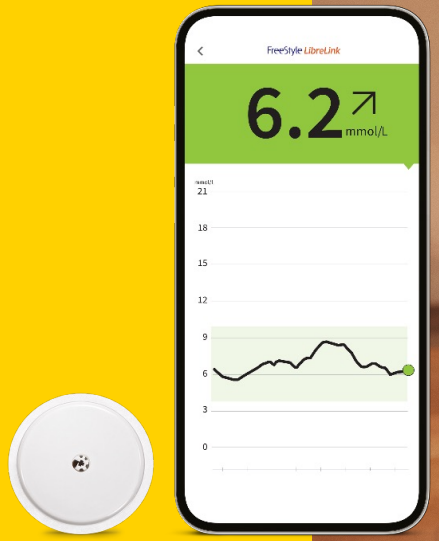
FreeStyle Libre 2

Case study

Case study: Margaret



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Case study: Margaret

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Age	59	**BMI**	28.7 kg/m^2
Diabetes (Type)	Type 2 diabetes	**Last HbA1c value**	74 mmol/mol (8.9%)
Profession	Sales assistant	**Target glucose range**	3.9–10 mmol/L
Duration of diabetes	5 years	**Treatment**	Basal-bolus insulin therapy

Summary

For Margaret there is still value in getting tight glucose control to reduce her risk of complications. She is on an intensive basal-bolus multiple daily injection (MDI) regime. Margaret is intolerant of metformin but is on sitagliptin; she also has severe anxiety about hypoglycaemia.

Comorbidities

Coronary heart disease, hypertension, high cholesterol, epilepsy and mild depression.

Specific objective

Managing her overall glycaemic exposure is a key goal given her duration of her diabetes as well as minimising her risk of hypoglycaemia.

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Case study: Margaret

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AGP Report

26 April 2021 - 9 May 2021 (14 Days)

LibreView

GLUCOSE STATISTICS AND TARGETS

26 April 2021 - 9 May 2021	14 Days
% Time Sensor is Active	97%

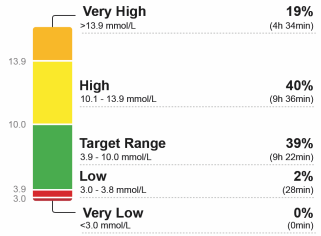
Ranges And Targets For	Type 1 or Type 2 Diabetes
Glucose Ranges	**Targets** % of Readings (Time/Day)
Target Range 3.9-10.0 mmol/L	Greater than 70% (16h 48min)
Below 3.9 mmol/L	Less than 4% (58min)
Below 3.0 mmol/L	Less than 1% (14min)
Above 10.0 mmol/L	Less than 25% (6h)
Above 13.9 mmol/L	Less than 5% (1h 12min)

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

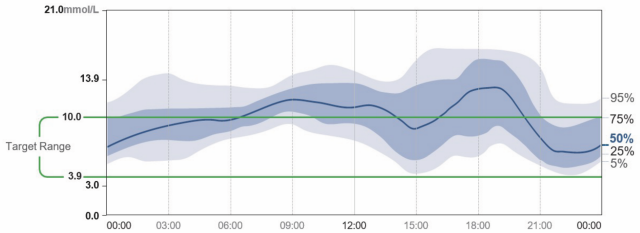
Average Glucose	10.1 mmol/L
Glucose Management Indicator (GMI)	8.0% or 64 mmol/mol
Glucose Variability	42.4%

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

TIME IN RANGES



AMBULATORY GLUCOSE PROFILE (AGP)



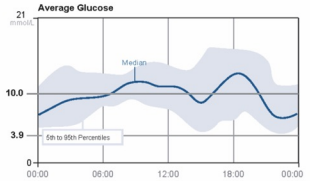
Snapshot

26 April 2021 - 9 May 2021 (14 Days)

LibreView

Glucose — GMI 8.0 % or 64 mmol/mol

AVERAGE GLUCOSE	10.1 mmol/L
% above target	59 %
% in target	39 %
% below target	2 %



