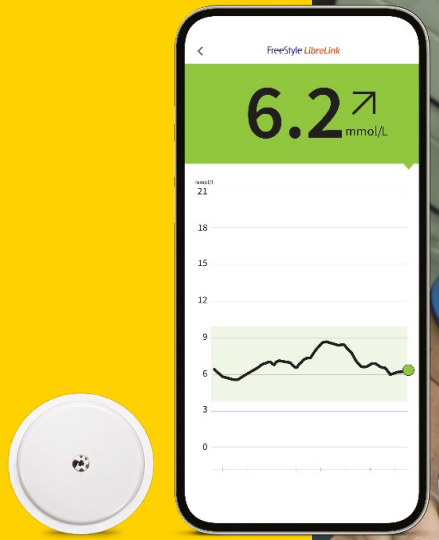
FreeStyle Libre 2

Case study

Case study: Trevor



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Case study: Trevor

FreeStyle Libre 2

Age	53	**BMI**	24.2 kg/m^2
Diabetes (Type)	Type 1 diabetes	**Last HbA1c value**	45 mmol/mol (6.3%)
Profession	Maths teacher	**Target glucose range**	3.9–10 mmol/L
Duration of diabetes	7 years	**Treatment**	Basal-bolus insulin therapy

Summary

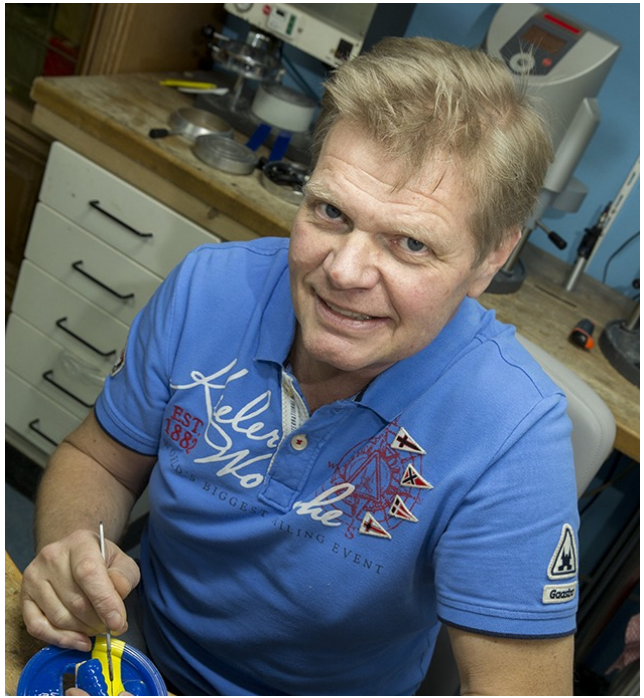
Trevor is a secondary school teacher, who developed type 1 diabetes 7 years ago. He is anxious to avoid an episode of hypoglycaemia while teaching and wants to show his pupils that you can live normally with the condition.

Comorbidities

Hypertension; currently prescribed olmesartan.

Specific objective

Trevor is keen to improve overall control of his glucose levels, with a focus on preventing hypoglycaemia during his teaching day.



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Case study: Trevor

FreeStyle Libre 2

AGP Report

25 April 2021 - 8 May 2021 (14 Days)

LibreView

GLUCOSE STATISTICS AND TARGETS

25 April 2021 - 8 May 2021	14 Days
% Time Sensor is Active	96%

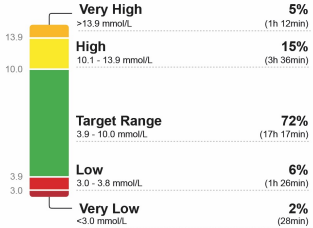
Ranges And Targets For	Type 1 or Type 2 Diabetes
Glucose Ranges	**Targets** % of Readings (Time/Day)
Target Range 3.9-10.0 mmol/L	Greater than 70% (16h 48min)
Below 3.9 mmol/L	Less than 4% (58min)
Below 3.0 mmol/L	Less than 1% (14min)
Above 10.0 mmol/L	Less than 25% (6h)
Above 13.9 mmol/L	Less than 5%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

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

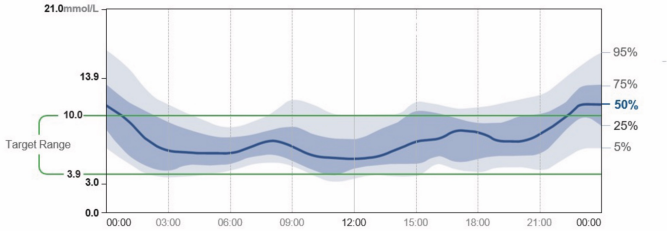
Average Glucose	7.7 mmol/L
Glucose Management Indicator (GMI)	6.5% or 48 mmol/mol
Glucose Variability	35.3%

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

TIME IN RANGES



AMBULATORY GLUCOSE PROFILE (AGP)



Snapshot

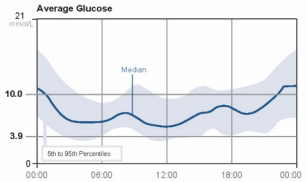
25 April 2021 - 8 May 2021 (14 Days)

LibreView

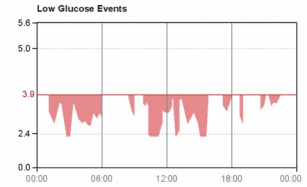
Glucose

GMI 6.5 % or 48 mmol/mol

AVERAGE GLUCOSE	7.7 mmol/L
% above target	20 %
% in target	72 %
% below target	8 %

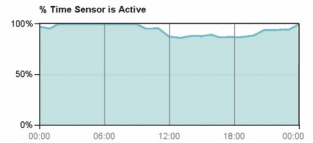


LOW GLUCOSE EVENTS	22
Average duration	76 Min



Sensor Usage

% TIME SENSOR IS ACTIVE	96 %
Average scans/views	18 / Day



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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)

Trevor has collected 96% of his sensor data which will provide an accurate picture of his sensor glucose levels. His Time in Range is 72%, which is a great result.

