con il patrocinio di

AMD ASSOCIAZIONE MEDICI DIABETOLOGI EMILIA ROMAGNA

Fe. D. E. R. Federazione Diabete Emilia Romagna

# Percorsi in diabetologia: dai target ai benefici per la persona con diabete

## Percorsi terapeutici della U.O.C. Medicina Interna ad indirizzo Diabetologico DACP - AUSL Modena

**24 Settembre 2022**

**Modena**

**RMH DES ARTS Hotel**
**Via Luigi Settembrini, 10**

# Dichiarazione dei conflitti d’interesse

- **Brunetti Massimo**

Direttore Comunicazione, Relazioni Esterne e Promozione della Salute Azienda USL di Modena

**Nessun conflitto di interesse**

- **Daniela Piani**

FF Direttore UOC Medicina Interna ad indirizzo Diabetologico – DACP - Azienda USL di Modena

ASTRA ZENECA

MSD

ELI LILLY

# Persone con T1DM & Devices High Tech.
# Costo e qualità della vita a confronto


**Daniela Piani**

**Con la collaborazione di Massimo Brunetti**

# CONTENUTI

1. Quali sono le evidenze che la tecnologia CGM migliori gli outcomes nella gestione del T1DM?
2. Quali sono i costi della gestione del T1DM?
3. Qual è il rapporto costo-efficacia della tecnologia CGM standalone?

# Quali sono le evidenze che la tecnologia CGM migliori gli outcomes nella gestione del T1DM?

Chetoacidosi

| Study or Subgroup | CGM Events | CGM Total | SMBG Events | SMBG Total | Weight | Odds Ratio M-H, Random, 95% CI |
|---|---|---|---|---|---|---|
| Battelino 2011 | 1 | 18 | 0 | 9 | 5.3% | 1.63 [0.06, 44.01] |
| Battelino 2012 | 2 | 30 | 4 | 30 | 18.3% | 0.46 [0.08, 2.75] |
| Beck 2017 | 0 | 57 | 0 | 53 | | Not estimable |
| Deiss 2006 | 0 | 0 | 0 | 0 | | Not estimable |
| Guilmin-Crepon 2019 | 3 | 48 | 6 | 52 | 27.7% | 0.51 [0.12, 2.17] |
| Heinemann 2018 | 0 | 52 | 0 | 46 | | Not estimable |
| Hirsch 2008 | 0 | 72 | 1 | 66 | 5.6% | 0.30 [0.01, 7.52] |
| JDRF 2008 1 | 0 | 0 | 0 | 0 | | Not estimable |
| JDRF 2008 2 | 0 | 0 | 0 | 0 | | Not estimable |
| JDRF 2008 3 | 0 | 0 | 0 | 0 | | Not estimable |
| Kordonouri 2012 | 0 | 74 | 2 | 72 | 6.2% | 0.19 [0.01, 4.01] |
| Lagarde 2006 | 0 | 76 | 0 | 78 | | Not estimable |
| Lind 2017 | 0 | 153 | 0 | 153 | | Not estimable |
| Mauras 2012 | 1 | 117 | 2 | 61 | 9.9% | 0.25 [0.02, 2.86] |
| News 2015 | 0 | 0 | 0 | 0 | | Not estimable |
| O'Connel 2009 | 0 | 8 | 0 | 7 | | Not estimable |
| Olafsdottir 2017 | 0 | 0 | 0 | 0 | | Not estimable |
| Oliver 2014 | 0 | 0 | 0 | 0 | | Not estimable |
| Raccah 2009 | 2 | 20 | 3 | 20 | 15.9% | 0.63 [0.09, 4.24] |
| Riveline 2012 | 1 | 142 | 0 | 142 | 5.6% | 3.02 [0.12, 74.79] |
| Sequeira 2013 | 0 | 0 | 0 | 0 | | Not estimable |
| Tumminia 2015 | 0 | 105 | 1 | 53 | 5.6% | 0.17 [0.01, 4.14] |
| Van Beers 2017 | 0 | 75 | 0 | 74 | | Not estimable |
| Total (95% CI) | | 1047 | | 916 | 100.0% | 0.49 [0.23, 1.04] |
| Total events | 10 | | 19 | | | |

Heterogeneity: Tau² = 0.00; Chi² = 3.00, df = 8 (P = 0.93); I² = 0%
Test for overall effect: Z = 1.85 (P = 0.06)

Odds Ratio M-H, Random, 95% CI

0.05 0.2 1 5 20
Favours [experimental] Favours [control]

HbA1c

| Study or Subgroup | CGM Mean | CGM SD | CGM Total | SMBG Mean | SMBG SD | SMBG Total | Weight | Mean Difference IV, Random, 95% CI |
|---|---|---|---|---|---|---|---|---|
| Battelino 2011 | 6.7 | 0.5 | 18 | 7 | 0.5 | 58 | 5.9% | −0.30 [−0.56, −0.04] |
| Battelino 2012 | 8.1 | 0.6 | 30 | 8.5 | 0.7 | 153 | 6.2% | −0.40 [−0.64, −0.16] |
| Beck 2017 | 7.7 | 0.8 | 57 | 8.2 | 0.8 | 53 | 5.3% | −0.50 [−0.80, −0.20] |
| Deiss 2006 | 8.2 | 1.2 | 30 | 8 | 1 | 30 | 2.6% | 0.20 [−0.36, 0.76] |
| Guilmin-Crepon 2019 | 8.4 | 1.5 | 48 | 8.4 | 1.5 | 52 | 2.4% | 0.00 [−0.59, 0.59] |
| Heinemann 2018 | 7.4 | 0.8 | 52 | 7.3 | 0.9 | 74 | 5.3% | 0.10 [−0.20, 0.40] |
| Hirsch 2008 | 7.8 | 0.8 | 72 | 7.8 | 0.9 | 66 | 5.5% | 0.00 [−0.29, 0.29] |
| JDRF 2008 1 | 7.1 | 0.5 | 60 | 7.6 | 0.5 | 46 | 7.1% | −0.50 [−0.69, −0.31] |
| JDRF 2008 2 | 7.8 | 0.7 | 31 | 7.7 | 0.8 | 53 | 4.9% | 0.10 [−0.23, 0.43] |
| JDRF 2008 3 | 7.6 | 0.7 | 62 | 7.7 | 0.6 | 58 | 6.4% | −0.10 [−0.33, 0.13] |
| Kordonouri 2012 | 7.6 | 1.3 | 74 | 7.7 | 1.2 | 78 | 4.0% | −0.10 [−0.50, 0.30] |
| Lagarde 2006 | 7.8 | 0.9 | 76 | 8.6 | 0.9 | 9 | 2.2% | −0.80 [−1.42, −0.18] |
| Lind 2017 | 7.9 | 0.8 | 153 | 8.3 | 0.9 | 142 | 7.0% | −0.40 [−0.59, −0.21] |
| Mauras 2012 | 7.7 | 0.8 | 117 | 7.8 | 0.8 | 72 | 6.4% | −0.10 [−0.33, 0.13] |
| News 2015 | 8.1 | 1.2 | 49 | 8 | 1 | 48 | 3.6% | 0.10 [−0.34, 0.54] |
| O'Connel 2009 | 7.1 | 0.8 | 8 | 7.8 | 0.9 | 31 | 2.1% | −0.70 [−1.34, −0.06] |
| Olafsdottir 2017 | 7.9 | 1.5 | 69 | 8.4 | 1.5 | 73 | 3.1% | −0.50 [−0.99, −0.01] |
| Oliver 2014 | 8 | 0.9 | 8 | 8.4 | 0.8 | 7 | 1.3% | −0.40 [−1.26, 0.46] |
| Raccah 2009 | 8.3 | 1.3 | 20 | 8.7 | 1.2 | 55 | 2.1% | −0.40 [−1.05, 0.25] |
| Riveline 2012 | 8.4 | 0.9 | 142 | 8.8 | 0.9 | 61 | 5.8% | −0.40 [−0.67, −0.13] |
| Sequeira 2013 | 8.1 | 1.7 | 39 | 8.1 | 1.7 | 39 | 1.6% | 0.00 [−0.75, 0.75] |
| Tumminia 2015 | 7.8 | 0.6 | 105 | 8.4 | 1 | 20 | 3.4% | −0.60 [−1.05, −0.15] |
| Van Beers 2017 | 7.3 | 0.8 | 75 | 7.3 | 0.8 | 52 | 5.6% | 0.00 [−0.28, 0.28] |
| Total (95% CI) | | | 1395 | | | 1330 | 100.0% | −0.24 [−0.34, −0.13] |

Heterogeneity: Tau² = 0.03; Chi² = 48.14, df = 22 (P = 0.001); I² = 54%
Test for overall effect: Z = 4.35 (P < 0.0001)

Mean Difference IV, Random, 95% CI

−1 −0.5 0 0.5 1
Favours CGM Favours SMBG

## Effects of real-time continuous glucose monitoring in type 1 diabetes: a meta-analysis of randomized controlled trials

I. Dicembrini[1,2] · C. Cosentino[1] · M. Monami[1] · E. Mannucci[1,2] · L. Pala[1]

Acta Diabetologica 2021; 58:401-410

Ipoglicemia

| Study or Subgroup | CGM Events | CGM Total | SMBG Events | SMBG Total | Weight | Odds Ratio M-H, Random, 95% CI |
|---|---|---|---|---|---|---|
| Battelino 2011 | 0 | 18 | 0 | 9 | | Not estimable |
| Battelino 2012 | 4 | 30 | 2 | 30 | 6.3% | 2.15 [0.36, 12.76] |
| Beck 2017 | 2 | 57 | 2 | 53 | 5.5% | 0.93 [0.13, 6.83] |
| Deiss 2006 | 0 | 0 | 0 | 0 | | Not estimable |
| Guilmin-Crepon 2019 | 0 | 0 | 0 | 0 | | Not estimable |
| Heinemann 2018 | 24 | 52 | 39 | 46 | 9.9% | 0.15 [0.06, 0.41] |
| Hirsch 2008 | 3 | 72 | 11 | 66 | 8.2% | 0.22 [0.06, 0.82] |
| JDRF 2008 1 | 5 | 60 | 4 | 55 | 8.0% | 1.16 [0.29, 4.56] |
| JDRF 2008 2 | 3 | 31 | 5 | 31 | 7.3% | 0.56 [0.12, 2.57] |
| JDRF 2008 3 | 4 | 62 | 6 | 58 | 8.2% | 0.60 [0.16, 2.24] |
| Kordonouri 2012 | 1 | 74 | 5 | 72 | 5.0% | 0.18 [0.02, 1.61] |
| Lagarde 2006 | 0 | 76 | 0 | 78 | | Not estimable |
| Lind 2017 | 1 | 153 | 5 | 153 | 5.0% | 0.19 [0.02, 1.69] |
| Mauras 2012 | 3 | 117 | 6 | 61 | 7.7% | 0.24 [0.06, 1.00] |
| News 2015 | 0 | 0 | 0 | 0 | | Not estimable |
| O'Connel 2009 | 0 | 8 | 0 | 7 | | Not estimable |
| Olafsdottir 2017 | 1 | 69 | 5 | 73 | 5.0% | 0.20 [0.02, 1.76] |
| Oliver 2014 | 0 | 0 | 0 | 0 | | Not estimable |
| Raccah 2009 | 1 | 20 | 1 | 20 | 3.4% | 1.00 [0.06, 17.18] |
| Riveline 2012 | 20 | 142 | 6 | 142 | 10.1% | 3.72 [1.45, 9.56] |
| Sequeira 2013 | 0 | 0 | 0 | 0 | | Not estimable |
| Tumminia 2015 | 0 | 105 | 0 | 53 | | Not estimable |
| Van Beers 2017 | 10 | 75 | 18 | 74 | 10.5% | 0.48 [0.20, 1.12] |
| Total (95% CI) | | 1221 | | 1081 | 100.0% | 0.53 [0.28, 0.97] |
| Total events | 82 | | 115 | | | |

