

Using CGM in routine care...

Gothenburg experience

Peter Adolfsson MD PhD

The hospital of Halland, Kungsbacka, Sweden

peter.adolfsson@regionhalland.se

Disclosures

Research: Recent research where equipment has been provided by Medtronic, Nordic InfuCare/Dexcom, HemoCue, Novo Nordisk and Menarini

Advisory board: Abbot, Eli Lilly, Sanofi and Roche

One of the founders and board member: Diasend

Creator of CGM 1 – 2 – 3 + HCP; A guide for effective startup, feedback and optimization of CGM

CGM or pump – first choice?



CGM and CSII / Switch study

CGM + CSII

RCT, multicenter study / Children and adults (n=153)

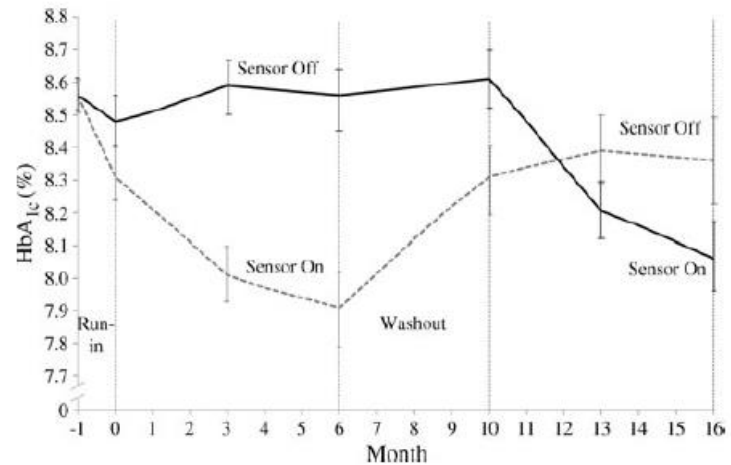
HbA1c 7.5-9.5% (58.5-80.3 mmol/mol)

Table 1 Baseline characteristics of study participants

Characteristic	Sequence OFF/ON			Sequence ON/OFF		
	All participants	Adults	Children	All participants	Adults	Children
Sample size, <i>n</i>	76	41	35	77	40	37
Mean age (years)	28±17	42±11	12±3.2	28±16	42±10	12±3.6
Male sex, <i>n</i> (%)	37 (49)	20 (49)	17 (49)	42 (54)	18 (45)	24 (65)
Mean weight (kg)	66±21	79±13	52±20	65±23	77±15	53±23
Mean height (cm)	166±17	174±8.8	156±18	165±18	174±10	156±20
BMI (kg/m ²)	24±4.5	26±3.2	20±4.0	23±5.0	25±3.3	21±5.4
HbA _{1c} (%)	8.5±0.6	8.4±0.6	8.5±0.6	8.3±0.7	8.1±0.5	8.6±0.7
HbA _{1c} (mmol/mol)	69.4±6.5	68.3±6.5	69.4±6.5	67.2±7.6	65.0±5.5	70.5±7.6
Time since diagnosis of diabetes (years)	14±10	21±8.9	6.3±3.1	16±12	24±11	7.4±4.1
Time since start of CSII (years)	5.1±4.1	6.4±4.8	3.5±2.2	5.0±4.2	6.3±5.3	3.5±1.7

CGM and CSII / Switch study

HbA1c was reduced:
0,43% (- 4,74 mmol/mol),
 $p < 0,001$



Less time spent below
target, $< 3,9$ mmol/L:
19 vs. 31 min/dag,
 $p = 0,009$



Technology provides opportunities

Number of boluses:

$6,8 \pm 2,5$ vs. $5,8 \pm 1,9$ / day,
 $p < 0,0001$

Use of temporary basal rate:

$0,75 \pm 1,1$ vs. $0,26 \pm 0,47$ / day,
 $p < 0,001$

Suspension of the CSII:

$0,91 \pm 1,25$ vs. $0,70 \pm 0,75$ / day
 $p < 0,018$

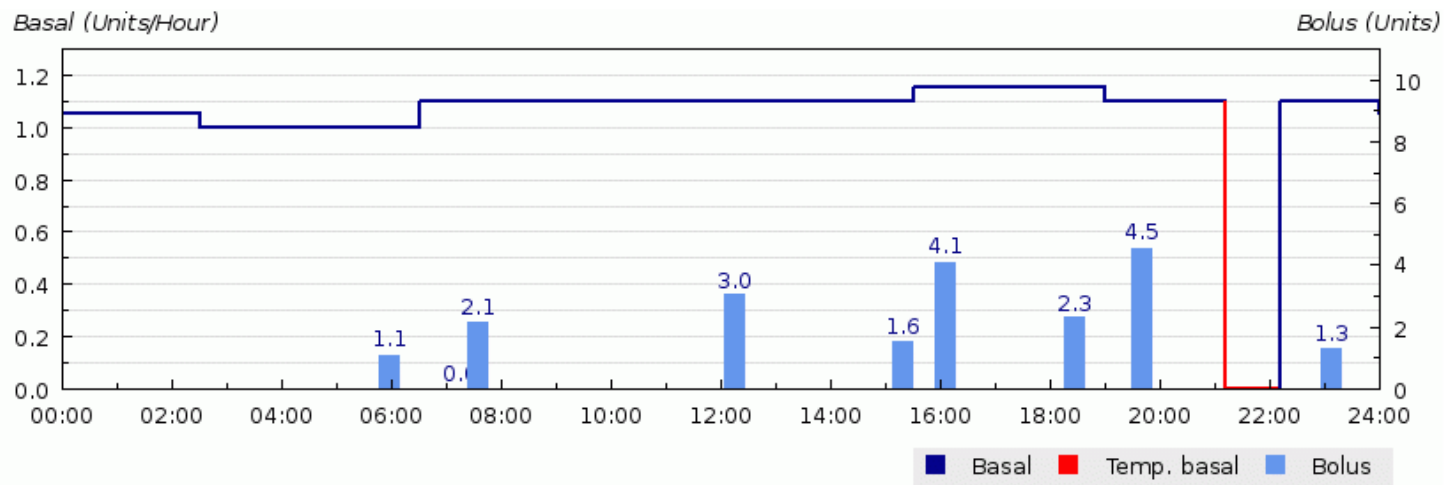
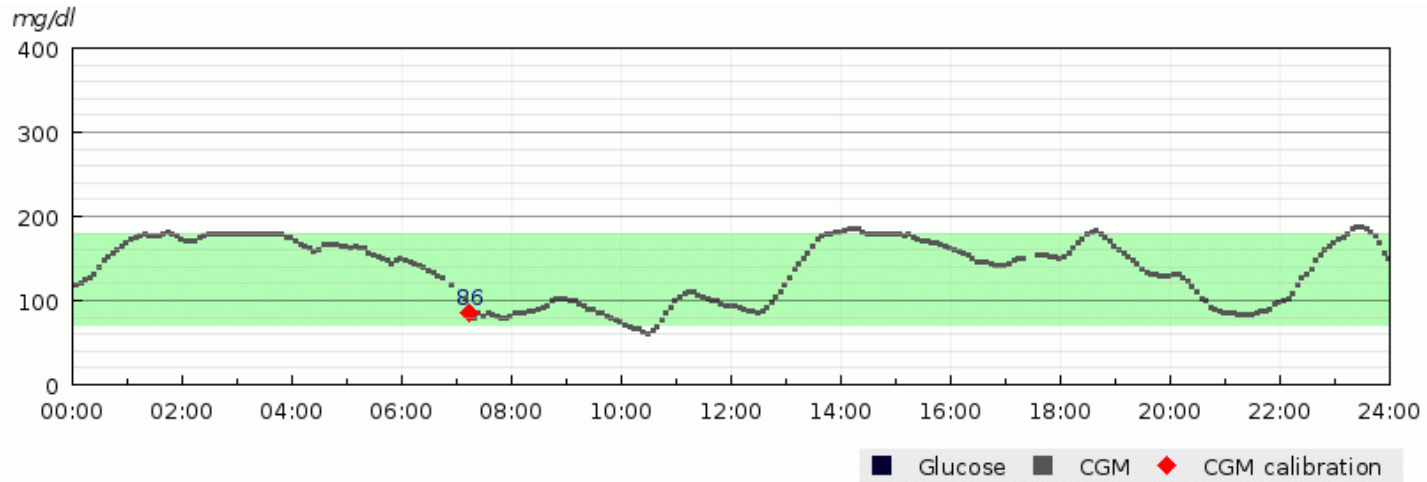


Active use of CSII and CGM!

Using the technique correctly
requires training and
motivation!

