Barts Health
NHS Trust

East London

Stick with what we know or try something new? Considering closed loop technology and high risk diabetes patients

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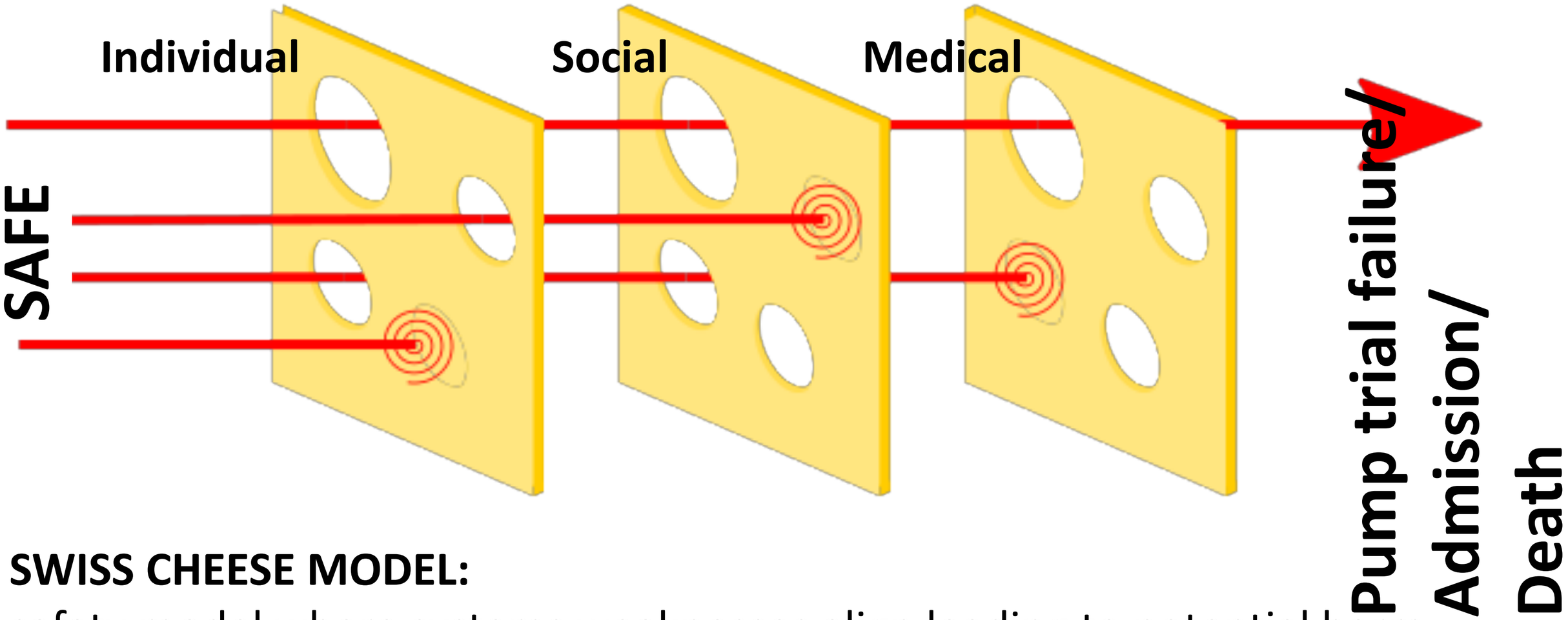
How we conceptualise and catergorise risks

What factors suggest potential issues

Four cases to think about

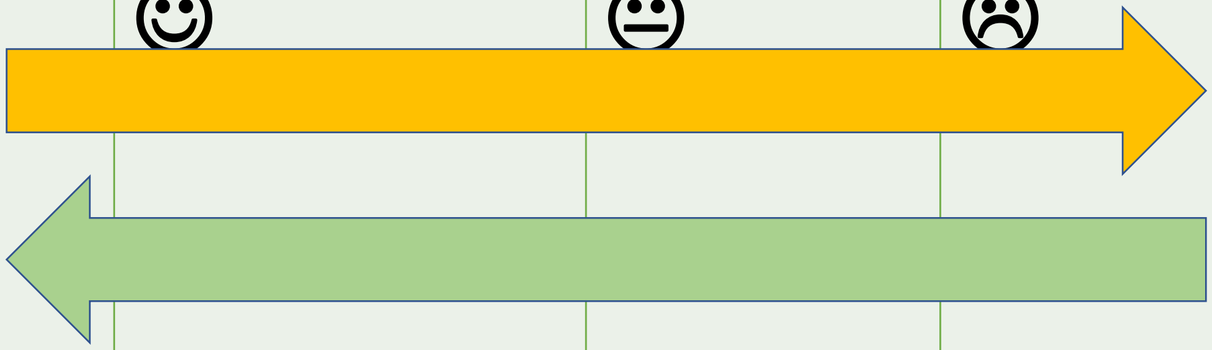


SWISS CHEESE MODEL:
safety model where systems weaknesses align leading to potential harm

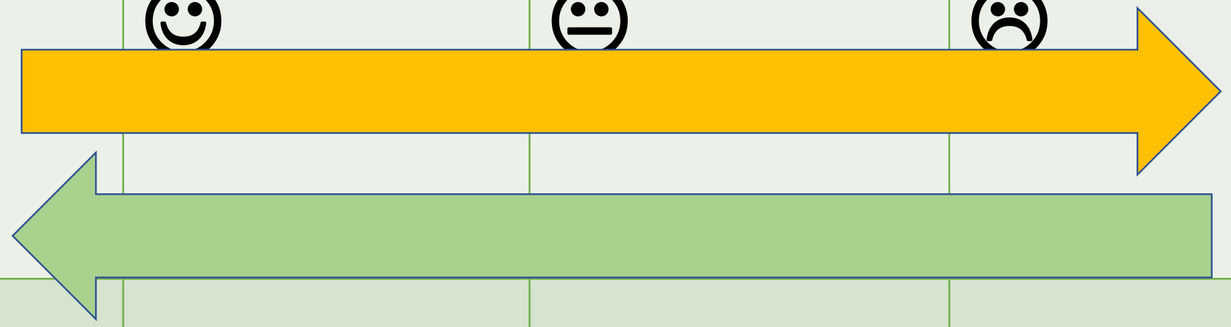
However, one layer influences weaknesses to occur in other layers

