

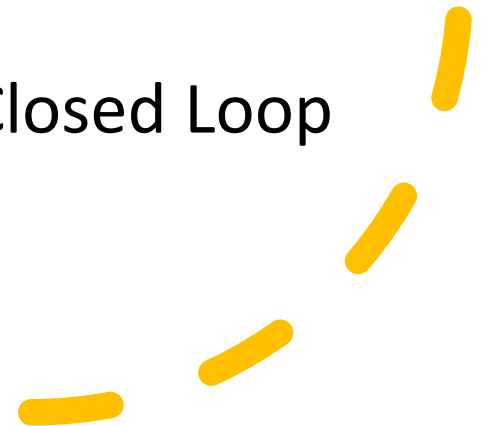
CBT  
Technology  
Type 1 Diabetes &  
Disordered Eating (T1DE)

Jennie Brown

Diabetes Nurse Specialist and CBT Therapist

# DTTN Workshop

- T1DE our patients
- CBT in T1DE
- CGM & CBT to support understanding of what is happening
- Thinking about T1DE & Hybrid Closed Loop



# The complexity of type 1 diabetes & disordered Eating

- Holistic approach combining physical & mental health
- Predominately female 18-45 years old but 60+
- BMI
- HbA1c
- Mental health disorders
- Diabetes complications
  
- Monitoring glucose
- Monitoring ketones
- Sick day rules
- Insulin omission
- Rescue boluses
- Food restriction
- Binge eating
- Purging



# Key Functions of T1DE

To manage weight and shape  
(poor self-esteem, social norms, to be more likable/lovable, food freedom, compensate for defective body)

To provide control when everything else seems out of control (perfectionism/ all or nothing thinking)

Brain fog associated with high BG to help protect against difficult emotions

# The Complexity of T1DE Behaviours

## Key physical components

- The impact of variable BG levels/diabetes rules on appetite, eating & relationship with food “diabetes is an eating disorder”
- The impact of variable BG on weight & body image “what weight is normal for me”
- The impact of changing weight upon insulin requirements
- Experience of re-insulinsation “Fluid not fat”
- The image of what might happen if insulin is matched to food