Adding CGM to the picture

Friday 3/18



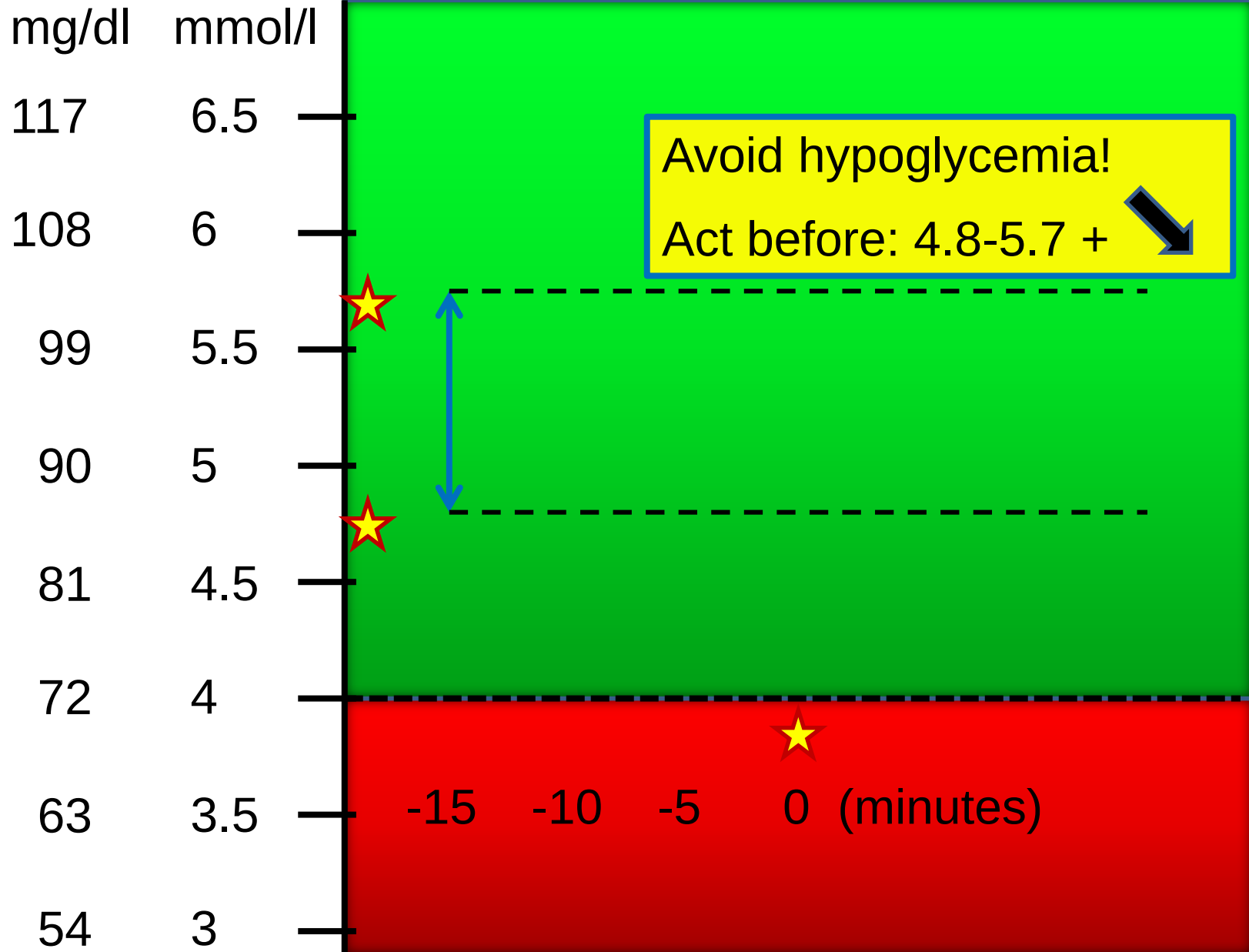
Education – Technique - Teamwork



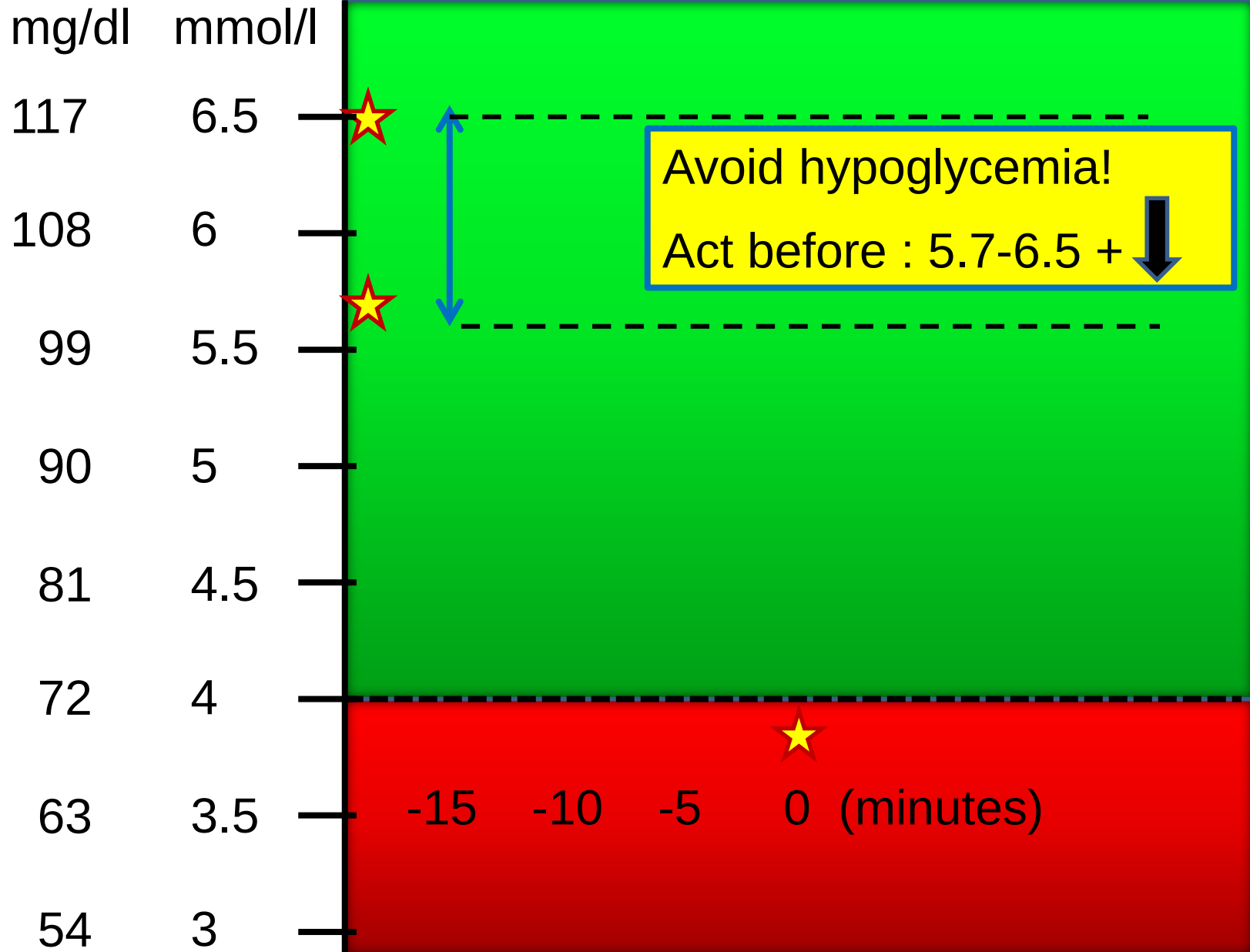
Diabetesteam

Avoiding hypoglycemia

Response in time!



Response in time!



Response in time!

