

# Economic Evaluation For Robotic-assisted Surgery in APAC: A 10-year Systematic Review

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## OBJECTIVE

- Robotic-assisted surgery (RAS) has increased rapidly across Asia-Pacific (APAC) region.
- Although improved clinical outcomes may translate into downstream cost savings, the higher procedural costs of RAS raise uncertainty about its long-term economic value.
- This systematic review synthesizes APAC full economic evaluations integrating both costs and effectiveness (e.g., QALYs and ICERs), to inform healthcare policy and resource allocation.

## METHODS

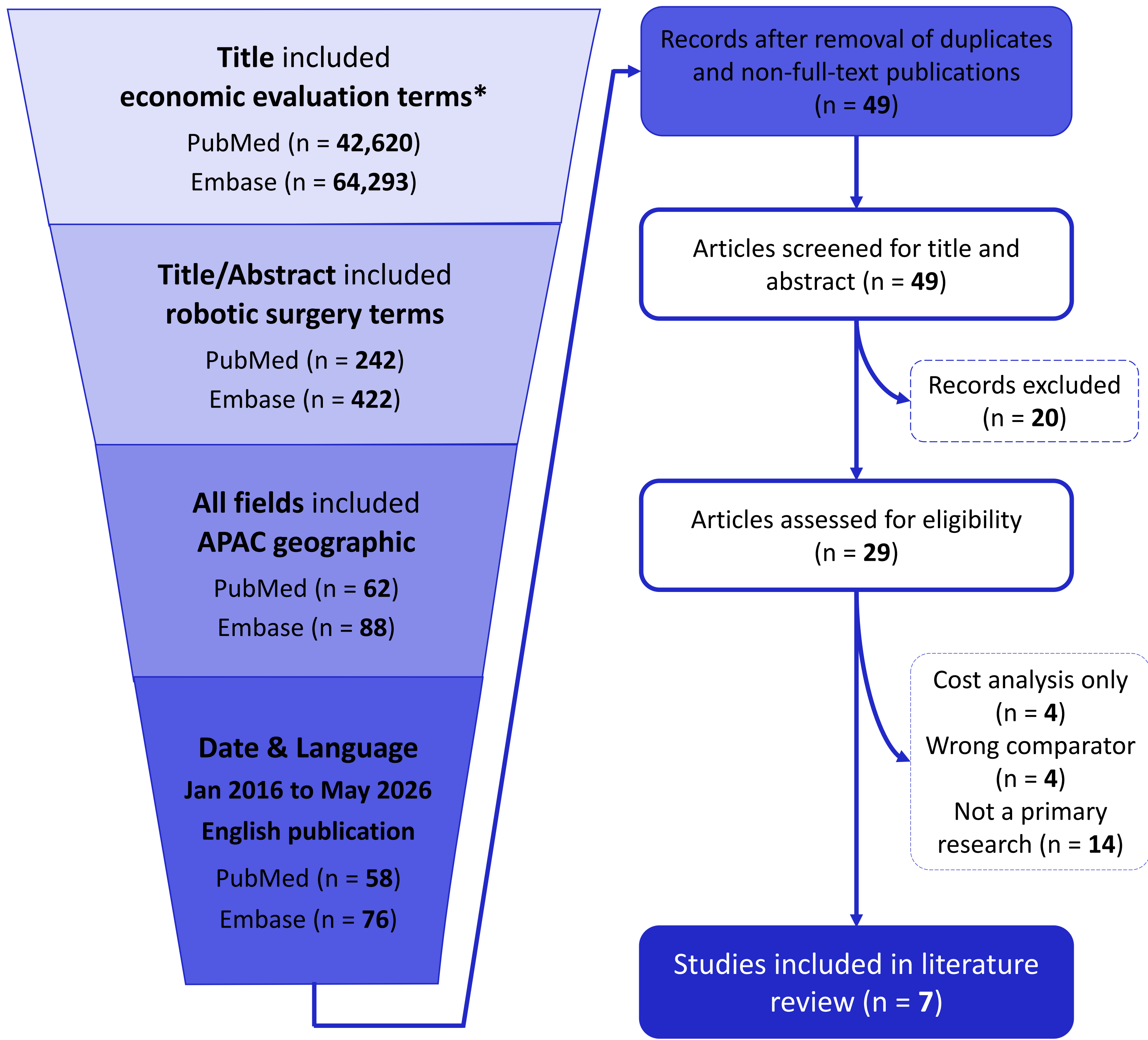


Figure 1. Search Strategy and Flow Chart

Economic evaluation terms include cost-effectiveness, cost-benefit, cost-utility, economic evaluation, and cost-minimization analysis.