Heterogeneity: Tau² = 0.75; Chi² = 32.15, df = 13 (P = 0.002); I² = 60%
Test for overall effect: Z = 2.05 (P = 0.04)

Odds Ratio M-H, Random, 95% CI

0.01 0.1 1 10 100
Favours [experimental] Favours [control]

Studi:
JDRF-CGM
DIAMOND
IN-Controll

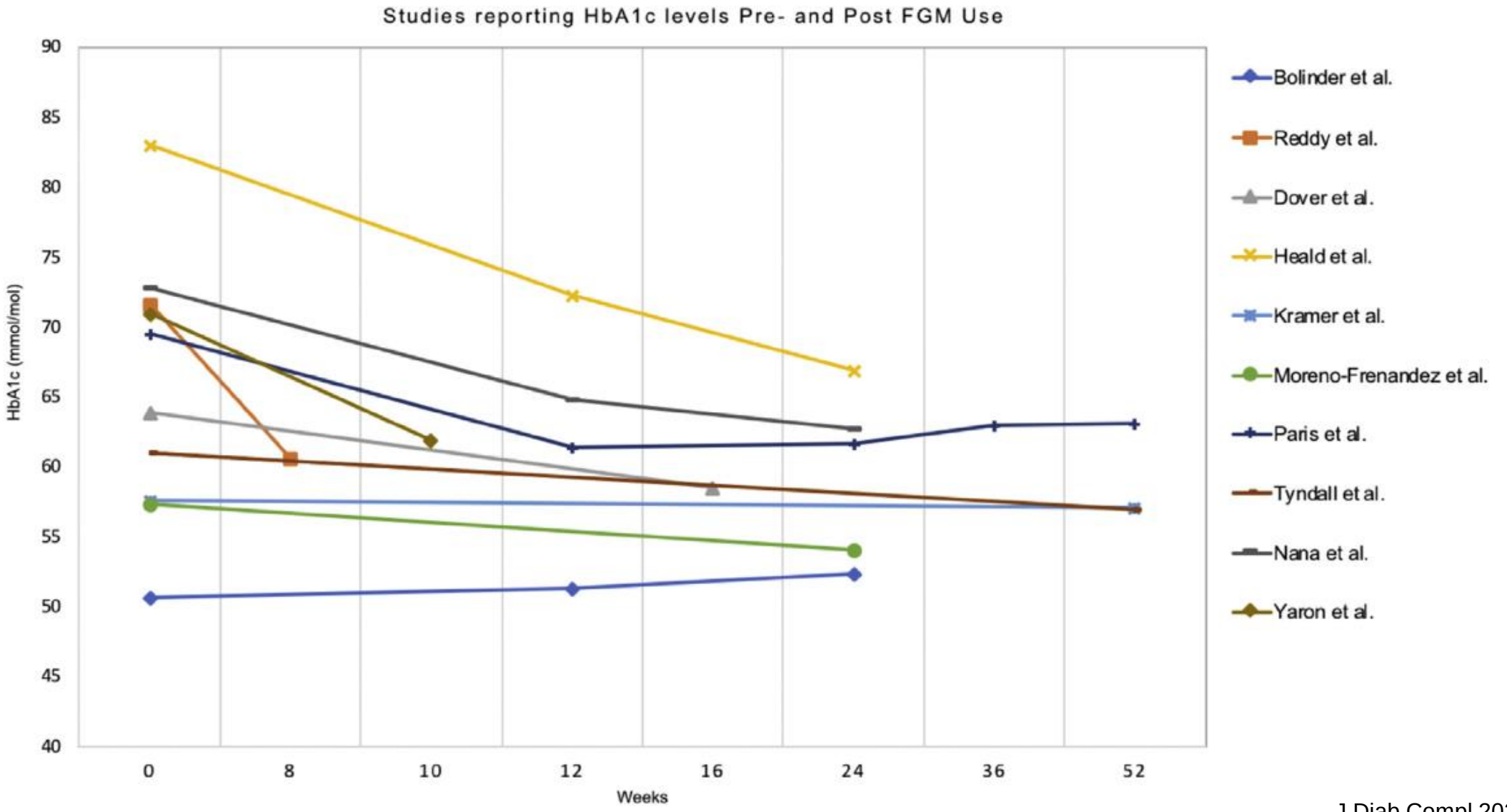
**Table 1**
**Results for type 1 diabetes mellitus reduction in hemoglobin A1c and hypoglycemia**

| | Baseline | | | Outcome | | |
|---|---|---|---|---|---|---|
| Study | n | Length | Hemoglobin A1c | Δ Hemoglobin A1c | Hemoglobin A1c <7.0% | Severe Hypoglycemia |
| JDRF-CGM | 52 | 6 mo | 7.6 | −0.5 | 30% | 21.8 |
| JDRF-CGM 6 mo | 51 | 1 y | 7.6 | −0.5 | 29% | 7.1 |
| Deiss | 81 | 3 mo | 8.1 | −0.6 | 27% | NA |
| O'Connell | 15 | 3 mo | 7.3 | −0.4 | 56% | NA |

Nelle persone con T1DM e HbA1c elevata l'introduzione del CGM produce una significativa e sostanziale riduzione della HbA1c
La riduzione della HBA1c è proporzionale al suo livello al baseline e al tempo di uso del CGM
Il miglioramento della HbA1c è stato dimostrato per tutte le fasce di età, ma in particolare per 8-14 anni e >25 anni
Nelle persone ad alto rischio di ipoglicemia, l'utilizzo del CGM consente di ridurre gli eventi ipoglicemici del 30-50%

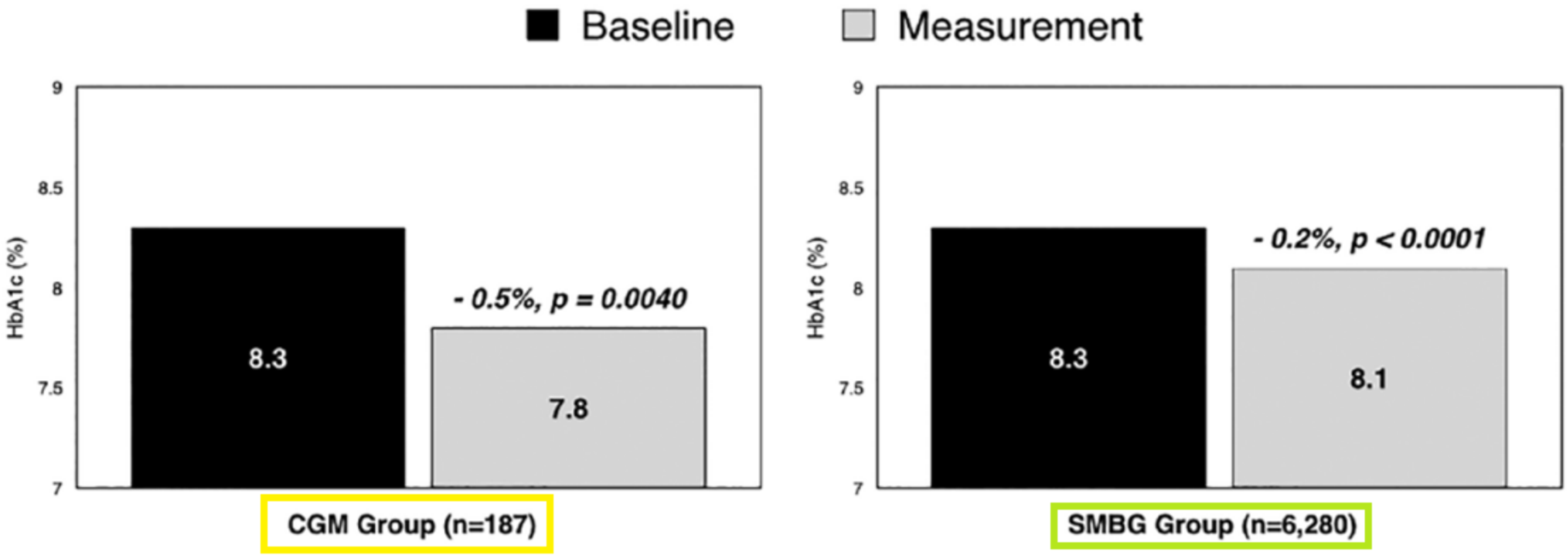
DIABETES TECHNOLOGY & THERAPEUTICS 2017; 19(3): S25

# Flash glucose monitoring (FGM): A clinical review on glycaemic outcomes and impact on quality of life




J Diab Compl 2020; 34:107559

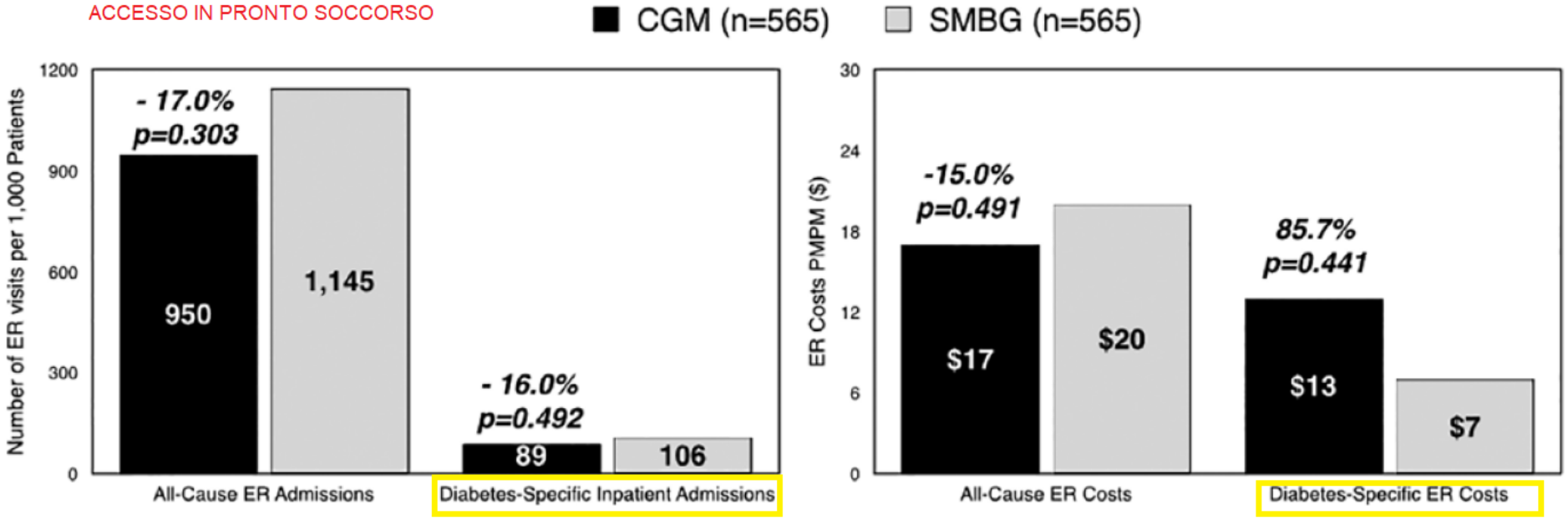
# Continuous Glucose Monitoring Use in Type 1 Diabetes: Longitudinal Analysis Demonstrates Meaningful Improvements in HbA1c and Reductions in Health Care Utilization



