

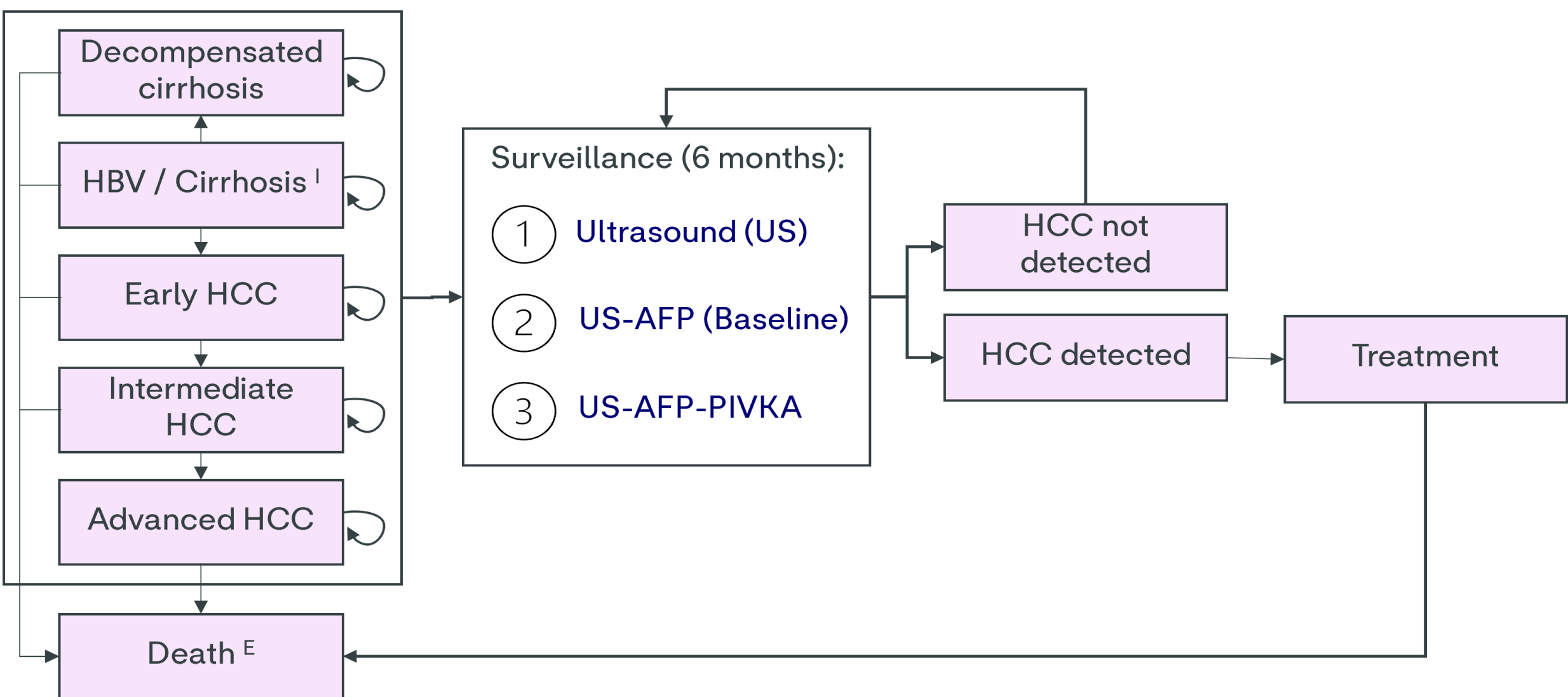
Cost-Effectiveness of Adding PIVKA-II to Ultrasound and AFP Surveillance for Hepatocellular Carcinoma in Thailand

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Background

- HBV is the leading risk factor for HCC in Thailand.
- Early-stage HCC enables curative treatment and better outcomes.
- Current surveillance in high-risk populations consists of ultrasound (US) plus alpha-fetoprotein (AFP) every 6-12 months.
- Adding PIVKA-II to AFP improves HCC detection.
- The impact of PIVKA-II-based surveillance on time to diagnosis, duration of undiagnosed HCC, and early-stage detection has not been evaluated.

