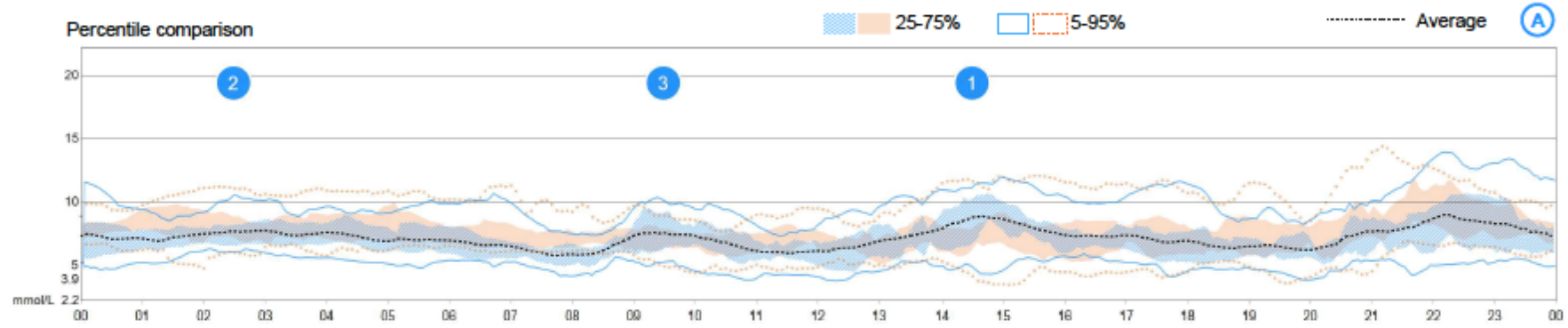
Report Interpretation and related management



Content

- Report interpretation
- Food bolus
  - Fake carb
- Temp Target and Exercise
- Pump holiday management
  - Revert from Pump to Pen

Percentile comparison



Carb Ratio (g/U)	00:00	07:00	14:00
Ⓐ	7.0	7.0	6.6
Ⓑ	7.0	7.0	6.6

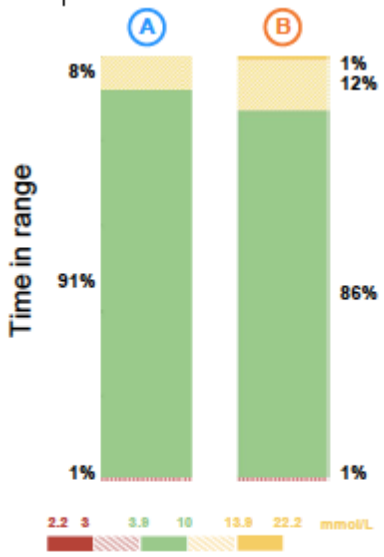
Ⓐ

Hypoglycemic patterns (0) — # Episodes (per day): 0.2

None

Hyperglycemic patterns (5)² — # Episodes (per day): 1.4

1. 14:00 - 14:59 (4 occurrences)
2. 02:00 - 02:59 (2 occurrences)
3. 09:00 - 09:59 (2 occurrences)



2 Only highest priority shown.
3 Glucose Management Indicator
4 24hr total according to active basal pattern setting for manual mode

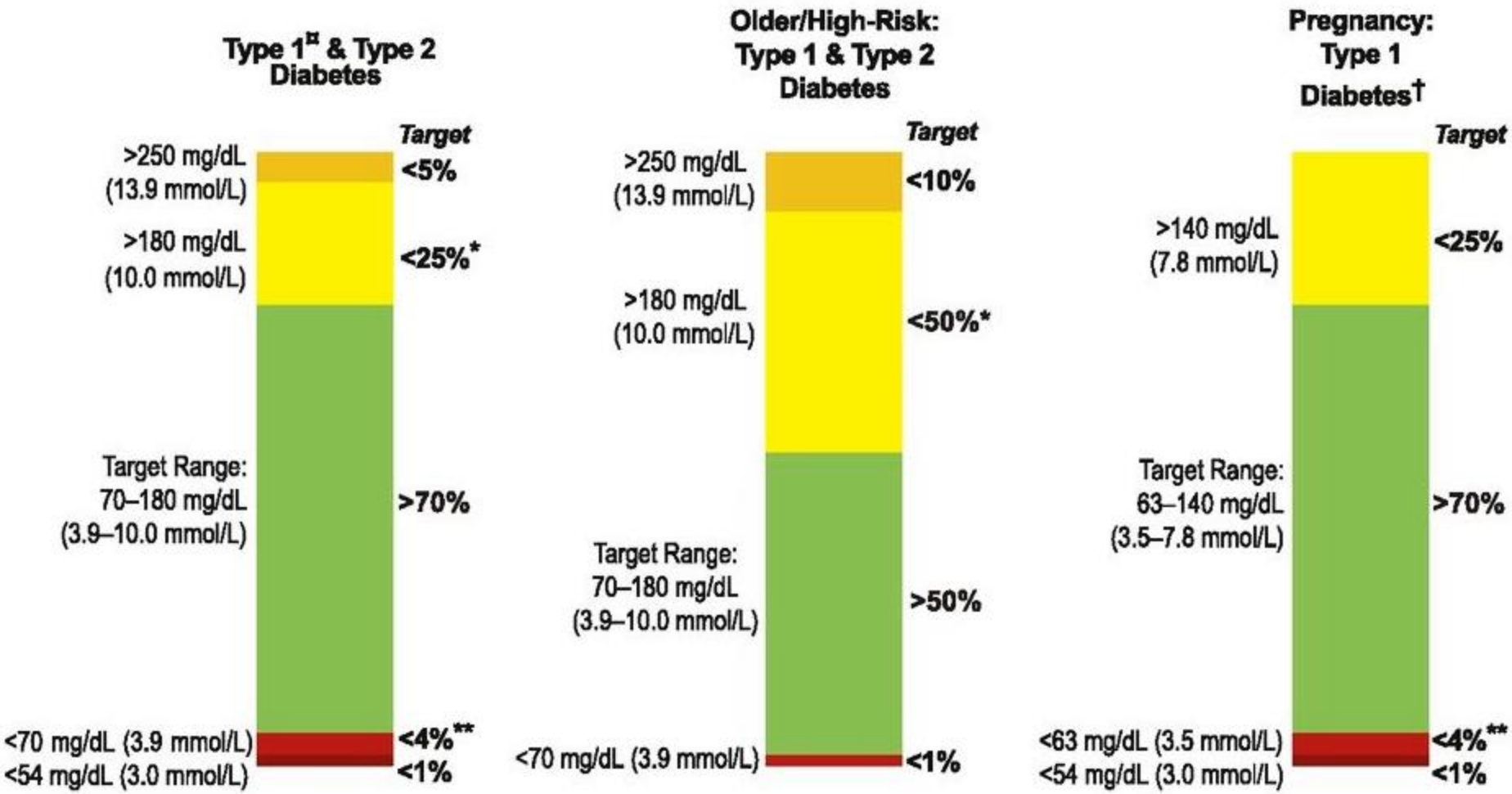
SmartGuard Exits	Ⓐ	Ⓑ
No Calibration	0	0
SmartGuard max delivery	0	0
SmartGuard min delivery	0	0
BG required for SmartGuard	0	0
Sensor Algorithm Underread	0	0
Sensor Updating	0	0
No SG values	0	0
Sensor Expired	• 1	0
SmartGuard disabled by user	0	0
Prolonged Suspend	0	0
SmartGuard Warm Up	0	0
Unidentified	0	0

Statistics	Ⓐ	Ⓑ
SmartGuard (per week)	98% (6d 21h)	100% (7d 00h)
Manual Mode (per week)	2% (03h)	0% (00h)
Sensor Wear (per week)	96% (6d 17h)	97% (6d 19h)
Average SG ± SD	7.2 ± 1.9 mmol/L	7.7 ± 1.9 mmol/L
GMI³	6.4% (48.8 mmol/mol)	6.6% (48.8 mmol/mol)
Coefficient of Variation (%)	26.7%	24.7%
Low / High SG Alerts (per day)	0.9 / 3.2	1.3 / 4.4
Average BG	13.4 ± 6.2 mmol/L	8 ± 4.7 mmol/L
BG / Calibration (per day)	0.2 / 0.1	0.4 / 0.4
Total daily dose (per day)	57.9 units	45.8 units
Bolus amount (per day)	35.0U (60%)	30.9U (67%)
Auto Correction amount (per day)	6.1U (17%)	5.5U (18%)
Auto Basal / Basal amount (per day)	22.9U (40%)	14.9U (33%)
Set / Reservoir Change	2.3 / 2.3 days	6.0 / 6.0 days
Carbs entered / Meal (per day)	185 ± 38 g / 5.1	171 ± 41 g / 6.2
Active Insulin time	2:00 hrs	2:00 hrs
24 hr Manual Basal (% TDD)⁴	16.900U (29%)	16.900U (37%)

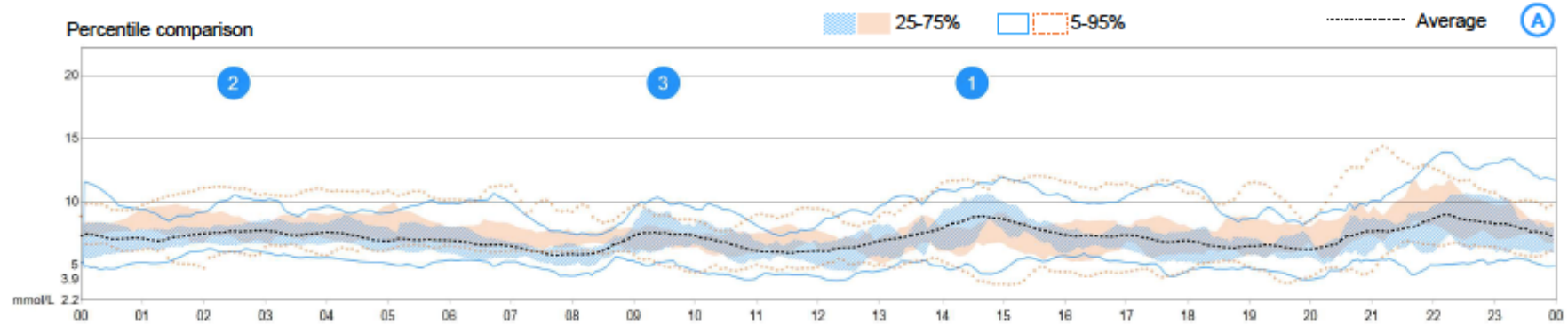
Treatment Target

- Time in range (TIR)
- Time below range (TBR)
- Time above range (TAR)
- Glucose management indicator (GMI): <7%
- Coefficient of variation (CV): <36%

- Smart Guard use/ sensor use ≥ 85%


Type 1¤ & Type 2 Diabetes
Target
>250 mg/dL (13.9 mmol/L)
<5%
>180 mg/dL (10.0 mmol/L)
<25%*
Target Range: 70–180 mg/dL (3.9–10.0 mmol/L)
>70%
<70 mg/dL (3.9 mmol/L)
<4%**
<54 mg/dL (3.0 mmol/L)
<1%
Older/High-Risk: Type 1 & Type 2 Diabetes
Target
>250 mg/dL (13.9 mmol/L)
<10%
>180 mg/dL (10.0 mmol/L)
<50%*
Target Range: 70–180 mg/dL (3.9–10.0 mmol/L)
>50%
<70 mg/dL (3.9 mmol/L)
<1%
Pregnancy: Type 1 Diabetes†
Target
>140 mg/dL (7.8 mmol/L)
<25%
Target Range: 63–140 mg/dL (3.5–7.8 mmol/L)
>70%
<63 mg/dL (3.5 mmol/L)
<4%**
<54 mg/dL (3.0 mmol/L)
<1%

