Cost-Effectiveness of GLP-1 Receptor Agonists Versus Long-Acting Insulins in Type 2 Diabetes from the Healthcare Sector Perspective: A Model-Based Analysis Using Real-World Data

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Background and objective

- Methodological concerns in previous cost-effectiveness analyses (CEAs) of glucagon-like peptide-1 receptor agonists (GLP-1RAs) vs. long-acting insulins (LAIs) (e.g., using trial data as input) limit the applicability of study findings to real-world patients with type 2 diabetes (T2D).
- We conducted a **model-based CEA** of GLP-1RAs vs. LAIs from a healthcare sector perspective using **real-world, population-based data of Taiwanese T2D patients** to inform decision-makings.

Methods

- Population: T2D patients initiating a GLP-1RA or LAI
- Model settings: Markov model **(Figure 1)**, a 10-year simulation horizon and 3% annual discount rate on both costs and quality-adjusted life years (QALYs).
- Cost and health utility parameters:

① Derived from **published literature of Taiwanese T2D patients**

② **Adjusted by patient characteristics** of the overall study cohort and subgroup populations in base-case and subgroup analyses, respectively.

- Transition probabilities:

① LAI group: **cumulative risks of clinical events** measured from analyzing **Taiwan's National Health Insurance Research Database (NHIRD)** 2013-2019

② GLP-1RA group: modified cumulative risks of LAI group with the **relative hazards of clinical events** associated with using GLP-1RAs versus LAIs (measured from **propensity-score matched pairs of GLP-1RA and LAI users** in NHIRD)

③ Separate analyses conducted in subgroup populations (i.e., with/without prior cardiovascular diseases [CVDs] or chronic kidney diseases [CKDs])

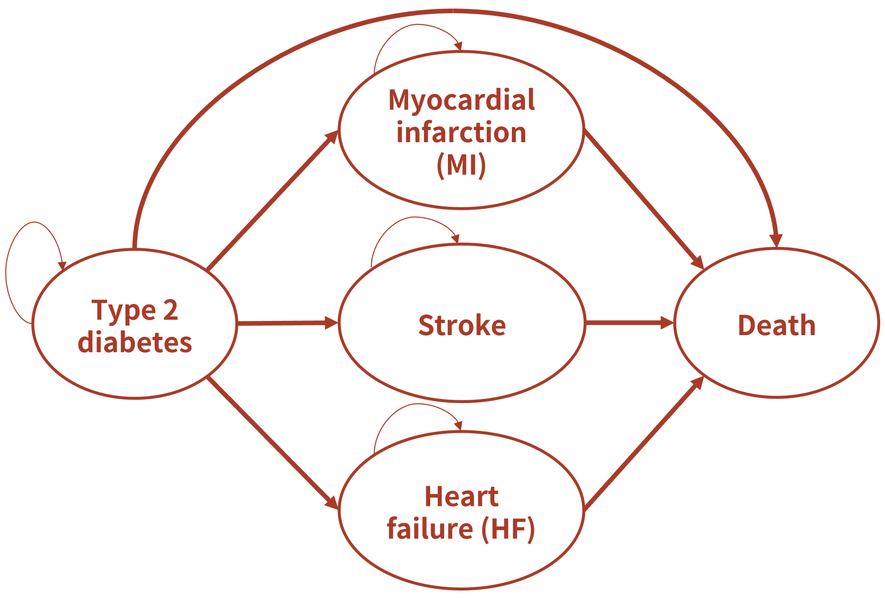

Figure 1: Model structure

Results

- In the base-case analysis, using GLP-1RAs versus LAIs yielded an **incremental cost-effectiveness ratio (ICER) of 6,053 USD per QALY gained**, which was considered as **highly cost-effective** against the pre-defined willingness-to-pay (WTP) threshold of 33,011 USD (one-time gross domestic product per capita in Taiwan in 2021) **(Table 1)**.

Table 1: ICER estimates of GLP-1RAs versus LAIs

	ΔQALYs	Δcosts (USD)	ICERs
Base-case (overall cohort)	0.804	4,866	6,053
Patients with CVDs	**0.996**	**-673**	**-675**
Patients without CVDs	0.656	5,965	9,093
Patients with CKDs	1.181	1,978	1,675
Patients without CKDs	0.704	5,392	7,659

- Scenario analyses (e.g., varied simulation horizons and treatment effects of GLP-1RAs) showed consistent findings.
- Economic benefit of GLP-1RA therapy was revealed across patient subgroups, especially among those with prior CVDs or CKDs **(Table 1 and Figure 2)**.

