

Tecnologie avanzate in diabetologia: Up to date

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Il Mondo dei Robot: 50 anni dopo

Ilaria Dicembrini

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WESTWORLD

...where robot men and
women are programmed
to serve you for
...ROMANCE
...VIOLENCE
...ANYTHING



MGM Presents "WESTWORLD" Starring YUL BRYNNER RICHARD BENJAMIN
James Brolin Music by Fred Karlin Written and Directed by Michael Crichton Produced by Paul N. Lazarus III
PG PARENTAL GUIDANCE SUGGESTED (PG) PANAVISION® METROCOLOR

Il Mondo dei Robot, gli androidi: la tecnologia

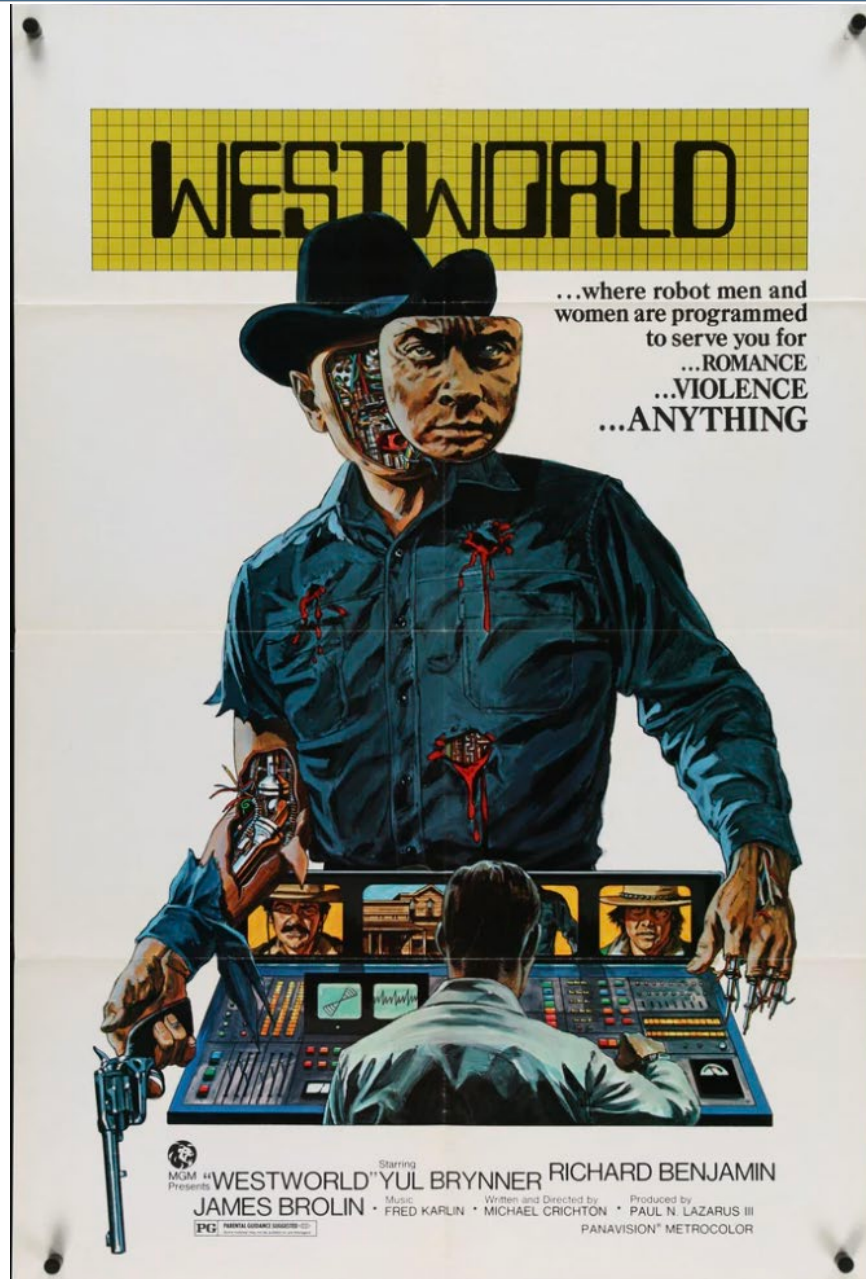


Il Mondo dei Robot, la cabina di regia: i team diabetologici



Il Mondo dei Robot, i visitatori: le persone con diabete

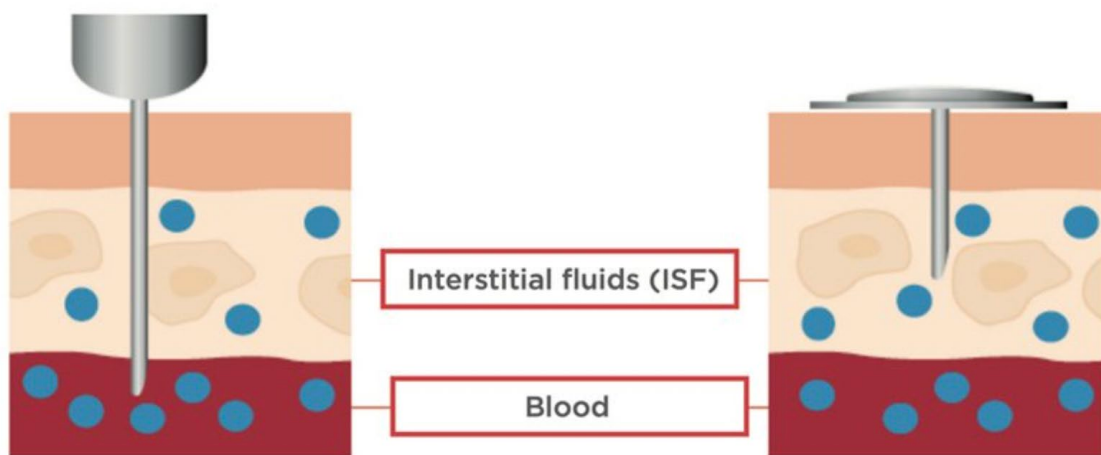




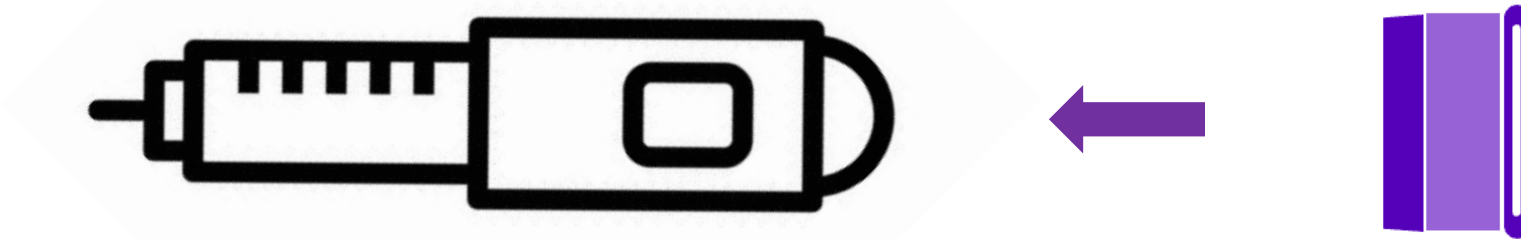
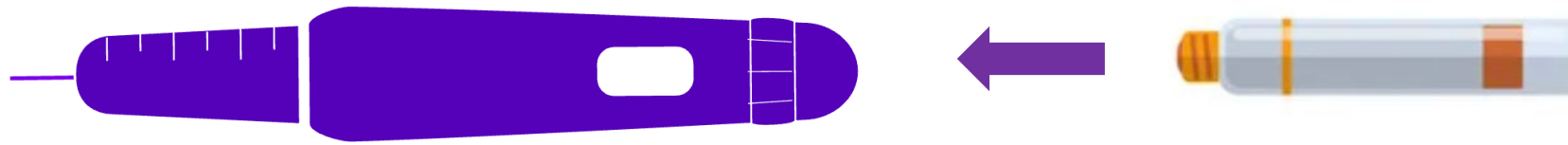
...where robot men and
women are programmed
to serve you for

1. Improving adherence!

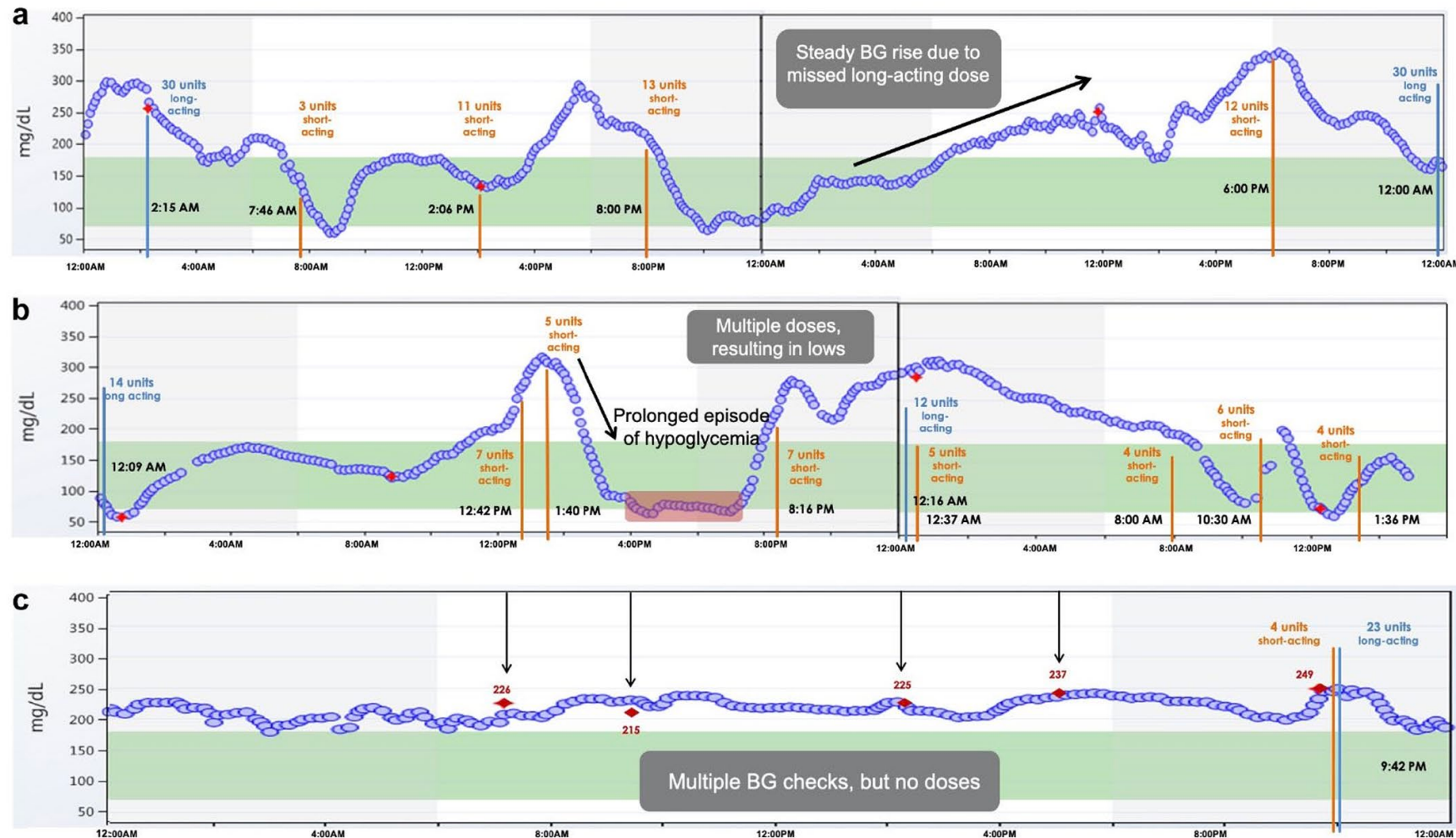
Sistema di monitoraggio del glucosio interstiziale. Oltre....



