Managing Diabetes in Frailty: Opportunities and Challenges

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Disclosures

Guiseppe Maltese

None to declare

Katie Hards

Speaker fees from SBK and Insulet

Type 1 Diabetes in Older People Has Nearly Tripled Globally Since the '90s

— But the increase marks good news for survival, study suggests

by Kristen Monaco, Senior Staff Writer, MedPage Today
June 13, 2024

Global burden of type 1 diabetes in adults aged 65 years and older, 1990-2019: population based study

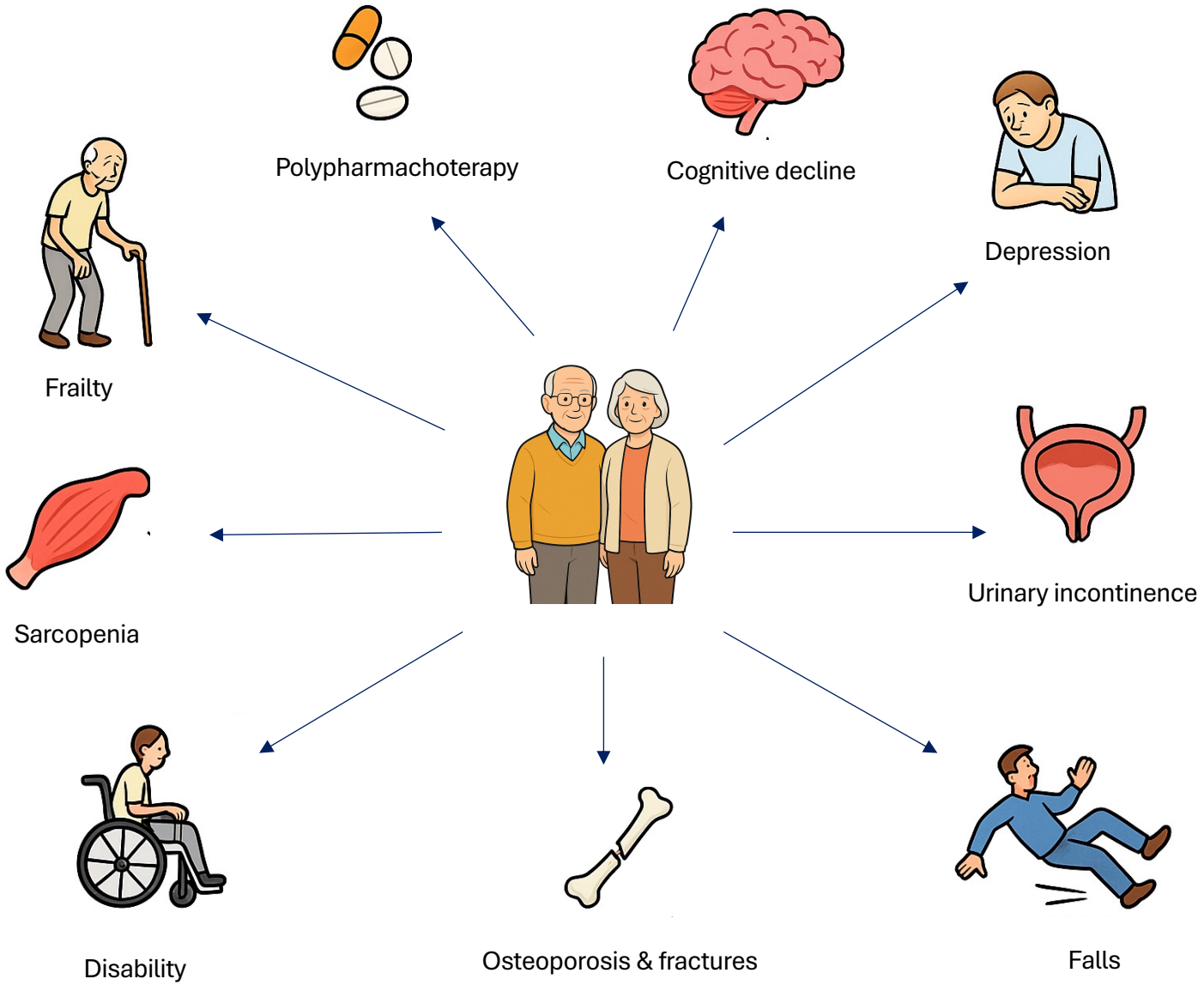
Kaijie Yang,[1] Xue Yang,[1] Chenye Jin,[2] Shuangning Ding,[1] Tingting Liu,[1] Bing Ma,[3] Hao Sun,[3] Jing Zhang,[4] Yongze Li[1]

- **Objectives -** To estimate the burden, trends, and inequalities of type 1 diabetes mellitus (T1DM) among older adults at global, regional, and national level from 1990 to 2019.
- **Design** - Population based study
- **Population**- adults aged ≥65 years from 21 regions and 204 countries and territories (Global Burden of Disease and Risk Factors Study 2019) from 1990 to 2019.
- **Primary outcomes** were T1DM related age standardised prevalence, mortality, disability adjusted life years (DALYs), and average annual percentage change.

Key findings

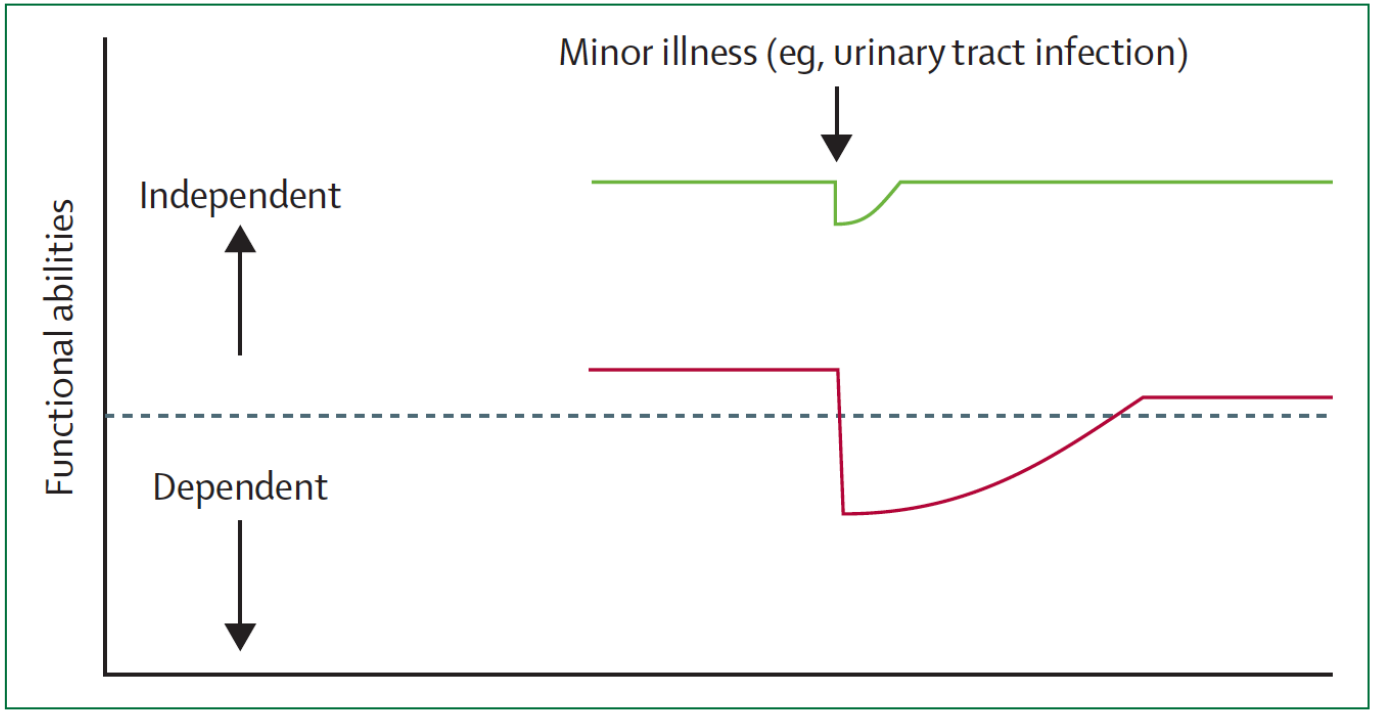
- Globally, between 1990 and 2019, the number of people with T1D aged ≥65 years increased from 1.3 million to 3.7 million
- The age standardised prevalence rate of T1D among this age group increased by 28%
- The age standardised mortality significantly decreased by 25%
- The age standardised DALYs decreased by 8.8%
- Mortality fell 13 times faster in countries with a high sociodemographic index versus countries with a low-middle sociodemographic index

Type 1 diabetes and age-associated conditions



Frailty in elderly people

Andrew Clegg, John Young, Steve Iliffe, Marcel Olde Rikkert, Kenneth Rockwood



Lancet 2013; 381: 752–62

Frailty: two models, one concept

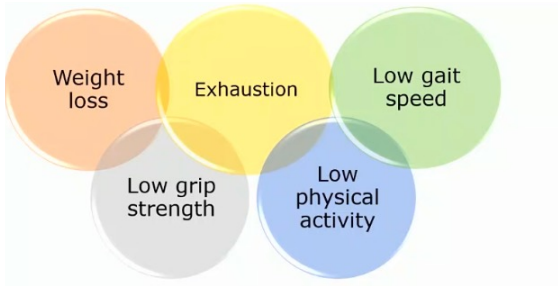
JOURNAL ARTICLE

Frailty in Older Adults: Evidence for a Phenotype

Linda P. Fried ✉, Catherine M. Tangen, Jeremy Walston, Anne B. Newman, Calvin Hirsch, John Gottdiener, Teresa Seeman, Russell Tracy, Willem J. Kop, Gregory Burke ... Show more

The Journals of Gerontology: Series A, Volume 56, Issue 3, 1 March 2001, Pages M146–M157, https://doi.org/10.1093/gerona/56.3.M146

Published: 01 March 2001 **Article history ▾**



FRIED Phenotype Model (Fried L et al, 2001)