mg/dl mmol/l

117 6.5

108 6

99 5.5

90 5

81 4.5

72 4

63 3.5

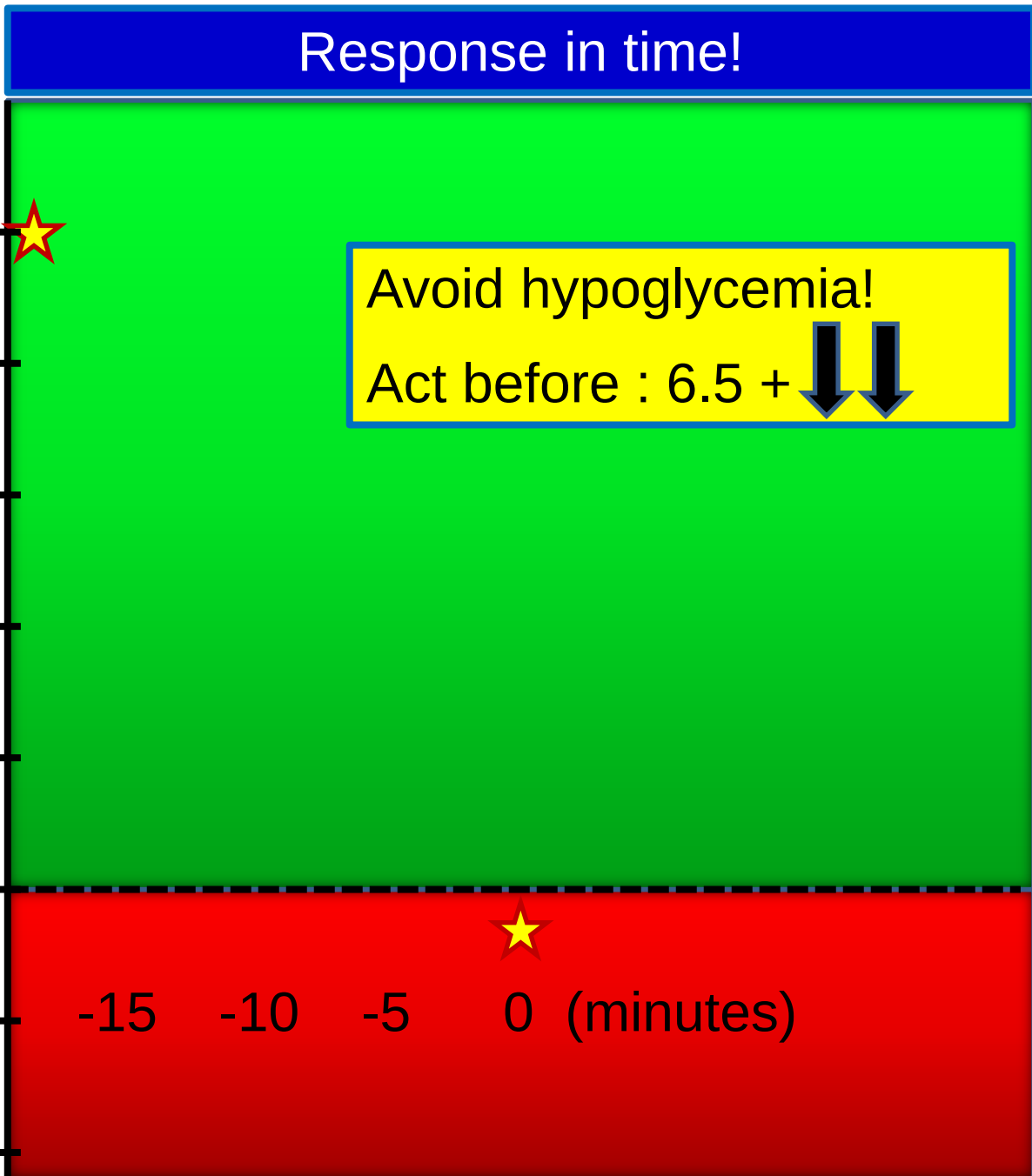
54 3

Avoid hypoglycemia!

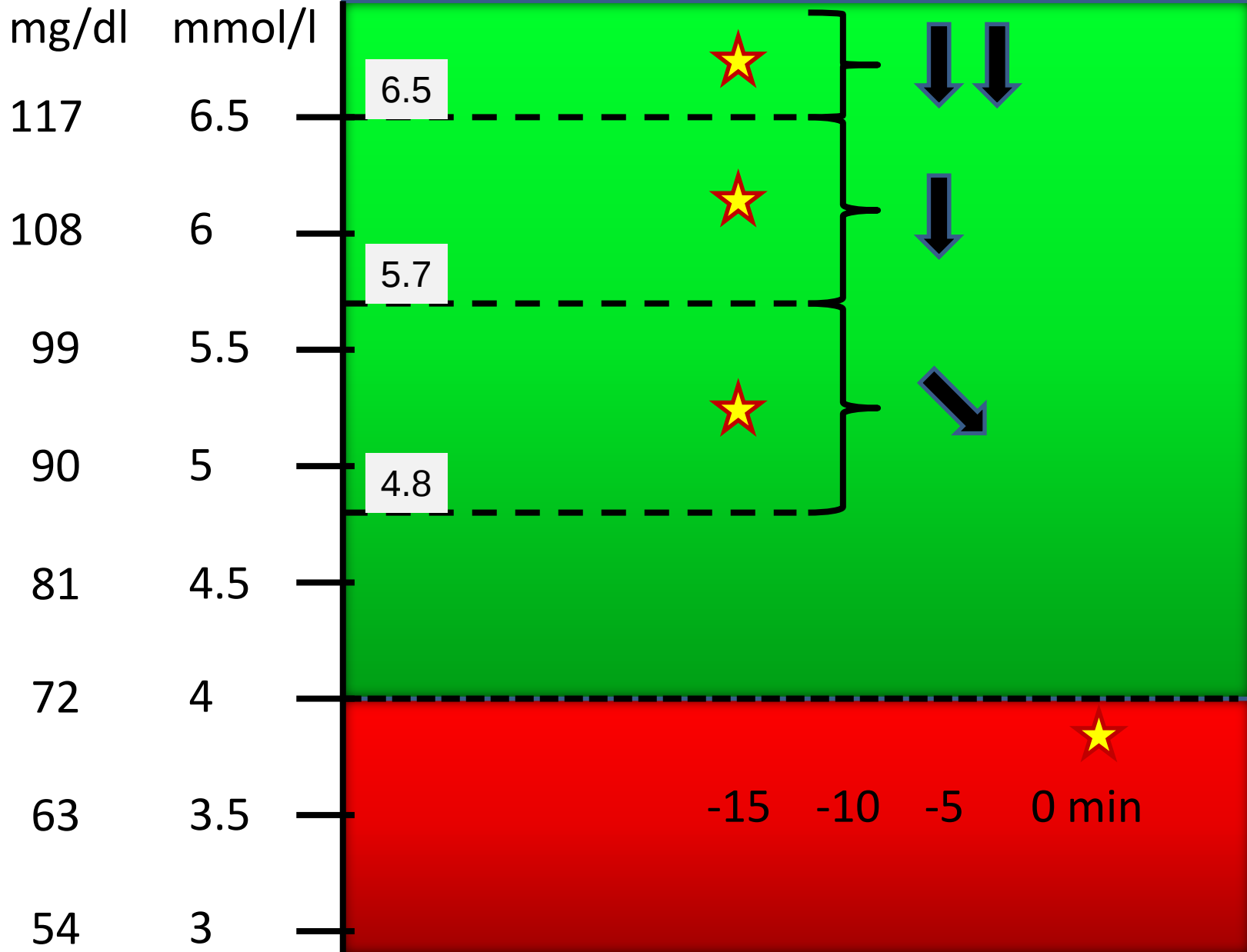
Act before : 6.5 +



-15 -10 -5 0 (minutes)



Being able to get a warning!



Avoid hypoglycemia!

Product	Interval	Trend arrow	Interval	Trend arrow	Interval	Trend arrow
Dexcom	> 6.5		5.7 – 6.5		4.8 – 5.7	
Freestyle Navigator or Libre			> 5.7		4.8 – 5.7	
Medtronic	> 6.5		> 5.7		4.8 – 5.7	

Adjustments of the dose

Being able to adjust!

mg/dl

mmol/l

180

10

162

9

144

8

126

7

108

6

90

5

72

4

54

3



Do you use the same
dose at these
occassions?