# The Complexity of T1DE behaviour's

## Key emotional components of T1DE

Feeling different

Feeling defective

Feeling Inadequate / failing

Anxious

Ashamed

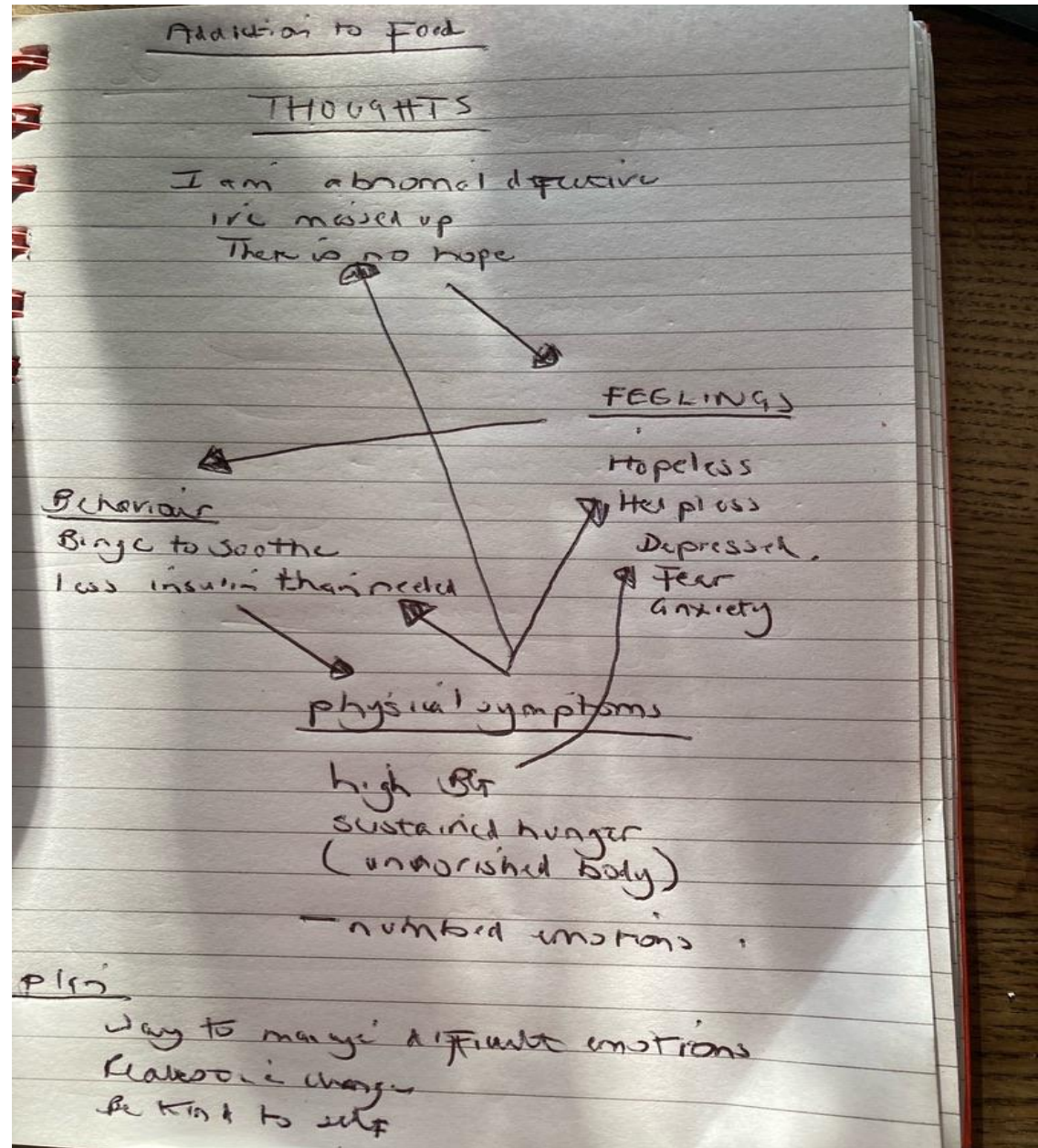
Feeling out of control

Helpless

Hopeless

Depressed

CBT  
Starting to  
understand  
the problem



# CBT formulation

*Diagnosed type 1 diabetes aged 13. Parents split up 1 month post diagnosis*

*“When I was first diagnosed, I had to hold her whilst she was crying and tell her everything was going to be OK. She couldn’t be the adult for me when I needed it, and I had no reassurance from anyone. I was terrified”*

*“My mum told me she did not want “fat children”*

## **Thoughts/ beliefs**

*“I have diabetes my body is defective its up to me to manage”*

*“If my BG aren’t good enough, it means I am not good enough, not a good person, unlovable”*

## **Feelings**

*Distress, anxiety, shame, guilt, overwhelm, depression*





# CBT formulation

## Harsh rules...

### Behaviours

*"I was only allowed to eat if my bloods were a certain way. I began by manipulating my bloods to go lower so I felt allowed to eat"*

- If my BG is 7 mmol/L or lower, I am allowed to eat
- If my BG is above 7mmol/L , I can't eat until it comes down

### Physical symptoms

Stress

Eating according to BG levels

*"not knowing when I'm hungry,"*

### Rules impossible to sustain

### Behaviours

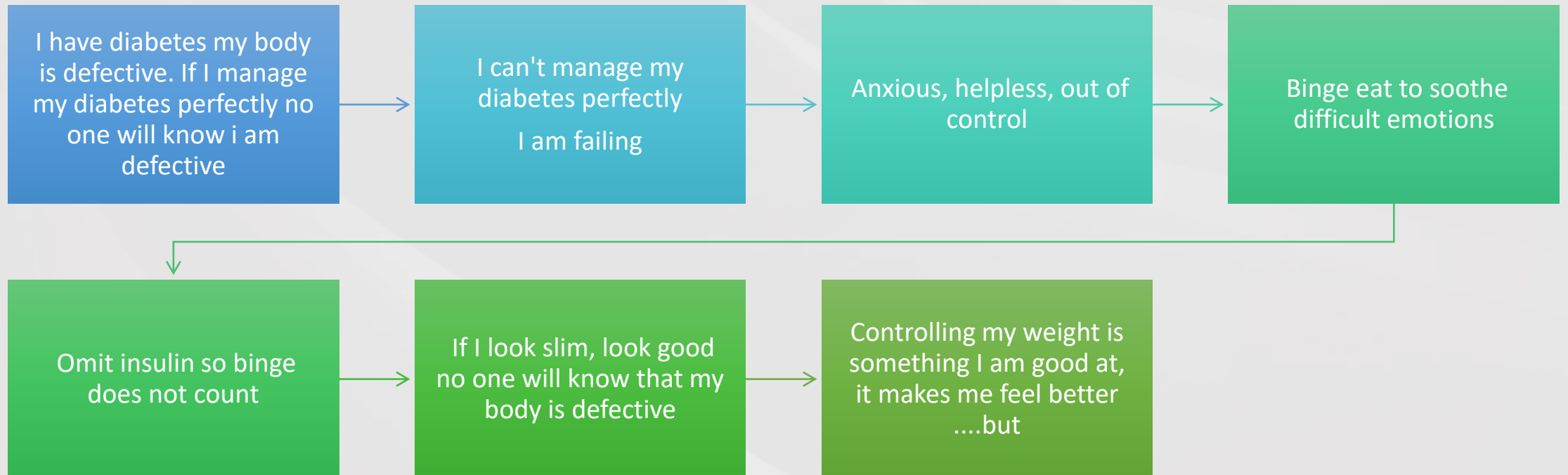
Comfort eating *"soothing when I feel shame and distress,*