Score

0-1	= Not frail
2	= Pre-frail
3	= Frail

Based on data from the Cardiovascular Health Study, 2001

JOURNAL ARTICLE

Frailty in Relation to the Accumulation of Deficits

Kenneth Rockwood ✉, Arnold Mitnitski

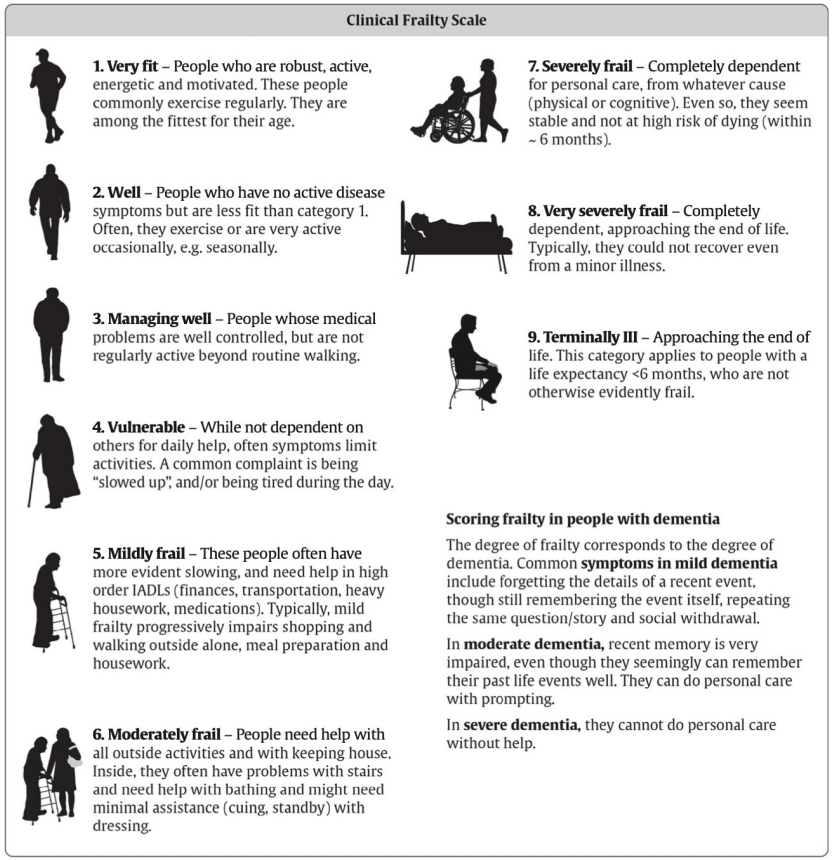
The Journals of Gerontology: Series A, Volume 62, Issue 7, July 2007, Pages 722–727, https://doi.org/10.1093/gerona/62.7.722

Published: 01 July 2007 **Article history ▾**

"The more health deficits an individual has accumulated, the more likely they are to be frail and to experience adverse outcomes."

$$FI = \frac{\text{Number of deficits present}}{\text{Total number of deficits considered}}$$

Measuring frailty – Clinical Frailty Scale (CFS) and Electronic Frailty Index (eFI)



Clinical Frailty Scale

1. Very fit – People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are among the fittest for their age.

2. Well – People who have no active disease symptoms but are less fit than category 1. Often, they exercise or are very active occasionally, e.g. seasonally.

3. Managing well – People whose medical problems are well controlled, but are not regularly active beyond routine walking.

4. Vulnerable – While not dependent on others for daily help, often symptoms limit activities. A common complaint is being "slowed up", and/or being tired during the day.

5. Mildly frail – These people often have more evident slowing, and need help in high order IADLs (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.

6. Moderately frail – People need help with all outside activities and with keeping house. Inside, they often have problems with stairs and need help with bathing and might need minimal assistance (cuing, standby) with dressing.

7. Severely frail – Completely dependent for personal care, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~ 6 months).

8. Very severely frail – Completely dependent, approaching the end of life. Typically, they could not recover even from a minor illness.

9. Terminally Ill – Approaching the end of life. This category applies to people with a life expectancy <6 months, who are not otherwise evidently frail.

Scoring frailty in people with dementia

The degree of frailty corresponds to the degree of dementia. Common **symptoms in mild dementia** include forgetting the details of a recent event, though still remembering the event itself, repeating the same question/story and social withdrawal.

In **moderate dementia,** recent memory is very impaired, even though they seemingly can remember their past life events well. They can do personal care with prompting.

In **severe dementia,** they cannot do personal care without help.

eFI tool

- The eFI consists of 36 deficits which have been constructed using around 2,000 primary care Read codes

Requires a software system in place, e.g. EMIS Web

- The eFI calculates a frailty score by dividing the number of deficits present by the total possible: uses 36 validated deficits

- **Scores**

Robust - 0-0.12; Mild - 0.13-0.24; Moderate – 0.25-0.36; Severe =>0.36

- The score is a robust predictor of those who are at greater risk of adverse outcomes

An eFI > 0.36 have a six-fold increased risk of admission to a care home in the next 12 months and a five-fold increased mortality risk compared to fit older people

Clegg A et al, 2016

FRAIL TEST – non – invasive frailty screening tool – a preferred frailty measure, Morley JE at al 2012

The clinician asks:

Fatigue: Are you fatigued?

Resistance: Are you unable to walk up one flight of stairs?

Aerobic: Are you unable to walk one block?(equivalent of about 200m)

Illnesses: Do you have more than 5 illnesses?

Loss of weight: Have you lost more than 5% of your weight in the past 6 months?

Interpretation: Answers yes to:

1-2: indicates pre-frailty, and ≥3: indicates frailty

Advantages of Test

- Simple, easy to learn
- Does not require a face to face consultation
- Utilises 4 components of the Cardiovascular Study Index (Fried Criteria) and 1 component from the Rockwood Clinical Frailty Scale
- Correlates well with IADL, gait speed and SPPB
- Valid in late middle age and older adults

Rosas-Carrasco O et al, 2010 (Mexicans);
Li Y et al 2015 (Chinese); Ravindrarajah R et al 2013 (Europeans)

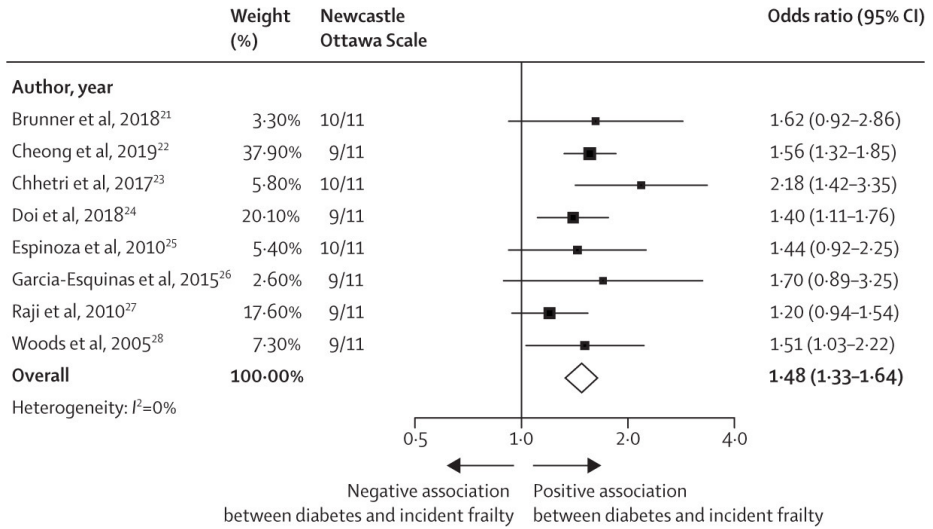
Frailty measurement, prevalence, incidence, and clinical implications in people with diabetes: a systematic review and study-level meta-analysis

Peter Hanlon, Isabella Fauré, Neave Corcoran, Elaine Butterly, Jim Lewsey, David McAllister, Frances S Mair**

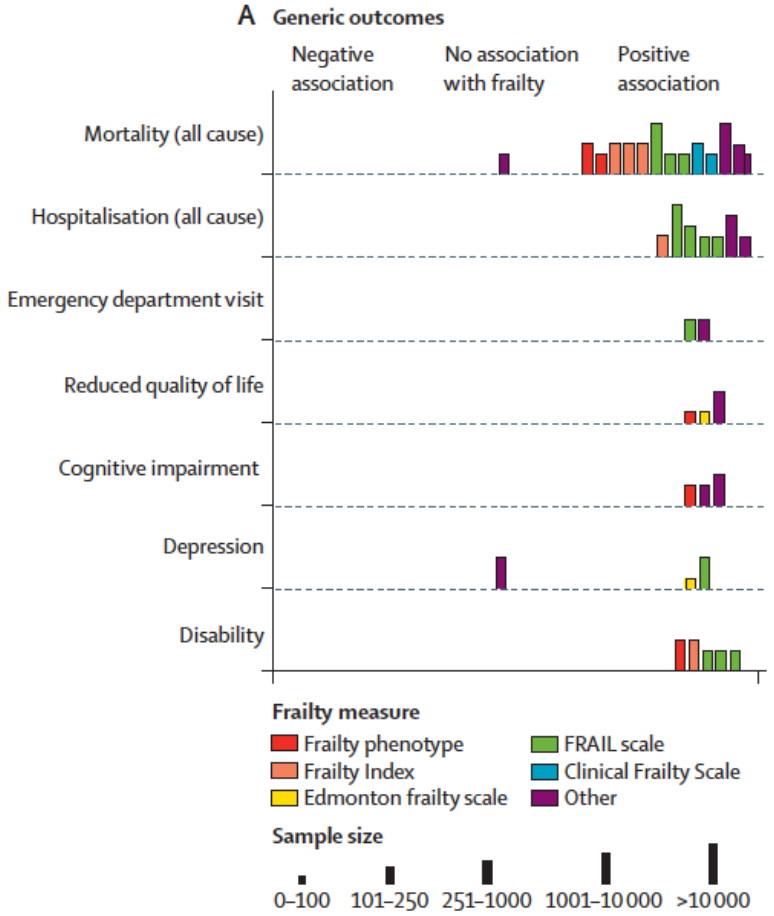
Aims: to quantify the *prevalence of frailty in people with diabetes*, and to summarise the *association between frailty and generic outcomes* (e.g. mortality) and *diabetes-specific outcomes* (e.g. hypoglycaemia).