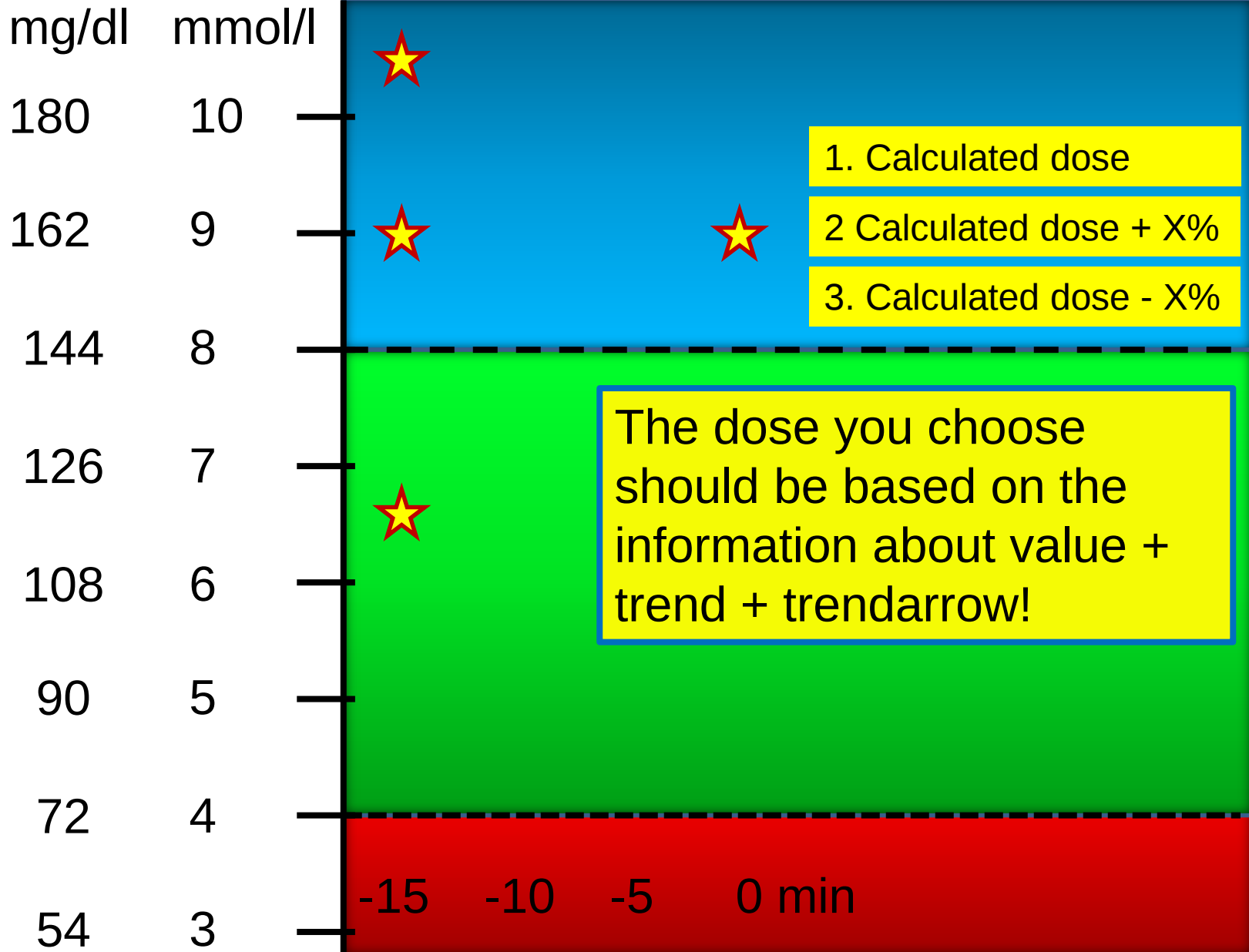
-15

-10

-5

0 min

Being able to adjust!



Is accuracy of importance?

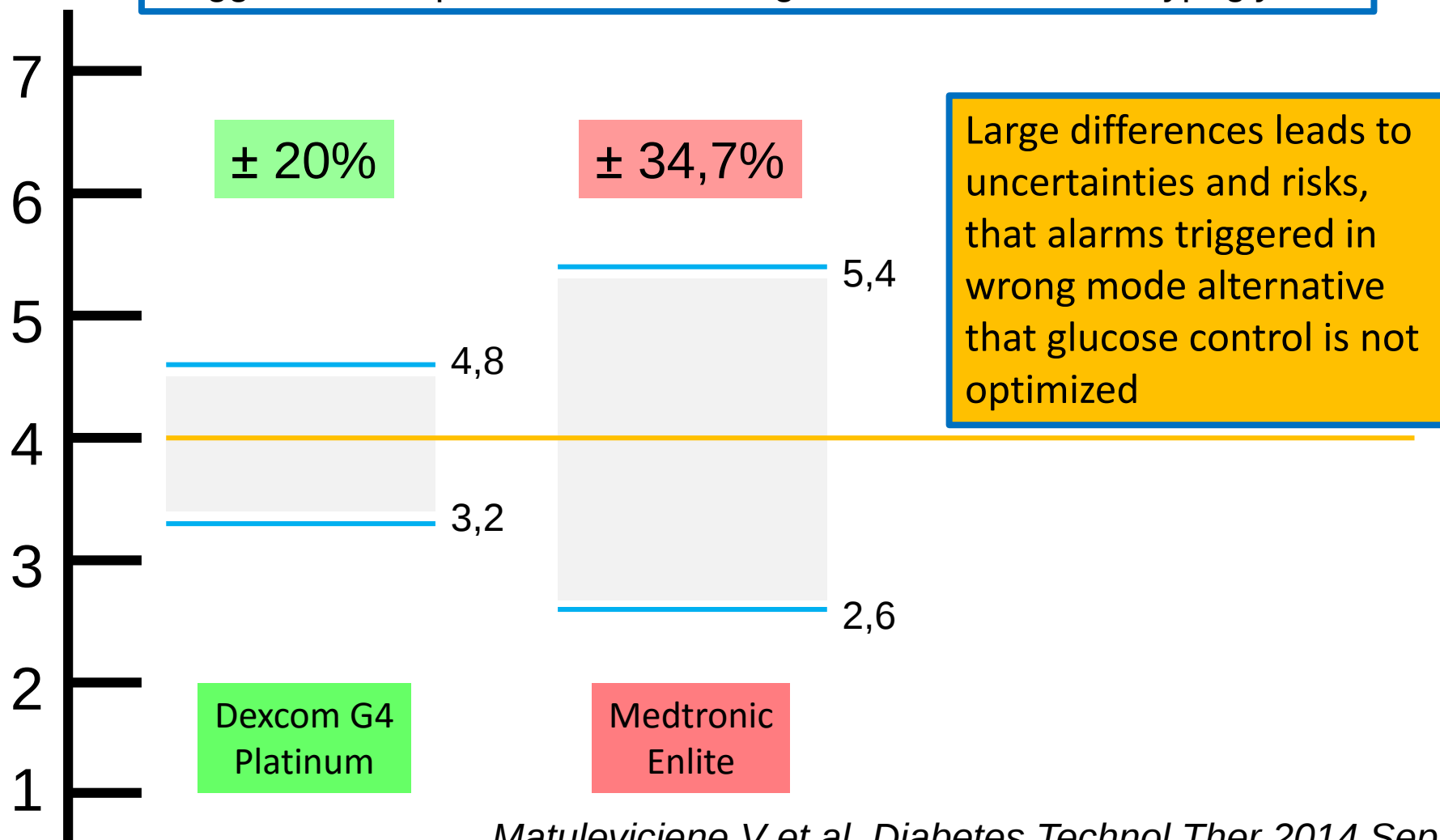
Differences CGM-systems

System	MARD % overall	MARD % day 1-3 and 4-6	MARD % hypo range
Dexcom G4 Platinum CRC	13,9	15,0 and 13,6	20,0
Enlite CRC	17,8	19,4 and 15,9	34,7

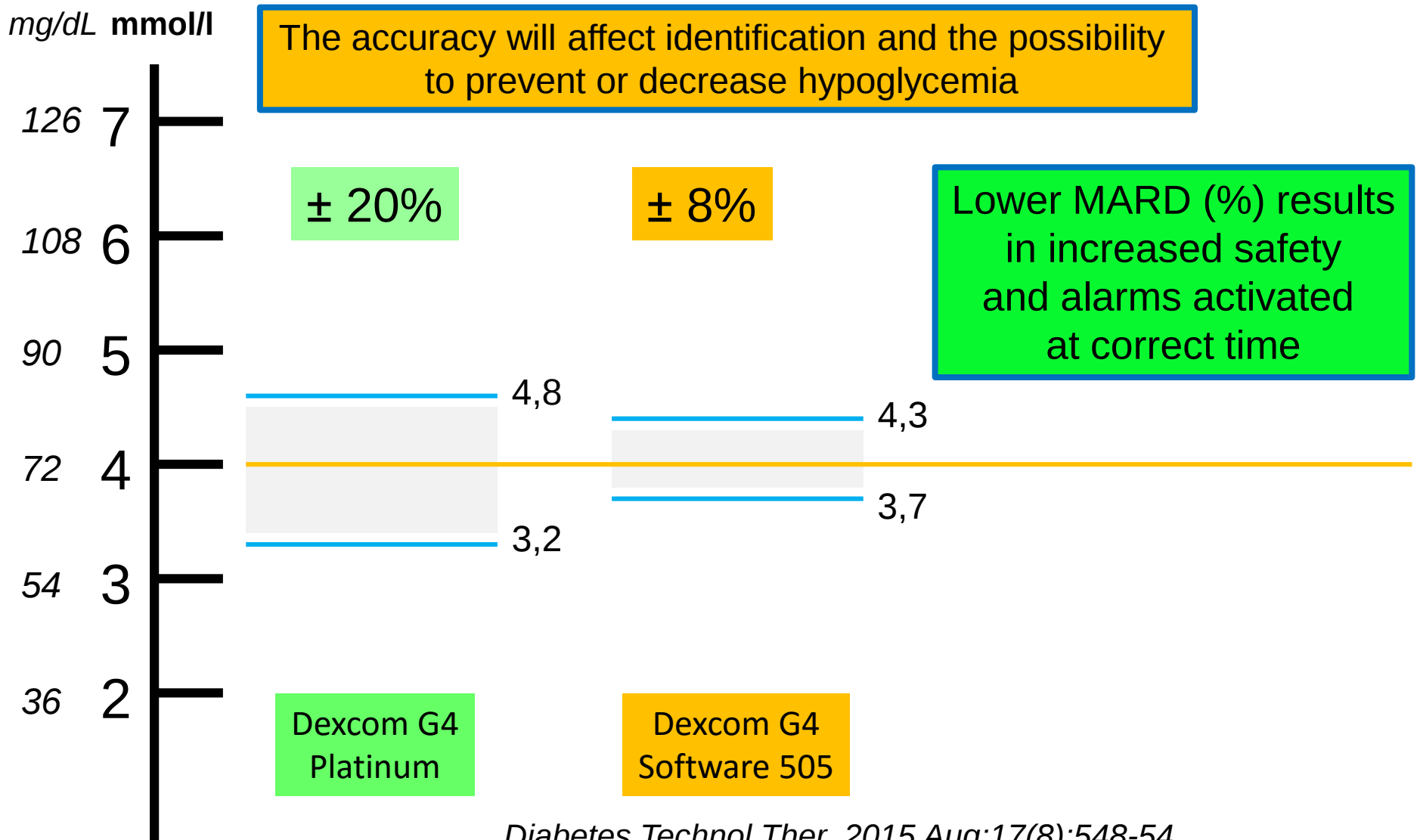
Patients rated the Dexcom G4 more favorably than the Enlite in 12 out of the 13 user experience questions

