

Basal insulin: insulin pumps

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Learning objectives

- Understand the desired effect of basal insulin on glucose levels
- Feel more confident adjusting basal insulin in response to FreeStyle Libre traces
- Understand which factors change insulin requirements

Insulin Pump Basal Insulin

- The role of basal insulin is to keep glucose steady when not eating and to provide 24 hour coverage
- On an insulin pump the basal rate can be set hour to hour meet the needs of the individual throughout the day
- Many need higher basal rates in the morning and lower rates later in the day



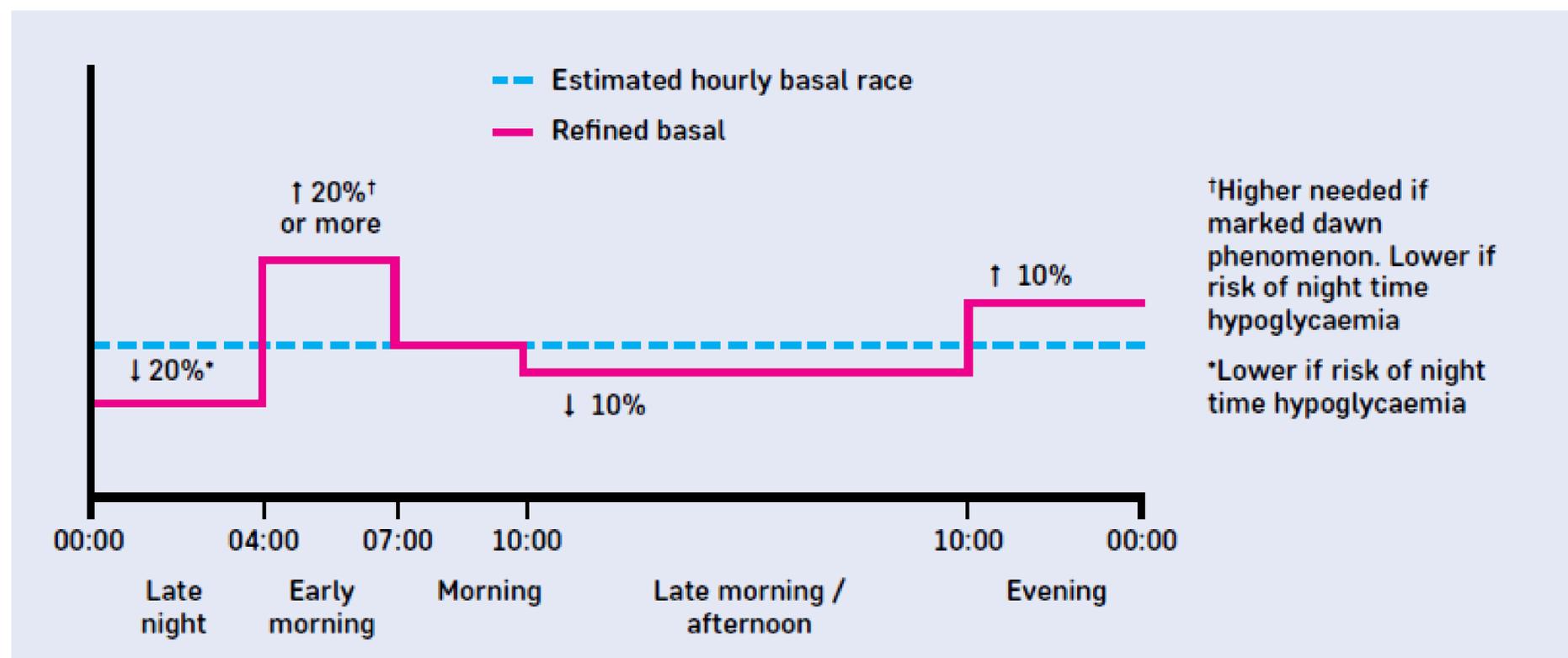
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Insulin Pump Basal Insulin

- Blood insulin levels reach a steady state 2-5 hours after a basal rate change



<https://abcd.care/dtn-uk-best-practice-guides>

Assessing basal insulin



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Pump basal rate testing

- The FreeStyle Libre helps with basal rate testing by providing 24/7 insight into glucose levels
- Basal rates are best assessed on 'normal days'
- Many factors can change insulin requirements: stress, alcohol, illness, exercise etc.

