

Model-Based Cost-Utility Analysis of Artificial Intelligence-Assisted General Practitioner-Led Follow-Up Management for Hyperlipidemia in Shanghai, China

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Background

Hyperlipidemia is a major modifiable risk factor for atherosclerotic cardiovascular disease (ASCVD). Shanghai policies support the integration of lipid management into general practitioner (GP) services. However, evidence on the economic value of incorporating artificial intelligence (AI) into GP-led management remains limited.

Objective

To conduct an early economic evaluation of AI-assisted GP-led lipid management for the primary prevention of ASCVD among community-dwelling adults with hyperlipidemia in Shanghai.

Methods

A sex-stratified Markov cohort model was developed as an early economic evaluation of GP+AI management for primary prevention of ASCVD. Management effects were linked to changes in statin use and lifestyle modification, which translated into low-density lipoprotein cholesterol (LDL-C) reductions and subsequent cardiovascular risk changes. Costs and quality-adjusted life-years (QALYs) were evaluated from the Chinese healthcare system perspective and discounted at 3% annually. Cost-effectiveness was assessed against a willingness-to-pay threshold of CNY 99,665/QALY (1× China's 2025 GDP per capita). Sensitivity and scenario analyses were conducted to characterize uncertainty.

Results

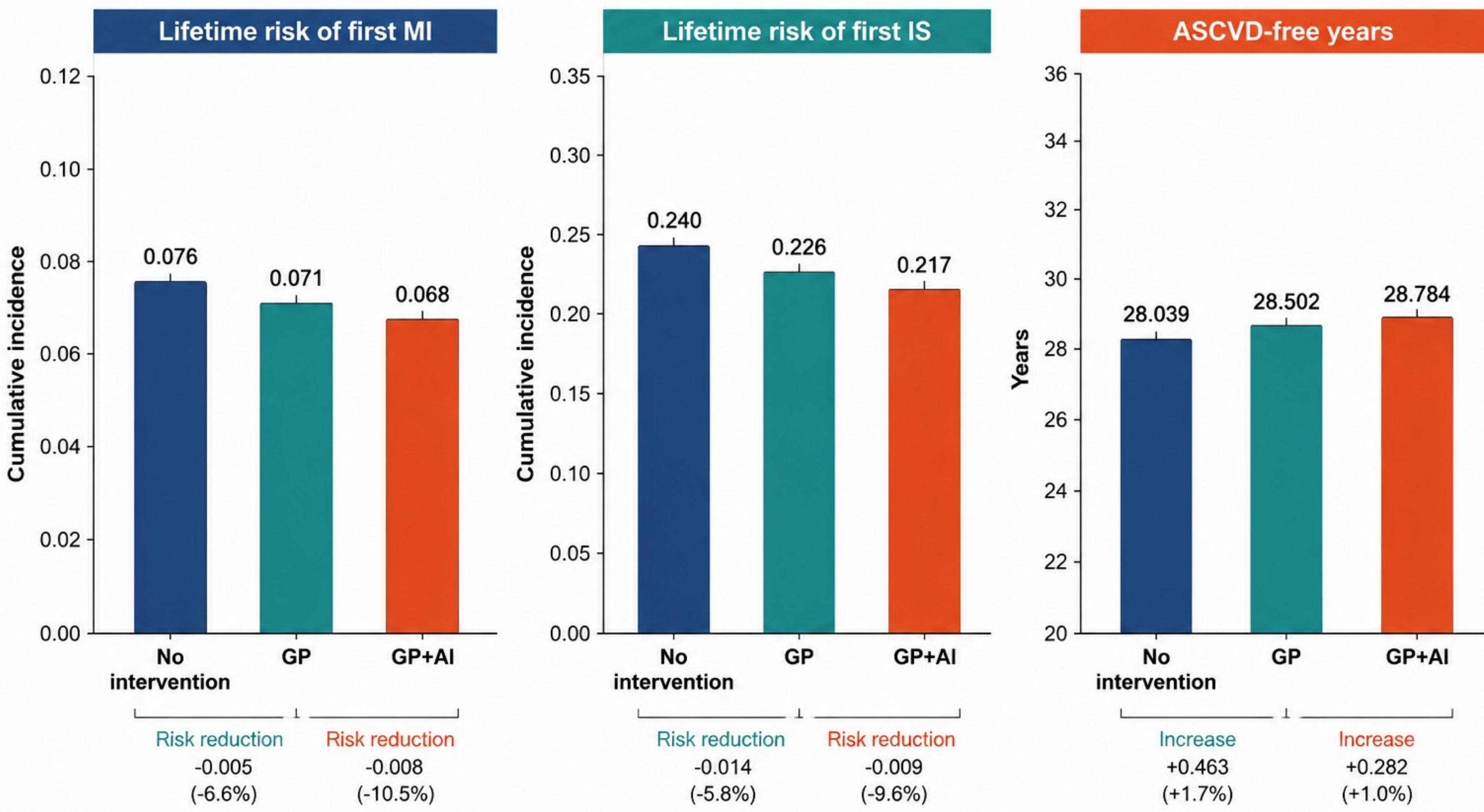
Result 1: Base-Case Cost-Effectiveness Results

