

Budget Impact Model for Insulin Glargine-300U/mL (Gla-300) vs Insulin Degludec 100 U/mL in the treatment of Type 1 Diabetes Mellitus based on the InRange study

Mimouni S¹, Hachelaf Z², Aissaoui A², Mahieu A³, Omar Alsaleh A⁴,

¹Endocrinology and Metabolic disease Department, EHS CPMC; ²Sanofi Algeria; ³Sanofi Paris France; ⁴Sanofi Milan Italy

BACKGROUND

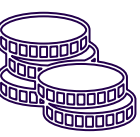
- The incidence of type 1 diabetes varies around the world, with some regions having much higher incidences than others. Incidence has been increasing, in Algeria T1D is growing rapidly at 8.1% each year compared with 5.2% for T2D diabetes.¹
- Intensified insulin therapy has become the standard therapy for patients with Type 1 diabetes as such treatment has been shown to reduce both micro and macrovascular complications. However, this kind of therapy increases the incidence of hypoglycemia, including severe episodes.²
- The second-generation basal insulin (BI) analogues insulin glargine 300 U/ml (Gla-300) and insulin degludec 100 U/ml (IDeg-100) offer more stable and prolonged pharmacokinetic and pharmacodynamic (PK/PD) profiles versus the first-generation analogue insulin glargine 100 U/ml (Gla-100), translated into similar glycemic control with less hypoglycemia.³

OBJECTIVES

- The objective of this budget impact analysis is to estimate the impact long-acting insulin therapies Glargine-300U/mL (Gla-300) vs Insulin Degludec 100 U/mL in the treatment of type 1 diabetes mellitus :
 - based on the input of the InRange (Battelino et al. 2022) study
 - assuming only 2nd Generation basal insulin is used

METHODS

Model structure	
Population	• Type 1 diabetes in patients, adults
Intervention	Insulin glargine U-300 : long-acting second-generation basal insulin analogues indicated for the treatment of both type 1 diabetes (T1D) and type 2 diabetes (T2D)
Comparator	Insulin degludec, U-100 is included as a treatment comparator in the model.
Perspective	Algerian Social Security perspective
Country	• Algeria
Time horizon	• The analysis assumes a 5-years time horizon to capture the potential financial impact of Gla -300 vs IDeg-100 • A cumulative analysis is provided.
Model structure	The model will follow a prevalence-based structure. This cohort is followed until the end of the model time horizon to capture treatment costs. Epidemiology data references were from National office of statistics, IDF and IDMPs wave 7, all eligible population is treated with 2nd Generation BI and all are treated with basal insulin. The following inputs were extracted from the InRange RCT (Open label active controlled parallel-group trial): demographics (weight) efficacy outcomes (dose), Safety outcomes (glycemic events)



All costs were reported in euros. Deterministic sensitivity analysis was carried out on all relevant costs and parameters included in the budget impact assessment.

RESULTS

- Introducing Gla-300 into the Algeria market, with a 100% market share led to an average cost-saving of -12.5 millions euros in the first year and an overall 5 years cumulative cost saving of (-70 millions euros) per (Table 1 & Figure 1),
- Results for the cumulative budget impact per costs category are provided in (figure 2). It is important to highlight that the highest contributor to the cost-savings are drug acquisitions costs which represents 74% of cost savings vs 26% are for the cost of management of glycemic events.
- A change in population size over time may impact the potential cost saving, per the deterministic sensitivity analysis conducted in the model structure (figure 3)

Table 1: Incremental Budget impact

	Without Gla-300	With Gla-300	Incremental Budget impact
Gla 300	0 €	233,712,637 €	233,712,637 €
IDeg 100	304,639,328€	0 €	-304,639,328€
Total	304,639,328€	233,712,637 €	-70,926,691 €

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-70 millions euros cumulative
-Budget impact
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Table 2: Model setting

