I SISTEMI AHCL : IL FUTURO È GIÀ PRESENTE

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UNIVERSITÀ DEL PIEMONTE ORIENTALE

Pediatria Novara

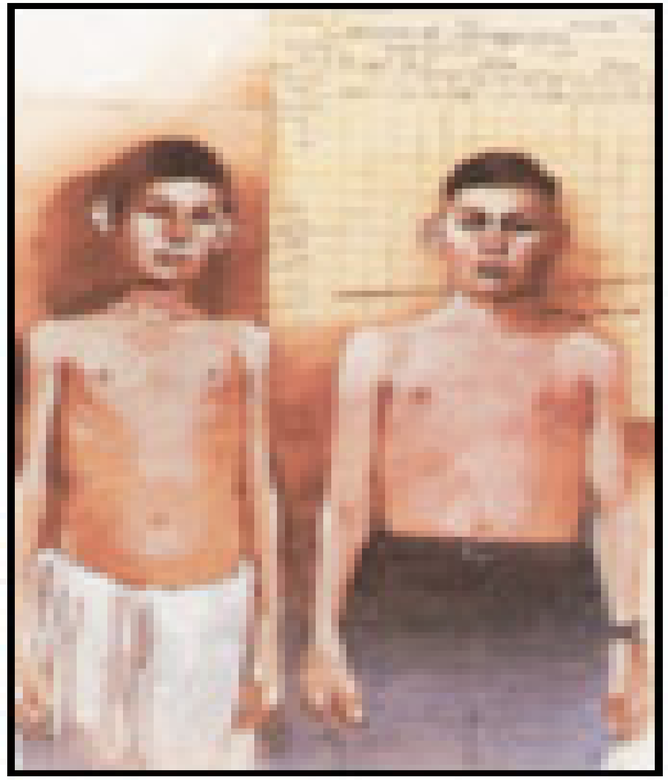
Disclosure

La Prof.ssa Ivana Rabbone dichiara di aver ricevuto negli ultimi due anni compensi o finanziamenti dalle seguenti Aziende Farmaceutiche e/o Diagnostiche:

-Eli Lilly, Sanofi, Theras, Abbott, Ypsomed, Aboca, Orsana

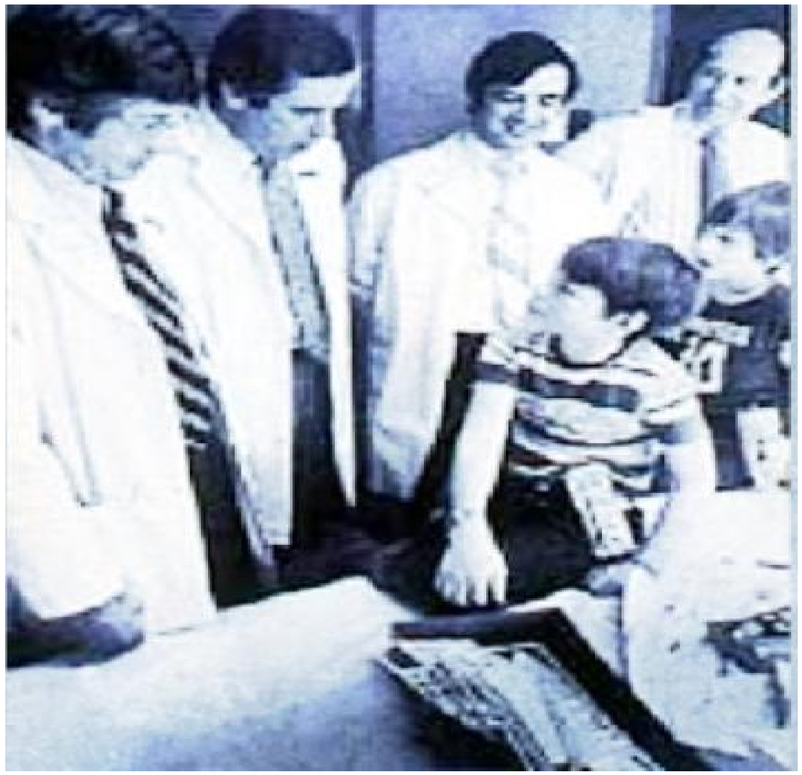
Dichiara altresì il proprio impegno ad astenersi, nell'ambito dell'evento, dal nominare, in qualsivoglia modo o forma, aziende farmaceutiche e/o denominazione commerciale e di non fare pubblicità di qualsiasi tipo relativamente a specifici prodotti di interesse sanitario (farmaci, strumenti, dispositivi medico-chirurgici, ecc.).

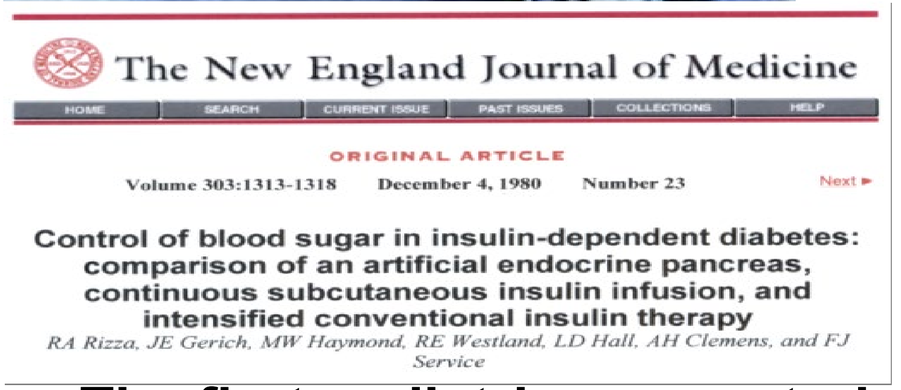
1922



On January 11 1922 the 14-year old Leonard Thompson received the first succesful insulin injection

1979





The New England Journal of Medicine

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ORIGINAL ARTICLE

Volume 303:1313-1318 December 4, 1980 Number 23 Next ►

Control of blood sugar in insulin-dependent diabetes: comparison of an artificial endocrine pancreas, continuous subcutaneous insulin infusion, and intensified conventional insulin therapy

RA Rizza, JE Gerich, MW Haymond, RE Westland, LD Hall, AH Clemens, and FJ Service

The first pediatric pump study was published in 1980

Paradigm change in pediatric diabetology

Raccomandazioni sull'utilizzo della tecnologia in diabetologia pediatrica

Il **MONITORAGGIO DELLA GLICEMIA** (sia CGM che FGM) è **EFFICACE**:

riduce HbA1c, variabilità glicemica e tempo in ipoglicemia, e aumenta il *time in range* (A)

Il **MICROINFUSORE** è **SICURO e VANTAGGIOSO** in età pediatrica

indipendentemente dall'età (B)

Il microinfusore **RIDUCE** episodi di **IPOGLICEMIA** (A) e **COMPLICANZE** croniche del diabete

rispetto alla terapia multiniettiva (B)

Stabilire **ASPETTATIVE REALISTICHE** quando ci si approccia alla **TECNOLOGIA**

è alla base del successo terapeutico (B)

(A) - (B) = livelli di evidenza

Gruppo di studio SIEDP sul diabete in età pediatrica, Acta biomedica, 2019

Better outcomes with technology

Total n = 25,654	Injection only	Injection + sensor	Pump only	Pump + sensor
n	9,606	3,843	4,418	7,787
HbA1c	8.72 [8.68–8.75]	8.30 [8.25–8.35]	8.07 [8.03–8.12]	7.81 [7.77–7.84]
DKA	2.91 [2.59–3.31]	2.87 [2.34-3.45]	2.02 [1.64–2.48]	1.98 [1.64–2.48]
Severe Hypo	2.35 [2.04–2.71]	4.25 [3.65–4.95]	1.10 [0.85–1.43]	2.17 [1.86-2.52]

- **HbA1c was lower in all categories of participants who used a pump and/or sensor compared with the injections–no sensor treatment method (P < 0.001).**
- **DKA episodes were lower in participants in the pump + sensor (P < 0.001) and the pump–no sensor (P < 0.05) groups when compared with those in the injections–no sensor group .**
- **Severe hypoglycemia was lower in pump–no sensor group (P < 0.001) but higher in the injections 1 sensor group compared with the injections–no sensor group.**

SWEET
PEDIATRIC DIABETES
WORKING TO CREATE CENTERS OF REFERENCE

Diabetes Care

Glycemic Outcome Associated With Insulin Pump and Glucose Sensor Use in Children and Adolescents With Type 1 Diabetes. Data From the International Pediatric Registry SWEET

Roque Cardona-Hernandez,[1] Anke Schwandt,[2,3] Hessa Alkandari,[4] Heiko Bratke,[5] Agata Chobot,[6] Nicole Coles,[7] Sarah Corathers,[8] Damla Goksen,[9] Peter Goss,[10] Zineb Imane,[11] Katrin Nagl,[12] Stephen M.P. O'Riordan,[13] and Craig Jefferies,[14] for the SWEET Study Group*

https://doi.org/10.2337/dc20-1674

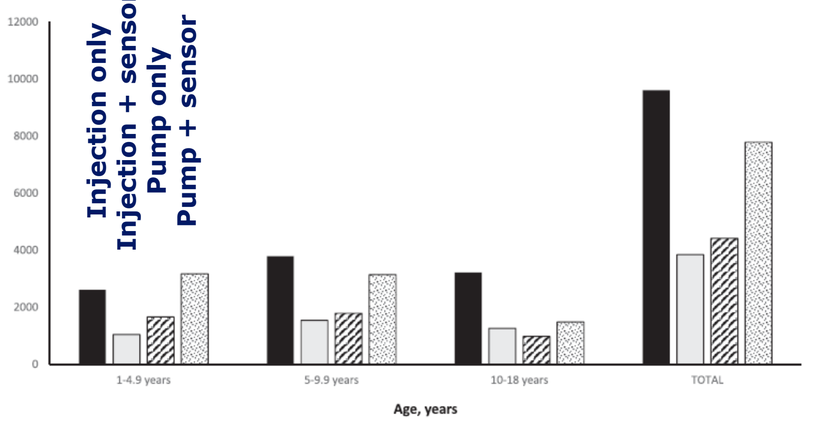
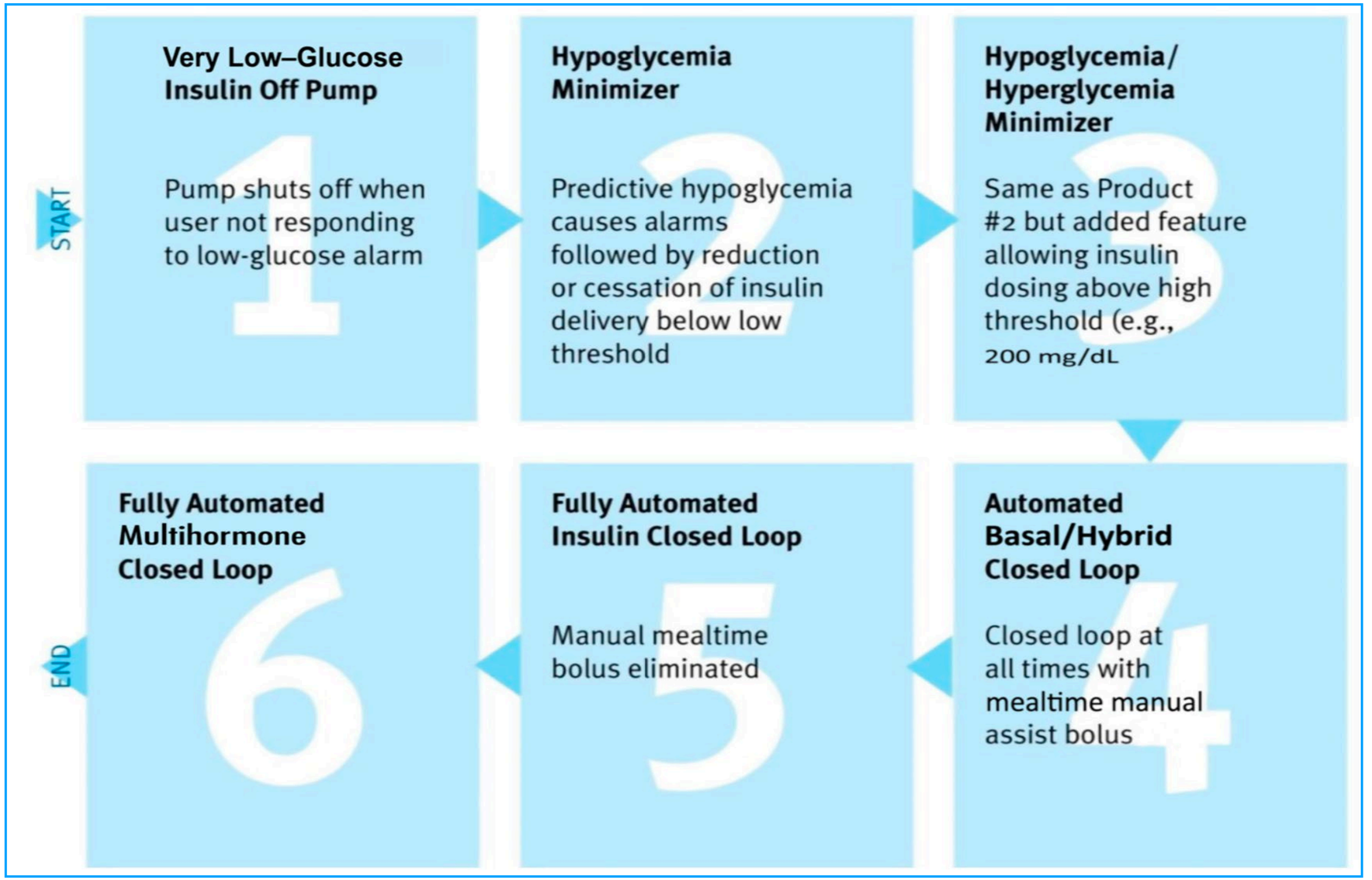