## RESULTS

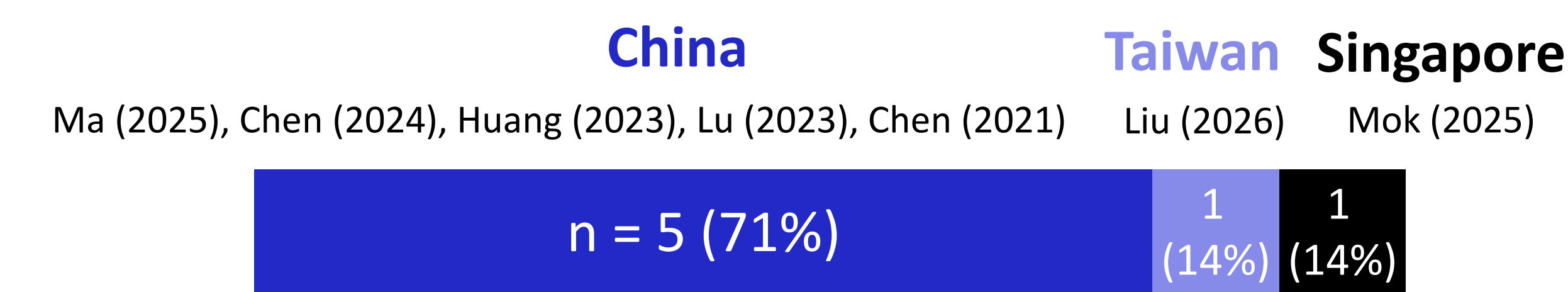
Table 1. Summary of the Included Studies

| Study         | Procedure   | Time horizon | Cost scope              | Was RAS cost-effective? (ICER/QALY)           |
|---------------|-------------|--------------|-------------------------|-----------------------------------------------|
| Liu YC, 2026  | Urologic    | 10 years     | Direct medical costs    | Yes (< 1x GDP)                                |
| Ma L, 2025    | Gastric     | 1 year       | Direct medical costs    | Yes (< 1x GDP)                                |
| Mok CW, 2025  | Breast      | 10 years     | Direct medical costs    | Yes (< 0.5x GDP)                              |
| Chen C, 2024  | Gynecologic | Lifetime     | Direct + indirect costs | Yes (< 3x GDP)                                |
| Huang J, 2023 | Pediatric   | 2 years      | Direct medical costs    | Yes (< 100K USD)                              |
| Lu J, 2023    | Gastric     | 1 year       | Direct + indirect costs | No (> 3x GDP)                                 |
| Chen D, 2021  | Thoracic    | 5 years      | Direct medical costs    | Yes vs OT (< 3x GDP)<br>No vs VATS (> 3x GDP) |

GDP: gross domestic product; OT: open thoracotomy; VATS: Video-Assisted Thoracoscopic Surgery