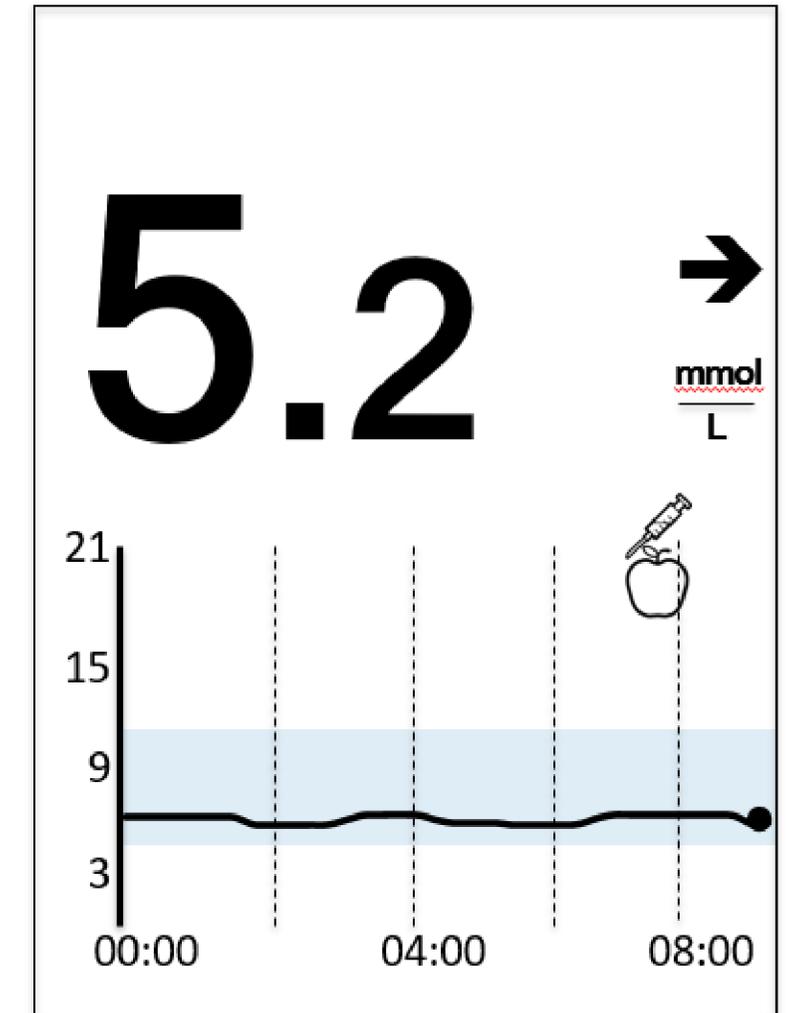


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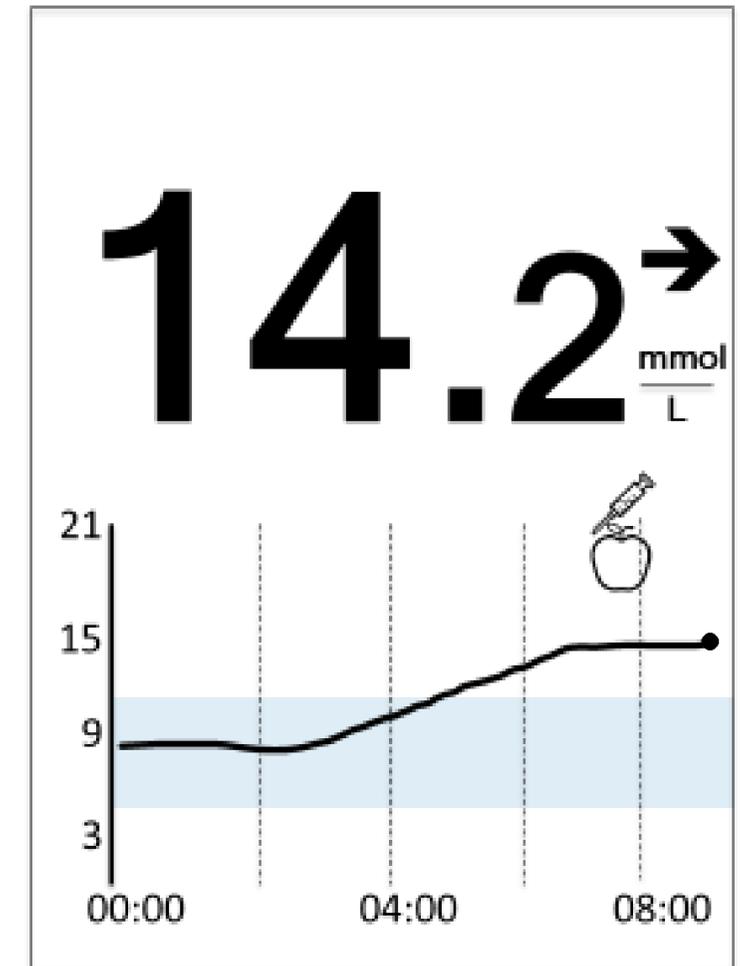
Basal insulin dose correct

- To assess whether the basal rate is correct, look at the glucose trace overnight
- If the basal rate is correct, the glucose level should stay stable overnight



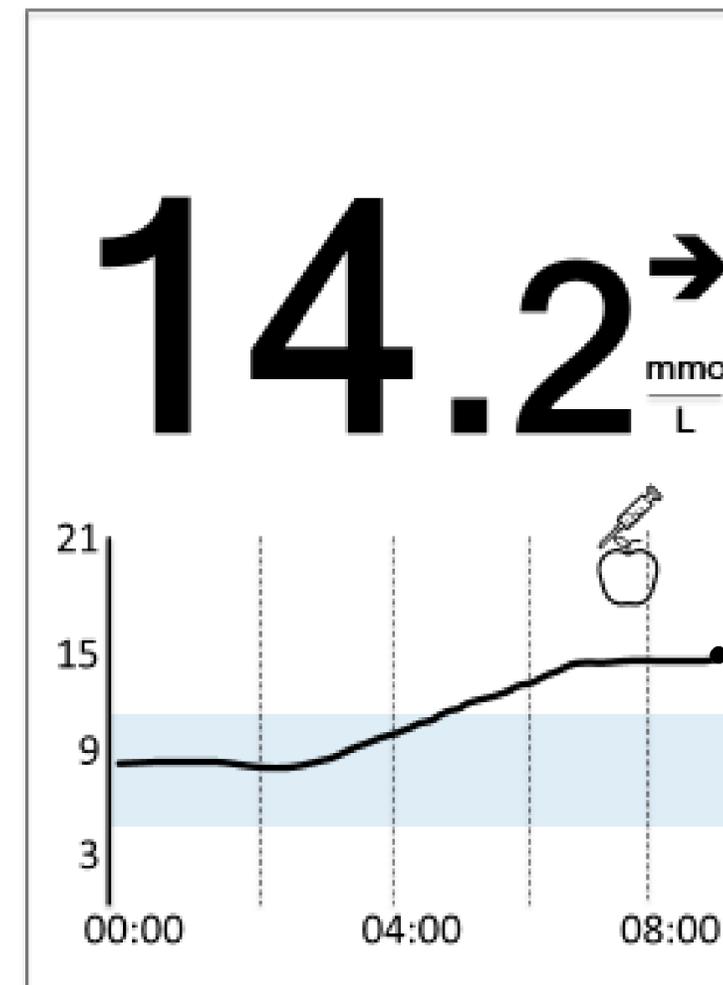
Basal insulin rate too low

- If the basal rate is too low, the glucose will **rise**
- A recurrent **rise** in glucose overnight can mean the basal rate needs to be **increased**



