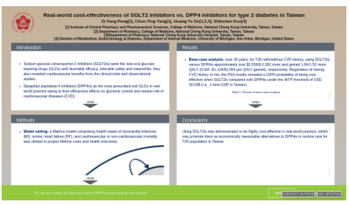
Real-world cost-effectiveness of SGLT2 inhibitors vs. DPP4 inhibitors for type 2 diabetes in Taiwan



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INTRODUCTION

- Sodium-glucose cotransporter-2 inhibitors (SGLT2is) are the newer class of oral glucose-lowering drugs (GLDs) with favorable efficacy, tolerable safety and pose cardiovascular benefits revealed from clinical trials and observational studies.
- Dipeptidyl peptidase-4 inhibitors (DPP4is) are among the most commonly prescribed oral GLDs in real-world practice owing to their efficacious effects on glycemic control and neutral effects on cardiovascular diseases (CVDs).
- This study therefore aimed to perform the country-specific, real-world cost-effectiveness analysis of SGLT2i versus DPP4i use for type 2 diabetes (T2D) from a healthcare sector perspective to inform whether use of SGLT2is would be an economically reasonable alternative to DPP4is in the real-world setting among the Taiwanese population with T2D.

METHODS

- **Model structure and simulation:** a Markov model comprising the health states of myocardial infarction (MI), stroke, heart failure (HF), and cardiovascular or non-cardiovascular mortality was utilized to project costs and health outcomes over a 30-year time horizon.

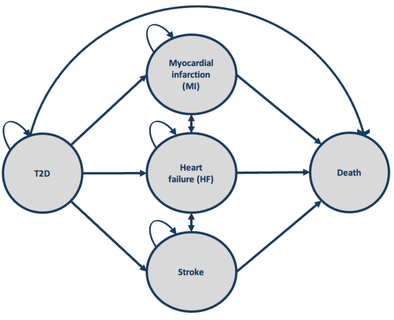

Figure 1. Markov model

- **Model assumptions:**
  - 30-year simulation for effectiveness (i.e., life expectancy [LE], quality-adjusted life-year [QALY]) and cost outcomes (i.e., healthcare costs)
  - A discount rate of 3% annually
- **Data sources of cost and effectiveness parameters:**
  - Cost and health utilities: published studies conducted in Taiwanese T2D population
  - Effectiveness parameters (e.g., transition probabilities between different health states): analysis of Taiwan's National Health Insurance Research Database
- **Statistical analyses:**
  - Costs expressed in 2020 US dollars (USD)
  - Incremental cost-effectiveness ratios (ICERs): cost per LE or QALY gained for using SGLT2is versus DPP4is
  - Sensitivity (i.e., one-way and probabilistic sensitivity analyses [PSA]) and scenario analyses for examining robustness of study results
- **Willingness-to-pay (WTP) threshold:** 1-3 times of Taiwan's gross domestic production per capita (i.e., USD 30,038 – USD 90,114 in 2020)

RESULTS

- **Base-case analysis:** over 30 years, for T2D with/without CVD history, using SGLT2is versus DPP4is approximately cost $2,056/$ 2,382 more and gained 1.84/1.52 more QALYs (ICER: $1,118/$1,564 per QALY gained), respectively. Regardless of having CVD history or not, the PSA results revealed a 100% probability of being cost-effective for using SGLT2is versus DPP4is under the WTP threshold of USD 30,038 (i.e., one time of GDP in Taiwan).

Table 1. Results of base-case analysis

Strategy	Cost (USD)	Incremental Cost (USD)	Effectiveness (year or QALY)	Incremental Effectiveness (year or QALY)	ICER (USD/QALY gained)	PSA results under WTP of USD 30,038 (% of cost-effective)
With CVD history						
LE (cost: 3% discounting rate)						
DPP4is	26,803		16.93			0%
SGLT2is	28,859	2,056	19.67	2.73	**752**	100%
QALY (cost and QALY: 3% discounting rate)						
DPP4is	26,803		11.01			0%
SGLT2is	28,859	2,056	12.93	1.84	**1,118**	100%
Without CVD history						
LE (cost: 3% discounting rate)						
DPP4is	26,017		21.53			0%
SGLT2is	28,399	2,382	23.98	2.45	**973**	100%
QALY (cost and QALY: 3% discounting rate)						
DPP4is	26,017		14.28			0%
SGLT2is	28,399	2,382	15.80	1.52	**1,564**	100%

- **One-way sensitivity analyses:** regardless of having CVD history or not, the ICER values were most sensitive to the following study parameters: annual acquisition cost of DPP4is, relative hazard for HF of SGLT2is versus DPP4is, discounting rate, relative hazard for stroke of SGLT2is versus DPP4is, and annual acquisition cost of SGLT2is.

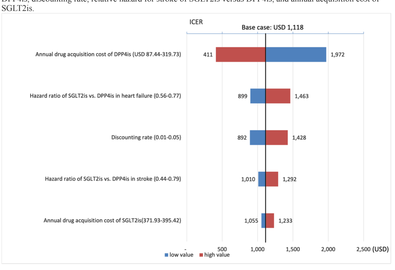

Figure 2. Tornado diagram of ICER (cost per QALY gained) for T2D with CVD history

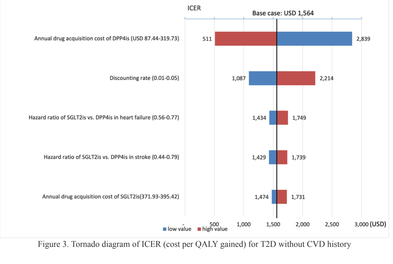

Figure 3. Tornado diagram of ICER (cost per QALY gained) for T2D without CVD history

CONCLUSIONS

Use of SGLT2is may be promoted as an economically reasonable alternative to DPP4is in routine care for the T2D population in Taiwan given their favorable cost-effectiveness profile.