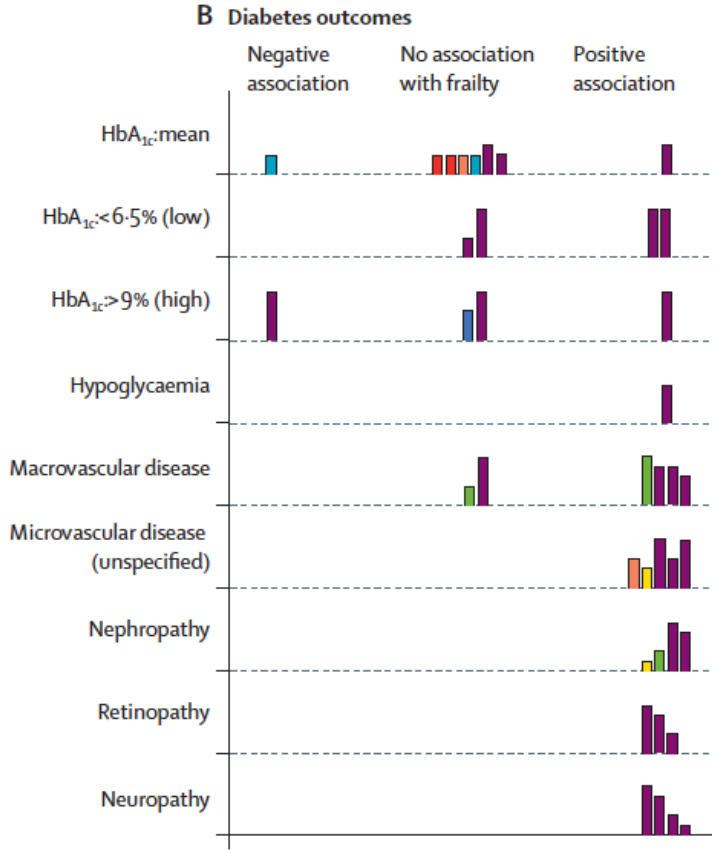
Key Findings

- Of 3,038 studies, 118 studies using 20 different frailty measures were eligible for inclusion
- Studies were heterogenous in setting (88 studies were community-based, 18 were outpatient-based, 10 inpatient-based, and 2 were based in LCT facilities)
- Mean age ranged from 50.4 years to 88.0 years (median 72.8 [IQR 69·6–74·4])
- Median community frailty prevalence using frailty phenotype was 13% (IQR 9–21)



***Lancet Healthy Longevity* 2020; e106–16**



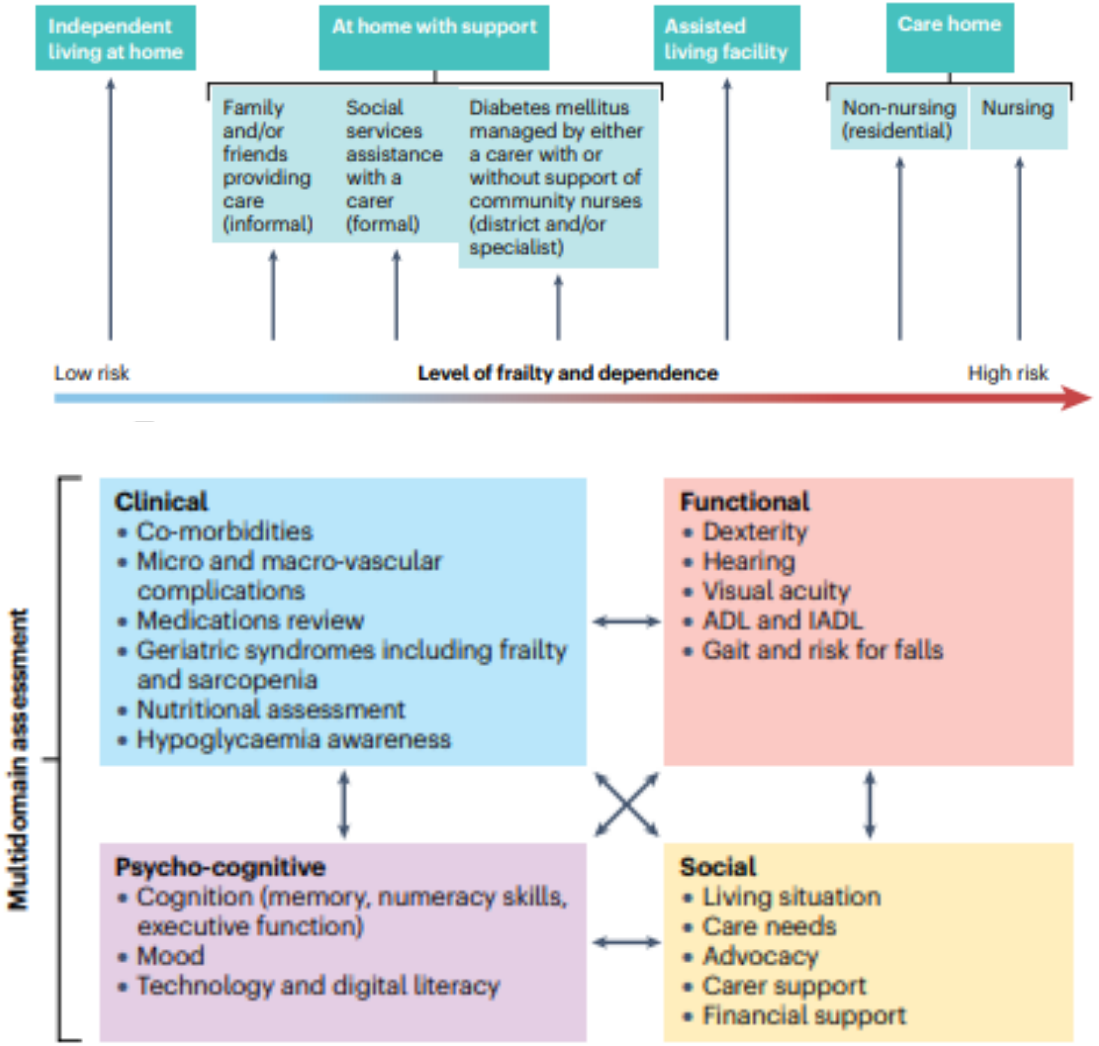


Frailty was consistently associated with:

1. **Mortality** in 13 (93%) of 14 studies assessing this outcome (pooled hazard ratio 1·51 [95% CI 1·30–1·76])
2. **Hospital admission** in seven (100%) of seven
3. **Disability** in five (100%) of five studies.

Frailty was also associated with

1. **Hypoglycaemia** events in one study (<1%)
2. **Microvascular and macrovascular complica**tions in nine (82%) of 11 studies
3. Lower **quality of life** in three (100%) of three studies assessing quality of life
4. **Cognitive impairment** in three (100%) of three studies assessing cognitive impairment.



Maltese G & Sinclair AJ. Nature Reviews Endocrinology 2025.

HbA1c targets in older adults according to current international guidelines

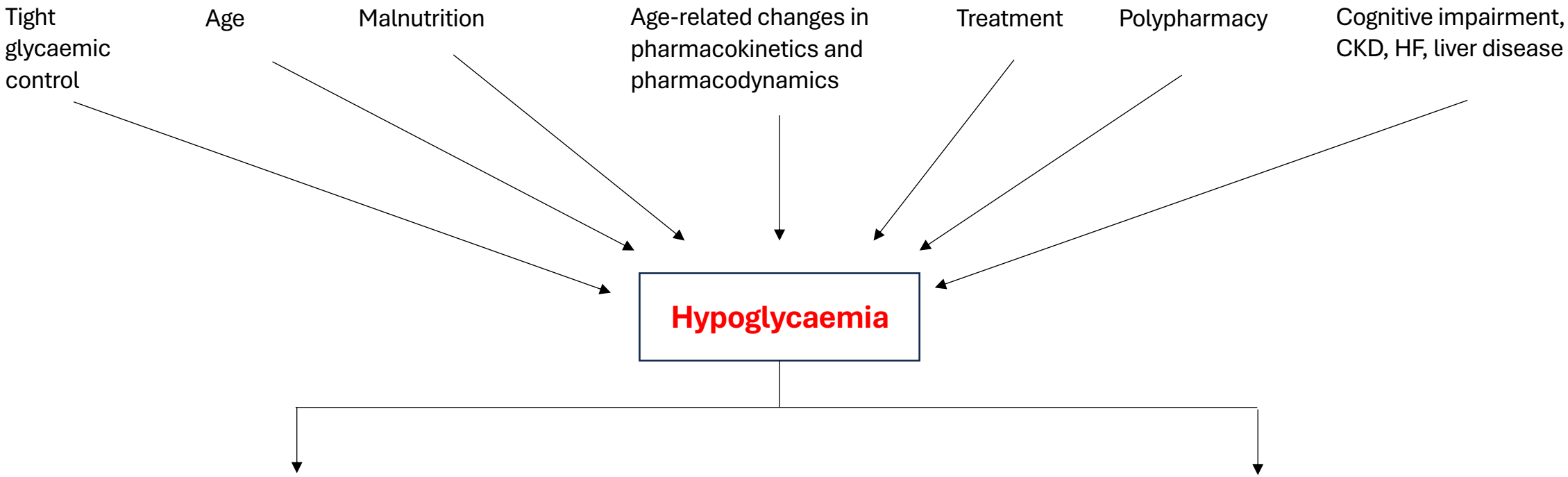
International guidelines (year)	Good health/Non frail/Functionally independent	Complex-intermediate health/Moderately frail/Functionally dependent	Poor Health/Severely frail/End of life
ADA (2025)	<7.0-7.5% (<53-58 mmol/mol)	<8% (<64 mmol/mol)	Hypoglycaemia avoidance
Endocrine Society (2019) Hypo risk drugs? **NO** **YES**	<7.5% (<53 mmol/mol) ≥7.0% and <7.5%	<8% ≥7.5% and <8.0%	<8.5% ≥8.0% and <8.5%
IDF (2013)	7.0-7.5% (53-58 mmol/mol)	7.0-8.0% (53-64 mmol/mol) Frail Up to 8.5% (69 mmol/mol) Dementia Up to 8.5% (69 mmol/mol)	Hypoglycaemia avoidance

