

Cost-Utility of Tenofovir Disoproxil Fumarate versus Entecavir for Chronic Hepatitis B in India: A Markov State-Transition Model

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INTRODUCTION: Chronic hepatitis B (CHB) continues to pose a significant public health threat in India, impacting around 3-4% of the population. Continuous antiviral management is crucial to avoid cirrhosis, hepatocellular carcinoma, and early death. Within the realm of limited resources, the treatment strategy should be effective yet affordable. The present study aims to determine the cost-effectiveness of Tenofovir disoproxil fumarate (TDF) and Entecavir (ETV) for CHB from the perspective of the Indian payer.

OBJECTIVE: To compare the cost-utility of Tenofovir Disoproxil Fumarate (TDF) versus Entecavir (ETV) for chronic hepatitis B in India, using a Markov model from the healthcare payer perspective

METHOD: A Markov model was used to compare Tenofovir Disoproxil Fumarate and Entecavir for Chronic Hepatitis B from the Indian healthcare payer perspective. Costs, utilities, and transition probabilities were obtained from published literature. Outcomes included costs, QALYs, ICERs, and probabilistic sensitivity analysis.

RESULT: Treatment with Tenofovir Disoproxil Fumarate (TDF) was both less costly and more effective than Entecavir (ETV). Patients on TDF accrued 14.81 QALYs at a lifetime cost of ₹26,81,200, while those on ETV accrued 14.31 QALYs at a cost of ₹27,44,200. This produced a negative ICER of -₹1,24,851 per QALY, indicating that TDF dominates ETV by saving costs and improving outcomes. Probabilistic sensitivity analysis confirmed robustness, with most simulations favoring TDF at the ₹1,50,000/QALY willingness-to-pay threshold.

