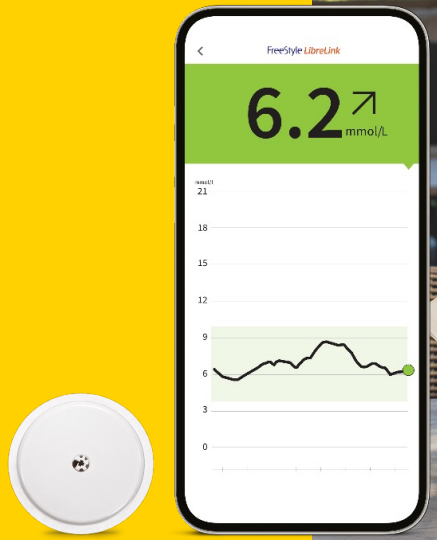
FreeStyle Libre 2

Case study

# Case study: Susan

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# Case study: Susan

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| | | | |
|---|---|---|---|
| **Age** | 49 | **BMI** | 29.5 kg/m$^2$ |
| **Diabetes (Type)** | Type 1 diabetes | **Last HbA1c value** | 42.1 mmol/mol (6.0%) |
| **Profession** | Attorney, Politician | **Target glucose range** | 3.9–10 mmol/L |
| **Duration of diabetes** | 23 years | **Treatment** | Basal-bolus insulin therapy |

## Summary

Susan is a busy politician and lawyer, she has had Type 1 diabetes since her 20's and is on CSII pump therapy. A low HbA1c suggests she is well controlled.

## Comorbidities

Hypercholesterolaemia.

## Specific objective

To manage Susan's glucose levels in line with the pressures of her job and her high cholesterol level.

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# Case study: Susan

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## AGP Report

8 November 2021 - 21 November 2021 (14 Days)

LibreView

### GLUCOSE STATISTICS AND TARGETS

| | |
|---|---|
| 8 November 2021 - 5 December 2021 | 14 Days |
| % Time Sensor is Active | 88% |

| 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) |

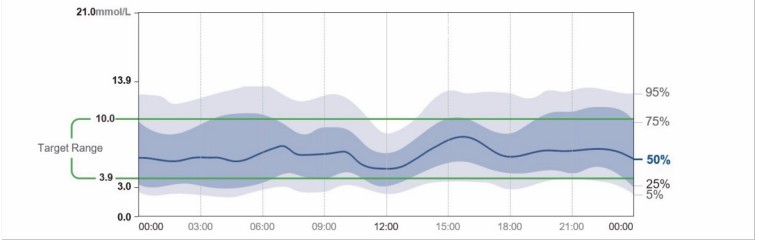
Each 5% increase in time in range (3.9-10.0 mmol/L) is clinically beneficial.

| | |
|---|---|
| **Average Glucose** | 6.9 mmol/L |
| **Glucose Management Indicator (GMI)** | 6.0% or 42 mmol/mol |
| **Glucose Variability** | 41.1% |

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

### TIME IN RANGES

### AMBULATORY GLUCOSE PROFILE (AGP)




## Snapshot

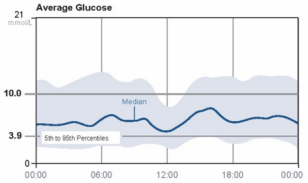
8 November 2021 - 21 November 2021 (14 Days)

LibreView

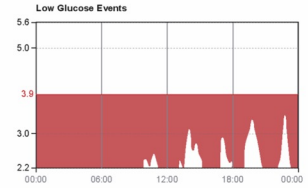
### Glucose

GMI 6.0 % 42 mmol/mol

| | |
|---|---|
| AVERAGE GLUCOSE | 6.9 mmol/L |
| % above target | 16 % |
| % in target | 60 % |
| % below target | 24 % |

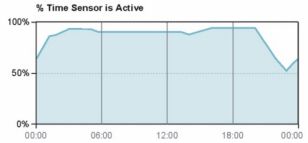



| | |
|---|---|
| LOW GLUCOSE EVENTS | 52 |
| Average duration | 173 Min |




### Sensor Usage

| | |
|---|---|
| % TIME SENSOR IS ACTIVE | 88 % |
| Daily scans | 8 / Day |

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# What does this 4-step review tell us?