Percentile comparison



Carb Ratio (g/U)			
A	7.0	7.0	6.6
B	7.0	7.0	6.6

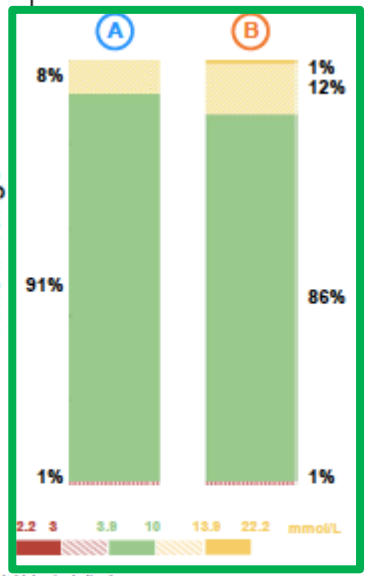
Hypoglycemic patterns (0) — # Episodes (per day): A 0.2

None

Hyperglycemic patterns (5)² — # Episodes (per day): A 1.4

1. 14:00 - 14:59 (4 occurrences)
2. 02:00 - 02:59 (2 occurrences)
3. 09:00 - 09:59 (2 occurrences)

Time in range



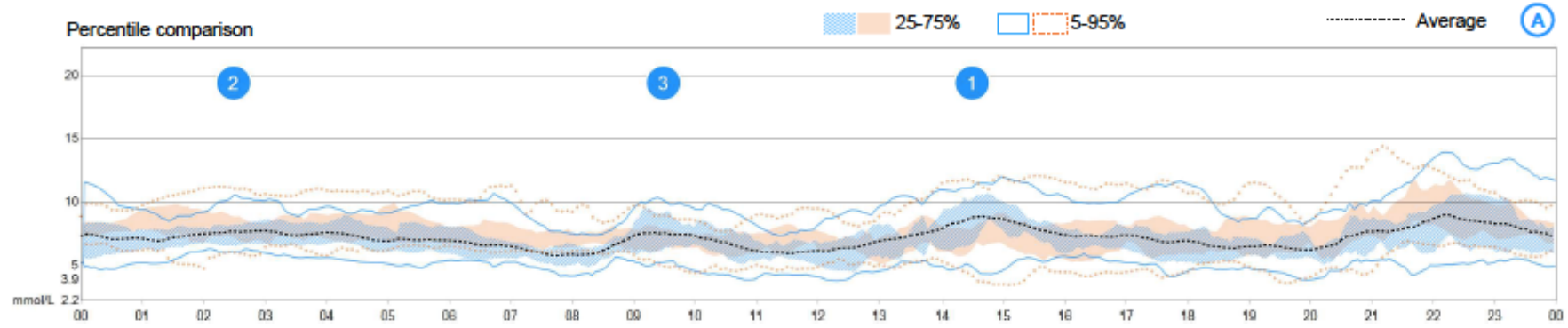
2 Only highest priority shown.
3 Glucose Management Indicator
4 24hr total according to active basal pattern setting for manual mode

SmartGuard Exits

	A	B
No Calibration	0	0
SmartGuard max delivery	0	0
SmartGuard min delivery	0	0
BG required for SmartGuard	0	0
Sensor Algorithm Underread	0	0
Sensor Updating	0	0
No SG values	0	0
Sensor Expired	• 1	0
SmartGuard disabled by user	0	0
Prolonged Suspend	0	0
SmartGuard Warm Up	0	0
Unidentified	0	0

Statistics

	A	B
SmartGuard (per week)	98% (6d 21h)	100% (7d 00h)
Manual Mode (per week)	2% (03h)	0% (00h)
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Average SG ± SD	7.2 ± 1.9 mmol/L	7.7 ± 1.9 mmol/L
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Low / High SG Alerts (per day)	0.9 / 3.2	1.3 / 4.4
Average BG	13.4 ± 6.2 mmol/L	8 ± 4.7 mmol/L
BG / Calibration (per day)	0.2 / 0.1	0.4 / 0.4
Total daily dose (per day)	57.9 units	45.8 units
Bolus amount (per day)	35.0U (60%)	30.9U (67%)
Auto Correction amount (per day)	6.1U (17%)	5.5U (18%)
Auto Basal / Basal amount (per day)	22.9U (40%)	14.9U (33%)
Set / Reservoir Change	2.3 / 2.3 days	6.0 / 6.0 days
Carbs entered / Meal (per day)	185 ± 38 g / 5.1	171 ± 41 g / 6.2
Active Insulin time	2:00 hrs	2:00 hrs
24 hr Manual Basal (% TDD)⁴	16.900U (29%)	16.900U (37%)



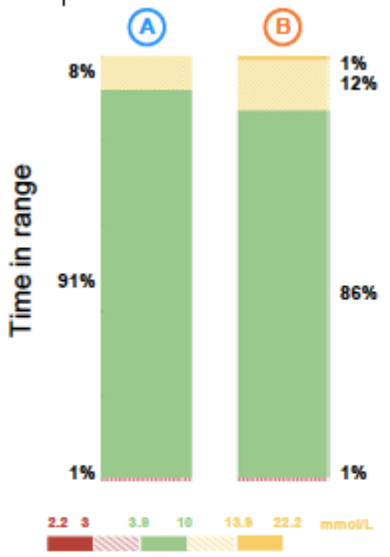
Carb Ratio (g/U)			
A	7.0	7.0	6.6
B	7.0	7.0	6.6

Hypoglycemic patterns (0) # Episodes (per day): 0.2

None

Hyperglycemic patterns (5)² # Episodes (per day): 1.4

1. 14:00 - 14:59 (4 occurrences)
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3. 09:00 - 09:59 (2 occurrences)



SmartGuard Exits	A	B
No Calibration	0	0
SmartGuard max delivery	0	0
SmartGuard min delivery	0	0
BG required for SmartGuard	0	0
Sensor Algorithm Underread	0	0
Sensor Updating	0	0
No SG values	0	0
Sensor Expired	• 1	0
SmartGuard disabled by user	0	0
Prolonged Suspend	0	0
SmartGuard Warm Up	0	0
Unidentified	0	0

Statistics	A	B
SmartGuard (per week)	98% (6d 21h)	100% (7d 00h)
Manual Mode (per week)	2% (03h)	0% (00h)
Sensor Wear (per week)	96% (6d 17h)	97% (6d 19h)
Average SG ± SD	7.2 ± 1.9 mmol/L	7.7 ± 1.9 mmol/L
GMI³	6.4% (48.8 mmol/mol)	6.6% (48.8 mmol/mol)
Auto Correction amount (per day)	6.1U (17%)	5.5U (18%)
Auto Basal / Basal amount (per day)	22.9U (40%)	14.9U (33%)
Set / Reservoir Change		6.0 / 6.0 days
Carbs entered / Meal (per day)	185 ± 38 g / 5.1	171 ± 41 g / 6.2
Active Insulin time	2:00 hrs	2:00 hrs
24 hr Manual Basal (% TDD)⁴	16.900U (29%)	16.900U (37%)

Auto correction > 30% TDD may signify need for strengthening ICR if other causes ruled out

2 Only highest priority shown.
3 Glucose Management Indicator
4 24hr total according to active basal pattern setting for manual mode

Fine Tuning

- What parameters can we adjust when in 780G automode?
  1. **Auto basal target:** 5.5; 6.1; 6.7 mmol/L
  2. **Insulin to Carbohydrates ratio (ICR)**
  3. **Active insulin time (AIT)**: 2-8 hours

- Recommended setting by Medtronic:
  - Auto basal target 5.5 mmol/L; AIT 2 hours

Mrs B, 51/F

- DM for 20 years (since 31 year old)
- DM complications: microalbuminuria on acertil, no DMR
- BW 54kg, BMI 22.2
- While on MDII: a1c 7.5-8.5%

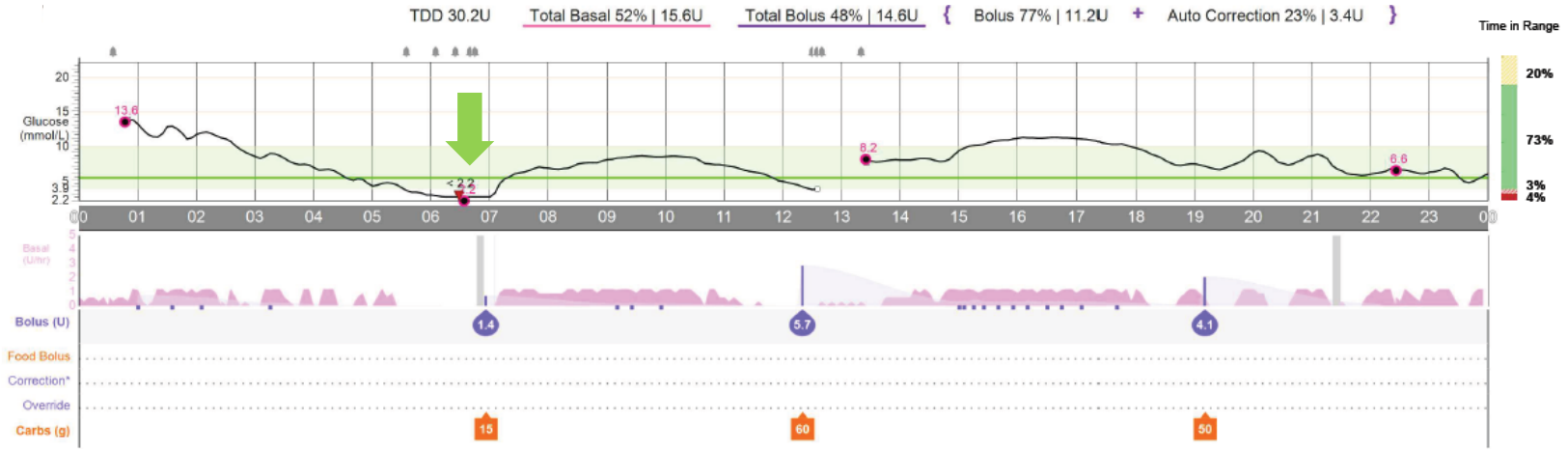
- Challenges in her glucose management:
  1. Hypoglycemia unawareness (hx of hypoglycemia induced seizure)
  2. High glucose variability
  3. Suboptimal carb counting

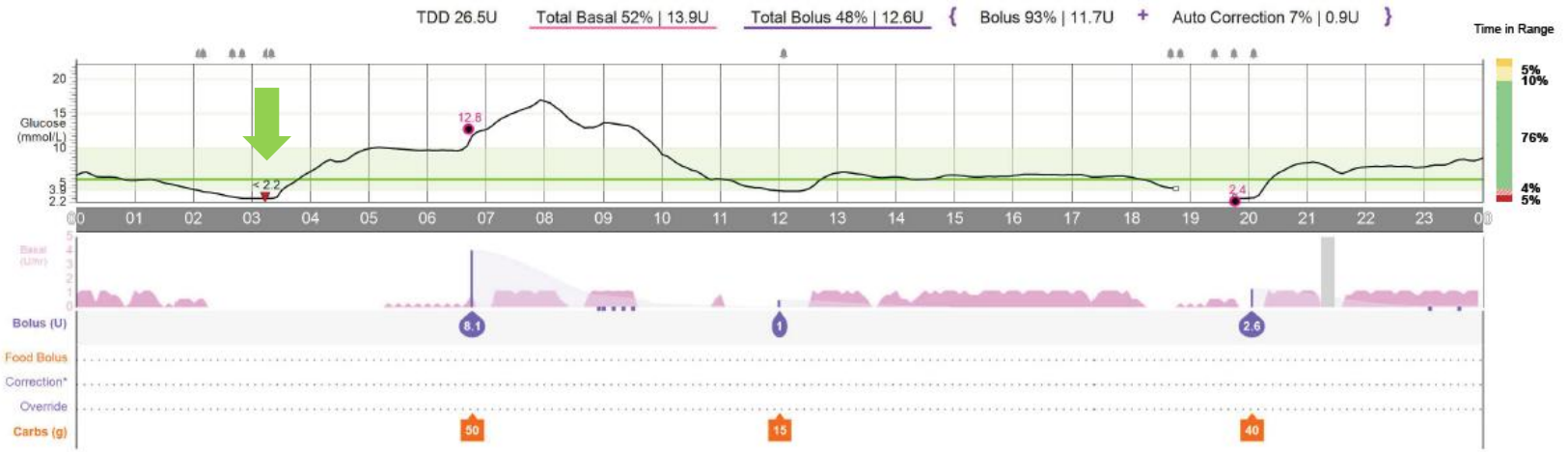
1st week with 780G

SmartGuard	
SmartGuard	On
Target	5.5 mmol/L
Auto Correction	On

Bolus Wizard	On
Units	g, mmol/L
Active Insulin Time (h:mm)	3:00
Maximum Bolus	10.0 U

Morning hypoglycaemia
What to do?