STEP 2

Look for patterns of hypoglycaemia

A look at his **Snapshot** shows that Trevor has experienced 22 low-glucose events, including several episodes below 3.0 mmol/L. His AGP Report shows his blue-shaded band is close to or below 3.9 mmol/L between 2:00am and 5:00am and again from 10:00am until noon. His grey band skirts the lower target range more frequently. There is a definite risk of hypoglycaemia at these times, and these should be the priority for management.

STEP 3

Look for patterns of hyperglycaemia

Only 20% of his readings are above target, including only 5% above 13.9 mmol/L, so he is hitting the consensus targets for Time Above Range. His median line shows a steady increase from 2:00pm–3:00am, peaking around midnight, and he has a trend to high glucose from around 10:00pm to 2:00am. This may be a focus for attention.

STEP 4

Look for patterns of glucose variability

Trevor's Time in Range just above the consensus target for a target range of 3.9- 10 mmol/L, at 72%, and his CV is below 36%, indicating there is no priority to address glycaemic variability. The blue and grey bands on Trevor's AGP indicate some day-to-day variability that is worth investigating, especially towards the end of the day and overnight.

What actions might you agree with Trevor?

- Since Trevor's hypoglycaemic episodes at night may also result from insulin corrections before sleeping, a reduction in his correction factor would be appropriate.
- Since Trevor is concerned about daytime hypos, his prandial insulin at breakfast and lunch may need to be reduced, enough to avoid the low glucose events he is seeing.
- Increase Trevor's bolus insulin with his evening meal to reduce his tendency for rising glucose levels after dinner.

Case study: Trevor

FreeStyle Libre 2

AGP Report

21 September 2021 - 4 October 2021 (14 Days)

LibreView

GLUCOSE STATISTICS AND TARGETS

21 September 2021 - 4 October 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.

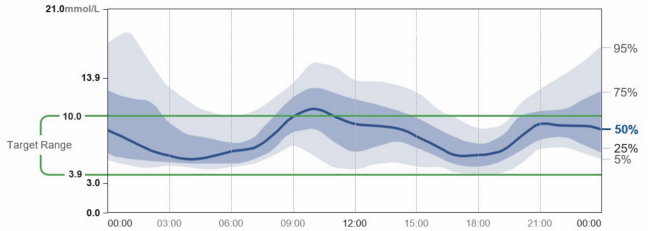
Average Glucose	8.3 mmol/L
Glucose Management Indicator (GMI)	6.8% or 51 mmol/mol
Glucose Variability	37.8%

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	22% (5h 17min)
Target Range	3.9 - 10.0 mmol/L	64% (15h 22min)
Low	3.0 - 3.8 mmol/L	4% (58min)
Very Low	<3.0 mmol/L	0% (0min)

AMBULATORY GLUCOSE PROFILE (AGP)



Snapshot

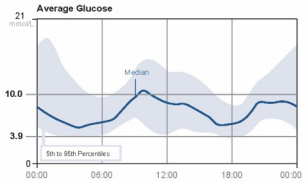
21 September 2021 - 4 October 2021 (14 Days)

LibreView

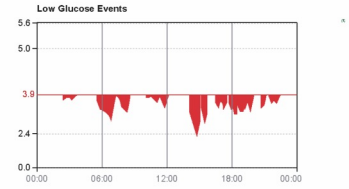
Glucose

GMI 6.8 % or 51 mmol/mol

AVERAGE GLUCOSE	8.3 mmol/L
% above target	32 %
% in target	64 %
% below target	4 %



LOW GLUCOSE EVENTS	12
Average duration	90 Min



Sensor Usage

% TIME SENSOR IS ACTIVE	97 %
Average scans/views	15 / Day

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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)

Trevor's scanning behaviour is still very good, with 97% of his sensor data captured. His Time in Range has reduced to 64% from 72%, which is worth investigating.

STEP 2

Look for patterns of hypoglycaemia

Trevor's risk of hypoglycaemia has reduced; his time below target has halved from 8% to 4% and his number of low glucose events has reduced from 22 to 12, with few excursions below 3.0 mmol/L. There is still a risk of hypoglycaemia in the late afternoon and early evening, when his grey band shows readings at or below the lower limit of his target glucose range, which is a concern.

STEP 3

Look for patterns of hyperglycaemia

With 32% or readings above 10 mmol/L, Trevor's Time Above Range has increased significantly. This may be due to his anxiety about experiencing a hypo. His median line is swinging up after breakfast, between 8:00am–10:00am, suggestive of a need to match his prandial insulin with his breakfast carbs.

STEP 4

Look for patterns of glucose variability

The blue and grey bands in Trevor's AGP Report have become wider at night since Trevor's last consultation and his glycaemic variability has risen above 36%, indicating less glucose stability. This is evident in the ballooning of the blue and grey bands throughout the day, with wide peaks at 2.00am and 10:00am.

What actions might you agree with Trevor?

- There is still a risk of hypoglycaemia in the early afternoon. Discuss with Trevor how this matches his daily routine and suggest strategies to address this. If he can blunt his morning excursion, he may benefit from a mid-afternoon snack to combat the risk of hypoglycaemia.
- Trevor's morning upswing suggests he should increase his breakfast insulin dose and timing.
- There is still significant variation in glucose levels overnight, indicating a decrease in basal insulin dose at bedtime may be required, but accompanied by further increases in evening mealtime insulin to reduce the evening high glucose.