Factor / slice of swiss cheese	☺	😐	☹
INDIVIDUAL (psychological)			
• Trust	Some	Little	None
• Mood	OK	Low or ↕	Very low / ↕
• Wt/shape core beliefs			What prob?
• Suicidality	None	Occasional	Persistent
• Self-destructiveness	“	“	“
• Recklessness	“	“	“
• Capacity*	Present	Fluctuating	Ab/Unrec
INDIVIDUAL (behavioural)			
• Eating and drinking patterns			High sugar
• Sensor	On, working	On, no data	???
• BM	(alternative)	Some data	No data
• SA	Some	Little / none	None / SB
• LA	Mostly	Some	Little / none
• (Pump / HCL)	On, working	On, oh dear	On?

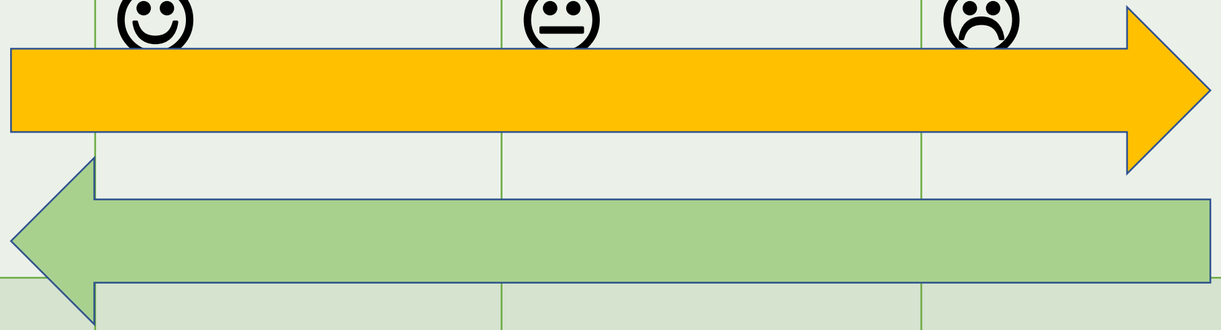
Factor / slice of swiss cheese	☺	😐	☹
INDIVIDUAL (physical)			
• EYE	Not present & Screened		Present & Not screened
• KIDNEY	“		“
• FEET	“		“
• Gut	Symps not present		Present, consistent
• Weight			<20



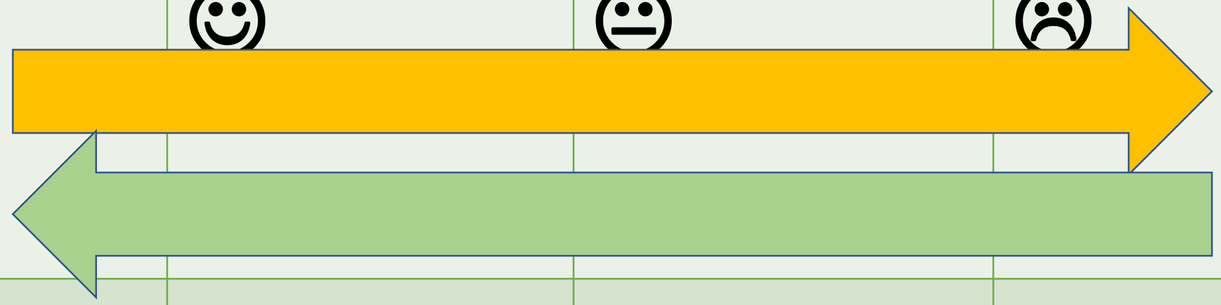
Factor / slice of swiss cheese	☺	😐	☹
SOCIAL (RELATIONSHIPS) • Family / Partner • Friends • Work	 Present & stable “ In work	 Present not stable “	 Absent “ Not working
SOCIAL (CARE) • Care leaver • Money (UC / PIP) • Housing • Adult social care		 Involved	 Yes Not receiving Homeless



Factor / slice of swiss cheese	☺	😐	☹
MEDICAL (Primary care) • Access • Relationship • Prescriptions • District nurses	Accessible Positive	Neutral	Inaccessible Hostile Problematic (? Capacity)
MEDICAL (Secondary Care, OP) • Nurses • Doctors • Dieticians, structured education • Psychologists	Yes applying	Yes not really applying	Disengaged Who's DAFNE?



Factor / slice of swiss cheese	☺	😐	☹
MEDICAL (secondary care, IP) • AE • IP / ITU	Care plan ↑	Relationship? pH	↓
MEDICAL (secondary care, MH) • CMHT • HTT • IP	Understand issues and risk and available when needed		



Case 1.