Insulin Smart Pen, Insulin Pen Cap.



Insulin Smart Pen plus CGM & non adherence to insulin regimen.





Efficacy of a Connected Insulin Pen Cap in People With Noncontrolled Type 1 Diabetes: A Multicenter Randomized Clinical Trial

Randomized Clinical trial

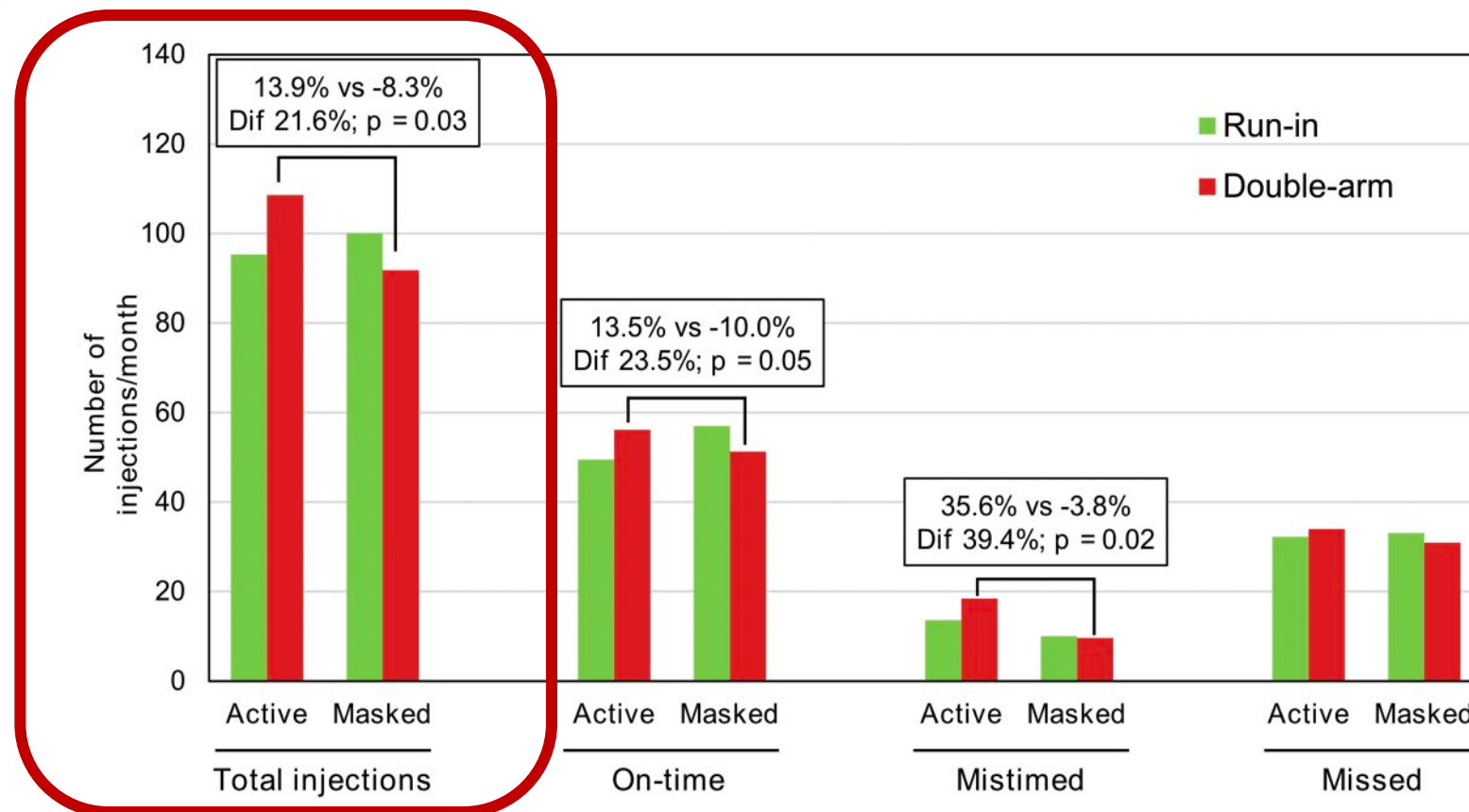
Treatment: Insulin Pen Cap+CGM

Comparator: Masked Pen Cap+CGM

Principal endpoint: TIR

Patients: 55 Type 1 Diabetes

Follow-up: 4 wks run in+6 wks



regularly attending (≥ 2 per year) visits at the endocrinology department
7 study visits



Efficacy of a Connected Insulin Pen Cap in People With Noncontrolled Type 1 Diabetes: A Multicenter Randomized Clinical Trial

Randomized Clinical trial

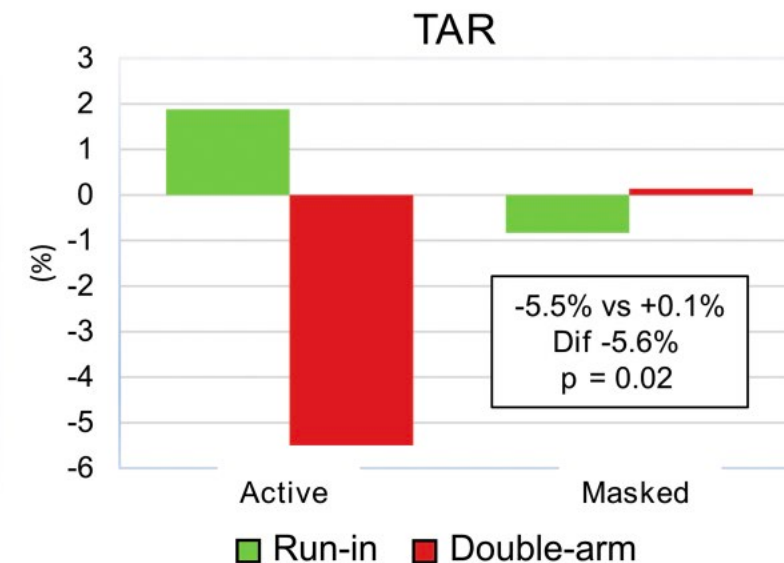
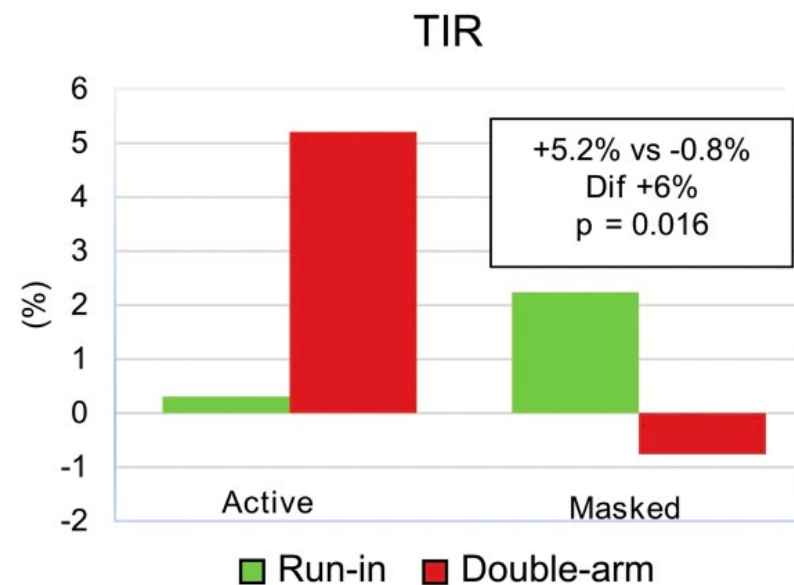
Treatment: Insulin Pen Cap

