Economics of Improved Time in Range in Type 1 Diabetes Management in Italy, Spain, Greece and Israel

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OBJECTIVES:

Time in range (TIR) is a key target in managing people with type 1 diabetes (PwT1D). Time spent in a glucose range of 70-180 mg/dL (3.9-10.0mmol/L) is recommended to be >70%, which has been linked to reduced complication incidence.
While frequently used in evaluating automated insulin delivery (AID) systems, TIR has rarely been applied in health economic assessments. We examined the impact of **a 10%-point increase in TIR on clinical and economic outcomes for PwT1D in Italy, Greece, Spain and Israel.**

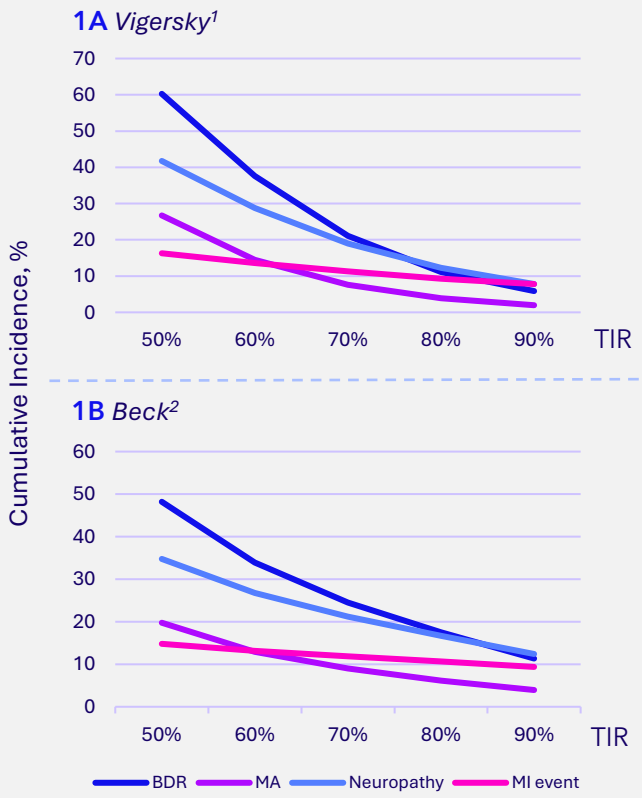
METHODS:

Four baseline TIR levels (50%, 60%, 70%, 80%) and the investigated **TIR increase of 10% were mapped to glycated hemoglobin (HbA1c)** using two published statistical approaches.[1,2]
Those HbA1c estimates informed the IQVIA CORE Diabetes Model (version 10), projecting complication incidence, quality-adjusted life expectancy (QALE) and costs **over 20 years, from a public healthcare system perspective**.
Cohort baseline data, complication costs, and utilities were sourced from published literature for each country.

RESULTS:

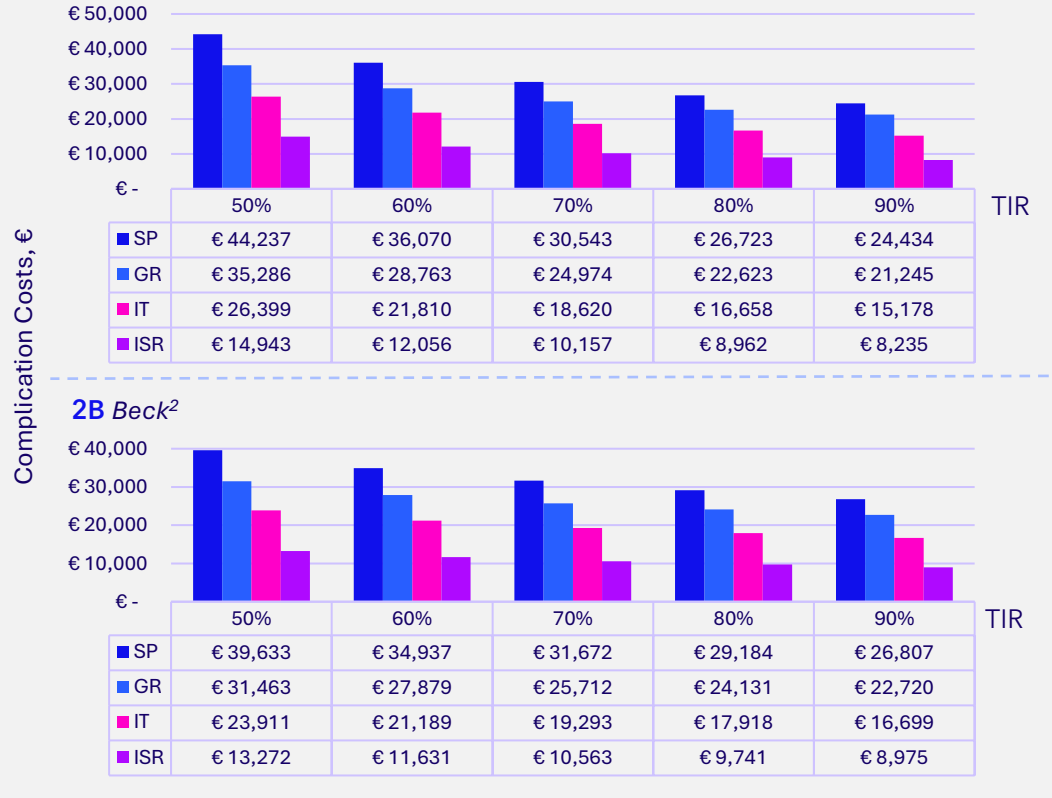
- **A 10%-point increase in TIR** projected **reductions in the cumulative complications' incidence**, by 29-41%, 17-25%, 10-17%, and 10-16% for ophthalmic, renal, neuropathic and cardiovascular complications respectively, when averaged across baseline TIR levels and sub-complications.
- **Fewer complications** translated into **QALE-gains of 0.130-0.371 years**. Those can be represented as **47 to 135 days more in perfect health**.
- Total projected **reductions in complication costs** ranged between 8.8-13.6%, corresponding to an average reduction of **%11.4 across countries and baseline TIR levels**.
- For both QALE-gains and cost-savings, **higher gains** were observed for **lower baseline TIR levels**.

Figure 1. Cumulative Incidence of Complications at Different TIR-% Levels



BDR: Background Diabetic Retinopathy; MA: Microalbuminuria; MI: Myocardial Infarction

Figure 2. Complication Costs at Different TIR-% Levels



	50%	60%	70%	80%	90%
SP	€ 44,237	€ 36,070	€ 30,543	€ 26,723	€ 24,434
GR	€ 35,286	€ 28,763	€ 24,974	€ 22,623	€ 21,245
IT	€ 26,399	€ 21,810	€ 18,620	€ 16,658	€ 15,178
ISR	€ 14,943	€ 12,056	€ 10,157	€ 8,962	€ 8,235

	50%	60%	70%	80%	90%
SP	€ 39,633	€ 34,937	€ 31,672	€ 29,184	€ 26,807
GR	€ 31,463	€ 27,879	€ 25,712	€ 24,131	€ 22,720
IT	€ 23,911	€ 21,189	€ 19,293	€ 17,918	€ 16,699
ISR	€ 13,272	€ 11,631	€ 10,563	€ 9,741	€ 8,975

Israeli Shekel converted into Euros (€) at the exchange rate of 1 ILS=0.25€, June 2025.

Notes: As HbA1c is the core input of the model, TIR values were converted into HbA1c prior to being modelled, per Vigersky et al. 2019 (Fig 1A & 2A) and Beck et al. 2019 (Fig 1B & 2B). It is assumed that the modelled individuals improved their TIR by a 10%-point increment and maintain at that TIR level over 20-.years (ie.TIR improved from 70% to 80%, and remained at 80% for over 20-years). Outputs from the model at different TIR levels are provided on a per PWT1D basis, and vary by each 10% TIR increment. To generate the figures shown, the outputs required averaging.

CONCLUSIONS:

A 10%-point increase in TIR is projected to **reduce the cumulative incidence of diabetic complications in PwT1D**, leading to **lower costs** in treating these complications.
These findings highlight the **potential long-term clinical and economic value of achieving higher TIR in T1D management**, which can be obtained using AID system.

References:
1. Vigersky RA, McMahon C. Diabetes Technol Ther.2019;21(2):81-85.
2. Beck RW, et al. J Diabetes Sci Technol. 2019;13(4):614-626.

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