19 year old, non-white British, struggles with trust and affect regulation

Long standing diagnosis T1D, new to service

A1c 120

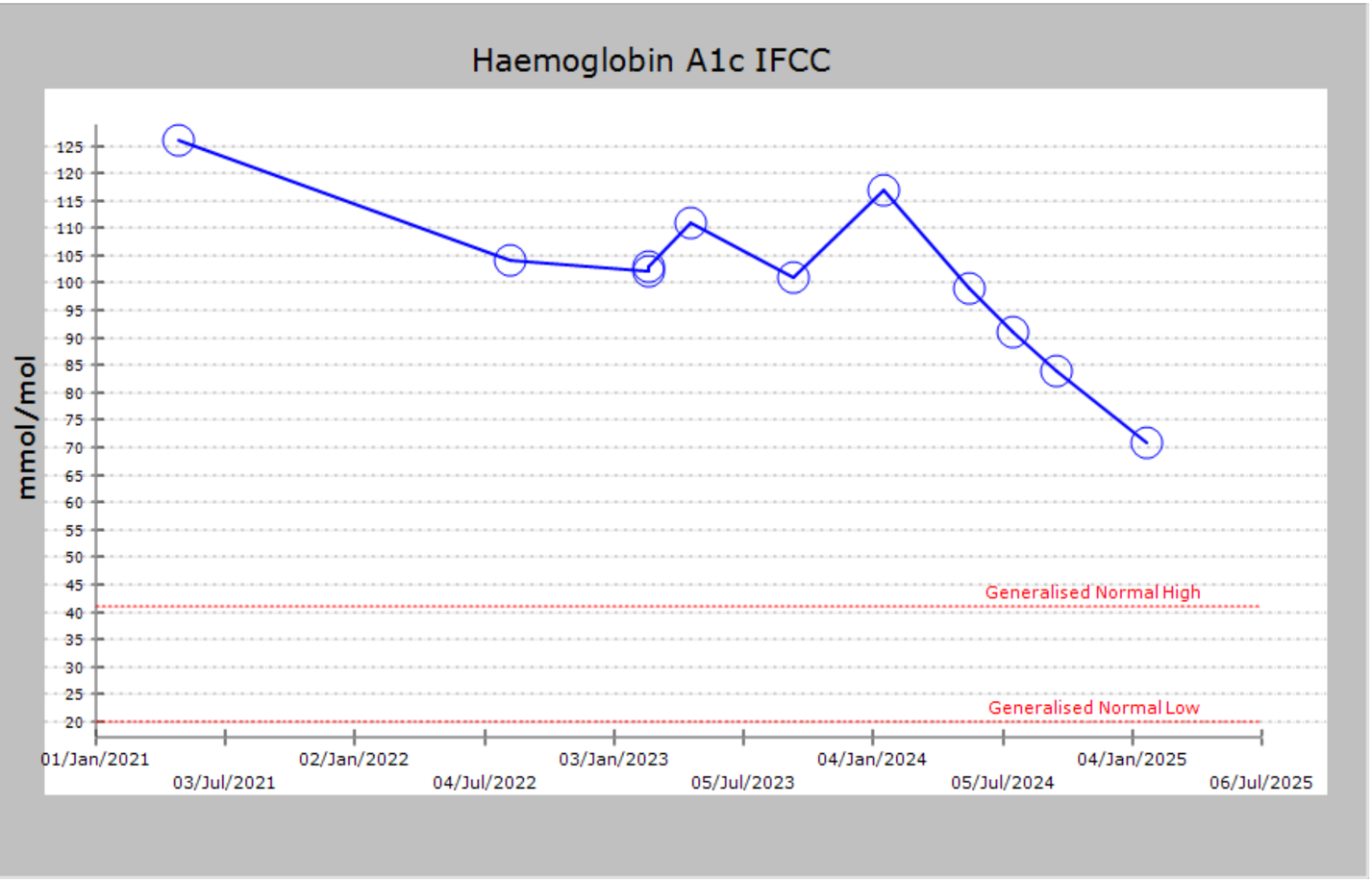
20+ DKA in approximately 24 months including 4 ITU admissions

Living with mum and brother

Didn’t finish secondary school

Recent DAFNE

What more would you like to know



Glucose – Time In Range

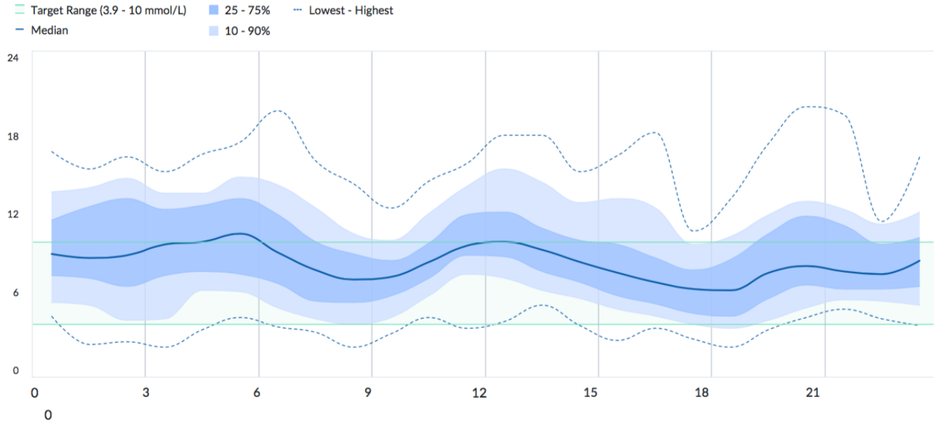
8%	**Very High**	> 13.9 mmol/L
24%	**High**	10.1-13.9 mmol/L
64%	**Target Range**	3.9-10 mmol/L
3%	**Low**	3-3.8 mmol/L
1%	**Very Low**	< 3 mmol/L

Summary

GMI
7.1% (54.3 mmol/mol)
Average
8.8 mmol/L
% Time CGM Active
96.6% (13.5 days)

SD	3.3 mmol/L
CV	36.8%
Median	8.4 mmol/L
Highest	20 mmol/L
Lowest	LO mmol/L

Ambulatory Glucose Profile (AGP)



Insulin - Device

From Insulin Pump

46% 24.8 units Basal/Day
54% 29.5 units Bolus/Day

Insulin/day	54.3 units
Overrides (%)	0% (0 boluses)
# Bolus/Day	6.1

System Details

Insulet Omnipod® 5 System (13d 17h)

Automated Mode	100% (13d 16h)
Automated: Limited	2% (5h)
Automated: Activity	10% (1d 10h)
Manual Mode	0% (1h)

Diet

Carbs/Day	254.9 g
Entries/Day	5.8

Activity

No activity data available

Comments

Case 2.