Comparator: Masked Pen Cap

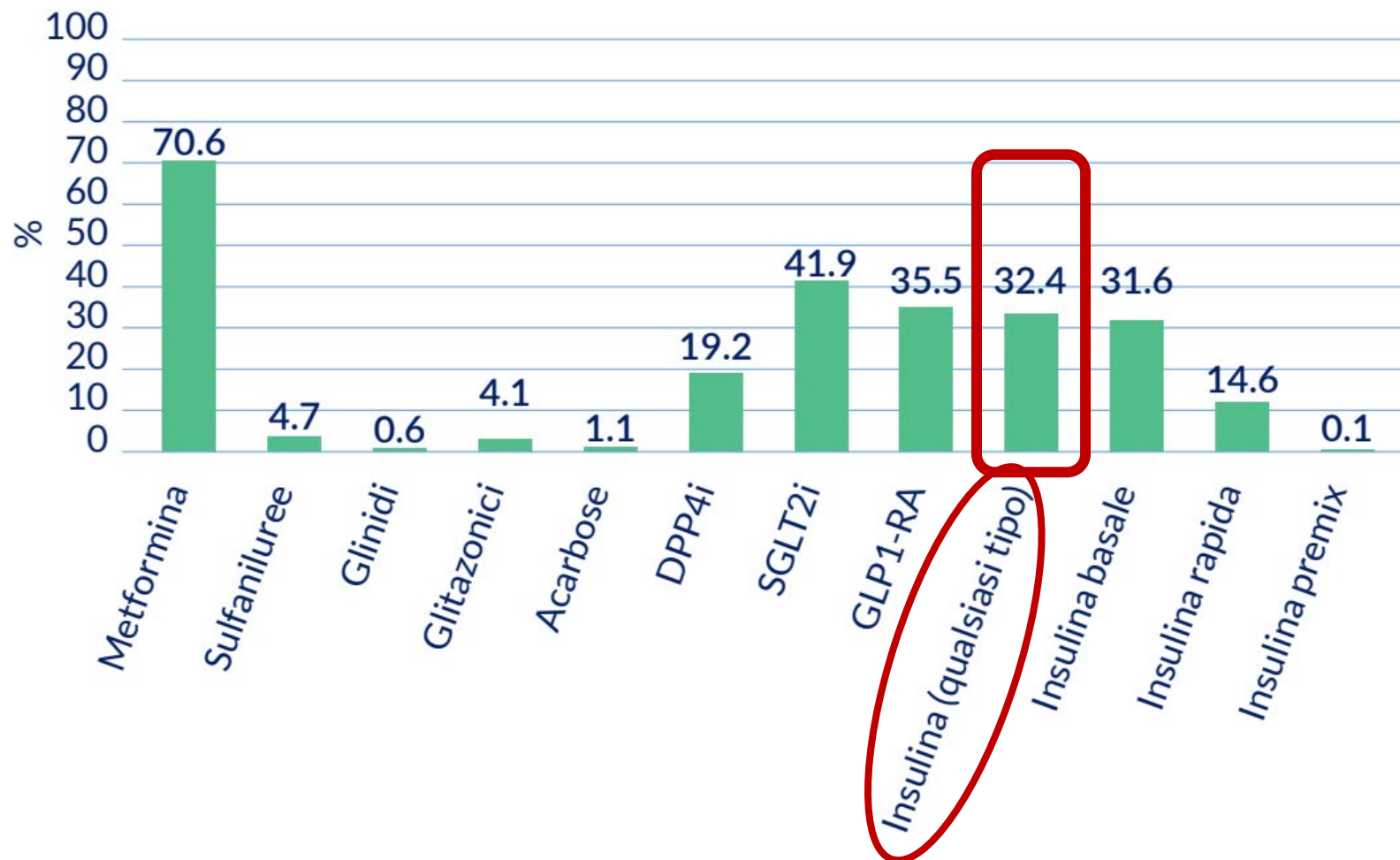
Principal endpoint: TIR

Patients: 55 Type 1 Diabetes

Follow-up: 4 wks run in+6 wks



Terapia antiperglicemizzante nel Diabete tipo 2 in Italia. I dati AMD.



Adherence to Basal Insulin= measure medication possession ratio>80%

REVIEW

Adherence and Persistence to Basal Insulin Among People with Type 2 Diabetes in Europe: A Systematic Literature Review and Meta-analysis

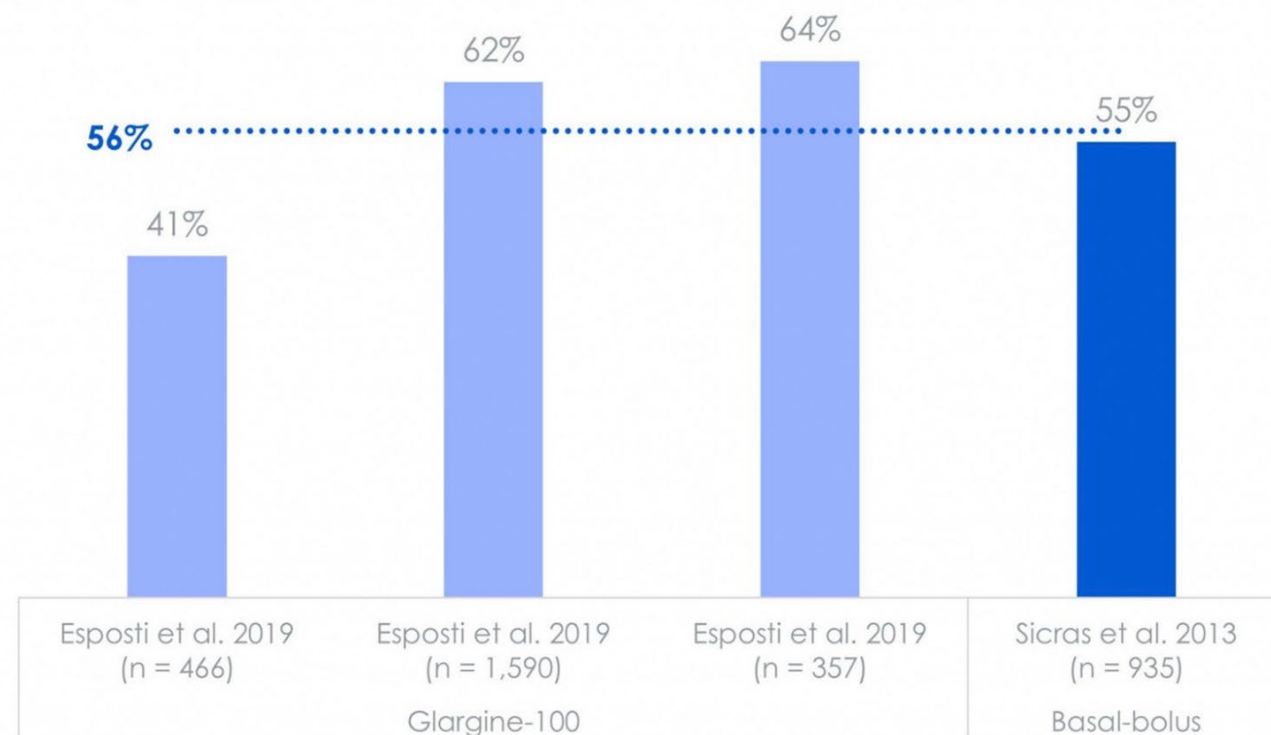
Systematic Review and Meta-analysis

Database: Medline and Embase

Patients: Type 2 Diabetes treated with basal insulin

Outcomes: Adherence and persistence

Study type: observational studies, questionnaires, clinical trials, aggregated population data



Efficacy of a Smart Insulin Pen Cap for the Management of Patients with Uncontrolled Type 2 Diabetes: A Randomized Cross-Over Trial

Rodolfo J. Galindo, MD, FACE¹ , Clementina Ramos, MD¹,
Saumeth Cardona, MD, MPH¹ , Priyathama Vellanki, MD, MS¹,
Georgia M. Davis, MD¹, Omolade Oladejo, MD, MPH¹ ,
Bonnie Albury, MD¹, Neil Dhruv, BS, Limin Peng, PhD²,
and Guillermo E. Umpierrez, MD, CDE¹ 

Pilot Randomized Cross-Over trial

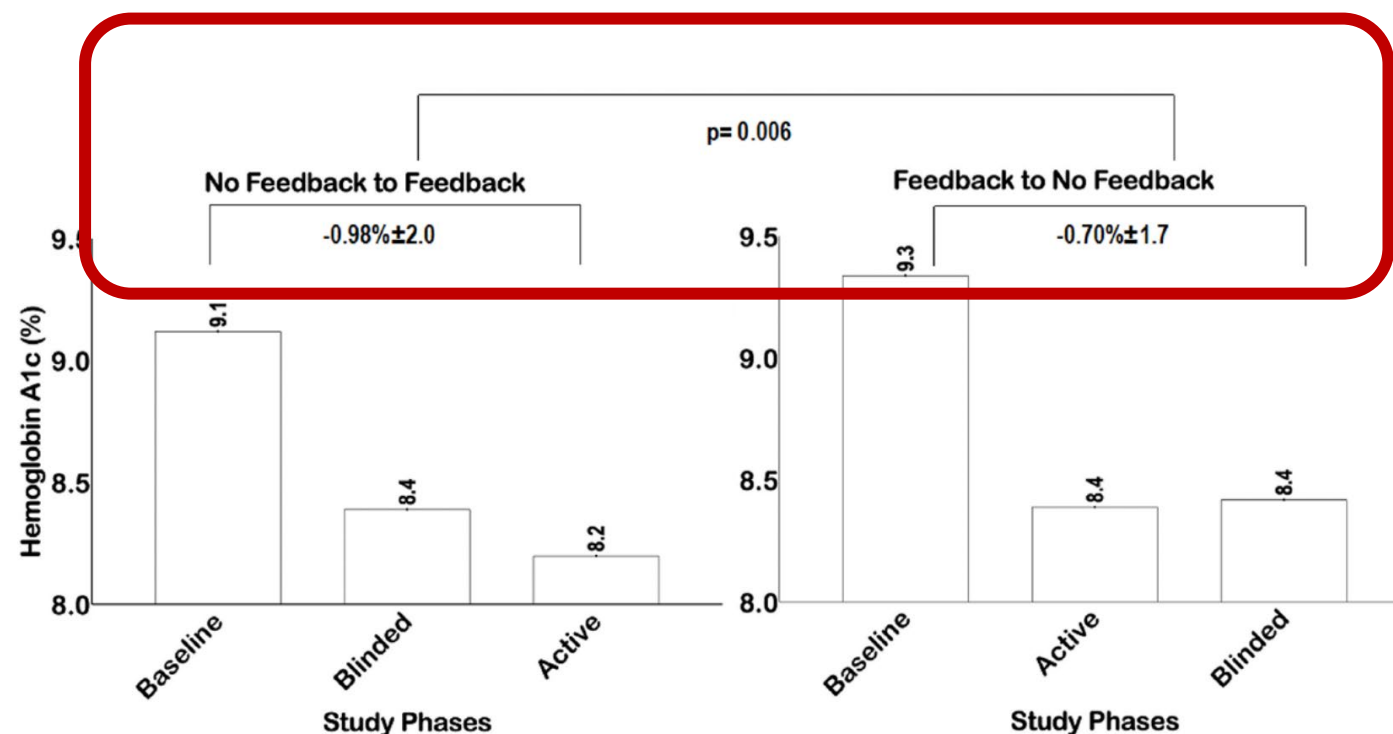
Treatment: Insulin Pen Cap+SMBG

Comparator: masked Pen Cap+SMBG

Principal endpoint: HbA1c

Patients: 80 T2DM (Basal insulin+OAD)

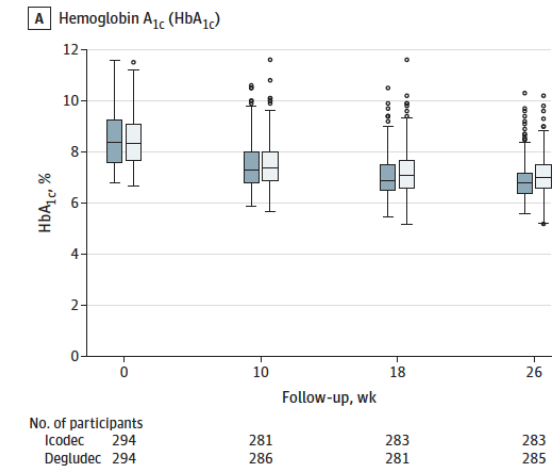
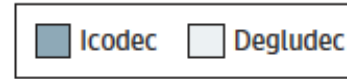
Follow-up: 24 weeks



JAMA

Once-Weekly Insulin Icodec vs Once-Daily Insulin Degludec in Adults With Insulin-Naive Type 2 Diabetes