LOW GLUCOSE EVENTS	6
Average duration	44 Min

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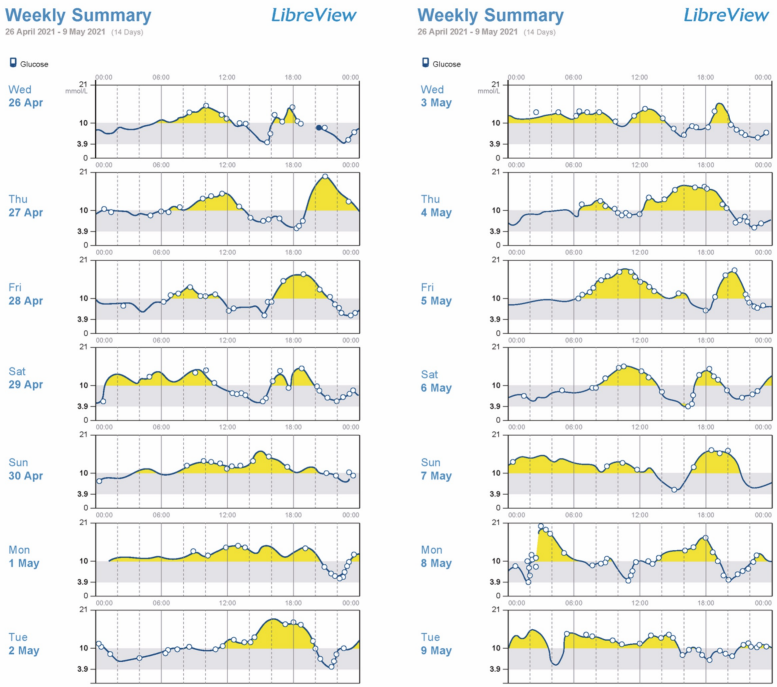
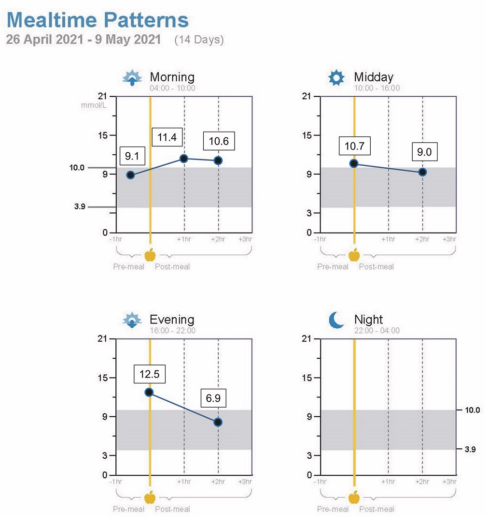
Case study: Margaret





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What does the 4-step review tell us?

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STEP 1

Data capture and Time in Range (TIR)

Margaret is scanning regularly, with 97% data capture. Her Time in Range is 39%, which reflects her anxiety about hypoglycaemia as a consequence of tighter control.

STEP 2

Look for patterns of hypoglycaemia

Margaret's AGP Report shows us only 2% of readings below 3.9 mmol/L. She has a moderate risk of hypoglycaemia between 2:00pm–4:00pm in the afternoon and also later in the evening. Her **Mealtime Patterns** suggest that falling glucose after her evening meal may contribute to her risk of low glucose later in the evening. Her **low glucose events** indicate a few brief episodes of hypoglycaemia, but her risk of dropping to 3.0 mmol/L is very low. Overall, no action required.

STEP 3

Look for patterns of hyperglycaemia

Margaret's hypo anxiety and her epilepsy mean that she runs her glucose high, such that 59% of her readings are above 10 mmol/L. Her medial line is above target for most of the day from just after 6:00am until 9:00pm, and her Time in Range is correspondingly poor at 39%. Her **Weekly Summary reports** show her daily glucose traces follow these patterns, indicating a need to examine her treatment parameters.

STEP 4

Look for patterns of glucose variability

The blue and grey bands in Margaret's AGP are narrowest from 6:00–10:00 am, but then billow through the rest of the day. They are especially wide through the afternoon and evening indicating significant day-to-day variability at this time. She also sees a significant upswing in the middle of the afternoon, with a downswing in the evening, suggesting that her glucose is unstable at this time, corresponding to the period after her evening meal. This is confirmed by a look at the daily profiles in her **Weekly Summary** reports. Her wide blue band suggests a need to examine her therapeutic parameters in the afternoon and evening, as well as aspects of her daily activities, as indicated by the wide grey band.

What actions might you agree with Margaret?

- Margaret is recommended to increase her evening basal insulin dose to improve her fasting glucose.
- Margaret's rapid-acting insulin should be increased at breakfast and also in the afternoon to counter postprandial rises in glucose evident in her daily profiles.
- Some education and awareness are also needed to help Margaret match her intensive insulin regimen with her carbohydrate intake.

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Case study: Margaret

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AGP Report

16 November 2021 - 29 November 2021 (14 Days)

LibreView

GLUCOSE STATISTICS AND TARGETS

16 November 2021 - 29 November 2021	14 Days
% Time Sensor is Active	90%

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 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.

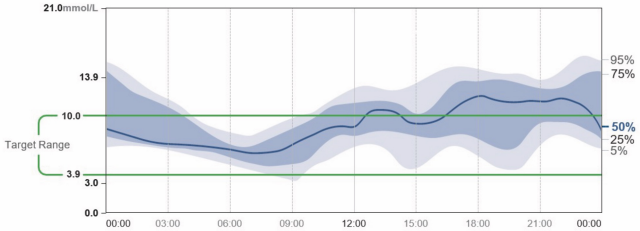
Average Glucose	9.4 mmol/L
Glucose Management Indicator (GMI)	7.5% or 58 mmol/mol
Glucose Variability	38.0%

