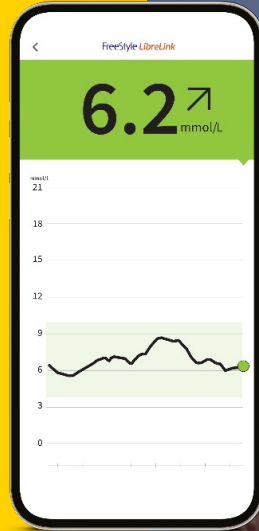




FreeStyle
Libre 2

Case study

Case study: Ruby



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Case study: Ruby

Age	18	BMI	19.6 kg/m ²
Diabetes (Type)	Type 1 diabetes	Last HbA1c value	72.7 mmol/mol (8.8%)
Profession	Student	Target glucose range	3.9–10 mmol/L
Duration of diabetes	8 years	Treatment	Basal-bolus insulin therapy



Summary

Ruby is a normal teenager who was diagnosed with Type 1 diabetes 8 years ago. She is struggling to accept the need to manage her condition and is poorly compliant with her insulin therapy. Her insulin bolus levels are selected by Ruby for practical reasons.



Specific objective

Ruby's blood glucose levels are very high which is concerning. The specific objective is to improve her glucose control by engaging with ruby about various aspects of her diabetes.

Case study: Ruby

AGP Report

12 April 2021 - 25 April 2021 (14 Days)

GLUCOSE STATISTICS AND TARGETS

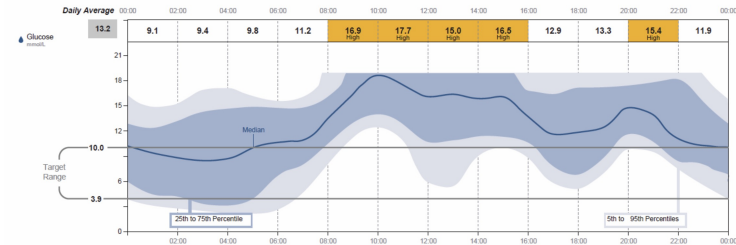
12 April 2021 - 25 April 2021 14 Days
 % Time Sensor is Active 73%

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 13.2 mmol/L
Glucose Management Indicator (GMI) 9.9% or 85 mmol/mol
Glucose Variability 49.3%
 Defined as percent coefficient of variation (%CV); target ≤36%

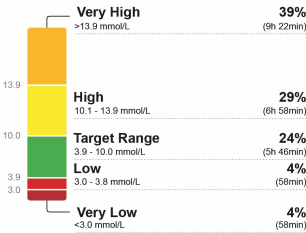
Daily Patterns

12 April 2021 - 25 April 2021 (14 Days)



LibreView

TIME IN RANGES



LibreView

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

Snapshot

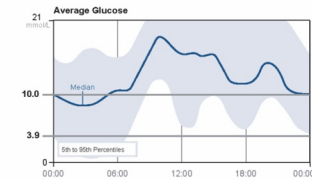
12 April 2021 - 25 April 2021 (14 Days)

LibreView

Glucose

GMI 9.9 % or 85 mmol/mol

AVERAGE GLUCOSE 13.2 mmol/L
 % above target 78 %
 % in target 24 %
 % below target 8 %

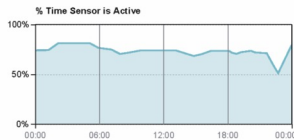


LOW GLUCOSE EVENTS 6
 Average duration 213 Min



Sensor Usage

% TIME SENSOR IS ACTIVE 73 %
 Daily scans 5 / Day



What does this 4-step review tell us?

STEP 1

Data capture and Time in Range (TIR)

Ruby has managed to capture 73% of her sensor data, so the resulting AGP report can be reviewed with confidence. Her Time in Range is 24%, which helps to frame the consultation.

STEP 2

Look for patterns of hypoglycaemia

The blue and grey bands in Ruby's AGP have strayed below the bottom of her 3.9 mmol/L target glucose range between midnight and 6:00am. Her Snapshot report shows that she has recorded a number of low glucose events below 3.0 mmol/L. There is an immediate need to address this adverse consequence of her glucose variability.

STEP 3

Look for patterns of hyperglycaemia

Ruby's blue median line traces above her 10 mmol/L target range throughout the day until midnight and 68% of her glucose readings are above target. The detail provided by her **Daily Patterns** report shows that between 8:00am and 4:00pm her mean glucose is above 15 mmol/L and doesn't drop below 10 mmol/L until midnight. This extensive and chronic hyperglycaemia should be a focus for management, once her risk of overnight hypoglycaemia is addressed.