Figure 2—The distribution of treatment modality by age group. Each bar represents a treatment modality. Black bars denote injection-no sensor group; Light grey bars denote injection+sensor group; Striped bars denote pump-no sensor group. White bars with dots represent pump+sensor group. Data are number of patients.

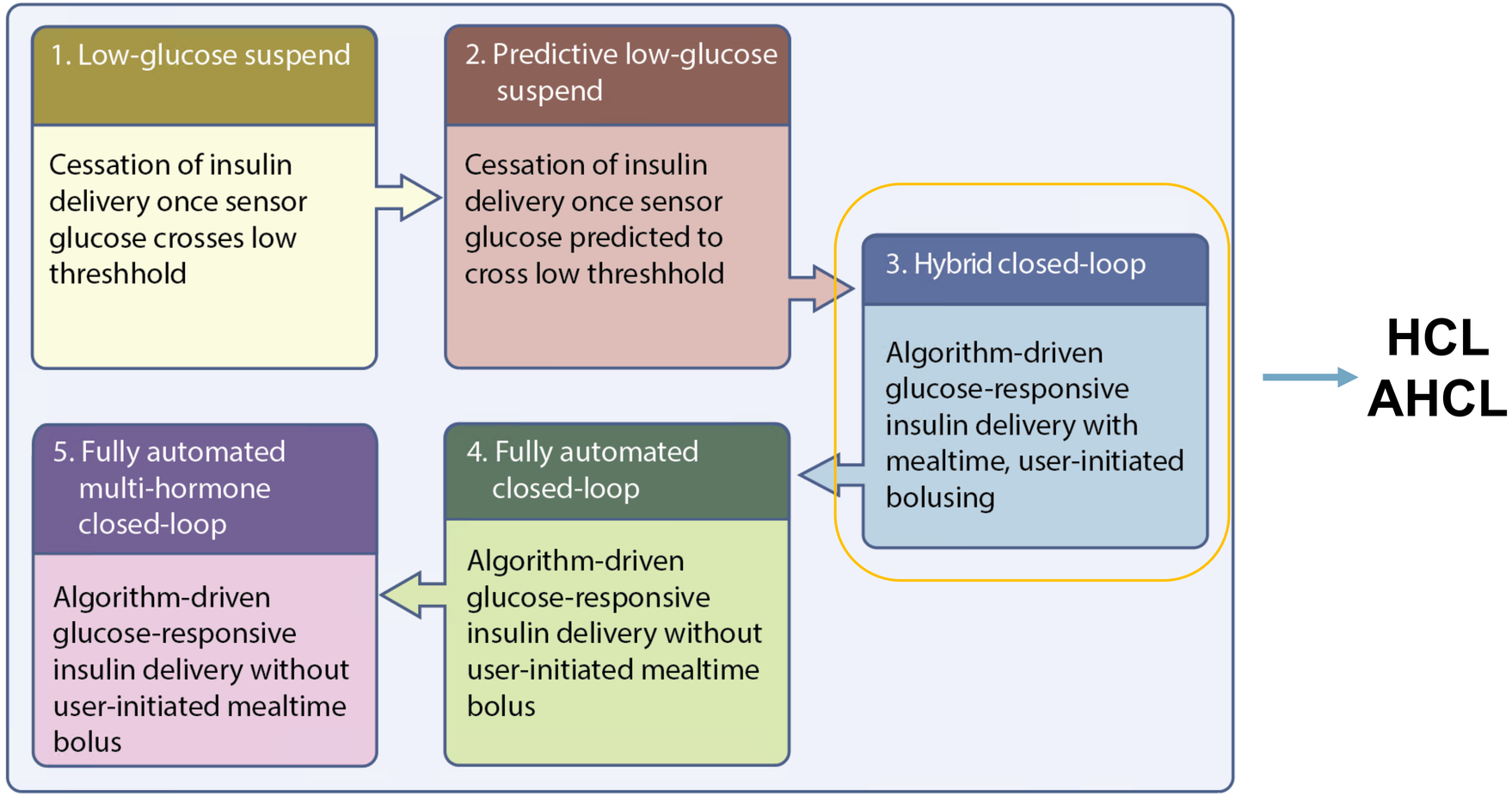
Diabetes Care. 2021 Mar 2:dc201674. Online ahead of print.

La roadmap proposta da Kowalski rispetto allo sviluppo dei sistemi integrati



Kowalski A. Pathway to artificial pancreas systems revisited: moving downstream. Diabetes care 2015; 38(6): 1036-43

Roadmap verso pancreas artificiale (Hovorka)



Boughton and Hovorka. Diabetologia 2021

The path to closed loop started at diabetes camps

2013

ORIGINAL ARTICLE

Nocturnal Glucose Control with an Artificial Pancreas at a Diabetes Camp

Moshe Phillip, M.D., Tadej Battelino, M.D., Eran Atlas, M.Sc., Olga Kordonouri, M.D., Natasa Bratina, M.D., Shahar Miller, B.Sc., Torben Biester, M.D., Magdalena Avbelj Stefanija, M.D., Ido Muller, B.Sc., Revital Nimri, M.D., and Thomas Danne, M.D.

CONCLUSIONS

Patients at a diabetes camp who were treated with an artificial-pancreas system had less nocturnal hypoglycemia and tighter glucose control than when they were treated with a sensor-augmented insulin pump. (Funded by Sanofi and others; ClinicalTrials.gov number, NCT01238406.)

N ENGL J MED 368;9 NEJM.ORG FEBRUARY 28, 2013

The first closed-loop study outside the hospital

Randomized Summer Camp Crossover Trial in 5- to 9-Year-Old Children: Outpatient Wearable Artificial Pancreas Is Feasible and Safe

DOI: 10.2337/dc15-2815

2015

ruttomesso[2]

La

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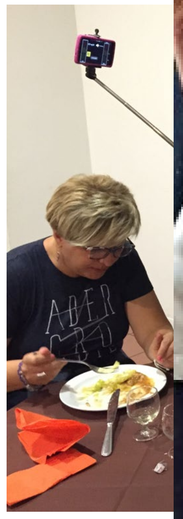
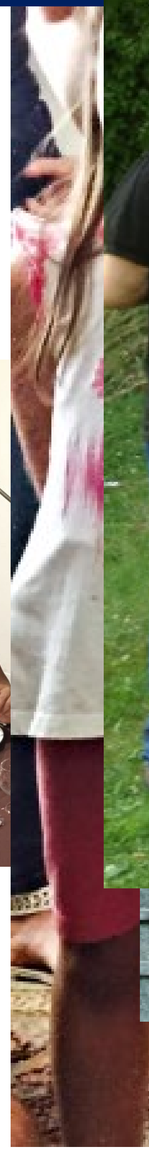
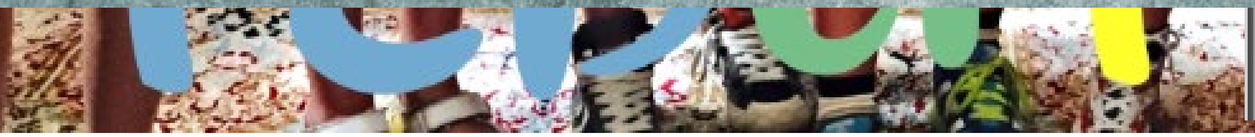






Pederpan28
22:25:18 Europe/Amsterdam
ClosedLoop

Pederpan29
22:25:18 Europe/Amsterdam
ClosedLoop

Pederpan30
22:25:18 Europe/Amsterdam
ClosedLoop

Batteria Telefono: 45 %
Ultimo Errore:(2015-09-07 21:43:01)
Send_Ping, Response conversion

Batteria Telefono: 84 %
Ultimo Errore:(2015-09-07 19:28:44)
Send_Ping, Response conversion

Batteria Telefono: 59 %
Ultimo Errore:(2015-09-07 16:43:08)
Send_Ping, Response conversion

Clinical Targets for Continuous Glucose Monitoring Data Interpretation: Recommendations From the International Consensus on Time in Range

https://doi.org/10.2337/dci19-0028

Table 2—Standardized CGM metrics for clinical care: 2019

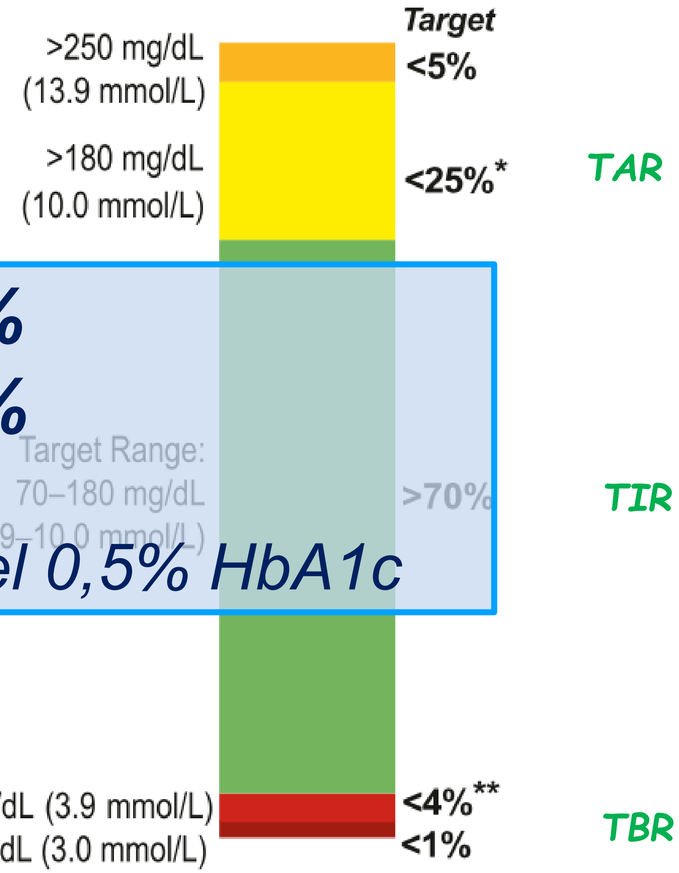
1. Number of days CGM worn (recommend 14 days) (42,43)	
2. Percentage of time CGM is active (recommend 70% of data from 14 days) (41,42)	
3. Mean glucose	
4. Glucose management indicator (GMI) (75)	
5. Glycemic variability (%CV) target ≤36% (90)*	
6. Time above range (TAR): % of readings and time >250 mg/dL (>13.9 mmol/L)	Level 2
7. Time above range (TAR): % of readings and time 181–250 mg/dL (10.1–13.9 mmol/L)	Level 1
8. Time in range (TIR): % of readings and time 70–180 mg/dL (3.9–10.0 mmol/L)	In range
9. Time below range (TBR): % of readings and time 54–69 mg/dL (3.0–3.8 mmol/L)	Level 1
10. Time below range (TBR): % of readings and time <54 mg/dL (<3.0 mmol/L)	Level 2
Use of Ambulatory Glucose Profile (AGP) for CGM report	

CV, coefficient of variation. *Some studies suggest that lower %CV targets (<33%) provide additional protection against hypoglycemia for those receiving insulin or sulfonylureas (45,90,91).