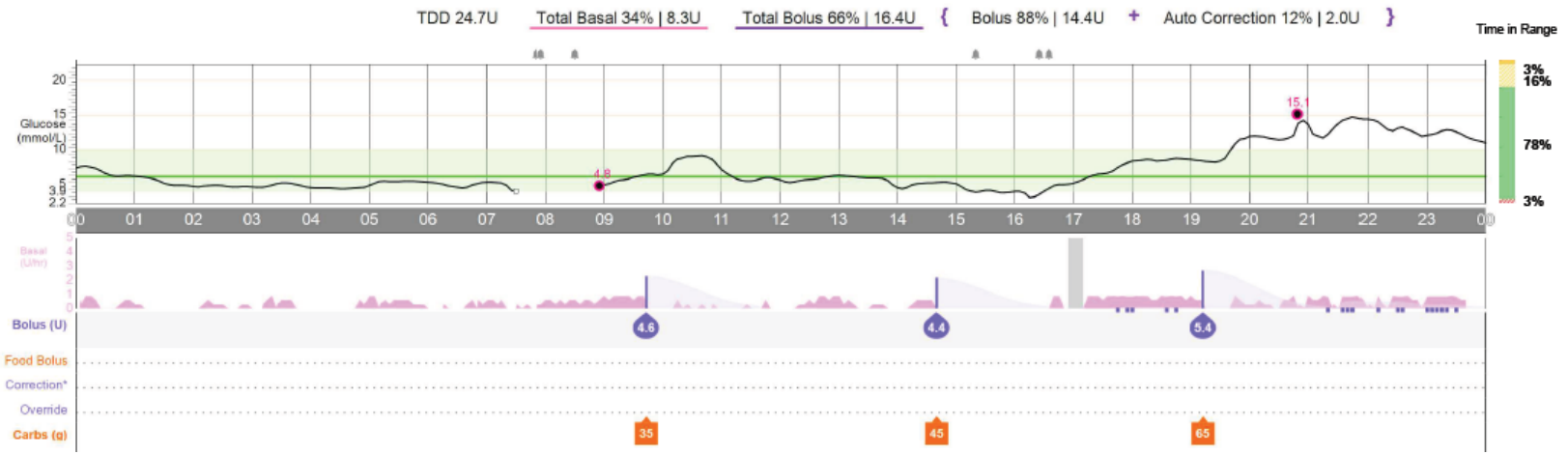


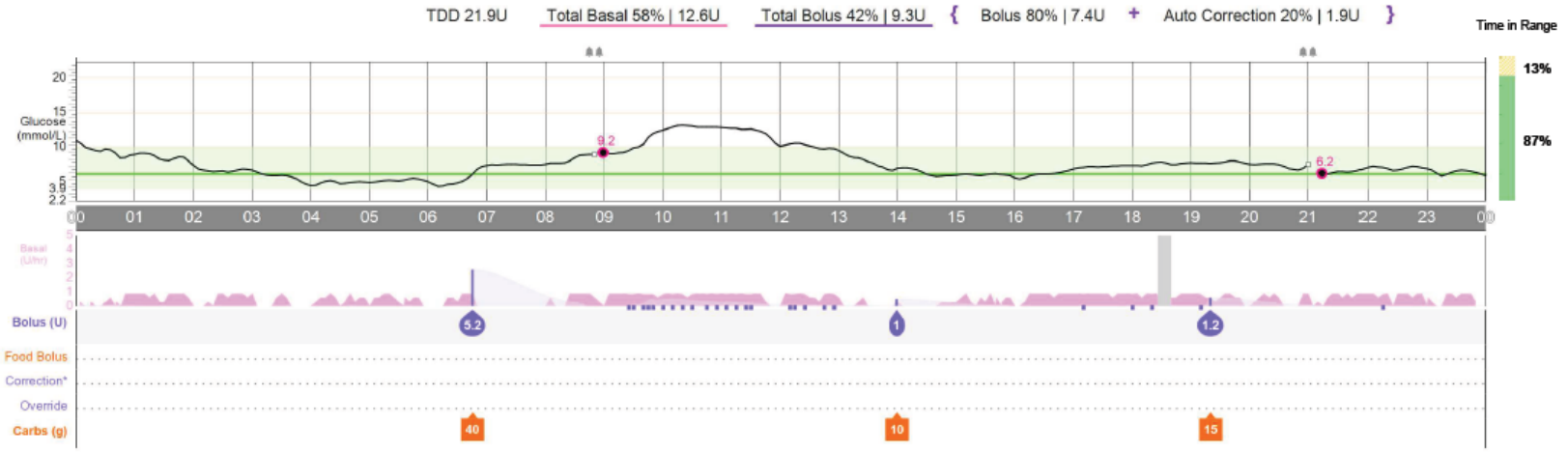


2nd week with 780G

SmartGuard	
SmartGuard	On
Target	6.1 mmol/L
Auto Correction	On

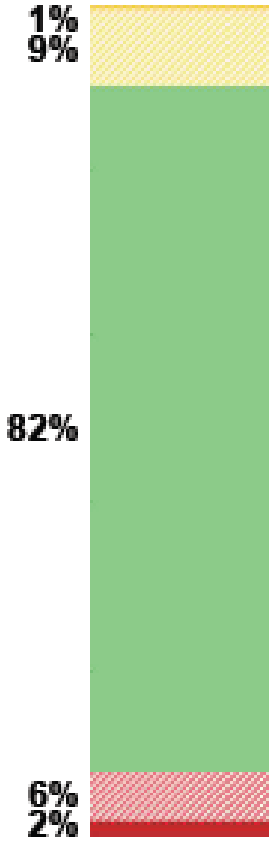
Bolus Wizard	On
Units	g, mmol/L
Active Insulin Time (h:mm)	2:00
Maximum Bolus	10.0 U





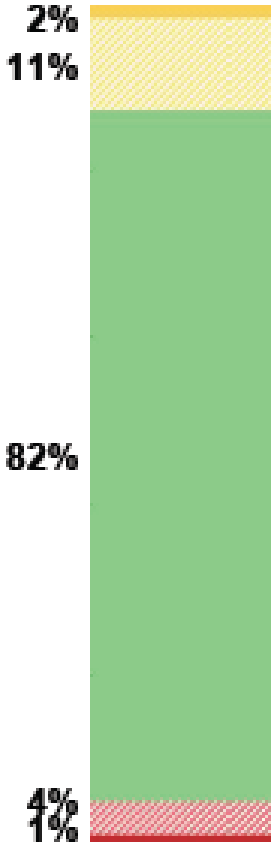
780G vs 780G

Target: 5.5
AIT: 3:00



CV: 39.9

Target: 6.1
AIT: 2:00



CV: 35.8

Comparable TIR with
less hypoglycaemia

Individualized

Fine Tuning: Auto basal target and AIT

- Who to START with a higher auto basal target and a less aggressive AIT?
  - Patients prone to hypoglycemia
  - Patients with very poor control
    - Sudden significant improvement in glucose control may precipitate diabetic retinopathy/ neuropathy