Omit rapid insulin to avoid weight gain *"I can't be fat"*

Stopped attending appointments *"Because I was failing"*



# Keeping me stuck.....



# CBT Challenging thoughts, beliefs & behaviour's

## What is the true meaning of insulin omission.....

How do you feel physically day to day

What worries you most now and about the future

What is the impact upon your relationships

What is the impact on the things you like to do or used to like doing?

How would you like things to be different

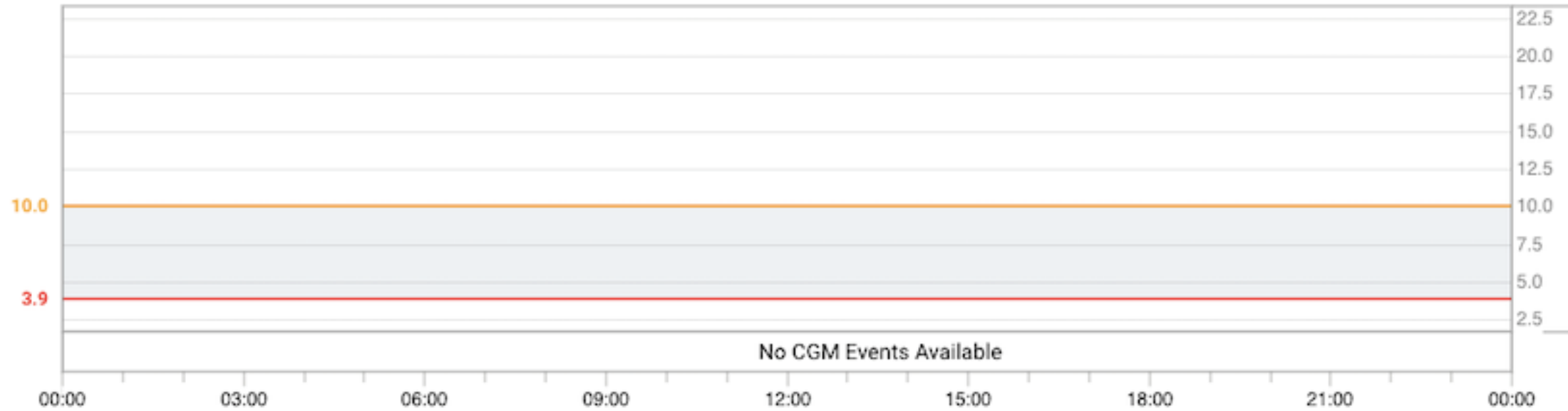
## Combining CBT & glucose data to better understand the experience and plan care

*What do you notice about these glucose traces*  
*How might you approach a consultation*  
*How might HCL be helpful/unhelpful*

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*How might you approach a consultation*  
*How might HCL be helpful/unhelpful*