*Un TIR del **70%** → HbA1c **7%***

*TIR del **50%** → HbA1c **8%***

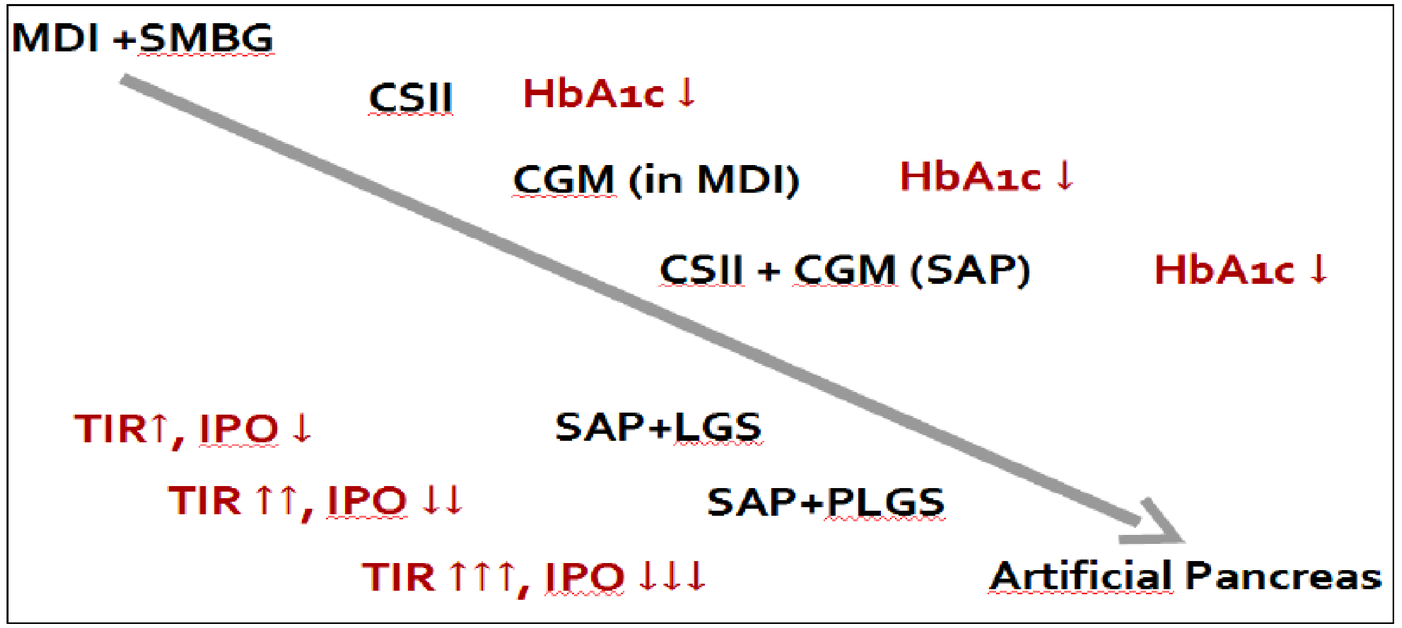
Un aumento del TIR del 10% → riduzione del 0,5% HbA1c



GMI (%) = Glucose Management Indicator (emoglobina glicata stimata)

CV (%) = coefficiente di variabilità glicemica

Il Percorso effettuato dalle tecnologie del diabete



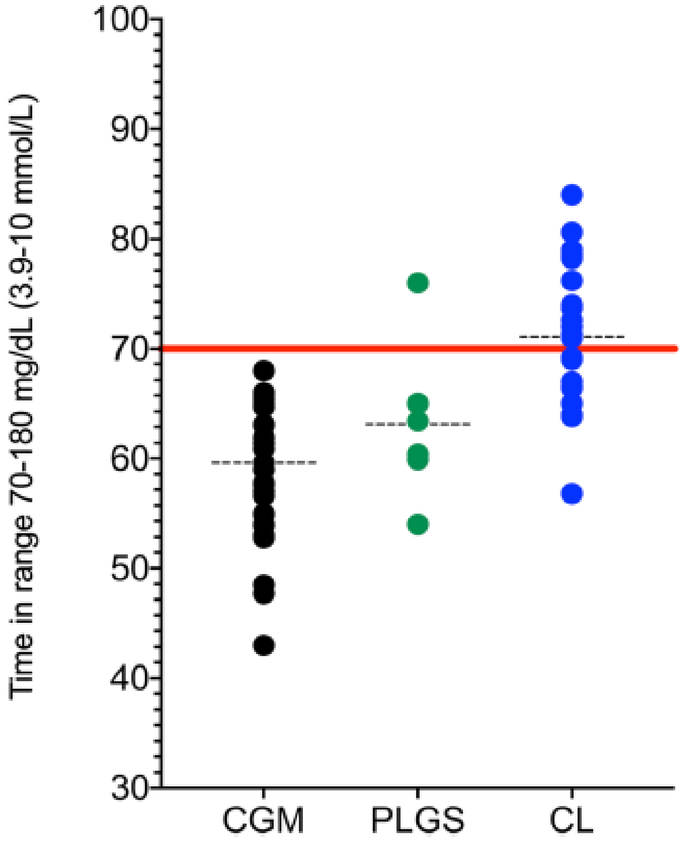


Fig. 1. Time in range for different treatment modalities from recent randomized controlled trials. CGM, Continuous Glucose Monitoring; PLGS, Predictive Low Glucose Suspend; CL, Closed-loop.Data from randomized controlled trials including children, adolescents and adults with type 1 diabetes for the last 5 years are included (34–36, 38, 39, 55, 73, 74, 77, 78, 80–116).


SAP

Differenze tra Multiiniettiva con e senza sensore realtime e Microinfusore

DIABETES TECHNOLOGY & THERAPEUTICS
Volume 22, Number 7, 2020

DOI: 10.1089/dia.2020.0031

ORIGINAL ARTICLE

Time In Range in Children with Type 1 Diabetes Using Treatment Strategies Based on Nonautomated Insulin Delivery Systems in the Real World

Valentino Cherubini, MD,[1] Riccardo Bonfanti, MD,[2] Alberto Casertano, MD,[3] Elena De Nitto, MD,[4] Antonio Iannilli,[1] Fortunato Lombardo, MD,[5] Giulio Maltoni, MD,[6] Marco Marigliano, MD, PhD,[7] Marta Bassi, MD,[8] Nicola Minuto, MD,[8] Enza Mozzillo, MD,[3] Ivana Rabbone, MD,[9] Novella Rapini, MD,[10] Andrea Rigamonti, MD,[2] Giuseppina Salzano, MD,[5] Andrea Scaramuzza, MD,[11] Riccardo Schiaffini, MD,[10] Davide Tinti, MD, PhD,[9] Sonia Toni, MD,[4] Luca Zagaroli, MD,[1] Stefano Zucchini, MD,[6] Claudio Maffeis, MD,[7] and Rosaria Gesuita, PhD[12]

STUDIO MULTICENTRICO ITALIANO

- 11 CENTRI
- 666 BAMBINI (M:F = 51:49 %)
- ETA' MEDIA 12 ANNI (IQR 10-15 ANNI)
- DURATA DI MALATTIA 5 ANNI (IQR 3-7 ANNI)