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

TIME IN RANGES

Very High	>13.9 mmol/L	10% (2h 24min)
High	10.1 - 13.9 mmol/L	33% (7h 55min)
Target Range	3.9 - 10.0 mmol/L	54% (12h 58min)
Low	3.0 - 3.8 mmol/L	3% (43min)
Very Low	<3.0 mmol/L	0% (0min)

AMBULATORY GLUCOSE PROFILE (AGP)



Snapshot

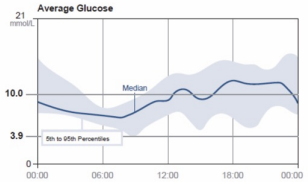
16 November 2021 - 29 November 2021 (14 Days)

LibreView

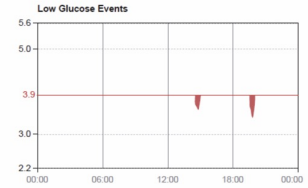
Glucose

GMI 7.5 % or 58 mmol/mol

AVERAGE GLUCOSE	9.4 mmol/L
% above target	43 %
% in target	54 %
% below target	3 %



LOW GLUCOSE EVENTS	3
Average duration	50 Min



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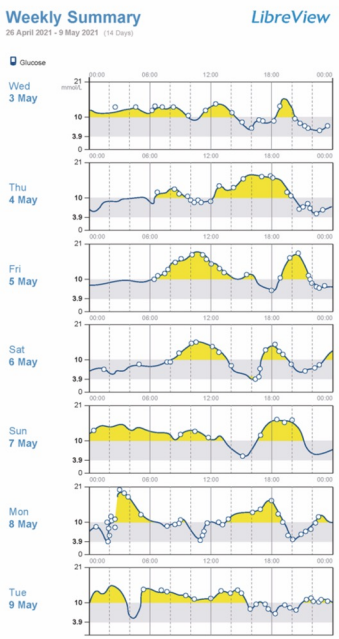
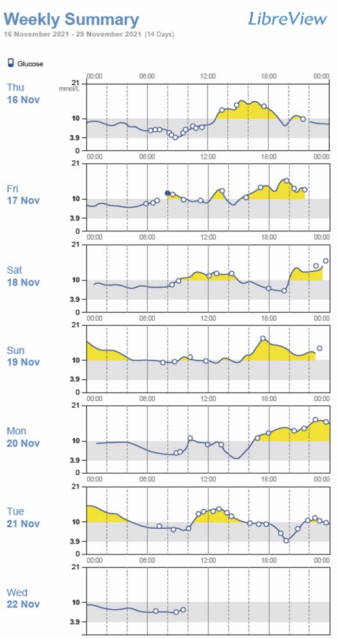
Before

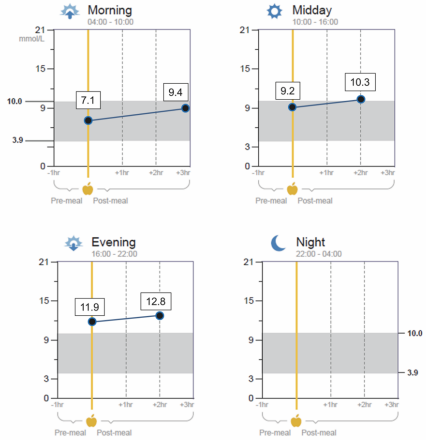


After



Mealtime Patterns

16 November 2021 - 29 November 2021 (14 Days)



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What does the 4-step review tell us?

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STEP 1

Data capture and Time in Range (TIR)

Margaret's has 90% data capture, and her Time in Range has increased substantially to 54%. This is good news and she can be proud of this achievement.

STEP 2

Look for patterns of hypoglycaemia

This AGP shows that Margaret's risk of hypoglycaemia remains low, with only 3% of readings below 3.9 mmol/L, with a few low glucose events in the afternoon. No action is needed here.

STEP 3

Look for patterns of hyperglycaemia

Margaret's median line is now within her target range during the night and through the morning, which is a good improvement. A comparison of her **Weekly Summaries** shows that her previous daily pattern of glucose excursions in the morning is now much reduced. Margaret's glucose still heads above target around 12:00am after breakfast and persists after lunch, as indicated in her mealtime patterns, and stays high for the rest of the day. Her Time in Range is improved to 54%, which reflects her reduced Time Above Range, down from 59% to 43%.

STEP 4

Look for patterns of glucose variability

The blue and grey bands in Margaret's AGP are narrow from 4:00am until around lunchtime but again billow through much of the day and night. The blue IQR band is in fact wider at night than previously, indicating increased day-today variability. However, her overall stability has improved as can be seen in her daily profiles in the **Weekly Summaries**.

What actions might you agree with Margaret?

- Margaret should continue to increase her dose of rapid-acting insulin with meals or snacks at lunch and also at dinner time. However, not at the cost of increasing her risk of hypoglycaemia.
- Continued education is needed to build Margaret's confidence in calculating her mealtime insulin bolus in line with her food intake, whilst minimising the risk of low glucose.
- A shorter interval between reviews is also recommended to keep track of progress.

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