**Fri, 14 Feb 2025**

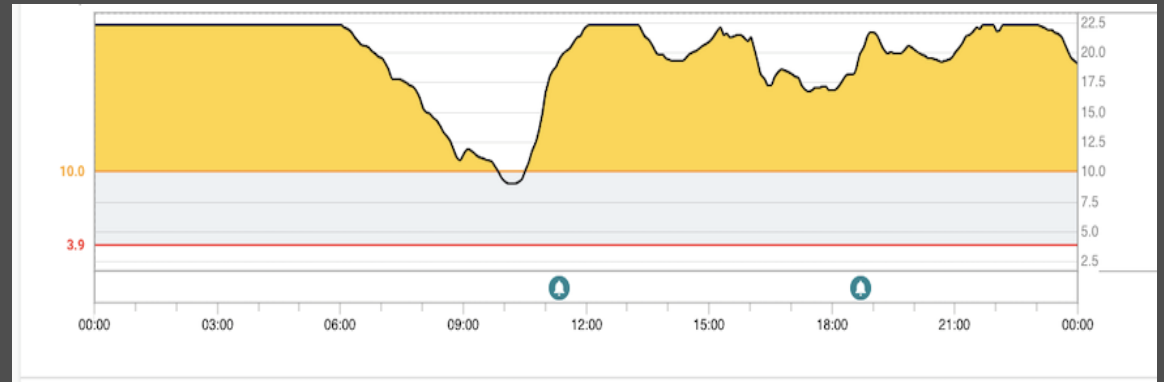
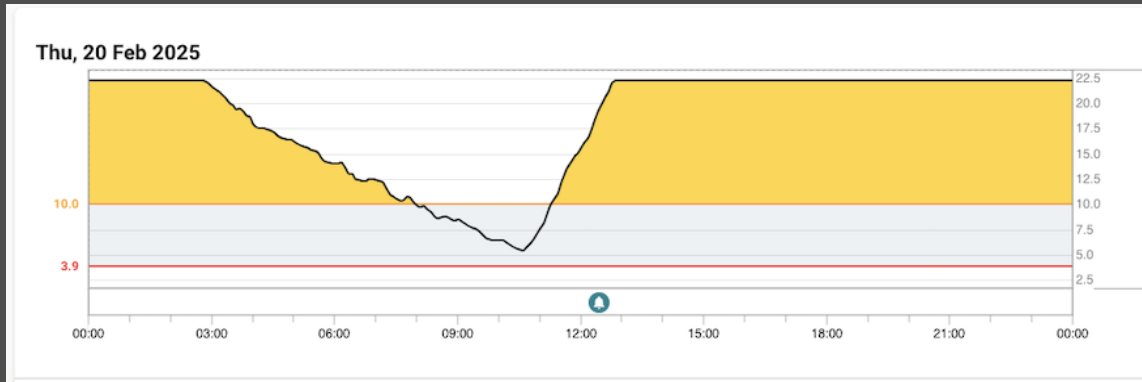




“This is  
normal for me  
I am only  
happy when  
my BG is high”

- What is the impact of high BG upon cognitive function
- Will sick day rules be followed?
- Mental health/diabetes risk assessment
  
- CBT...Is change safe/ feasible?
- HCL....Is it a safe option? Would weight gain be tolerated?
  
- Acute hospital admission to manage medical emergency
- ED hospital admission. T1DE support with diabetes management

*What do you notice about these glucose traces*  
*How might you approach a consultation*  
*How might HCL be helpful/unhelpful*





# *CBT and glucose data*

“I noticed how you often have lower BG levels in the morning”

*“Could we spend some time thinking about this”*

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# CBT & sensor glucose exploration

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Why might this be important to you?

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How do you feel in your body in the morning compared to the rest of the day?

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How do you feel emotionally in the morning compared to the rest of the day?

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How might your day be different if it started with a high BG reading?

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What does this tell you about your relationship with insulin?

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Based on your findings, what might you think about doing differently?

# Behaviour Experiment. A step towards HCL

## Behaviour Experiments – worksheet

Behaviour Experiment	Prediction and rating 1 – 10 (10=strongest belief)	Possible obstacles	Strategies to overcome obstacles	Outcomes of the experiment	What I have learned about this belief/assumption. Re-rating the strength of the belief.
I will take 2 units of rapid insulin with Breakfast every day in addition to my tesiba	I won't be able to feel in control of what I am eating so I will definitely gain weight and feel terrible about myself (10/10)	I may be really busy + forget  My negative thoughts will get the better of me and I will give up	Keep my nano-rapid in convenient places - in the kitchen so it takes some of the thoughts out of it and I'm less likely to forget  Remembering that insulin actually does really good things for me and may help me feel more in control.	I managed the experiment well I fell off the bandwagon a couple of times but I didn't let it completely derail my progress.  I had more energy, felt less ill and more positive - like I was really caring for myself	That, despite it being incredibly difficult + scary I am capable of challenging myself + the positives may outweigh the negatives  (6/10)



