

Cost-effectiveness of integrating artificial intelligence-based retinal photographic cardiovascular disease risk assessment with diabetic retinopathy screening programmes: a multi-country analysis

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① Background

- Diabetic patients have a high risk of cardiovascular disease (CVD).
- AI-based retinal photography can detect both diabetic retinopathy (DR) and CVD risk.

② Objectives

- To evaluate the cost-effectiveness of AI-integrated DR and CVD screening in Australia, Singapore, and the UK.

③ Methodology

- A model simulated lifetime DR and CVD progression in diabetics for each country.
- Compared AI-based DR screening alone vs. combined DR+CVD screening.
- Scenarios varied by age group and screening coverage (20%, 50%, 80%).
- Evaluated using ACER, ICER, and NMB; local QALY thresholds applied.
- Sensitivity analyses assessed robustness.

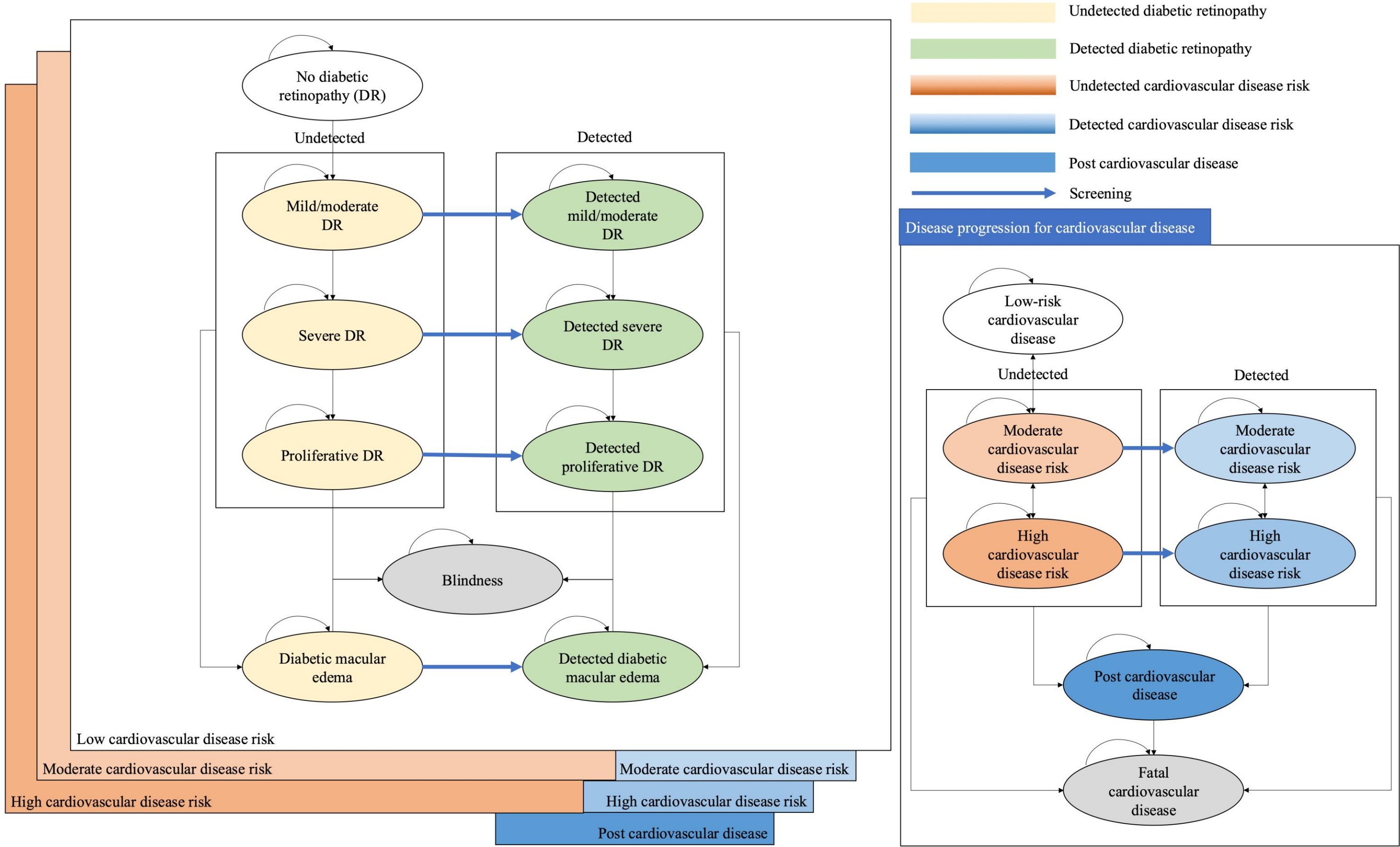
④ Results

- **Australia:** AI-based DR screening is cost-saving; combining with CVD screening at 80% coverage in all diabetic adults saves A\$1.45 billion and adds over 100,000 QALYs.
- **Singapore:** DR screening alone lacks cost-effectiveness, but combining with CVD screening achieves it, especially at 20–80% coverage levels.
- **United Kingdom:** DR screening alone is cost-saving; adding CVD screening enhances health benefits and remains cost-effective, except for those aged ≥75.

⑤ Conclusion

- AI-based CVD risk screening integrated with DR screening is cost-effective across all three countries.
- The degree of cost-effectiveness varies by national healthcare systems and implementation factors.

Figure 1. Flow chart of model structure



*All disease states (except for fatal cardiovascular disease) have the probability to transit to death state (background mortality).