	Populations	Mean weight (kg) (adult)	Daily basal insulin dose (U)	Hypoglycemia event per year	Drug Acquisition Costs	Direct Costs for Management of severe Hypoglycemia (Event/Euros)	Market share	Deterministic sensitivity analysis
Model inputs	N= 119116 (Year 1) Adults T1D Adults patient eligible to basal insulin treatment	79.6	Gla-300 = 37.1 IDeg-100=33.5	Severe Hypoglycemia (anytime 24h) Gla-300=0.209/IDeg-100=0.313	Public Price calculated from IAP basis of List Price	275.24	IDeg-100 : 0% Gla-300 : 100%	A variation of -10% lower and Upper 10%
Description and References	National office of statistics, ⁴ IDF IDMPs wave 7 ⁵	Demographics- In Range Study	Efficacy outcomes- In Range Study ³	Safety outcomes- In Range Study	List Price -According to Local pricing rules* Public Price - According to local commercial rules**	Direct costs related to the management of severe hypoglycemia (glycemic control costs + assistance costs, transport, healthcare utilization)- Sellam & al ⁶	Market share assumption based on : market with and without Gla-300	Parameters variation to test the base case results

*Official journal decree for pricing guidelines (26th Dec 2020)
**Official journal decree for medicines margins (1st Feb 1998)