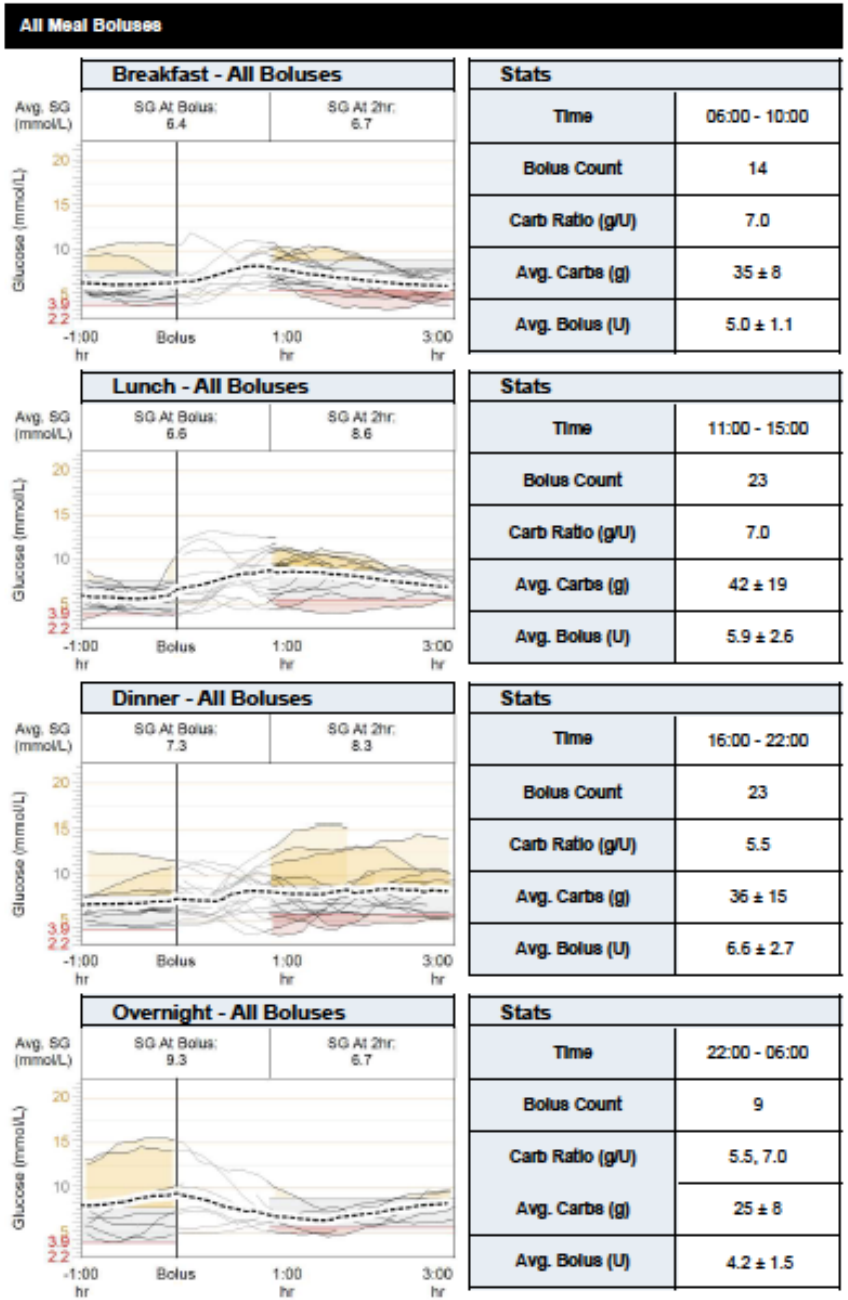
Fine Tuning: Auto basal target and AIT

- LOWS *without bolus/ overnight*
  - Higher Auto basal target

- LOWS *after Auto correction*
  - Longer AIT

Food bolus

- Aim: BG 2 hours post-prandial < 10 mmol/L

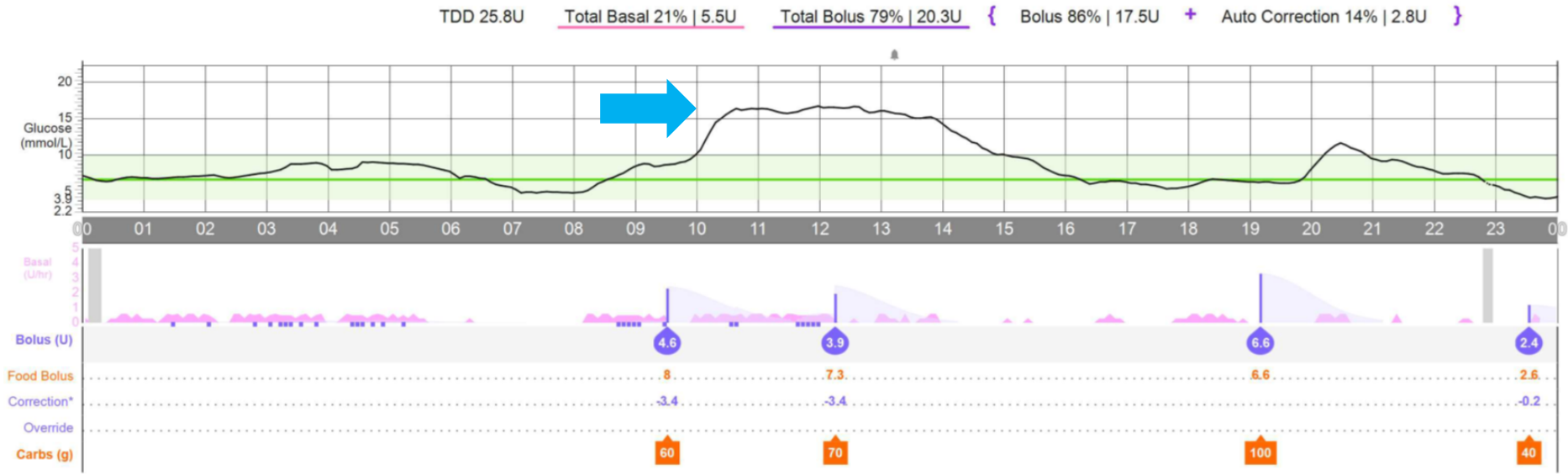


Food bolus

- **Timing of injection**: 10-15 mins before food
  - **Missed bolus:**
    - Within 30 mins: full bolus
    - 30-60 mins after meal: 50% of bolus
    - >60 mins: skip; correction as suggested by pump

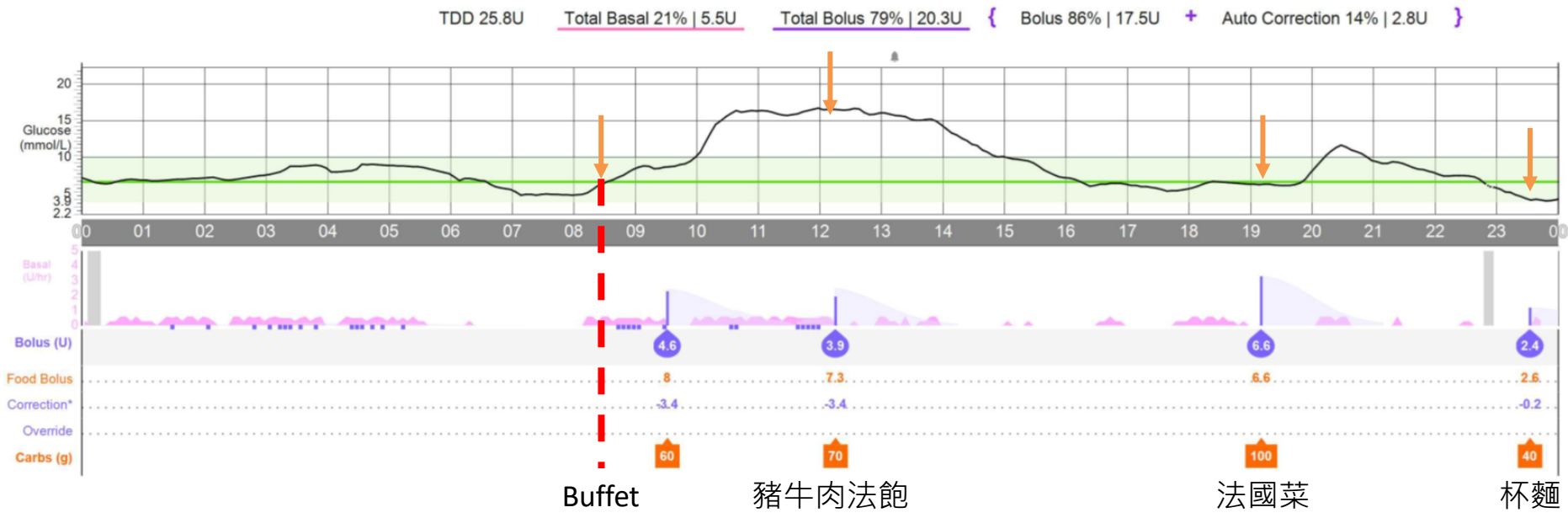
- **Bolus Speed**: Standard (1.5U/min)/ Quick bolus (15U/min)
- **Insulin to carbohydrate ratio (ICR)**

Tackling Post-prandial hyperglycemia: Case 1



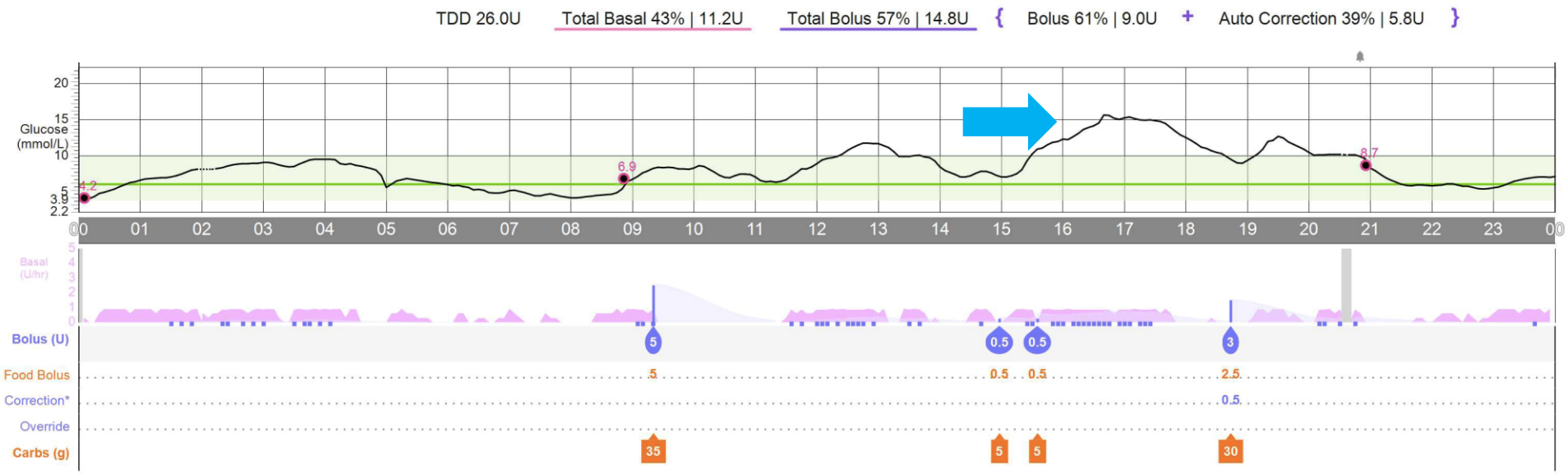
What is the cause of this post-meal hyperglycemia?

Tackling Post-prandial hyperglycemia: Case 1



1. Started breakfast buffet at 0830, but forgot to bolus…
2. Probably underestimated amount of carbs

Tackling Post-prandial hyperglycemia: Case 2



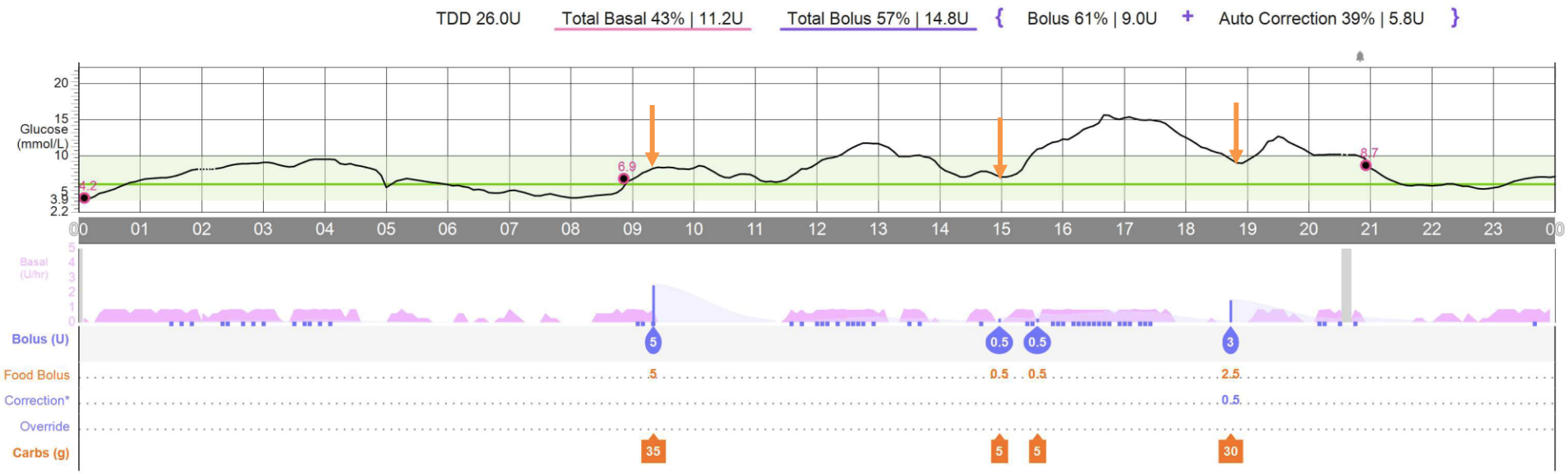
一份蛋牛治烘底
一杯熱咖啡

四粒蝦餃
兩塊無糖紅莓餅

鮑魚雞湯
炒菜
蒸魚
洋蔥炒牛肉

What is the cause of this post-meal hyperglycemia?

Tackling Post-prandial hyperglycemia: Case 2



一份蛋牛治烘底
一杯熱咖啡

四粒蝦餃
兩塊無糖紅莓餅

鮑魚雞湯
炒菜
蒸魚
洋蔥炒牛肉

一粒蝦餃=5 gram → Underestimate

Tackling Post-prandial hyperglycemia

Step 1: Inject at right time?

- Optimal: 10-15 mins before meal
- If not able to bolus earlier → Inject with meal + quick bolus

Step 2: Carb counting ok?