Worth thinking about(4 mmol/l)

Noggrannheten påverkar identifiering och undvikande av hypoglykemi



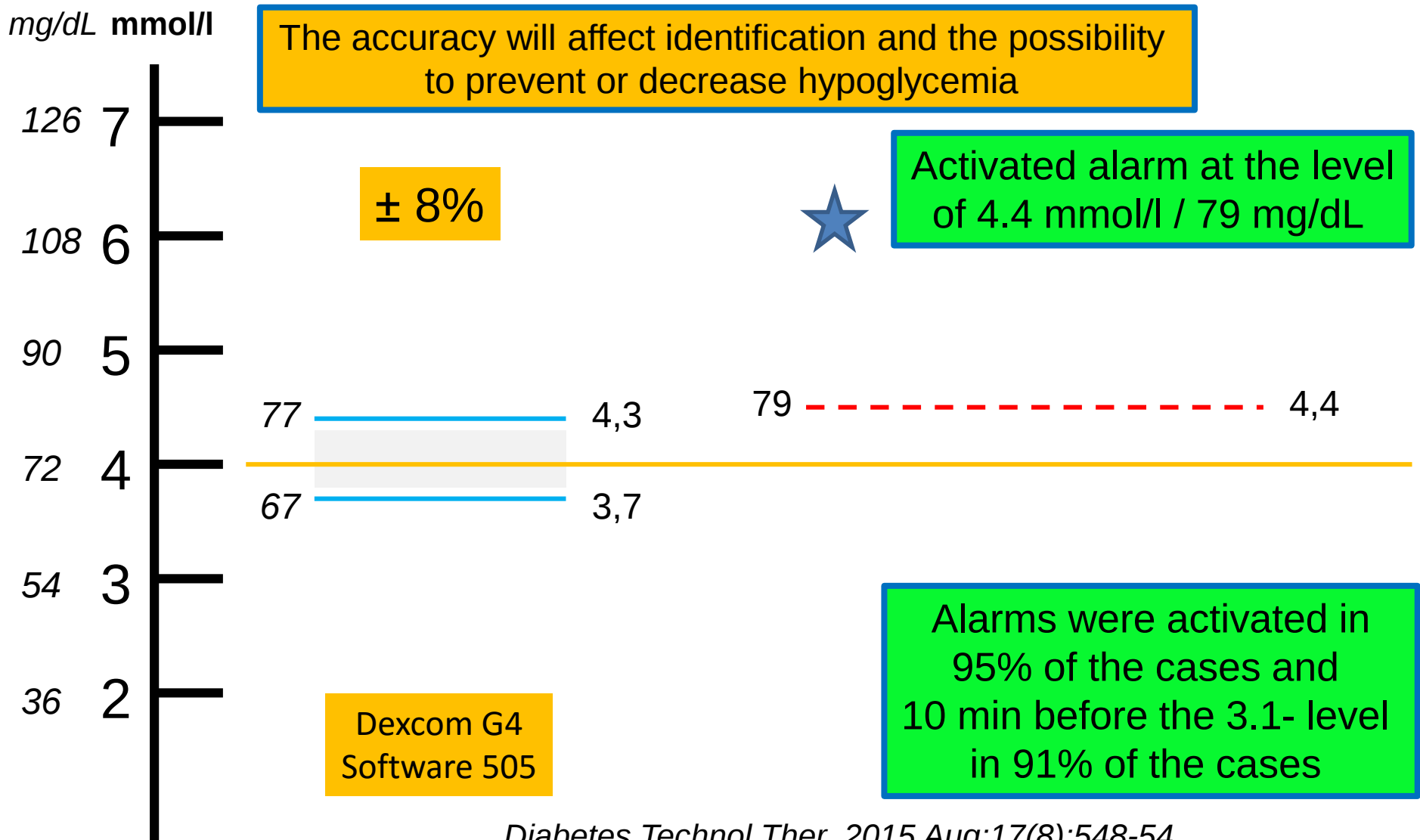
MARD at 4 mmol/l / 72 mg/dL



Diabetes Technol Ther. 2015 Aug;17(8):548-54.

Peyser TA, Nakamura K, Price D, Bohnett LC, Hirsch IB, Balo A.

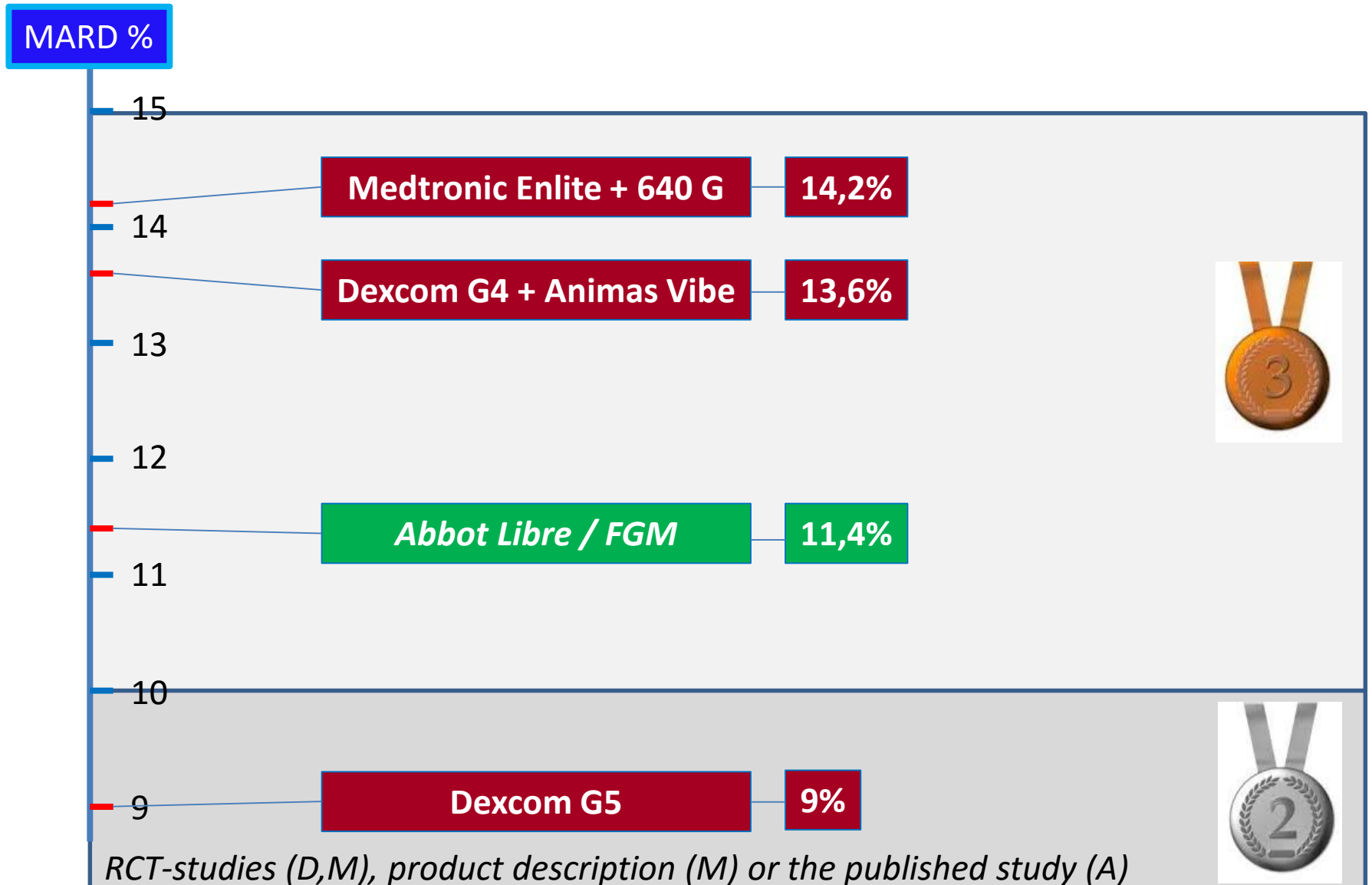
MARD at 4 mmol/l / 72 mg/dL



Diabetes Technol Ther. 2015 Aug;17(8):548-54.