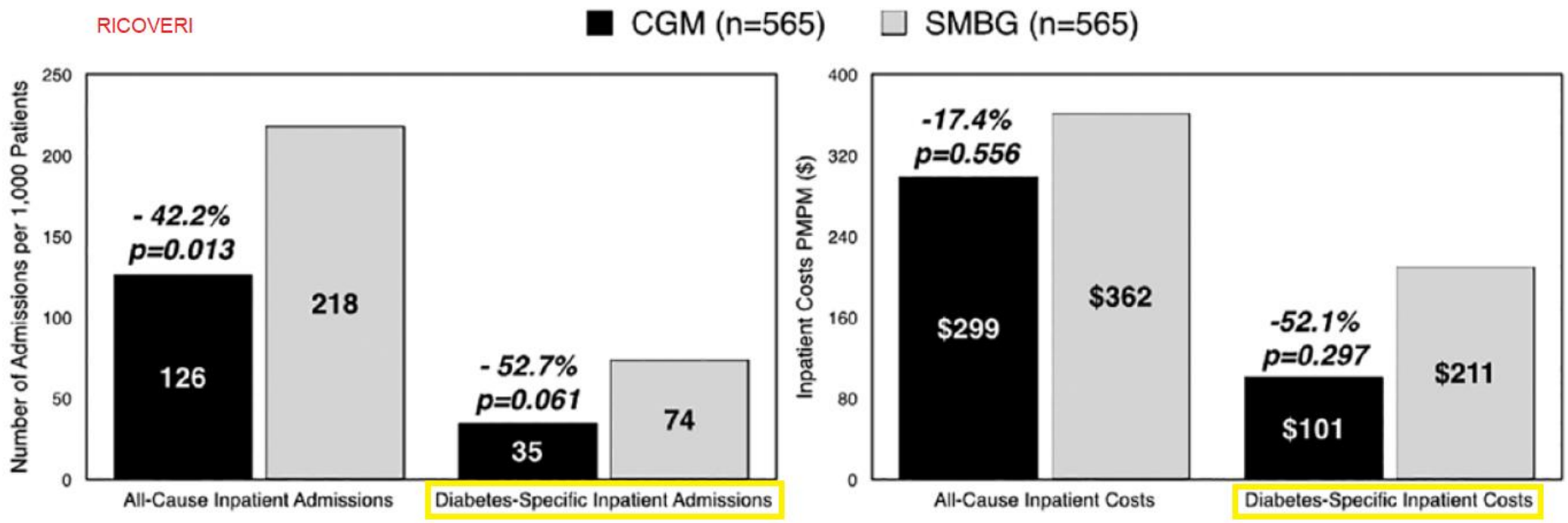

Data for the study were obtained from the Optum Research Database (Optum, Eden Prairie, MN, USA), which contains eligibility, pharmacy claims, medical claims and laboratory data for more than 14 million enrollees in fully insured and self-funded health care plans.

Journal of Diabetes Science and Technology 2017, Vol. 11(3) 522– 528

ACCESSO IN PRONTO SOCCORSO

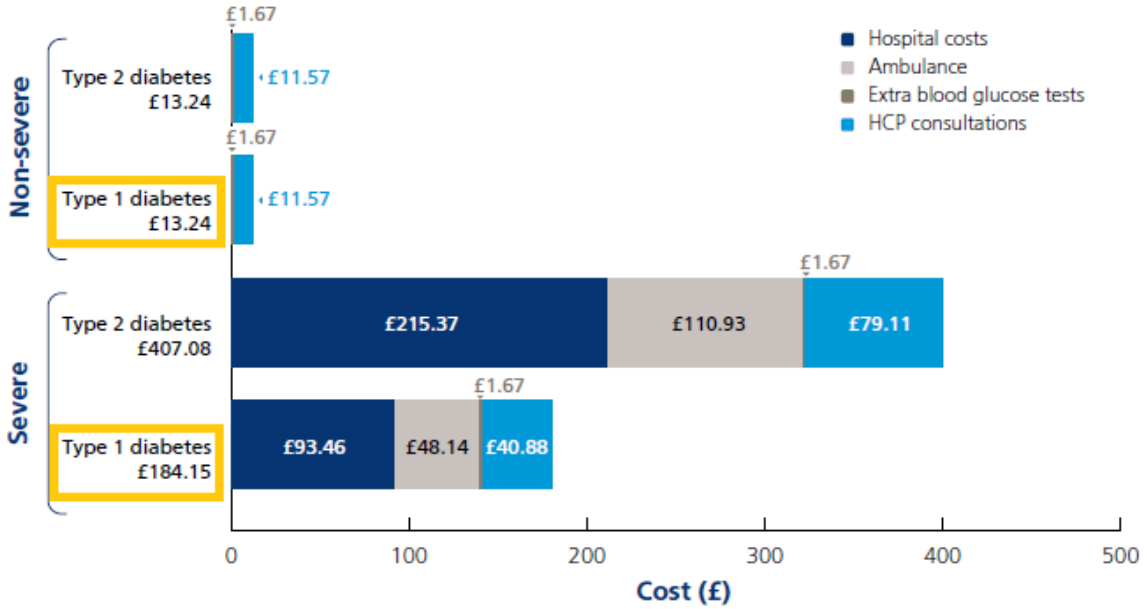



RICOVERI



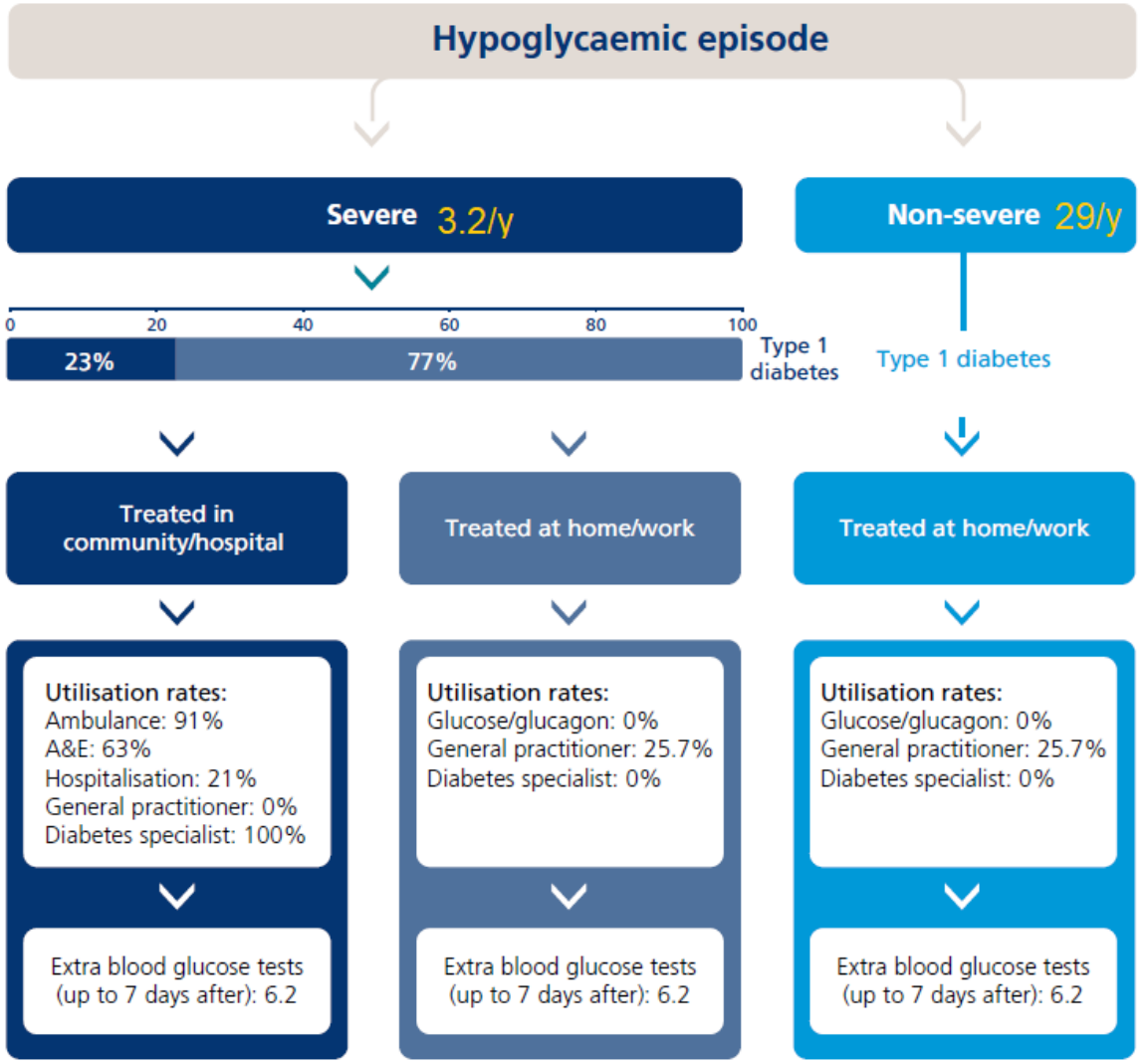
# COSTI DIRETTI

| COSTI «FISSI» E «SUNK COSTS» | COSTI VARIABILI |
|---|---|
| DIAGNOSI & SCREENING | **MONITORAGGIO GLICEMICO** |
| TERAPIA IPOGLICEMIZZANTE | **COMPLICANZE ACUTE: IPOGLICEMIA SEVERA E CHETOACIDOSI** |
| MEDICINA SPECIALISTICA | **Ambulanze, accesso in PS, ospedalizzazione, SMBG, consulto medico** |
| PROGRAMMI DI EDUCAZIONE TERAPEUTICA | COMPLICANZE CRONICHE |
| PROGRAMMI DI VACCINAZIONE | Terapie, cure, ricoveri per complicanze d'organo etc |




| Population | | Severe | Non-severe | Total |
|---|---|---|---|---|
| Sample general population (100 000) | Type 1 diabetes (474 people) | £279,317 | £181,983 | **£461,300** |

# Quali sono i costi della gestione del T1DM?




Diabet Medicine 2012;29:855-862; 2015:32:1156-1166

# COSTI DIRETTI USA

**Vigersky RA J Diab Sci Thec 2015; 9(2):320-330**

Estimate Cost of Hypoglycemia Admissions in Patients With Type 1

| | Lowest rate of hypoglycemia/year for type 1 diabetes | Highest rate of hypoglycemia/year for type 1 diabetes |
|---|---|---|
| Patients | 1.0 million | 1.0 million |
| Insulin-requiring patients | 1.0 million | 1.0 million |
| Hypoglycemia unaware patients[b] | 200 000 | 200 000 |
| Severe hypoglycemia events | 480 000[c] | 1 600 000[d] |
| Hospitalizations[e] | 100 800 | 336 000 |
| Cost of hospitalization ($)[f] | 1.8 billion | 5.9 billion |

[b]20% hypoglycemia unawareness in type 1 diabetes
[c]Low annual rate of severe hypoglycemia events: 2.4/pz/v
[d]High annual rate of severe hypoglycemia events: 8.1/pz/y
[e]21% hospitalization rate for severe hypoglycemia
[f]Cost of hospitalization for severe hypoglycemia = $17 564.