Figure 2: Cumulative budget impact per cost category

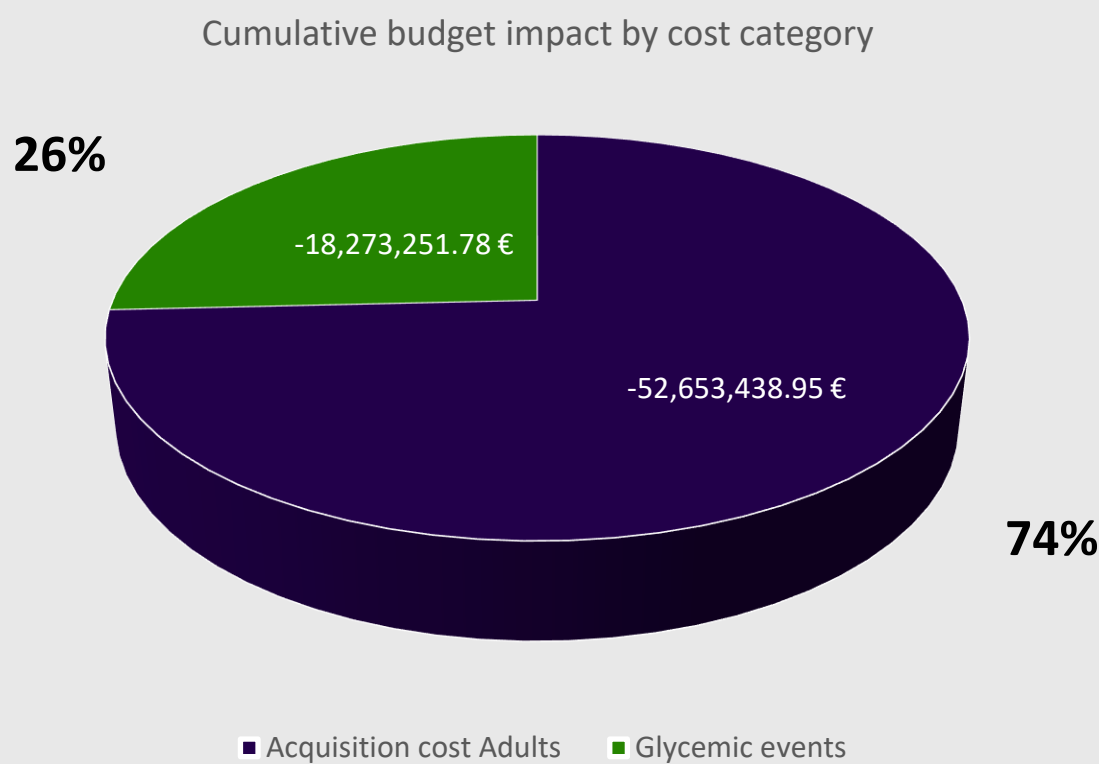


Figure 1: Budget impact Results

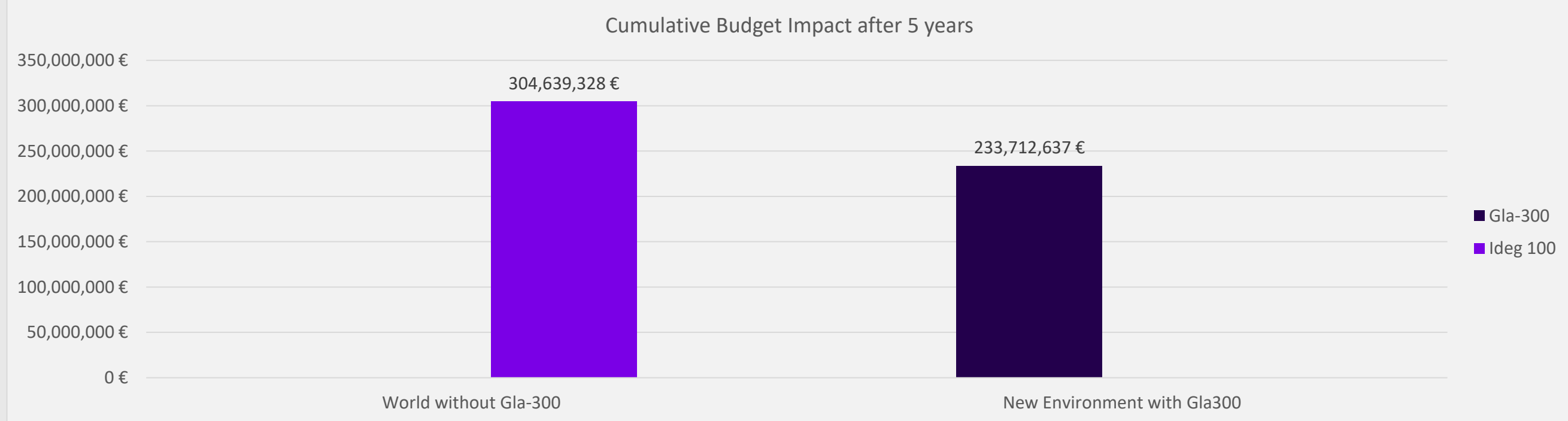
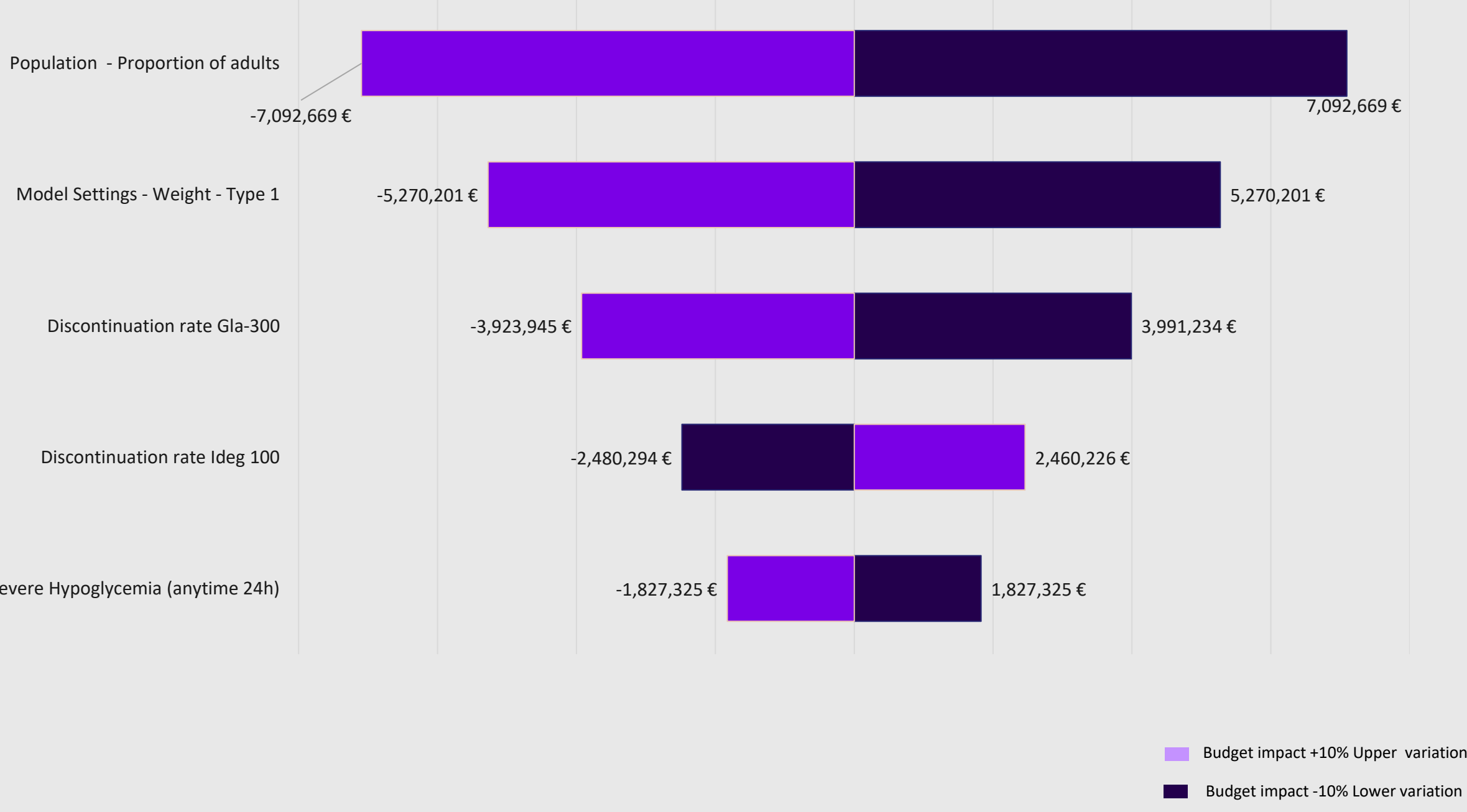