Peyser TA, Nakamura K, Price D, Bohnett LC, Hirsch IB, Balo A.

"Present" sensor accuracy



Performance - other aspects

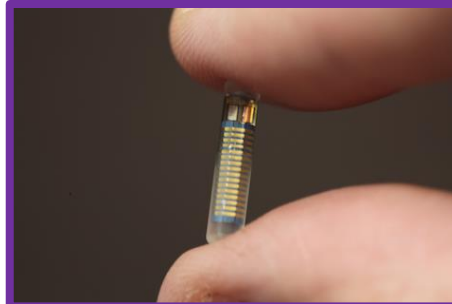
Time in function... 5 – 6 – 7 days?

14 days with FGM
based on CGM
technology



- * Easy to start and understand
- * No alarms
- * No CGM realtime!

Or 90 days...



- * Implanted subcutaneously on the upper arm

Education and training

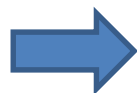
Education and strategy!

DEXCOM | G4[®]
PLATINUM

DEXCOM | G4[®]
PLATINUM

DEXCOM | G4[®]
PLATINUM

CGM 1
Start



CGM 2
Active use

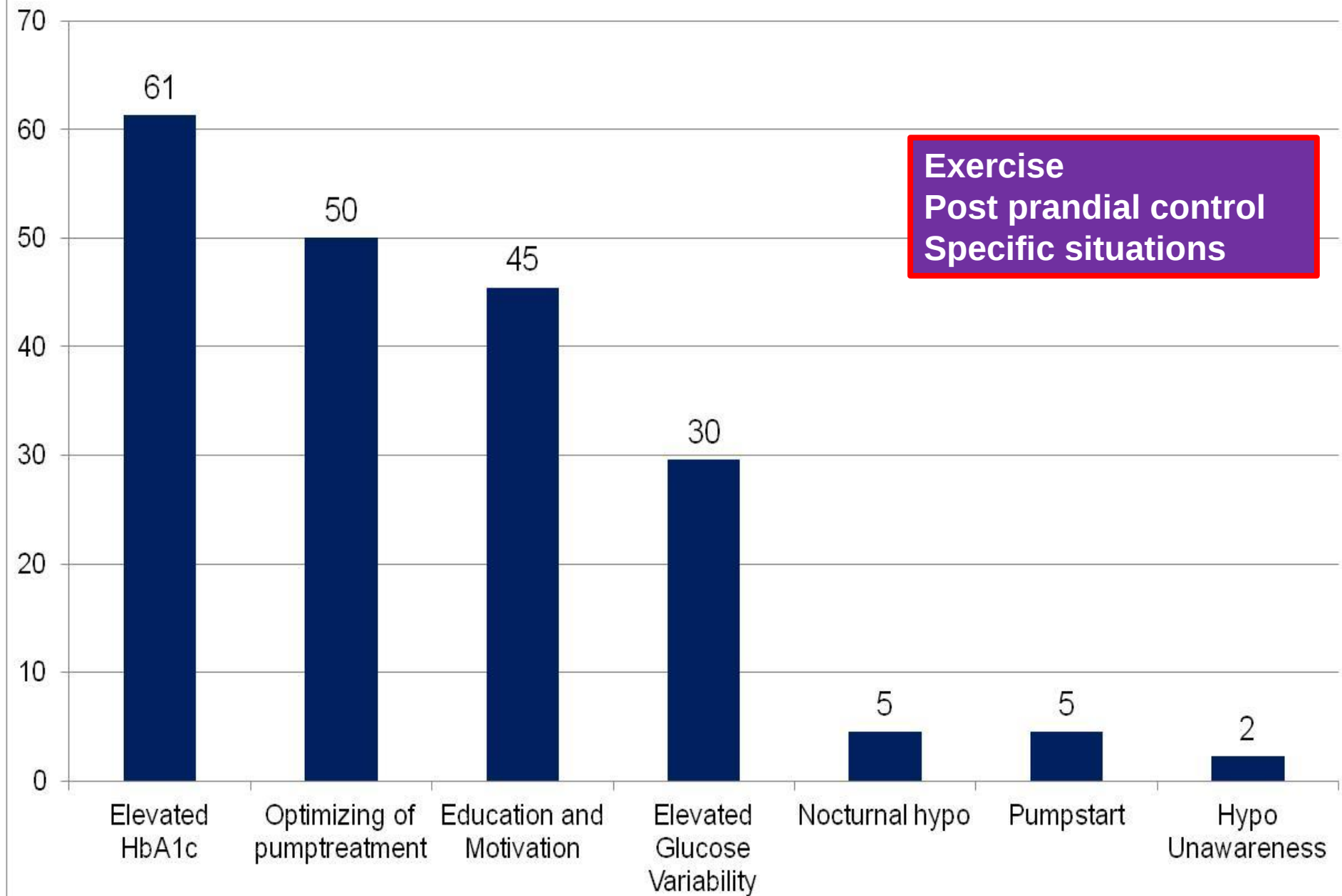


CGM 3
Optimizing
effect



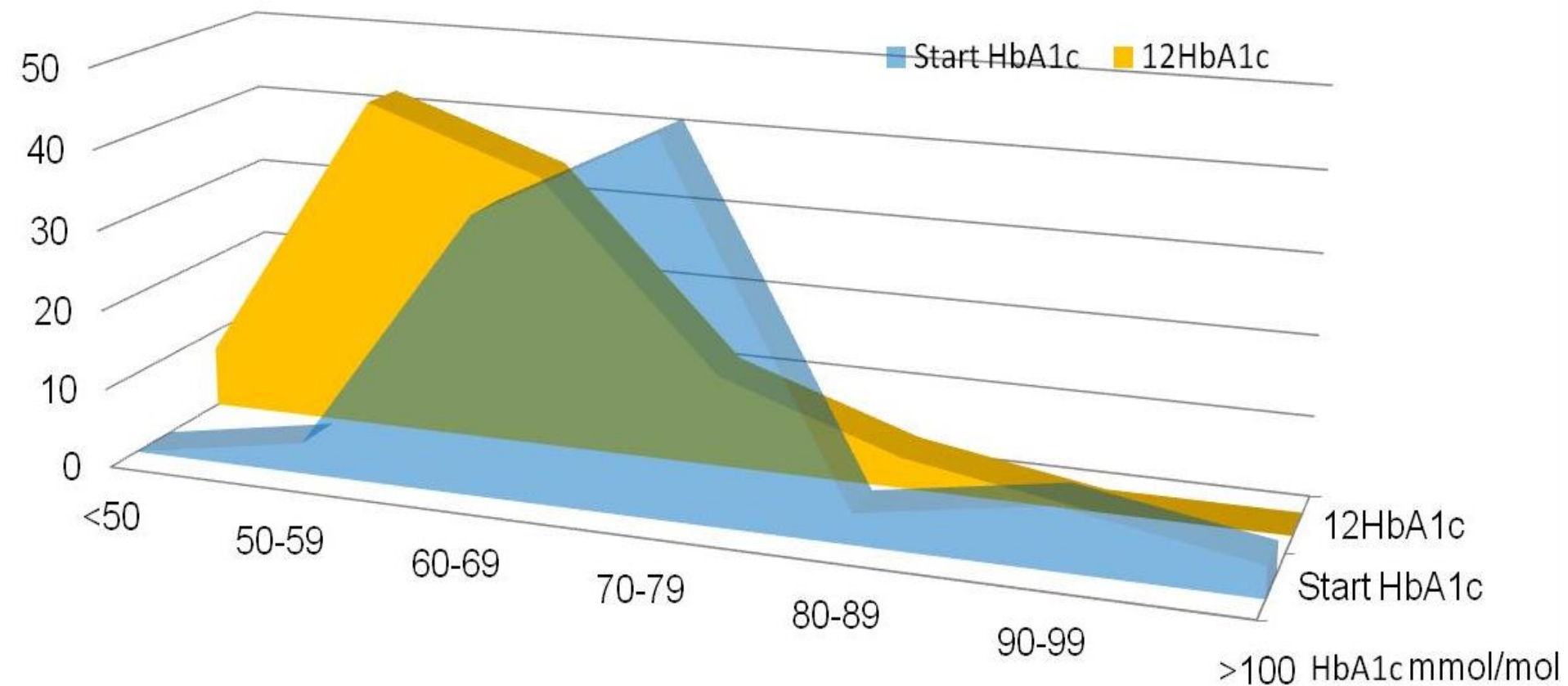
Special tool for HCP's!