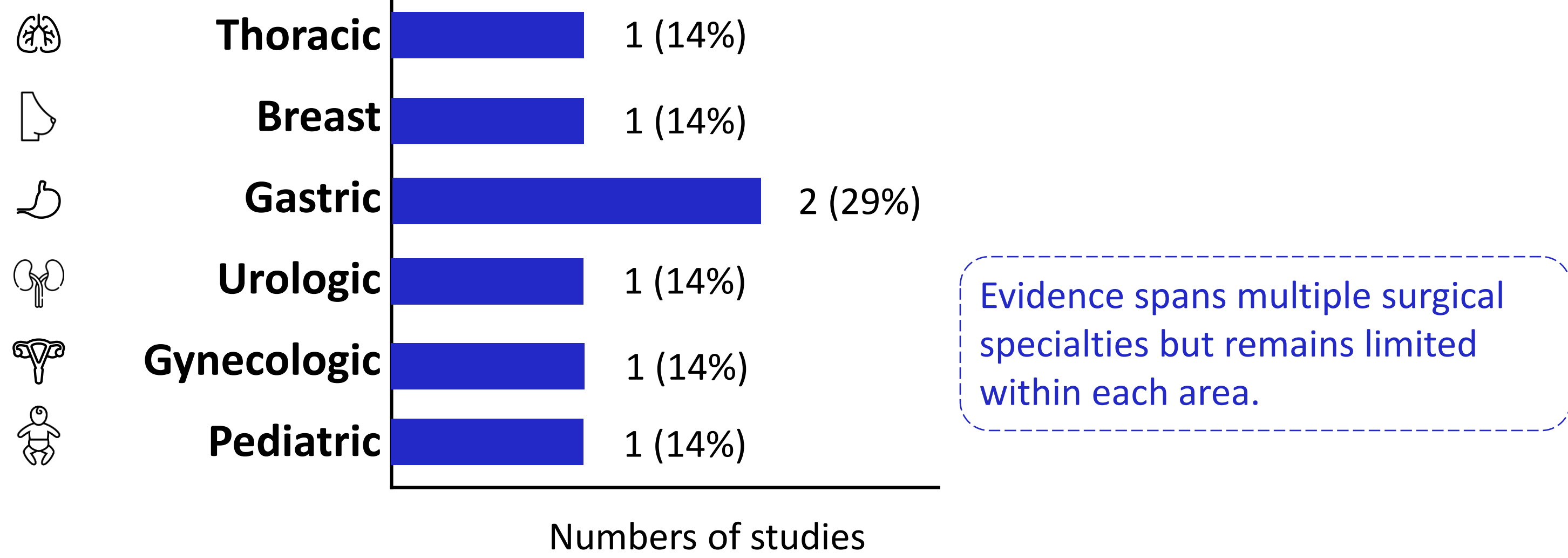
- Current APAC economic evidence for RAS is favorable.

### A. Geographic concentration



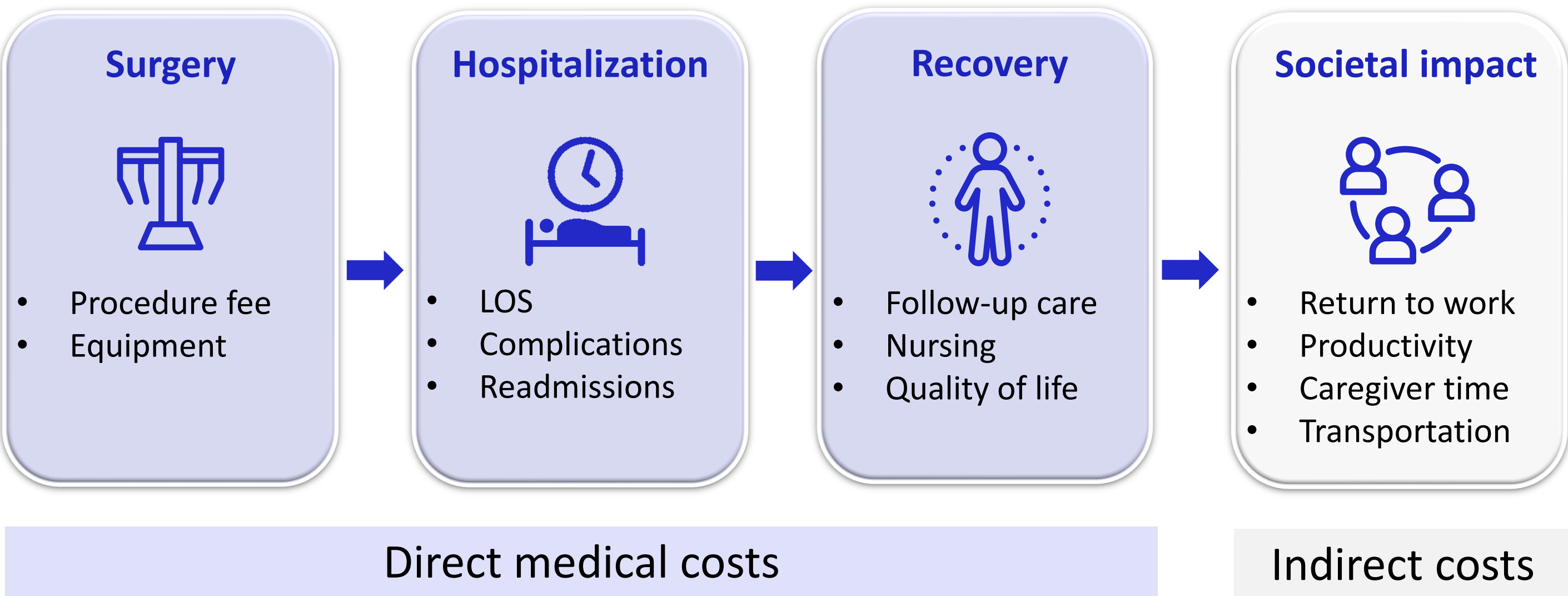
- Full economic evaluations remain geographically concentrated despite broader RAS adoption across APAC region.