Emotional &  
physical  
components of  
T1DE  
aged 12 onwards

**Thought**

I am different to my friends. I just want to be normal

**Feelings**

Anger distress

**Behaviour**

Induced low BG to allow chocolate binge with friends

“A Binge buffer”

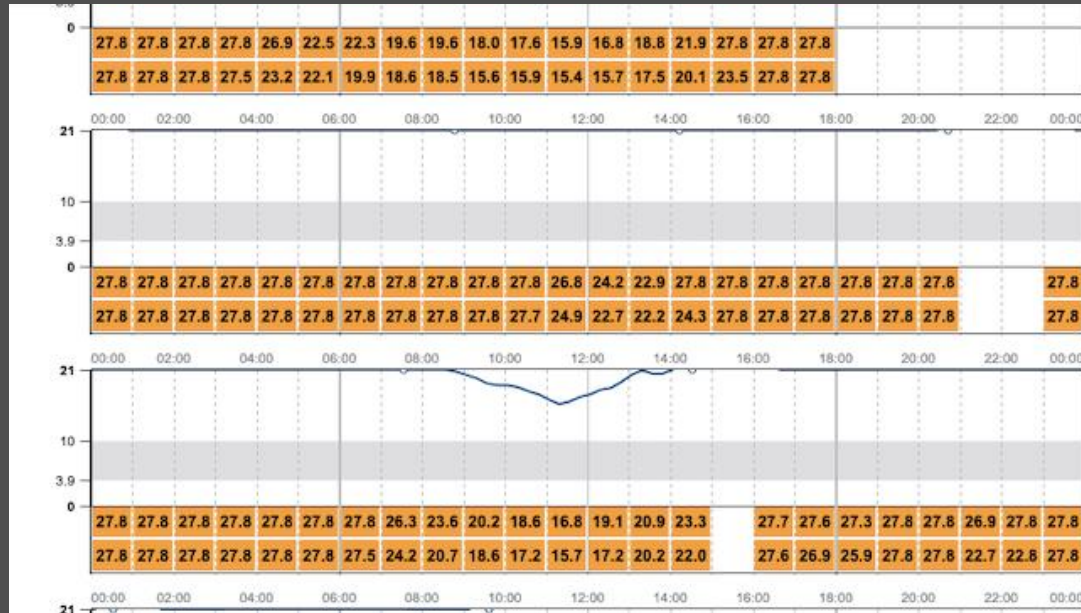
Once BG high, large rapid bolus to correct.

**Physical symptoms**

Hypo/hyper symptoms, repeated acute hospital admissions

“These behaviour’s may have served you well in the past but how well do they serve you now?”

What do you notice about these glucose traces  
 How might you approach a consultation  
 How might HCL be helpful/unhelpful



### GLUCOSE STATISTICS AND TARGETS

3 February 2023 - 16 February 2023 **14 Days**

Time Sensor Active: **55%**

Ranges And Targets For	Type 1 or Type 2 Diabetes
<b>Glucose Ranges</b>	<b>Targets</b> % 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.