The ONWARDS 3 Randomized Clinical Trial



ONWARDS-3 trial

Treatment: Icodec

Comparator: Degludec

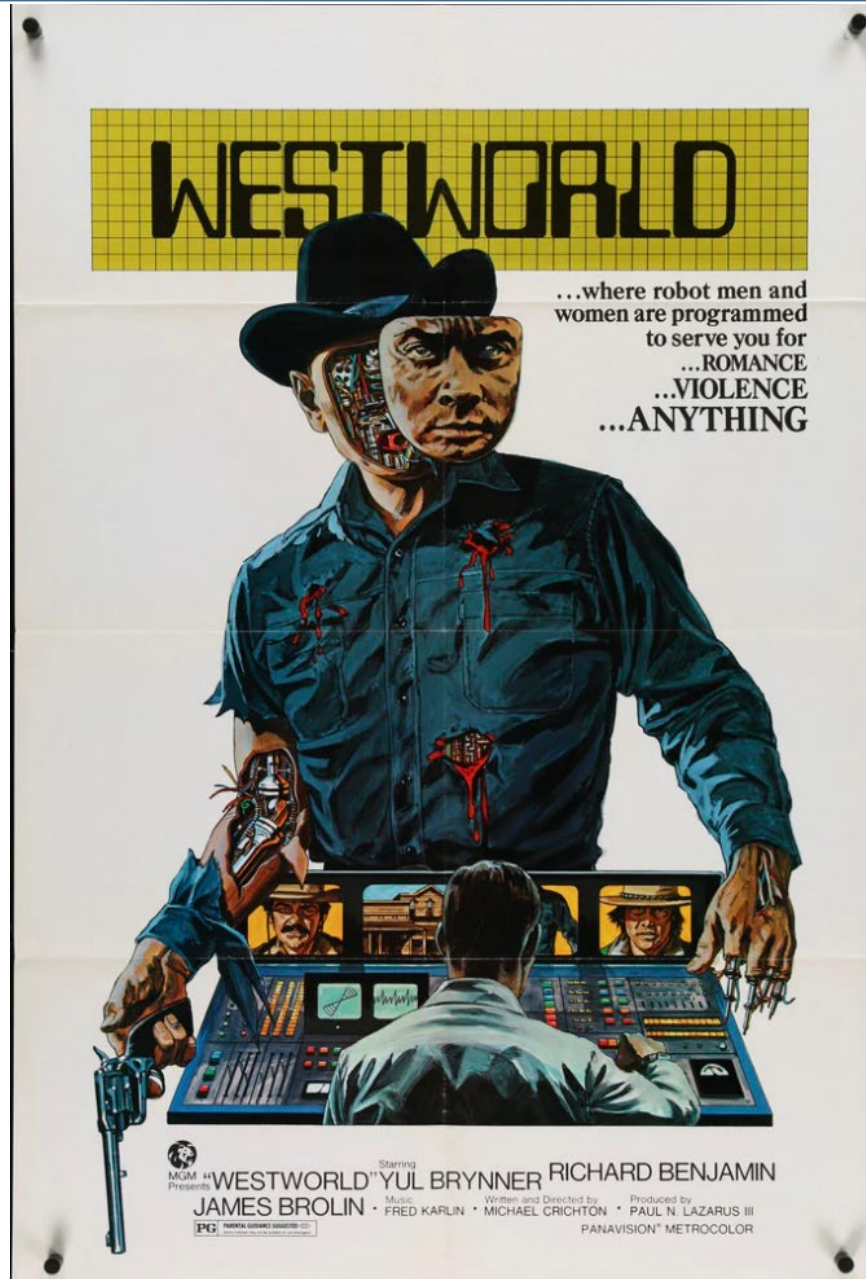
Patients: 588 T2D

inadequately controlled with non-insulin drugs

Outcome: HbA_{1c} at 26 wk

Follow-up: 31 wk

	Once-weekly insulin icodec (n = 293)			Once-daily insulin degludec (n = 294)				<i>P</i> value
	Participants, No. (%)	Events		Participants, No. (%)	Events		Estimated rate ratio (95% CI)	
		No.	Rate per patient-year of exposure		No.	Rate per patient-year of exposure		
Key secondary safety end points								
Level 2 hypoglycemic episodes ^a								
Baseline to week 31 ^b	26 (8.9)	53	0.31	17 (5.8)	23	0.13	2.09 (0.99-4.41)	.05
Baseline to week 26 ^c	24 (8.2)	50	0.35	13 (4.4)	17	0.12	3.12 (1.30-7.51)	.01
Level 3 hypoglycemic episodes ^a								
Baseline to week 31 ^b	0	0		2 (0.7)	2	0.01		
Baseline to week 26 ^c	0	0		0	0			
Level 2 or level 3 hypoglycemic episodes								
Baseline to week 31 ^b	26 (8.9)	53	0.31	18 (6.1)	25	0.15	1.82 (0.87-3.80)	.11
Baseline to week 26 ^c	24 (8.2)	50	0.35	13 (4.4)	17	0.12	3.12 (1.30-7.51)	.01



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women are programmed
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2. Improving Insulin management



Shining the Spotlight on Multiple Daily Insulin Therapy: Real-World Evidence of the InPen Smart Insulin Pen

Retrospective cohort analysis

Treatment: Smart Pen MDI

Endpoints: diabetes management and
glycemic outcomes

Patients: 3793 T1D, 552 T2D, and
808 unidentified

Follow-up: last 2 wks

+Aderenza

= +TIR

	Cluster 1 (N=1125)	Cluster 2 (N=2139)	Cluster 3 (N=1889)
Dose timing (%)			
On-time	27.9±8.5	49.4±0.8	72.9±1.0
Missed	59.8±9.2	37.2±7.2	17.3±7.8
Late	12.3±7.3	13.3±12.3	9.9±7.6
Glycemic outcomes			
TBR	1.6±2.8	1.7±2.6	2.4±5.0
TIR	37.4±20.5	50.9±20.5	69.0±19.8
TAR	61.0±21.1	47.5±21.1	28.6±20.3
Age (N)			
0–17	695	141	287
18–64			
65 or older			
Not specified			
Diabetes type (N)			
Type 1	3793	833	1601
Type 2	552	97	219
Not specified	808	195	319

Data are shown as mean ± SD or count.

Shining the Spotlight on Multiple Daily Insulin Therapy:
Real-World Evidence of the InPen Smart Insulin Pen

Retrospective cohort analysis
Treatment: Smart Pen MDI
Endpoints: diabetes management and
glycemic outcomes
Patients: 3793 T1D, 552 T2D, and
808 unidentified
Follow-up: last 2 wks

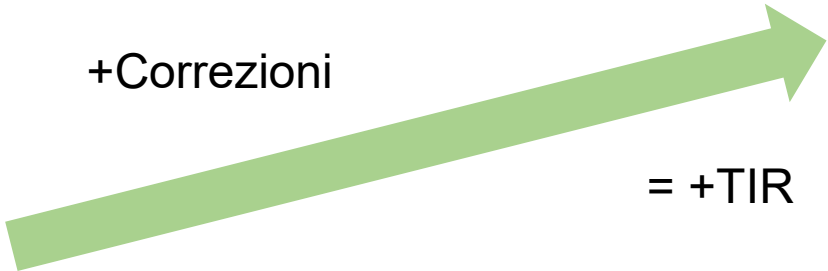


TABLE 2. GLYCEMIC OUTCOMES AND CORRECTION
FREQUENCY BY DOSE COUNT GROUP

<i>Dose count group</i>	<i>N</i>	<i>TBR (%)</i>	<i>TIR (%)</i>	<i>TAR (%)</i>	<i>GMI</i>	<i>Correction frequency (%)</i>
≥1	462	1.81	50.8	47.3	8.01	19.7
≥2	1447	1.66	52.3	46.0	7.84	15.7
≥3	1546	1.75	54.7	43.6	7.66	17.2
≥4	858	2.23	55.2	42.6	7.59	20.4
≥5	468	2.42	58.2	39.3	7.44	23.8
≥6+	382	2.51	61.0	36.4	7.33	24.1

TBR, time below range; TIR, time-in-range.

Assessment of basal insulin adherence in people with type 2 diabetes in telemonitoring: Post-hoc analysis of novel data modalities including insulin injection data

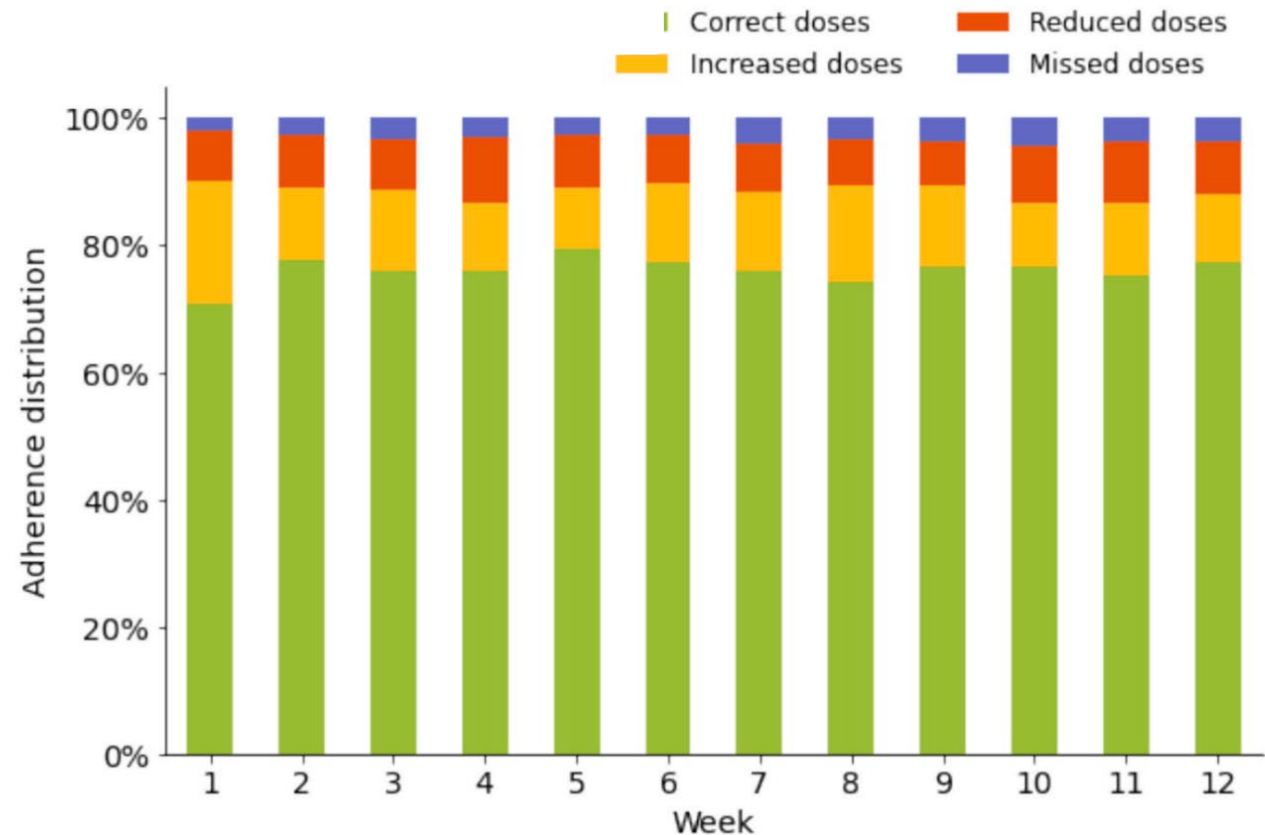
Post-hoc analysis

Treatment: Insulin Smart Pen +CGM

Principal endpoint: basal insulin adherence

Patients: 165 insulin-treated Type 2 Diabetes

Follow-up: 12 wks



Non-persistence **within 6** and **12 months**

REVIEW

Adherence and Persistence to Basal Insulin Among People with Type 2 Diabetes in Europe: A Systematic Literature Review and Meta-analysis