Strategy	Total cost (CNY)	QALYs	ICER
No intervention	21,388	17.78	Dominated by GP
GP management	21,006	17.89	Reference
GP + AI management	23,844	17.96	40,216

Key findings:

- GP management dominated no intervention, with lower costs and greater QALYs.
- Compared with GP management, GP+AI increased QALYs by 0.071 at an additional cost of CNY 2,838, resulting in an ICER of CNY 40,216/QALY.

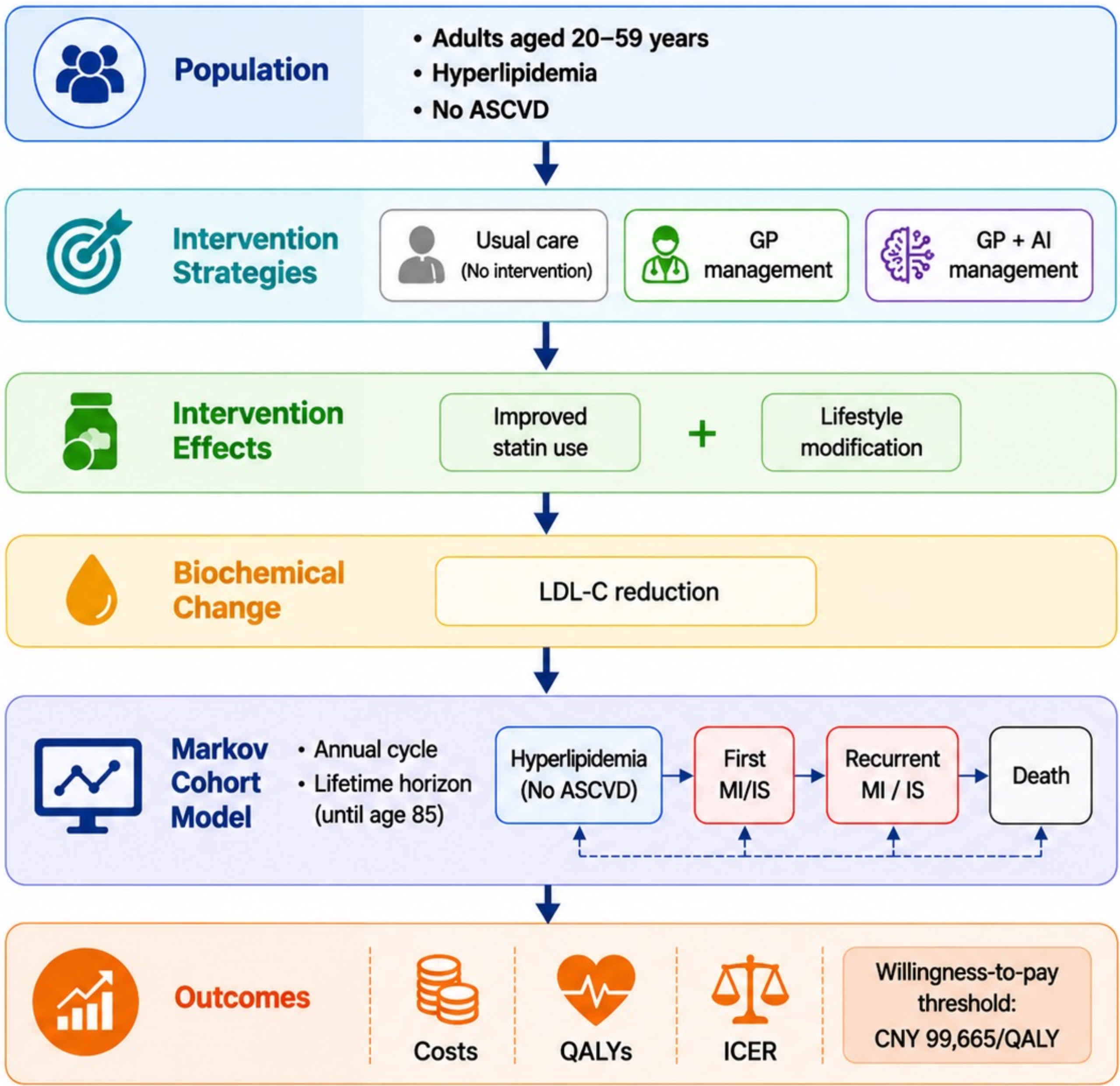
Result 2: Cardiovascular Incremental Outcomes



Conclusion

As an early economic evaluation, our findings suggest that AI-assisted GP-led lipid management may be cost-effective for the primary prevention of ASCVD among adults with hyperlipidemia in Shanghai. Compared with GP management alone, GP+AI generated additional health gains at a modest incremental cost, supporting its potential value in community-based ASCVD prevention. Further real-world evidence is needed to validate the effectiveness and long-term sustainability of the intervention.