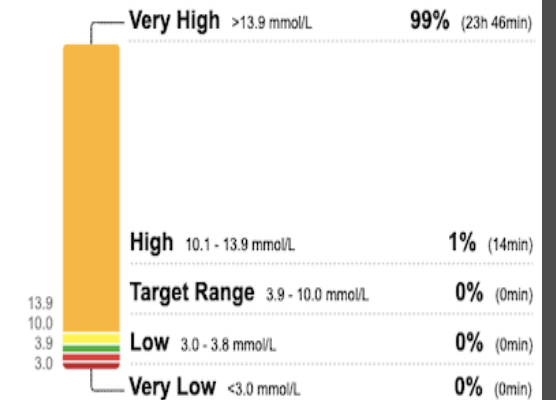
Average Glucose **25.1** mmol/L

Glucose Management Indicator (GMI) **-**

Glucose Variability **15.8%**

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

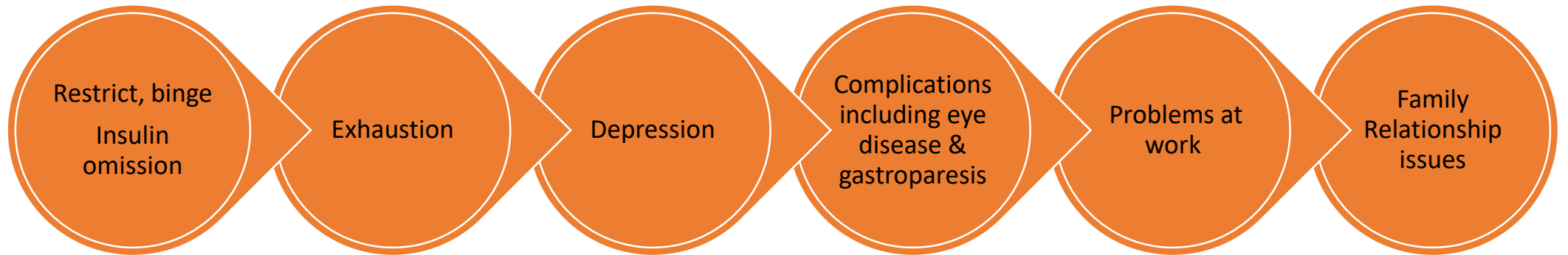
### TIME IN RANGES



## Functions of T1DE

*“Being slim makes me more lovable”*

“High BG protect against difficult emotions”



# Working towards HCL

Challenge unhelpful thinking about weight and shape

Nutrition review

*Lower BG gradually checking tolerance of weight changes*

*Manage complications/ risk of exacerbation*

What is the meaning of changed diabetes self-care

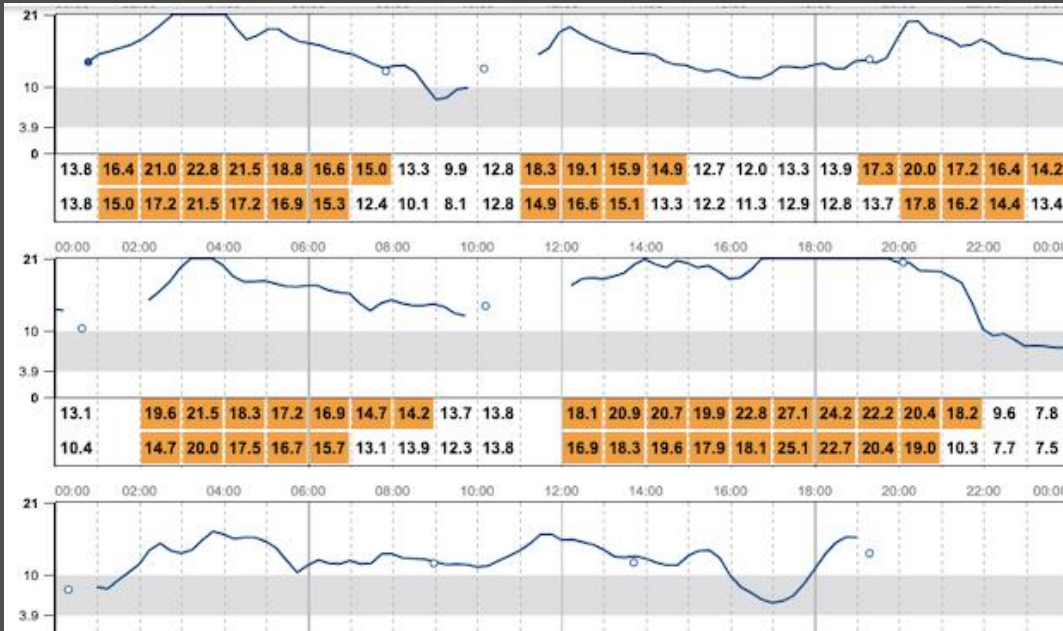
*Agree HbA1c pre-transfer*

*Pump choice (consider pump algorithms & target BG)*

Relapse planning  
How would you know & what would you do



What do you notice about these glucose traces  
 How might you approach a consultation  
 How might HCL be helpful/unhelpful



### GLUCOSE STATISTICS AND TARGETS

12 July 2024 - 25 July 2024

14 Days

Time Sensor Active:

66%

Ranges And Targets For	Type 1 or Type 2 Diabetes
<b>Glucose Ranges</b>	<b>Targets % of Readings (Time/Day)</b>
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)
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Each 5% increase in time in range (3.9-10.0 mmol/L) is clinically beneficial.