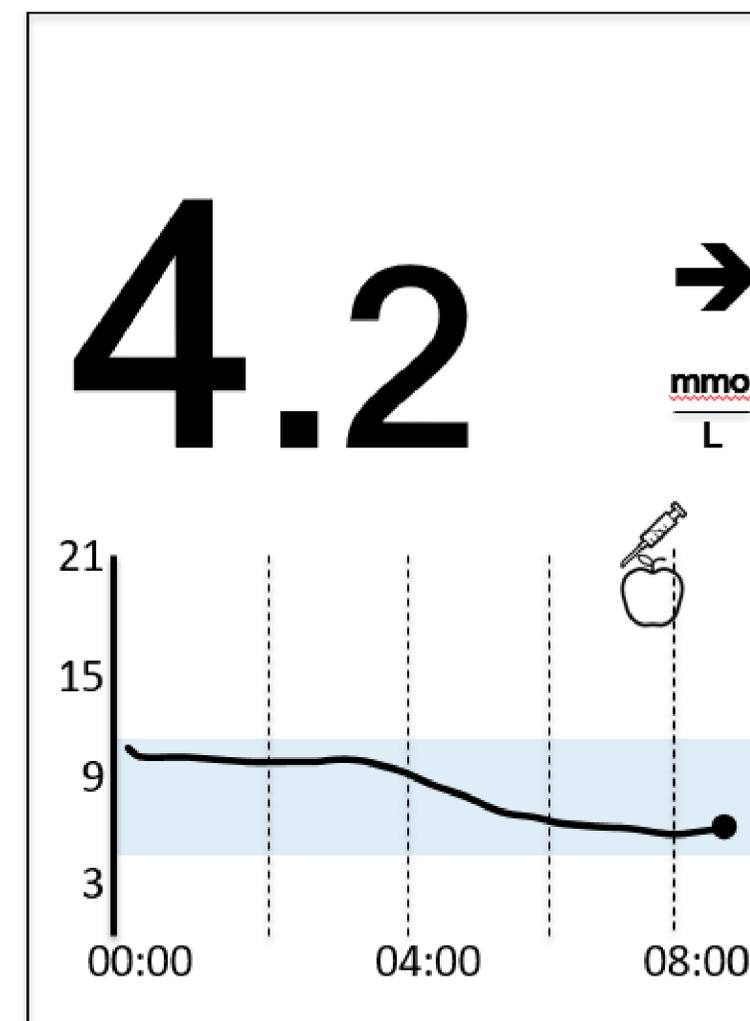
Increasing the basal

- Identify when the glucose starts to rise and increase the basal rate 2 hours before this
- This person has noticed a recurrent rise in their glucose from 3am-7am
- They should increase their basal from 1am-5am



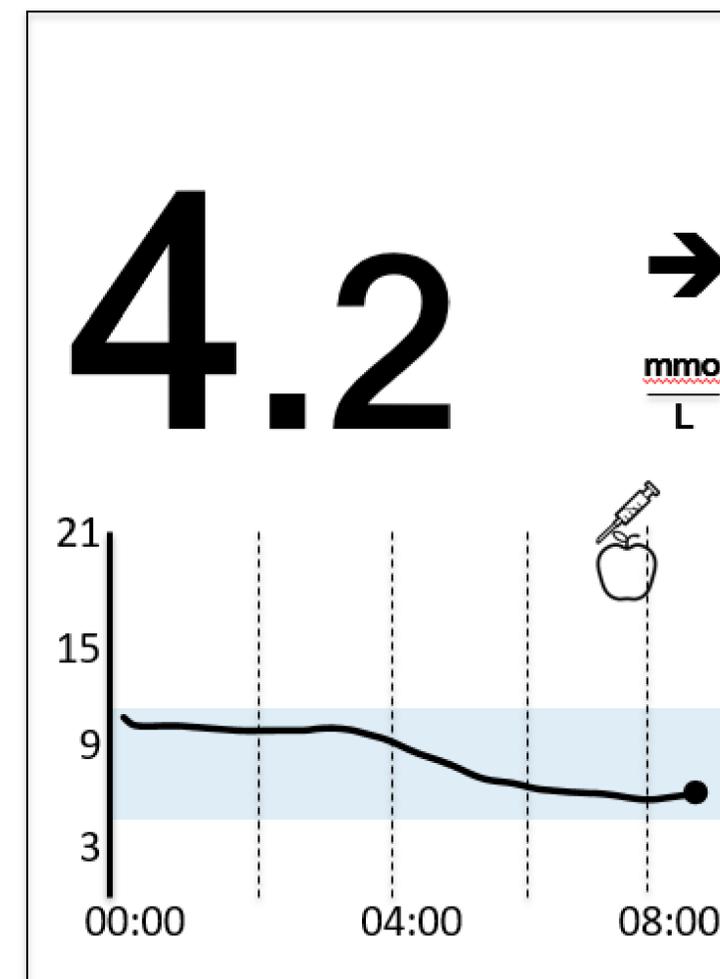
Basal insulin rate too high

- If the basal insulin dose is too high, the glucose will **fall** overnight
- A recurrent **fall** in glucose overnight can mean the basal rate needs to be **decreased**, usually 2 hours before the fall begins