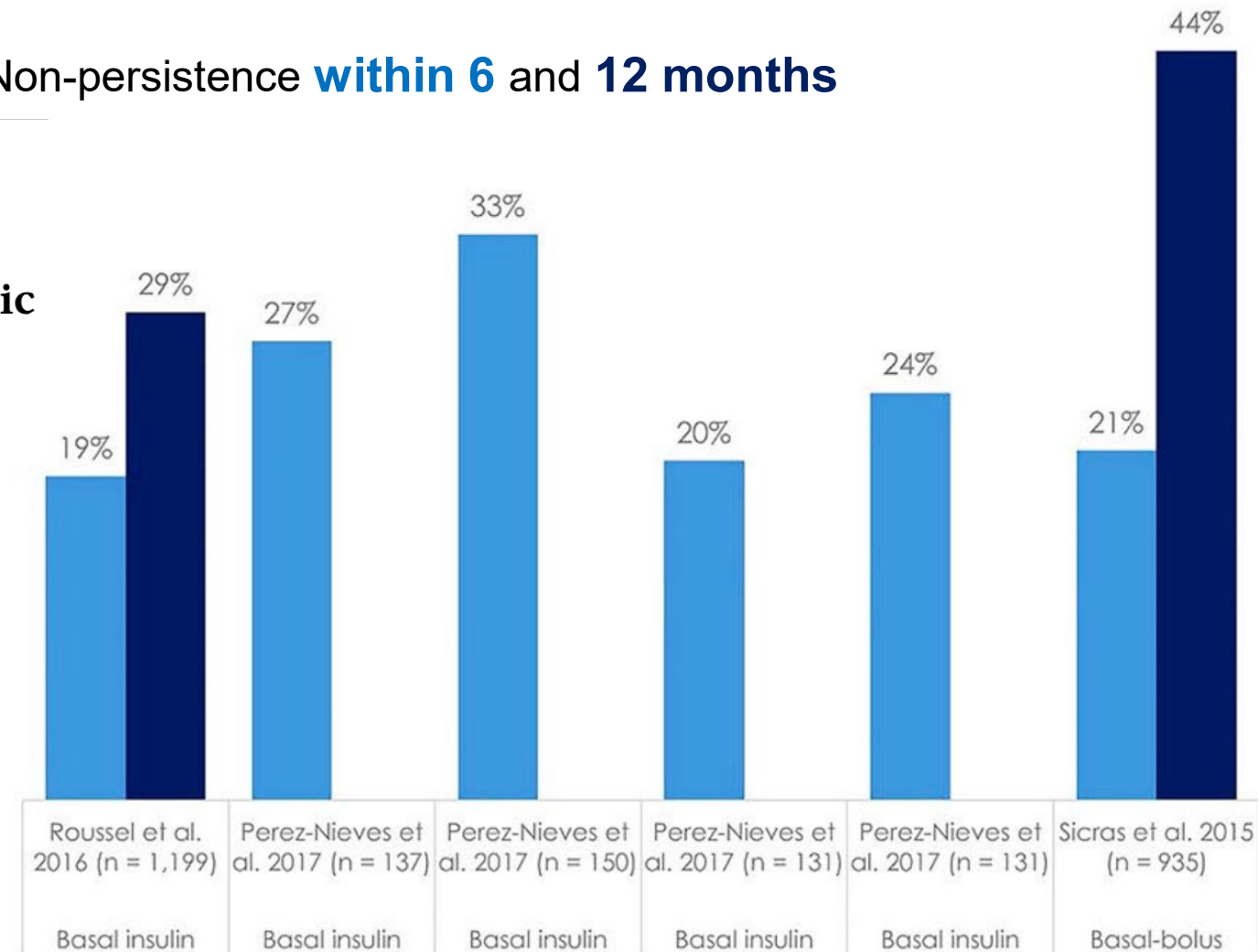
Systematic Review and Meta-analysis

Database: Medline and Embase

Patients: Type 2 Diabetes treated with basal insulin

Outcomes: Adherence and persistence

Study type: observational studies, questionnaires, clinical trials, aggregated population data



Use of smartphone application versus written titration charts for basal insulin titration in adults with type 2 diabetes and suboptimal glycaemic control (My Dose Coach): multicentre, open-label, parallel, randomised controlled trial

Norbert Hermanns,^{a,b,c,*} Dominic Ehrmann,^{a,c} Katharina Finke-Groene,^a Michael Krichbaum,^a Timm Roos,^a Thomas Haak,^b Guido Freckmann,^d and Bernhard Kulzer^{a,b,c}

Variable	Control group		Intervention group		Model-based adjusted difference (95% CI) ^a	p-value
	Baseline	Follow-up	Baseline	Follow-up		
Median (IQR) or number (%)						
Median HbA1c (%)	8.3 (7.7–9.0)	7.4 (7.0–8.1)	8.1 (7.8–9.1)	7.3 (6.8–7.8)	–0.3 (–0.69, –0.01)	0.0388
Fasting glucose in mg/dl	155.7 (136.3–181.1)	147.4 (125.9–163.5)	160.0 (140.7–181.2)	138.2 (118.3–150.2)	–11.0 (–19.5, –3.5)	0.0046

Randomized Clinical trial

Treatment: Smartphone app for insulin titration + fasting SMBG

Comparator: written chart for insulin titration + fasting SMBG

Principal endpoint: HbA1c

Patients: 251 T2D in basal insulin

Follow-up: 12 wks

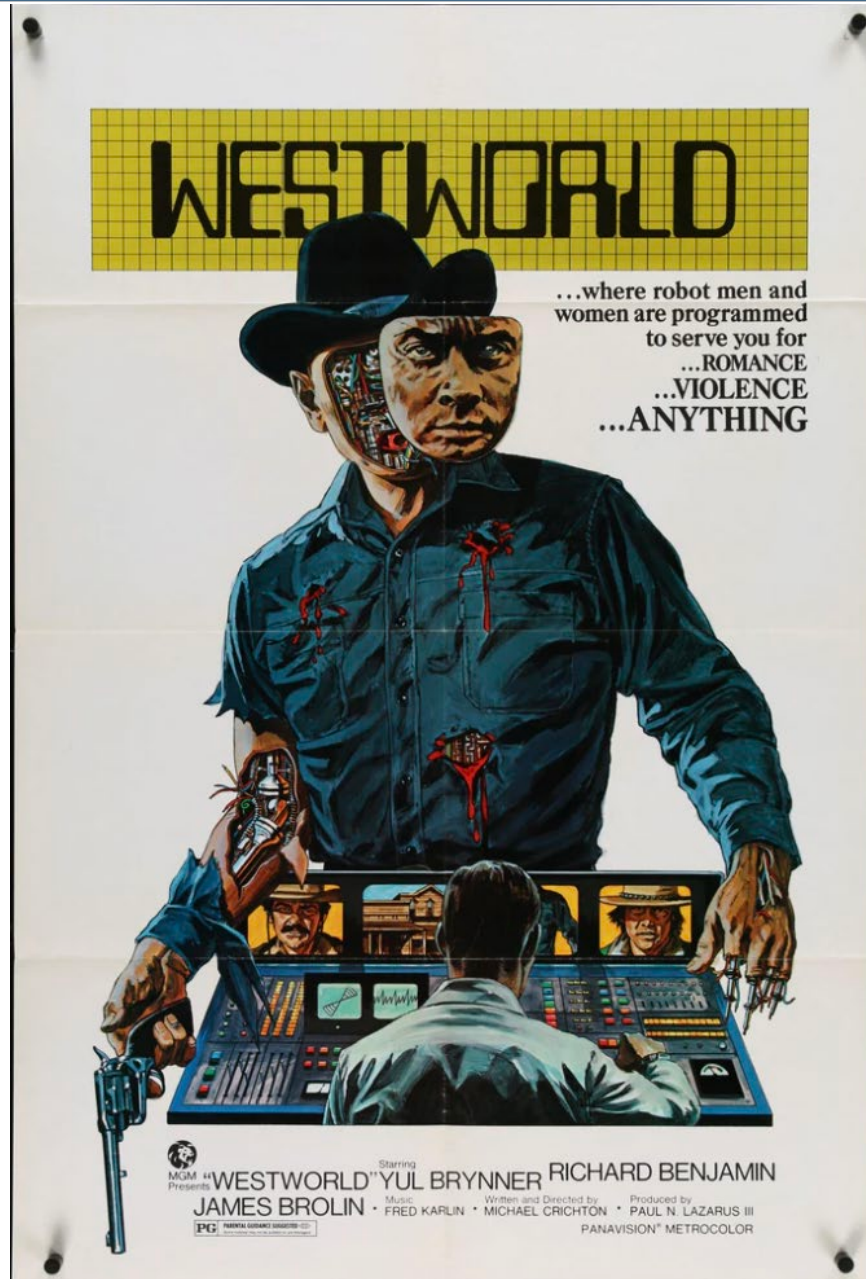


Linee Guida Italiane per il trattamento del diabete tipo 1, 2024

Sistemi ibridi ad ansa chiusa

In soggetti con diabete mellito di tipo 1 si raccomanda l'utilizzo di sistemi ad ansa chiusa costituiti da microinfusore e sensore con automatismo rispetto all'uso di sistemi senza automatismo.