Lady in late 30s with autism diagnosis

T1D diagnosis for approx. 5 years

A1c 105

20 admissions over prior 12 months to another hospital, approximately half DKA, mild presentations and quickly improved

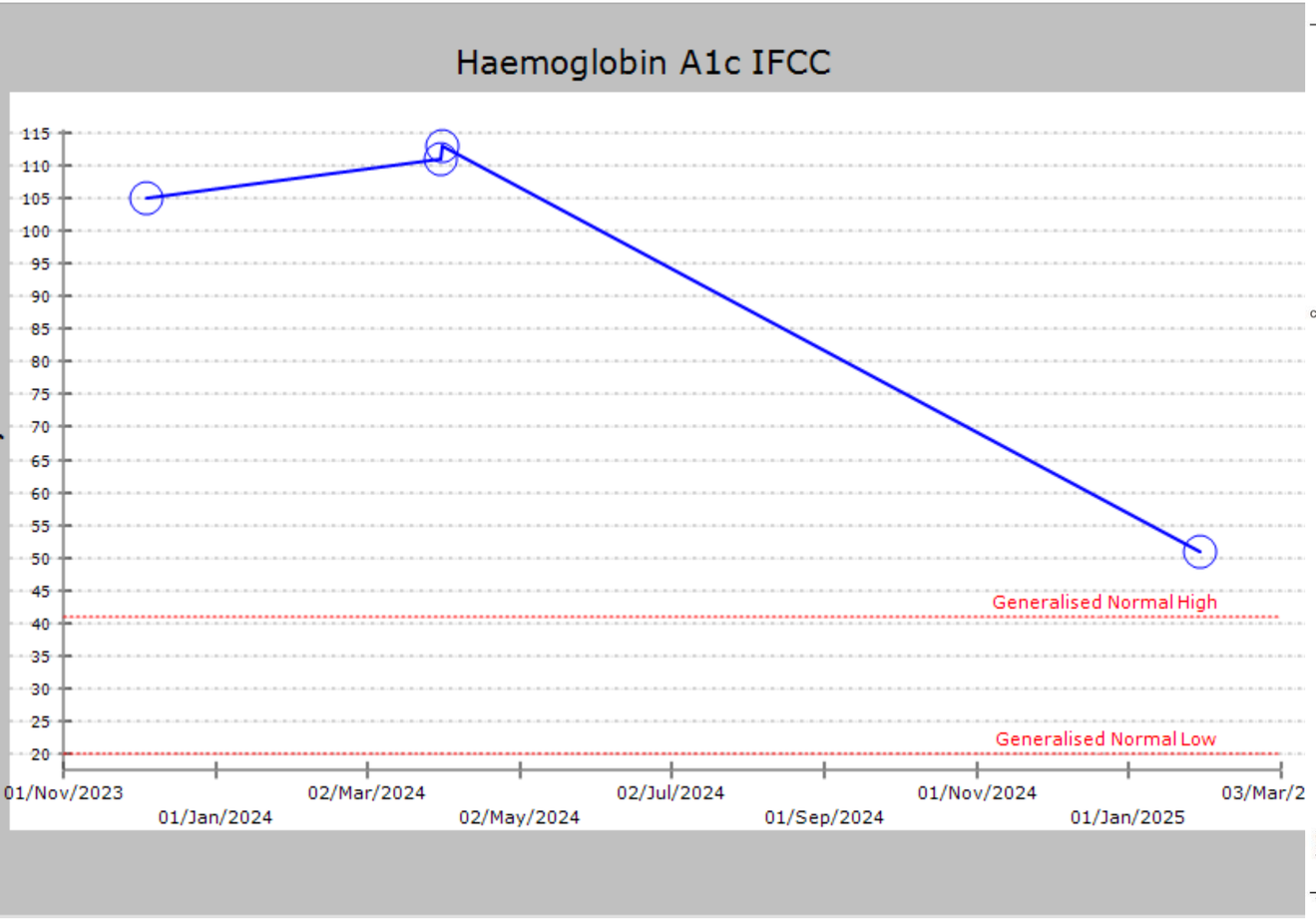
Living with mum and dad

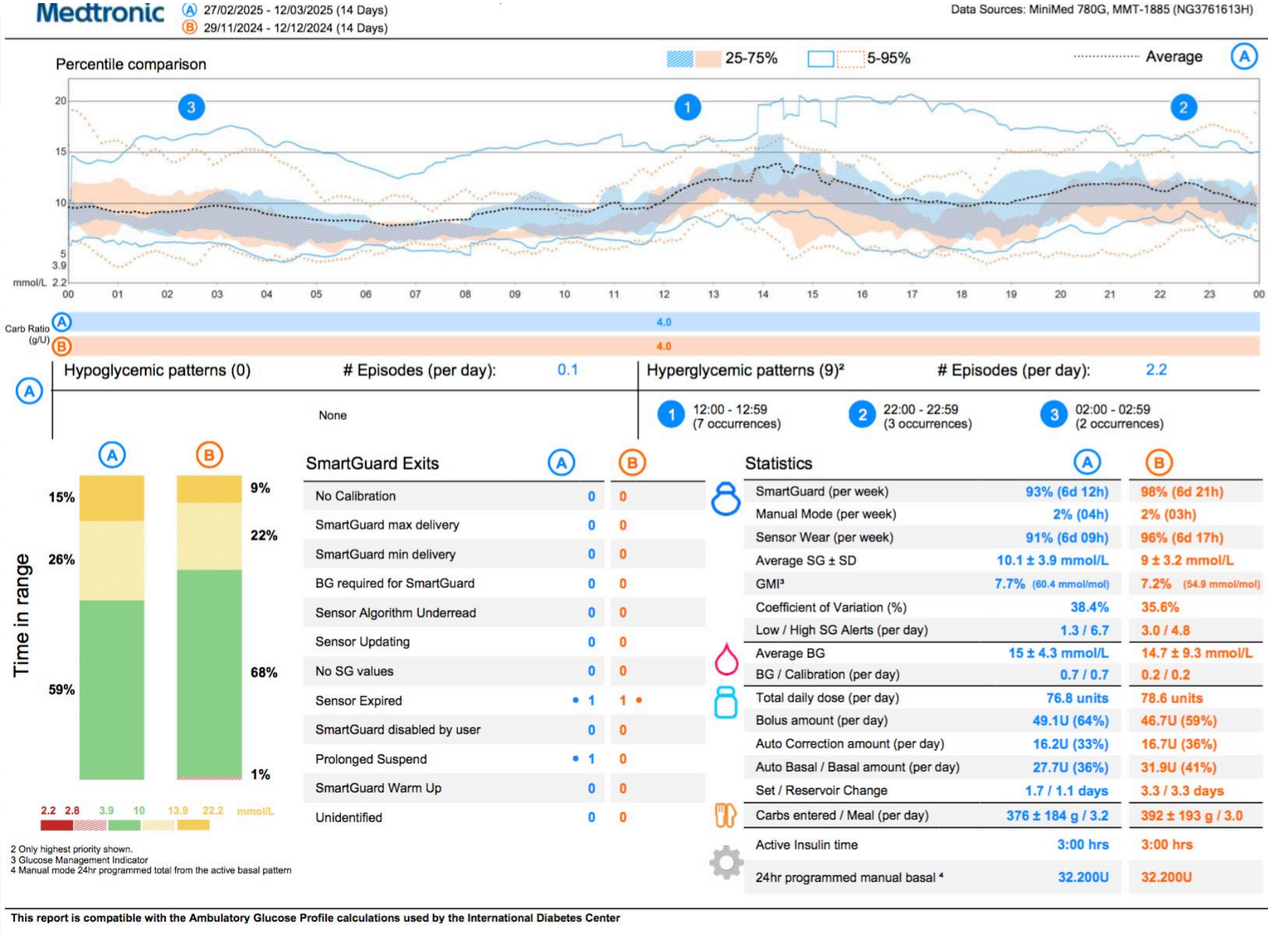
Completed secondary school, but limited GCSEs/qualifications

Limited carb counting

What more would you like to know

Case 2.


Haemoglobin A1c IFCC
115
110
105
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
Generalised Normal High
Generalised Normal Low
01/Nov/2023
01/Jan/2024
02/Mar/2024
02/May/2024
02/Jul/2024
01/Sep/2024
01/Nov/2024
01/Jan/2025
03/Mar/2


Medtronic
A 27/02/2025 - 12/03/2025 (14 Days)
B 29/11/2024 - 12/12/2024 (14 Days)
Data Sources: MiniMed 780G, MMT-1885 (NG3761613H)
Percentile comparison
25-75%
5-95%
Average
mmol/L
Carb Ratio (g/U)
Hypoglycemic patterns (0)
Episodes (per day): 0.1
None
Hyperglycemic patterns (9)²
Episodes (per day): 2.2
1 12:00 - 12:59 (7 occurrences)
2 22:00 - 22:59 (3 occurrences)
3 02:00 - 02:59 (2 occurrences)
Time in range
15%
26%
59%
9%
22%
68%
1%
2.2 2.8 3.9 10 13.9 22.2 mmol/L
SmartGuard Exits
No Calibration
SmartGuard max delivery
SmartGuard min delivery
BG required for SmartGuard