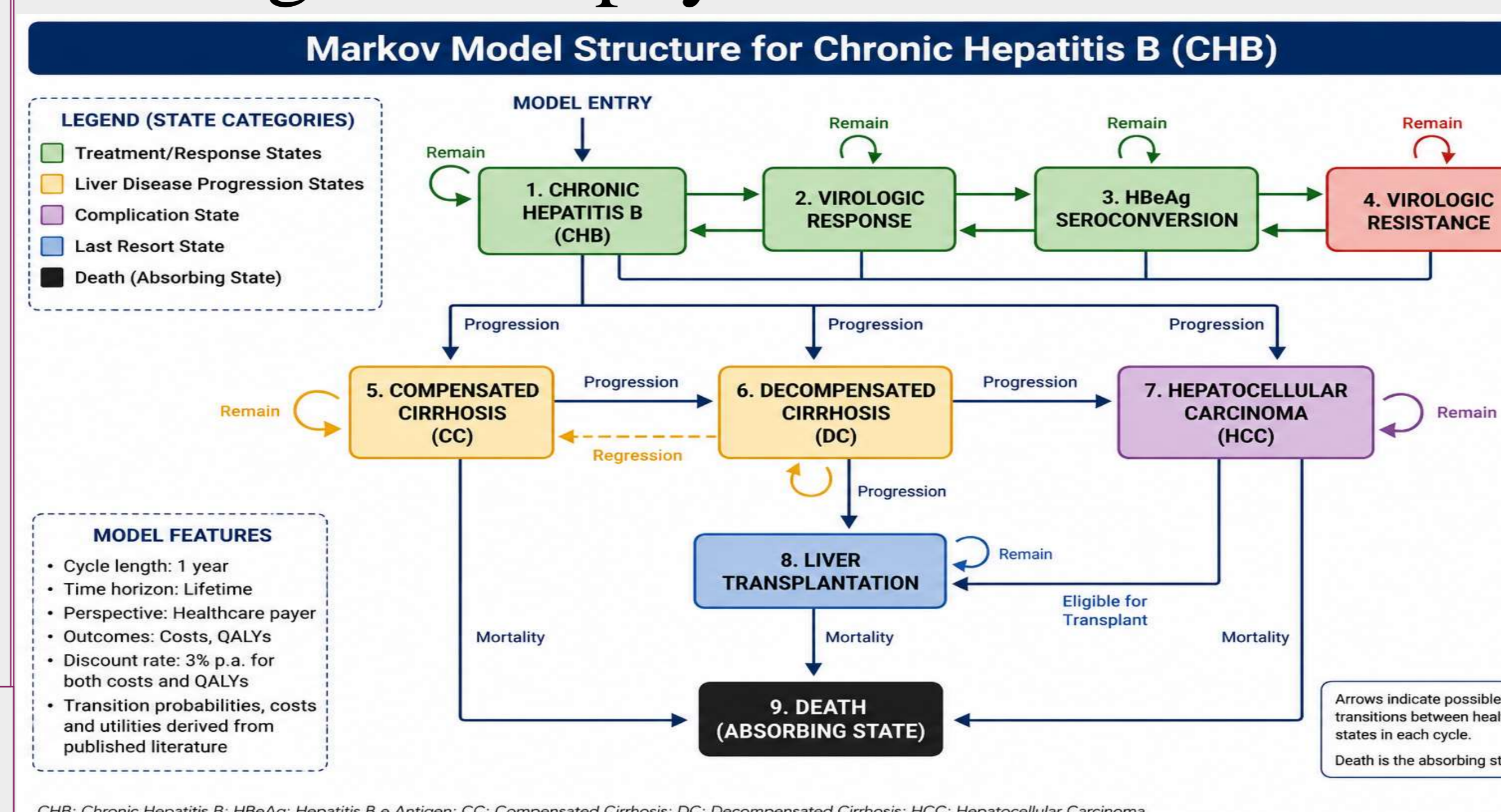
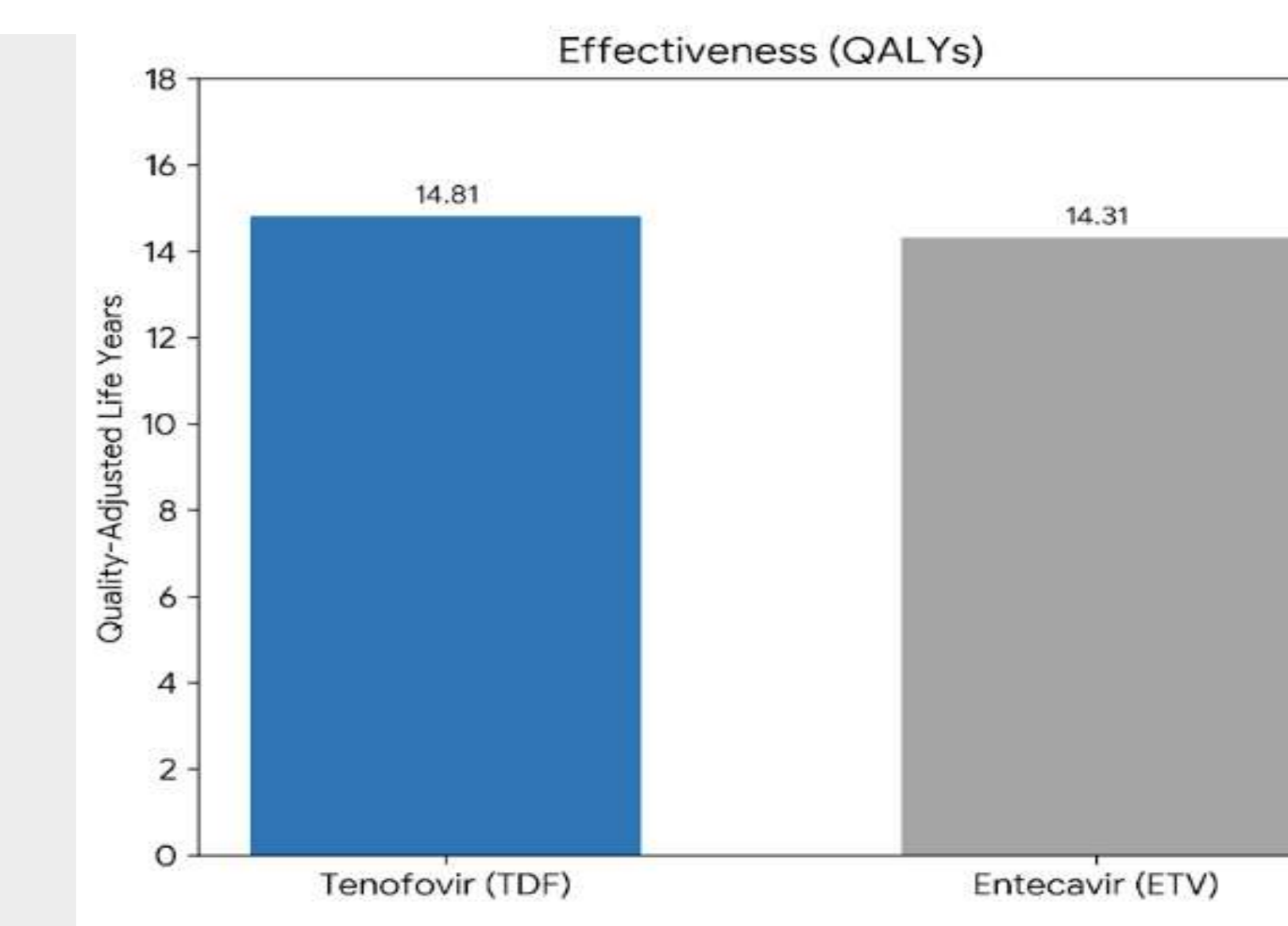
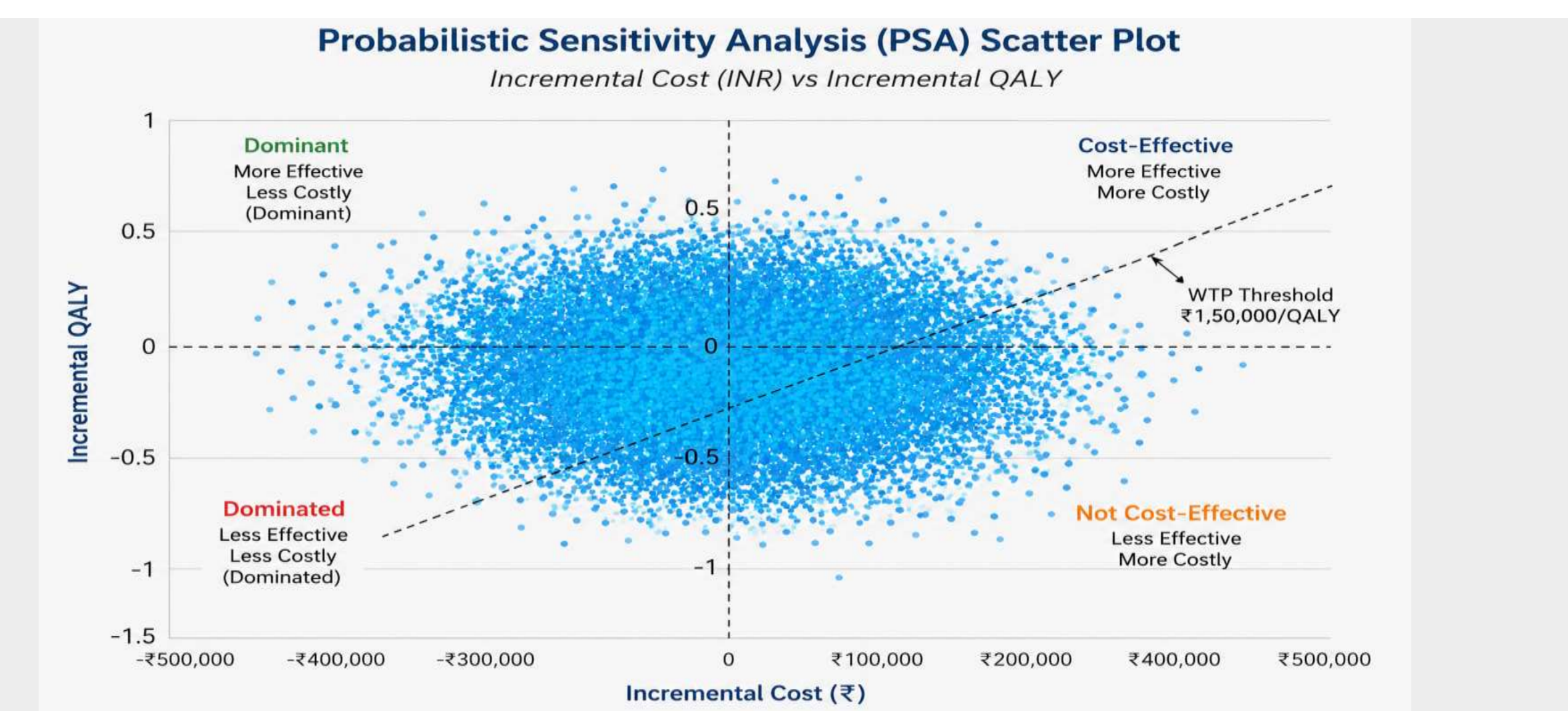
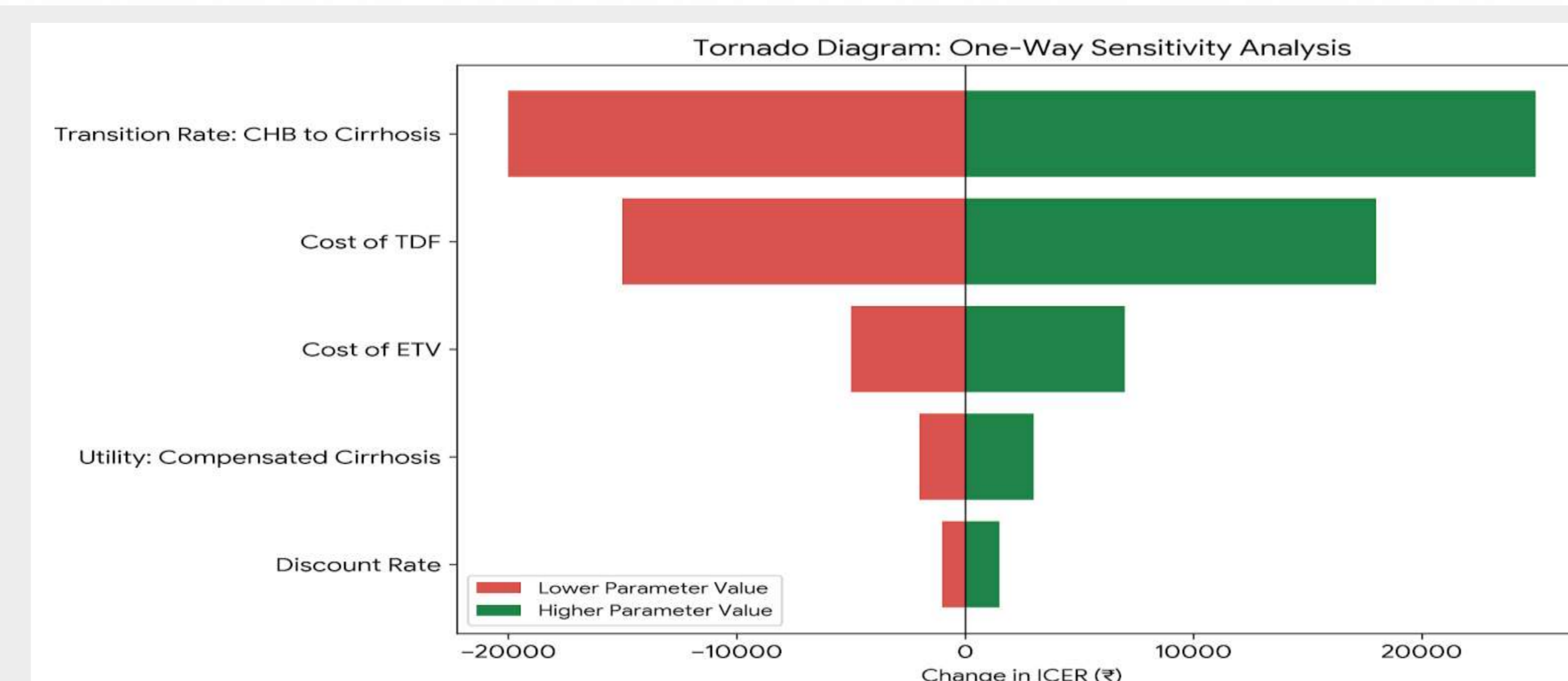
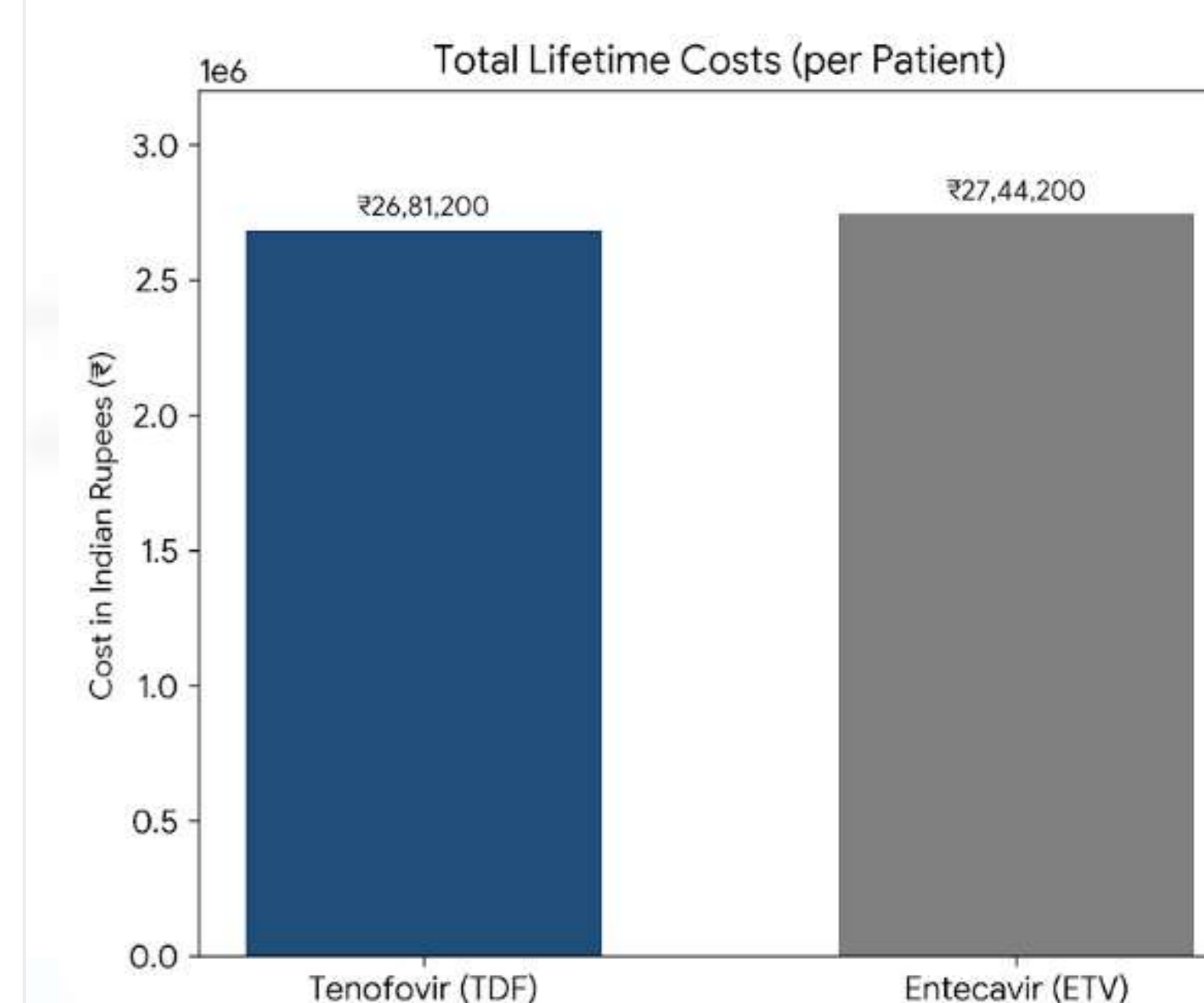


Table 1. Summary of Cost-Utility Analysis Results

Outcome Measure	Tenofovir (TDF)	Entecavir (ETV)
Total Costs (₹)	26,81,200	27,44,200
Total Effectiveness (QALYs)	14.81467	14.31008
Incremental Cost (₹)	—	63,000
Incremental Effectiveness (QALYs)	—	-0.50459
ICER (₹/QALY)	Dominant	-1,24,851.11

Note: TDF is considered "Dominant" because it is both more effective (higher QALYs) and less expensive than ETV. Calculations based on a healthcare payer perspective in India. Abbreviations: ICER, Incremental Cost-Effectiveness Ratio; QALY, Quality-Adjusted Life Year.



CONCLUSION: TDF is both cost-saving and more effective than ETV for chronic hepatitis B in India. From the healthcare payer perspective, TDF dominates ETV, offering better health outcomes at lower costs. These findings support TDF as a strong value-for-money option for routine use and can guide treatment guidelines, procurement, and reimbursement decisions.

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