



Projected Cost Savings with Achieving Optimal Medication Adherence in Patients with Previous Cardiovascular Events in China

Jeong-Yeon Cho¹, Yingyao Chen², Zhenyue Chen³, Kyoo Kim⁴, Nathorn Chaiyakunapruk^{1,5}

¹ Department of Pharmacotherapy, University of Utah College of Pharmacy, Salt Lake City, UT, USA; ² School of Public Health, Fudan University, Shanghai, China; ³ Cardiology Department, Shanghai Ruijin Hospital, Shanghai Jiaotong University School of Medicine, Shanghai, China; ⁴ Abbott Products Operations AG, Allschwil, Switzerland;

⁵ IDEAS Center, Veterans Affairs Salt Lake City Healthcare System, Salt Lake City, UT, USA

Background:

- Non-adherence to medication among Chinese dyslipidemia patients may contribute to not only fatal cardiovascular events (CVEs) but also reduced quality of life and increased healthcare costs.
- This study explores the economic and clinical benefits of improving medication adherence in Chinese patients with a history of CVEs.

Methods:

- We developed state-transition model to simulate Chinese patients with previous CVEs, involving stakeholders including healthcare provider (Figure 1) ¹. Model transition probabilities were obtained from network meta-analysis of lipid lowering therapy ².
- The analyses were conducted from both societal and healthcare system perspective over a lifetime horizon with annual 5% discount rate ³.
- We assessed the potential benefits of the optimal adherence scenario (88%), as determined by a meta-analysis of 51 randomized controlled trials ⁴, compared to current level of adherence (19%) in China ⁵.
- Clinical benefits were simulated based on a dose-response meta-analysis of observational studies. Outcomes of interest included the accumulated number of CVE, life years (LYs), quality-adjusted life years (QALYs) and costs in 2022 CNY.
- The willingness to pay threshold of ¥122,651 (1.45 GDP per capita) was considered ⁶.
- A series of sensitivity analyses were performed.

Results:

- Current adherence levels were associated with a higher risk of CVEs compared to optimal adherence (Relative risk 1.44, 95% CI 1.34-1.56).
- Furthermore, achieving optimal adherence from current level increased life-years by 1.11 and QALYs by 0.93.
- Achieving optimal adherence could reduce medical costs related to CVE by ¥3,718 per patient (Table 2).
- From the societal perspective, the optimal adherence scenario remained cost-saving by ¥4,654 per patient.
- In a scenario analysis needing any cost for an intervention program enhancing adherence, the annual cost of such an interventional program to achieve cost-effective results is affordable to spend at ¥9,970 per patient from societal perspective.
- Cost-effectiveness findings remained robust in sensitivity analyses.