Healthy (few coexisting chronic illnesses, intact cognitive and functional status)

Complex/intermediate (multiple coexisting chronic illnesses or two or more instrumental ADL impairments or mild to moderate cognitive impairment)

Very complex/poor health (LTC or end-stage chronic illnesses‡ or moderate to severe cognitive impairment or two or more ADL impairments)

Hypoglycaemia in older people with diabetes



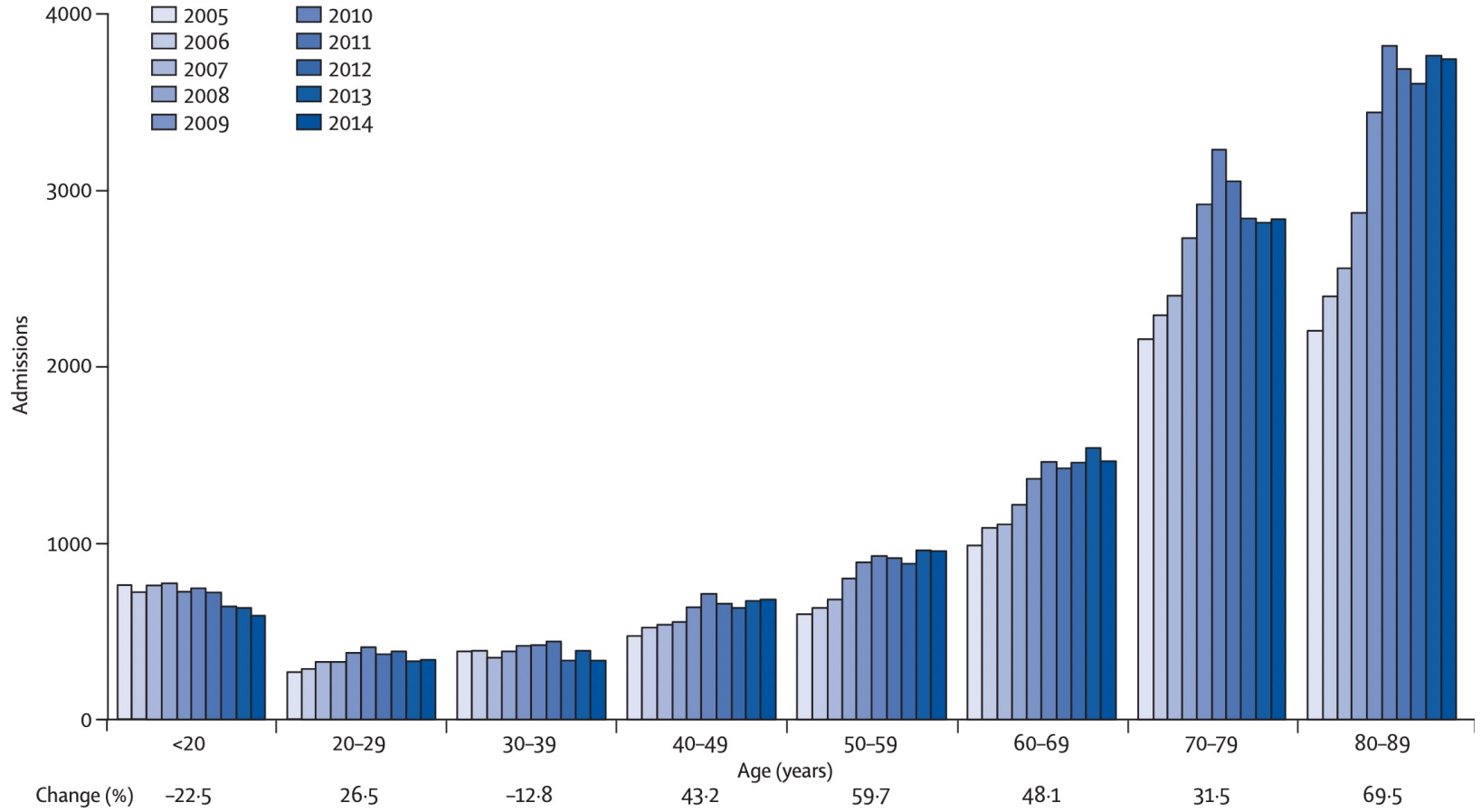
Short-term consequences

- Hyperglycaemia
- Fear of hypoglycaemia
- Falls and fractures
- Cardiac arrythmias
- ED attendance and hospital admission

Long-term consequences

- Social marginalisation
- Functional decline
- Cognitive decline
- Frailty
- Disability
- Institutionalisation

Crude hospital admissions for hypoglycaemia, England, 2005-14



Lancet Diabetes Endocrinol 2016; 4: 677–85

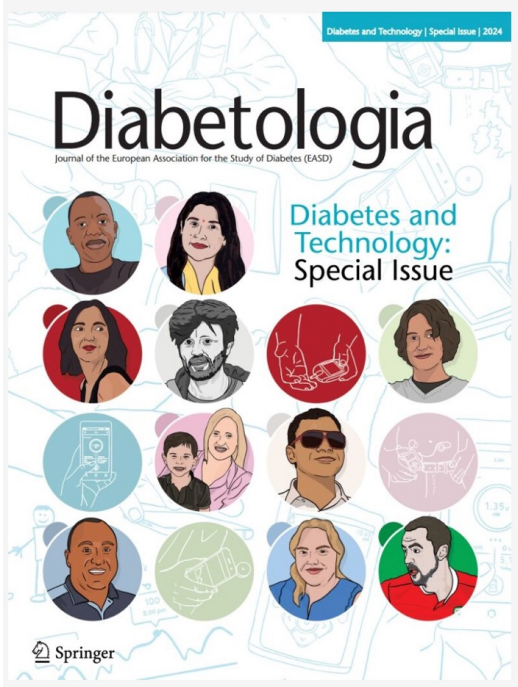
Home > Diabetologia > Article

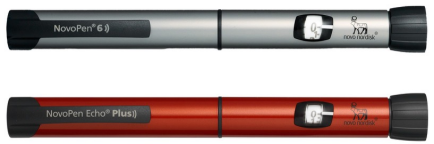
Ageing well with diabetes: the role of technology

Review | Open access | Published: 13 August 2024

(2024) Cite this article

Giuseppe Maltese, Sybil A. McAuley, Steven Trawley & Alan J. Sinclair



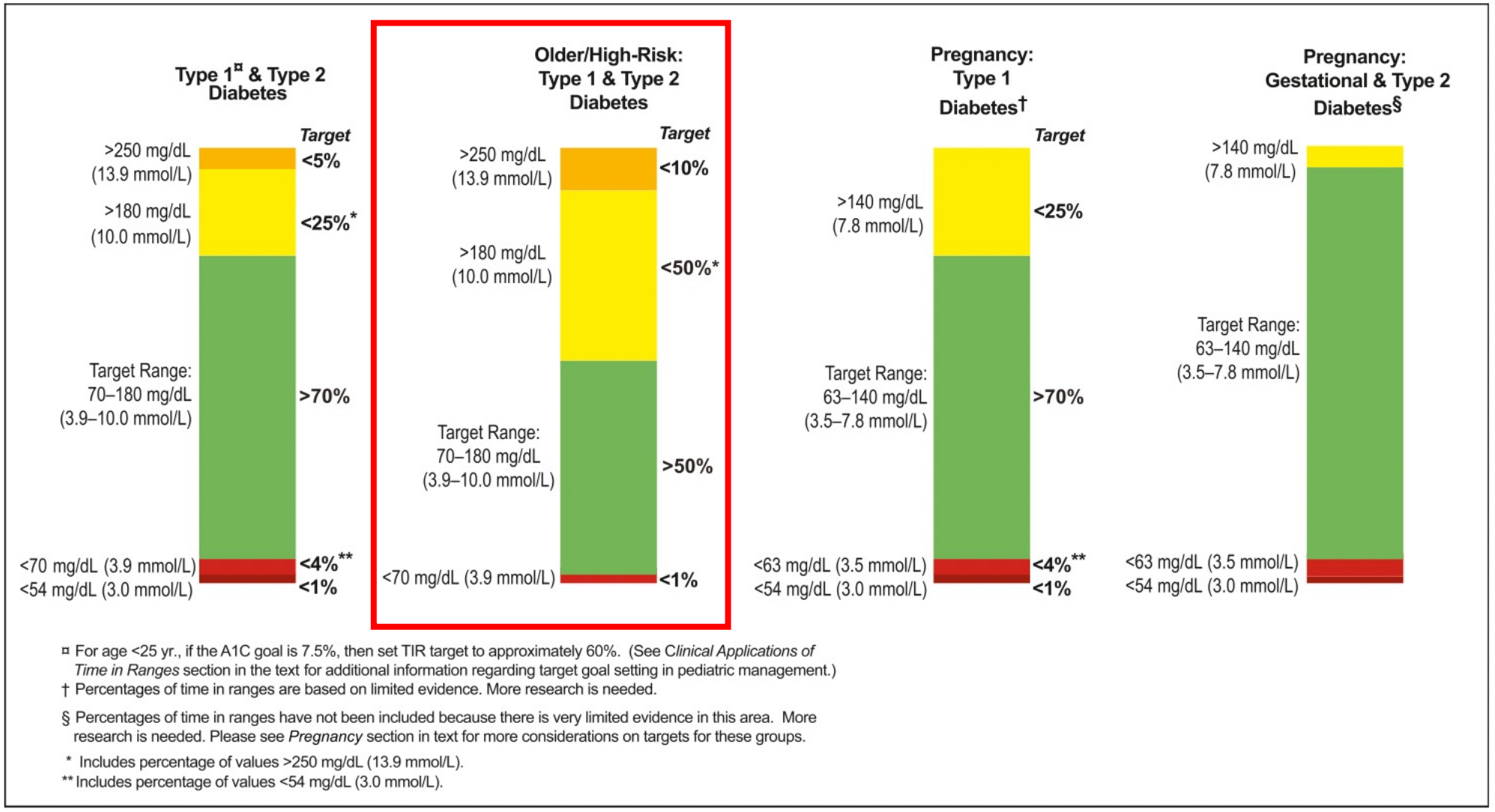


Bluetooth Connected Pens (Smart Pens)

CGM devices

Insulin pumps and automated insulin delivers systems (AID)

CGM-based targets for different diabetes populations



¤ For age <25 yr., if the A1C goal is 7.5%, then set TIR target to approximately 60%. (See *Clinical Applications of Time in Ranges* section in the text for additional information regarding target goal setting in pediatric management.)