- Practices make perfect
- More aggressive AIT

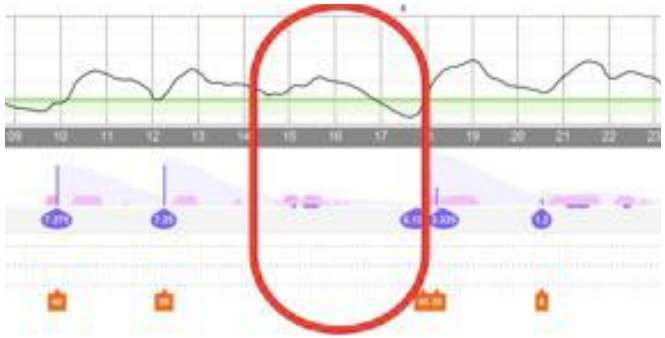
Step 3: Strengthen ICR

- E.g. ICR 1:10 to 1:8

Tackling Post-prandial hypoglycemia

Step 1: Inject at right time?

- Optimal: 10-15 mins before meal
- Missed bolus 30-60 mins: 50% bolus; > 60mins: skip

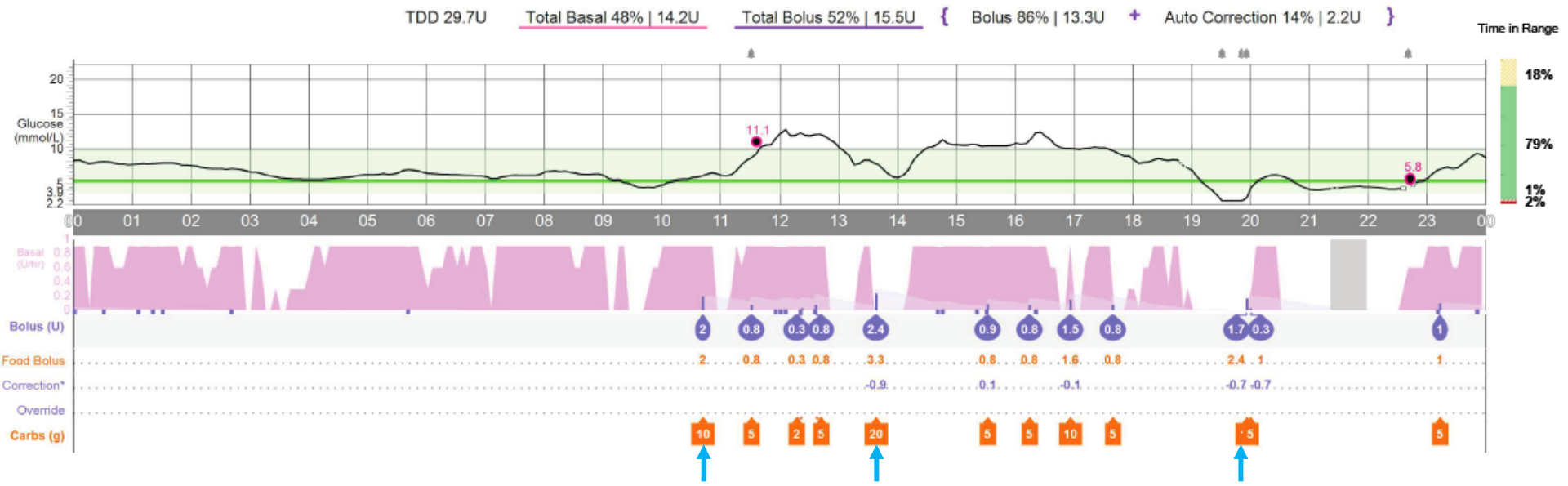


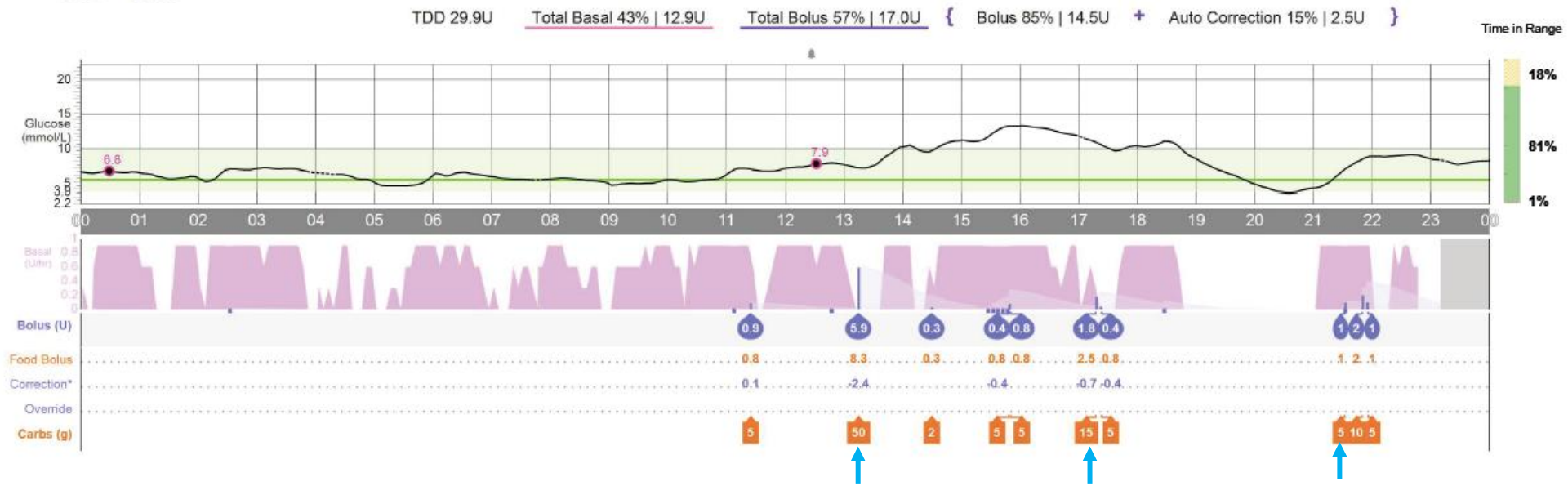
Step 2: Carb counting ok?

- Practices make perfect
- Less aggressive AIT

Step 3: Weaken ICR

- E.g. ICR 1:8 to 1:10


TDD 29.7U
Total Basal 48% | 14.2U
Total Bolus 52% | 15.5U
Bolus 86% | 13.3U
Auto Correction 14% | 2.2U
Time in Range
18%
79%
1%
2%
Glucose (mmol/L)
11.1
5.8
Basal (U/hr)
Bolus (U)
Food Bolus
Correction*
Override
Carbs (g)


TDD 29.9U
Total Basal 43% | 12.9U
Total Bolus 57% | 17.0U
Bolus 85% | 14.5U
Auto Correction 15% | 2.5U
Time in Range
18%
81%
1%
Glucose (mmol/L)
6.6
7.9
Basal (U/hr)
Bolus (U)
Food Bolus
Correction*
Override
Carbs (g)

Fake carb

- Mess up pump algorithm
- Increase risk of hypoglycemia

- Be patient!

Temp Target



- Temp target: 8.3 mmol/L
- Duration:
  - 30 mins up to 24 hours

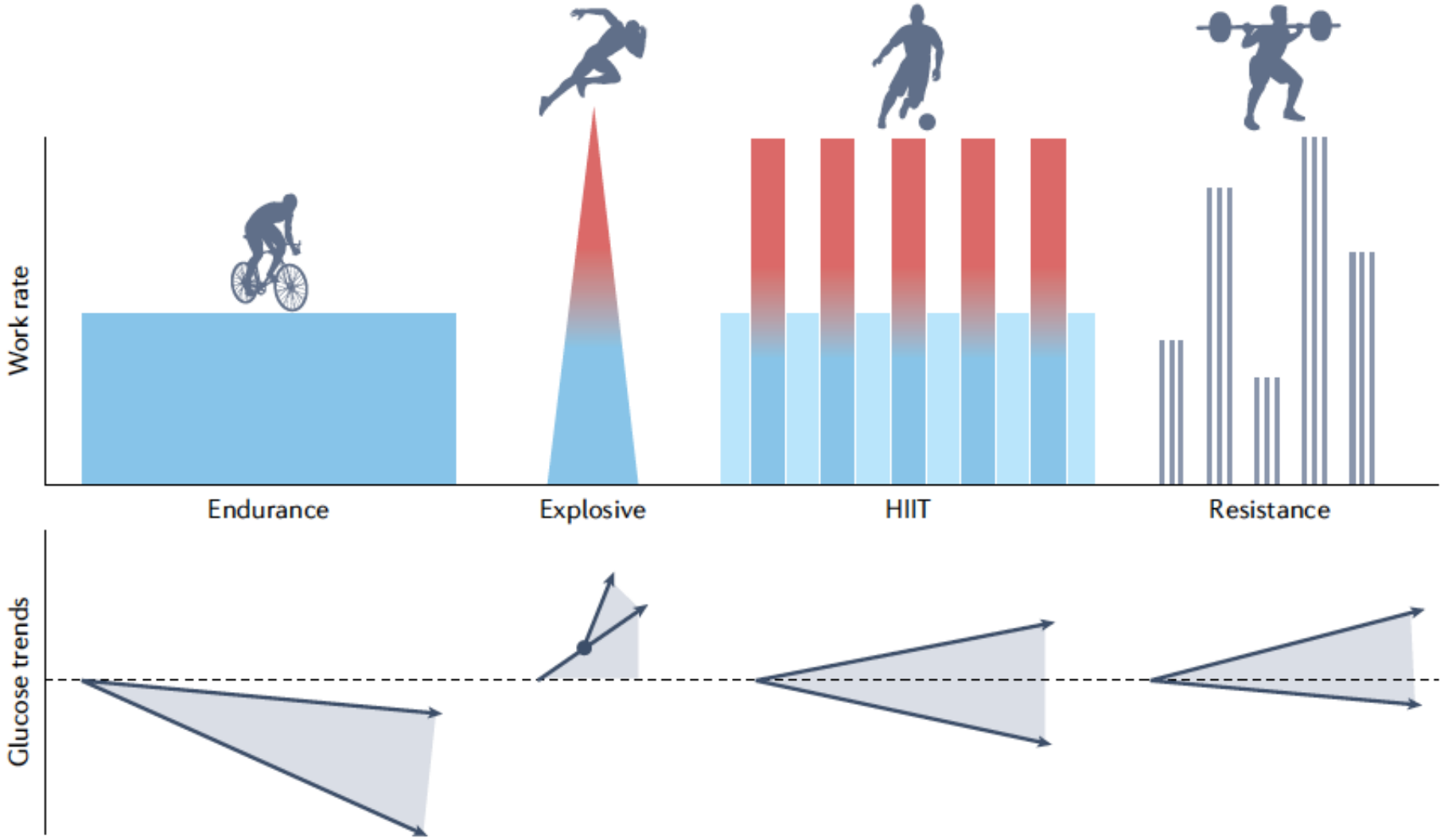
- Indications:
  - **Exercise**
  - Nocturnal hypoglycemia despite target 6.7 mmol/L







Glucose trend in different types of exercise

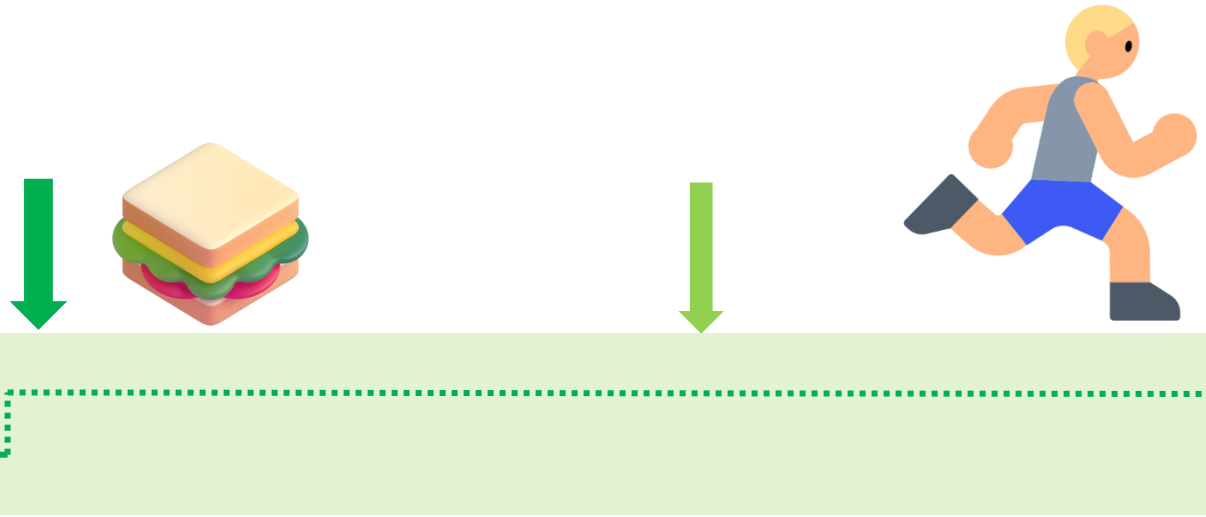


Endurance Exercise: How to minimize risk of hypoglycemia?