Sensor Algorithm Underread
Sensor Updating
No SG values
Sensor Expired
SmartGuard disabled by user
Prolonged Suspend
SmartGuard Warm Up
Unidentified
Statistics
SmartGuard (per week) 93% (6d 12h) 98% (6d 21h)
Manual Mode (per week) 2% (04h) 2% (03h)
Sensor Wear (per week) 91% (6d 09h) 96% (6d 17h)
Average SG ± SD 10.1 ± 3.9 mmol/L 9 ± 3.2 mmol/L
GMI³ 7.7% (60.4 mmol/mol) 7.2% (54.9 mmol/mol)
Coefficient of Variation (%) 38.4% 35.6%
Low / High SG Alerts (per day) 1.3 / 6.7 3.0 / 4.8
Average BG 15 ± 4.3 mmol/L 14.7 ± 9.3 mmol/L
BG / Calibration (per day) 0.7 / 0.7 0.2 / 0.2
Total daily dose (per day) 76.8 units 78.6 units
Bolus amount (per day) 49.1U (64%) 46.7U (59%)
Auto Correction amount (per day) 16.2U (33%) 16.7U (36%)
Auto Basal / Basal amount (per day) 27.7U (36%) 31.9U (41%)
Set / Reservoir Change 1.7 / 1.1 days 3.3 / 3.3 days
Carbs entered / Meal (per day) 376 ± 184 g / 3.2 392 ± 193 g / 3.0
Active Insulin time 3:00 hrs 3:00 hrs
24hr programmed manual basal ⁴ 32.200U 32.200U
2 Only highest priority shown.
3 Glucose Management Indicator
4 Manual mode 24hr programmed total from the active basal pattern
This report is compatible with the Ambulatory Glucose Profile calculations used by the International Diabetes Center

Case 3.