† Percentages of time in ranges are based on limited evidence. More research is needed.

§ Percentages of time in ranges have not been included because there is very limited evidence in this area. More research is needed. Please see *Pregnancy* section in text for more considerations on targets for these groups.

* Includes percentage of values >250 mg/dL (13.9 mmol/L).

** Includes percentage of values <54 mg/dL (3.0 mmol/L).

Adapted from Battelino et al. Diabetes Care 2019;42(8):1593–1603

Glucose Targets Using Continuous Glucose Monitoring Metrics in Older Adults With Diabetes: Are We There Yet?

Journal of Diabetes Science and Technology
2024, Vol. 18(4) 808–818

DOI: 10.1177/19322968241247568
journals.sagepub.com/home/dst
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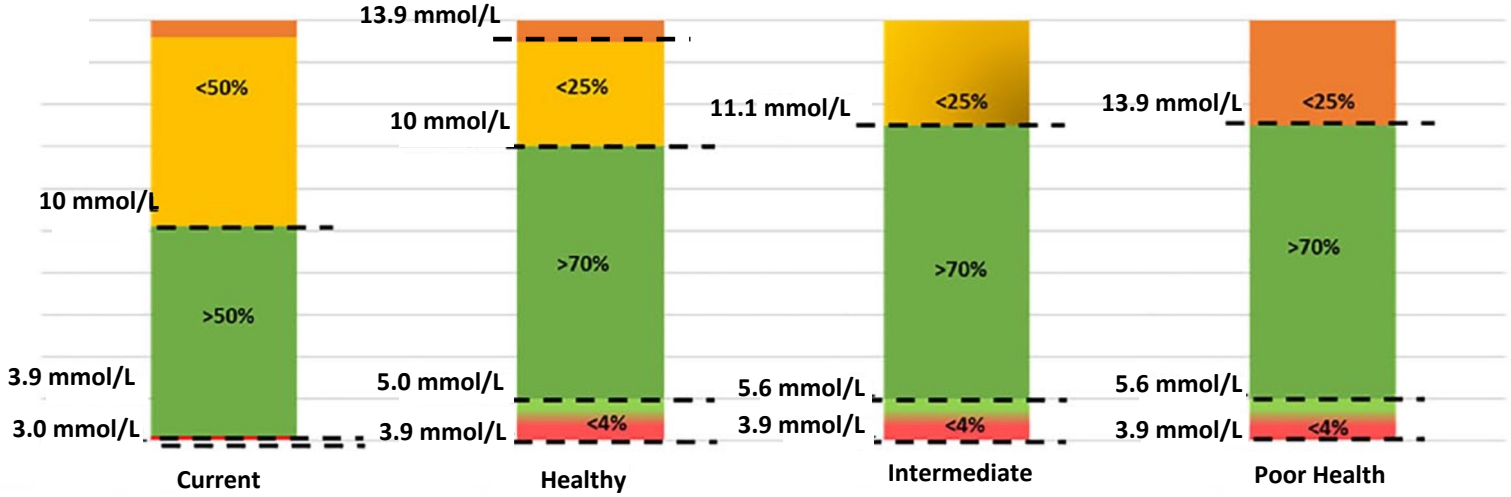
Elena Toschi, MD[1]*, David O'Neal, MD[2,3,4]*, Medha Munshi, MD[1], and Alicia Jenkins, MBBS, MD, FRACP, FRCP[2,3,4,5,6]



CGM Target	Current	Healthy	Intermediate	Poor Health
Time-Below-Range TBR%/min	<3.9 mmol/L <1% (60 min/day)	<3.9 mmol/L 0 min/day	<3.9 mmol/L 0 min/day	<3.9 mmol/L 0 min/day
Hypoglycaemia Buffer Zone %/min	N/A	3.9-5.0 mmol/L <4%	3.9-5.6 mmol/L <4%	3.9-5.6 mmol/L <4%
Time-in-Range TIR%/min	3.9-10.0 mmol/L >70%	5.0-11.0 mmol/L >70%	5.6-11.1 mmol/L >70%	5.6-13.9 mmol/L >70%
Time-above-Range TAR%/min	>10.0 mmol/L <50% >13.9 <10%	>10.0 mmol/L <25% >13.9 <10%	>11.1 mmol/L <25% TAR>13.9 <10%	>13.9 mmol/L <25%

Table 3 Key studies investigating insulin pump therapy and AID systems in older people with diabetes

Study	Type of diabetes	Sample size	Age (years)[a]	Comparison	Follow-up (weeks)	Main outcomes
Prospective, observational, single-centre study, Pintaudi et al 2023 [58]	T1D	18	74.1 ± 7.1	HCL system (MiniMed 780G)	48	HCL system was associated with a significant improvement in HbA_{1c} (mean ± SD 59.9 ± 10.5 mmol/mol [7.6% ± 3.1%] at baseline vs 53.2 ± 6.0 mmol/mol [7.0% ± 2.7%] at 1 year, p=0.01; mean difference 6.8 ± 10.3 mmol/mol [2.8% ± 3.1%]) and increase in TIR at 48 weeks (p<0.0001)
Open-label, randomised crossover trial (ORACL), McAuley et al 2022 [59]	T1D	30	67 ± 5	HCL system (MiniMed 670G) vs SAP	16	Mean (SD) TIR was higher in the HCL group than SAP group (75.2% [6.3] vs 69.0% [9.1], respectively; difference 6.2 percentage points [95% CI 4.4, 8.0]; p<0.0001) and the HCL group had a lower time in hypoglycaemia (<3.9 mmol/l) by a median of 0.5 percentage points (95% CI 0.3, 1.1; p=0.0005) vs SAP therapy
Retrospective analysis of electronic health records, Toschi et al 2022 [60]	T1D	48	70 ± 4	HCL system (Control-IQ)	12	CGM metrics showed an increase in mean ± SD TIR (from 62% ± 13% to 76% ± 9%; p<0.001) and a reduction in median (IQR) TBR (<3.9 mmol/l; from 2% [1–3%] to 1% [1–2%]; p=0.03) and mean ± SD TAR (>10.0 mmol/l; from 30% ± 11% to 20% ± 9%; p<0.001) at 3 months
Cross-sectional survey, Chakrabarti et al 2022 [61]	T1D	30	69 ± 5	–	–	Insulin pump therapy was associated with high levels of self-confidence in managing diabetes around exercise
Multinational, randomised, open-label crossover trial, Boughton et al 2022 [62]	T1D	37	Median [IQR] 68 [63–70]	HCL system (CamAPS FX) vs SAP	16	HCL system was associated with an improvement in TIR of 8.6 percentage points vs SAP through a reduction in time spent with glucose levels >16.7 mmol/l. There were no differences in TBR (<3.9 mmol/l) between the two groups
Post hoc analysis of a RCT, Thabit et al 2023 [63]	T1D	37	Median [IQR] 68 [63–70]	HCL system (CamAPS FX) vs SAP	16	There were no significant differences in sleep traits between the HCL and SAP groups

[a]Data are mean ± SD unless indicated otherwise

HCL, hybrid closed-loop; SAP, sensor-augmented pump; T1D, type 1 diabetes; T2D, type 2 diabetes; TAR, time above range; TBR, time below range; TIR, time in range

THE LANCET
Healthy Longevity

ARTICLES | VOLUME 3, ISSUE 3, E135-E142, MARCH 2022 Download Full Issue

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, PhD • Sara Hartnell • Hood Thabit, PhD • Womba M Mubita, RN • Katharine Draxlbauer, RN • Tina Poettler, RN • et al. Show all authors

Open Access • Published: March, 2022 • DOI: https://doi.org/10.1016/S2666-7568(22)00005-8 •

- Hybrid closed-loop (HCL) vs sensor-augmented pump (SAP) therapy in older adults with type 1 diabetes (T1D)
- Open-label, multicentre, multinational, randomised, crossover study
- Adults aged 60 years and older with T1D using insulin pump therapy underwent two 16-week periods comparing HCL (CamAPS FX, CamDiab, Cambridge, UK) and SAP therapy in random order
- 37 participants (median [IQR] age 68 [63–70] years, mean [SD] baseline glycated haemoglobin [HbA1c]; 7·4% [0·9%]; 57 [10] mmol/mol)

	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
Other secondary endpoints‡				
Time with glucose				
<3·5 mmol/L, %	0·7% (0·5 to 1·1)	0·7% (0·4 to 1·2)	0·0% (−0·2 to 0·1)	0·69
<3·0 mmol/L, %	0·2% (0·1 to 0·3)	0·2% (0·1 to 0·3)	0·0% (−0·1 to 0·1)	0·69
>16·7 mmol/L, %	0·5% (0·2 to 0·8)	0·8% (0·2 to 2·8)	−0·7% (−1·0 to −0·3)	<0·0001
Glucose, mmol/L	2·6 (0·5)	2·8 (0·6)	−0·2 (−0·3 to −0·1)	<0·0001
Glucose coefficient of variation, %	32·5 (4·2)	32·7 (4·5)	−0·3 (−1·2 to 0·6)	0·49
Total daily insulin, units per day	46·3 (36·9 to 53·5)	42·9 (36·6 to 53·0)	1·2 (−0·6 to 3·0)	0·20
Total daily basal insulin, units per day	27·7 (18·9 to 32·0)	21·5 (15·9 to 27·0)	4·7 (3·2 to 6·1)	<0·0001
Total daily bolus insulin, units per day	20·2 (13·5 to 26·1)	23·4 (17·0 to 29·6)	−3·5 (−4·9 to −2·0)	<0·0001
Total daily dose, units per kg/day	0·5 (0·5 to 0·6)	0·5 (0·4 to 0·6)	0·0 (0·0 to 0·0)	0·35
Time using continuous glucose monitoring, %	99·7 (99·3–99·9)	99·4 (98·8–99·9)	0·45 (0·06–0·85)	0·026
Time using closed-loop, %	96·7% (95·1–98·0)	..	..	..