Before exercise

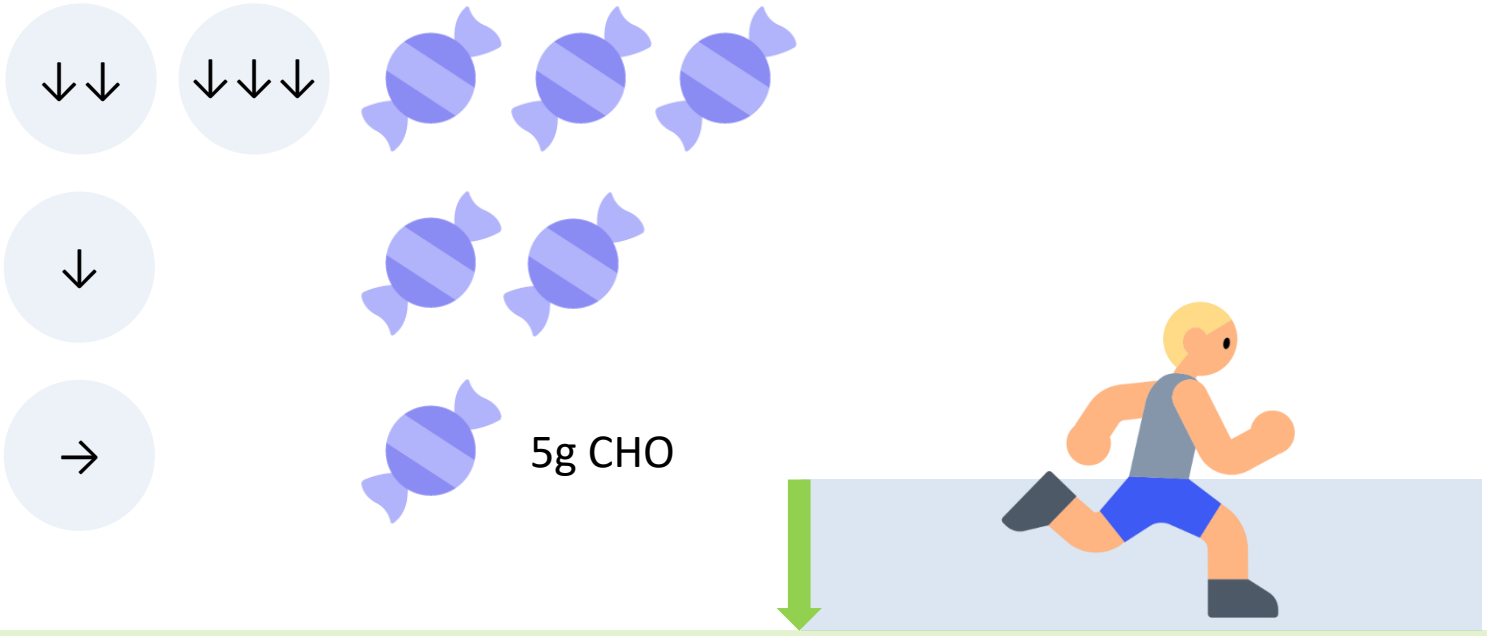
1. Start Temp target **1–2 hours** before exercise, if SG < 15
   For unplanned exercise, start temp target immediately before exercise

2. Food within 2 hours before exercise →
   - Reduce the prandial insulin dose by **25–33%**
   - Temp target should be initiated before food intake



Endurance Exercise: How to minimize risk of hypoglycemia?

During exercise, if SG < 7mmol/L, consume carb every 20-30 mins according to trend arrow:



07:00

08:30

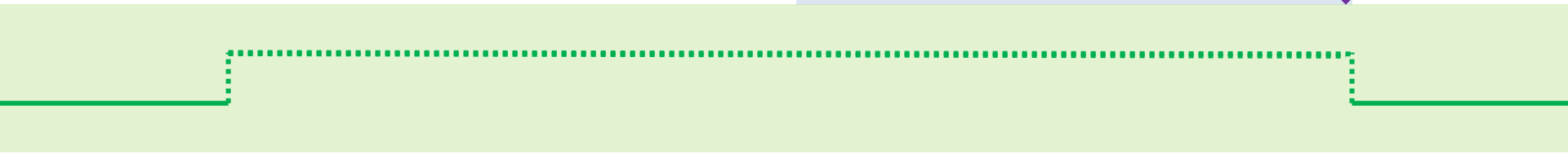
Start running

Endurance Exercise: How to minimize risk of hypoglycemia?

After exercise:

- **if SG > 5mmol**
  - **off temp target**
- **If SG <= 5mmol**
  - **extend temp target 2 hours more + extra carb**