Indications (%) for CGM: Region Halland Kungsbacka 2013-2014



Real time CGM at a pediatric unit: Distribution of HbA1c in percentage at start and at evaluation 2013-12-31

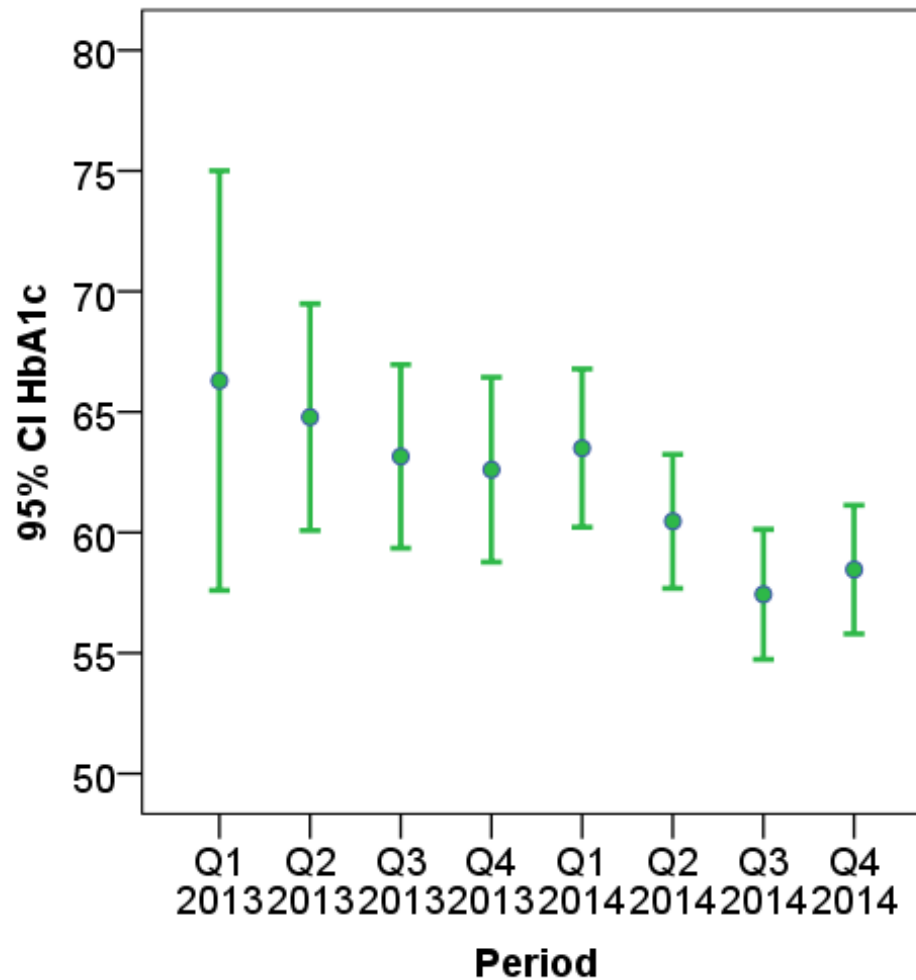
%



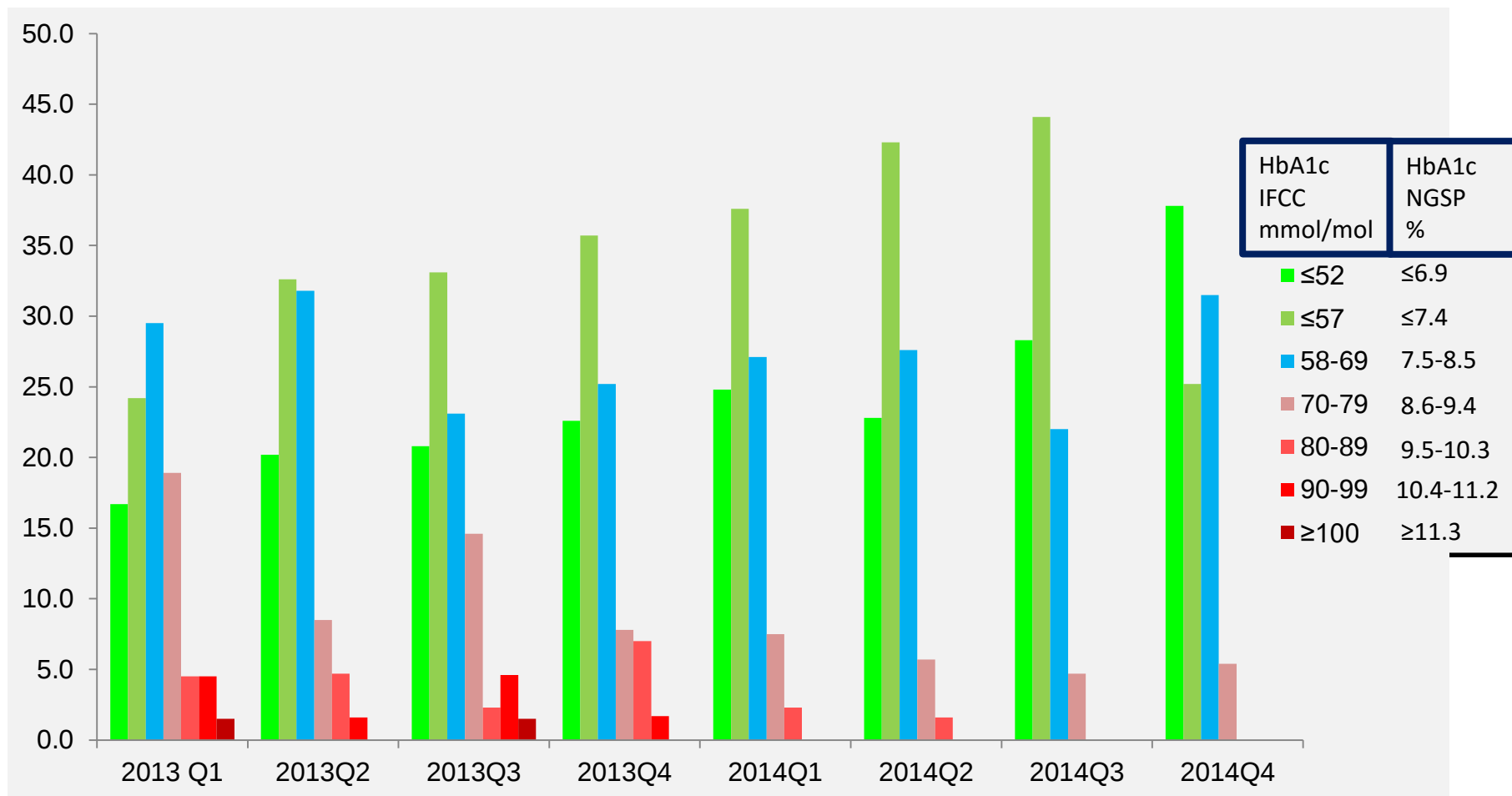
CGM and HbA1c, Kungsbacka hospital 2013

Time (months)	N	Min	Max	Mean NFCC	Mean NGSP
Start	44	45	108	66.4	8.2
1-3	37	41	101	62.1	7.8
4-6	35	47	85	59.8	7.6
7-9	24	43	92	59.0	7.5
10-12	21	40	77	57.0	7.4

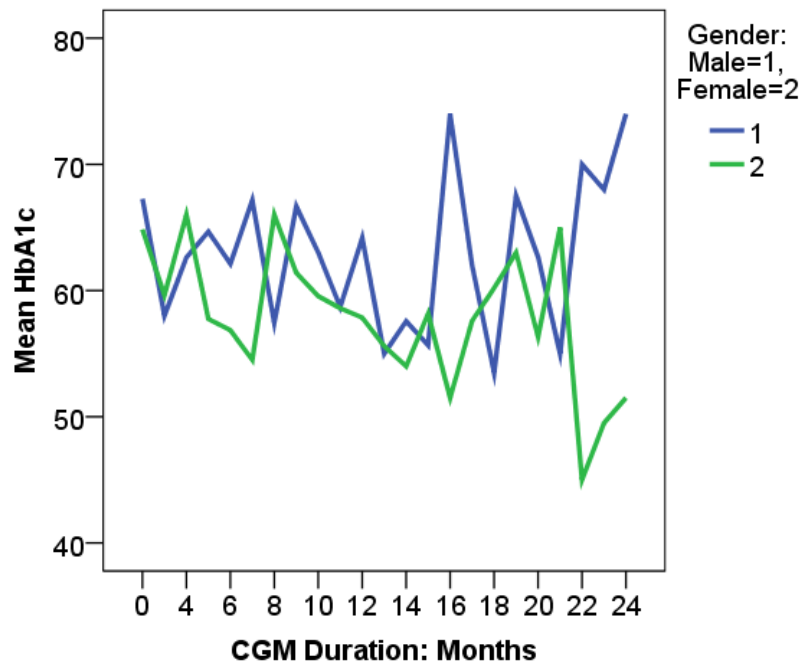
Results: CGM at Kungsbacka clinic 2013-2014