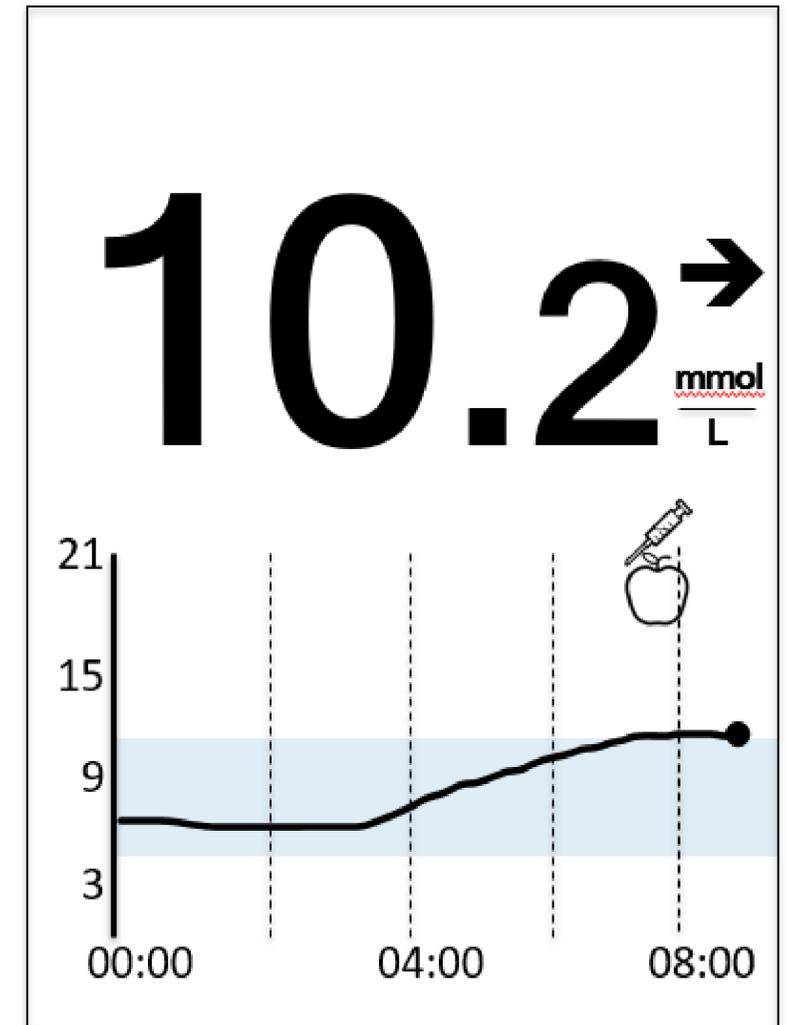
Reducing the basal

- Identify when the glucose starts to fall and reduce the basal rate 2 hours before this
- This person has noticed a recurrent fall in their glucose from 3am-6am
- They should decrease their basal rate from 1am-4am



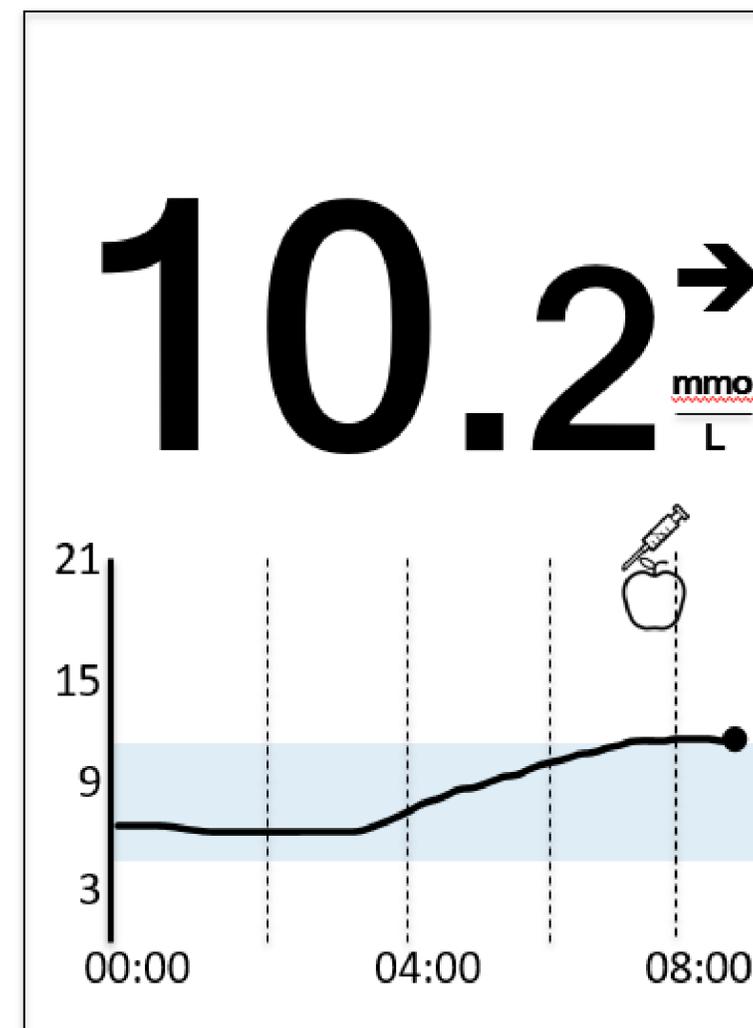
Dawn Phenomenon

- Glucose can increase in the morning before waking - the **Dawn Phenomenon**



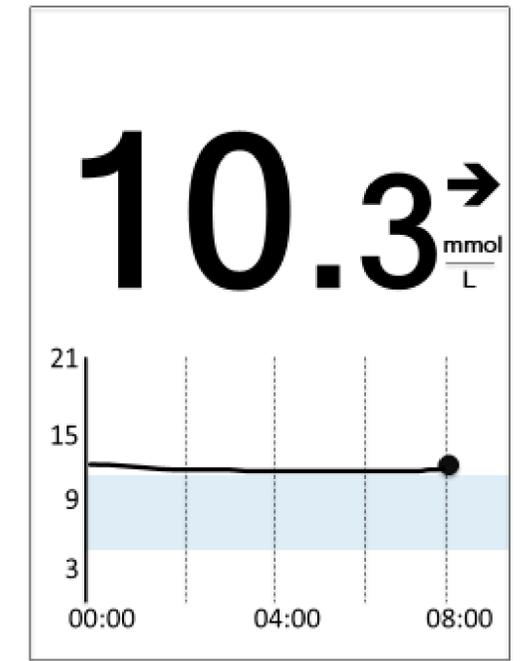
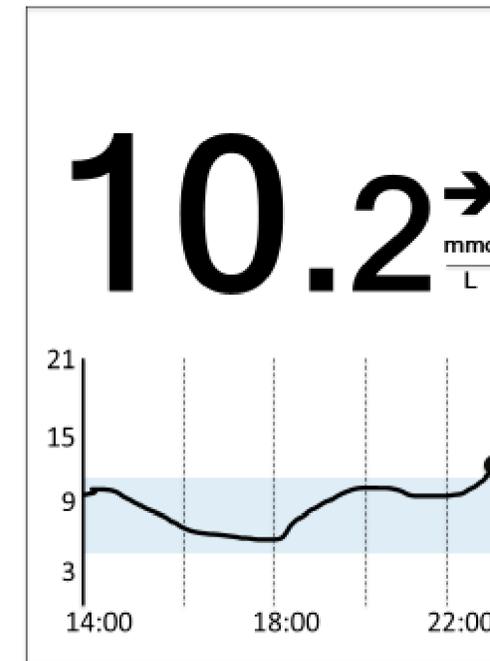
Dawn Phenomenon