Figure 2. Scenarios

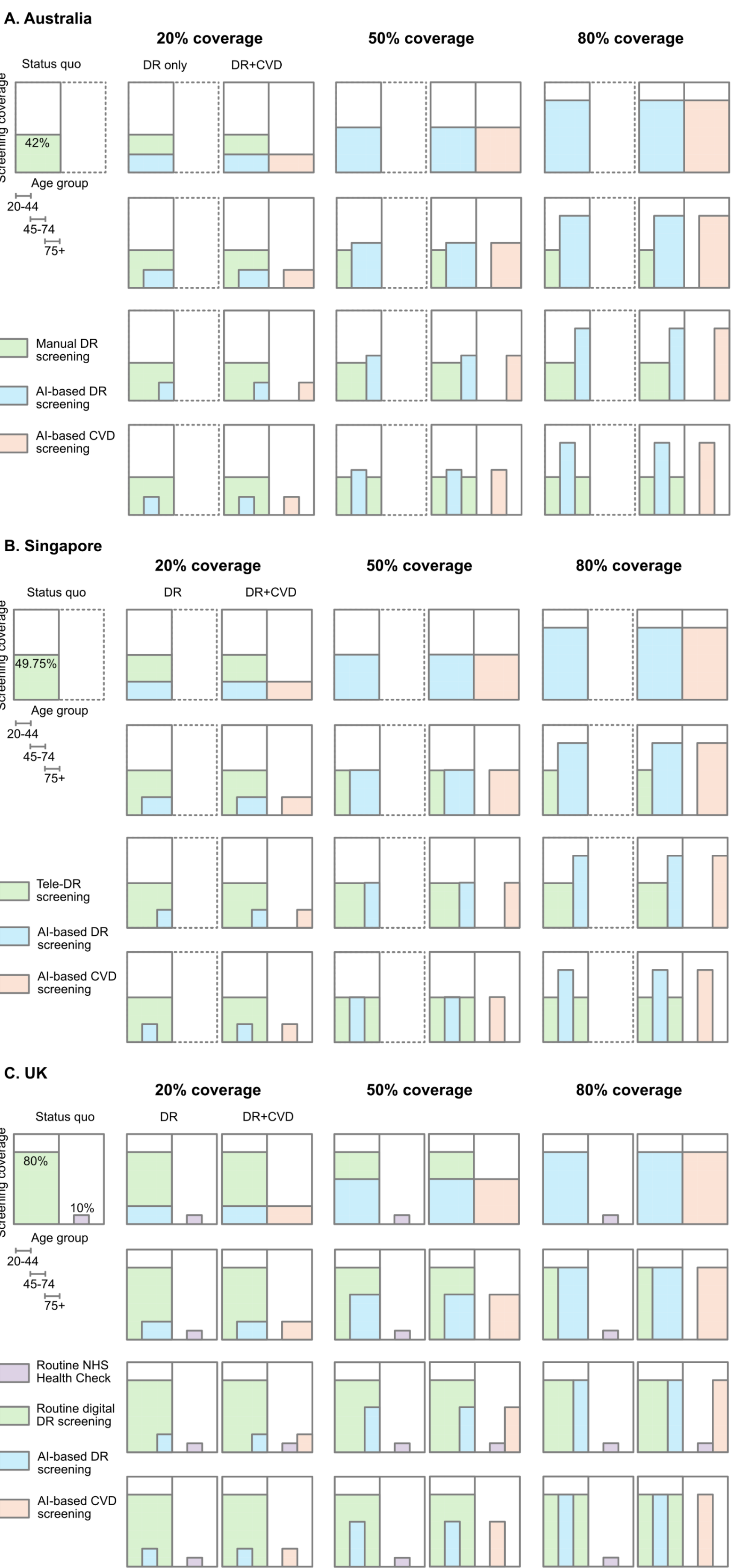


Figure 3. Cost-effectiveness plane