Diabet Med 2008;25:501-504; Diabetes Res Clin Pract. 2010;87:64-68;

# Quali sono i costi della gestione del T1DM?

| COSTI INDIRETTI della IPOGLICEMIA | |
|---|---|
| **PERDITA ORE DI LAVORO** | **SCELTE TERAPEUTICHE CHE INCIDONO SUGLI OUTCOMES INTERMEDI E DI ESITO** |
| PERDITA PRODUTTIVITA’ | |
| COSTI SOCIALI | |
| COMPORTAMENTI REATTIVI -> | |
| **COSTI INTANGIBILI** | |
| PAURA DELLA IPOGLICEMIA<br>VITALITA’<br>RUOLO SOCIALE<br>PERCEZIONE SOGGETTIVA DEL BENESSERE FISICO | (SF-36 SelfFunctioning; Problem Areas in Diabetes, short form [PAID-SF Problem Areas in Diabetes short form] ;<br>Hypoglycemia Fear Survey [HFS]–Worry;<br>Diabetes Treatment Satisfaction Questionnaire [DTSQ]<br>EQ-5D 5-Level-Euro-Qol Dimension (mobility, self-care, usual activities, pain/discomfort, anxiety/depression) |

# The Impact of Non-Severe Hypoglycemic Events on Work Productivity and Diabetes Management

VALUE IN HEALTH 2011: 14:665-671

*Meryl Brod, PhD[1,*], Torsten Christensen, MSc[2], Trine L. Thomsen, BSc, MSc[2], Donald M. Bushnell, MA[3]*

[1]*The Brod Group, Mill Valley, CA, USA;* [2]*Novo Nordisk A/S, Virum, Denmark;* [3]*Health Research Associates, Mountlake Terrace, WA, USA*

**– Productivity impact of an NSHE.**

| | Total | USA | UK | Germany | France | *P* value |
|---|---|---|---|---|---|---|
| NSHE during working hours, N (with 5% trim)* | N = 963 | N = 278 | N = 232 | N = 170 | N = 283 | |
| Missing work time, N (%) | 176 (18.3%) | 30 (10.8%) | 54 (23.3%) | 15 (8.8%) | 77 (27.2%) | <0.001§ |
| If missing work time, what was the amount of work time lost, mean (SD) | 9.9 (8.4) | 10.2 (9.5) | 11.4 (9.2) | 8.3 (7.1) | 8.9 (7.6) | 0.467‖ |
| Missing a meeting/appointment or not finishing a project in due time because of the NSHE, (N) % | 231 (23.8%) | 48 (17.2%) | 68 (28.8%) | 29 (17.0%) | 86 (30.1%) | <0.001§ |
| NSHE outside working hours, N (with 5% trim)† | N = 1046 | N = 307 | N = 287 | N = 173 | N = 279 | |
| Missing work time, N (%) | 150 (14.3%) | 26 (8.5%) | 41 (14.3%) | 14 (8.1%) | 69 (24.7%) | <0.001§ |
| If missing work time, what was the amount of work time lost, mean (SD) | 12.6 (11.0) | 11.1 (10.5) | 15.1 (13.6) | 9.2 (7.4) | 12.4 (9.9) | 0.268‖ |
| Missing a meeting/appointment or not finishing a project in due time because of the NSHE, N (%) | 173 (16.4%) | 39 (12.7%) | 49 (17.0%) | 17 (9.7%) | 68 (24.2%) | <0.001§ |
| Nocturnal NSHE, N (with 5% trim)‡ | N = 612 | N = 205 | N = 153 | N = 88 | N = 166 | |
| Missing work time, N (%) | 139 (22.7%) | 29 (14.1%) | 43 (28.1%) | 14 (15.9%) | 53 (31.9%) | <0.001§ |
| If missing work time, what was the amount of work time lost, mean (SD) | 14.7 (11.6) | 14.3 (11.8) | 14.2 (10.2) | 12.5 (12.7) | 15.9 (12.5) | 0.787‖ |
| Missing a meeting/appointment or not finishing a project in due time because of the NSHE, N (%) | 197 (31.8%) | 48 (23.3%) | 62 (40.3%) | 20 (22.2%) | 67 (39.4%) | <0.001§ |

NSHE, non-severe hypoglycemic events.

# COST INDIRETTI NSHE

**– Productivity loss* of an NSHE.** COSTOANNUO 1939-2986 USD

| | USA | UK | Germany | France | *P* value |
|---|---|---|---|---|---|
| NSHE outside working hours $, (SD), N | 26.43 (121.26)<br>N = 307 | 46.30 (157.60)<br>N = 287 | 15.50 (67.24)<br>N = 173 | 61.12 (144.41)<br>N = 279 | <0.001 |
| NSHE at work $, (SD), N | 31.12 (124.91)<br>N = 278 | 57.21 (140.51)<br>N = 232 | 15.26 (65.16)<br>N = 170 | 48.33 (111.58)<br>N = 283 | <0.001 |
| NSHE at sleep at night $, (SD), N | 55.16 (184.17)<br>N = 205 | 83.59 (177.30)<br>N = 153 | 35.58 (130.27)<br>N = 88 | 93.47 (197.62)<br>N = 166 | 0.002 |

NSHE, non-severe hypoglycemic event.
* Costs provided in US dollars (USD).

| Population | | Severe | Non-severe | Total |
|---|---|---|---|---|
| Sample general population (100 000) | Type 1 diabetes (474 people) | £42,493 | £385,092 | £427,585 |

Health and Quality of Life Outcomes 2013, 11:90 Diabet Medicine 2012;29:855-862; 2015:32:1156-1166

| Lifestyle Changes, %[†] | Mild or Moderate Hypoglycemic Episodes | | Severe Hypoglycemic Episodes | |
|---|---|---|---|---|
| | T1DM (n = 193) | T2DM (n = 97) | T1DM (n = 55) | T2DM (n = 19) |
| Modified insulin dose to avoid future hypoglycemia | 74.1 | 43.3 | 78.2 | 57.9 |
| Ate extra food | 66.8 | 62.9 | 70.9 | 63.2 |
| Had greater fear of future hypoglycemia | 37.8 | 29.9 | 63.6 | 84.2 |
| Had additional concerns about driving | 29.2 | 9.4[‡] | 36.4 | 15.8 |
| Asked someone to check on them | 9.3 | 14.4 | 45.5 | 57.9 |
| Went home from school, work, activities | 6.7 | 10.3 | 25.5 | 32.0 |
| Stayed home the next day | 1.6 | 9.3[§] | 20.0 | 26.3 |

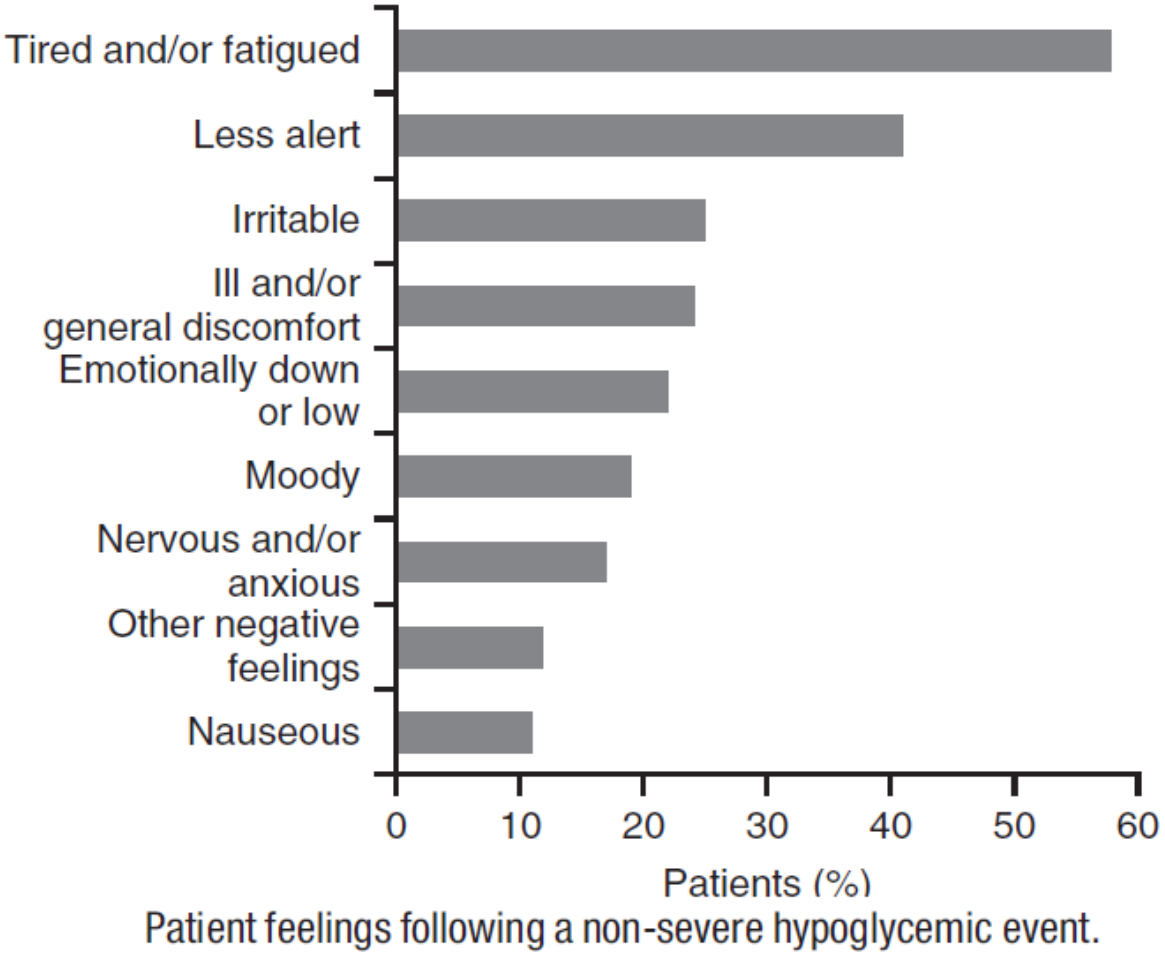
Abbreviations: T1DM, type 1 diabetes mellitus; T2DM, type 2 diabetes mellitus.
*Reported within 24 hours after the event.
[†]Percentage of patients who "sometimes" or "always" made lifestyle changes after hypoglycemic episodes.
[‡]$P < .001$.
[§]$P < .01$. Reprinted with permission from Canadian Journal of Diabetes.

Respondents reported that their NSHEs lasted an average of 33.0 minutes (SD 60.6)

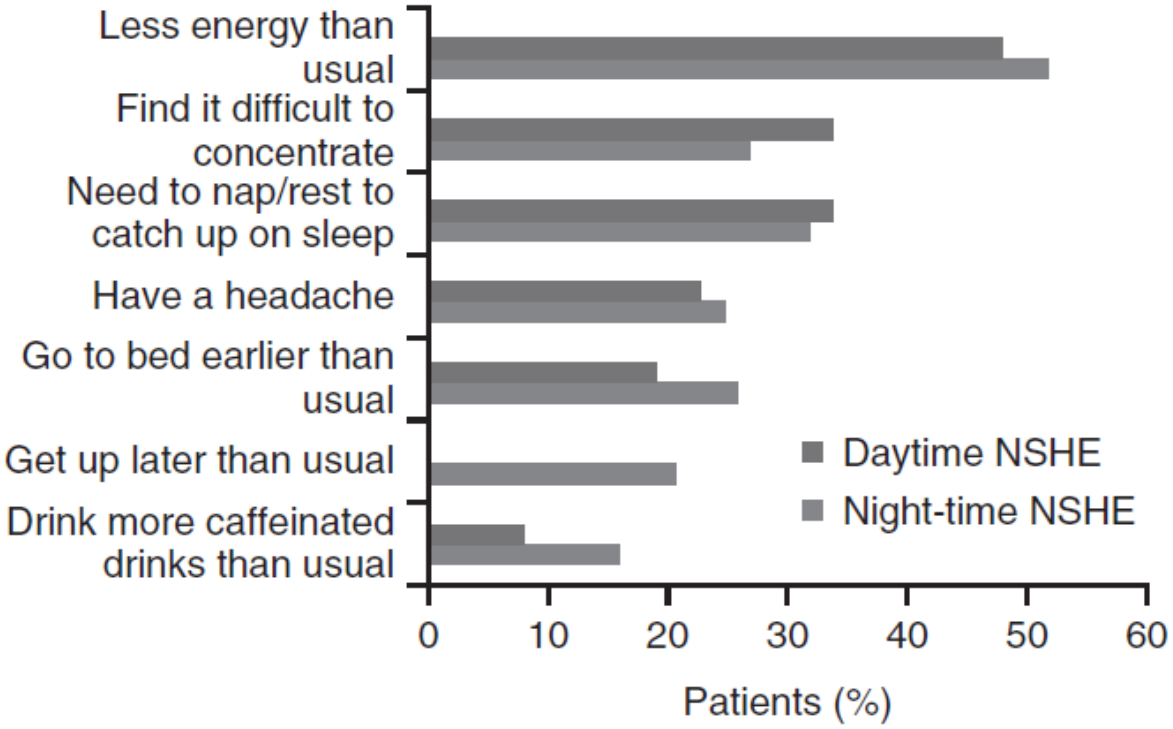
| Diabetes management after last NSHE. | Total | USA | UK | Germany | France | P value |
|---|---|---|---|---|---|---|
| Contacted a health-care professional[†] after last NSHE | | | | | | |
| Yes, N (%) | 349 (24.9%) | 56 (13.7%) | 99 (25.7%) | 56 (23.7%) | 138 (36.9%) | <0.001* |
| Did your LAST NSHE cause you to decrease your normal insulin dose? | | | | | | |
| Yes, N (%) | 351 (25.0%) | 109 (26.7%) | 101 (26.2%) | 33 (14.0%) | 108 (28.9%) | <0.001* |
| Total units decreased, mean (SD) | 6.5 (13.1) | 6.3 (8.0) | 6.2 (9.9) | 6.5 (9.3) | 6.8 (19.4) | 0.988[‡] |
| Days decreased, mean (SD) | 3.6 (5.1) | 4.7 (6.5) | 3.1 (4.2) | 3.1 (4.8) | 3.2 (4.0) | 0.062[‡] |

Value in Health 2011;14:665-671; The Diabetes Educator 2014;40(3):269-279

# Effects of patient-reported non-severe hypoglycemia on healthcare resource use,work-time loss, and wellbeing in insulin-treated patients with diabetes in seven European




Patient feelings following a non-severe hypoglycemic event.




