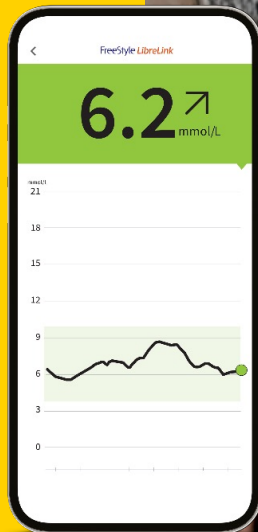




FreeStyle
Libre 2

Case study: Andrew

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Case study



Case study: Andrew

Age	69	BMI	25.7 kg/m ²
Diabetes (Type)	Type 1 diabetes	Last HbA1c value	55 mmol/mol (7.2%)
Profession	Retired furniture designer	Target glucose range	3.9–10 mmol/L
Duration of diabetes	23 years	Treatment	Basal-bolus insulin therapy



Summary

Andrew wants to continue to enjoy his retirement, including regular tennis matches with his friends.



Comorbidities

Coronary heart disease, hypertension, peripheral vascular disease, high cholesterol, retinopathy, peripheral neuropathy.



Specific objective

Managing his glycaemic control to reduce the risk of progression of his diabetic retinopathy and neuropathy is a key objective.

Case study: Andrew

AGP Report

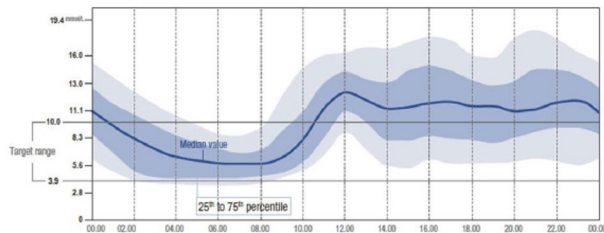
7 Sept 2019 - 21 Sept 2019 (14 Days)

GLUCOSE STATISTICS AND TARGETS

7 Sept 2019 - 21 Sept 2019		14 Days
% Time Sensor is Active		96%
Ranges And Targets For Type 1 or Type 2 Diabetes		
Glucose Ranges	Targets % of Readings (Time/Day)	
Target Range 3.9-10.0 mmol/L	Greater than 70% (16h 45min)	
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	9.9	mmol/L
Glucose Management Indicator (GMI)	7.9%	or 63
Glucose Variability	46.3%	
Defined as percent coefficient of variation (%CV); target ≤36%		

AMBULATORY GLUCOSE PROFILE (AGP)

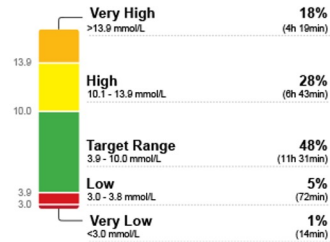
AGP is a summary of glucose values from the report period, with median (50%) and other percentiles shown as if occurring in a single day.



Images are for illustrative purposes only. Not actual patient data.

LibreView

TIME IN RANGES



Snapshot

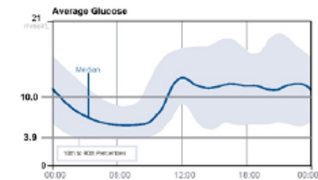
7 September 2019 - 21 September 2019 (14 Days)

LibreView

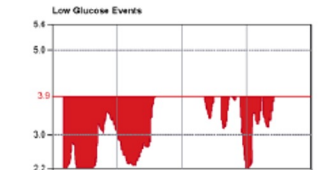
Glucose

GMI **7.9%** = **63** mmol/mol

AVERAGE GLUCOSE	9.9	mmol/L
% above target	46%	
% in target	48%	
% below target	6%	

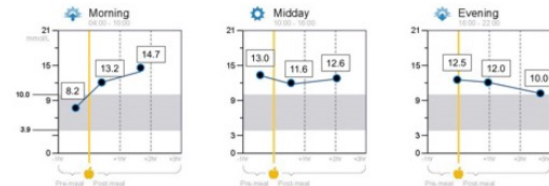


LOW GLUCOSE EVENTS	15
Average duration	178 min



Mealtime Patterns

7 September 2019 - 21 September 2019 (14 Days)



What does the 4-step review tell us?

STEP 1

Data capture and Time in Range (TIR)

Andrew's data capture is 96%, which is excellent, he can be proud of this. His %TIR is 48% which is not a major concern, although it is below the 50% target for older or at-risk individuals.

STEP 2

Look for patterns of hypoglycaemia

The most striking aspect of Andrew's AGP is that his glucose overnight shows significant variability in the blue shaded band and the outer grey shaded band, which is close to the bottom of his target glucose range. Looking at his **Snapshot** profile, many of Andrew's low glucose events are happening between 01:00am and 10:00am, including values below 3.0 mmol/L making his risk of nocturnal hypoglycaemia high. He also has low glucose events in the early evening, corresponding to his tennis games. These areas should all be a focus for management.

STEP 3

Look for patterns of hyperglycaemia

Andrew's AGP and mealtime patterns show that his glucose rises consistently in the late morning after breakfast and stays high, with sustained high average glucose all afternoon and evening until after bedtime. This is reflected in his %TAR which is above 13.9 mmol/L for 46 % of the time, in excess of the recommended 10% for his age profile. His darker blue band is wide and well above his target range.