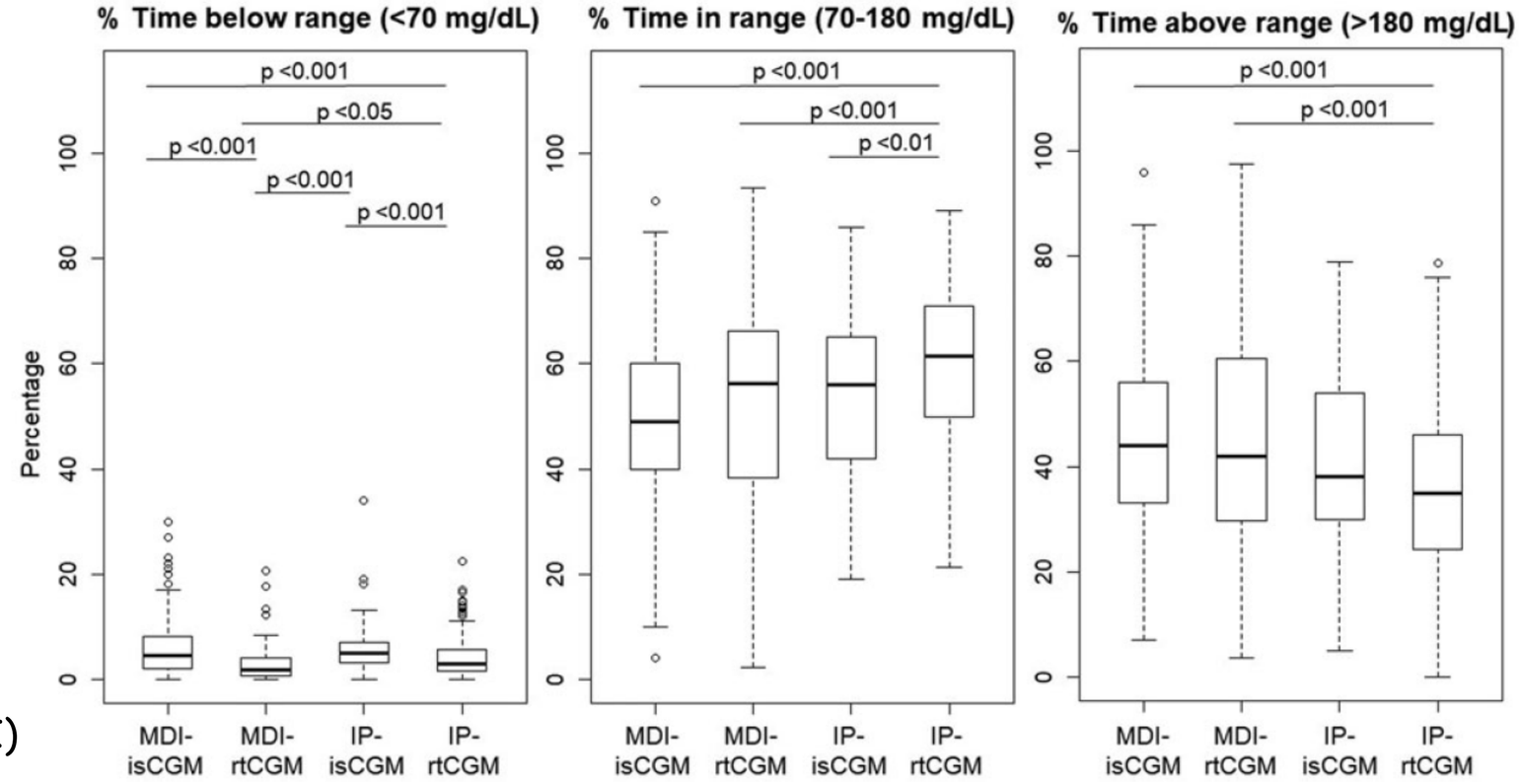


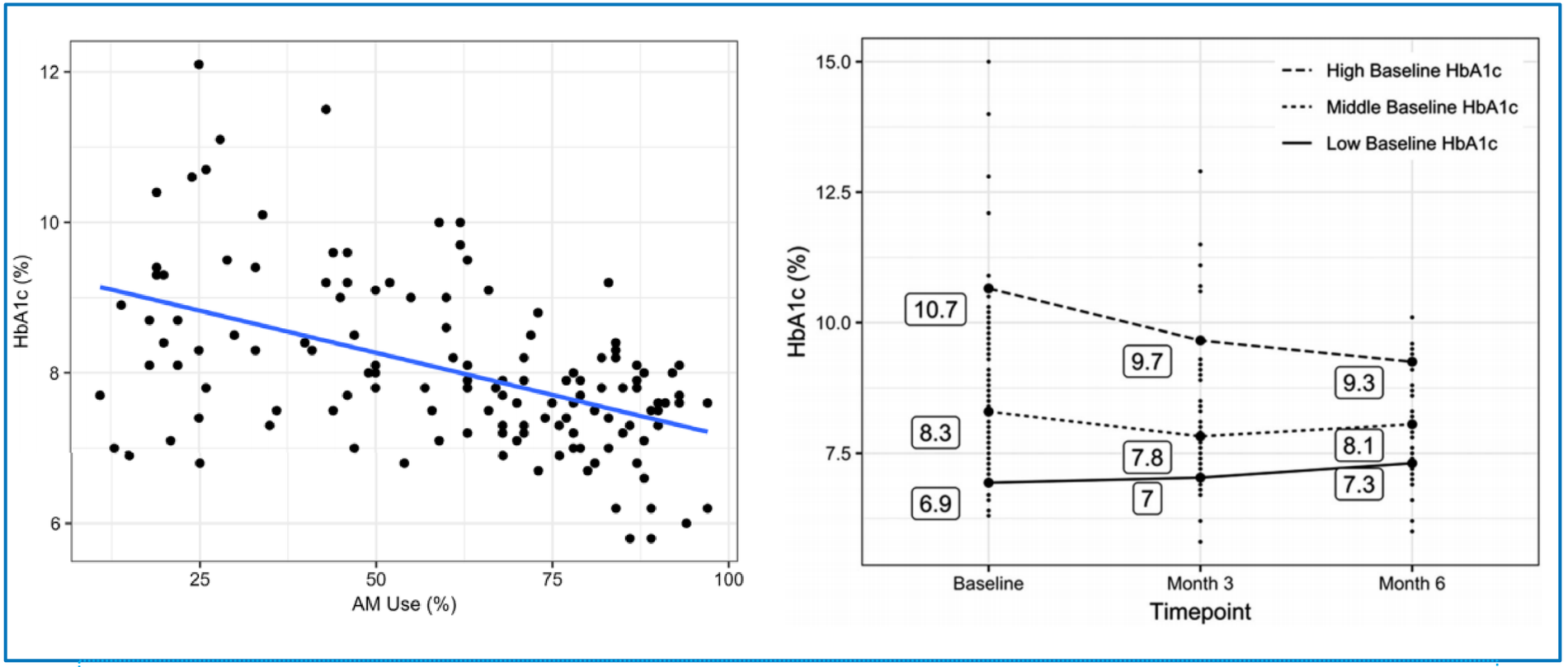
TABLE 2. CHILDREN ACHIEVING CONTINUOUS GLUCOSE MONITORING-BASED TARGETS

Recommended CGM-based targets[a]	*MDI-isCGM* (n = *240*) n (%)	*MDI-rtCGM* (n = *120*) n (%)	*IP-isCGM* (n = *85*) n (%)	*IP-rtCGM* (n = *221*) n (%)	P
TBR <4%	102 (42.5)	87 (72.5)	24 (28.2)	136 (61.5)	<0.001
TIR >60%	58 (24.2)	51 (42.5)	29 (34.1)	116 (52.5)	<0.001
TIR >70%	20 (8.3)	17 (14.2)	11 (12.9)	62 (28.1)	<0.001
TAR <25%	25 (10.4)	20 (16.7)	17 (20)	58 (26.2)	<0.001

P-values refer to chi-square test.
[a]As suggested by recent international consensus recommendations according to technology treatment.
TAR, time above range; TBR, time below range; TIR, time in range.


HCL

Six months of hybrid closed loop in the real-world: An evaluation of children and young adults using the 670G system



HCL use is associated with improved glycemic control and no change in psychosocial outcomes in this clinical sample

Increased percent time in auto mode was associated with lower HbA1c (P = .02)

Thirty percent of youth discontinued HCL in the first 6 months of use.

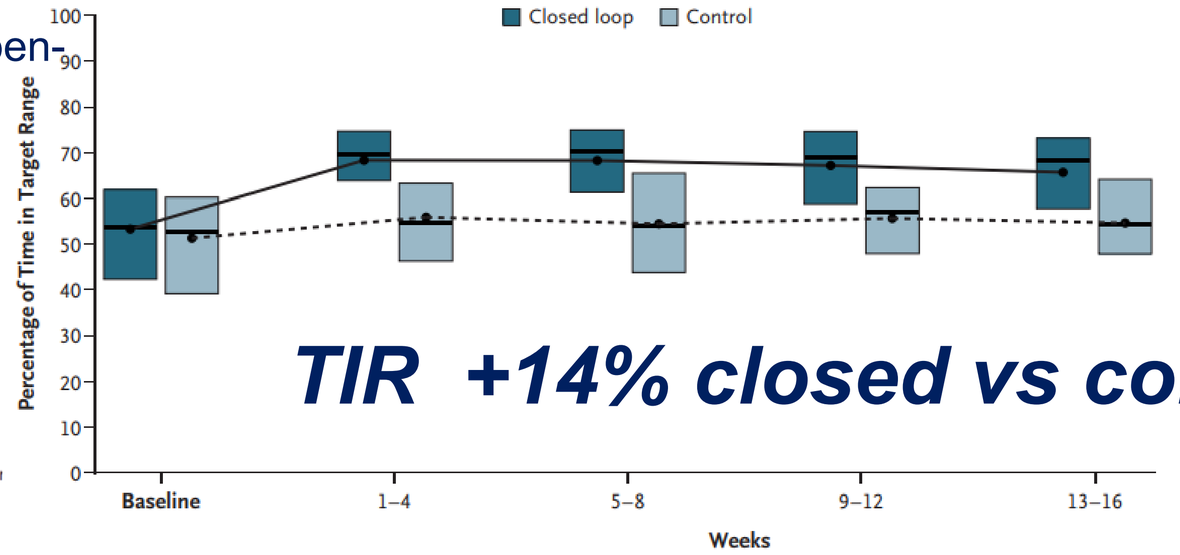
Berget et al, Pediatric Diabetes. 2020;21:310–318

AHCL

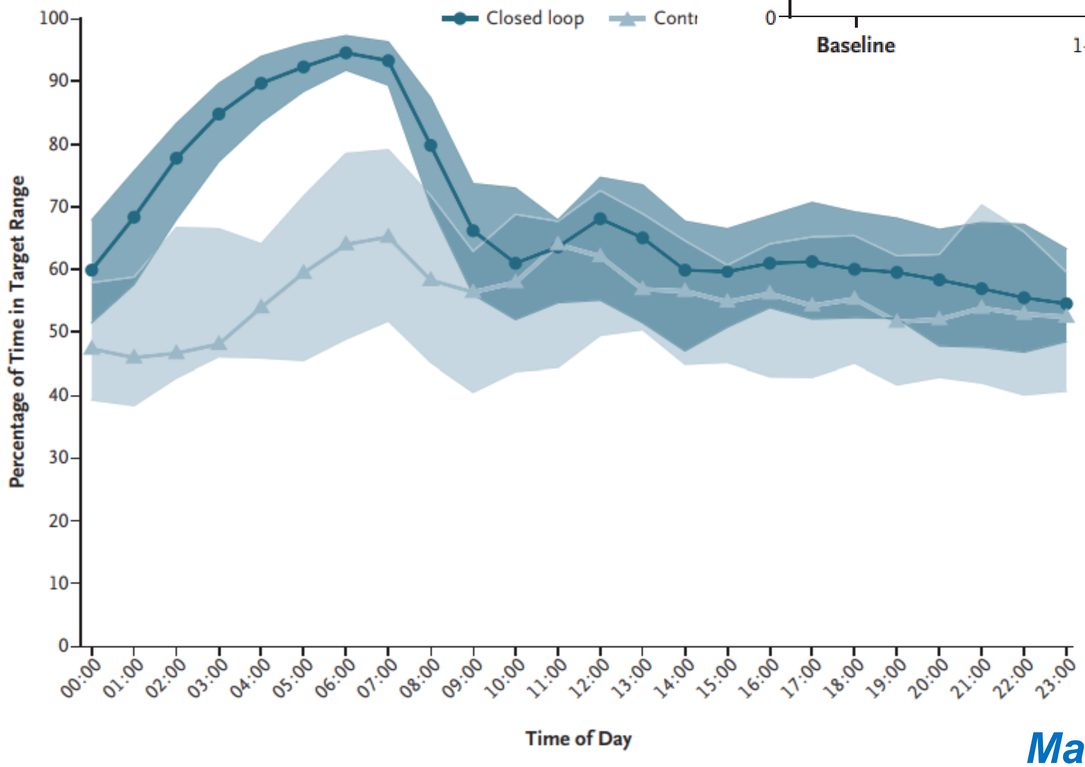
A Randomized Trial of Closed-Loop Control in Children with Type 1 Diabetes

In a 16-week, multicenter, randomized, open-label, parallel-group trial

101 children:78 closed-loop group and 23 control group; 6-13 ys



TIR +14% closed vs control



..the glucose level was in the target range for a greater percentage of time with the use of a closed-loop system than with the use of a sensor-augmented insulin pump.

Marc D. Breton et al, NEJM 2020, 383:836-45

Real-World Patient-Reported Outcomes and Glycemic Results with Initiation of Control-IQ Technology

TABLE 2. GLYCEMIC OUTCOMES FOR $N = 1{,}435$ STUDY PARTICIPANTS (AT TIME POINT 1 VS. TIME POINT 2). NIGHTTIME IS DEFINED AS 10 PM TO 6 AM

	Time point 1	*Time point 2*	P
Time in range (mean)	76.7 (±11.6)	77.2 (±12.3)	<0.001
Time in range (median)	78.2 (70.2–85.1)	79.2 (70.3–86.2)	<0.001
Time in range at day (mean)	75.9 (±11.9)	76.6 (±12.4)	<0.001
Time in range at day (median)	77.6 (69.2–84.8)	78.2 (69.2–85.7)	<0.001
Time in range at night (mean)	78.4 (±13.5)	78.5 (±14.7)	0.082
Time in range at night (median)	80.7 (71.2–88.2)	82.2 (71.2–89.2)	0.082
Mean glucose	147.3 (±18.5)	146.6 (±19.9)	<0.001
Median glucose	145.0 (135.0–157.0)	144.0 (133.0–157.0)	<0.001
Coefficient of variation	31.8 (±5.2)	31.3 (±5.2)	<0.001
Time <70 mg/dL	1.3 (0.6–2.3)	1.2 (0.5–2.4)	0.818
Time <54 mg/dL	0.2 (0.1–0.4)	0.2 (0.0–0.4)	0.826
Time >180 mg/dL	19.8 (12.8–28.4)	19.0 (11.8–28.2)	<0.001
Time >250 mg/dL	2.9 (1.2–6.2)	2.5 (0.9–5.9)	<0.001
Total dose delivered	45.9 (33.7–64.4)	45.0 (33.7–63.5)	0.083
Basal insulin units	22.5 (15.9–32.3)	22.6 (16.1–32.8)	<0.001
Bolus insulin units	22.3 (15.8–32.6)	21.9 (15.5–32.3)	<0.001
Time in automation	95.7 (92.7–97.3)	96.0 (92.6–97.4)	0.722
Time in sleep activity	32.8 (27.8–37.1)	33.4 (27.2–37.6)	<0.001
Time in exercise activity	0.3 (0.0–2.2)	0.0 (0.0–2.5)	<0.05

Continued real-world use of the t:slim X2 pump with Control-IQ technology showed improvements in psychosocial outcomes and persistent achievement of recommended TIR glycemic outcomes in people with T1D

	Time point 1	*Time point 2*	*Significance*
WHO-5	69.8 (18.0)	68.2 (17.8)	$P < 0.001$
DIDS scale: diabetes impact	2.8 (1.4)	2.7 (1.4)	$P < 0.01$
DIDS scale: device satisfaction	9.0 (1.1)	9.1 (1.1)	$P < 0.001$
Technology acceptance	49.7 (15.3)	—	—

DIDS, Diabetes Impact and Devices Satisfaction.