Data are mean (SD) or median (IQR). Endpoints calculated from all randomised subjects with at least 168 h of CGM data in at least one period. Glucose data are based on sensor glucose measurements. Treatment difference is calculated as closed loop minus sensor augmented pump therapy. One participant randomised to initial use of sensor-augmented pump therapy did not cross over to closed-loop insulin delivery. *Based on a linear mixed model adjusting for period as a fixed effect and site as a random effect. †Tested in hierarchy as listed to control the type 1 error using the fixed-sequence method. ‡Adjusted for multiple comparisons using Benjamini-Hochberg procedure to control false discovery rate. HbA_{1c}=glycated haemoglobin

Table 2: **Glucose control, insulin delivery, and usage endpoints in the intention-to-treat analysis population**

Closed-Loop Insulin Delivery Versus Sensor-Augmented Pump Therapy in Older Adults With Type 1 Diabetes (ORACL): A Randomized, Crossover Trial FREE

Sybil A. McAuley; Steven Trawley; Sara Vogrin; Glenn M. Ward; Spiros Fourlanos; Charlotte A. Grills; Melissa H. Lee; Andisheh Mohammad Alipoor; David N. O'Neal; Niamh A. O'Regan; Vijaya Sundararajan; Peter G. Colman; Richard J. MacIsaac

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Diabetes Care 2022;45(2):381–390

https://doi.org/10.2337/dc21-1667 **Article history**

PubMed:34844995

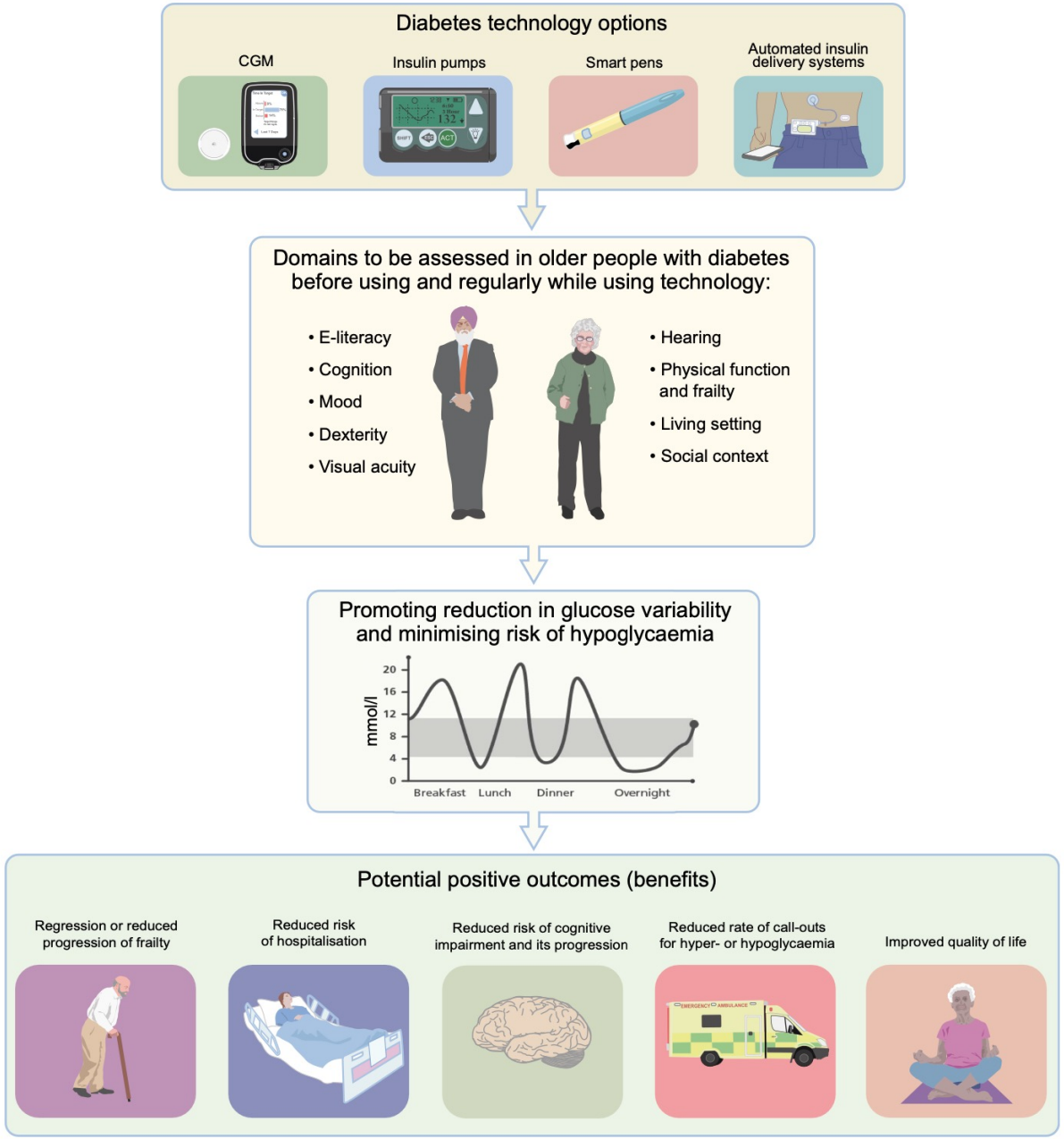
- Open-label, randomized (1:1), crossover trial compared 4 months of closed-loop versus sensor-augmented pump therapy among older adults with type 1 diabetes
- Adults were aged ≥60 years, diabetes duration ≥10 years, using an insulin pump
- 30 participants (mean age 67 [SD 5] years), median type 1 diabetes duration of 38 years

20% of participants had mild cognitive impairment and one-third had impaired awareness of hypoglycaemia; none was frail, although 20% were prefrail and 13% were at risk for malnutrition.

Table 2—Primary and secondary outcomes

	Closed-loop stage (n = 30)	Sensor-augmented pump stage (n = 30)	Difference	P value
Glucose and insulin outcomes				
Proportion of time at glucose concentration				
3.9–10.0 mmol/L, %*	75.2 (6.3)	69.0 (9.1)	6.2 (4.4 to 8.0)	<0.0001
3.9–7.8 mmol/L, %	48.2 (6.1)	42.8 (9.1)	5.4 (3.6 to 7.2)	<0.0001
>10.0 mmol/L, %	23.6 (6.6)	29.0 (9.8)	−5.4 (−7.3 to −3.5)	<0.0001
>13.9 mmol/L, %	3.9 (2.2–5.9)	4.9 (3.1–10.6)	−1.2 (−2.9 to −0.9)	0.0022
>16.7 mmol/L, %	0.66 (0.38–1.32)	0.87 (0.69–3.54)	−0.62 (−1.01 to −0.29)	<0.0001
<3.9 mmol/L, %	1.21 (0.60–1.68)	1.69 (1.00–2.54)	−0.47 (−1.05 to −0.25)	0.0005
<3.3 mmol/L, %	0.37 (0.12–0.49)	0.41 (0.20–0.78)	−0.19 (−0.36 to −0.06)	0.025
<3.0 mmol/L, %	0.13 (0.03–0.24)	0.16 (0.10–0.38)	−0.11 (−0.16 to −0.05)	0.0078
Mean glucose concentration, mmol/L	8.4 (8.0–8.8)	8.7 (7.9–9.2)	−0.2 (−0.5 to −0.1)	0.035
SD of glucose concentration, mmol/L	2.6 (2.4–2.9)	2.9 (2.8–3.5)	−0.4 (−0.5 to −0.2)	<0.0001
CV of glucose concentration, %	31.3 (29.9–33.9)	35.3 (32.9–36.1)	−3.4 (−4.5 to −1.7)	<0.0001
HbA_{1c}, %	7.3 (7.1–7.5)	7.5 (7.1–7.9)	−0.2 (−0.3 to 0)	0.13
HbA_{1c}, mmol/mol	56 (54–59)	59 (54–62)	−2 (−3 to 0)	0.11
Insulin total daily dose, units	38.3 (30.1–60.9)	38.2 (31.2–59.2)	−0.5 (−1.8 to 0.3)	0.26
Psychosocial well-being outcomes				
Gold score	3 (2–4)	3 (2–4)	0 (0 to 0)	0.48
Clarke score	2 (1–4)	2 (1–4)	0 (−1 to 0)	0.43
Hypoglycemia Fear Survey				
Total scale	7.5 (4–10)	7.5 (5–10)	−1 (−3 to 1)	0.72
Worry subscale	4.5 (2–7)	4.5 (3–7)	0 (−1 to 0)	0.14
Behavior subscale	2 (1–4)	2 (1–4)	0.0 (−2 to 0)	0.087
Diabetes distress (PAID-5)	4.3 (2.9)	4.6 (3.2)	−0.3 (−1.1 to 0.5)	0.46
Geriatric Depression Scale	1 (0–2)	1 (0–2)	0 (0 to 0)	>0.99
Impact of diabetes on quality of life (DIDP raw score)	4.5 (4.3–4.8)	4.7 (4.4–5.0)	0.0 (−0.2 to 0.0)	0.46
Perceived sleep quality (PSQI score)	5 (3–8)	5.5 (3–7)	0 (−1 to 1)	0.79