Lady in mid 40s no prior mental health diagnosis

Diagnosis 10 years

A1c 60

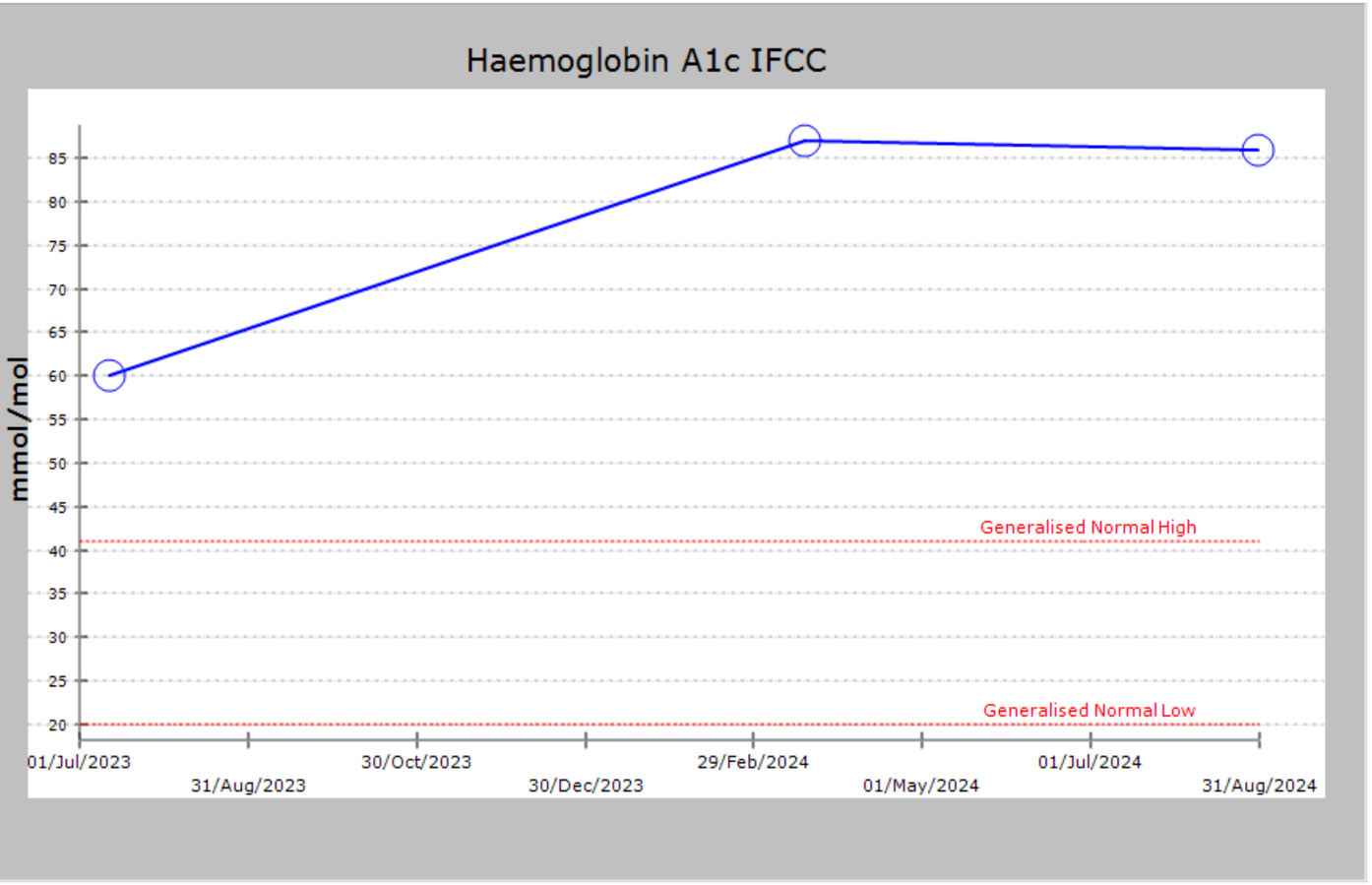
No admissions

Living alone for last 6 months

University degree, department lead in large company

DAFNE equivalent near to diagnosis

Case 3.



Today: 12 March 2025

Glucose – Time In Range

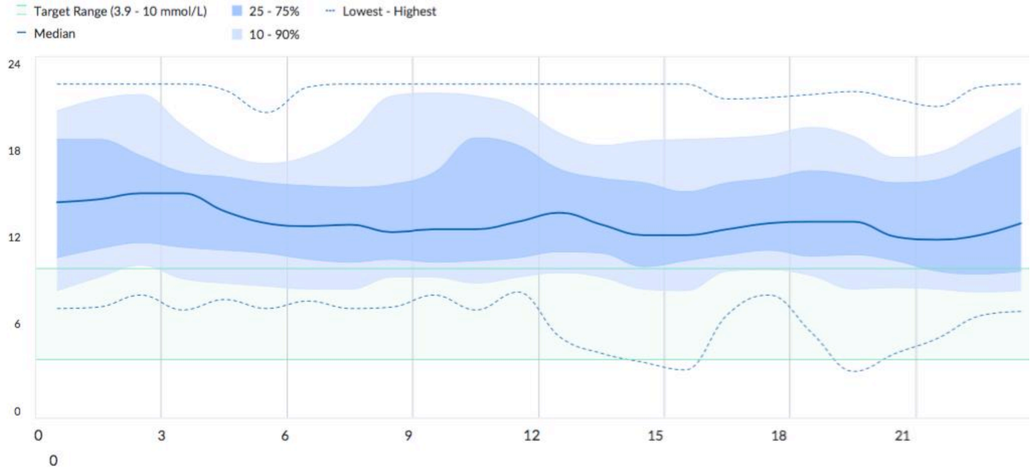
42%	**Very High** > 13.9 mmol/L
40%	**High** 10.1-13.9 mmol/L
18%	**Target Range** 3.9-10 mmol/L
0%	**Low** 3-3.8 mmol/L
0%	**Very Low** < 3 mmol/L

Summary

GMI
9.2% (76.9 mmol/mol)
Average
13.6 mmol/L
% Time CGM Active
93.6% (13.1 days)

SD	**4** mmol/L
CV	**29.1%**
Median	**12.9** mmol/L
Highest	**HI** mmol/L
Lowest	**3.1** mmol/L

Ambulatory Glucose Profile (AGP)



Insulin - Device

From Insulin Pump

68% 13.8 units Basal/Day
32% 6.5 units Bolus/Day

Insulin/day	**20.3** units
Overrides (%)	**3% (1 boluses)**
# Bolus/Day	**2.4**

System Details

Insulet Omnipod® 5 System (12d 10h)

Automated Mode	43% (5d 8h)
Automated: Limited	3% (10h)
Automated: Activity	1% (3h)
Manual Mode	57% (7d 2h)

Diet

Carbs/Day	**41.4** g
Entries/Day	**1.8**

Activity

No activity data available

Comments

Case 4.