J E Pinsker et al, Diabetes Technol Ther, 2021 23:120-127

HCL VS AHCL

THE LANCET

A comparison of two hybrid closed-loop systems in adolescents and young adults with type 1 diabetes (FLAIR): a multicentre, randomised, crossover trial

Multinational, randomised, crossover trial (Fuzzy Logic Automated Insulin Regulation [FLAIR]), 14-29 years old

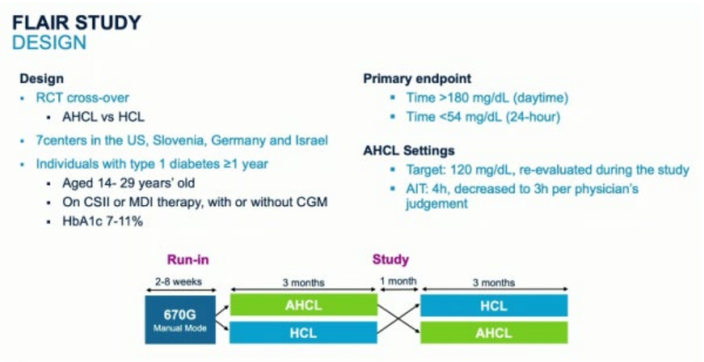
MiniMed 670G system (Medtronic) vs MiniMed 670G hybrid closed-loop system (670G) vs advanced hybrid closed-loop system (Medtronic) for the first 12-week then crossover

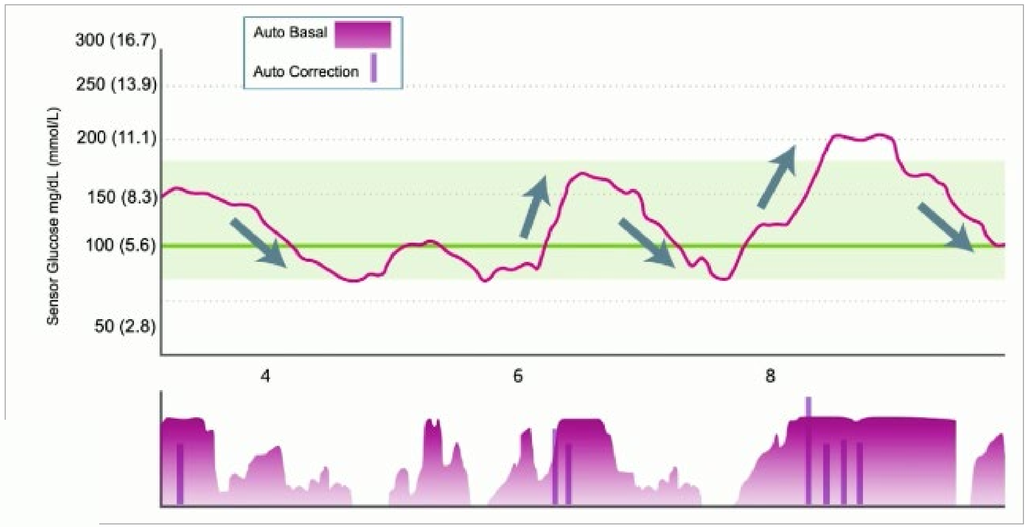
Hyperglycaemia was reduced without increasing hypoglycaemia in adolescents and young adults with type 1 diabetes using the investigational advanced hybrid closed-loop system compared with the commercially available MiniMed 670G system

Richard M Bergenstal, the Lancet, 2021, 397

Advanced hybrid closed loop:

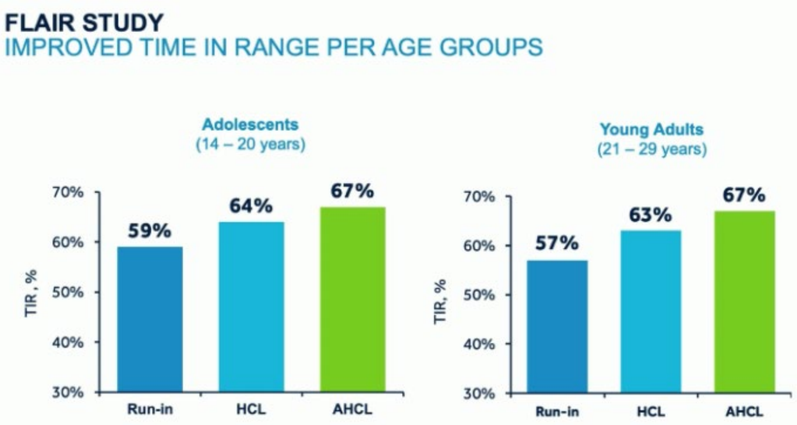
The next step improving Time in Range with automated correction bolus





FLAIR

2021



CrossMark

A comparison of two hybrid closed-loop systems in adolescents and young adults with type 1 diabetes (FLAIR): a multicentre, randomised, crossover trial

*Richard M Bergenstal, Revital Nimri, Roy W Beck, Amy Criego, Lori Laffel, Desmond Schatz, Tadej Battelino, Thomas Danne, Stuart A Weinzimer, Judy Sibayan, Mary L Johnson, Ryan J Bailey, Peter Calhoun, Anders Carlson, Elvira Isganaitis, Rachel Bello, Anastasia Albanese-O'Neill, Klemen Dovc, Torben Biester, Kate Weyman, Korey Hood, Moshe Phillip, for the FLAIR Study Group**

Auf der Bult Centre for Children and Adolescents: Thomas Danne (PI), Torben Biester (PI), Thekla von dem Berge (I), Jantje Weiskorn (I), Olga Kordonouri (I), Sarah Biester (PC), Bärbel Aschemeier (C), Kerstin Remus (C), Nicole Pisarek (C)

Lancet 2021; 397: 208–19

*Listed in the appendix (pp 24–25)

Summary

Background Management of type 1 diabetes is challenging. We compared outcomes using a commercially available hybrid closed-loop system versus a new investigational system with features potentially useful for adolescents and young adults with type 1 diabetes.

Improved Glycemic Outcomes With Medtronic MiniMed Advanced Hybrid Closed-Loop Delivery: Results From a Randomized Crossover Trial Comparing Automated Insulin Delivery With Predictive Low Glucose Suspend in People With Type 1 Diabetes

Table 2—Glycemic outcomes

					Total		Children aged 7–13 years		Adolescents aged 14–21 years		Adults aged 22–80 years	
Category*	Run-in	PLGM	AHCL 5.6 mmol/L	AHCL total	% change AHCL vs. PLGM	*P* value§	% change AHCL vs. PLGM	*P* value§	% change AHCL vs. PLGM	*P* value§	% change AHCL vs. PLGM	*P* value§
Subjects, *n*	59	59	52	59	59		19		14		26	
Average SG mmol/L overall	9.3 ± 0.9 (9.2)	9.5 ± 1.1 (9.4)	8.3 ± 0.7 (8.1)	8.5 ± 0.7 (8.4)	−0.6 ± 0.4 (−0.6)†	<0.001	−0.5 ± 0.4 (−0.6)†	<0.001	−0.7 ± 0.4 (−0.7)†	<0.001	−0.5 ± 0.5 (−0.5)†	<0.001
% CGM 3.9–10 mmol/L overall	59.0 ± 10.4 (60.8)	57.9 ± 11.7 (58.4)	72.0 ± 7.9 (71.9)	70.4 ± 8.1 (70.8)	12.5 ± 8.5 (11.2)‡	<0.001	11.8 ± 7.4 (11.8)‡	<0.001	14.4 ± 8.4 (12.3)‡	<0.001	11.9 ± 9.5 (10.6)‡	<0.001
% CGM 3.9–10 mmol/L day	58.2 ± 11.0 (57.9)	56.5 ± 12.2 (56.4)	68.7 ± 10.0 (69.5)	66.8 ± 9.9 (65.7)	10.4 ± 8.7 (9.0)‡	<0.001	7.9 ± 7.1 (8.3)‡	<0.001	14.1 ± 8.4 (13.6)‡	<0.001	10.1 ± 9.4 (8.5)‡	<0.001
% CGM 3.9–10 mmol/L night	61.2 ± 14.7 (63.5)	62.0 ± 15.0 (64.9)	81.9 ± 10.6 (82.3)	80.8 ± 10.4 (81.5)	18.8 ± 12.9 (19.3)‡	<0.001	23.6 ± 11.3 (22.6)‡	<0.001	15.1 ± 11.5 (11.6)‡	<0.001	17.2 ± 14.0 (13.7)‡	<0.001
% CGM >10 mmol/L overall	37.9 ± 10.6 (37.7)	39.6 ± 12.1 (39.2)	25.8 ± 8.2 (24.4)	27.5 ± 8.1 (27.7)	−12.1 ± 9.0 (−12.1)‡	<0.001	−11.2 ± 8.0 (−12.6)‡	<0.001	−14.0 ± 8.5 (−12.5)‡	<0.001	−11.8 ± 10.0 (−9.5)‡	<0.001
% CGM ≤3.0 mmol/L overall	0.5 ± 0.6 (0.3)	0.5 ± 0.5 (0.3)	0.4 ± 0.4 (0.3)	0.5 ± 0.5 (0.4)	−0.1 ± 0.4 (−0.1)‡	0.025	−0.2 ± 0.5 (−0.1)‡	0.0676	−0.1 ± 0.3 (−0.0)‡	0.2441	−0.0 ± 0.2 (−0.1)‡	0.5462
% CGM <3.9 mmol/L overall	3.1 ± 2.1 (2.7)	2.5 ± 1.6 (2.2)	2.2 ± 1.6 (1.9)	2.1 ± 1.4 (1.9)	−0.4 ± 1.3 (−0.4)‡	0.0318	−0.7 ± 1.8 (−0.6)‡	0.1216	−0.4 ± 1.1 (−0.4)‡	0.1804	−0.1 ± 0.9 (−0.2)‡	0.5184

*Results presented as mean ± SD (median). †SG % change is expressed as relative % reduction (% − %)/%) comparing overall value in AHCL. ‡TIR differences are expressed as absolute difference (% − %). §Analyses using paired *t* test.