- Identify when the glucose starts to rise and increase the basal rate 2 hours before this
- This person has noticed a recurrent rise in their glucose around 3-7am
- They should increase their basal rate from 1am-5am



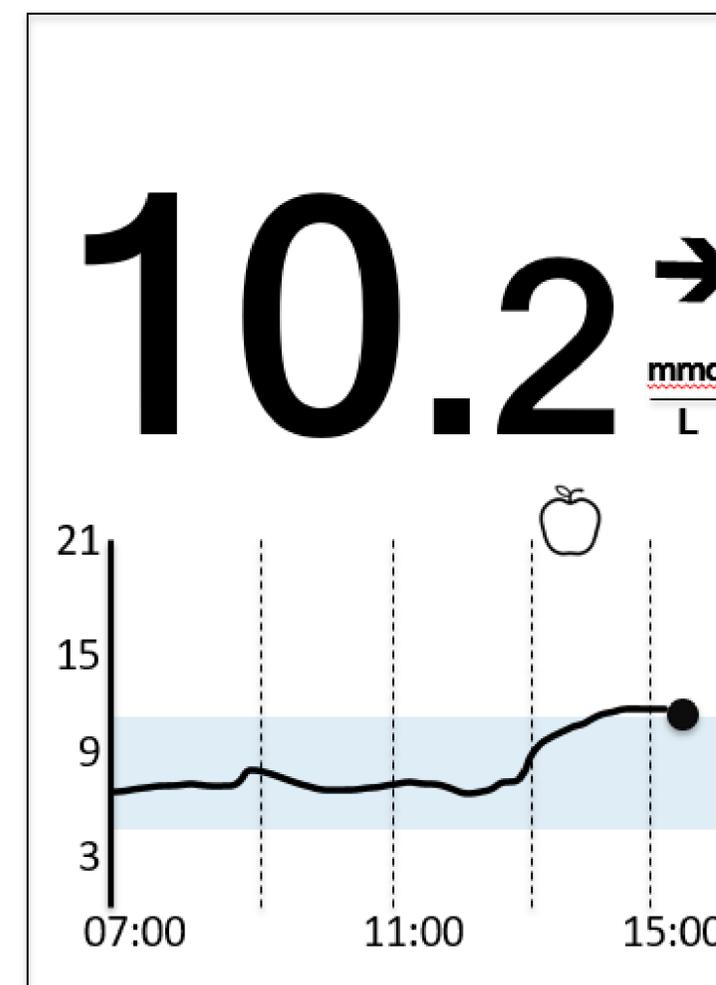
High morning glucose?

- A high, flat glucose overnight is often not a sign that the basal insulin is a problem
- Snacking in the evening is a common cause
- Aim for an in target glucose pre-bed



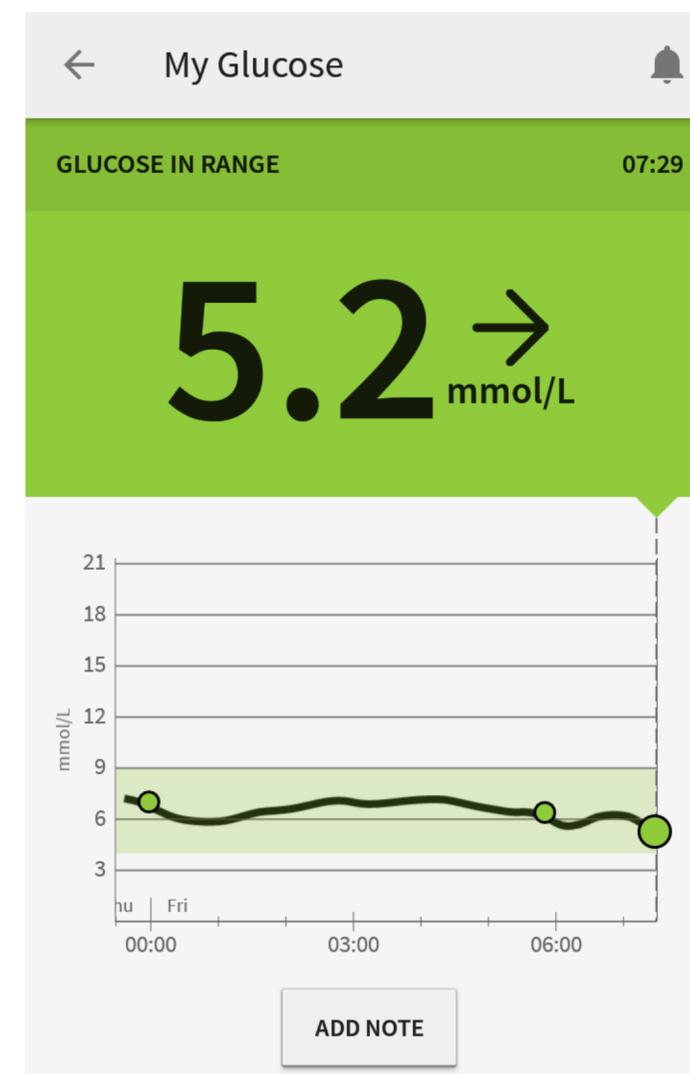
Daytime basal rate testing

- You can check the basal rate during the day by skipping a meal and observing the FreeStyle Libre trace
- This morning basal rate test shows the basal insulin settings are correct, followed by lunch at 12pm
- If the basal rate is correct, the glucose should remain steady



Basal control

- This is ideal
- Reality is insulin requirements vary greatly overnight
- This trace is not possible every night for the vast majority of people living with Type 1 diabetes