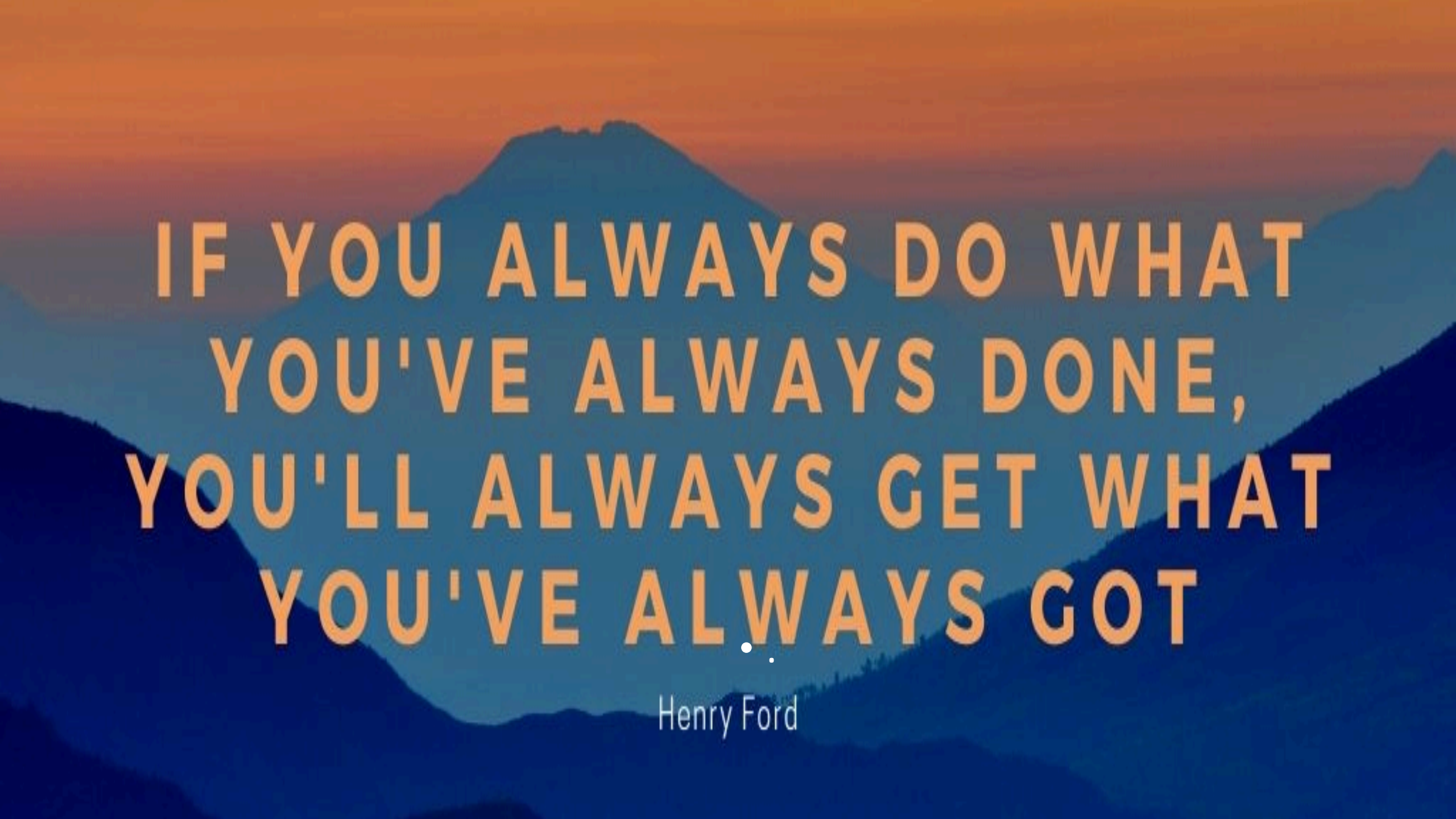
Results presented as mean (SD) or median (interquartile range); analyses using period-adjusted mixed effect linear regression or period-adjusted sign test, respectively. Differences presented as mean or median difference (95% CI). DIDP, Diabetes Attitudes, Wishes and Needs (DAWN) Impact of Diabetes Profile; PAID, Problem Areas in Diabetes; PSQI, Pittsburgh Sleep Quality Index. *Primary outcome. Sensor glucose and insulin outcomes are for the final 3 months of each stage.



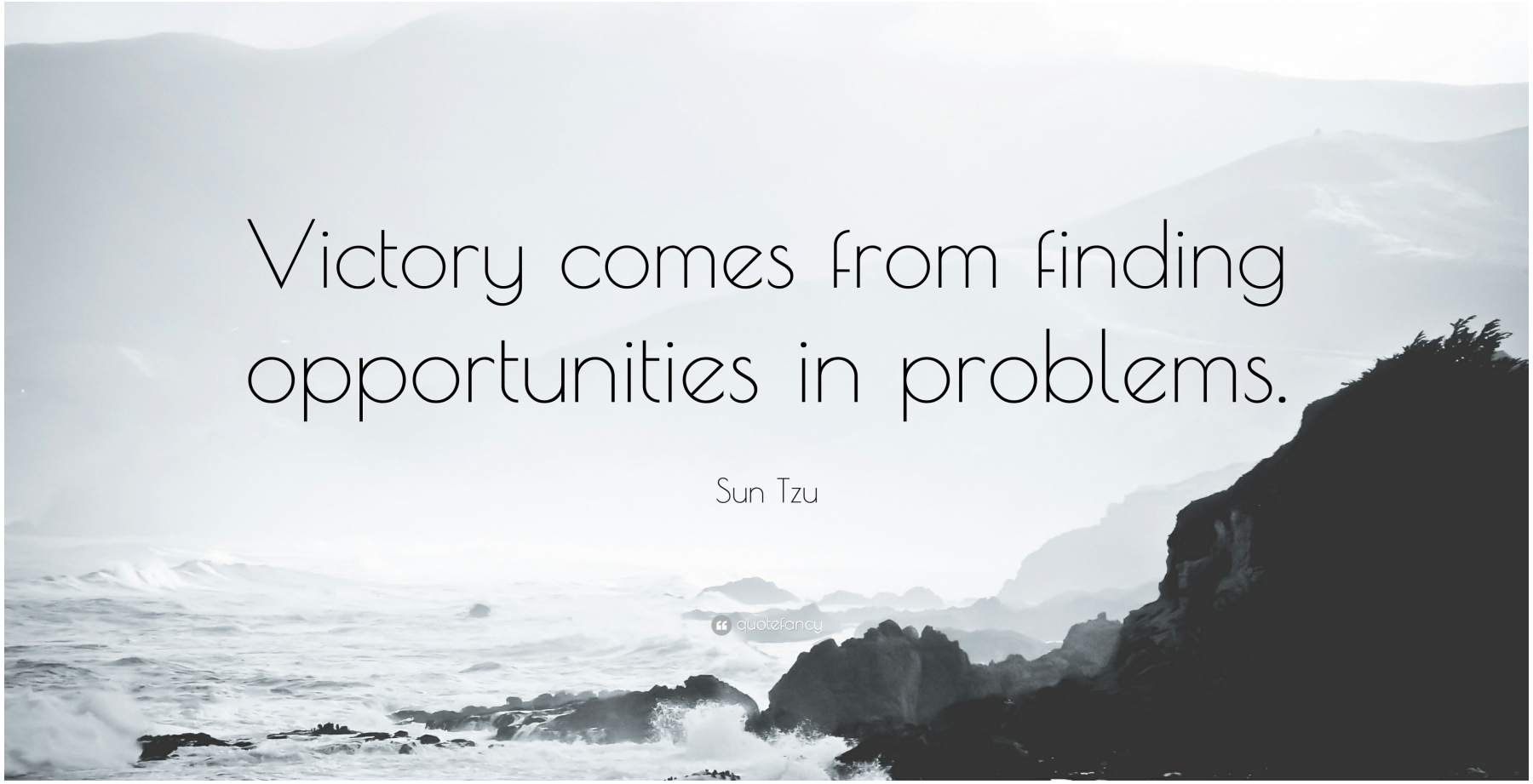
Maltese et al. Diabetologia 2024

Key barriers to the use of diabetes technology in older people

Maltese et al. Diabetologia 2024


IF YOU ALWAYS DO WHAT
YOU'VE ALWAYS DONE,
YOU'LL ALWAYS GET WHAT
YOU'VE ALWAYS GOT
Henry Ford

Opportunities



Hybrid closed loop systems for managing blood glucose levels in type 1 diabetes

Technology appraisal guidance | TA943 | Published: 19 December 2023

1.5 Only use HCL systems if the person or their carer:

1 Recommendations

- is able to use them, and
- is offered approved face-to-face or digital structured education programmes, or
- is competent in insulin dosing and adjustments.

HCL with DN and carers

Bill

68 man

T1dm for >50 years

Brain injury in 1997

Relies on DN team for insulin administration

High Variability in glucose – HbA1c 99mmol/mol

Many insulin combinations tried

Dementia

Lives independently with support and a package of care

John

39m young man

Brain injury at age 15, due to DKA

T1dm since childhood

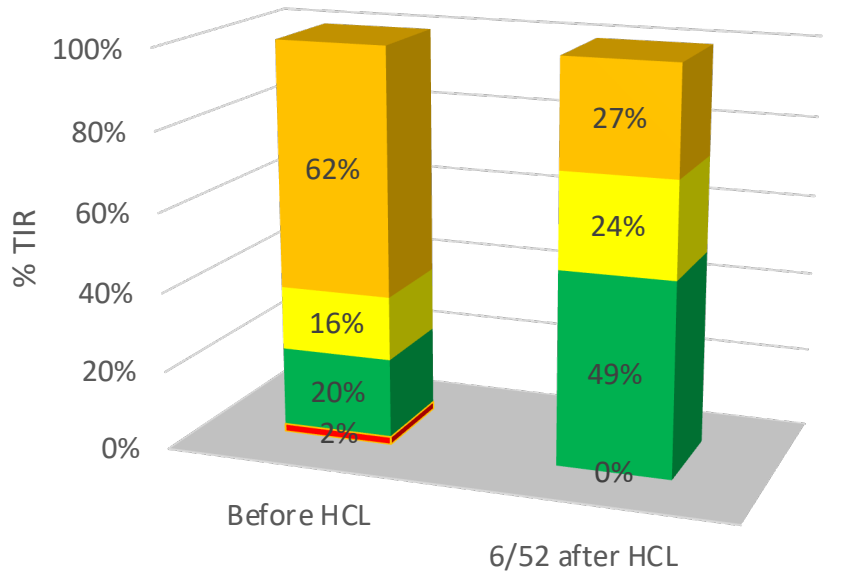
Formally as assessed as having no capacity