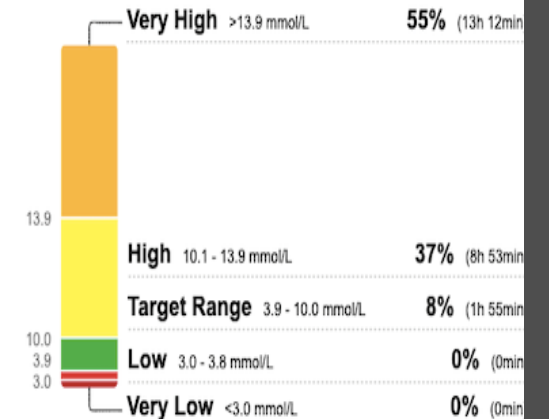
**Average Glucose** 14.6 mmol/L

**Glucose Management Indicator (GMI)** 9.6% or 81 mmol/mol

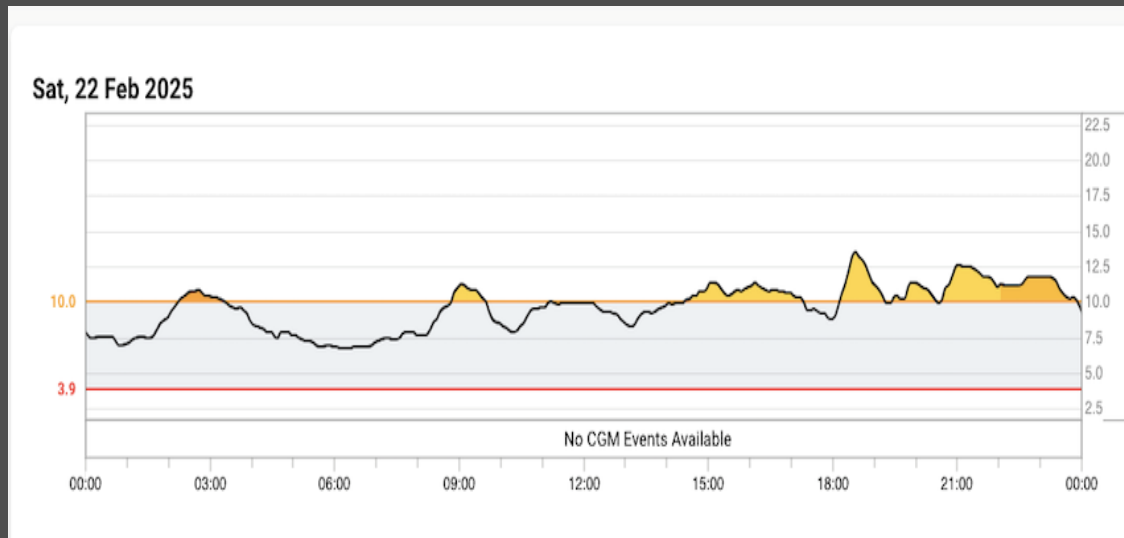
**Glucose Variability** 23.8%

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

### TIME IN RANGES



# What difference has CBT & HCL made on the physical & emotional components of T1DE?



## Overview

14 Days Tue 11 Feb 2025 - Mon 24 Feb 2025



Average glucose

**10.4** mmol/L

Standard deviation

**3.9** mmol/L

GMI

**7.8** %

Coefficient of Variation

**37.6** %

Time in Range

15% Very High  
30% High  
54% In Range  
1% Low  
0% Very Low


Target Range:  
3.9-10.0 mmol/L

Sensor usage

Days with data  
**13/14** days

Time active  
**94%**

Avg. calibrations per day  
**0.0**

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# The meaning of CBT & HCL in T1DE

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Thinking of food nourishing body,  
Eating same meals with my family

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Insulin “a friend not a foe”

HbA1c 7.8%

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Weight stable, normal BMI

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Reliable & more able to concentrate at work

---

Glucose stability=improved mood = improved communication =  
Improved relationships

---

Diabetes complications stable

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Headspace away from diabetes allows more freedom to focus on  
MH

---

CBT strategies to challenge difficult thoughts and manage difficult  
emotions

# STEADY- 1

## Semi structured interviews with people with lived experience of T1DE

Diabetic Medicine 2021

## Systematic review/ Diabulimia blog study

Diabetic Medicine 2018

## Challenges and therapeutic strategies

Diabetic Medicine 2019

## CGMS/ diabetes self care behaviour

Diabetic Medicine 2020

## Refining theoretical model(s) T1DE maintenance and recovery

**A cognitive behavioural model of the bidirectional relationship between disordered eating and diabetes self care in people with type 1 diabetes mellitus**