Patients' experience on the day following a daytime or nocturnal NSHE. NSHE, non-severe hypoglycemic event.

Journal of Medical Economics 2013; Vol. 16, No. 12:1453–1461

# Health Related Quality of Life (HRQol)

## Health-related quality of life associated with daytime and nocturnal hypoglycaemic events: a time trade-off survey in five countries

8286 people interviewed; 551 with T1DM, 1603 with T2DM across Canada, Germany, Sweden, UK, USA

**Average time trade-off utility values for health states [95% CIs, bootstrapped]**

| | Frequency of hypoglycaemic events | | | | |
|---|---|---|---|---|---|
| **Health state** | **One a year** | **One a quarter** | **One a month** | **One a week** | **Three a week** |
| Baseline diabetes | 0.844 [0.839 to 0.848] | – | – | – | – | – |
| Non-severe daytime hypoglycaemia | – | – | 0.812 [0.802 to 0.822] | 0.812 [0.802 to 0.822] | 0.808 [0.799 to 0.817] | 0.773 [0.762 to 0.784] |
| Non-severe nocturnal hypoglycaemia | – | – | 0.809 [0.800 to 0.819] | 0.804 [0.794 to 0.813] | 0.775 [0.764 to 0.786] | 0.729 [0.717 to 0.740] |
| Severe daytime hypoglycaemia | – | 0.762 [0.751 to 0.773] | 0.739 [0.739 to 0.750] | – | – | – |
| Severe nocturnal hypoglycaemia | – | 0.759 [0.749 to 0.770] | 0.738 [0.726 to 0.748] | – | – | – |

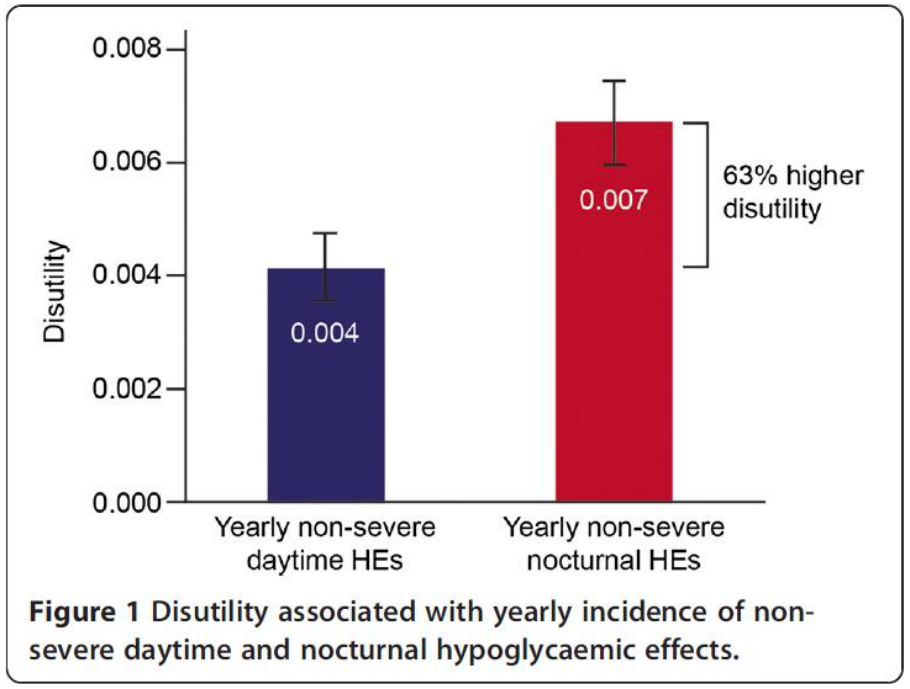



**Figure 1** Disutility associated with yearly incidence of non-severe daytime and nocturnal hypoglycaemic effects.

Health and Quality of Life Outcomes 2013;11:90

# The Potential Cost Implications of Averting Severe Hypoglycemic Events Requiring Hospitalization in High-Risk Adults With Type 1 Diabetes Using Real-Time Continuous Glucose Monitoring

J Diab Sci Thec 2016; 10(4): 905-913

Estimates for Cost Calculation.

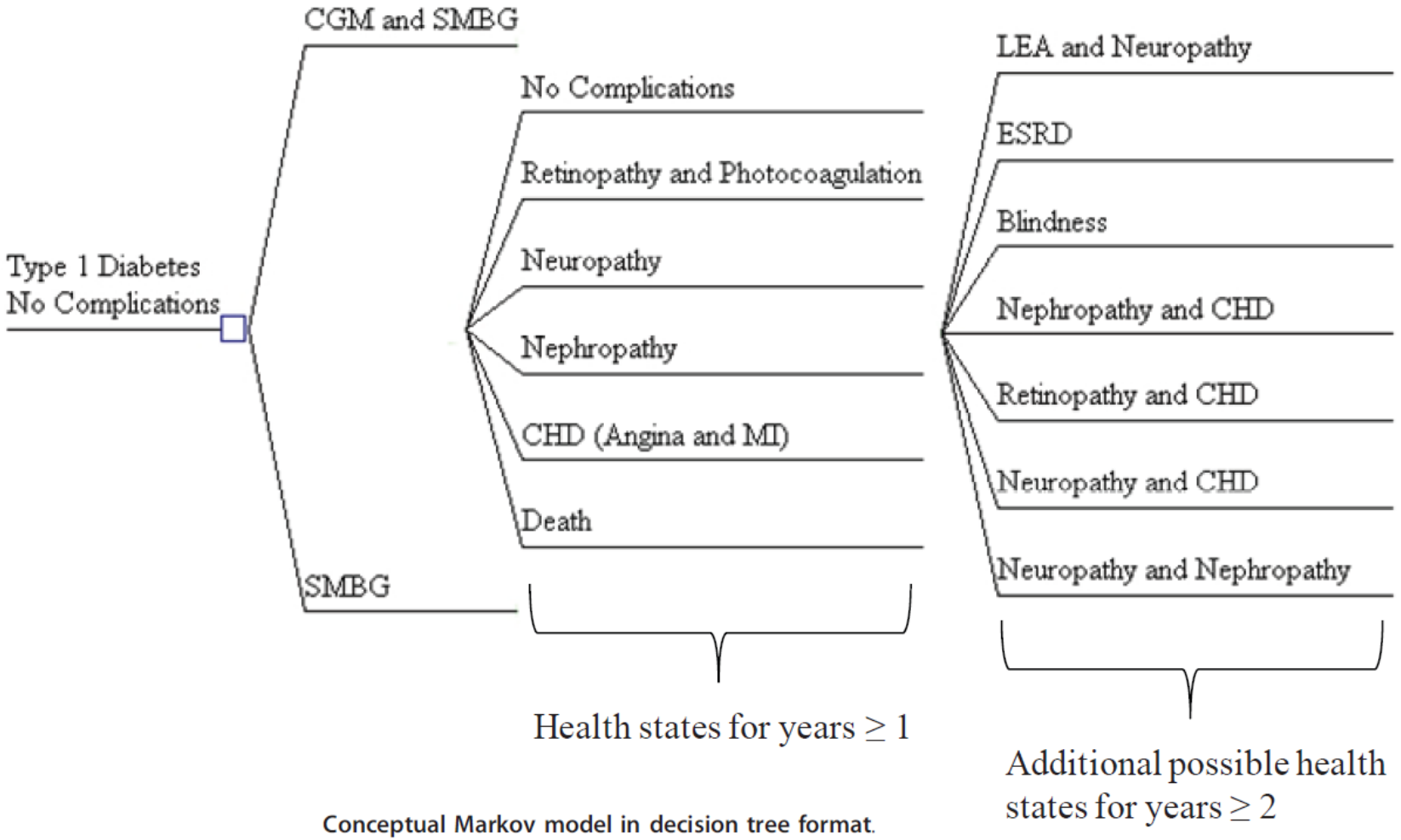
| Parameter | Estimate |
|---|---|
| % of T1DM adults with hypoglycemia unawareness | 20%[22] |
| Annual rate of severe hypoglycemia in adults with T1DM | 1.0[8-10,12] |
| Increased risk of severe hypoglycemia in T1DM adults with hypoglycemia unawareness | 6 times[22,23] |
| % of severe hypoglycemic episodes requiring hospitalization | 14.5%[27] |
| % reduction in severe hypoglycemic episodes conferred by RT-CGM in adults with T1DM | 32%[39] |
| Average cost of a hypoglycemia-related hospitalization | $21 000[a26] |
| Cost of RT-CGM | $4500 to $4900 |

Cost Calculation Inputs and Results for a Commercial Health Plan.

| Parameter | Calculation | Result |
|---|---|---|
| Number of adult members with T1DM | 10 million × 9.3% × 5% | 46 500 |
| Number of adult members with T1DM and hypoglycemia unawareness | 46 500 × 20% | 9300 |
| Number of annual severe hypoglycemic events without RT-CGM | 9300 × 6 episodes | 55 800 |
| Number of annual severe hypoglycemic events requiring hospitalization without RT-CGM | 55 800 × 14.5% | 8091 |
| Number of annual severe hypoglycemic events with RT-CGM | 55 800 – (55 800 × 32%) | 37 944 |
| Number of annual severe hypoglycemic events requiring hospitalization with RT-CGM | 37 944 × 14.5% | 5502 |
| Annual cost of severe hypoglycemic events requiring hospitalization | | |
| Without RT-CGM | 8091 × $21 000 | $169 911 000 |
| With RT-CGM | 5502 × $21 000 | $115 542 000 |
| Difference in cost | | $54 369 000 |
| Cost of RT-CGM (low estimate) | 9300 × $4500 | $41 850 000 |
| Cost of RT-CGM (high estimate) | 9300 × $4900 | $45 570 000 |
| Net cost savings conferred by RT-CGM (based on lower device cost) | $54 369 000 – $41 850 000 | $12 519 000 |
| Net cost savings conferred by RT-CGM (based on higher device cost) | $54 369 000 – $45 570 000 | $8 799 000 |
| Per patient cost savings conferred by RT-CGM (based on lower device cost) | $12 519 000/9300 | $1346 |
| Per patient cost savings conferred by RT-CGM (based on higher device cost) | $8 799 000/9300 | $946 |

# Cost-effectiveness of continuous glucose monitoring and intensive insulin therapy for type 1 diabetes

R Brett McQueen[1*†], Samuel L Ellis[2†], Jonathan D Campbell[1†], Kavita V Nair[1†] and Patrick W Sullivan[3†]