STEP 4

Look for patterns of glucose variability

Andrew's last HbA1c of 55 mmol/mol (7.2%) is masking considerable glucose variability (CV of 46.3%) with sections of his day spent in the lower end of his target glucose range and others with glucose well-above target. The blue and grey bands in Andrew's AGP are billowing through much of the day and are especially wide through the afternoon and evening indicating significant day-to-day variability. From noon onwards until midnight there is scope to target this aspect of Andrew's glucose management without risking hypoglycaemia. Once Andrew's trend to overnight low glucose is addressed, the variability identified in Step 4 can become a focus for management.

What actions might you agree with Andrew?

- Andrew's risk of nocturnal hypoglycaemia is the focus for treatment adjustment here. His evening basal insulin dose can be reduced to avoid dropping his glucose too low, especially on the evenings when he is playing tennis.
- He is recommended to eat longer-acting carbohydrates to help this.
- The variability in Andrew's daily AGP is a focus for future management as is his consistent hyperglycaemia.

Case study: Andrew

AGP Report

31 Oct 2019 - 13 Nov 2019 (14 Days)

LibreView

GLUCOSE STATISTICS AND TARGETS

31 Oct 2019 - 13 Nov 2019 **14 Days**
 % Time Sensor is Active **99%**

Ranges And Targets For		Type 1 or Type 2 Diabetes
Glucose Ranges		Targets % of Readings (Time/Day)
Target Range 3.9-10.0 mmol/L		Greater than 70% (16h 45min)
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% (8h)
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.		

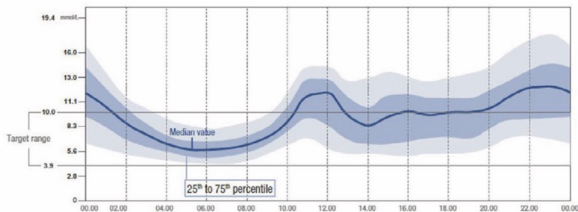
Average Glucose **9.3** mmol/L
Glucose Management Indicator (GMI) **7.4% or 57** mmol/mol
Glucose Variability **39.8%**
 Defined as percent coefficient of variation (%CV); target ≤36%

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.



Images are for illustrative purposes only. Not actual patient data.

Snapshot

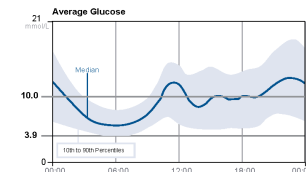
31 October 2019 - 13 November 2019 (14 Days)

LibreView

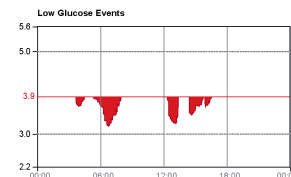
Glucose

GMI **7.4 %** or **57** mmol/mol

AVERAGE GLUCOSE **9.3** mmol/L
 % above target **38 %**
 % in target **60 %**
 % below target **2 %**

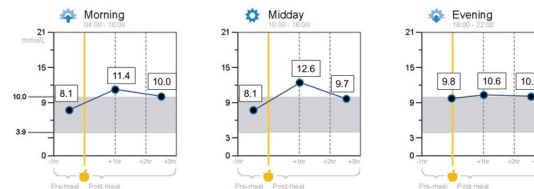


LOW GLUCOSE EVENTS **9**
 Average duration **113** min



Mealtime Patterns

31 October 2019 - 13 November 2019 (14 Days)



What does the 4-step review tell us?

STEP 1

Data capture and Time in Range (TIR)

Andrew's data capture is still excellent and his %TIR is substantially increased to 60%. These are good results, and he should be congratulated.

STEP 2

Look for patterns of hypoglycaemia

Andrew's TBR has reduced from 6% to 2%. The risk of hypoglycaemia has been reduced to the period between 4:00am–8:00am, with fewer low glucose events and none below 3.0 mmol/L, this is a good improvement. The trend to falling glucose after evening meals has also been stabilised, as shown in his mealtime patterns. There is lower variability overnight also, which helps to minimise risk. It may be worth looking at Andrew's daily glucose logs to further understand any issues between 4:00am–8:00am.

STEP 3

Look for patterns of hyperglycaemia

Average glucose as traced by the **median line** has come down between 2:00pm and 8:00pm, and this is reflected in his improved %TIR of 60%. However, Andrew is still spending 38% of time above target, including 13% of time above 13.9 mmol/L, so this is a focus for attention.

STEP 4

Look for patterns of glucose variability

Variability in Andrew's AGP, as measured by CV, has reduced to 39.8%. This is particularly evident overnight, but his blue and grey bands are still very wide from late morning onwards, indicating continued day-to-day variability across the afternoon and evening. Similarly, the steep upward swing between 10:00am–12:00pm is still a feature. Further reductions in the width of his blue and grey shaded bands can be made through the afternoon and evening, with minimal risk of hypoglycaemia.

What actions might you agree with Andrew?

- Further reduction in basal insulin may help further reduce the risk of hypoglycaemia between 4:00–8:00am.
- The upward excursion from 10:00am–12:00pm should be a target for therapy adjustment, either by increasing the dose of prandial insulin or timing it better ahead of Andrew's morning meal.
- Andrew's regular evening tennis exercise creates a very individual need for management.