Full time funded care

Time In Range at 30%

HbA1c High @ 74mmol/mol

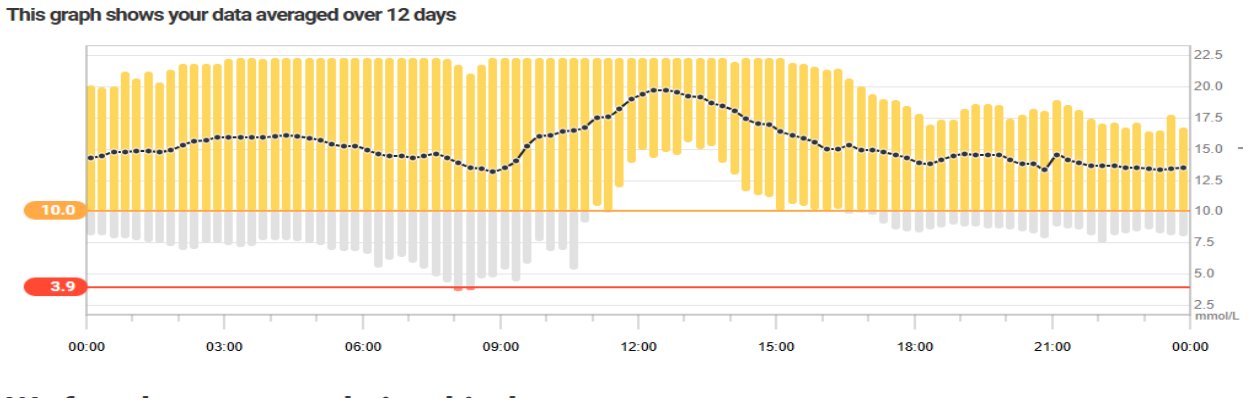
Bills Change in TIR



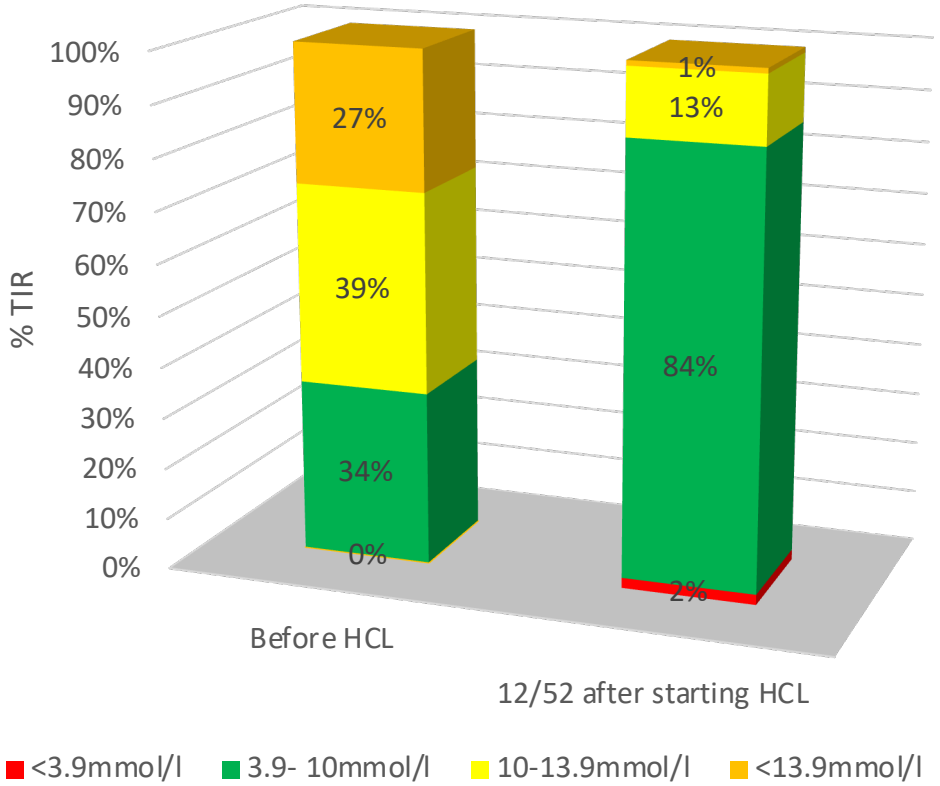
HbA1c 74mmol/l in July 2025

June 2025

December 2024



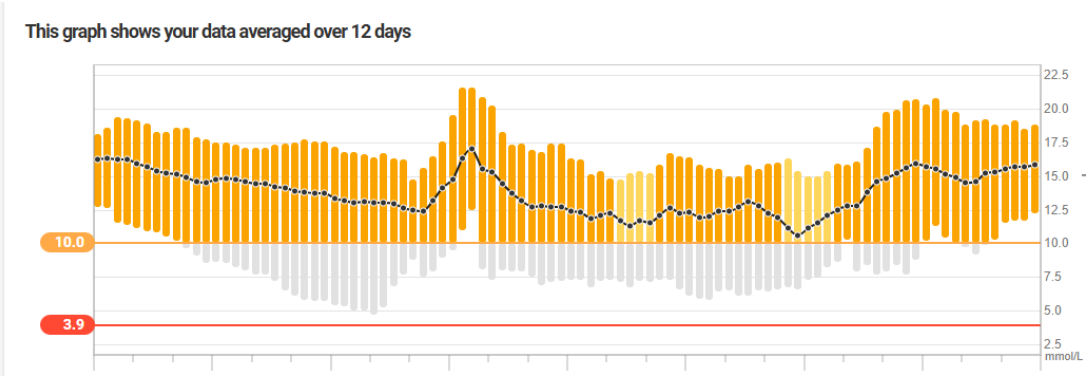
John’s Change in TIR



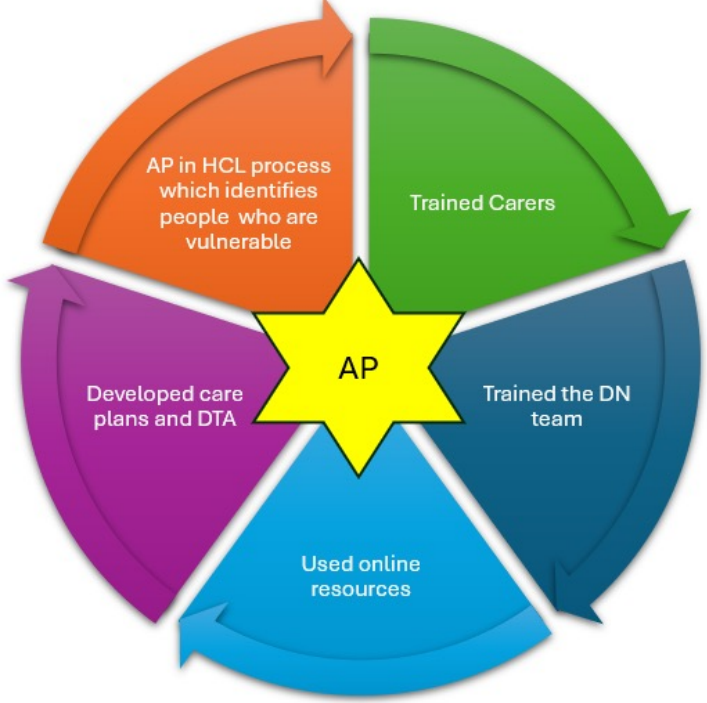
HbA1c now 58mmol/mol July 2025

August 2025

September 2024



How



Workforce – diversify
Be aware of your 80/20 split
Collaboration – DN /carers
Tech learning – Glooko/Dexcom/DTN
Ongoing review
Data generation
Becomes the new norm
AP in HCL process which identifies people who are vulnerable

Feedback from John and his care team

- A huge thank you to you, Katie and the team at OCDEM for your support with moving John onto a sensor and lately an insulin pump.
- John said: “ I really appreciate the regular visits from Charlotte. She has really got to know me and all the advice she gives is brilliant. She gives my team all the help they need to support me. I feel happy because she is with me”
- John’s team: “Charlotte is always very warm, welcoming, informative and open to discuss. She is always there to answer questions. She gives quick responses to email queries. She has been very good at co-working with the team and understanding the challenges John can keep out of sight.”
-
- ‘“We appreciate having the clinical expertise from Katie and the whole team and helpline /registrar”.
- The introduction of a sensor, which took a good amount of time for John and his 24hr team to get used to and recently the insulin pump have had a life changing impact on John’s health. His cardiology and eye health. He now has good habits and his diabetic management is much more integrated. His behaviours (hiding sweet treats / secret eating) remain present but less impactful.
-
- The education for the team (training each person as if they have type one diabetes) has been transformative.
- The flexibility of approach has been so beneficial, with trying different sensors and also in working to a timeframe which John and the team could follow. Digesting new stages and information as it became available.

Feedback from Bills DN team

I was very apprehensive about the changes to Bills visits at the beginning and the two visits a day. It was a new idea. We have received great support from yourself and Meg and feel I feel reassured now when visiting that we can contact you for the support if needed. The changes to Bill have been positive & he is more stable than he was before we started. We have also managed to change his daily routine for the better because of this as he will stay up until we visit again in the afternoon (on most occasions he will!)

There was some anxiety at the beginning and before the system was implemented. Bills cbgs are now more stable and pt safety is much improved.

There are still some anxieties around the system still and we are still working on upskilling the team which is a work in progress. I think we have found safety work arounds doing changes on weekend days etc.

Take Home Messages

- Improved life expectancy in people with type 1 diabetes comes with a greater burden of age-related comorbidities, which influence diabetes management and shape therapeutic goals
- Frailty is associated with adverse outcomes, both generic and diabetes-specific, including hypoglycaemia, hospitalisation, and loss of independence
- Hypoglycaemia remains a major threat in older adults with type 1 diabetes; liberalising HbA_1c targets alone does not eliminate the risk
- Diabetes technology can significantly reduce time below range and improve time in range, enhancing safety and quality of life
- However, barriers persist, including frailty itself, the need for support with device use, and limited evidence in the most vulnerable populations.

Outline of this talk

- Age related conditions associated with T1D
- Frailty in people with diabetes
- Holistic approach to older people with T1D
- Individualised HbA1c targets
- Hypoglycaemia risk in older adults
- Available diabetes technologies and emerging evidence on their benefits in older people
- Barriers to adopting diabetes technology
- It is possible to start HCL in older or young frail people with diabetes