sugarydoc

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References

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