STEP 4

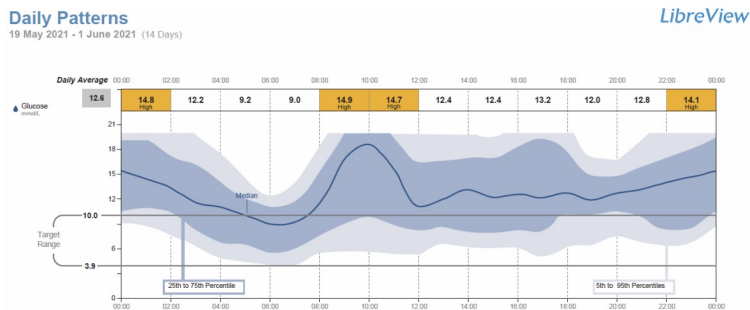
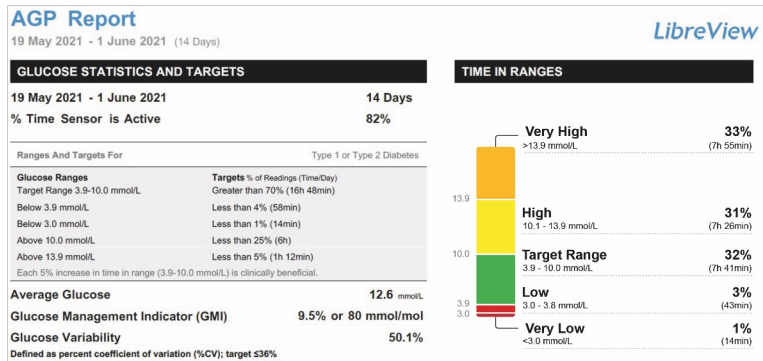
Look for patterns of glucose variability

The blue and grey bands in Ruby's AGP are very wide throughout all times of the day, indicating high levels of day-to-day variability, both in her treatment patterns and in her daily activities. With a CV of 49.3%, it is evident that her glucose is unstable. Overall, this AGP shows that Ruby has a combination of issues, both with managing her insulin treatment and also with her compliance and daily routines.

What actions might you agree with Ruby?

- A reduction in Ruby's basal insulin in the evening should be recommended to reduce Ruby's risk of hypoglycaemia overnight.
- Ruby should be encouraged to increase her morning prandial insulin dose to moderate her breakfast excursion. The amount of air under the clouds indicates that this can be done without increased risk of hypoglycaemia.
- The timing of her injections in relation to her morning and evening meals also needs to be discussed.
- An urgent discussion about Ruby's compliance is warranted, as well as to pinpoint aspects of her behaviour and routines.

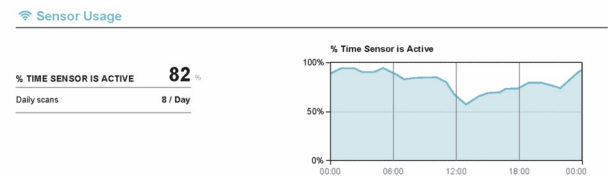
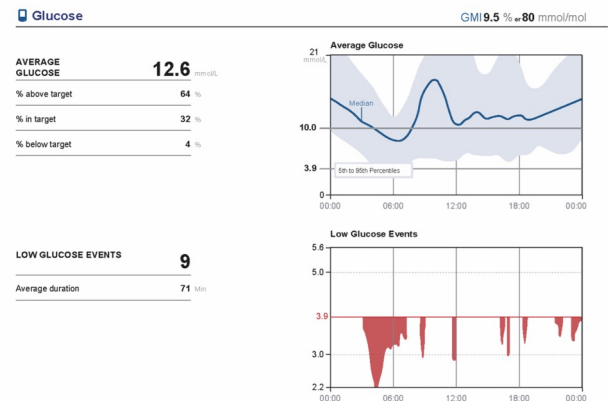
Case study: Ruby



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

Snapshot

19 May 2021 - 1 June 2021 (14 Days)



What does this 4-step review tell us?

STEP 1

Data capture and Time in Range (TIR)

Ruby has managed to increase her data capture to 82% and her Time in Range to 32%, both encouraging improvements.

STEP 2

Look for patterns of hypoglycaemia

Ruby has managed to reduce the worrying overnight trend towards hypoglycaemia and her Time below Range has decreased to 4%, a positive outcome! However, although her risk of hypoglycaemia is reduced at night, the blue and grey bands in Ruby's **Daily Patterns** AGP show a downward trend towards 3.9 mmol/L of the target glucose range between 4:00am–8:00am. This is confirmed as leading to low glucose events in her **Snapshot report** at this time of the morning. The high degree of variability at this time indicates that intervention is still required to manage the risk of hypoglycaemia in the early morning.

STEP 3

Look for patterns of hyperglycaemia

Ruby's average glucose as traced by the median line is spiking after breakfast between 8:00am–12:00pm with another significant high-glucose excursion between 10:00pm–2:00am. Her Time Above Range is reduced to 64%, but she is generally above target throughout the day and night, and 33% of her readings are above 13.9 mmol/L. This degree of continued chronic hyperglycaemia is a worry.

STEP 4

Look for patterns of glucose variability

Ruby's blue and grey bands continue to balloon widely across the day and night and this high variability is a concern. Ruby's glucose is not stable, with CV above 50%, and is a real problem to address. The blue and grey bands are both very wide, indicating that there are issues to deal with in regard to Ruby's medication regimen and her daily activities.

What actions might you agree with Ruby?