### B. Procedure distribution



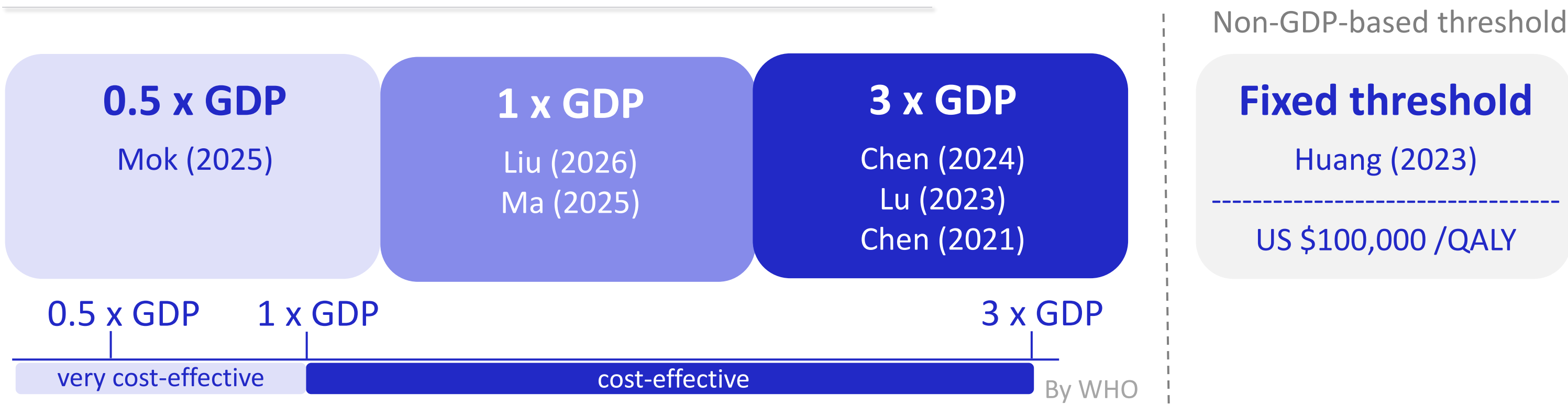
### C. Cost scope & perspective

- Direct medical cost were captured in all studies.
- Indirect costs were less commonly captured.