Raccomandazione forte a favore dell'intervento; qualità delle prove alta



...where robot men and
women are programmed
to serve you for

3. dealing succesfully with specific situations



ORIGINAL ARTICLE

Automated Insulin Delivery in Women with Pregnancy Complicated by Type 1 Diabetes

Tara T.M. Lee, M.B., B.S., Corinne Collett, B.Sc., Simon Bergford, M.S., Sara Hartnell, B.Sc., Eleanor M. Scott, M.D., Robert S. Lindsay, Ph.D., Katharine F. Hunt, M.D., David R. McCance, M.D., Katharine Barnard-Kelly, Ph.D., David Rankin, Ph.D., Julia Lawton, Ph.D., Rebecca M. Reynolds, Ph.D., Emma Flanagan, Ph.D., Matthew Hammond, M.Sc., Lee Shepstone, Ph.D., Malgorzata E. Wilinska, Ph.D., Judy Sibayan, M.P.H., Craig Kollman, Ph.D., Roy Beck, Ph.D., Roman Hovorka, Ph.D., and Helen R. Murphy, M.D., for the AiDAPT Collaborative Group*

Treatment: Hybrid Closed-loop

Comparator: MDI or Insulin Pump +CGM

Principal endpoint: TIR (63-140 mg/dL)

Patients: 124 pregnant T1D HbA1c>6.5%

Follow-up: from 16 wk until delivery

Outcomes	Baseline†		Antenatal Intervention Phase‡		
	Closed Loop (N = 59)	Standard Care (N = 59)	Closed Loop (N = 59)	Standard Care (N = 61)	Adjusted Treatment Difference (95% CI)§
Primary outcome					
Percentage of time with glucose level in range 63–140 mg/dl	47.8±16.4	44.5±14.4	68.2±10.5	55.6±12.5	10.5 (7.0 to 14.0)¶
Key secondary outcomes					
Percentage of time with glucose level >140 mg/dl	48.7±18.0	51.8±16.2	29.2±10.6	41.4±13.2	−10.2 (−13.8 to −6.6)
Percentage of overnight time with glucose level in range 63–140 mg/dl (11 p.m. to 7 a.m.)†	47.4±20.8	44.5±16.6	70.8±11.2	56.7±13.6	12.3 (8.3 to 16.2)
Other secondary outcomes					
Percentage of time with glucose level in range 63–180 mg/dl	71±16	68±15	87±9	80±10	6 (3 to 9)
Percentage of time with glucose level >180 mg/dl	26±17	28±16	11±9	17±11	−5 (−8 to −3)
Glucose area under the curve >120 mg/dl	39.5±23.7	41.3±19.7	19.3±12.2	27.9±12.9	−7.4 (−11.1 to −3.7)
Mean glucose level — mg/dl	149±28	151±24	125±14	136±16	−9.2 (−13.7 to −4.7)
Glycated hemoglobin level — %	7.6±1.1	7.9±1.3	6.0±0.5	6.4±0.5	−0.3 (−0.5 to −0.1)
Glucose SD — mg/dl**	54±14	55±12	42±11	47±10	−4.5 (−7.3 to −1.6)
Glucose coefficient of variation — %	36±5	37±6	33±5	34±5	−1.1 (−2.5 to 0.3)
Hypoglycemia					
Median percentage of time with glucose level <63 mg/dl (IQR)	2.75 (0.86 to 4.87)	2.22 (0.72 to 6.00)	2.26 (1.54 to 3.31)	2.02 (1.25 to 4.37)	−0.43 (−1.04 to 0.19)
Median percentage of time with glucose level <54 mg/dl (IQR)	1.05 (0.07 to 2.37)	0.79 (0.18 to 2.28)	0.71 (0.49 to 1.19)	0.73 (0.36 to 1.67)	−0.23 (−0.55 to 0.09)

Advanced Hybrid Closed-Loop Therapy Compared With Standard Insulin Therapy Intrapartum and Early Postpartum in Women With Type 1 Diabetes: A Secondary Observational Analysis From the CRISTAL Randomized Controlled Trial

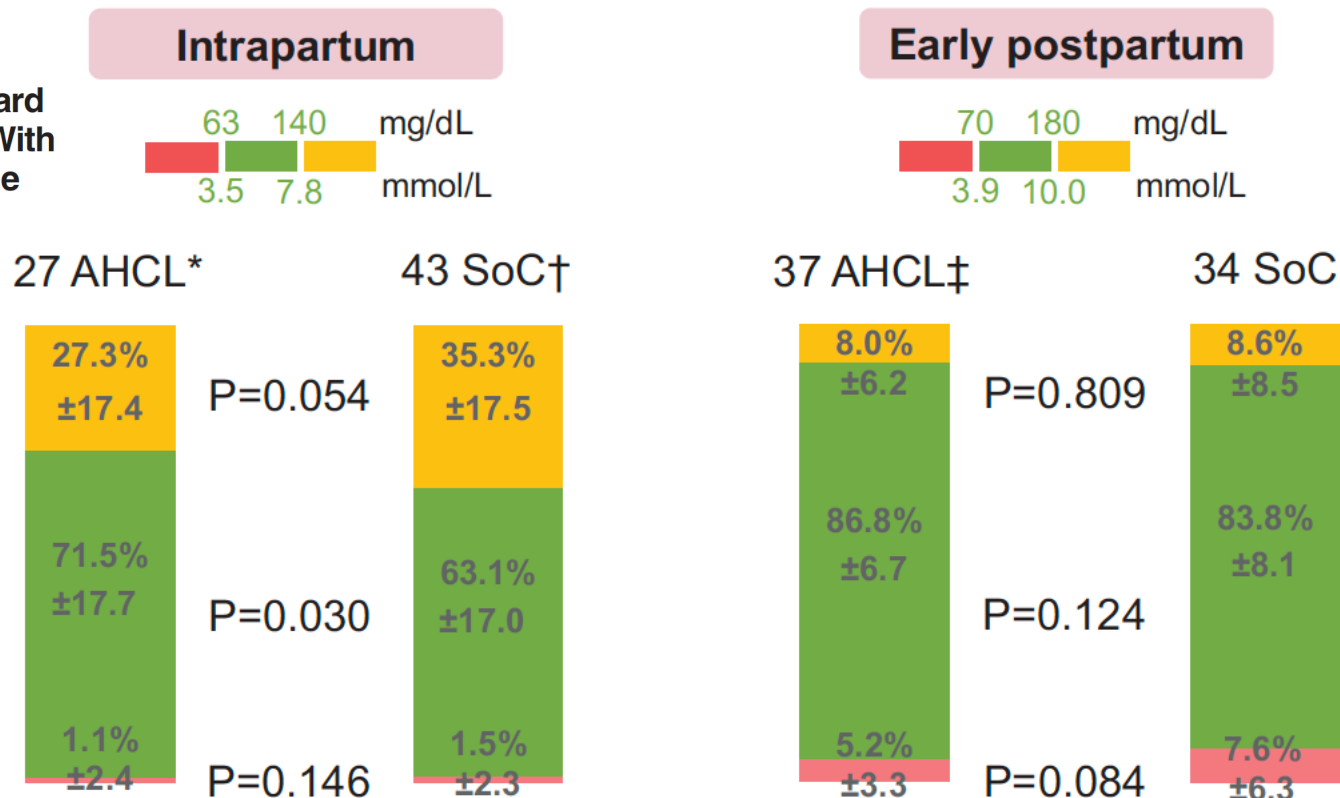
Observational Analysis From RCT

Treatment: Hybrid Closed-loop

Comparator: MDI or Insulin Pump +CGM

Principal endpoint: glucose metrics and Obstetric and neonatal outcomes

Patients: 95 pregnant T1D



Hybrid closed-loop glucose control compared with sensor augmented pump therapy in older adults with type 1 diabetes: an open-label multicentre, multinational, randomised, crossover study

Charlotte K Boughton, Sara Hartnell, Hood Thabit, Womba M Mubita, Katharine Draxlbauer, Tina Poettler, Malgorzata E Wilinska, Korey K Hood, Julia K Mader, Parth Narendran, Lalantha Leelarathna, Mark L Evans, Roman Hovorka

Treatment: Hybrid Closed-loop

Comparator: Sensor augmented Pump

Principal endpoint: Time in Range (70-180 mg/dL)

