

# Cost-Effectiveness of Real-Time Continuous Glucose Monitoring With Self Monitoring of Blood Glucose (SMBG) Compared to SMBG Alone for Type 1 Diabetes in France

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## Objective

To explore the cost-effectiveness of the Dexcom G4 PLATINUM real-time continuous glucose monitoring system (RT-CGM) among people with type 1 diabetes (T1D) using multiple daily injection (MDI) therapy in France.

## Methods

- IMS Core Diabetes Model<sup>1</sup> used to simulate diabetes complications, untoward events, and non-specific mortality over a 50-year lifespan
- Model assumptions based on published research<sup>3-10</sup>
- France-specific parameters from IMS Health (2016)
- Clinical and cost outcomes discounted at 4% Per Annum
- Analyses based on 1000 hypothetical patients and 2000 microsimulations
- Cohort mean age 37.5 yrs; diabetes duration 23.6 yrs
- Assume CGM with SMBG linked to 50% reductions in NSHEs, SHEs not requiring medical resources (SHE1), and SHEs requiring medical resource use (SHE2)

Table 1: Base Case Values and Sources

BASE CASE PARAMETER [Reference]	ASSUMPTION	
	SMBG only	CGM + SMBG
Cohort baseline HbA1c [3-5]	7.6% (SD 0.45%)	
Change in HbA1c [3-5]	0.02% (SD 0.47%)	-0.50% (SD 0.51%)
Hypoglycemia rates*		
Rate of NSHE [6]	2900	1450
Rate of SHE 1 [6]	278	139
Rate of SHE 2 [6]	42	21
SHEs needing medical services (%) [7]	13	
Annual intervention costs <sup>‡</sup>	€ 557.72 <sup>§</sup>	€ 4629.50 <sup>†</sup>
Utilities and Disutilities:		
Starting utility [11]	0.90	
Disutility per NSHE [12, 13]	-0.0142	
Disutility for each SHE 1 [12]	-0.047	
Disutility for each SHE 2 [12]	-0.047	
Disutility for hypoglycemia progression:	Stable impact (CDM default assumption)	
Direct costs per NSHE [8]	€ 0 (IMS)	
Direct costs per SHE 1 [9]	€ 216.27 (IMS)	
Direct costs per SHE 2 [10]	€ 4156.33 (IMS)	

\*, per 100 patient-years. ‡, includes 5.5% VAT. §, CPAM 2016. †, Dexcom 2016.

## Results

Table 2: Base Case Cost-Effectiveness

OUTCOMES	SMBG	CGM + SMBG	Δ	
	Mean	Mean		
Quality-adjusted life years (QALYs)	3.899	8.117	4.218	
Total lifetime direct costs (€)	€157,003	€205,343	€48,340	
Incremental costs/QALYs gained (ICER)				€11,460

Table 3: Sensitivity Analyses

PARAMETERS	ICER
1) Baseline HbA1c 8.5%; CGM decrease -0.86%; SMBG decrease -0.43%	€11,406
2) 25% reduction in severe/ non-severe hypo events for CGM	€27,682
3) 10 year time horizon	€11,949
4) 25 year time horizon	€11,600
5) G5 Mobile CGM cost with SMBG: 2.5 strips per day; SMBG only: 4 strips per day***	€12,557
6) Diminishing dis-utilities of hypo events (50% decrease)**	€61,058
7) Reduction in hypo dis-utilities by 50%	€22,606
Other EU CEA analyses with base case assumptions	
Germany /G4 Platinum simulation	€11,430
United Kingdom /G5 Mobile simulation	€12,713
Netherlands / G5 Mobile simulation	€10,338

\*\*Diminishing dis-utilities of hypo-events<sup>14</sup>: there is an increasing negative effect on HRQoL with greater frequency of NSHEs, but individual events may be associated with a marginally decreasing dis-utility as more events are experienced

\*\*\* G5 Mobile has higher device cost and less SBGM use than in the Base Case-G4 Platinum simulation.

## Conclusions

- RT-CGM can be cost-effective for persons with T1D using MDI in France. Results for France are in line with CEA results in surrounding EU countries.
- The ICER of €11,406 is well below the commonly accepted NICE UK CE-threshold of £20,000.
- Results were minimally impacted by baseline HbA1c, the rate of SHEs, shorter time horizons, and updated RT-CGM devices.
- Indirect costs of hypoglycemia<sup>15</sup> were not considered.
- Hypoglycemia-related patient-reported outcomes should be included in estimates of the financial impact of diabetes management strategies.
- Higher-risk MDI populations may experience more favorable ICERs.
- These results support a “CGM First” strategy for people with T1D on MDI therapy.**

## References

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