**Conceptual Markov model in decision tree format.**

# McQueen Parametri

**Table 1 Parameters for Type 1 Diabetes Markov Model**

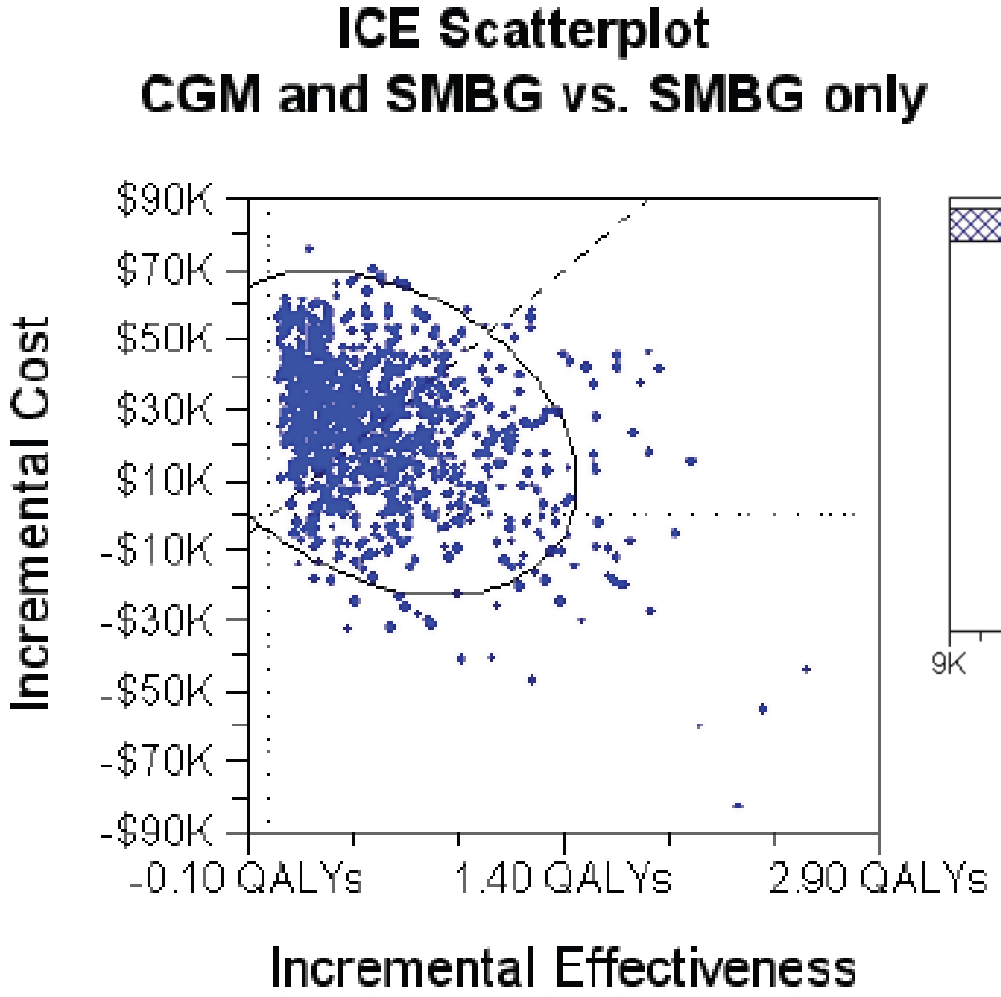
| Transition Probabilities [Annual cycle length][a] | Mean | 2.5%[b] | 97.50% | Reference |
|---|---|---|---|---|
| Retinopathy to blindness | 0.101 | 0.057 | 0.156 | Hoerger et al. [16,17] |
| Diabetes with no complications to CHD | 0.031 | 0.018 | 0.048 | Hoerger et al. [16,17] |
| Subsequent LEA | 0.110 | 0.062 | 0.169 | Hoerger et al. [16,17] |
| Diabetes with no complications to nephropathy | 0.072 | 0.041 | 0.112 | Klein et al. [18] |
| Nephropathy to CHD | 0.022 | 0.013 | 0.034 | Klein et al. [18] |
| Nephropathy to ESRD | 0.072 | 0.041 | 0.109 | Hoerger et al. [16,17] |
| Diabetes with no complications to neuropathy | 0.035 | 0.020 | 0.055 | Klein et al. [18] |
| Neuropathy to CHD | 0.029 | 0.016 | 0.044 | Hoerger et al. [16,17] |
| Neuropathy to LEA | 0.131 | 0.074 | 0.200 | Hoerger et al. [16,17] |
| Neuropathy to nephropathy | 0.097 | 0.055 | 0.149 | Wu et al. [19] |
| Diabetes with no complications to retinopathy | 0.011 | 0.006 | 0.017 | Hoerger et al. [16,17] |
| Retinopathy to CHD | 0.028 | 0.016 | 0.043 | Klein et al. [18] |
| **Cost Parameters [Annual or initial costs represented in 2007 US$][c]** | | | | |
| Blindness and retinopathy | 9,912 | 7,251 | 12,945 | ADA [1] |
| CGM technology | 4,189 | 3,062 | 5,492 | CGM website [24] |
| Initial cost of CGM technology | 4,809 | 3,499 | 6,321 | CGM website [24] |
| CHD | 35,271 | 25,820 | 46,433 | ADA [1] |
| Diabetes with no complications | 6,705 | 4,879 | 8,788 | ADA [1] |
| ESRD | 36,370 | 26,377 | 47,708 | ADA [1] |
| LEA | 50,150 | 36,541 | 65,798 | ADA [1] |
| Nephropathy | 20,161 | 14,614 | 26,643 | ADA [1] |
| Neuropathy | 25,075 | 18,226 | 33,004 | ADA [1] |
| Retinopathy | 4,956 | 3,578 | 6,489 | ADA [1] |

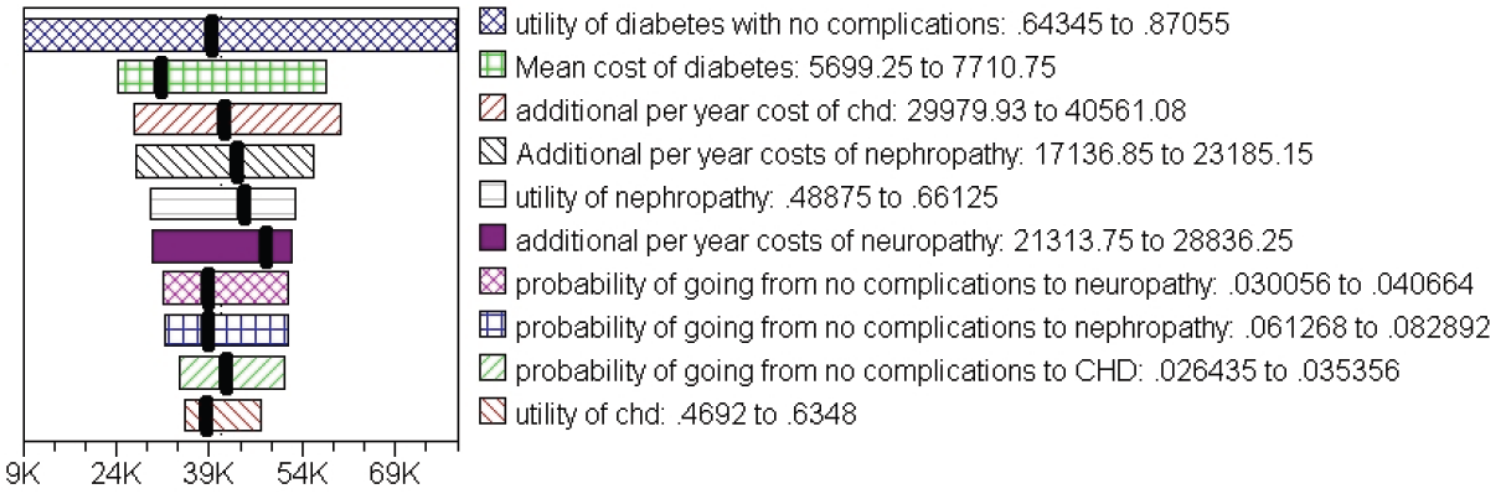
| Utility Parameters [Annual cycle length][a] | | | | |
|---|---|---|---|---|
| Blindness | 0.569 | 0.531 | 0.607 | Sullivan et al. [22] ICD-9 250 |
| CHD | 0.552 | 0.513 | 0.591 | Sullivan et al. [22] ICD-9 250, 593 |
| ESRD | 0.521 | 0.485 | 0.558 | Sullivan et al. [22] ICD-9 250, 355 |
| LEA | 0.572 | 0.538 | 0.604 | Sullivan et al. [22] ICD-9 250, 362 |
| Nephropathy | 0.575 | 0.545 | 0.606 | Sullivan et al. [22] ICD-9 250, 355, 593 |
| Nephropathy and CHD | 0.516 | 0.465 | 0.567 | Sullivan et al. [22] ICD-9 250, 593, 410, 413 |
| Neuropathy | 0.603 | 0.573 | 0.632 | Sullivan et al. [22] ICD-9 250, 355, 410, 413 |
| Neuropathy and CHD | 0.544 | 0.495 | 0.593 | Sullivan et al. [22] ICD-9 250, 362, 410, 413 |
| Neuropathy and nephropathy | 0.557 | 0.520 | 0.595 | Sullivan et al. [22] ICD-9 250, 410, 413 |
| Diabetes with no complications | 0.757 | 0.747 | 0.767 | Sullivan et al. [22] ICD-9 250, 593, 586 |
| Retinopathy | 0.612 | 0.581 | 0.643 | Sullivan et al. [22] ICD-9 250, 355, 354 |
| Retinopathy and CHD | 0.553 | 0.503 | 0.605 | Sullivan et al. [22] ICD-9 250, 362, 369 |
| Disutility of age | -0.0003 | | | Sullivan et al. [22] |
| **Other Parameters[d]** | | | | |
| CGM risk reduction for CHD | 0.050 | 0.013 | 0.107 | DCCT [20] |
| CGM risk reduction for nephropathy | 0.270 | 0.006 | 0.768 | DCCT [20] |
| CGM risk reduction for neuropathy | 0.188 | 0.004 | 0.593 | DCCT [20] |
| CGM risk reduction for retinopathy | 0.306 | 0.075 | 0.618 | Selvin et al. [21] |
| Start age | 40 | | | Assumption |
| Years since diagnosis | 20 | | | Assumption |
| Discount rate | 0.03 | | | Assumption |

**Table Expected Cost and Effectiveness of Continuous Glucose Monitoring (CGM) and Self-Monitoring of Blood Glucose (SMBG)**

| Strategy | Expected Cost in 2007 $US (range)* | Expected Effectiveness QALYs (range)* | Incremental cost-effectiveness ratio (ICER) |
|---|---|---|---|
| SMBG | 470,583 (397,782 - 550,598) | 10.289 (9.615 - 10.957) | |
| CGM and SMBG | 494,135 (420,381 - 571,631) | 10.812 (9.894 - 11.887) | US $45,033/QALY |