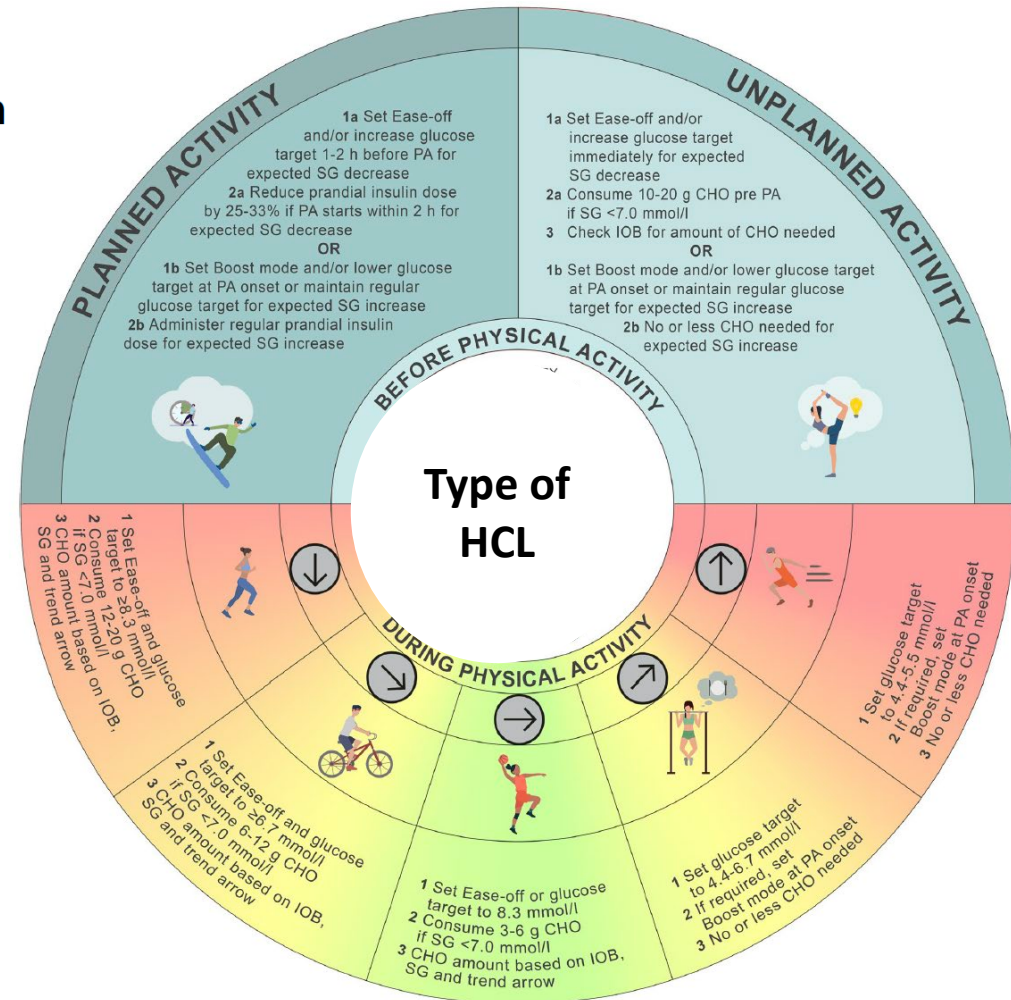
Patients: 38 older T1D

Follow-up: 16 wk+16 wk

	Closed-loop group (n=36)	Sensor-augmented pump therapy group (n=37)	Treatment difference (95% CI)	p value*
Primary endpoint†				
Time with glucose 3.9 to 10.0 mmol/L, %	79.9% (7.9)	71.4% (13.2)	8.6 (6.3 to 11.0)	<0.0001
Key secondary endpoints†				
Time with glucose >10.0 mmol/L, %	16.7% (11.4 to 23.9)	21.4% (16.9 to 36.5)	-8.5% (-10.9 to -6.1)	<0.0001
Mean glucose, mmol/L	7.8 (0.7)	8.5 (1.1)	-0.7 (-0.9 to -0.5)	<0.0001
HbA _{1c} , mmol/mol	49.3 (7.9)	52.1 (9.2)	-2.7 (-4.2 to -1.2)	0.0008
HbA _{1c} , %	6.7% (0.7%)	6.9% (0.9%)	-0.2% (-0.4 to -0.1)	0.0008
Time with glucose <3.9 mmol/L, %	1.7 (1.3 to 2.4)	1.7 (0.9 to 2.7)	-0.1 (-0.3 to 0.2)	0.54

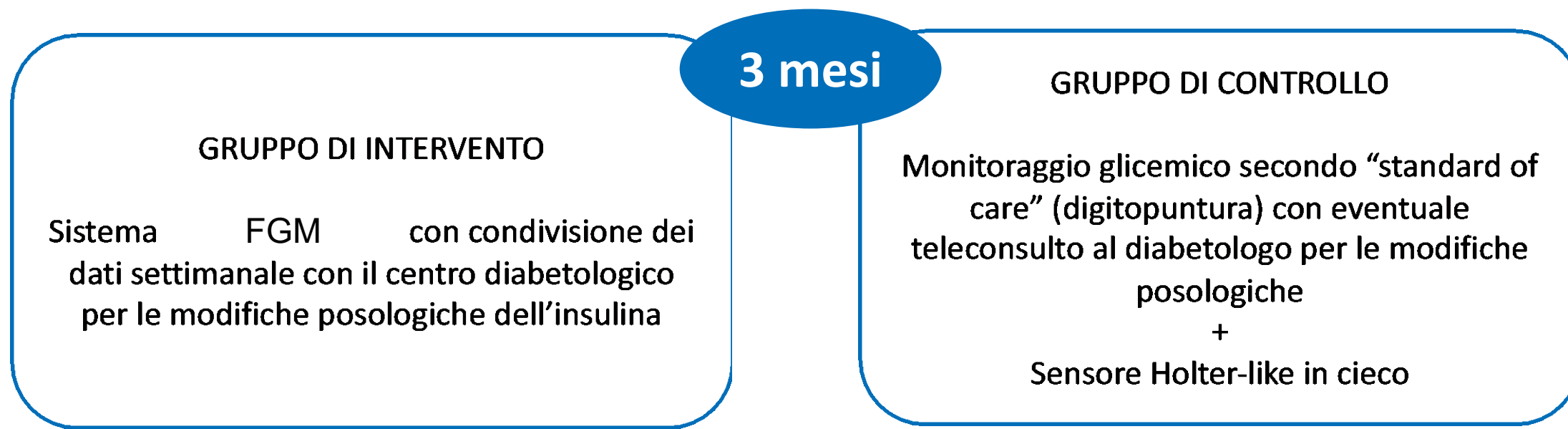
The use of automated insulin delivery around physical activity and exercise in type 1 diabetes: a position statement of the European Association for the Study of Diabetes (EASD) and the International Society for Pediatric and Adolescent Diabetes (ISPAD)

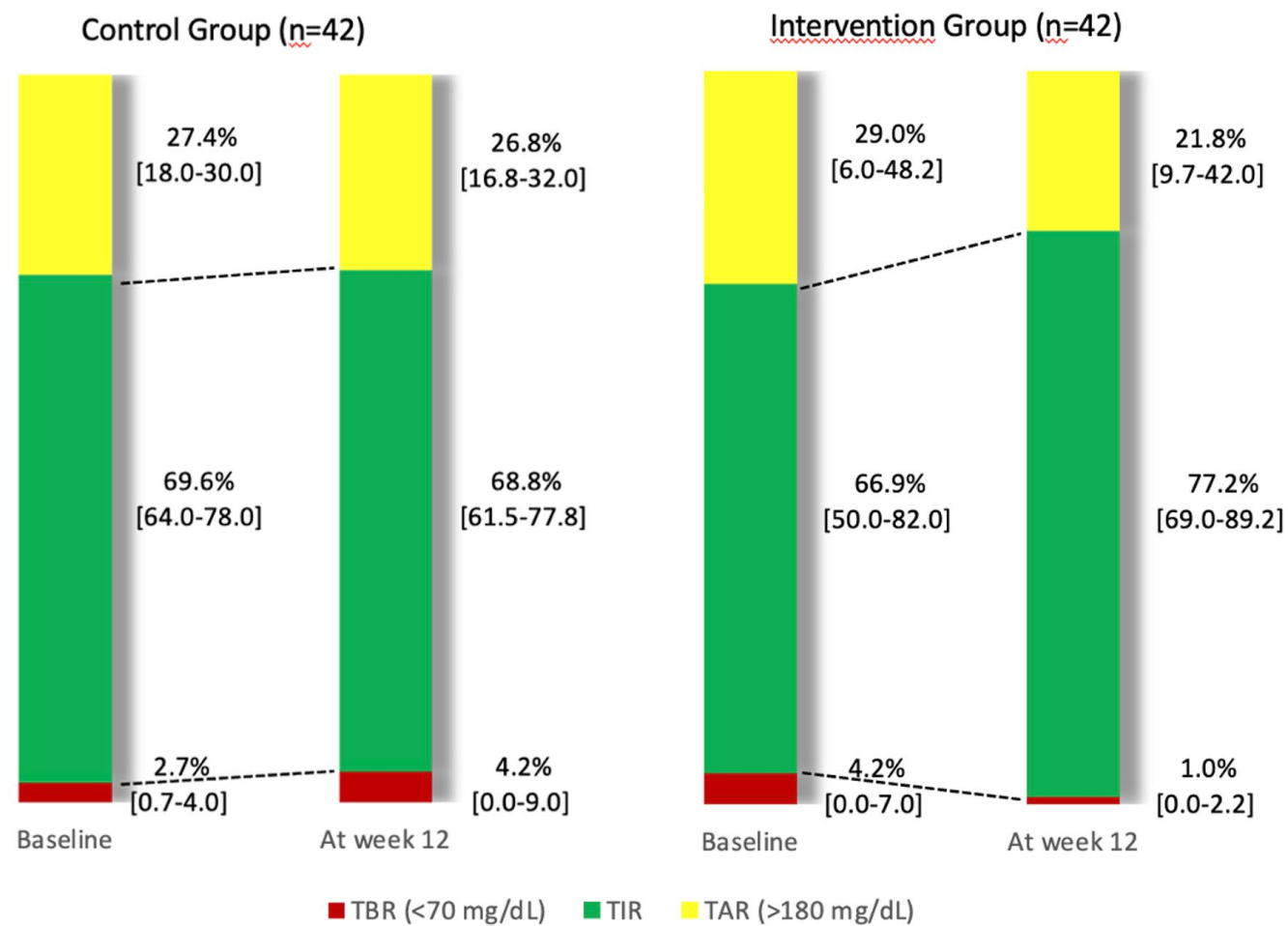
Othmar Moser^{1,2,3} · Dessi P. Zaharieva⁴ · Peter Adolfsson^{5,6} · Tadej Battelino^{7,8} · Richard M. Bracken⁹ · Bruce A. Buckingham⁴ · Thomas Danne^{10,11} · Elizabeth A. Davis^{12,13,14} · Klemen Dovc^{7,8} · Gregory P. Forlenza¹⁵ · Pieter Gillard¹⁶ · Sabine E. Hofer¹⁷ · Roman Hovorka^{18,19} · Peter G. Jacobs²⁰ · Julia K. Mader² · Chantal Mathieu¹⁶ · Kirsten Nørgaard^{21,22} · Nick S. Oliver²³ · David N. O'Neal^{24,25,26} · John Pemberton²⁷ · Rémi Rabasa-Lhoret^{28,29,30} · Jennifer L. Sherr³¹ · Harald Sourij^{2,3} · Martin Tauschmann³² · Jane E. Yardley³³ · Michael C. Riddell³⁴



Sensori e Fragili: lo studio FGM-RSA.

Scopo: indagare gli effetti in termini di miglioramento del compenso glicemico di un sistema di telemedicina come supporto per la modifica posologica da remoto delle dosi di insulina in pazienti con diabete ricoverati presso RSA.





ORIGINAL ARTICLE | JANUARY 31 2025

In-Hospital Diabetes Management by a Diabetes Team and Insulin Titration Algorithms Based on Continuous Glucose Monitoring or Point-of-Care Glucose Testing in Patients With Type 2 Diabetes (DIATEC): A Randomized Controlled Trial