Basal insulin: cruising at the desired altitude



Turbulence in basal requirements

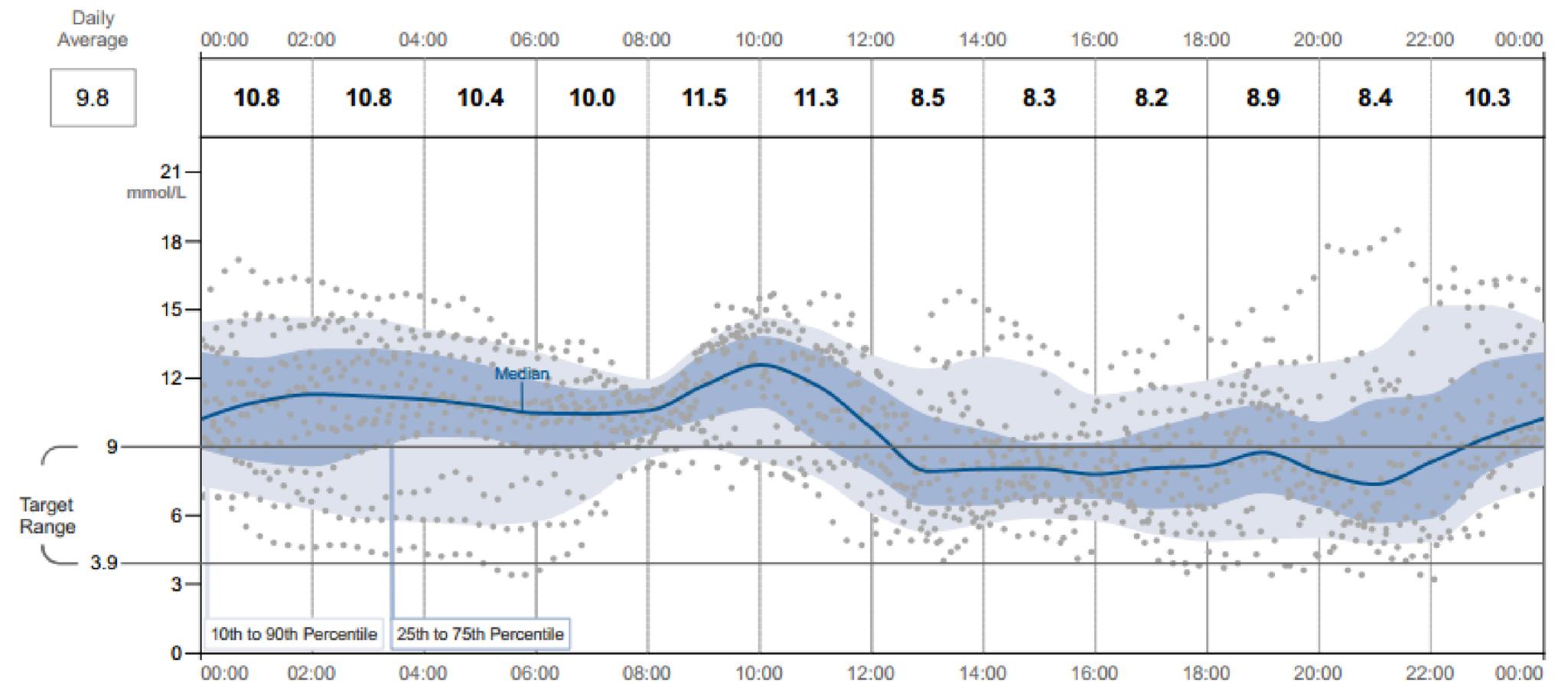
Exercise, standing, alcohol, relaxation



Stress, illness, sitting, pre-menstruation

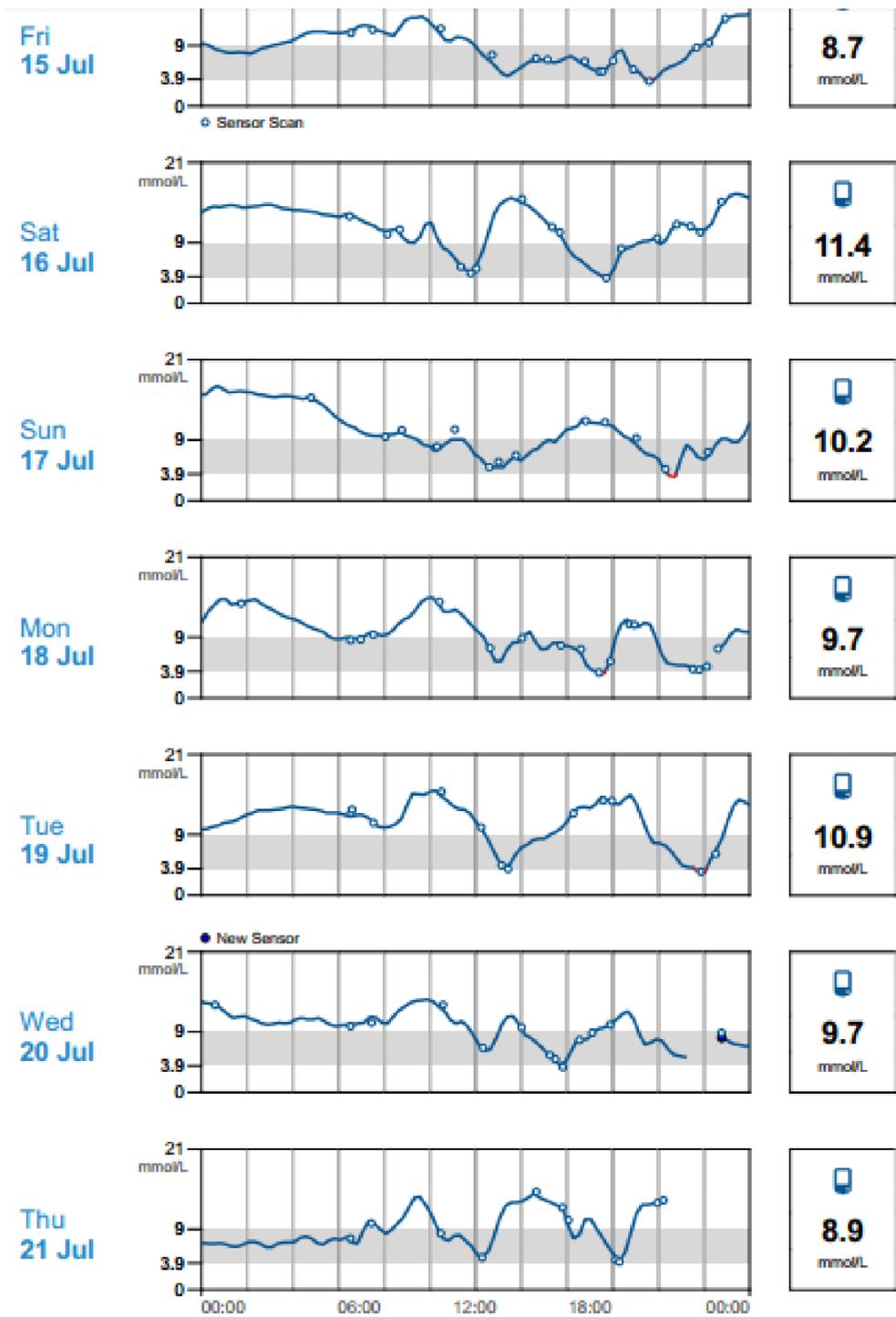
What would you do with the basal overnight?