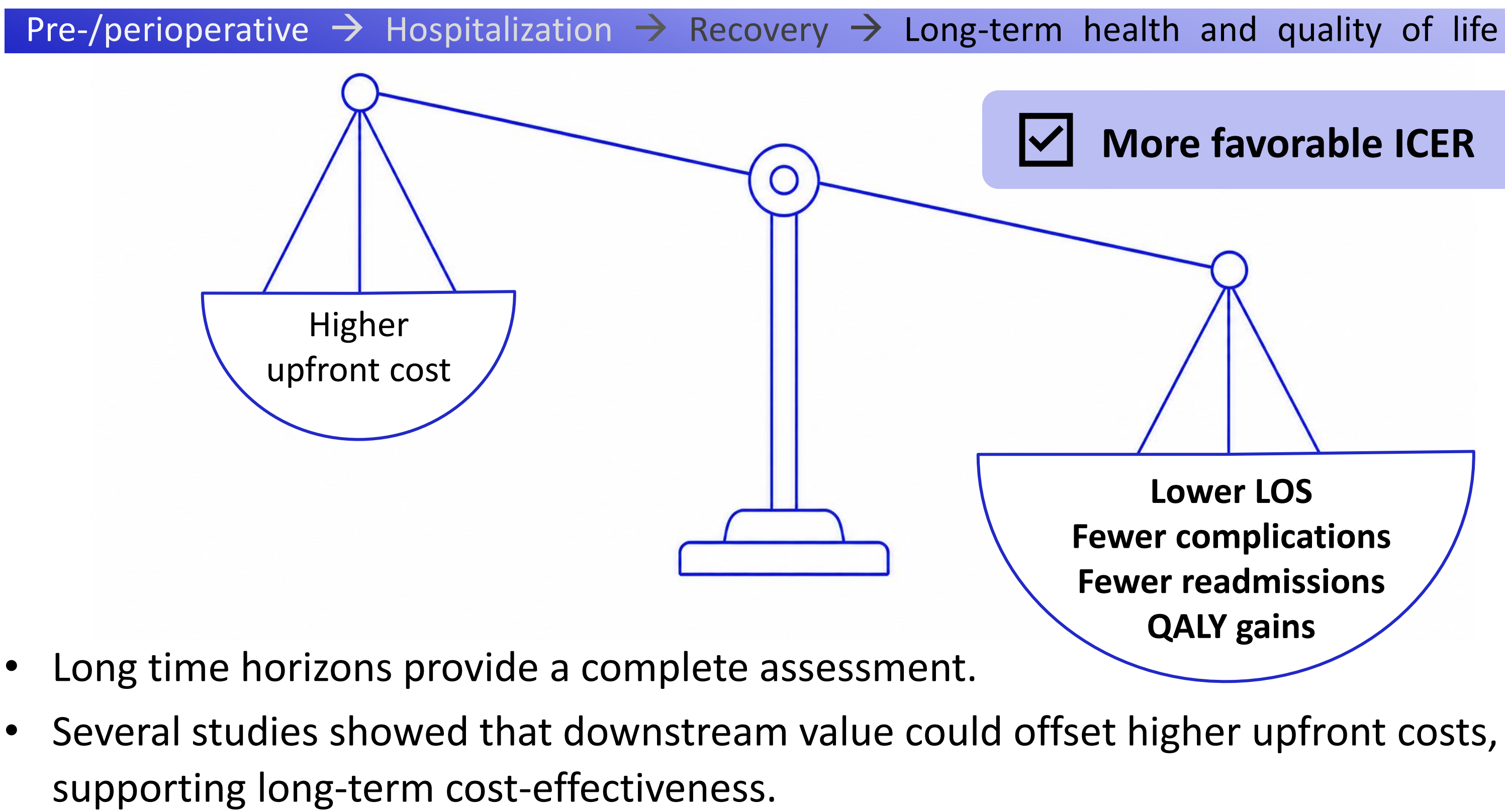
- Costs should be interpreted within local reimbursement contexts.
- Payer-perspective evaluations are particularly policy-relevant in single-payer healthcare systems.
- Societal perspectives can capture broader resource use and downstream economic consequences.

### D. Willingness-to-pay (WTP) threshold



- WTP thresholds varied substantially across studies.
- Six studies used GDP-based thresholds (0.5x to 3x); one applied a fixed threshold.

### What drives RAS cost-effectiveness?



- Long time horizons provide a complete assessment.
- Several studies showed that downstream value could offset higher upfront costs, supporting long-term cost-effectiveness.

## CONCLUSIONS

- Evidence from full economic evaluations of RAS in APAC remains limited.
- Most studies supported RAS as cost-effective under study-specific thresholds.
- Future APAC evaluations should capture longer-term and societal consequences and expand to understudied procedures.