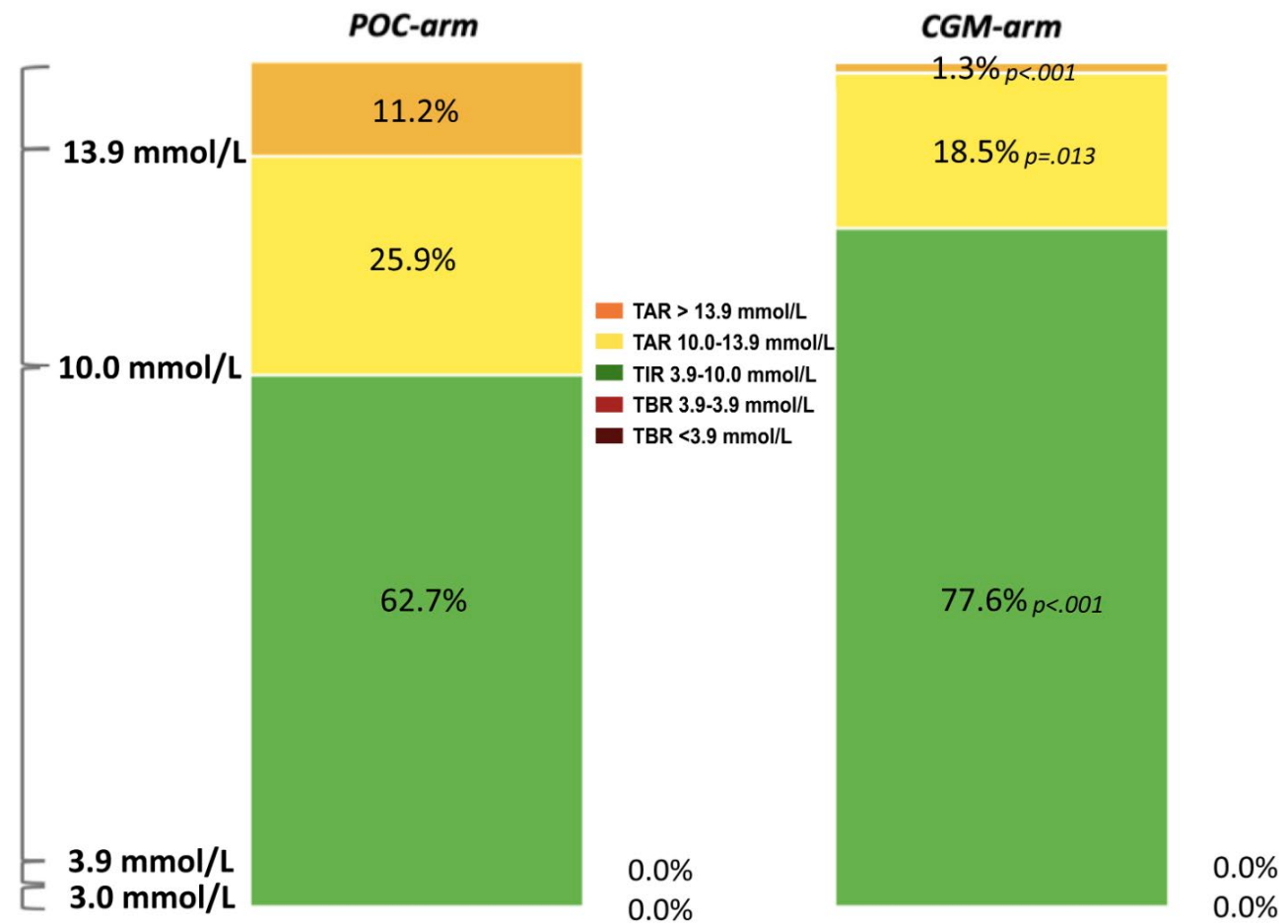
RCT with CGM-based algorithm

Treatment: CGM-based insulin titration algorithm

Comparator: POC glucose

Principal outcome: TIR

Patients: 166 inpatients not-ICU with T2D



WESTWORLD

...where robot men and
women are programmed
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MGM Presents "WESTWORLD" Starring YUL BRYNNER RICHARD BENJAMIN
James Brolin Music by Fred Karlin Written and Directed by Michael Crichton Produced by Paul N. Lazarus III
PG PARENTAL GUIDANCE SUGGESTED (PG) PANAVISION® METROCOLOR



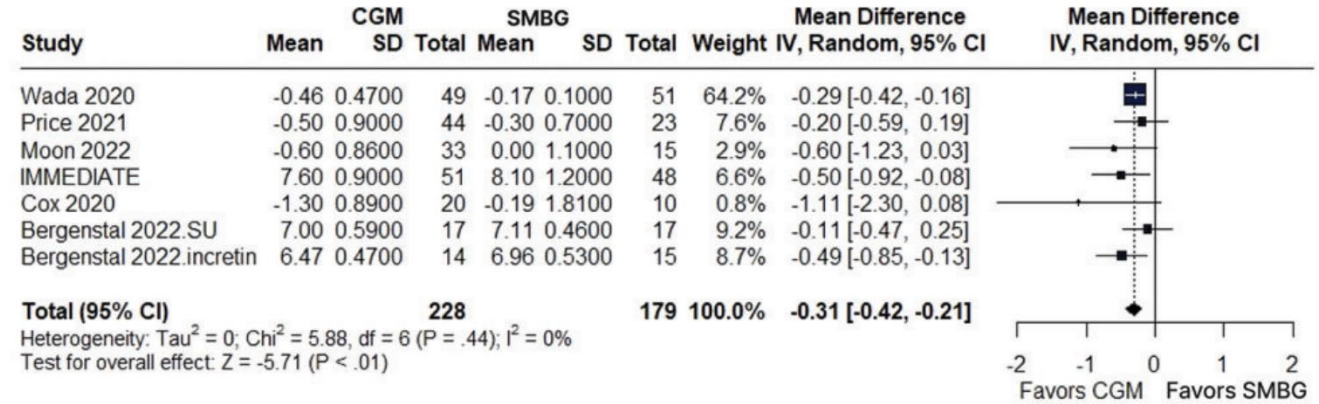


Continuous Glucose Monitoring Systems in Noninsulin-Treated People with Type 2 Diabetes: A Systematic Review and Meta-Analysis of Randomized Controlled Trials

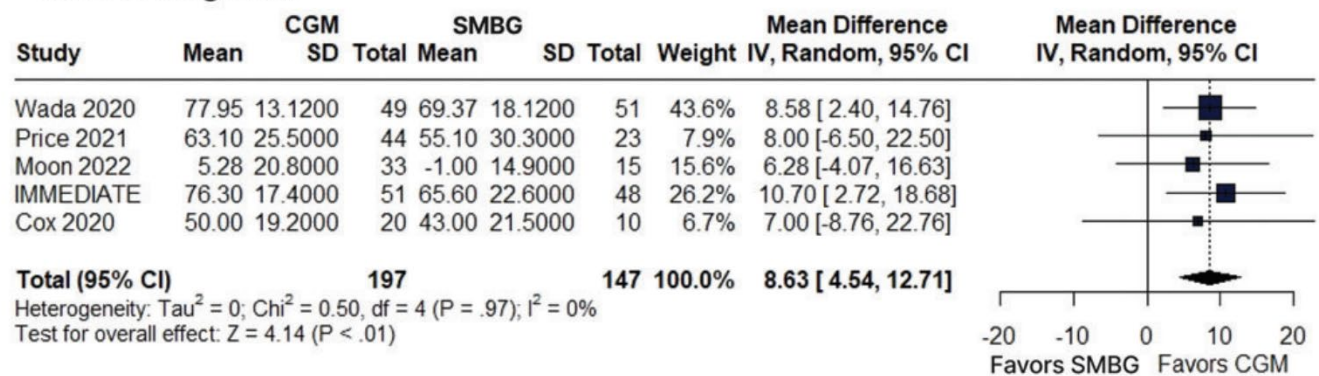
Principal endpoint: HbA1c, TIR
Follow-up: 21 weeks
Patients: 407 patients

These outcomes are likely attributed to the trial design uniformly adopted by all RCTs, which integrated CGM usage with educational programs.

HbA1c level (%)



Time in range (%)



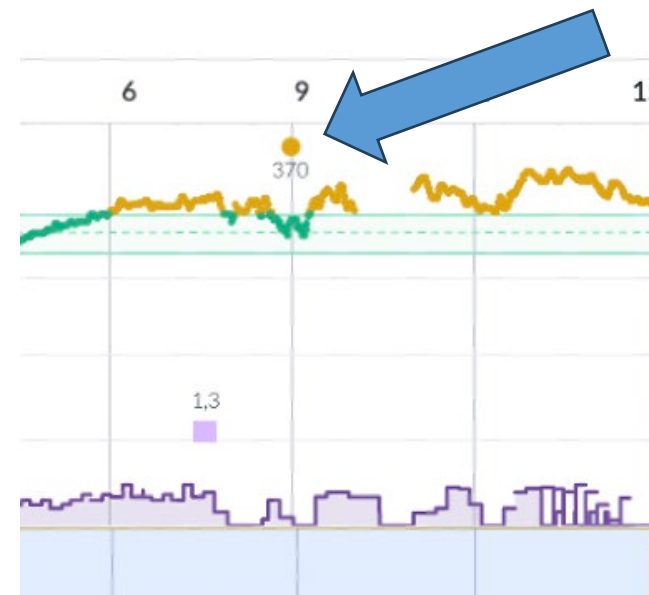


Assistenza diabetologica: l'importanza dell'uso della tecnologia.

sabato, 6 settembre 2025



venerdì, 5 settembre 2025

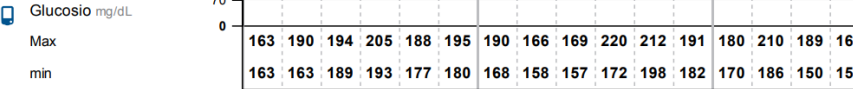


Assistenza diabetologica: l'importanza dell'uso della tecnologia.

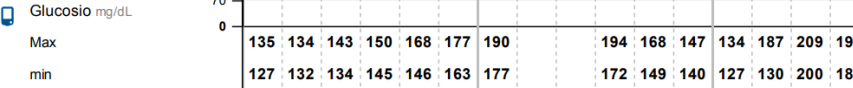
Diario giornaliero

5 settembre 2025 - 18 settembre 2025 (14 Giorni)

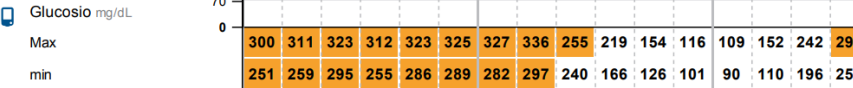
DOM 14 set



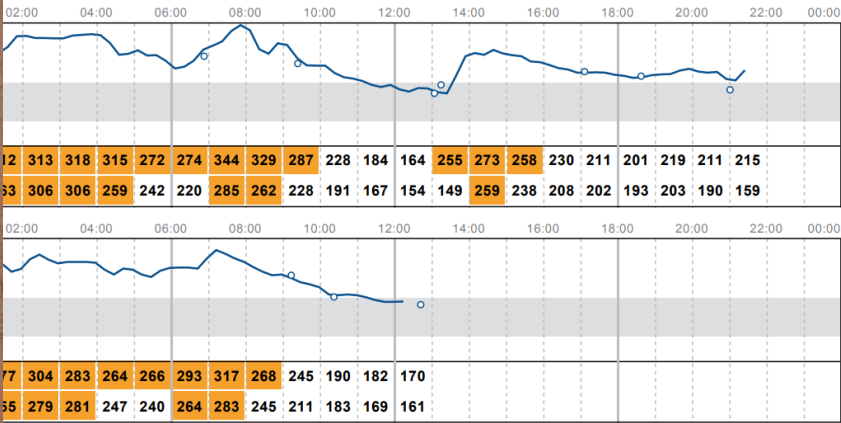
LUN 15 set



MAR 16 set



2025 (14 Giorni)



Esperienza condivisa
con Jacopo Guidi e Maria Totugno