- A discussion regarding Ruby's mealtime and habits and daily activities in the context of her diabetes is definitely necessary. The high degree of variability is contributing to her risk of hypoglycaemia overnight and needs to be addressed.
- Ruby must become more consistent in her administration of the correct dosage of mealtime insulin and with the right timing. If necessary, consider additional education in this context.
- Ruby's morning and evening prandial insulin dose needs to be further increased to manage her chronic hyperglycaemia. This should be possible without an increased risk of hypoglycaemia.
- Review Ruby's AGP again after 14 days.

Case study: Ruby



AGP Report

7 June 2021 - 20 June 2021 (14 Days)

GLUCOSE STATISTICS AND TARGETS

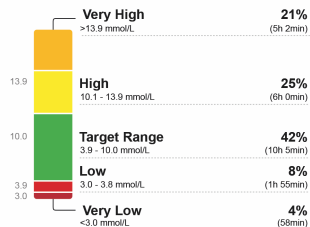
7 June 2021 - 20 June 2021 **14 Days**
 % Time Sensor is Active **97%**

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 **9.6** mmol/L
Glucose Management Indicator (GMI) **7.6% or 60** mmol/mol
Glucose Variability **46.2%**
 Defined as percent coefficient of variation (%CV); target ≤36%

LibreView

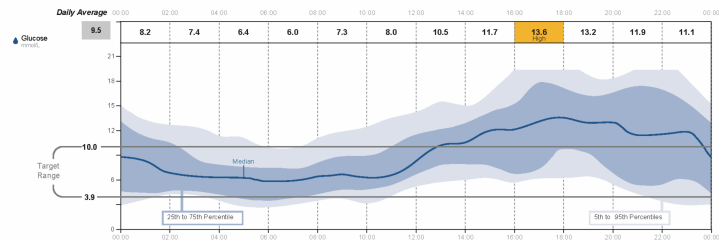
TIME IN RANGES



Daily Patterns

7 June 2021 - 20 June 2021 (14 Days)

LibreView



Snapshot

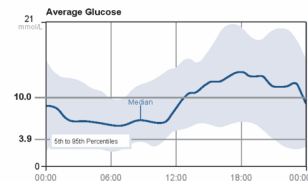
7 June 2021 - 20 June 2021 (14 Days)

LibreView

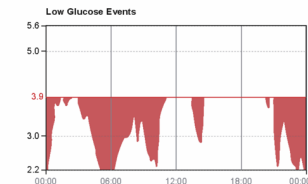
Glucose

GMI **7.6%** or **60** mmol/mol

AVERAGE GLUCOSE **9.6** mmol/L
 % above target **46%**
 % in target **42%**
 % below target **12%**

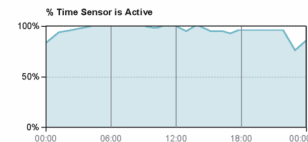


LOW GLUCOSE EVENTS **19**
 Average duration **126** Min



Sensor Usage

% TIME SENSOR IS ACTIVE **97%**
 Daily scans **8 / Day**



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

What does this 4-step review tell us?

STEP 1

Data capture and Time in Range (TIR)

Ruby's AGP shows a much better Time in Range at 42%, and her data capture is 97%. Great to see these forward steps!

STEP 2

Look for patterns of hypoglycaemia

The blue and grey bands in Ruby's AGP show that she is now experiencing more hypoglycaemic episodes, and her Time Below Range has increased to 12%, including 4% of readings below 3.0 mmol/L. This is confirmed in her **Snapshot report** by her low glucose events, which are evident between 10:00pm–11:00am. This is now a particular concern.

STEP 3

Look for patterns of hyperglycaemia

Ruby's median line is in the target glucose range between 2:00am–11:00am and her Time in Range has increased substantially to 42%. Ruby's average glucose, as shown in her **Daily Patterns report**, is no longer very high in the morning, but continues to be elevated high between noon and midnight, with a significant upward swing between 4:00pm–8:00pm. This continued high glucose in the second half of the day remains a worry.

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.
1. The FreeStyle LibreLink app is only compatible with certain mobile devices and operating systems. Please check the website for more information about device compatibility before using the app. Use of FreeStyle LibreLink requires registration with LibreView.

STEP 4

Look for patterns of glucose variability

The blue and grey bands in Ruby's AGP continue to billow throughout the afternoon and evening, with poor stability between 4:00pm and midnight. Overall, her glucose variability is reduced to a CV of 46.2%, but this is still above the 36% target and is contributing to her risk of hypoglycaemia overnight and in the morning.

What actions might you agree with Ruby?

- Ruby's basal insulin rate needs to be reduced to manage her increased risk of hypoglycaemia overnight and in the morning.
- Ruby's therapy compliance is linked to her worry of low glucose events. Better awareness of using her FreeStyle LibreLink app¹ to predict and avoid lows may help improve her confidence with her insulin therapy.
- Ruby's insulin bolus at midday should increase to address her high glucose levels after lunch.
- She is making progress, but a discussion regarding Ruby's mealtime habits and activities in the afternoon and evening is necessary.