Figure 3 : Tornado Diagram - Sensitivity Analysis



Model

Costs

Results

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✓ The model follows a prevalence-based structure, in which in the first year of the model, a prevalent cohort of patients initiate treatment and enter the model. This cohort is followed until the end of the model time horizon to capture treatment costs.
✓ This is the first budget impact model in Algeria that compared the 2nd Generation insulins Gla-300 vs IDeg-100.
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✓ While Gla-300 insulin dose is relatively more required, this study shows lower acquisition cost of Gla-300 outweighed the increased insulin usage, resulting in lower overall treatment expenses.
✓ Both insulins performed similarly in terms of glycemic event occurrence and therefore costs
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✓ The utilization of Gla-300 is associated with relevant savings for Algerian social security.
✓ The sensitivity analysis has shown that the budget impact is sensitive to the proportion of patient population considered.
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LIMITATIONS

- The current model assumes that the market shares are the same for type 1 diabetes, and they are constant over the five years' time horizon
- Patient population assumption were estimated from international references as there is limited local data on T1D prevalence and incidence.
- Only costs for the management of severe hypoglycemia are considered.

CONCLUSIONS

- Results from the present study revealed that Glargine-300U/mL in Algeria reduces the costs of T1DM management. The proportion of eligible patients had considerable influence on the net financial impact. Glargine-300U/mL as a primary treatment strategy may offers both clinical and economic advantages, making it a promising approach to mitigating the diabetes burden and its related expenses. Further studies are suggested to validate these results.

REFERENCES:

- Type 1 diabetes index.
- Anderbro & al 2010, treatment fears of hypoglycemia
- Battelino & al. 2022, In Range study
- National office of statistics N°890 2020
- Malek R & al, IDMPs Wave 7, 20119
- Sellam Y, & al Value in Health. 2020

CONFLICTS OF INTEREST:

AA, ZH, AM and AOA : Sanofi — employee, may hold stock and/or stock options in the company.
SM: — have no conflicts of interest to disclose

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