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**STEP 1**

## Data capture and Time in Range (TIR)

Susan has 88% of her sensor glucose data and her Time in Range is 60%, which is a good way to start her review.

**STEP 2**

## Look for patterns of hypoglycaemia

Susan is spending 24% of her time below her target and her AGP shows that she is experiencing low glucose throughout the day and night as evident from the blue and grey bands straying below target, including below 3.0 mmol/L. Both her blue and grey bands dip below her target glucose range overnight, with episodes of low glucose below 3.0 mmol/L and her risk of hypoglycaemia is high at all times of day. The low glucose events shown in her **Snapshot report** confirm extensive excursions, many of which are below 3.0 mmol/L. This indicates that Susan may have impaired hypoglycaemia awareness, and her Snapshot report shows her average scan rate is 8 times a day, which may need to increase if she is to see her many low glucose moments. These are all serious problems to address.

**STEP 3**

## Look for patterns of hyperglycaemia

Susan's median line is tracing within her target glucose range throughout the day, and her blue band is also mostly within her target range. This is good. Although her grey band shows readings above 10 mmol/L for much of the day, Susan's time above range is only 16%, with only 1% of readings above 13.9 mmol/L, so within recommended targets.

**STEP 4**

## Look for patterns of glucose variability

Even though her median glucose line is within her target range, Susan's AGP shows that her blue and grey bands are ballooning through much of the day and evening, indicating significant day-to-day glucose variability. Both her treatment plan and her day-to-day activities need to be examined in this context.

## What actions might you agree with Susan?

- The main priority is to reduce time in hypoglycaemia for Susan, and the issue of impaired awareness of hypoglycaemia should be raised with her.
- Susan is advised to increase her number of scans and use her trend arrows to detect impending hypoglycaemia.
- Susan's basal insulin rate should be reduced to address her overnight hypoglycaemia and her mealtime insulin doses should also be reduced to combat her risk of low glucose across the day.

The information 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.

# Case study: Susan

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## AGP Report

5 December 2021 - 18 December 2021 (14 Days)

LibreView

### GLUCOSE STATISTICS AND TARGETS

| | |
|---|---|
| 5 December 2021 - 18 December 2021 | 14 Days |
| % Time Sensor is Active | 97% |

Ranges And Targets For — Type 1 or Type 2 Diabetes

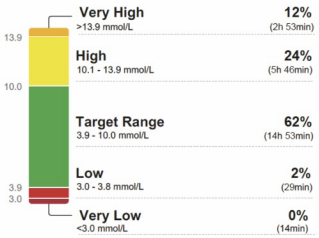
| Glucose Ranges | Targets % of Readings (Time/Day) |
|---|---|
| Target Range 3.9-10.0 mmol/L | Greater than 70% (16h 48min) |
| Below 3.9 mmol/L | Less than 4% (58min) |
| Below 3.0 mmol/L | Less than 1% (14min) |
| Above 10.0 mmol/L | Less than 25% (6h) |
| Above 13.9 mmol/L | Less than 5% (1h 12min)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

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

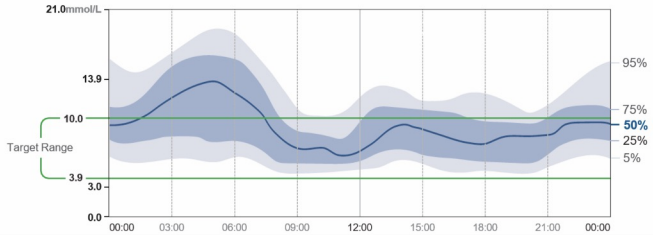
| | |
|---|---|
| Average Glucose | 9.2 mmol/L |
| Glucose Management Indicator (GMI) | 7.4% or 57 mmol/mol |
| Glucose Variability | 42.2% |