AHCL with automated correction bolus demonstrated significant improvement in glucose control compared with SAP 1 PLGM. A lower algorithm SG set point during AHCL resulted in greater TIR, with no increase in hypoglycemia

O. J. Collyns, Diabetes Care, 2021; 44:969–975

Diabetes Technology and Therapeutics

DOI: 10.1089/dia.2021.0203

Title

Real-world Performance of the MiniMed™ 780G System: First Report of Outcomes from 4'120 Users

Authors

Julien Da Silva[1], Giuseppe Lepore[2], Tadej Battelino[3], Arcelia Arrieta[4], Javier Castañeda[4], Benyamin Grossman[5], John Shin[5], Ohad Cohen[1]

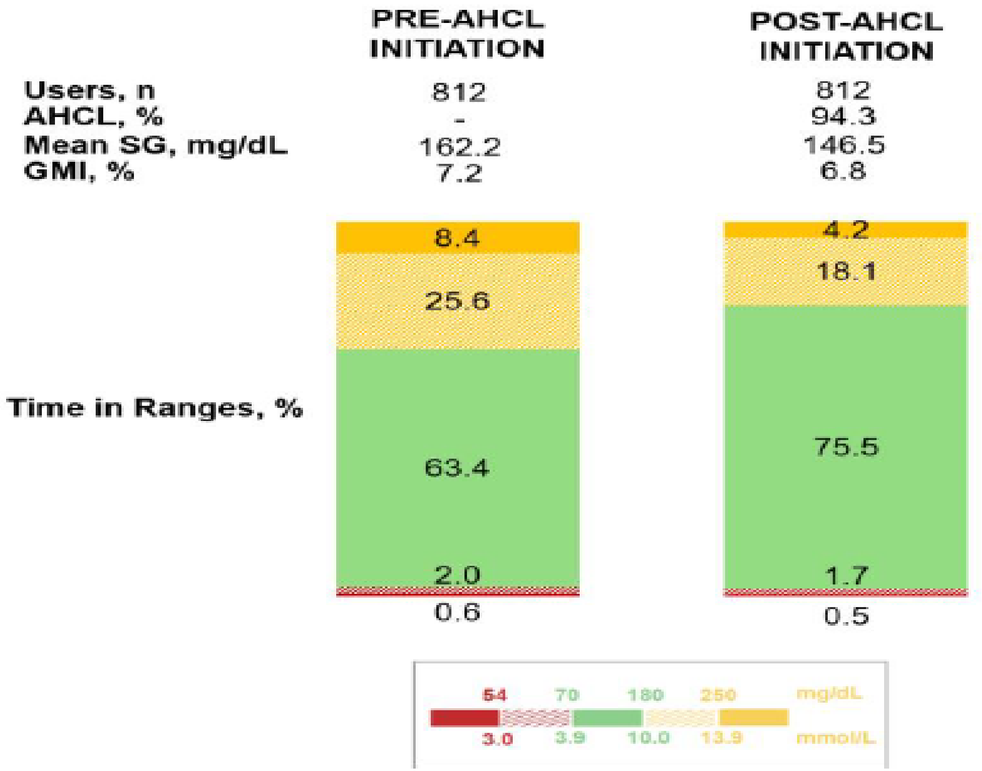
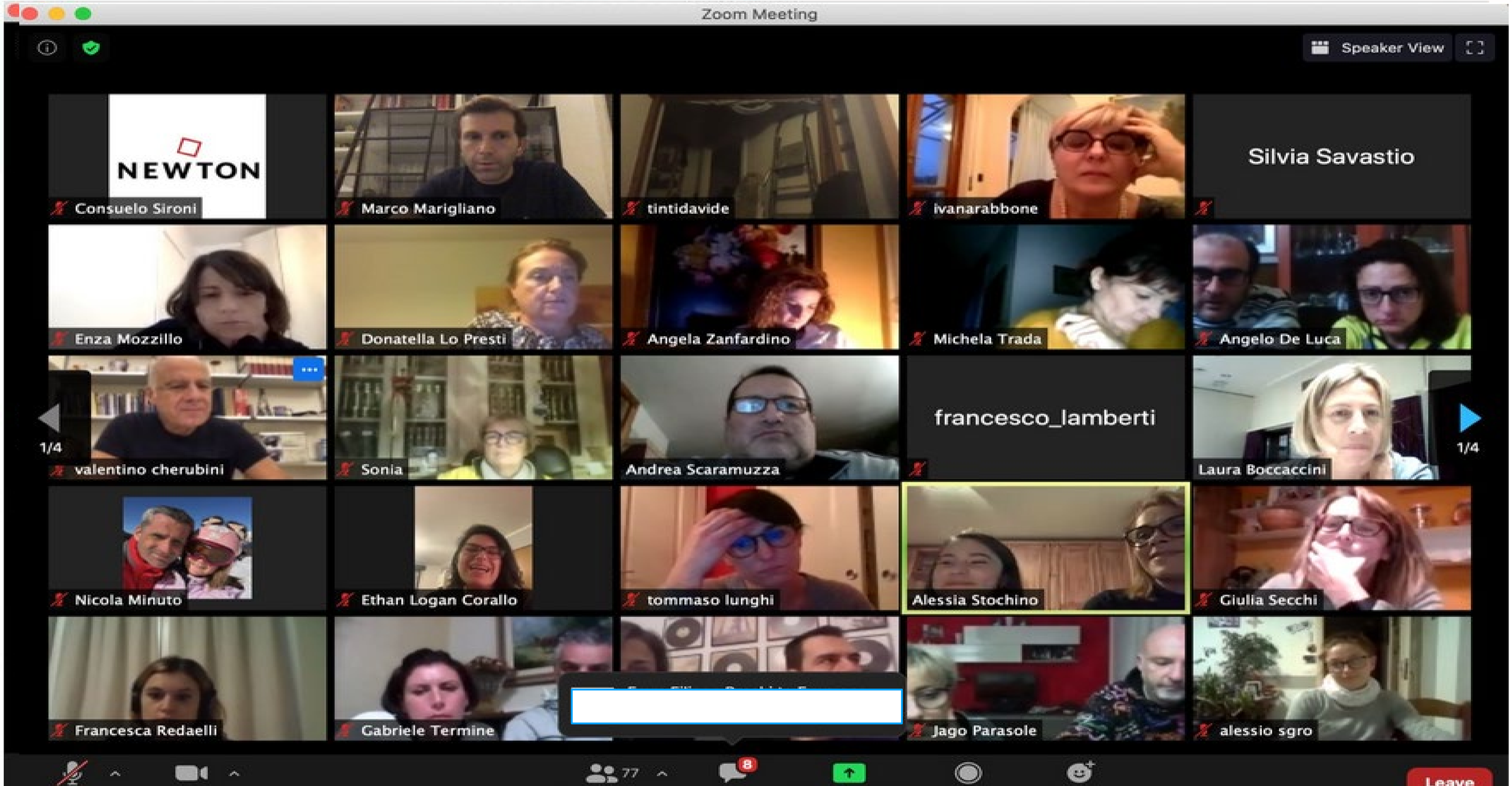


Figure 2. MiniMed™ 780G system performance pre- and post-AHCL initiation

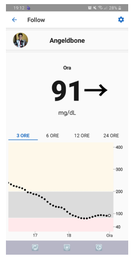
Figure 2. Caption

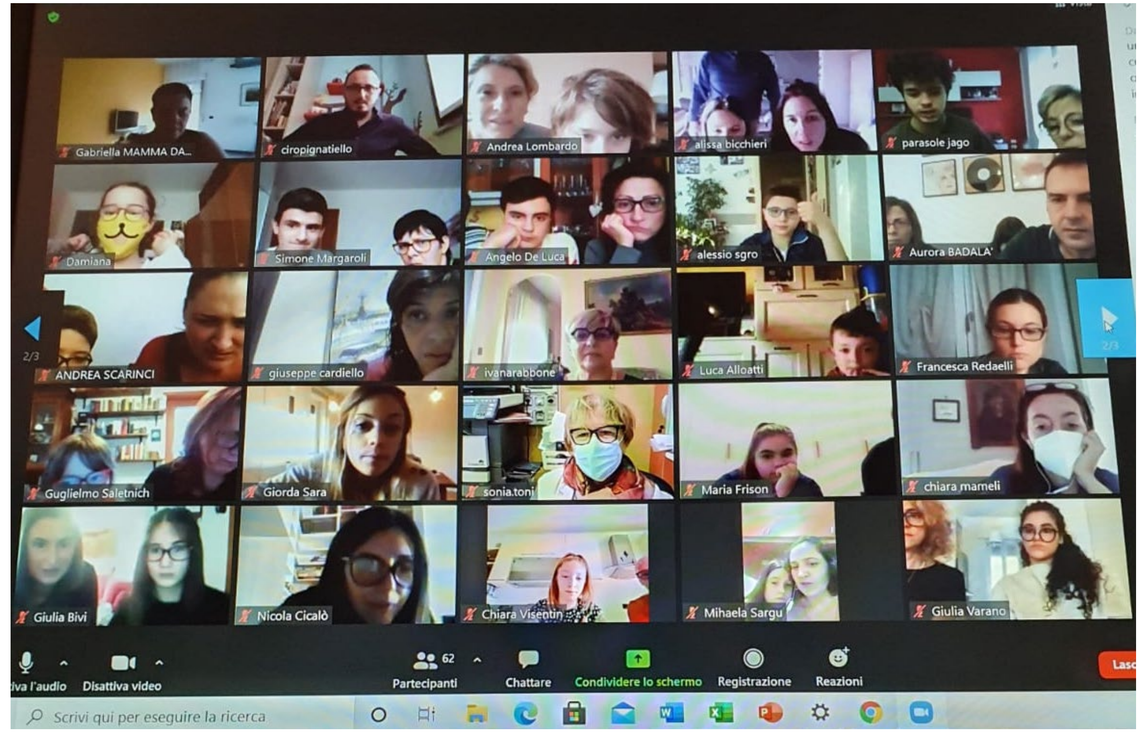
La tecnologia spinta applicata ai bambini

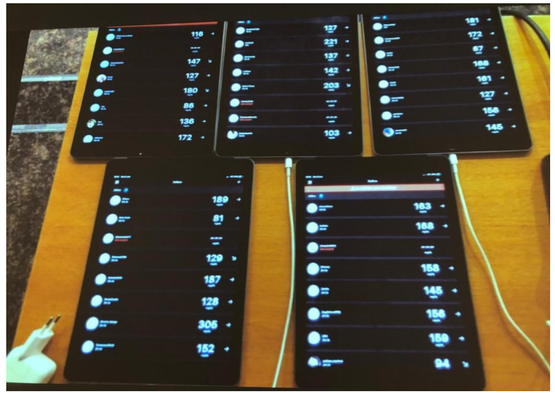
Neanche la PANDEMIA ci ha fermato !!!