Amy Harrison<sup>1,2,3</sup> | Natalie Zaremba<sup>1</sup> | Jennie Brown<sup>1,4</sup> | Jacqueline Allan<sup>1</sup> | Emmanouela Konstantara<sup>1</sup> | David Hopkins<sup>4</sup> | Janet Treasure<sup>3</sup> | Khalida Ismail<sup>5</sup> | Marietta Stadler<sup>1,5</sup>



**'Diabulima' through the lens of social media: a qualitative review and analysis of online blogs by people with Type 1 diabetes mellitus and eating disorders**

E. Staite<sup>1</sup>, N. Zaremba<sup>1</sup>, P. Macdonald<sup>2</sup>, J. Allan<sup>3</sup>, J. Treasure<sup>2</sup>, K. Ismail<sup>1</sup> and M. Stadler<sup>4</sup>



**Multidisciplinary healthcare teams' challenges and strategies in supporting people with type 1 diabetes to recover from disordered eating**

N. Zaremba<sup>1</sup>, A. Watson<sup>2</sup>, C. Kan<sup>3</sup>, M. Broadley<sup>9</sup>, H. Partridge<sup>4</sup>, C. Figueiredo<sup>5</sup>, D. Hopkins<sup>6</sup>, J. Treasure<sup>3</sup>, K. Ismail<sup>6,7</sup>, A. Harrison<sup>1,8</sup> and M. Stadler<sup>1,7</sup>



**Disordered eating in women with type 1 diabetes: Continuous glucose monitoring reveals the complex interactions of glycaemia, self-care behaviour and emotion**

Suresh Rama Chandran<sup>1,2</sup> | Natalie Zaremba<sup>3</sup> | Amy Harrison<sup>3,4</sup> | Pratik Choudhary<sup>1,3</sup> | Yee Cheah<sup>1</sup> | Jacqueline Allan<sup>3</sup> | Fredrik Debono<sup>5</sup> | Fiona Reid<sup>6</sup> | Janet Treasure<sup>4</sup> | David Hopkins<sup>7</sup> | Khalida Ismail<sup>4</sup> | Marietta Stadler<sup>3,4</sup>



# STEADY- 2

## EBCD intervention design Feasibility RCT

### STEADY intervention development using participatory action design process

Diabetic Medicine 2021

Developing a novel intervention for type 1 diabetes and disordered eating using a participatory action design process: Safe management of people with Type 1 diabetes and EAting Disorders study (STEADY)

Natalie Zaremba, Glenn Robert, Jacqueline Allan, Amy Harrison, Jennie Brown, Emmanouela Konstantara, Miranda Rosenthal, Divina Pillay, Anita Beckwith, Janet Treasure, David Hopkins, Khalida Ismail, Marietta Stadler  ... See fewer authors 



### STEADY protocol paper

Diabetic Medicine 2024

#### STUDY PROTOCOLS

**Protocol for the STEADY intervention for type 1 diabetes and disordered eating: Safe management of people with Type 1 diabetes and EAting Disorders studyY**

Natalie Zaremba, Amy Harrison, Jennie Brown, Jacqueline Allan, Divina Pillay, Janet Treasure, Salma Ayis, David Hopkins, Khalida Ismail, Marietta Stadler 



First published: 08 January 2024 | <https://doi.org/10.1111/dme.15273>

### STEADY Feasibility trial results

Lancet Regional Health Europe 2025

**Safety of a co-designed cognitive behavioural therapy intervention for people with type 1 diabetes and eating disorders (STEADY): a feasibility randomised controlled trial**

Marietta Stadler,<sup>a,b,\*</sup> Natalie Zaremba,<sup>a,b,c</sup> Amy Harrison,<sup>a,b,d</sup> Jennie Brown,<sup>a,e</sup> Divina Pillay,<sup>a</sup> Jacqueline Allan,<sup>a</sup> Rachael Tan,<sup>a,e</sup> Salma Ayis,<sup>f</sup> Emmanouela Konstantara,<sup>a</sup> Janet Treasure,<sup>g</sup> David Hopkins,<sup>a,h</sup> and Khalida Ismail<sup>b,g</sup>