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

### TIME IN RANGES




### AMBULATORY GLUCOSE PROFILE (AGP)




## Snapshot

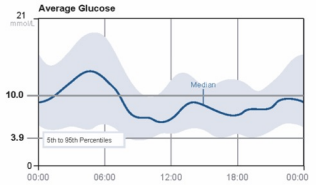
5 December 2021 - 18 December 2021 (14 Days)

LibreView

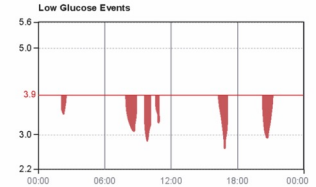
### Glucose

GMI 7.4 % or 57 mmol/mol

| | |
|---|---|
| AVERAGE GLUCOSE | 9.2 mmol/L |
| % above target | 36 % |
| % in target | 62 % |
| % below target | 2 % |

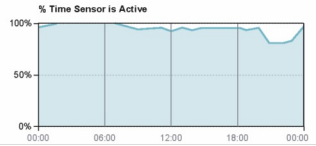



| | |
|---|---|
| LOW GLUCOSE EVENTS | 6 |
| Average duration | 52 Min |




### Sensor Usage

| | |
|---|---|
| % TIME SENSOR IS ACTIVE | 97 % |
| Daily scans | 8 / Day |

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# What does this 4-step review tell us?

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STEP 1

## Data capture and Time in Range (TIR)

Susan's data capture is 97%, up from 88% in her previous consultation, and her Time in Range is slightly higher at 62%, so good steps in the right direction.

STEP 2

## Look for patterns of hypoglycaemia

Susan's treatment plan has reduced her time in hypoglycaemia significantly from 24% to 2%, and this is evident from both the inner blue and outer grey bands. Importantly, her **Snapshot report** is registering far fewer low glucose events, especially those below 3.0 mmol/L. However, the grey band tends to drop near her lower target level from 8:00am–12:00pm and between 4:00pm–8:00pm. This hypoglycaemic trend should be monitored closely.

STEP 3

## Look for patterns of hyperglycaemia

The median line in Susan's AGP swings up above 10 mmol/L with a significant excursion between 2:00am–8:00am. Her blue and grey bands are also ballooning significantly between 10:00pm–6:00am, such that her Time above Range has increased from 16% to 36%. This overnight hyperglycaemia is now a cause for concern.

STEP 4

## Look for patterns of glucose variability

Susan's AGP shows that the blue and grey bands are extremely wide between midnight and 8:00am, indicating significant glucose variability overnight, and her grey band is wide across the day. Her CV is 42.2%, indicating unstable glucose variability. This all indicates that Susan still needs to match her treatment plan with her day-to-day activities.

## What actions might you agree with Susan?

- Susan's basal rate should now be increased moderately at night to try to reduce her overnight variability and her trend to high glucose overnight.
- Similarly, a moderate increase in Susan's insulin dose with her evening meal may bring her control within her target glucose range.
- A discussion with Susan is needed about her night-time behaviour, to understand the reason for her high overnight variability.

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# Case study: Susan

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## AGP Report

3 January 2021 - 16 January 2021 (14 Days)

LibreView

### GLUCOSE STATISTICS AND TARGETS

| | |
|---|---|
| 3 January 2021 - 16 January 2021 | 14 Days |
| % Time Sensor is Active | 100% |

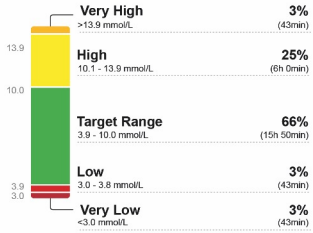
| Ranges And Targets For | Type 1 or Type 2 Diabetes |
|---|---|
| **Glucose Ranges** | **Targets** % of Readings (Time/Day) |
| Target Range 3.9-10.0 mmol/L | Greater than 70% (16h 48min) |
| Below 3.9 mmol/L | Less than 4% (58min) |
| Below 3.0 mmol/L | Less than 1% (14min) |
| Above 10.0 mmol/L |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