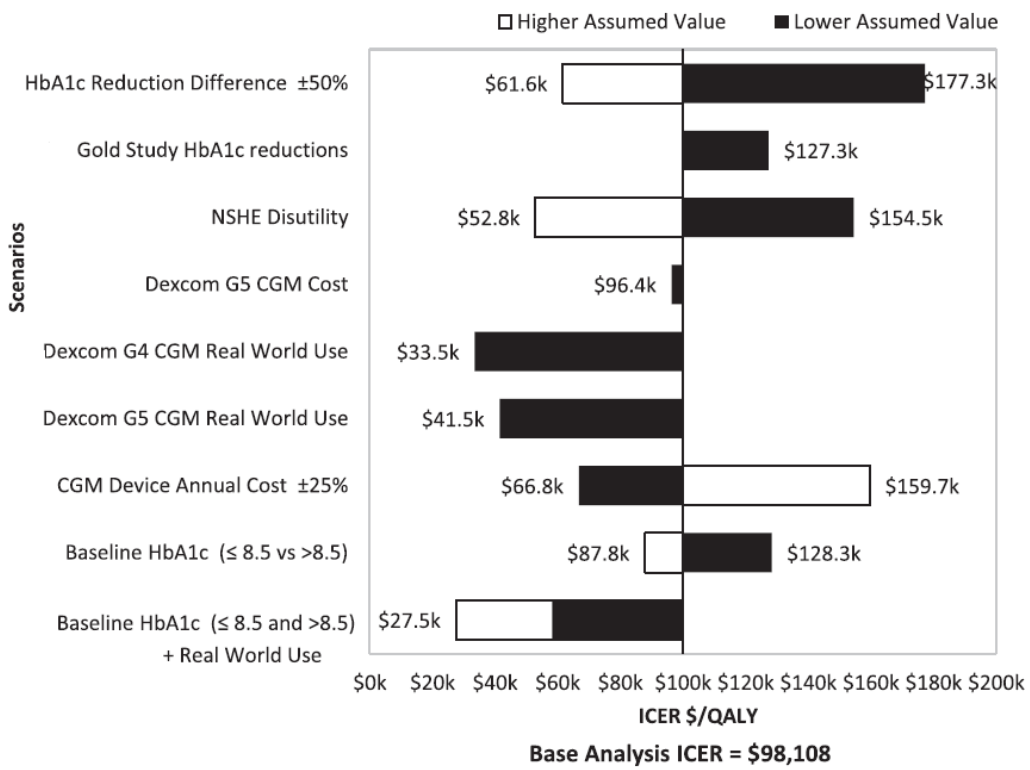
*95% credible ranges based on the results from the 10,000 Monte Carlo simulations




33 Ys; life expectancy 73 Ys
CORE Diabetes Model

# Cost-effectiveness of Continuous Glucose Monitoring for Adults With Type 1 Diabetes Compared With Self-Monitoring of Blood Glucose: The DIAMOND Randomized Trial




—Results of base-case lifetime CEA

| | Control | | CGM |
|---|---|---|---|
| Lifetime probability of | | | |
| Diabetic retinopathy, % | | | |
| Background | 33.5 | | 27.3 |
| Proliferative | 28.9 | | 24.6 |
| Macular edema, % | 8.4 | | 6.4 |
| Blindness, % | 1.9 | | 1.8 |
| Macroalbuminuria, % | 19.7 | | 17.2 |
| End-stage renal disease, % | 11.7 | | 10.1 |
| Neuropathy, % | 33.2 | | 27.3 |
| Amputation, % | 8.1 | | 7.1 |
| Myocardial infarction, % | 37.8 | | 37.0 |
| Stroke, % | 7.2 | | 7.0 |
| Angina, % | 20.6 | | 20.6 |
| Heart failure, % | 11.1 | | 10.7 |
| Expected life–years | 24.29 | | 25.01 |
| Difference in expected life-years | | 0.72 | |
| Discounted QALYs, means | 12.78 | | 13.32 |
| Difference in QALYs, mean | | 0.54 | |
| Discounted total costs, mean | 305,278 | | 360,486 |
| Difference in costs, mean | | 55,208 | |
| ICER, mean (95% CI*) lifetime | | 98,108 (90,298–105,144) | |

Sheffield T1DM Policy Model; 158 pz 2:1 CGM:SMBG; 6 mesi

Diabetes Care 2018;41:1227–1234

| -Within-trial cost-effectiveness results | Control ($n$ = 53) | | CGM ($n$ = 103) | | |
|---|---|---|---|---|---|
| | Mean (SD) | Median (range or IQR) | Mean (SD) | Median (range or IQR) | |
| Utility and QALYs | | | | | $P$ value[b] |
| Utility change from baseline | 0.0 (0.08) | 0 (−0.27, 0.26) | −0.01 (0.09) | 0 (−0.33, 0.32) | 0.78 |
| QALYs | 0.46 (0.06) | 0.47 (0.13, 0.50) | 0.46 (0.05) | 0.47 (0.24, 0.50) | 0.61 |
| Costs, $ | | | | | $P$ value[b] |
| Total direct costs | 3,118 (3,120) | 2,565 (1,928, 3,277) | 5,336 (3,070) | 5,092 (4,485, 5,726) | **<0.01** |
| Direct trial personnel | 96 (205) | 47 (0, 94) | 60 (77) | 47 (0, 94) | 0.41 |
| Medical care | 3,022 (3,088) | 2,478 (1,880, 3,122) | 2,921 (3,065) | 2,509 (1,909, 3,095) | 0.86 |
| CGM | 0 (0) | 0 | 2,554 (0) | 2,554 | **<0.01** |
| Total indirect costs | 36 (121) | 0 (0, 0) | 54 (314) | 0 (0, 0) | 0.85 |
| Missed work | 26 (101) | 0 (0, 0) | 36 (307) | 0 (0, 0) | 0.65 |
| Poor performance | 10 (40) | 0 (0, 0) | 18 (70) | 0 (0, 0) | 0.63 |
| Self-management | 4,012 (5,529) | 2,829 (0, 5,610) | 5,473 (10,300) | 2,829 (2,259, 5,658) | 0.86 |
| Total costs | 7,236 (6,097) | 5,287 (4,586, 8,223) | 11,200 (11,300) | 8,178 (6,864, 10,300) | **<0.01** |
| Total costs[a] | 3,154 (3,122) | 2,565 (1,999, 3,513) | 5,593 (3,083) | 5,105 (4,496, 5,780) | **<0.01** |
| Clinical outcomes: reduction from baseline | | | | | $P$ value[b] |
| $HbA_{1c}$ | −0.39 (0.70) | −0.30 (−3.20, 0.90) | −0.99 (0.77) | −1.00 (−3.00, 0.70) | **<0.01** |
| Daily strip tests | 0.1 (1.5) | 0 (−4, 3) | −0.5 (1.5) | 0 (−5, 3) | **0.04** |
| Insulin dose | 1.0 (11) | 1 (−23, 25) | −2.3 (22) | 0 (−145, 52) | 0.31 |
| Daily rate of NSHEs | −0.06 (0.27) | 0 (−0.93, 0.47) | −0.12 (0.29) | −0.08 (−1.07, 0.63) | **0.02**[c] |
| BMI | 0.27 (1.07) | 0.15 (−2.22, 2.80) | 0.59 (1.38) | 0.56 (−3.42, 5.28) | 0.16 |
| Patients having severe hyperglycemic events, $n$ (%) | 1 (2) | | 0 (0) | | 0.34 |
| Patients having severe hypoglycemic events, $n$ (%) | 2 (4) | | 2 (2) | | 0.6 |

# Cost-effectiveness of G5 Mobile continuous glucose monitoring device compared to self-monitoring of blood glucose alone for people with type 1 diabetes from the Canadian societal perspective

Sensitivity analyses (base-case—G5 Mobile CGM vs SMBG alone).

| Parameter | ICER (CAD) (CI) |
|---|---|
| Discount rate = 0% | $34,411 (33,166–33,785) |
| Discount rate = 3% | $33,729 (33,550–34,078) |
| Cohort baseline HbA1c = 7.6% | $34,781 (34,579–35,067) |
| Cohort baseline HbA1c = 9.5% | $32,816 (32,530–33,129) |
| Hypoglycemia disutilities decrease by 50% | $65,363 (65,394–66,617) |
| Hypoglycemia disutilities increase by 50% | $22,783 (22,618–22,977) |
| Non-severe hypoglycemic events reduction = 50% | $19,715 (19,569–19,868) |
| Severe hypoglycemic event reduction = 25% | $39,662 (39,417–39,987) |
| Severe hypoglycemic event reduction = 75% | $29,140 (28,922–29,387) |
| Starting utility of cohort = 0.71 | $34,382 (34,137–34,655) |
| Starting utility of cohort = 0.95 | $33,656 (33,429–33,951) |
| G5 Mobile CGM vs SMBG with 6 fingersticks per day | $29,871 (29,642–30,138) |
| G5 Mobile CGM vs SMBG with 8.2 fingersticks per day | $25,731 (25,496–25,990) |
| % HbA1c reduction for CGM vs SMBG = 0.3 | $34,738 (34,453–35,023) |
| % HbA1c reduction for CGM vs SMBG = 0.9 | $32,723 (32,463–32,984) |
| G **5 Mobile** CGM (with receiver) vs SMBG | $ **33.789/Qualy** |

Orizzonte temporale: 50 anni

| Outcomes | CGM + SMBG, Mean | SMBG, Mean | Difference, Mean |
|---|---|---|---|
| Life expectancy (years) | 23.233 (CI: 23.216–23.25) | 23.197 (CI: 23.18–23.213) | 0.037 (CI: 0.013–0.061) |
| Quality-adjusted life years (QALYs) | 8.382 (CI: 8.375–8.388) | 5.027 (CI: 5.023–5.032) | 3.354 (CI: 3.346–3.326) |
| Total lifetime direct costs (CAD) | 339,196 (CI: 338,567–339,825) | 225,862 (CI: 225,278–226,447) | 113,334 (CI: 112,468–114,199) |
| Incremental costs/QALY gained (CAD) | | | 33,789 (CI: 33,558–34,079) |

Journal od Medical Economics 2017;20(11):112-35

| Base case parameter | Assumption | References |
|---|---|---|
| *Patient demographics* | | |
| Mean cohort baseline HbA1c | 8.6% (SD 0.7%) | Beck *et al.*[13] |
| Mean age | 46 years | Beck *et al.*[13] |
| Mean duration of diabetes | 19 years | Beck *et al.*[13] |
| Proportion of male | 53% | Beck *et al.*[13] |
| Treatment effects | | |
| Mean change in HbA1c | | |
| SMBG only | –0.4% (SD 0.7%) | Beck *et al.*[13] |
| CGM + SMBG | –1.0% (SD 0.7%) | Beck *et al.*[13] |
| Hypoglycemia event rates | | |
| SMBG only | | |
| NSHE | 2,900/100 patient years | UK Hypoglycemia Study Group[21] |
| SHE 1 | 278/100 patient years | UK Hypoglycemia Study Group[21] |
| SHE 2 | 42/100 patient years | UK Hypoglycemia Study Group[21] |
| % requiring medical services | 13% | Foos *et al.*[22] |
| CGM + SMBG | | |
| NSHE | 26% reduction | Battelino *et al.*[23] |
| SHE 1 | 50% reduction | JDRF Continuous Glucose Monitoring Study Group[24,25] |
| SHE 2 | 50% reduction | JDRF Continuous Glucose Monitoring Study Group[24,25] |
| Key utility inputs | | |
| Starting utility for people with type 1 diabetes adult cohort | 0.90 | Solli *et al.*[26] |
| Disutilities for hypoglycemic events | | |
| NSHE | –0.0142 | Currie *et al.*[27]; Beaudet *et al.*[28] |
| SHE 1 | –0.0142 | Currie *et al.*[27]; Beaudet *et al.*[28] |
| SHE 2 | –0.047 | Currie *et al.*[27]; Beaudet *et al.*[28] |
| Approach to hypoglycemia disutility progression | Stable impact | CDM default assumption |
| Key acute event costs | | |
| Direct costs hypoglycemic events | | |
| NSHE | 4.79 | Harris *et al.*[29] |
| SHE 1 | 29.47 | O'Brien *et al.*[30] |
| SHE 2 | 2,101.6 | CADTH[31] |
| Simulation time horizon | 50 years | Convention |
| Discount rate | 1.5% | CADTH[20] |

# Long-term cost-effectiveness of Dexcom G6 real-time continuous glucose monitoring system in people with type 1 diabetes in Australia