Lady in mid-twenties

T1D for 10 years

A1c 80

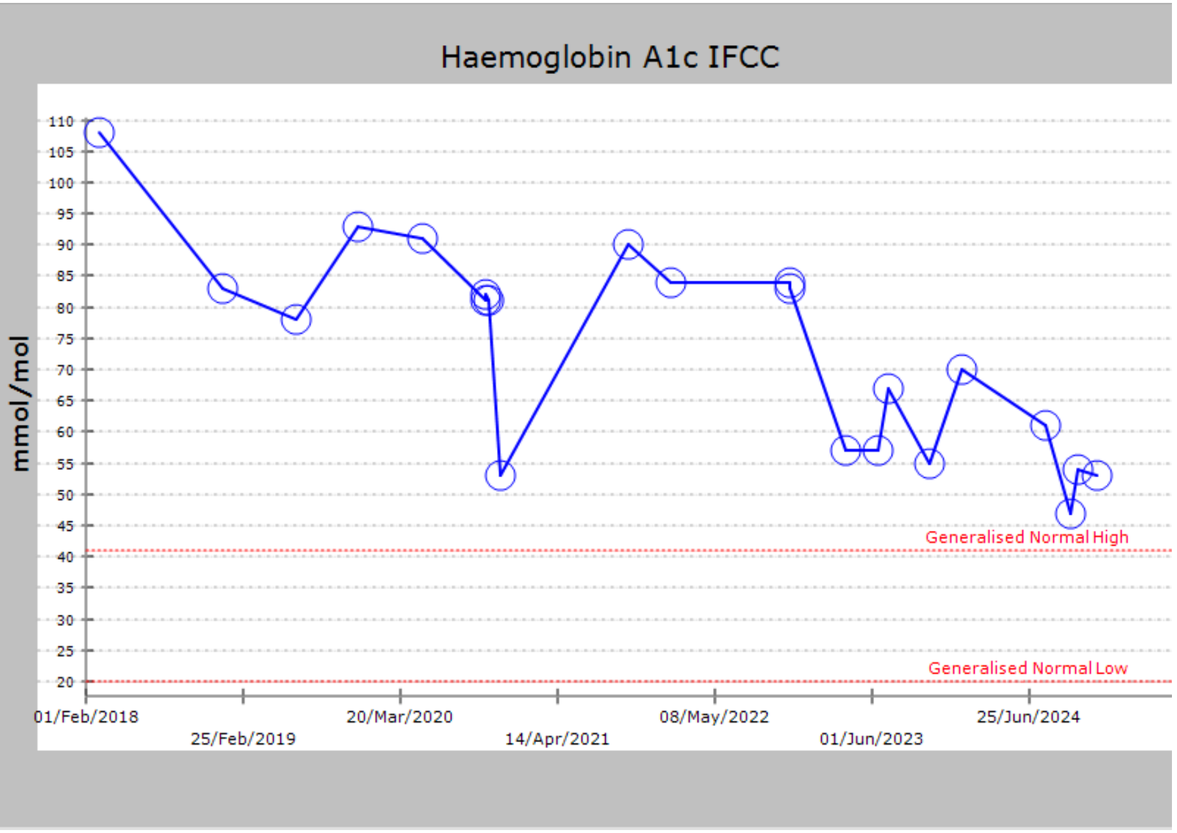
Recurrent sickness admissions for 8 months, no DKA

Living alone in temporary accommodation

EGFR 30-40

What more would you like to know

Case 4.



Medtronic

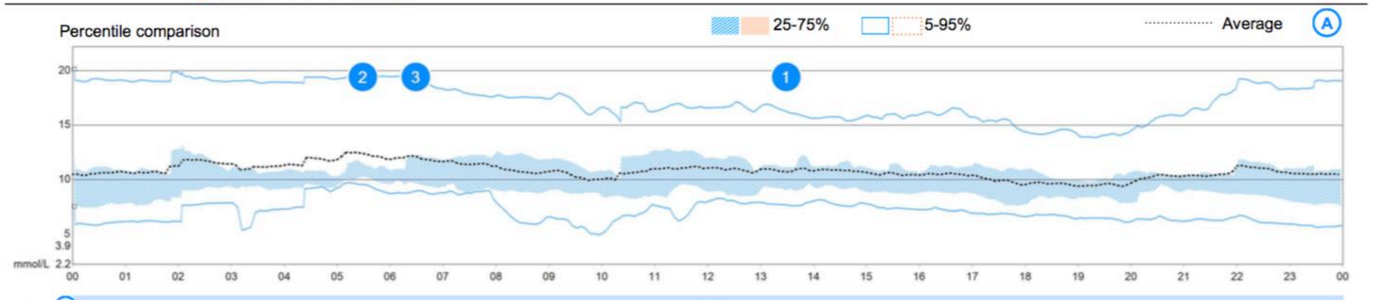
A 18/12/2024 - 31/12/2024 (14 Days)
B 19/09/2024 - 02/10/2024 (14 Days)

PID: Newham N7494785

Data Sources: MiniMed 780G, MMT-1885 (NG3313407H)