Study Design and Model Framework



Result 3: Cost-Effectiveness Acceptability Curve

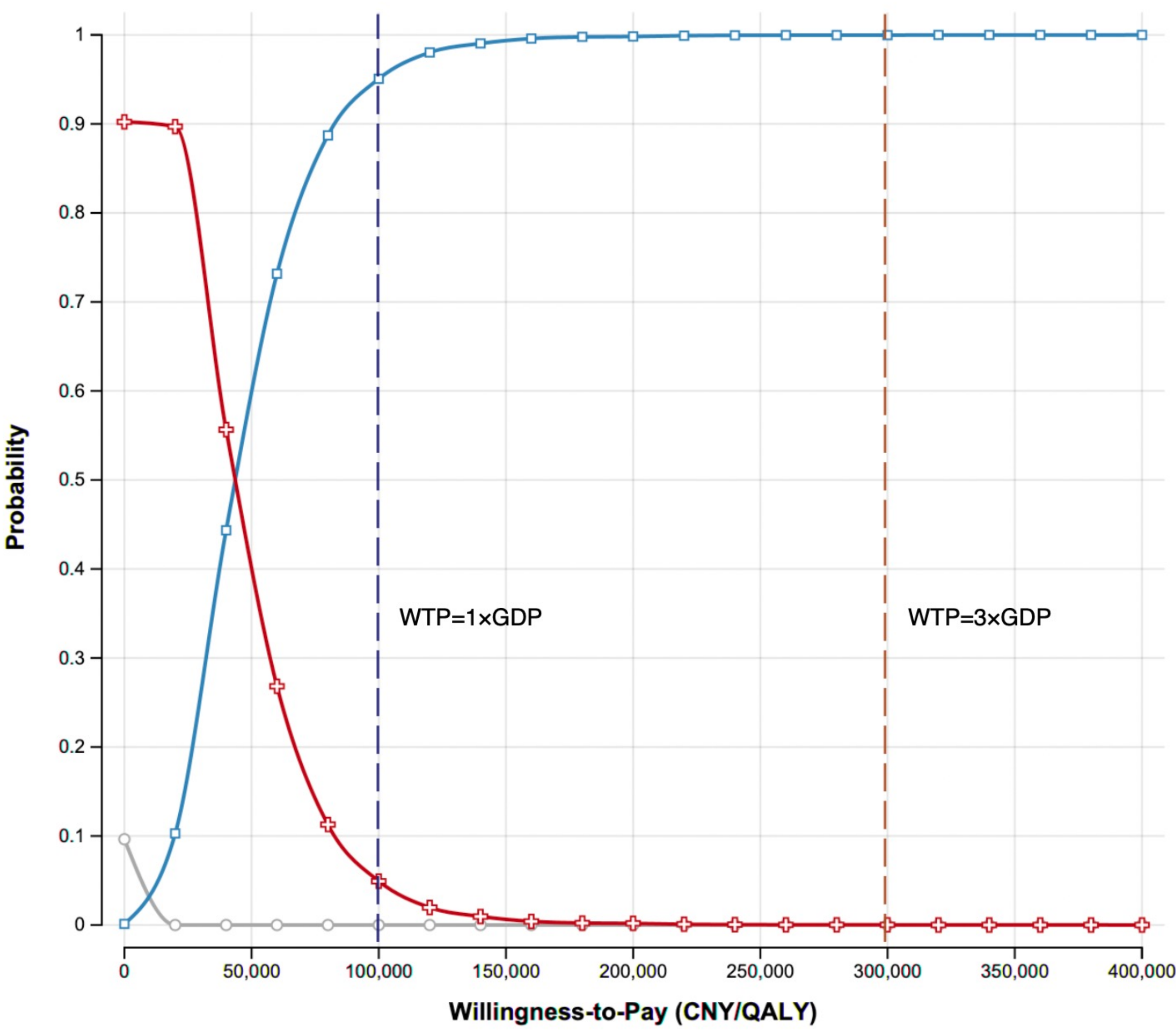


Figure note: The red, blue, and grey curves represent GP management, GP+AI management, and usual care, respectively. The vertical dashed lines indicate willingness-to-pay thresholds of 1× and 3× China's 2025 GDP per capita.