07:00

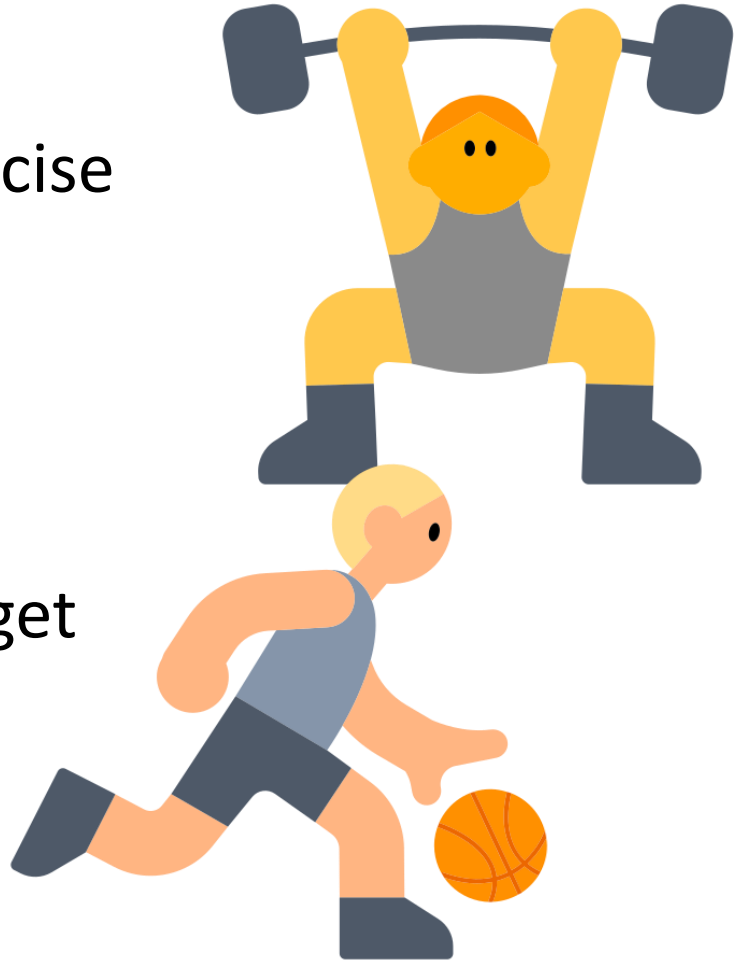
08:30

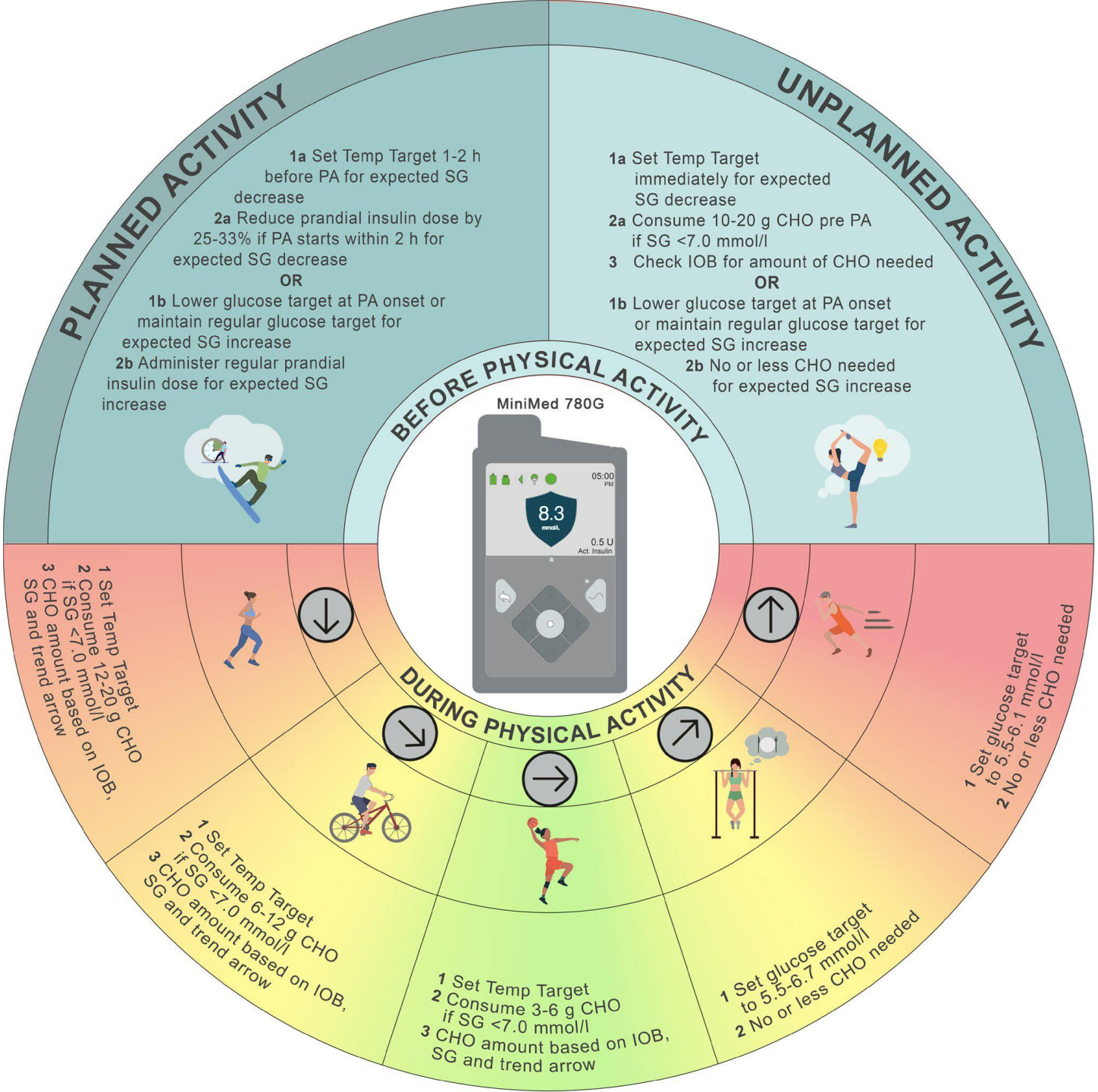
10:00
Stop running

When SG rise is expected during exercise

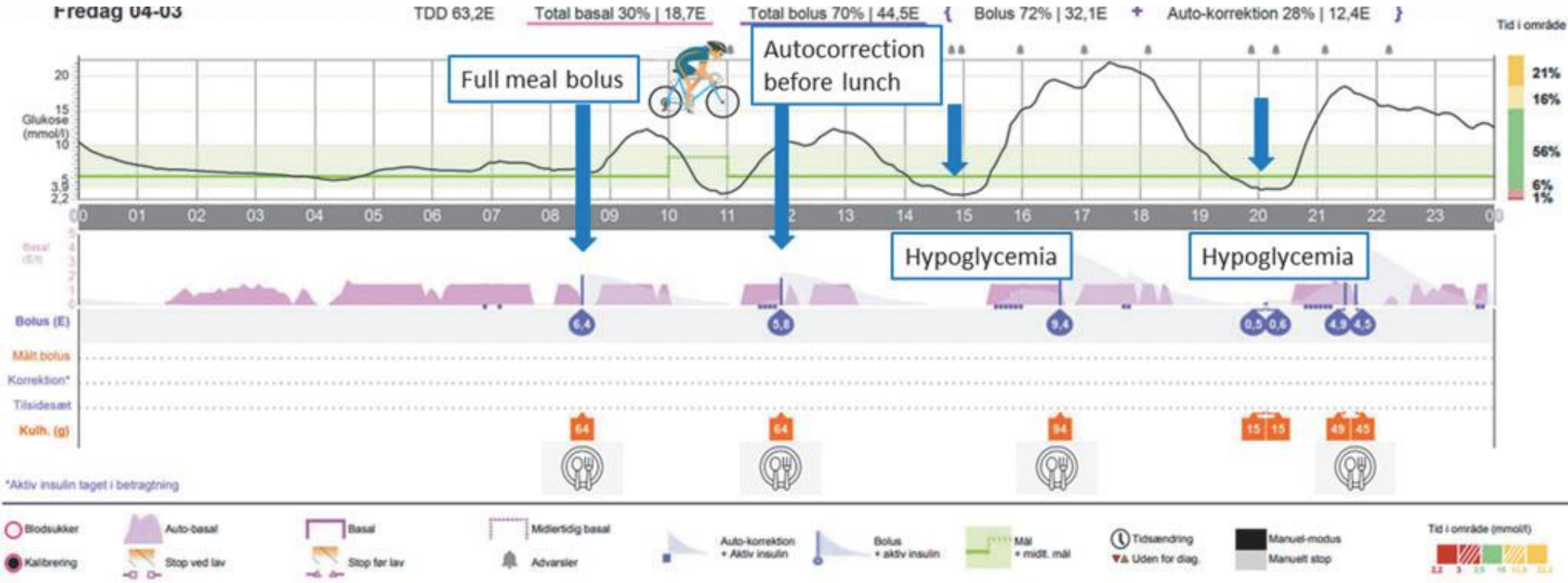
- Examples:
  - Anaerobic/ resistance exercise
  - Competitive sport

- Before exercise:
  - Same or lower glucose target
  - Keep usual dose prandial insulin



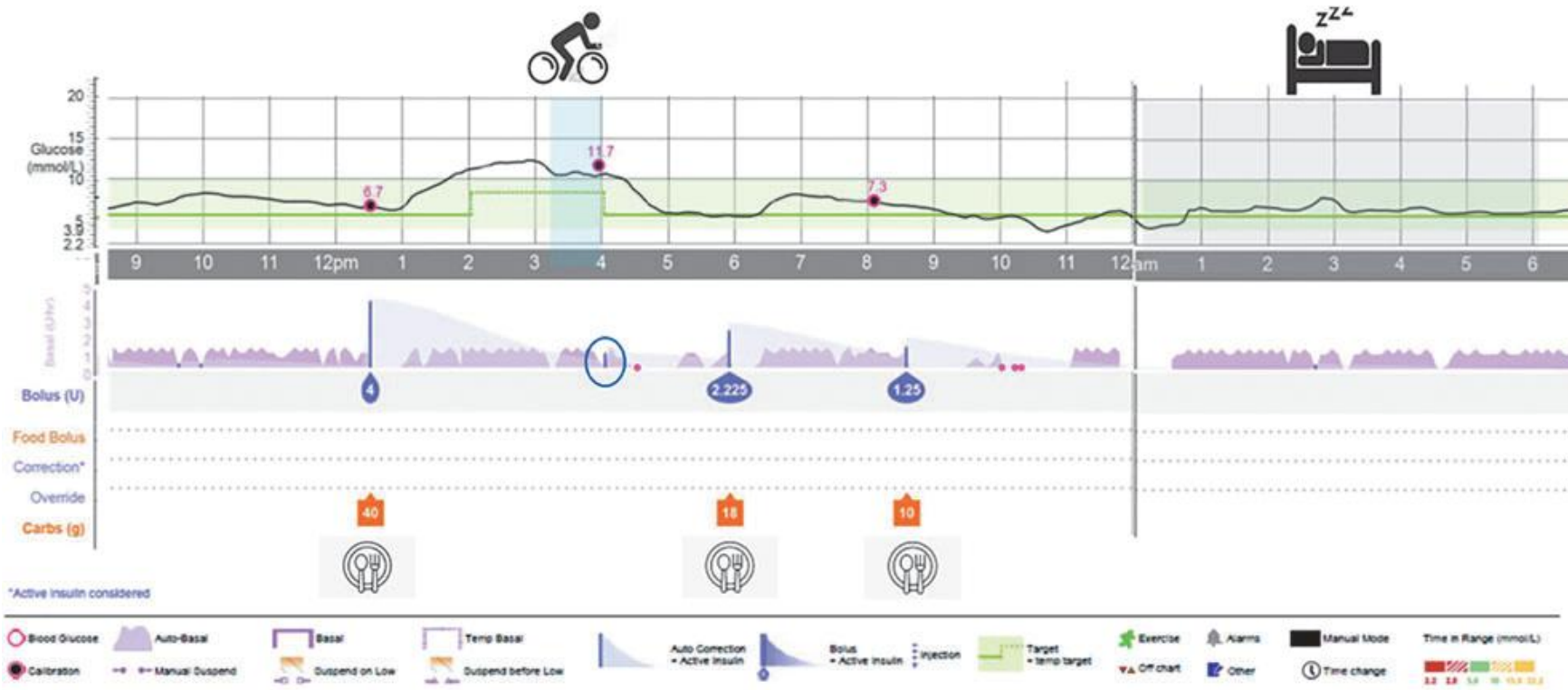

PLANNED ACTIVITY
1a Set Temp Target 1-2 h before PA for expected SG decrease
2a Reduce prandial insulin dose by 25-33% if PA starts within 2 h for expected SG decrease
OR
1b Lower glucose target at PA onset or maintain regular glucose target for expected SG increase
2b Administer regular prandial insulin dose for expected SG increase
UNPLANNED ACTIVITY
1a Set Temp Target immediately for expected SG decrease
2a Consume 10-20 g CHO pre PA if SG <7.0 mmol/l
3 Check IOB for amount of CHO needed
OR
1b Lower glucose target at PA onset or maintain regular glucose target for expected SG increase
2b No or less CHO needed for expected SG increase
BEFORE PHYSICAL ACTIVITY
MiniMed 780G
05:00 PM
8.3 mmol/L
0.5 U Act. Insulin
DURING PHYSICAL ACTIVITY
1 Set Temp Target
2 Consume 12-20 g CHO if SG <7.0 mmol/l
3 CHO amount based on IOB, SG and trend arrow
1 Set Temp Target
2 Consume 6-12 g CHO if SG <7.0 mmol/l
3 CHO amount based on IOB, SG and trend arrow
1 Set Temp Target
2 Consume 3-6 g CHO if SG <7.0 mmol/l
3 CHO amount based on IOB, SG and trend arrow
1 Set glucose target to 5.5-6.7 mmol/l
2 No or less CHO needed
1 Set glucose target to 5.5-6.1 mmol/l
2 No or less CHO needed

Case 1



- Full meal bolus given
- Exercise started 90 mins after breakfast (45 mins of cycling between 10:00 and 10:45 AM)
- Temp target set just before exercise, stopped 15 mins after exercise

Case 2



Moderate intensity exercise

- Full bolus given at lunch (3 hours pre-exercise)
- Temp target started ~1 hour before exercise and stopped once exercise ended
- 25% bolus reduction for dinner (2 hours post-exercise) and night snack (4.5 hours post-exercise)

Case 2

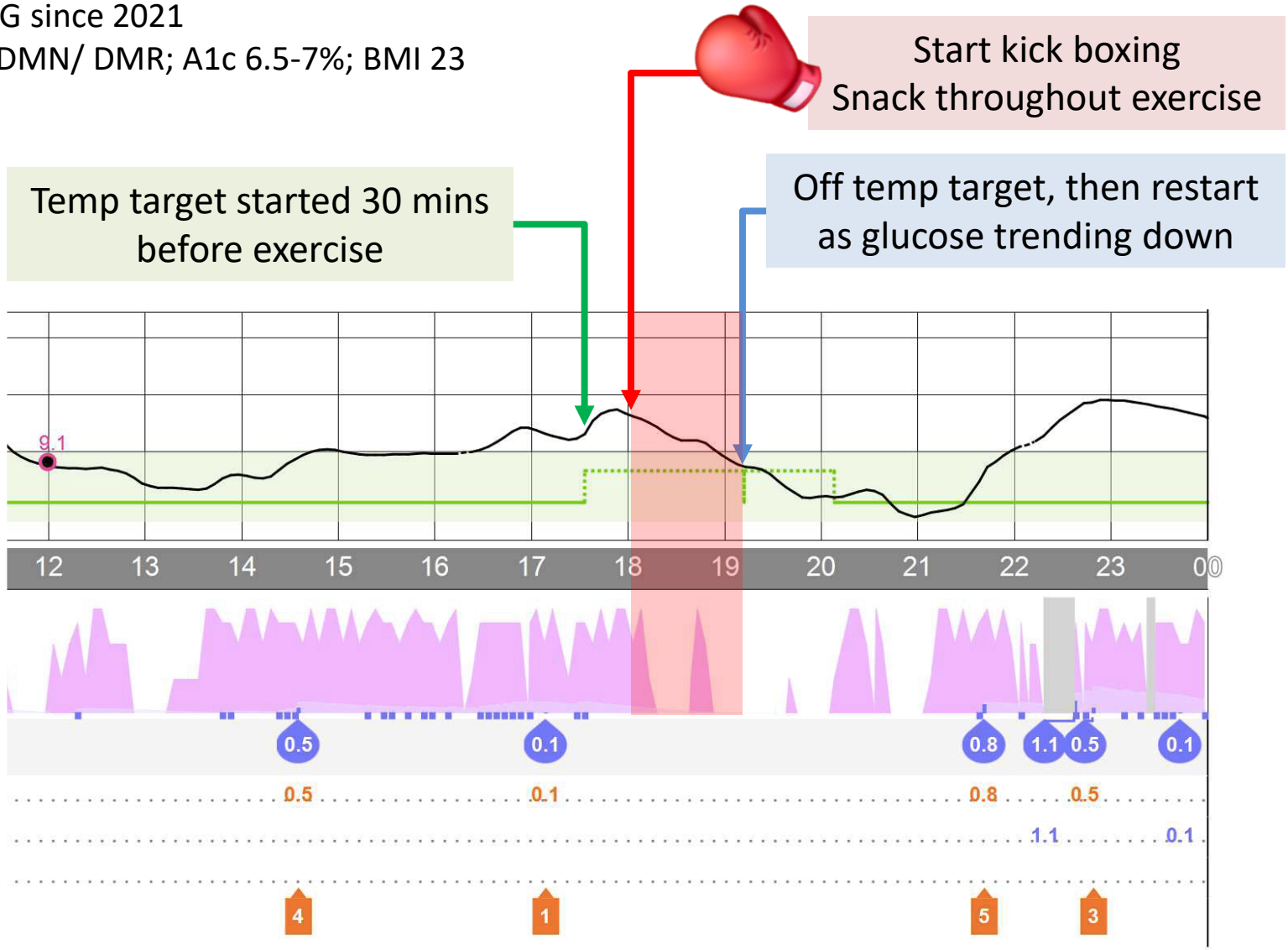


<u>High intensity exercise (↑counter-regulatory hormone response)</u>

- Temp target started ~2 hours before exercise and stopped once exercise ended
- Automated correction after discontinuation of temp target
- 25% bolus reduction for dinner (1 hour post-exercise)