Percentile comparison

25-75% 5-95% Average



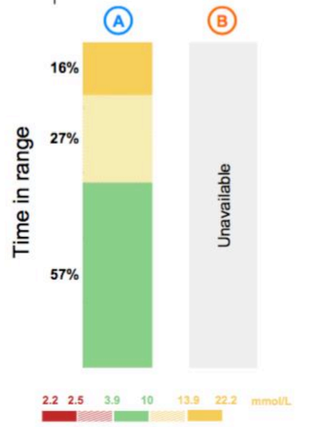
Carb Ratio (g/U) A 20.0 B 20.0

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

None

Hyperglycemic patterns (6)² # Episodes (per day): 1.5

1 13:00 - 13:59 (3 occurrences)
2 05:00 - 05:59 (2 occurrences)
3 06:00 - 06:59 (2 occurrences)

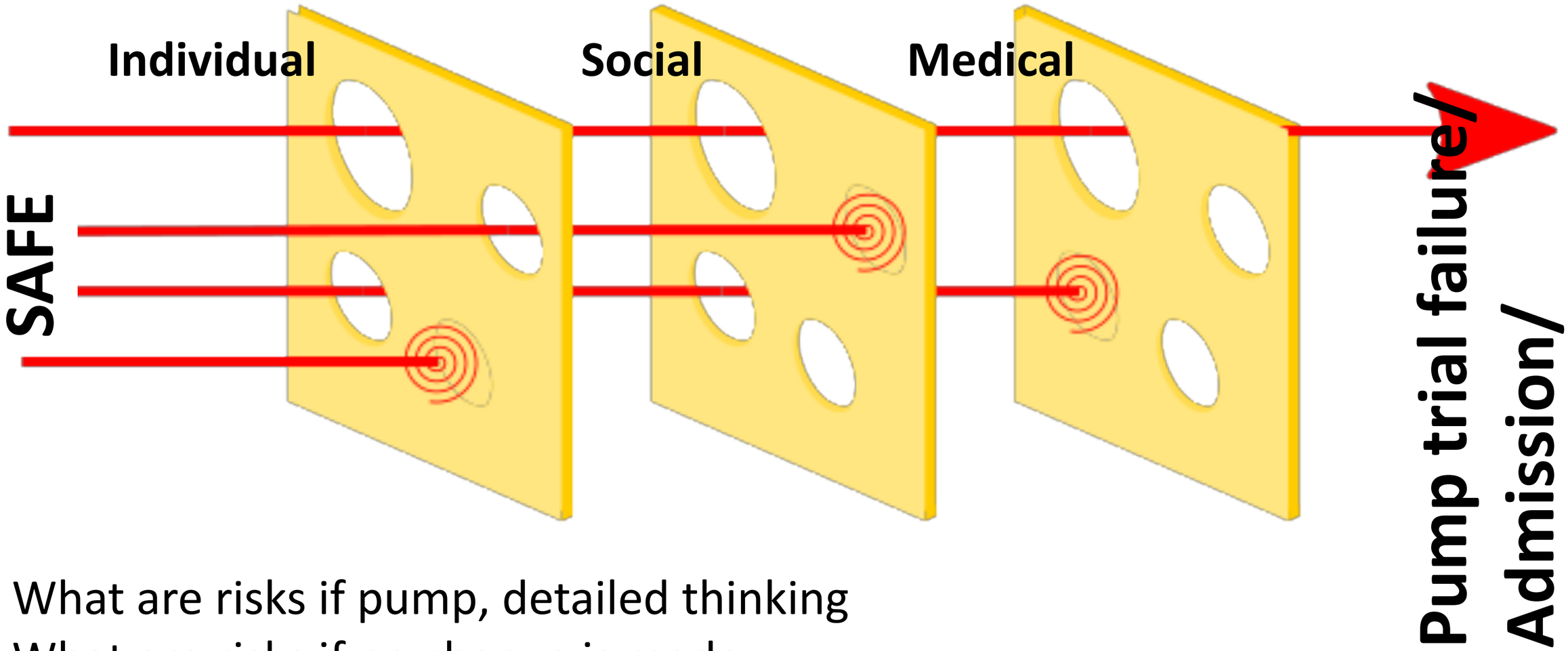


SmartGuard Exits	A	B
No Calibration	0	0
SmartGuard max delivery	0	0
SmartGuard min delivery	0	0
BG required for SmartGuard	0	0
Sensor Algorithm Underread	0	0
Sensor Updating	0	0
No SG values	0	0
Sensor Expired	0	0
SmartGuard disabled by user	4	0
Prolonged Suspend	1	1
SmartGuard Warm Up	0	0
Unidentified	0	0

Statistics	A	B
SmartGuard (per week)	46% (3d 05h)	0% (00h)
Manual Mode (per week)	47% (3d 08h)	100% (7d 00h)
Sensor Wear (per week)	53% (3d 18h)	0% (00h)
Average SG ± SD	10.8 ± 4 mmol/L	--
GMI³	--	--
Coefficient of Variation (%)	37.1%	--
Low / High SG Alerts (per day)	0.5 / 3.0	0.0 / 0.0
Average BG	15.2 ± 4.6 mmol/L	--
BG / Calibration (per day)	1.9 / 1.6	--
Total daily dose (per day)	16.4 units	--
Bolus amount (per day)	7.4U (45%)	--
Auto Correction amount (per day)	3.3U (45%)	--
Auto Basal / Basal amount (per day)	9.0U (55%)	--
Set / Reservoir Change	-- / --	-- / --
Carbs entered / Meal (per day)	25 ± 45 g / 0.8	-- / --
Active Insulin time	2:30 hrs	2:30 hrs
24hr programmed manual basal ⁴	8.400U	8.400U

2 Only highest priority shown.
3 Glucose Management Indicator
4 Manual mode 24hr programmed total from the active basal pattern

This report is compatible with the Ambulatory Glucose Profile calculations used by the International Diabetes Center



What are risks if pump, detailed thinking
What are risks if no change is made
Who is around the person
What is actually going on for person

Thank you