ISPOR Europe 2025. 9-12 November 2025 | Glasgow, Scotland, UK

Budget Impact of Introducing Accu-Chek SmartGuide Real-Time Continuous Glucose Monitoring (rtCGM) solution for Diabetes Management in Portugal

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Poster no. EE108

Introduction

Type 1 and Type 2 Diabetes (T1D and T2D) are chronic diseases that require constant management to prevent complications and improve a person's quality of life.

Traditional Self-Monitoring of Blood Glucose (SMBG) relies on intermittent finger-prick tests. Continuous Glucose Monitoring (CGM) systems represent a significant advancement, measuring glucose levels automatically every few minutes.

Real-time CGM (rtCGM) systems offer automatic low and high glucose alerts, while continuously displaying current glucose values, unlike intermittently scanned CGM (isCGM) systems.

The Accu-Chek® SmartGuide solution is a new rtCGM solution that includes predictive features designed to prevent hypo and hyperglycemia, and therefore enabling proactive therapy adjustments and potentially improving diabetes management.

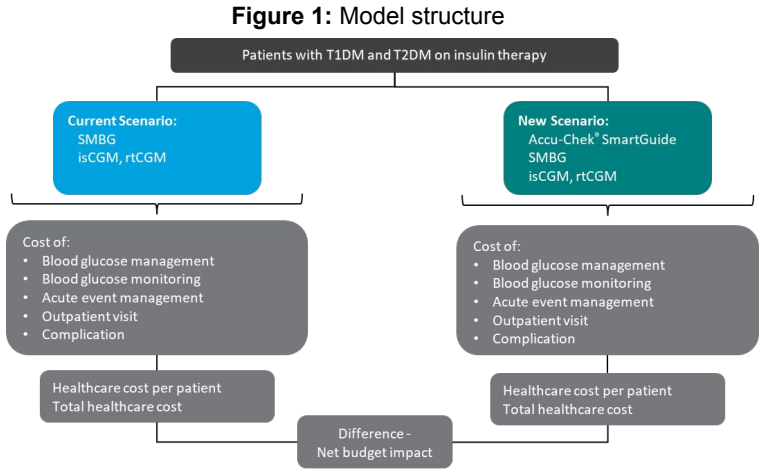
Objective

To estimate the 5-year budget impact of introducing Accu-Chek SmartGuide solution in Portugal, from a healthcare payer perspective.

Methods

Model Framework: A Budget Impact Model (BIM) was developed in Microsoft Excel® to compare two scenarios over a 5-year time horizon: a "World without Accu-Chek SmartGuide solution" (current market) and a hypothetical "World with Accu-Chek SmartGuide solution" (reimbursed scenario).

Figure 1: Model structure



Population: The model included adults (≥18 years) in Portugal with T1D or T2D treated with Multiple Daily Injections (MDI). The eligible population was estimated at 72,034 for T1D on MDI and 18,296 for T2D on MDI, using data from *Programa Nacional para a Diabetes*.[1]

Cost components: The analysis incorporated costs for: blood glucose monitoring (SMBG, isCGM, rtCGM), blood glucose management (insulin therapy), acute events (severe/non-severe hypoglycemia, diabetic ketoacidosis), and chronic complications (cardiovascular, renal, eye, and foot complications).

Clinical inputs: Chronic complications were modeled using the IQVIA Core Diabetes Model,[2] assuming a baseline of HbA1c levels of 8.3 for T1D and a reduction of 0.21 for isCGM and 0.29 for rtCGM and Accu-Chek SmartGuide solution.[3-5] For T2D the assumed HbA1c baseline was 7.6 and expected reductions were 0.54 for SMBG, 0.7 for isCGM, and 0.9 for rtCGM and Accu-Chek SmartGuide solution.[6,7] The rates of acute events applied in the BIM were substantiated via a comprehensive targeted literature review (see Table 1). Benefit of Accu-Chek SmartGuide solution on non-severe hypoglycaemia was calculated based on in-silico study data.[8,9]

Table 1: Rates of acute events per 100 patient-years and event costs in T1D and T2D on MDI

Treatment	Severe hypo, night-time	Severe hypo, day-time	Non-severe hypo, night-time	Non-severe hypo, day-time	Ketoacidosis
T1D - all patients, on MDI					
Accu-Chek SmartGuide Solutic	14.5	14.5	151	430	6.7
SMBG	26.5	26.5	1'197	3'407	13.6
isCGM	14.8	14.8	1'019	2'899	6.7
rtCGM	14.8	14.8	1'019	2'899	6.7
Cost per event	**€ 293**	**€ 293**	**€ 5**	**€ 5**	**€ 1'912**
T2D - all patients, on MDI					
Accu-Chek® SmartGuide	2.88	2.88	37	79	0.91
SMBG	6.22	6.22	346	734	1.82
isCGM	2.95	2.95	250	531	0.91
rtCGM	2.95	2.95	250	531	0.91
Cost per event	**€ 416**	**€ 416**	**€ 8**	**€ 8**	**€ 1'912**