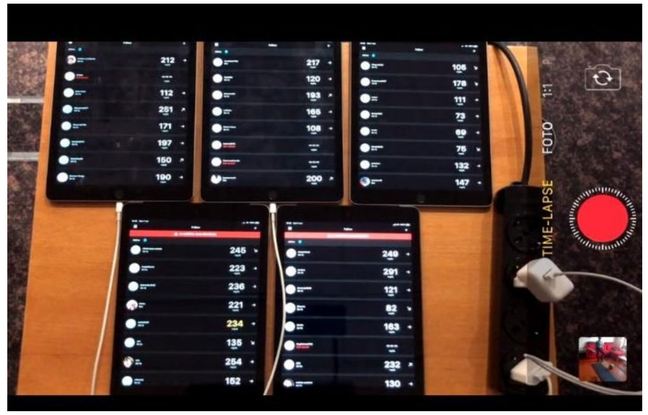


Setting up the vEC





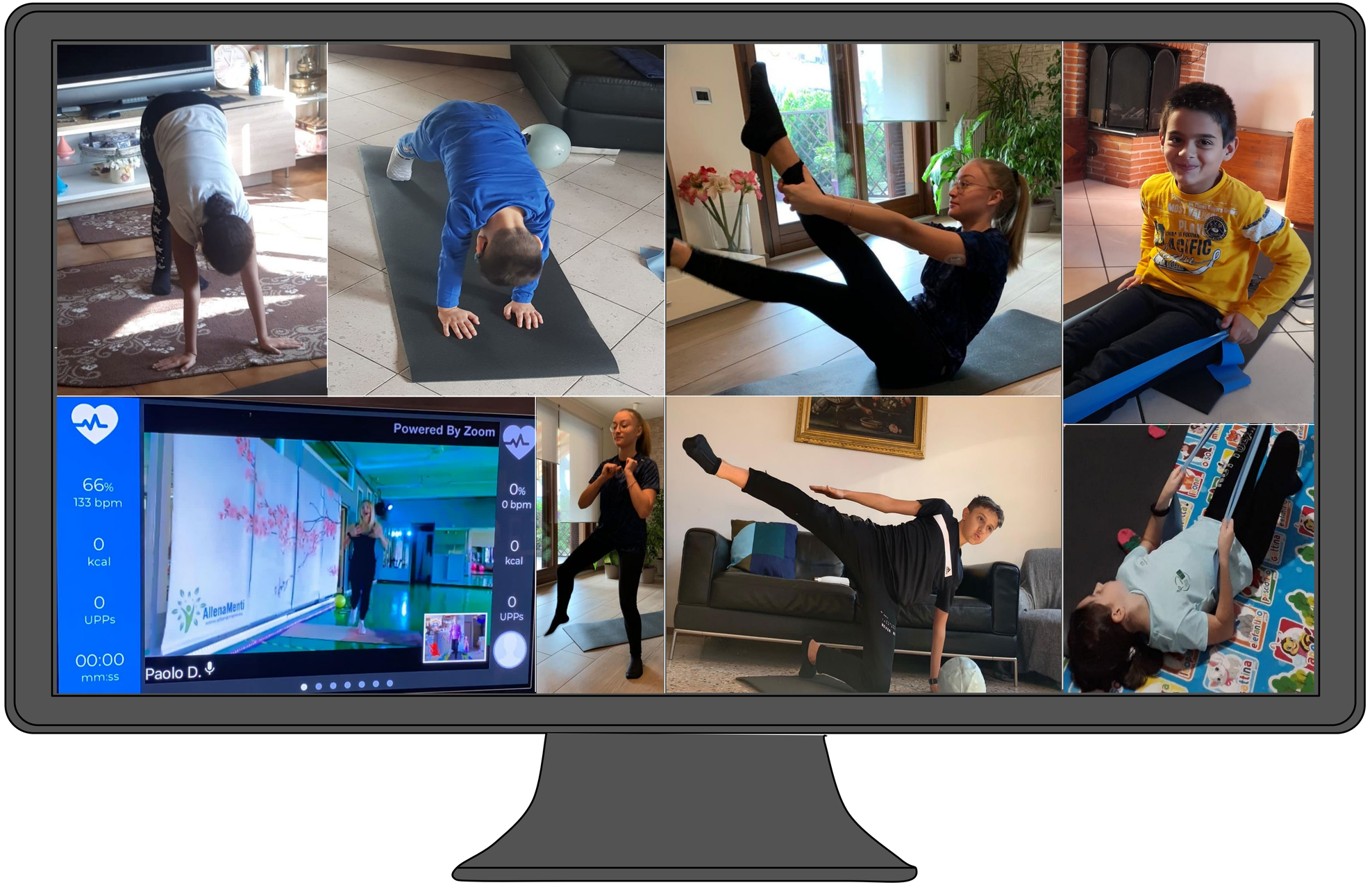




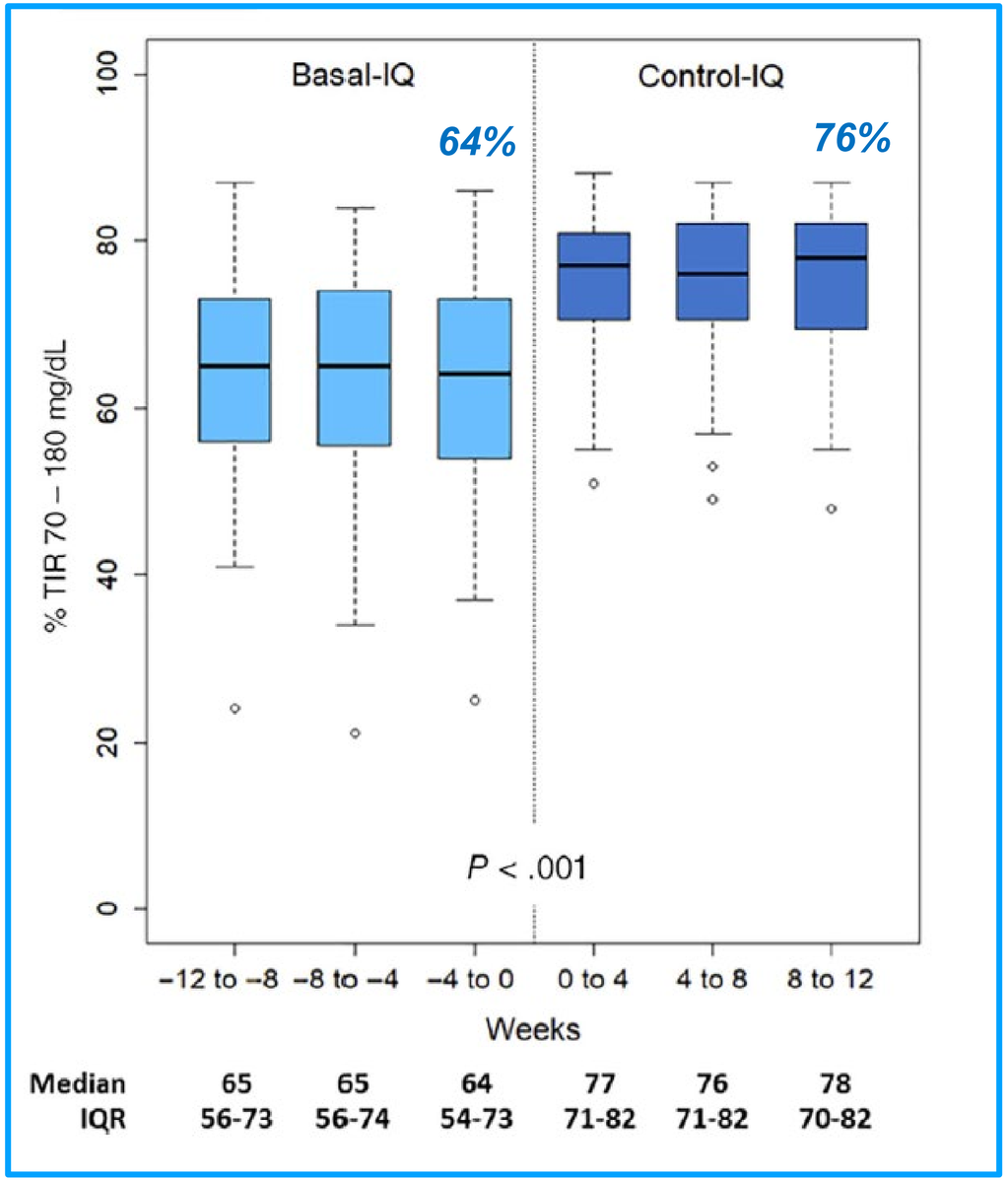
Meal time at the vEC

Cooking and snacking at the vEC

Workout at the vEC



Effectiveness of a closed-loop control system and a virtual educational camp for children and adolescents with type 1 diabetes: A prospective, multicentre, real-life study

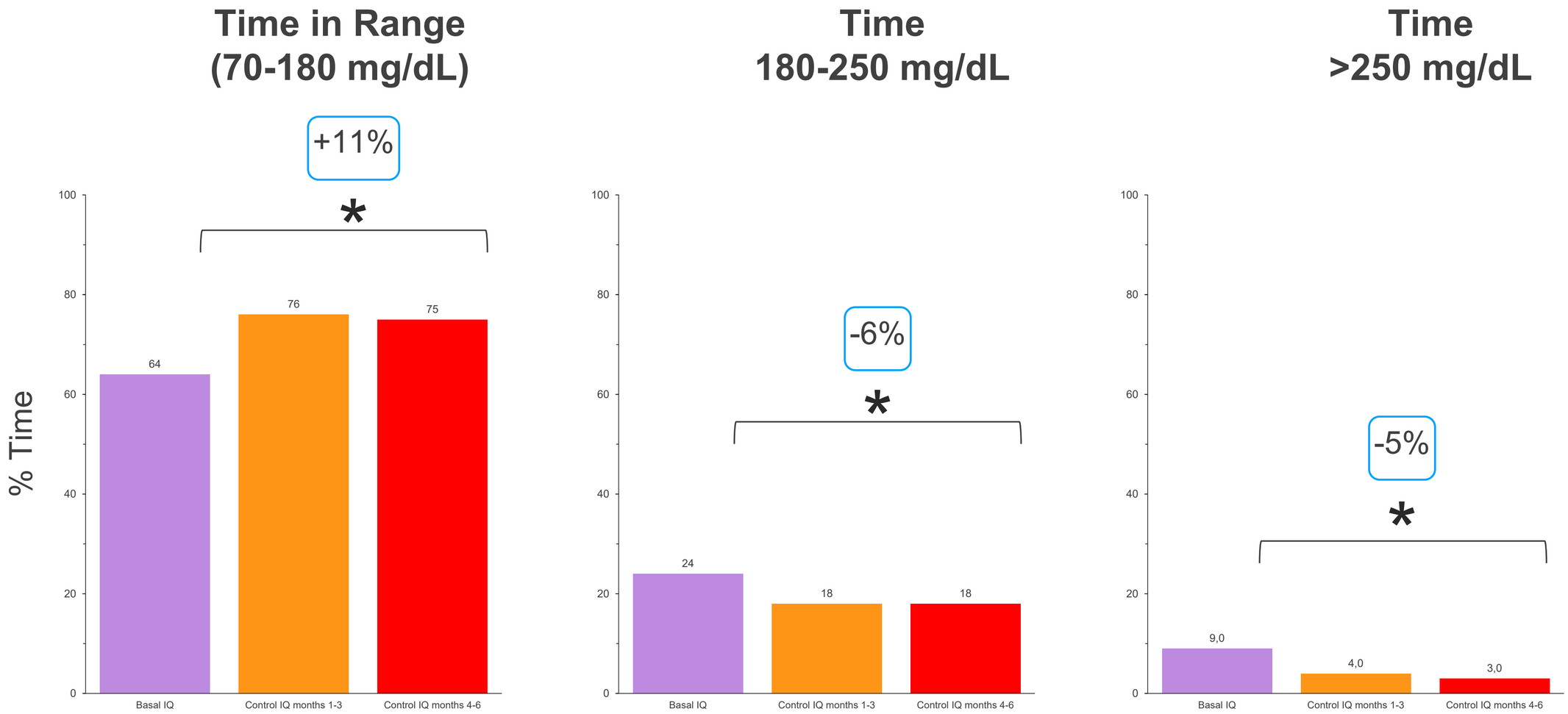


Differences in metrics with CIQ versus BIQ	BIQ TIR ≤70% n = 30	BIQ TIR >70% n = 13	*P* value
Δ % time <54 mg/dL	0 (0; 0)	0 (−1; 0)	.482
Δ % time 54-70 mg/dL	0 (−1; 0)	0 (−1; 0)	.277
Δ % time 70-180 mg/dL	14 (10; 18)	6 (2; 8)	.001
Δ % time 180-250 mg/dL	−7 (−9; −5)	−2 (−6; −1)	.001
Δ % time >250 mg/dL	−6 (−8; −4)	−1 (−2; −1)	.001
Δ mean BG	−19 (−23; −10)	−1 (−6; 1)	.001
Δ % CV	−3 (−5; −0.3)	−2 (−5; −1)	.852
Δ GMI	−0.4 (−0.6; −0.3)	0 (−0.1; 0)	.001
Δ HbA1c (%)	−0.3 (−0.8; −0.1)	−0.2 (−0.4; 0)	.228
mmol/mol	−3.3 (−8.7; −1.1)	−2.2 (−4.4; 0)	.208

In this study of children managing their diabetes in a real-world setting, more than 75% of children who participated in a vEC after starting a CLC system could obtain and maintain a TIR of more than 70%

Cherubini et al, Diabetes Obes Metab. 2021;1–8.