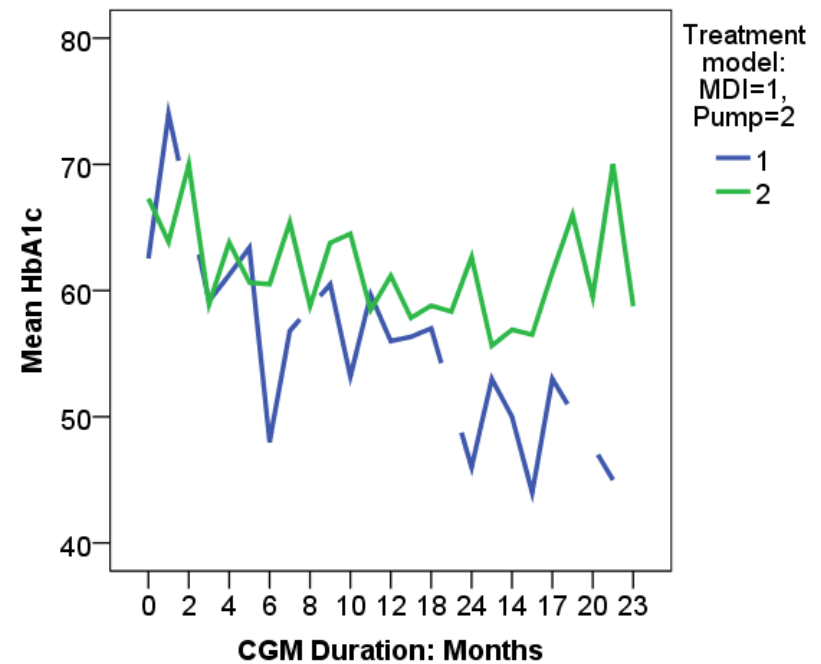
Results: CGM at Kungsbacka clinic 2013-2014



Results: CGM at Kungsbacka clinic 2013-2014



No difference depending on gender



No difference depending on treatment

Results: CGM in clinic 2013-2014

- 52% of the patients used CGM more or less continuously at the 31 Dec 2014
- HbA1c was reduced in 78% of the patients
- 87% have a positive attitude to CGM

The parents stated...

... We have got our life back

... Now we have been able to sleep all night

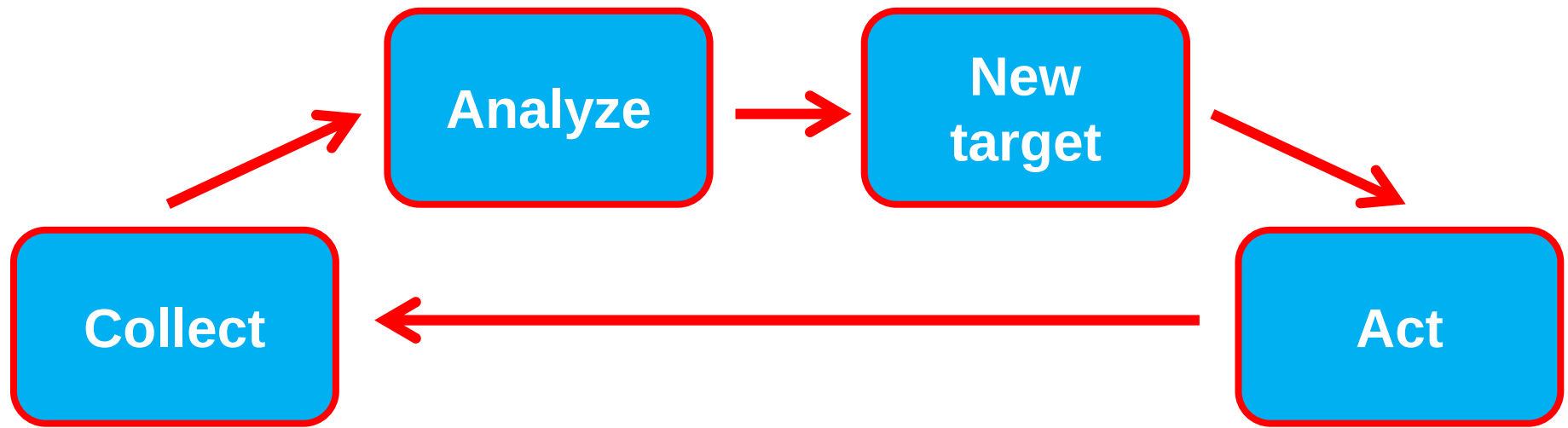
... Lisa has cycled and played with the neighbor kids without us parents needed to be with her

... Now we don't measure blood glucose several times at night

... The teachers love it - they feel safe when they do not only see a single value but several, and in addition to this a trend

CGM realtime at Kungsbacka clinic 150801

- CGM realtime has increased from 52% to 55%.
- The use of Libre/FGM system has increased from 1% to 15%.
- **In total: 55% on CGM real time and 15% on Libre/FGM**



Datamanagement

The work continues by
working with new goals

Step by step, work
towards higher goals!

Sport camps in type 1 diabetes



Sport camp during 4 days with exercise 1-2 times a day

Active use of CGM

Education / Download / Feedback

Using more possibilities with CSII

**Revealed need for training:
both individuals and HCP's**

**Glucose control improved:
short and long term!**

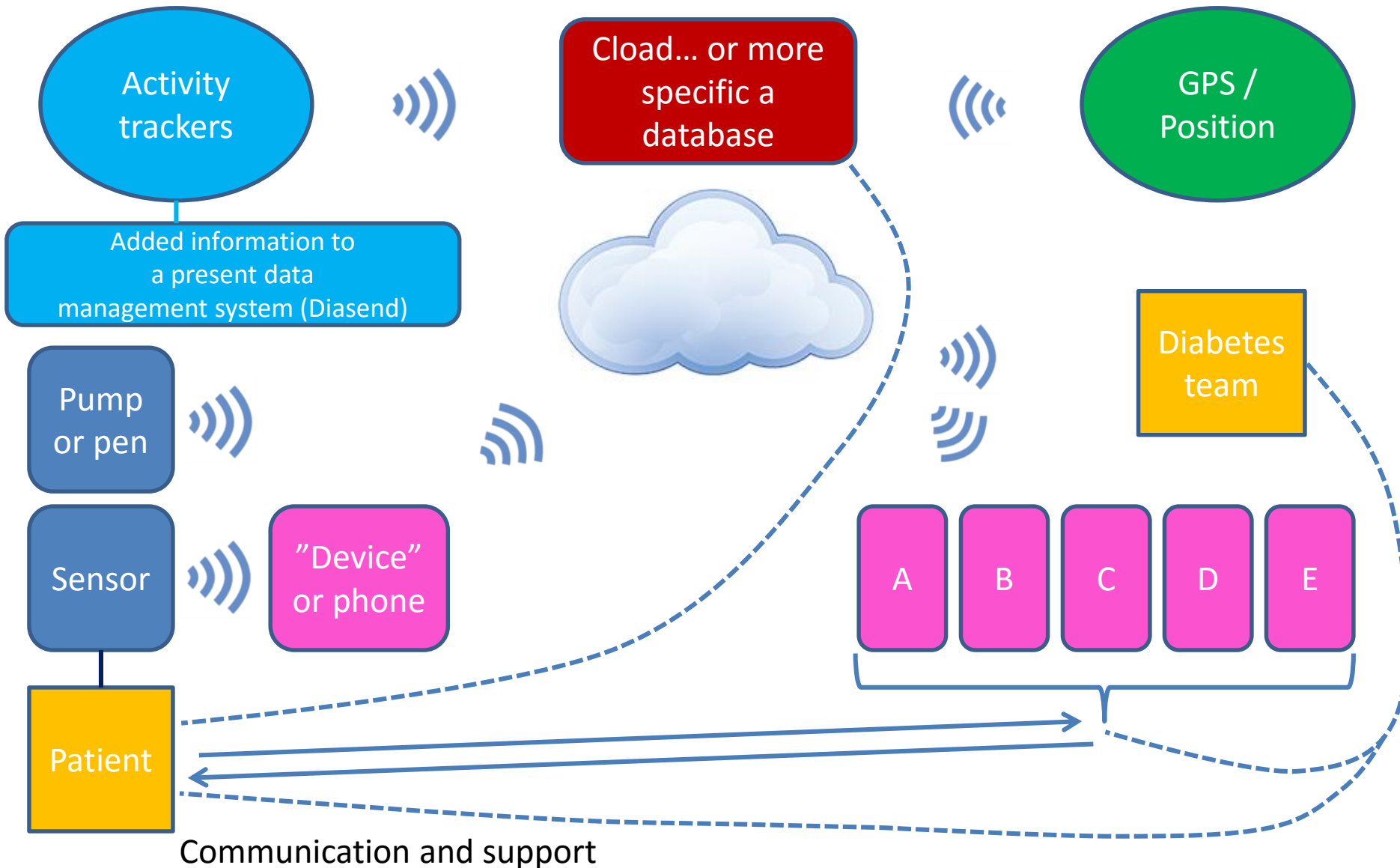
**Extremely positive about using
CGM!**

Future

Dexcom G5 Mobile



Future – share information



"Present" expenditures (Swe)

- Dexcom G5



X 2

- Dexcom G4



X 3

- Medtronic iPro2



X 5

- Abbot Libre



X 9

Thank you – questions?