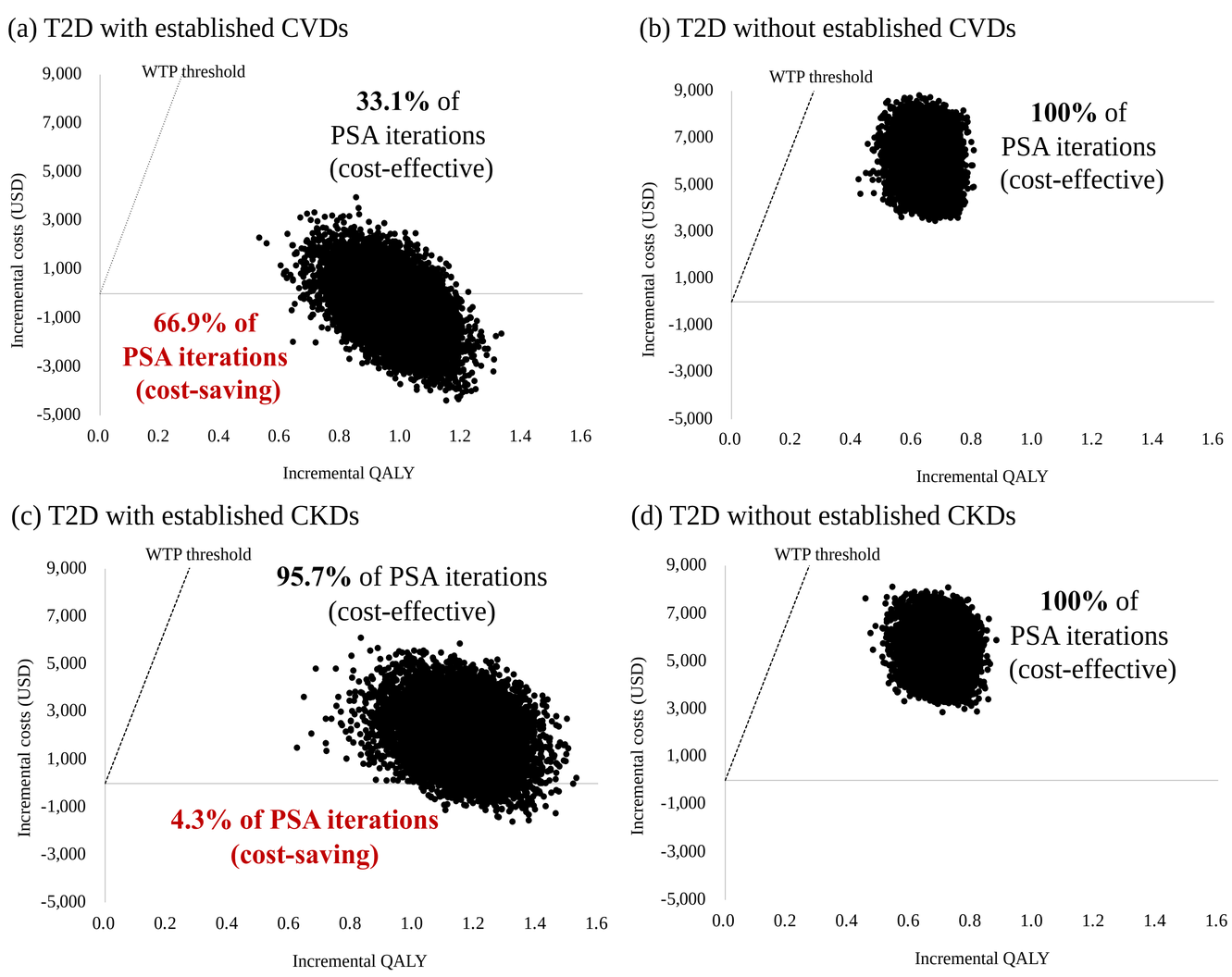

Figure 2: Results of probabilistic sensitivity analysis (PSA)

Conclusions

Using GLP-1RAs versus LAIs would be highly cost-effective for T2D patients requiring injectable therapy. **Remarkable economic benefit** of GLP-1RA therapy among **patients with CVDs or CKDs** supports rational treatment decisions and healthcare resource optimization for these patients.

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