Estimated A1c **7.8%** or **62 mmol/mol**



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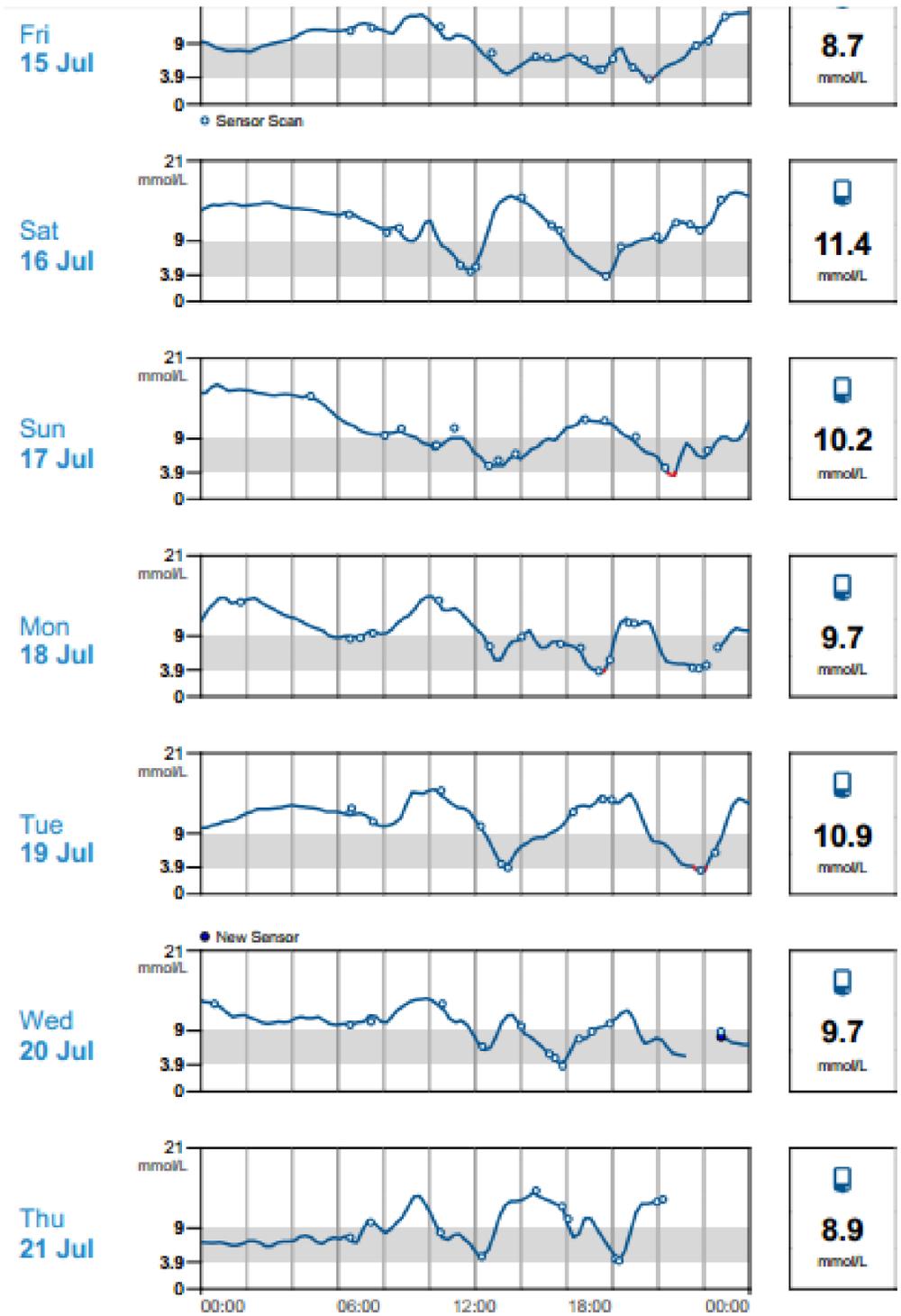




Question

What would you do with the basal insulin?