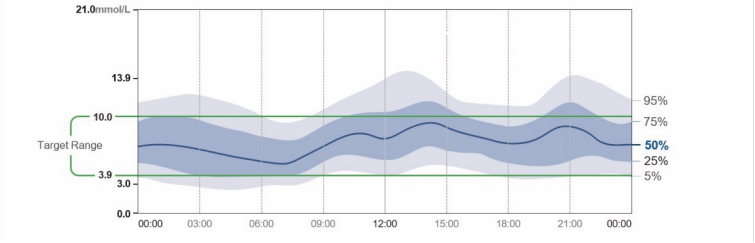
| | |
|---|---|
| Average Glucose | 8.1 mmol/L |
| Glucose Management Indicator (GMI) | 6.7% or 50 mmol/mol |
| Glucose Variability | 39.4% |

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

### TIME IN RANGES




### AMBULATORY GLUCOSE PROFILE (AGP)




## Snapshot

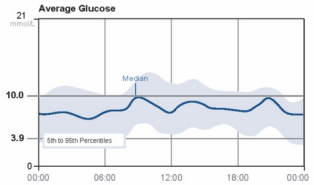
3 January 2021 - 16 January 2021 (14 Days)

LibreView

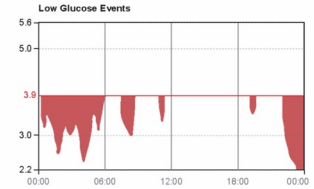
### Glucose

GMI 6.7 % or 50 mmol/mol

| | |
|---|---|
| AVERAGE GLUCOSE | 8.1 mmol/L |
| % above target | 28 % |
| % in target | 66 % |
| % below target | 6 % |

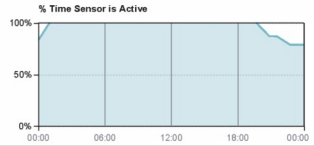



| | |
|---|---|
| LOW GLUCOSE EVENTS | 8 |
| Average duration | 113 Min |




### Sensor Usage

| | |
|---|---|
| % TIME SENSOR IS ACTIVE | 100 % |
| Daily scans | 11 / Day |

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# What does this 4-step review tell us?

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STEP 1

## Data capture and Time in Range (TIR)

Susan has captured 100% of her glucose data and her Time in Range has increased again to 66%, both definite results.

STEP 2

## Look for patterns of hypoglycaemia

Susan's AGP shows a return to overnight and early morning low glucose, especially between 6:00pm–8:00am where her blue band hits the bottom of her target glucose range. Her **Snapshot report** confirms some low glucose events below 3.0 mmol/L later in the evening and overnight. Although her daily scanning rate has increased, this continues to indicate that she is unaware of her night-time hypoglycaemia. This is now the priority.

STEP 3

## Look for patterns of hyperglycaemia

Susan's median line is within her target range throughout the day but does show an upward swing and oscillation between 8:00pm–2:00pm, as does her blue band. Although her time in range has continued to improve to 66%, she is above target 28% of the time, a little higher than recommended. A discussion with Susan on her insulin-carbohydrate corrections and lifestyle factors is warranted.

STEP 4

## Look for patterns of glucose variability

Both of Susan's blue and grey bands of variability are still wider than she wants at all times of the day and night and continues to show unstable variability above 36%. This glucose variability should be targeted as part of Susan's treatment plan.

## What actions might you agree with Susan?

- Susan must continue to scan frequently as her impaired awareness of hypoglycaemia is making it hard to avoid low glucose episodes.
- No change in Susan's nightly basal rate is required, since her median line suggests this is not necessary.
- Susan is advised to check her glucose levels and her trend arrows before going to bed. If her level is <5.6 mmol/L she is advised to take some carbohydrate if her trend is not upwards.
- Further education on matching her current insulin pump regimen with her meals and snacks is recommended to try and flatten Susan's profile and reduce variability.

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