# Cost-Utility Analysis of an Advanced Hybrid Closed-Loop System vs Multiple Daily Injection Therapy with Intermittently Scanned Continuous Glucose Monitoring in People with Type 1 Diabetes and Above-Target HbA1c in France

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### **1. OBJECTIVE**

Improved glycaemic control is associated with reduced diabetesrelated complications. The use of advanced hybrid closed-Loop (AHCL) systems, with automated adjustment of insulin delivery and correction bolus features, improves glycaemic outcomes for people with type 1 diabetes (T1D) with above-target HbA1c compared to multiple daily insulin injections (MDI) with intermittently scanned continuous glucose monitoring (isCGM).

The aim of this study is to assess AHCL cost-effectiveness versus MDI + isCGM in France.

#### 2. METHODS

A cost-utility analysis was performed where costs and clinical outcomes were estimated using the IQVIA CORE Diabetes Model.

Complications cost data were derived from published literature and inflated to 2023 prices. Country-specific mortality data were applied [1]. Clinical data were derived from a prospective, multicentre, randomized clinical trial [2]. The HbA1c reduction at study end was 1.54% for AHCL vs 0.2% for MDI + isCGM, from a baseline 9% HbA1c.

The analysis was conducted from a healthcare system perspective, over a time horizon of 40 years. A willingness-to-pay threshold of €50.000 was used, and future costs and outcomes were discounted at 2.5% annually.

#### **3. RESULTS**

The analysis produced an ICUR of €34,732/QALY-gained for AHCL versus MDI + isCGM. AHCL therapy resulted in a lower cumulative incidence of diabetes-related complications, leading to €50.913 savings in avoided complications/person over 40-years. (Figure 1) Higher acquisition costs were partially offset by reduced complications costs. Individuals treated with AHCL benefited from a gain of 2.26 QALYs, corresponding to 825 days more in full health.

The probabilistic sensitivity analysis (PSA) based on a 20% variation in both clinical and economic parameters, showed an ICUR of €37.926/QALY-gained, an estimate close to the central estimate underlining the robustness of the results (Figure 2).

The deterministic sensitivity analyses (DSA) demonstrated that the model was most sensitive to the following parameters: time horizon (10 and 20 years), fear of hypoglycemia utilities, and treatment effect in HbA1c improvement (Figure 3).



## 4. CONCLUSIONS

In France, over a time horizon of 40 years, AHCL appears to be a strategy with positive cost-utility results in improving glycaemic outcomes for people with T1D and above-target HbA1c versus MDI + isCGM.

These findings complement the short-term economic benefits of adopting AHCL, suggesting it also offers good long-term utility value for people with T1D and above-target HbA1c in France.

References: [1] WHO. Life tables: France. 2019. Accessed June 18, 2024. [2] Choudhary P, et al. Lancet Diabetes Endocrinol. 2022;10(10):720-731.