1. Increase
2. Decrease
3. Stay the same



← Alcohol

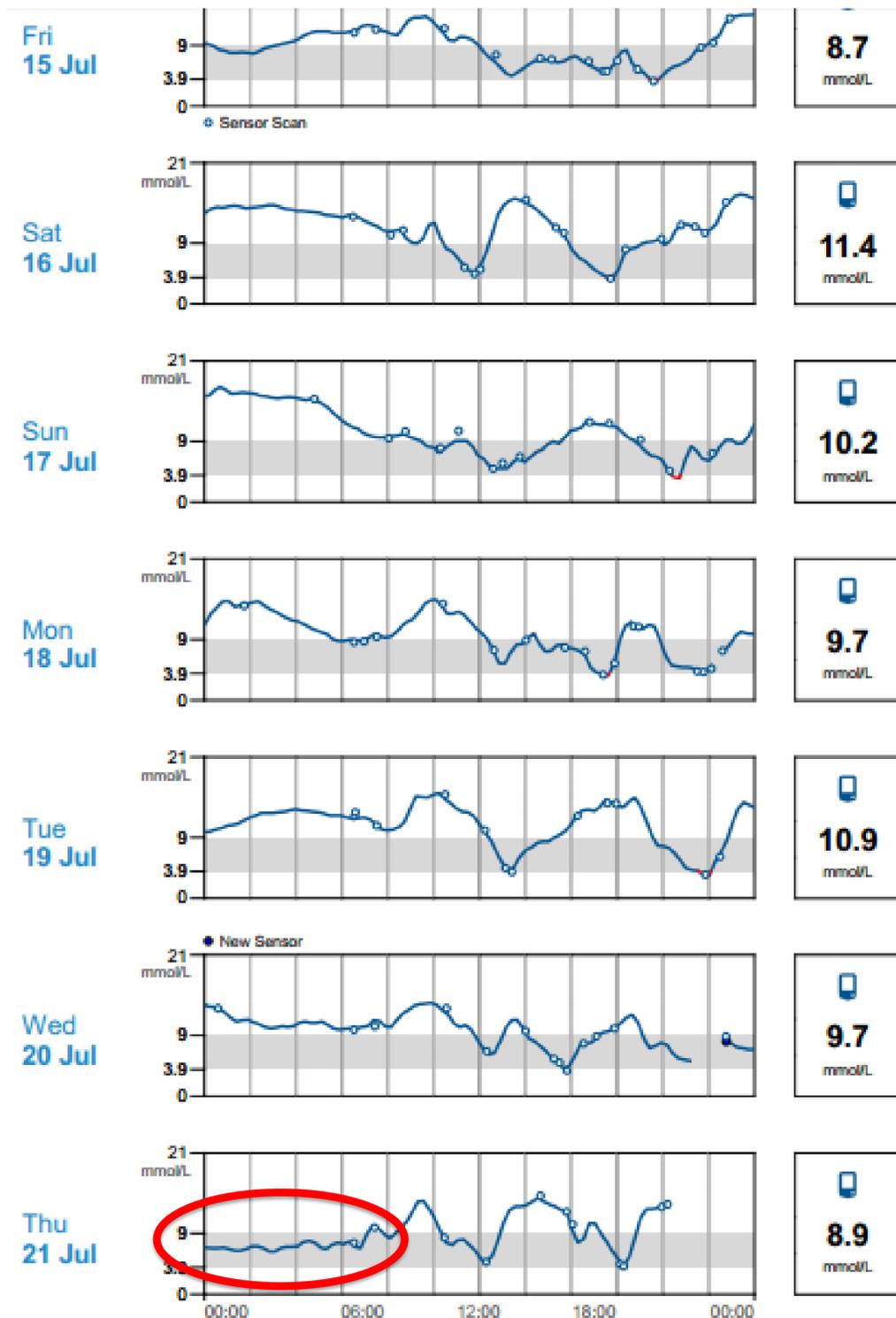
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Question

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1. Increase
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When in target pre bed basal is perfect



← Alcohol

← Alcohol

Question

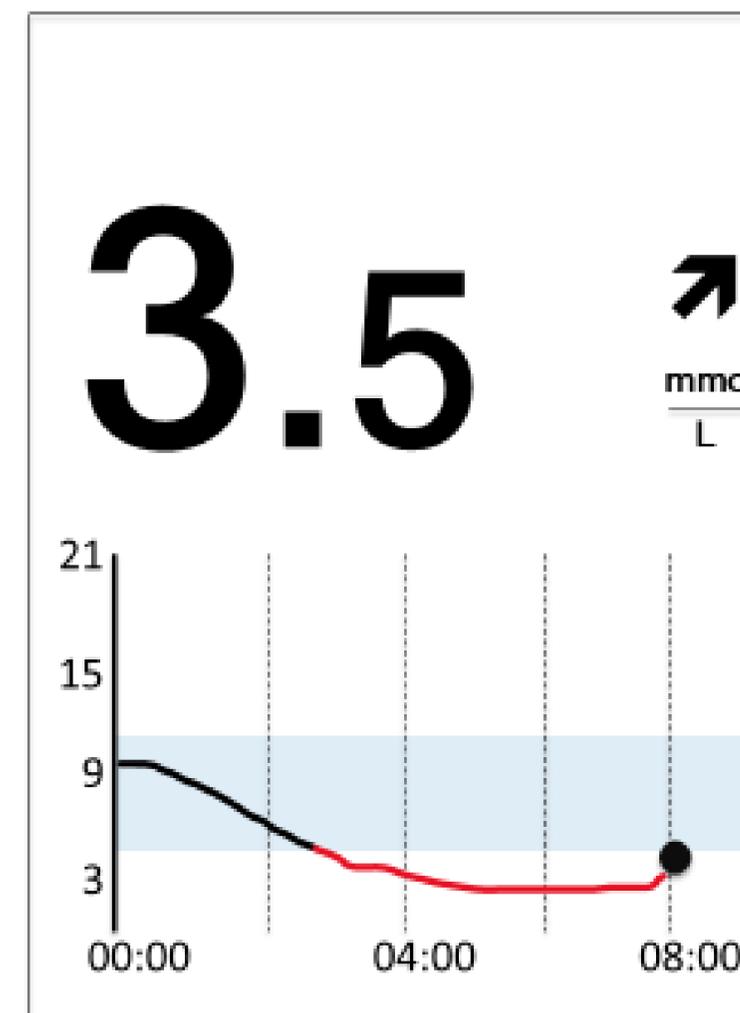
What would you do with the basal insulin?

1. Increase
2. Decrease
3. **Stay the same**

When in target pre bed basal is perfect

Hypoglycaemia

- If an **unexplained** night-time hypos occurs, reduce the overnight basal rate immediately the following night
- More information on hypoglycaemia can be found in Dr Pratik Choudhary's Hypoglycaemia module



Conclusion

- FreeStyle Libre allows you to see your glucose trend overnight
- The aim of basal insulin is to keep the glucose stable overnight, most nights
- There are factors other than insulin which can send the overnight glucose up and down