Model Structure



Methods

- A Markov decision model compared surveillance strategies in Thai patients with HBV-related compensated cirrhosis over a 20-year horizon from the healthcare system perspective.
- Clinical inputs were derived from published literature and costs from Thai sources. Diagnostic performance inputs differentiated early-stage and later-stage HCC.
- Outcomes included HCC diagnoses, time to diagnosis, early-stage detection, costs, QALYs, and cost-effectiveness.
- Deterministic and probabilistic sensitivity analyses were performed

Results

Adding PIVKA-II to standard surveillance (US+AFP) improved clinical and economic outcomes:

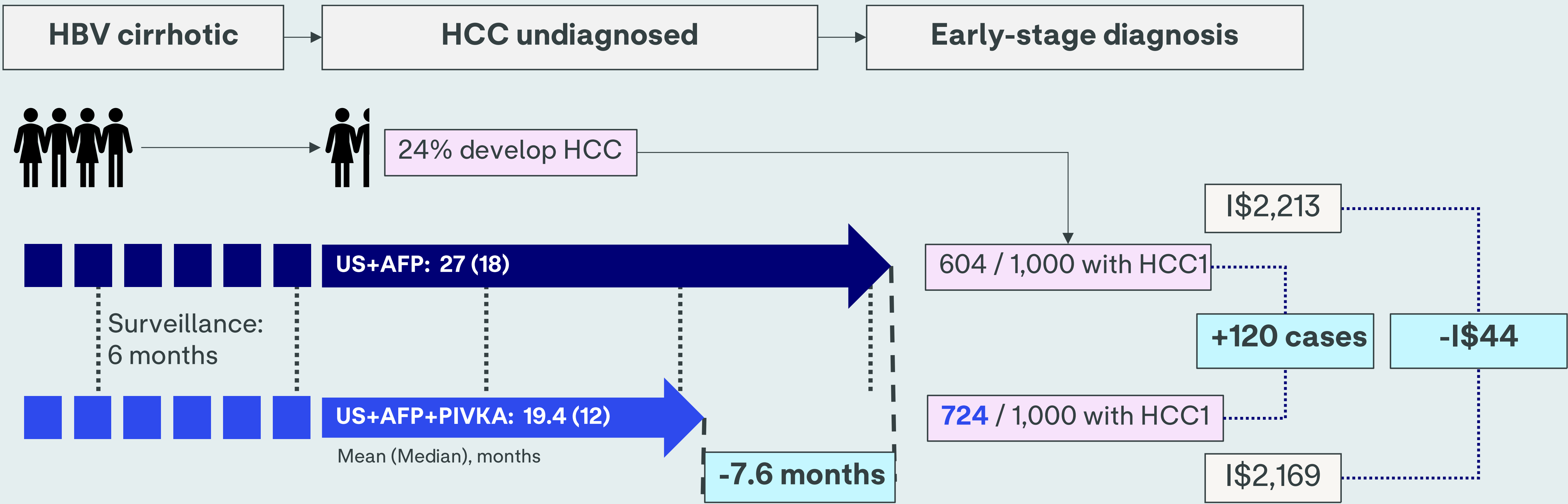
7.6 months
Earlier HCC diagnosis

33%
Reduction in pre-diagnosis deaths

72.4%
Early-stage HCC diagnosis

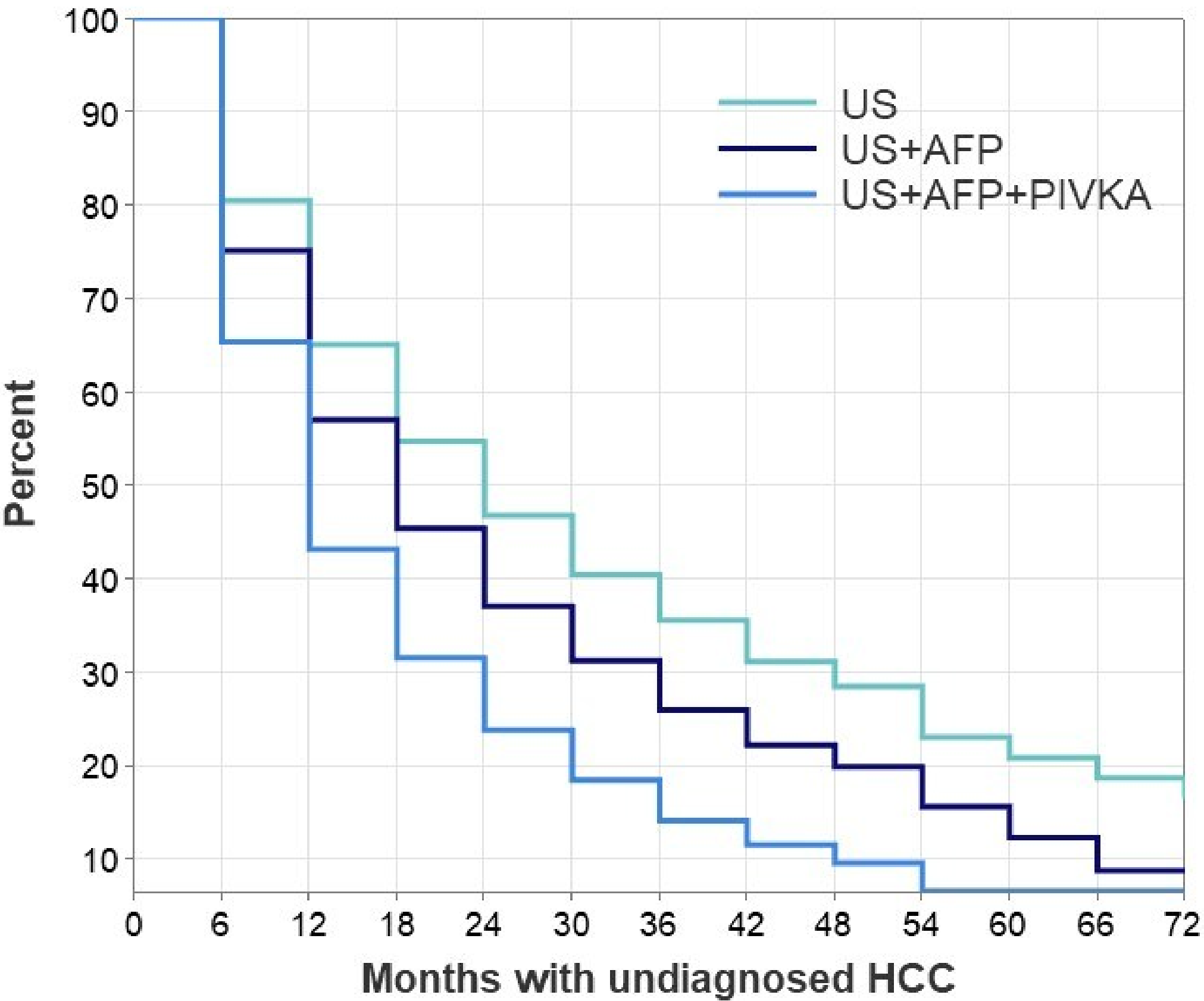
80%
Probability of being cost-effective

Early-stage Diagnosis and Costs To Diagnosis



Time to Diagnosis

Kaplan-Meier curves for time to HCC diagnosis under 6-month surveillance (p<0.01).



Strategy	Costs, I\$	QALYs	ICER
US	14,919	5.190	
US+AFP (Standard)	18,132	5.228	83,729
US+AFP+PIVKA	20,946	5.275	60,497

Sensitivity Analysis & Discussion

- **Results remained robust** across sensitivity analyses. Utility weights, costs for palliative care, adherence rate, specificity had the greatest impact on results.
- Probabilistic sensitivity analysis demonstrated an **80% probability** of being cost-effective at a WTP threshold of I\$60,000/QALY.

References:
Rattananukrom (2022) JGH Open. 6(6):408-20. Kim (2019) Scand J Gastroenterol. 54(10):1283-90. Tzartzeva (2018) Gastroenterol. 154(6):1706-18. Loglio (2020) Liver Int. 40(8):1987-96. Sangmala (2014) Asian Pac J Cancer Prev. 15(20):8993-9004. Saeoui (2025) Aliment Pharmacol Ther. 0:1-15. Kim (2023) Clin Mol Hepatol. 2023;29(2):277-292.

Adding PIVKA-II to standard US+AFP surveillance enabled **earlier detection** of HCC, increased **early-stage diagnosis**, and demonstrated a high probability of **cost-effectiveness** in Thailand