Economic Inputs: unit costs of medication, monitoring, outpatient visits, acute events (see Table 1) and chronic complications were estimated with Portuguese data.[10-14] Resource use for severe and non-severe hypo events were obtained from Parekh 2017[15] A price per sensor of 53€ was considered for all CGM solutions, based on Portugal Diabetes protocol.[16]

Market shares: the base case assumed Accu-Chek SmartGuide solution would capture market share from other CGMs. The share of T1D people on Accu-Chek SmartGuide solution grows from 2.5% in year 1 to 25% by year 5, and from 17.5% to 37.5% respectively for those with T2D. A separate scenario analysis explored increased CGM adoption driven by users switching from SMBG.

Results

In the base case, introducing Accu-Chek SmartGuide solution for people with T1D and T2D on MDI resulted in a 5-year net budget impact of €-6.97 million (approximately €-77 per patient). Savings were primarily driven by reduced acute events and chronic complications costs.

For T1D on MDI only, the net budget impact was estimated in €-7.2 million (approximately €-100 per patient). For T2D only, the net budget impact was estimated in €0.24 million (approximately €12.9 per patient).

In the scenario where Accu-Chek SmartGuide solution increases CGM uptake from SMBG, the 5-year net impact was €-5.13 million, explained by higher monitoring costs and fewer clinical event costs.

Table 2: Net budget impact by cost component. Base case.

Cost Breakdown	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Net Budget Impact	**-110,323€**	**-755,152€**	**-1,388,143€**	**-1,966,500€**	**-2,746,964€**	**-6,967,082€**
Blood glucose management	0€	0€	0€	0€	0€	0€
Blood glucose monitoring	391,978€	322,551€	394,230€	465,908€	537,586€	2,112,252€
Outpatient visit costs	0€	0€	0€	0€	0€	0€
Acute events costs	-459,059€	-1,013,177€	-1,734,881€	-2,344,860€	-3,178,289€	-8,730,266€
Chronic complications costs	-43,241€	-64,526€	-47,492€	-87,548€	-106,261€	-349,068€

Figure 2: Current spending vs spending with Accu-Chek® SmartGuide CGM solution

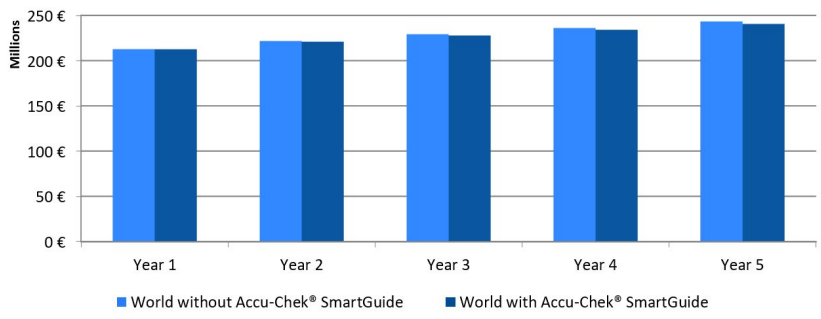
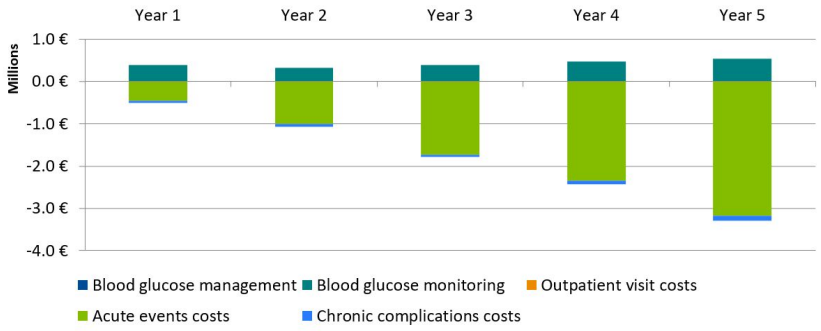


Figure 3: Net budget impact in T1D & T2D, with Accu-Chek SmartGuide CGM solution



Conclusions

The introduction of Accu-Chek SmartGuide CGM solution in Portugal may lead to budget savings, mainly due to its potential to reduce non-severe hypoglycaemia and other clinical event costs. The results are sensitive to assumptions on projected market share uptakes, and the efficacy data on reducing non-severe hypoglycaemia.

Acknowledgements and Disclosures

We thank Timothy Arnaut for his invaluable contributions on the design of the budget impact model during the initial phase of this project. All authors were involved in the study design, data interpretation, and preparation of this poster. This study was funded by Roche Diagnostics International Ltd. Rotkreuz, Switzerland. JT, OUG, PC and FRG are employees of Roche Diagnostics Ltd. A-VO, AN, and MP are employees of IQVIA.

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