Figure 1. Conceptual Model

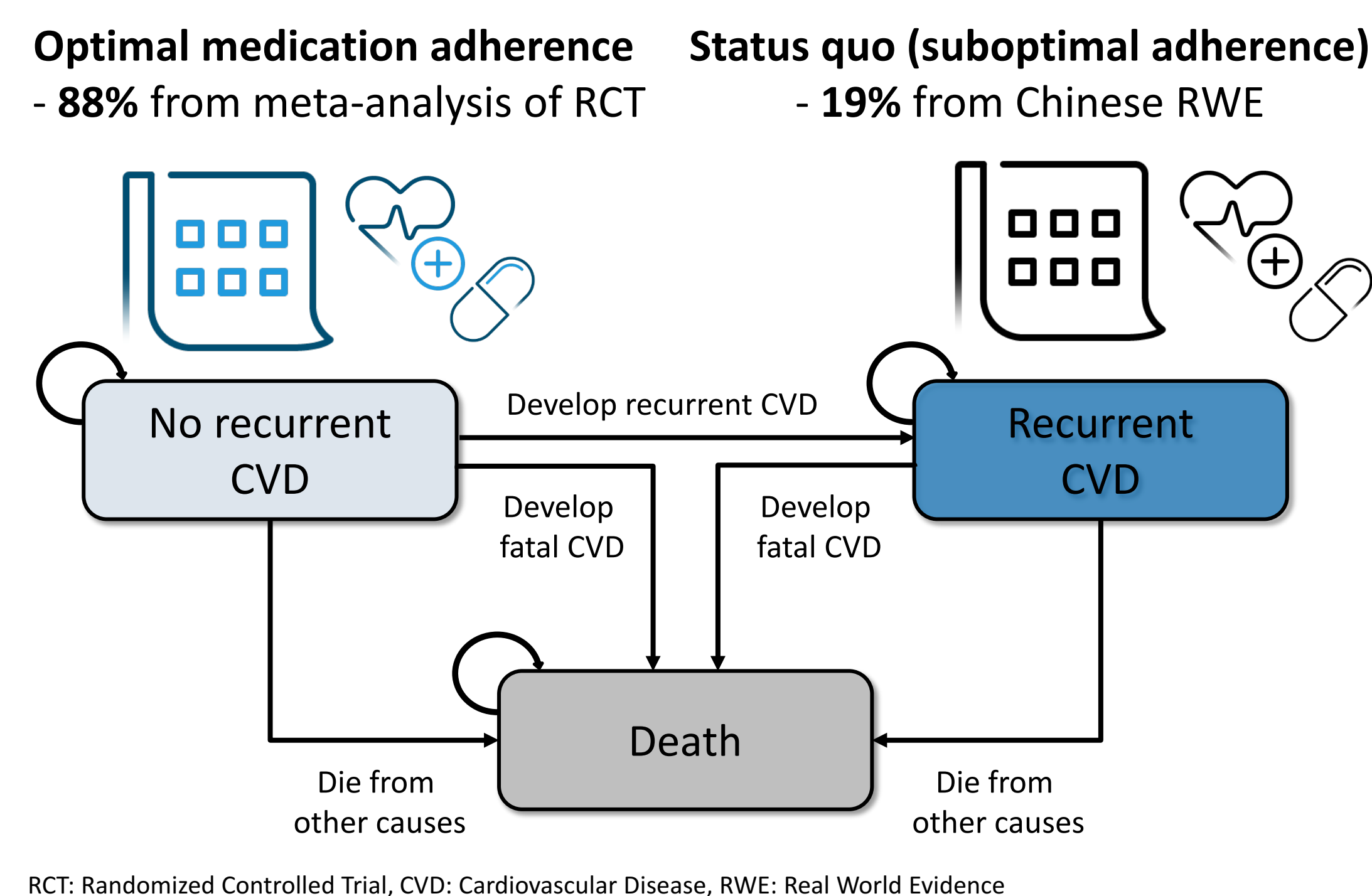


Table 1. Key input parameters

Input parameters	Input value
Effectiveness	
RR of CVEs in status quo vs. Optimal adherence	1.44 ⁷
Costs (in 2022 CNY)⁸	
Lipid lowering therapy	1,641
Non-fatal MI event	74,889
Non-fatal MI subsequent	8,783
Non-fatal stroke event	24,230
Non-fatal stroke subsequent	8,924
Fatal MI	92,529
Fatal stroke	62,233
Utility weights⁸	
Alive without recurrent CVD	0.824
Disutility after non-fatal MI	0
Disutility after non-fatal stroke	0.3