Miss C, 34/F

- T1DM for 14 years
- 780G since 2021
- No DMN/ DMR; A1c 6.5-7%; BMI 23



Miss C, 34/F

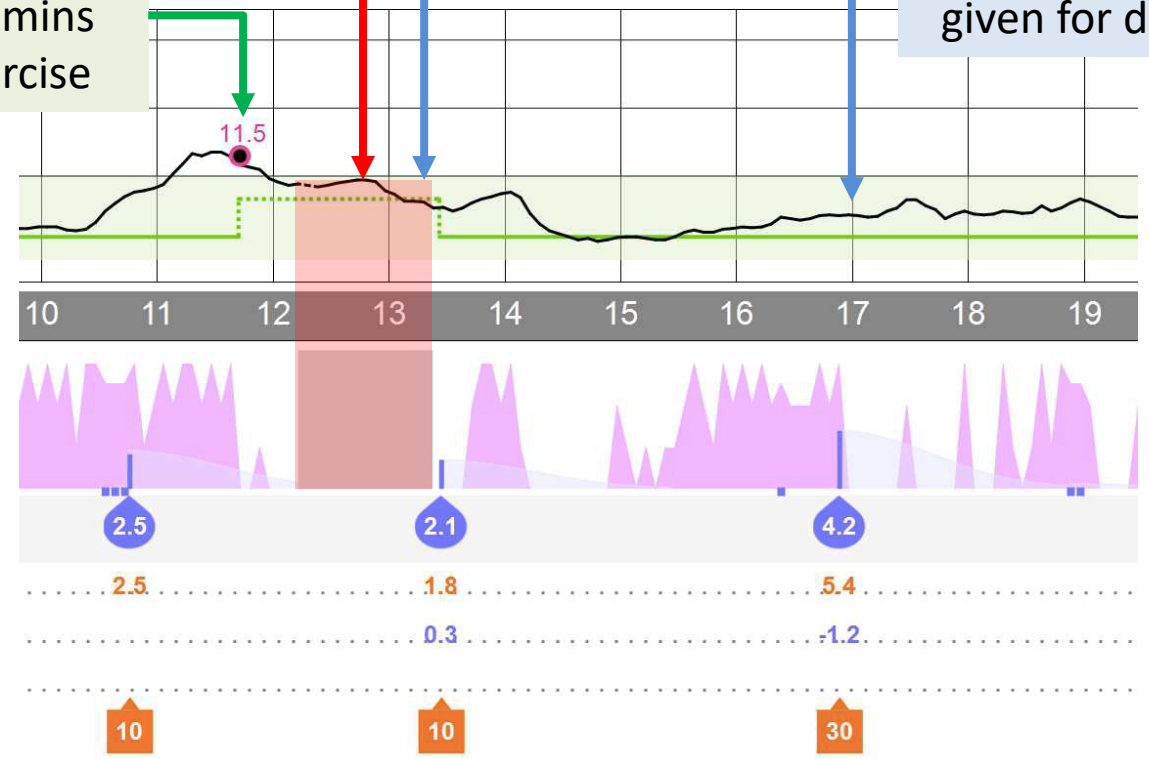


Start trampoline
Insulin suspended manuaully

Temp target started 30 mins before exercise

Off temp target

Full dose bolus given for dinner

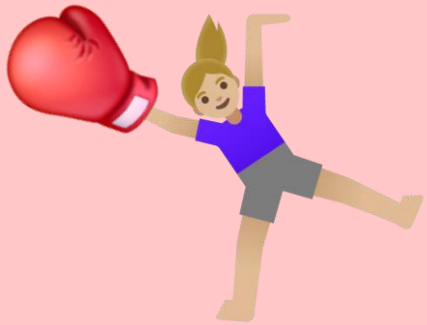


What can we learn from Miss C?

Her approach to minimize hypoglycemia

Before exercise:
- Slightly higher pre-exercise SG
- Temp target

During exercise:
- Food throughout exercise
- Suspend pump during exercise



After exercise:
- Extend temp target

Patient knows the best!

Travelling with pump

- Travel letter and pack everything else according to checklist





TRAVEL CHECKLIST

Use the following checklist as a guideline to remind you of important items to take on your trip.

- [ ] Extra insulin with a current prescription
- [ ] Insulin pump reservoirs
- [ ] Insulin pump infusion sets
- [ ] Insertion device for infusion sets
- [ ] CGM transmitter
- [ ] CGM charger
- [ ] Glucose sensors
- [ ] Insertion device for sensors
- [ ] Tapes and adhesives
- [ ] AA batteries
  (Energizer® for optimal performance)
- [ ] Blood glucose meter
- [ ] Test strips and lancets
- [ ] Glucose tablets or fast-acting sugar
- [ ] Snacks
- [ ] Ketone strips
- [ ] Medical ID
- [ ] Airport Information Card
- [ ] Document with current pump settings
- [ ] Insulin syringes for emergency injections and dosing instructions from your doctor

Travelling with pump

- Insulin and pump supplies shoulder be hand-carried
  - temperature in the luggage hold could freeze and inactivate the insulin
- No XR (including whole body scanner)
- Update the time of insulin pump and blood glucose meter if travel across time zones

Travelling with pump

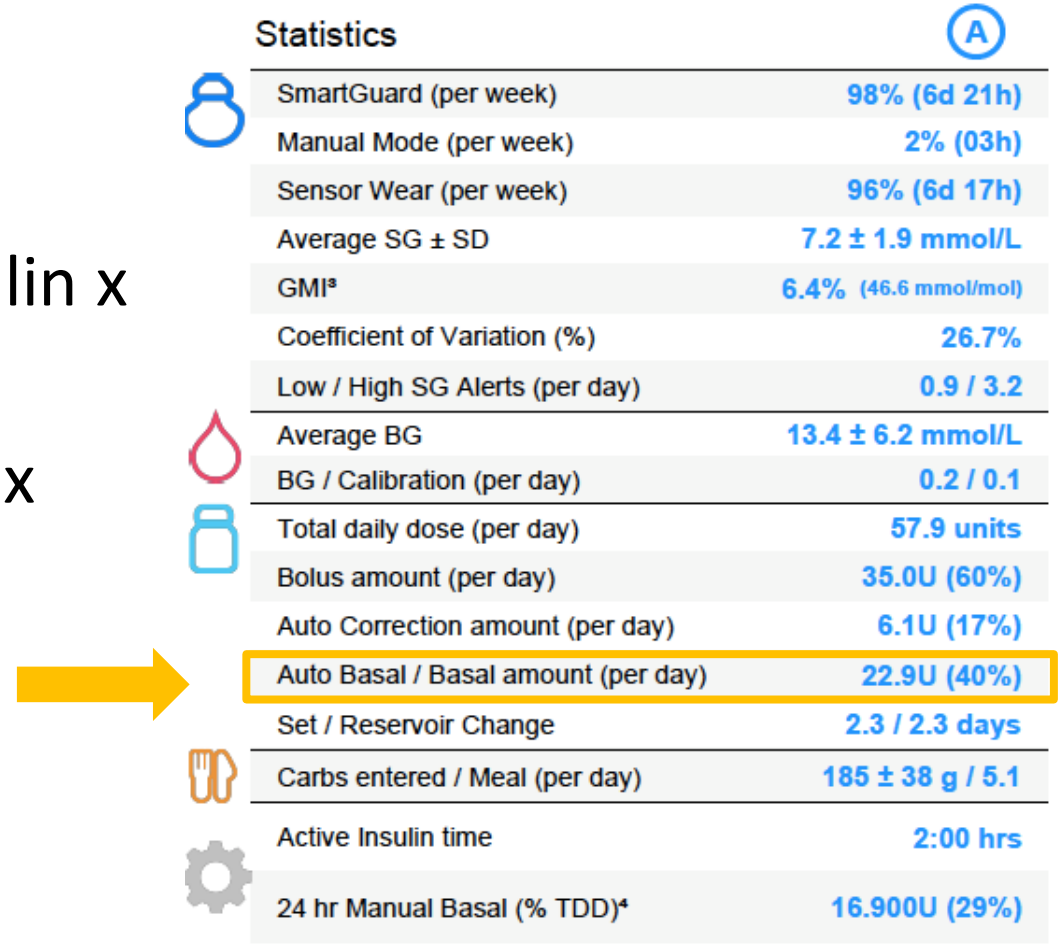
- Extreme of weather
  - Hot weather
    - Tape become insecure due to sweating
    - May denature insulin
  - Cold weather: may freeze insulin

- Remove the pump
  - Water/ contact sport; Sauna
  - Acceptable if less than 1 hour
  - Suspend insulin



Revert from Pump to Pen

- **Basal**
  - **Lantus/ Tresiba**
  - Pump basal insulin x 1.1
  - Example: 22.9U x 1.1= 25U



Statistics	A
SmartGuard (per week)	98% (6d 21h)
Manual Mode (per week)	2% (03h)
Sensor Wear (per week)	96% (6d 17h)
Average SG ± SD	7.2 ± 1.9 mmol/L
GMI[3]	6.4% (46.6 mmol/mol)
Coefficient of Variation (%)	26.7%
Low / High SG Alerts (per day)	0.9 / 3.2
Average BG	13.4 ± 6.2 mmol/L
BG / Calibration (per day)	0.2 / 0.1
Total daily dose (per day)	57.9 units
Bolus amount (per day)	35.0U (60%)
Auto Correction amount (per day)	6.1U (17%)
Auto Basal / Basal amount (per day)	22.9U (40%)
Set / Reservoir Change	2.3 / 2.3 days
Carbs entered / Meal (per day)	185 ± 38 g / 5.1
Active Insulin time	2:00 hrs
24 hr Manual Basal (% TDD)[4]	16.900U (29%)

Revert from Pump to Pen

- **Bolus**
  - Food bolus:
    - ICR 10; carbs in meal 50g
    - 50g/10 = 5 units
  - Correction:
    - ISF 6
    - Pre-meal h’stix 12; glucose target 6
    - (12-6)/6 = 2 units
  - Total: 5+2 = 7 units





Take Home Message

Individualize !

Reference

- Moser, Othmar et al. “The Use of Automated Insulin Delivery around Physical Activity and Exercise in Type 1 Diabetes: A Position Statement of the European Association for the Study of Diabetes (EASD) and the International Society for Pediatric and Adolescent Diabetes (ISPAD).” *Hormone research in paediatrics*, 1-28. 10 Dec. 2024, doi:10.1159/000542287
- Riddell, Michael C, and Anne L Peters. “Exercise in adults with type 1 diabetes mellitus.” *Nature reviews. Endocrinology* vol. 19,2 (2023): 98-111. doi:10.1038/s41574-022-00756-6
- O'Neal, David N et al. “Exercising Safely with the MiniMed™ 780G Automated Insulin Delivery System.” *Diabetes technology & therapeutics* vol. 26,S3 (2024): 84-96. doi:10.1089/dia.2023.0420