Sustained improvement of glucose control after 6 months



* *p<0.001*

Glucose metrics during Basal IQ and after 6 months of Control IQ

	Basal-IQ*	Control-IQ*	Difference (IC95%)#	p-value
% time <54 mg/dL	0 (0; 1)	0 (0; 1)	0 (-1; 1)	0.588
% time 54-70 mg/dL	1 (1; 3)	2(1; 3)	1(-1; 1)	0.334
% time 70-180 mg/dL	64 (56; 73)	75 (70; 82)	11 (9; 14)	<0.001
% time 180-250 mg/dL	24 (20; 28)	18 (13; 22)	-8 (-7; -4)	<0.001
% time >250 mg/dL	9 (4; 13)	3 (2; 6)	-5 (-6; -3)	<0.001
Mean BG, mg/dL	162 (150; 171)	147 (135; 157)	-15(-19; -9)	<0.001
%CV	36 (33; 39)	32 (30; 36)	-4 (-6; -2)	0.001
GMI	7.2 (6.9; 7.4)	6.8 (6.5; 7.1)	-0.4 (-0.5; -0.2)	0.001

Complicanze oggi:

studio registro australiano presentato a ISPAD 2021

Coorte esordi 1990-2009

Follow up medio di 19 anni +/- 5 anni

Considerati 5424 pazienti (età media all'esordio 8,9 anni)

Complicanze acute (DKA e Ipoglicemia) 49% ricoverati

Complicanze croniche:

6.7% complicanze oculari

15% complicanze renali (6% IRC, 0,8% dialisi)

0,2% cuore

0,2% ictus

2,5% neuropatia

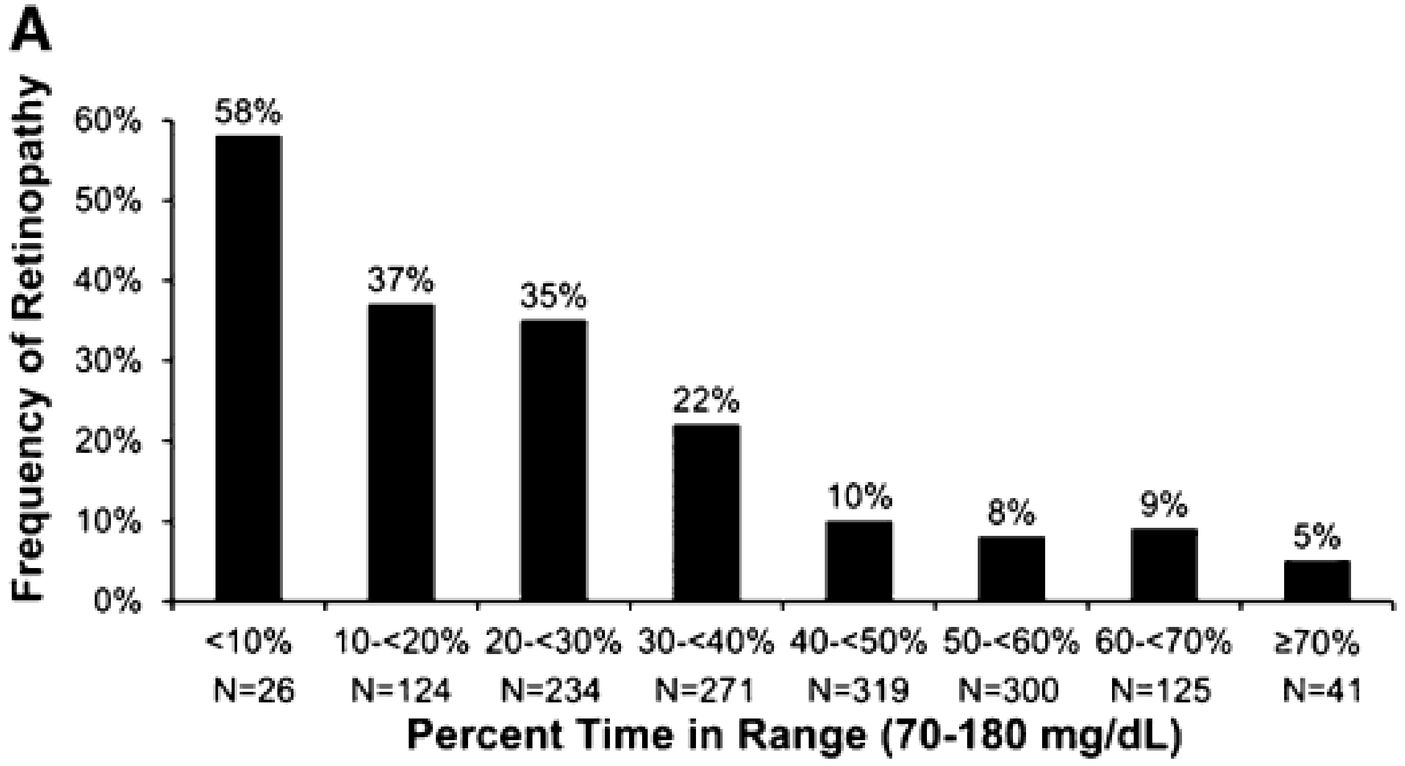
115 morti (50% per causa del diabete) circa 2% in 20 anni diabete

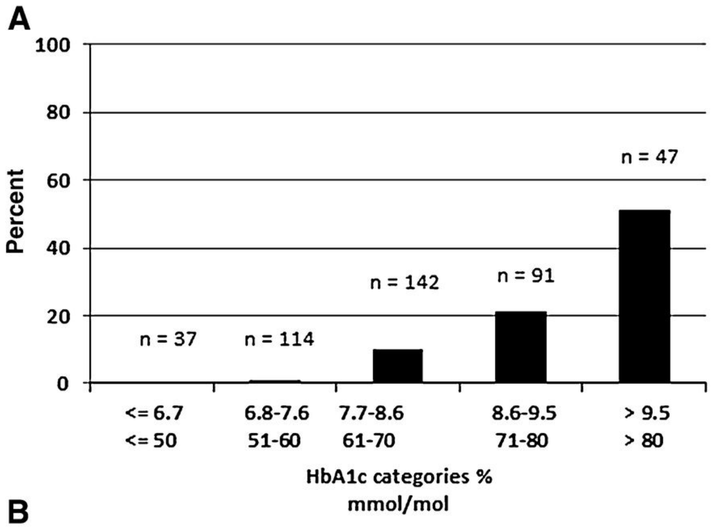
Donague K , ISPAD 2021

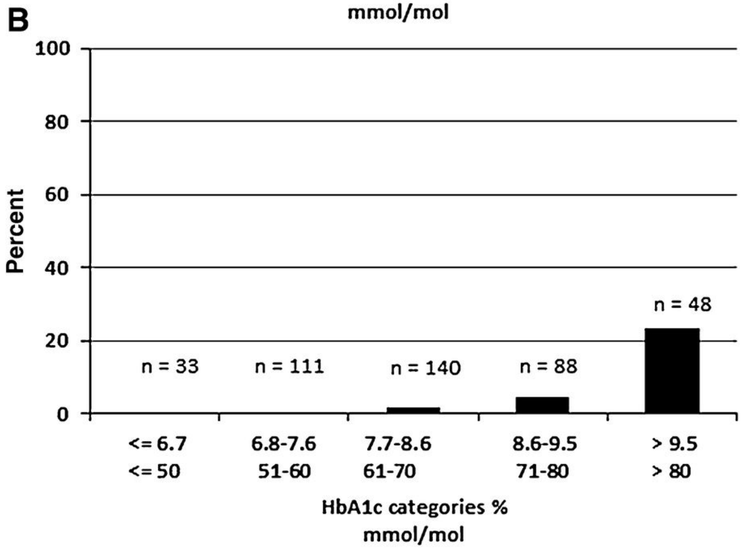
Validation of Time in Range as an Outcome Measure for Diabetes Clinical Trials

Roy W. Beck,[1] Richard M. Bergenstal,[2] Tonya D. Riddlesworth,[1] Craig Kollman,[1] Zhaomian Li,[1] Adam S. Brown,[3] and Kelly L. Close[4]

Diabetes Care 2019;42:400–405 | https://doi.org/10.2337/dc18-1444







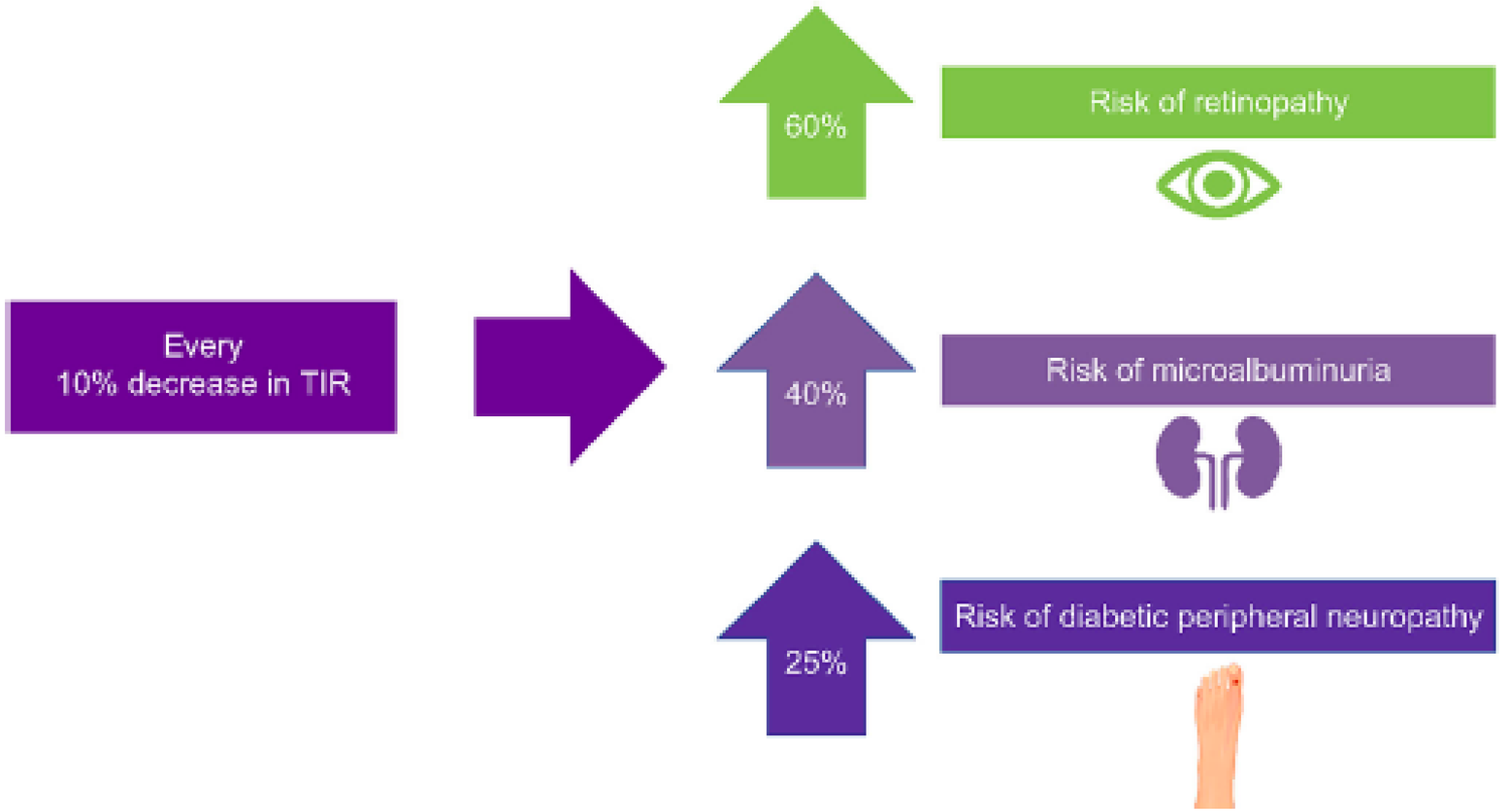


Fig. 3 Impact of TIR on microvascular outcomes [46]

Grazie per l'attenzione

Staff Diabetologia Pediatrica, Novara
Prof.ssa Ivana Rabbone

UNIVERSITÀ DEL PIEMONTE ORIENTALE

- ***Dr.ssa Silvia Savastio, Dr.ssa E. Pozzi, Dr.ssa R. Ricotti***
- ***Medici in formazione specialistica:***
  E. Chiarle, A. Manzo
  Psicologo: Dr. C. Pignatiello
- ***Dietista: Dr.sse S. Giorda, D. Carrera***

Pediatria Novara