



A Systematic Review of Economic Evaluations on Negotiated Type 2 Diabetes Mellitus Drugs in China

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BACKGROUND & OBJECTIVES

- The substantial economic burden that patients face due to frequent use of **Type 2 Diabetes Mellitus (T2DM) drugs** can be eased if they are successfully listed into the National Reimbursement Drug List (NRDL) in China.
- Pharmacoeconomic evidence** becomes increasingly important in reimbursement decision-making, with quality-adjusted life-year (QALY) being a critical indicator of health outcomes.
- This study aims to **review published local economic evaluations (EEs)** of 2020 NRDL listed negotiation T2DM drugs and evaluate the range of QALY gains.

METHODS

- Systematic literature review was conducted **via CNKI, Wan Fang Data, VIP, CBM, PubMed, Embase (OVID) and Web of Science** to identify up-to-date EEs of negotiated T2DM drugs involved in 2020 NRDL negotiation by March 2021.
- Descriptive analyses were performed on extracted information including the **study design (model choice, comparator), QALY gains** and other findings.

Table 1: Characteristics of Economic Evaluations about the Negotiated T2DM Drugs (n=24)

Study	Model choice	Type of analysis	Intervention	Comparator	Incremental cost	Incremental QALYs
TAO et al.2021	CORE Diabetes Model	CUA	Insulin Degludec	Insulin glargine	CNY: -77,567	0.064
WANG et al.2020	CORE Diabetes Model	CUA	Insulin Degludec	Insulin glargine	CNY: -29,431	0.064
Shi et al.2016	/	CBA	Exenatide	Insulin glargine	CNY: 5,730.9	/
Jiang et al.2013	/	CMA	Exenatide +Metformin	Insulin glargine + Metformin	CNY: 2,409.3	/
Hu et al.2014	/	CEA	Liraglutide	Rosiglitazone	CNY: 6,993.71	/
				Glimepiride	CNY: 4,834.8	/
				Exenatide	CNY: 1,052.18	/
				Insulin glargine	CNY: 2,656.2	/
Gu et al.2017	Cardiff Diabetes Model	CUA	Exenatide twice daily + OAD	Insulin glargine once daily + OAD	CNY: -117,706	1.94
Zhang et al.2016	CORE Diabetes Model	CUA	Metformin + Liraglutide or Exenatide	Exenatide	CNY: -4,483	0.388
Deng et al.2015	Cardiff Diabetes Model	CUA	Exenatide twice daily + OAD	Insulin glargine once daily + OAD	CNY: -114,593	1.88
Meng et al.2016	/	CMA	Liraglutide combined with Metformin	Insulin glargine combined with Metformin	CNY: 1,187.31	/
Xiao et al.2018	CORE Diabetes Model	CUA	Liraglutide	Sitagliptin	CNY: 12,297	0.2
Ma et al. 2019	Markov Model	CUA	1.2mg Liraglutide	Insulin glargine	CNY: 22,990. 61	1. 70
			1.8mg Liraglutide	Insulin glargine	CNY: 67,160. 22	2.02
Gu et al.2020	Cardiff Diabetes Model	CUA	Pharmacologic combination strategies	No obvious comparator	/	/
Gao et al.2012	Cardiff Diabetes Model	CUA	Liraglutide + Metformin	Glimepiride + Metformin	CNY: 3,617.106	0.168
Men et al.2019	CORE Diabetes Model	CUA	Lixisenatide + Basal insulin (BI)	Intensive premix insulin (premix)	CNY: 10,684	0.123
				Basal insulin	CNY: 5,594	0.092
				Premixed insulin	CNY: 9,271	0.073
Men et al.2020	CORE Diabetes Model	CUA	Lixisenatide	Placebo	CNY: 3,744	0.134
				Metformin	CNY: 3,960.88	0.096
				Metformin	CNY: 9,375.31	0.101
Xiong et al.2020	Markov model	CUA	5 mg Dapagliflozin + Metformin	Metformin	CNY: 71,117.26	0.59
			10 mg Dapagliflozin + Metformin	Metformin	CNY: 23,728.28	0.57
Ye et al.2020	Markov model	CUA	Dapagliflozin + Metformin	Metformin	CNY: 8,626	0.09
			Sitagliptin + Metformin	Metformin	CNY: 8,626	0.09
Cai et al.2019	Cardiff Diabetes Model	CUA	Dapagliflozin	Metformin	CNY: 8,626	0.09
Hu et al.2020	Cardiff Diabetes Model	CUA	Saxagliptin (SAXA)	DAPA + SAXA (vs. SAXA)	USD: -4,700.38	-0.02
			Dapagliflozin (DAPA)	DAPA + SAXA	USD: -2,346.35	0.17
Gu et al.2016	Cardiff Diabetes Model	CUA	Dapagliflozin	Acarbose	CNY: -8,439.41	0.25
Hou et al.2019	COMT: a validated Chinese diabetes policy analysis model	CUA	Canagliflozin + Metformin	Dapagliflozin + Metformin	USD: -129	0.013
Nian et al.2020	COMT: a validated Chinese diabetes policy analysis model	CUA	Dapagliflozin	Metformin	USD: 2,188	- 0.10
Shao et al.2017	Cardiff Diabetes Model	CUA	Dapagliflozin	Glimepiride	CNY: -49,065	1.01
Men et al.2020	A Microsoft Excel-based patient-level simulation model	CUA	Empagliflozin + BASC	BASC	CNY: 4,002	1.01

(OAD: Oral Anti-diabetic Drug; BASC: Best Available Standard Care)

RESULTS

- A total of **24 EEs** were included, involving **6 negotiated T2DM drugs**. The identified EEs comprised cost-utility analysis (83.3%), cost-effectiveness analysis (4.2%), cost-benefit analysis (4.2%) and cost-minimization analysis (8.3%). Among 20 model-based EEs, Cardiff diabetes model (40%), CORE diabetes model (30%) and Markov model (15%) were primarily adopted.
- Median incremental QALY gain was **0.168** and average incremental QALY gain was **0.48 [standard deviation: 0.63]**. The findings revealed that the economic assessments on the same drug vary in results depending on the **choice of outcome indicator, comparator, model selection, time horizon** and other factors. More details are presented in Table 1.

CONCLUSIONS

- The study design of identified EEs was generally aligned with **China Pharmacoeconomics Guideline**, and our analysis further shed some light on their convergence and divergence.
- The limitation of **sample size and data quality** may cause variation in QALYs across studies.
- Economic evaluations evidence of **higher quality** are needed in the future to better support reimbursement decision-making on T2DM drugs in China.