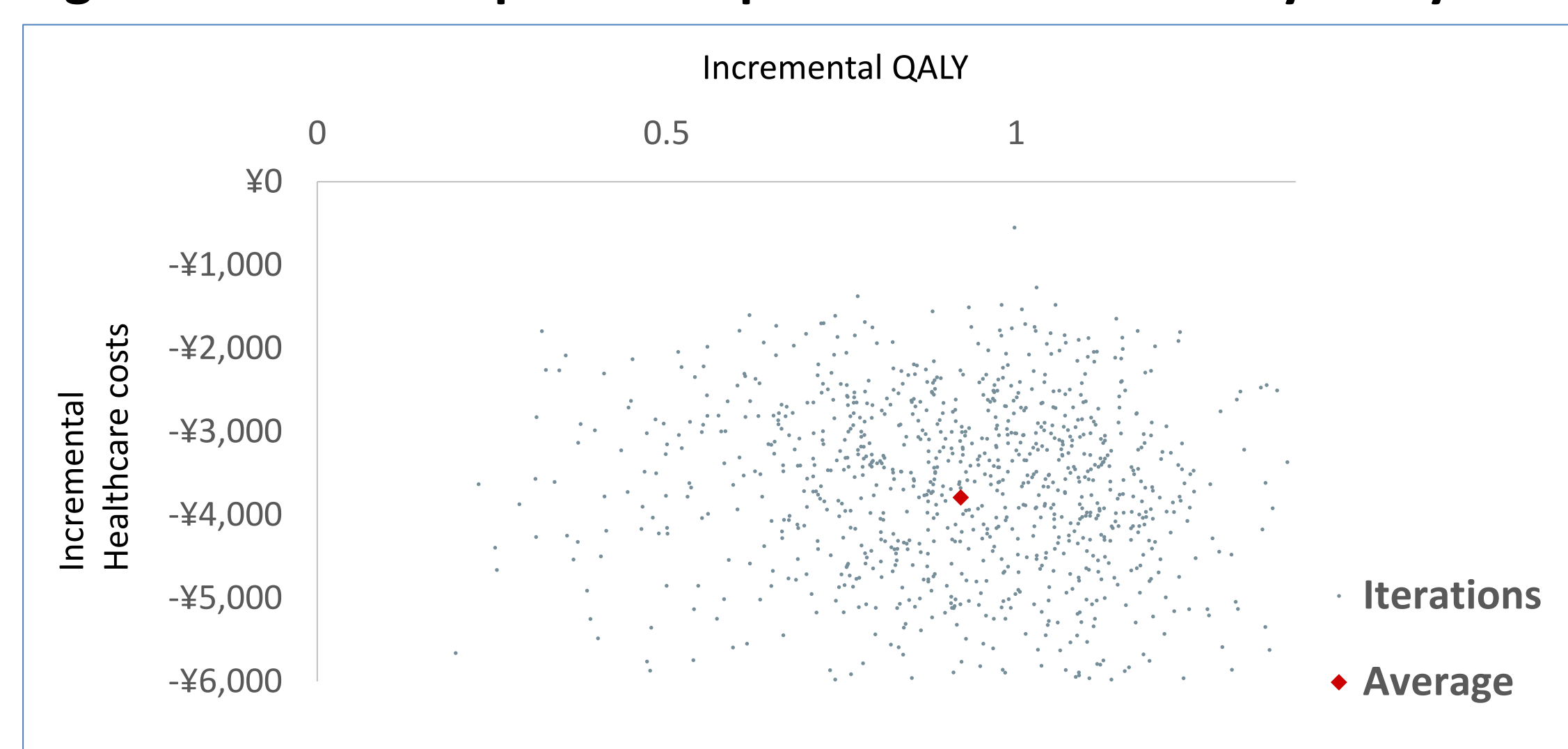
CVEs, Cardiovascular events; MI, Myocardial Infarction; CVD, Cardiovascular Disease

Table 2. Base-case results from societal perspective

	Value
Cardiovascular event-averted per 1000 patient	
Non-fatal CVEs	38.49
Fatal CVEs	24.47
Total CVEs	62.96
Incremental medical costs of optimal adherence per CVD patient	
Disease management costs*	¥1,832
Non-fatal CVEs	-¥3,524
Fatal CVEs	-¥2,026
Total healthcare costs	-¥3,718
Permissible annual expense for cost-saving**	¥389
Permissible annual expense for cost-effectiveness**	¥9,970

CVEs, Cardiovascular events
*The difference is caused by less use of treatment in status quo scenario due to pre-mature death
**permissible annual expense of technology to achieve optimal adherence

Figure 2. Scattered plot from probabilistic sensitivity analysis



Conclusion:

- This study highlights the potential clinical and economic benefits of improving medication adherence in Chinese patient with a history of CVEs.
- Behavioral change could improve medication adherence, and implementing adherence-enhancing interventions would likely to be cost-effective for both healthcare system and society.
- These findings advocate for the consideration of strategies by national healthcare system to improve optimal adherence.

References

1. Kongpakwattana K et al. *Pharmacoeconomics*. 2019;37:1277-1286.
2. Chaiyasothi T et al. *Front Pharmacol*. 2019;10:547.
3. Liu G et al. China guidelines for pharmacoeconomic evaluations. *Beijing: China Market*. 2020.
4. Zhang Z et al. *Clin Trials*. 2014;11:195-204.
5. Zhao B et al. *BMC Cardiovascular Disorders*. 2020;20:282
6. Cai D et al. *Eur J Health Econ*. 2022;23:607-615.
7. Liu M et al. *J Cardiovasc Dev Dis*. 2021;8.
8. Liang Z et al. *Front Pharmacol*. 2021;12:648244.