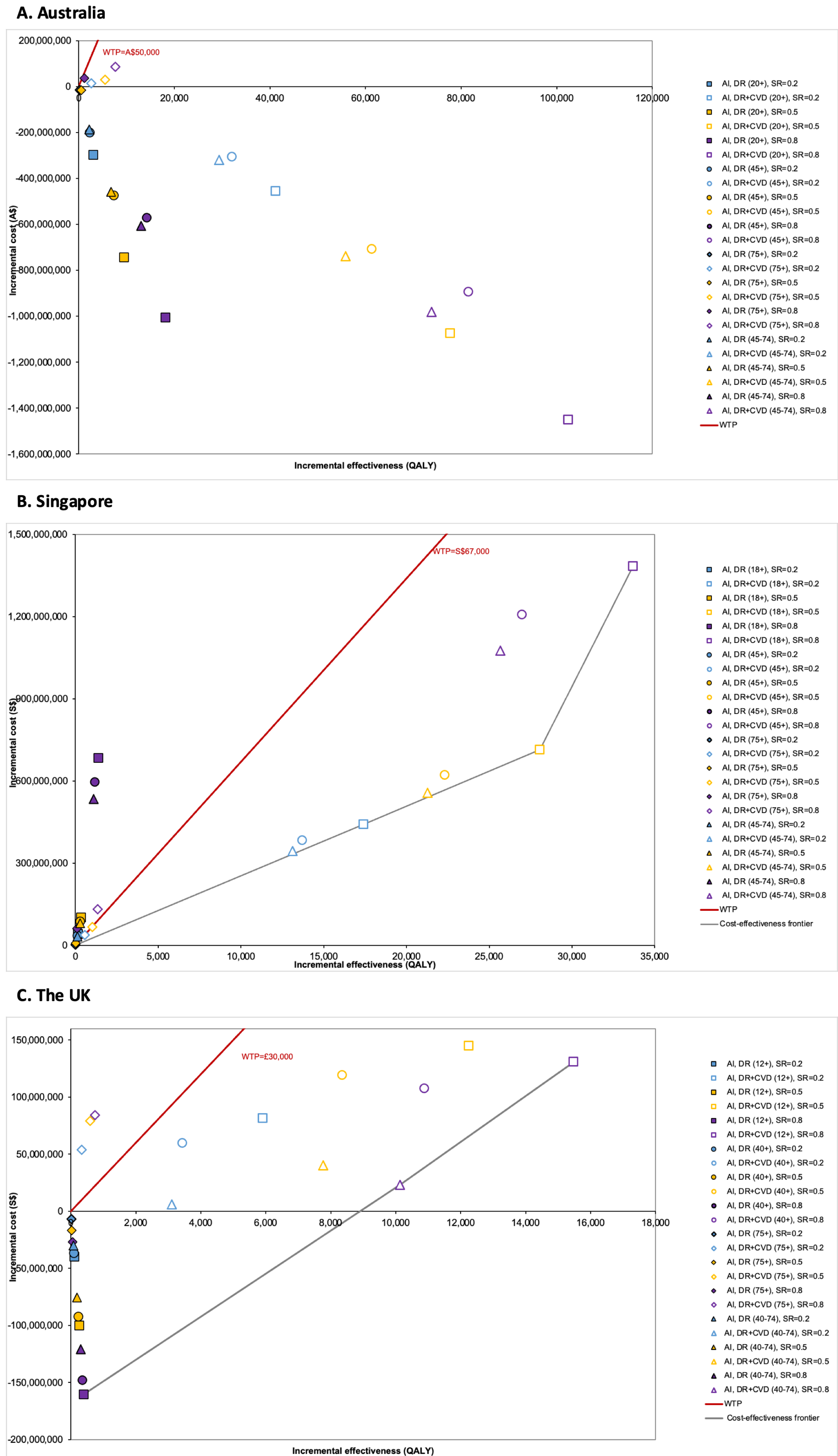
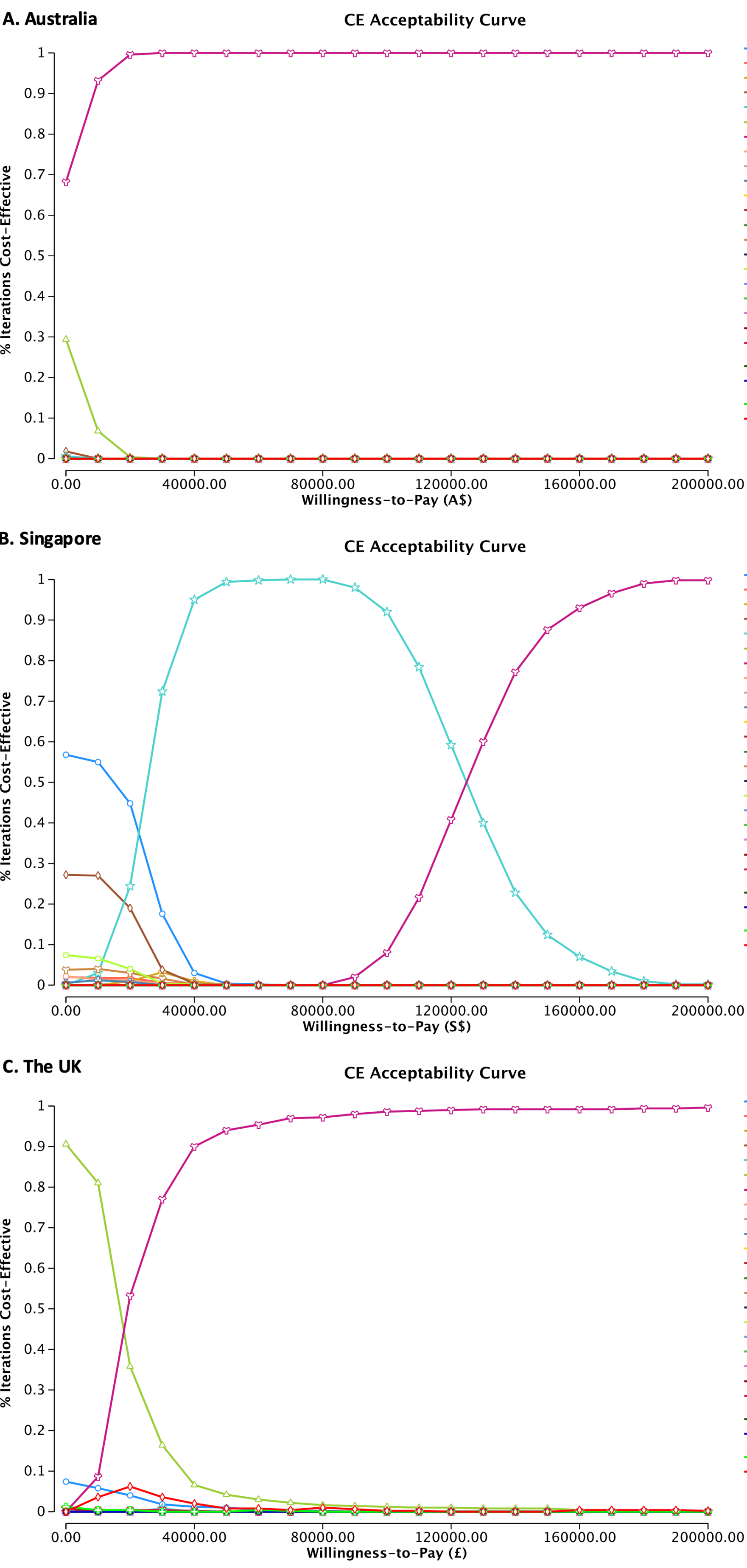


Figure 4. Probability Sensitivity Analysis



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