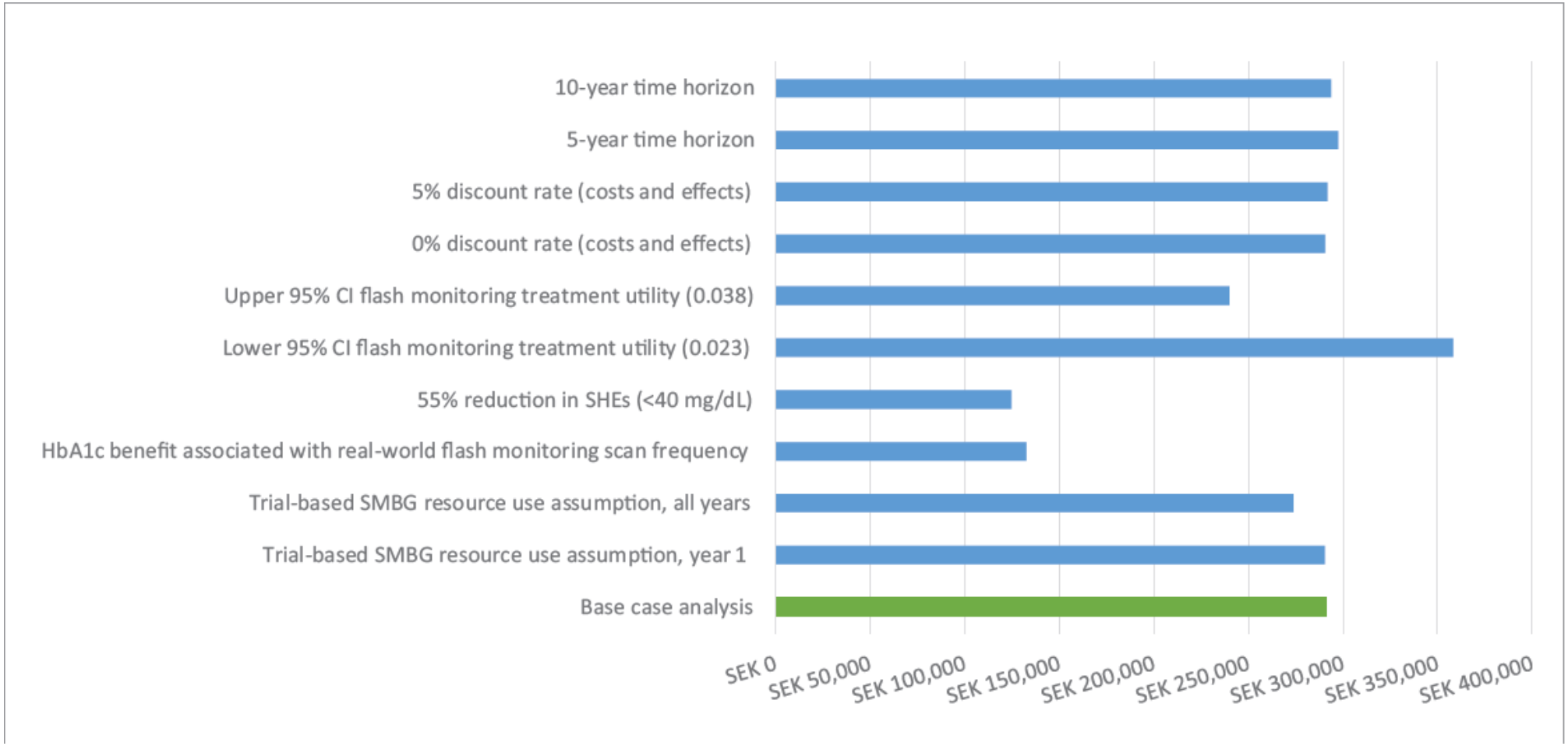
| | rt-CGM | SMBG | Difference |
|---|---|---|---|
| Cost, AUD | 246,146 | 224,549 | 21,597 |
| Quality-adjusted life expectancy, QALY | 9.362 | 8.163 | 1.199 |
| ICER, AUD per QALY gained | 18,020 | | |
| | **rt-CGM** | **FGM** | **Difference** |
| Cost, AUD | 246,146 | 235,082 | 11,064 |
| Quality-adjusted life expectancy, QALY | 9.362 | 8.235 | 0.569 |
| ICER, AUD per QALY gained | 19,455 | | |

Presupposti studio DIAMOND; modello statistico IQVIA Core Diabetes Model

*Diabetic Medicine.* 2022;39:e14831

| Analysis | Cost, AUD | | | Quality-adjusted life expectancy, QALYs | | | ICER, AUD per QALY gained |
|---|---|---|---|---|---|---|---|
| | rt-CGM | SMBG | Difference | rt-CGM | SMBG | Difference | |
| Base case | 246,146 | 244,549 | +21,597 | 9.362 | 8.163 | +1.199 | 18,020 |
| rt-CGM utility benefit 0% | 246,146 | 244,549 | +21,597 | 8.556 | 8.163 | +0.393 | 54,912 |
| rt-CGM utility benefit −50% | 246,146 | 244,549 | +21,597 | 8.959 | 8.163 | +0.796 | 27,135 |
| rt-CGM utility benefit +50% | 246,146 | 244,549 | +21,597 | 9.764 | 8.163 | +1.601 | 13,489 |
| rt-CGM $HbA_{1c}$ −30% | 253,968 | 224,549 | +29,419 | 9.278 | 8.163 | +1.115 | 26,375 |
| rt-CGM $HbA_{1c}$ +30% | 239,102 | 224,549 | +14,553 | 9.431 | 8.163 | +1.268 | 11,408 |
| rt-CGM SHE rate −50% | 244,792 | 224,549 | +20,242 | 9.369 | 8.163 | +1.206 | 16,780 |
| rt-CGM SHE rate +50% | 247,447 | 224,549 | +22,898 | 9.344 | 8.163 | +1.181 | 19,385 |
| rt-CGM NSHE rate −50% | 246,146 | 224,549 | +21,597 | 9.533 | 8.163 | +1.370 | 15,760 |
| rt-CGM NSHE rate +50% | 246,146 | 224,549 | +21,597 | 9.309 | 8.163 | +1.146 | 18,840 |
| 4 SMBG/day | 246,146 | 224,075 | +22,071 | 9.362 | 8.163 | +1.199 | 18,416 |
| 5.2 SMBG/day | 246,146 | 225,024 | +21,122 | 9.362 | 8.163 | +1.199 | 17,624 |
| 10 SMBG/day | 246,146 | 228,819 | +17,327 | 9.362 | 8.163 | +1.199 | 14,458 |
| QoL of T1D with no complications =0.672 | 246,146 | 244,549 | +21,597 | 8.547 | 7.400 | +1.148 | 18,821 |
| Time horizon 2 years | 21,802 | 17,092 | +4,710 | 1.100 | 0.965 | +0.135 | 34,810 |
| Time horizon 5 years | 49,907 | 39,247 | +10,600 | 2.697 | 2.380 | +0.317 | 33,640 |
| Time horizon 10 years | 93,032 | 75,597 | +17,435 | 4.851 | 4.280 | +0.571 | 30,562 |
| Time horizon 25 years | 188,716 | 166,258 | +22,458 | 8.199 | 7.202 | +0.998 | 22,510 |
| Discount rate 3.5% | 318,245 | 294,889 | +23,356 | 11.384 | 9.896 | +1.488 | 15,699 |
| Discount rate 0% | 675,215 | 648,377 | +26,838 | 20.241 | 17.406 | +2.836 | 9465 |

# Cost-effectiveness Analysis of a Flash Glucose Monitoring System for Patients with Type 1 Diabetes Receiving Intensive Insulin Treatment in Sweden




*European Endocrinology,* 2018;14(2):73–9

# Quality of Life and Glucose Control After 1 Year of Nationwide Reimbursement of Intermittently Scanned Continuous Glucose Monitoring in Adults Living With Type 1 Diabetes (FUTURE): A Prospective Observational Real- World Cohort Study

**Diabetes-related acute complications and work absenteeism before and after initiation of isCGM**

| | Baseline | 6 months | *P* value§ | 12 months | *P* value§ |
|---|---|---|---|---|---|
| People with | | | | | |
| Hospitalizations due to hypoglycemia and/or ketoacidosis*† | 63 (3.3) | — | — | 37 (2.2) | 0.031‖ |
| Hospitalizations due to hypoglycemia† | 36 (1.9) | — | — | 21 (1.2) | 0.104 |
| Hospitalizations due to ketoacidosis*† | 27 (1.4) | — | — | 17 (1.0) | 0.242 |
| Help from third parties due to hypoglycemia‡ | 280 (14.6) | 153 (8.4) | <0.0001‖ | 134 (7.8) | <0.0001‖ |
| Hypoglycemic comas‡ | 52 (2.7) | 16 (0.9) | <0.0001‖ | 18 (1.1) | 0.001‖ |
| Work absenteeism‡ | 111 (5.8) | 59 (3.2) | <0.0001‖ | 49 (2.9) | <0.0001‖ |
| Number per 100 patient-years of | | | | | |
| Help from third parties due to hypoglycemia‡ | 97.2 | 63.9 | 0.024‖ | 64.6 | 0.022‖ |
| Hypoglycemic comas‡ | 11.2 | 2.6 | <0.0001‖ | 4.3 | 0.017‖ |
| Days per 100 patient-years of | | | | | |
| Hospitalizations due to hypoglycemia and/or ketoacidosis*† | 9.3 | — | — | 6.6 | 0.021‖ |
| Hospitalizations due to hypoglycemia† | 2.5 | — | — | 1.8 | 0.129 |
| Hospitalizations due to ketoacidosis*† | 6.8 | — | — | 4.8 | 0.078 |
| Work absenteeism‡ | 109.5 | 49.3 | 0.038‖ | 53.5 | 0.058 |

Diabetes Care 2020;43:389–397

**The Benefits, Limitations, and Cost-Effectiveness of Advanced Technologies in the Management of Patients With Diabetes Mellitus**

Cost-effectiveness of health technologies in adults with type 1 diabetes: a systematic review and narrative synthesis

**Continuous Glucose Monitoring: A Review of Recent Studies Demonstrating Improved Glycemic Outcomes**

Evaluating optimal utilisation of technology in type 1 diabetes mellitus from a clinical and health economic perspective: protocol for a systematic review

DIABETES TECHNOLOGY & THERAPEUTICS 2017;19, Supplement 3; Journal of Diabetes Science and Technology 2015, Vol. 9(2) 320–330; Systematic Reviews (2020) 9:171; Systematic Reviews 2018; 7:44

# Utilità della tecnologia CGM nella gestione del T1DM

- **OUTCOMES**:

Riduzione HbA1c nel tempo
Riduzione della variabilità glicemica
Riduzione della frequenza delle ipoglicemie, non severe e severe

- **COSTI**

Diretti, indiretti, intangibili

- **OTTIMIZZIONE**

➢ **Dei processi di cura : focalizzazione su dati di processo trasparenti, condivisi, informativi**
➢ **Dei tempi della cura: focalizzazione su integrazione tra abitudini di vita e ricadute terapeutiche**
➢ **Della educazione terapeutica: focalizzazione su scelte terapeutiche e procedure in funzione degli obiettivi terapeutici**
➢ **Della relazione sanitari-persone con T1DM: peer-to-peer e bottom-up al fine di favorire un apprendimento continuo, reciproco**
➢ **Rinforzo motivazionale reciproco**

Endocrinol Metab Clin N Am 2016; 45: 895–904

# …i vantaggi a lungo termine superano i costi a breve?

Schierarsi dal lato giusto della storia è stato un investimento a lungo termine.

Alec Ross

Circolare 13 del 09 OTT 2015
REGIONE EMILIA ROMAGNA
SANITA' E POLITICHE SOCIALI PER L'INTEGRAZIONE

LINEE DI INDIRIZZO REGIONALI PER UN USO APPROPRIATO DEI DISPOSITIVI MEDICI PER L'AUTOCONTROLLO E L'AUTOGESTIONE DEL DIABETE MELLITO

GRAZIE !