



ECONOMIC EVALUATIONS OF CHIMERIC ANTIGEN RECEPTOR T-CELL THERAPIES: A SYSTEMATIC REVIEW

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Background and Objective

- CAR-T therapy has significantly transformed haematological malignancy treatment. Despite growing cost-effectiveness analyses of CAR-T therapy, systematic reviews on it remain scarce.
- This study aims to synthesise the existing evidence, summarise methodological and outcome heterogeneity, and inform decision-making.

Methods

- Data were sourced from PubMed, Web of Science, Cochrane Library and the CNKI (January 1998 to April 2026), economic evaluations comparing costs and effects of CAR-T therapy in cancer were included.
- Two researchers independently extracted data, disputes are resolved by a third researcher.
- Quality assessment was performed using the Quality of Health Economic Studies (QHES) scale.
- Descriptive statistical analysis was conducted on the results.

Results

- I. A total of 38 studies were included, with the United States being the most frequently represented country (24 studies, 63.2%).

Records identified through English-language databases (n=342):
Web of science (n=178)
The Cochrane Library (n=40)
Pubmed (n=124)

Records identified through Chinese-language databases (n=14):
CNKI (n=14)
VIP (n=0)
Wanfang Data (n=0)

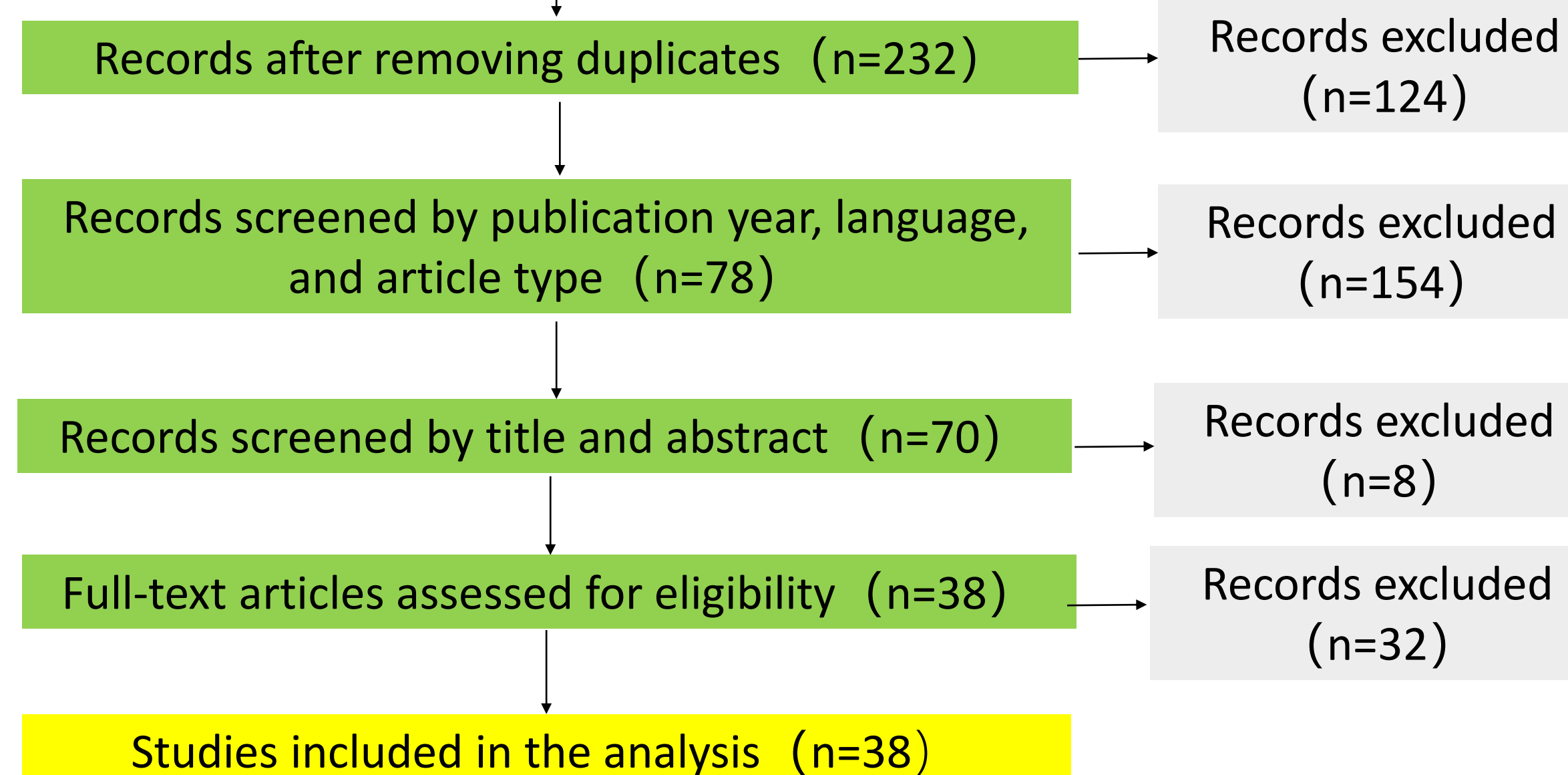
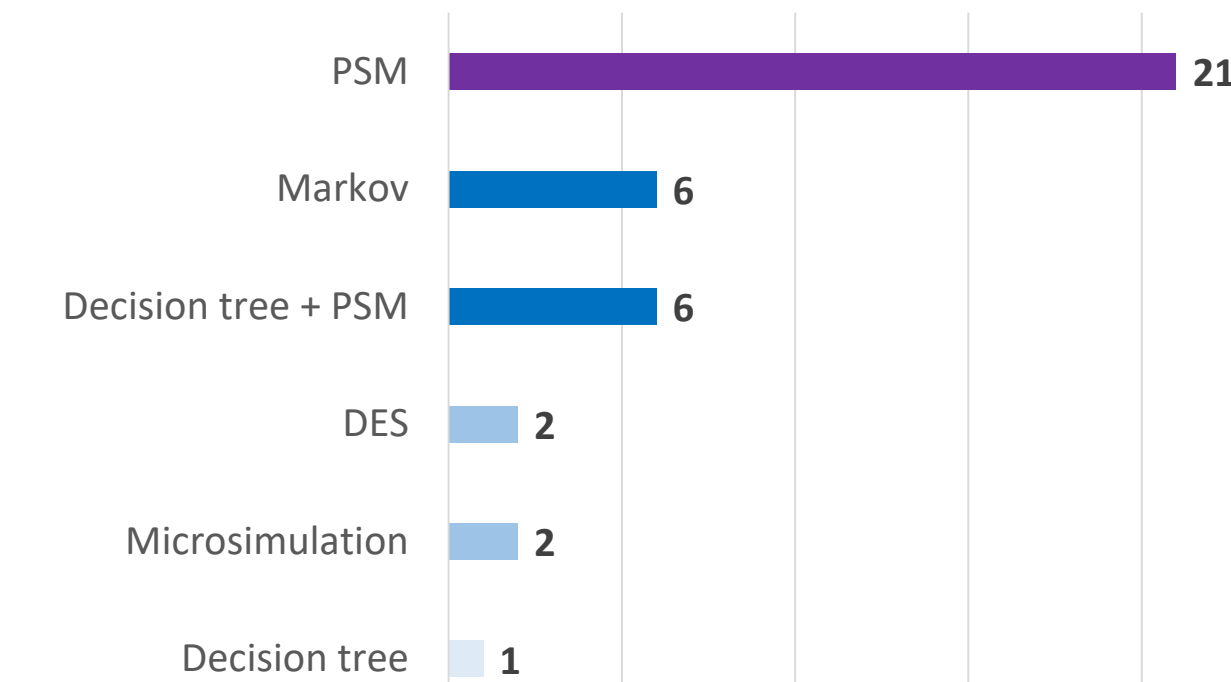


Figure 1 Literature Search Process and Results

Results

- II. Partitioned survival model (PSM) was the most commonly used modelling approach (21 studies), followed by Markov models (6 studies) and combined decision tree-PSM models (6 studies).
- III. Regarding study perspective, 22 studies adopted the payer perspective, 11 used the healthcare system perspective, 1 used the societal perspective, while 4 adopted multiple perspectives.



PSM, partitioned survival model; DES, discrete event simulation.

Figure 2 Modelling approaches used in included studies

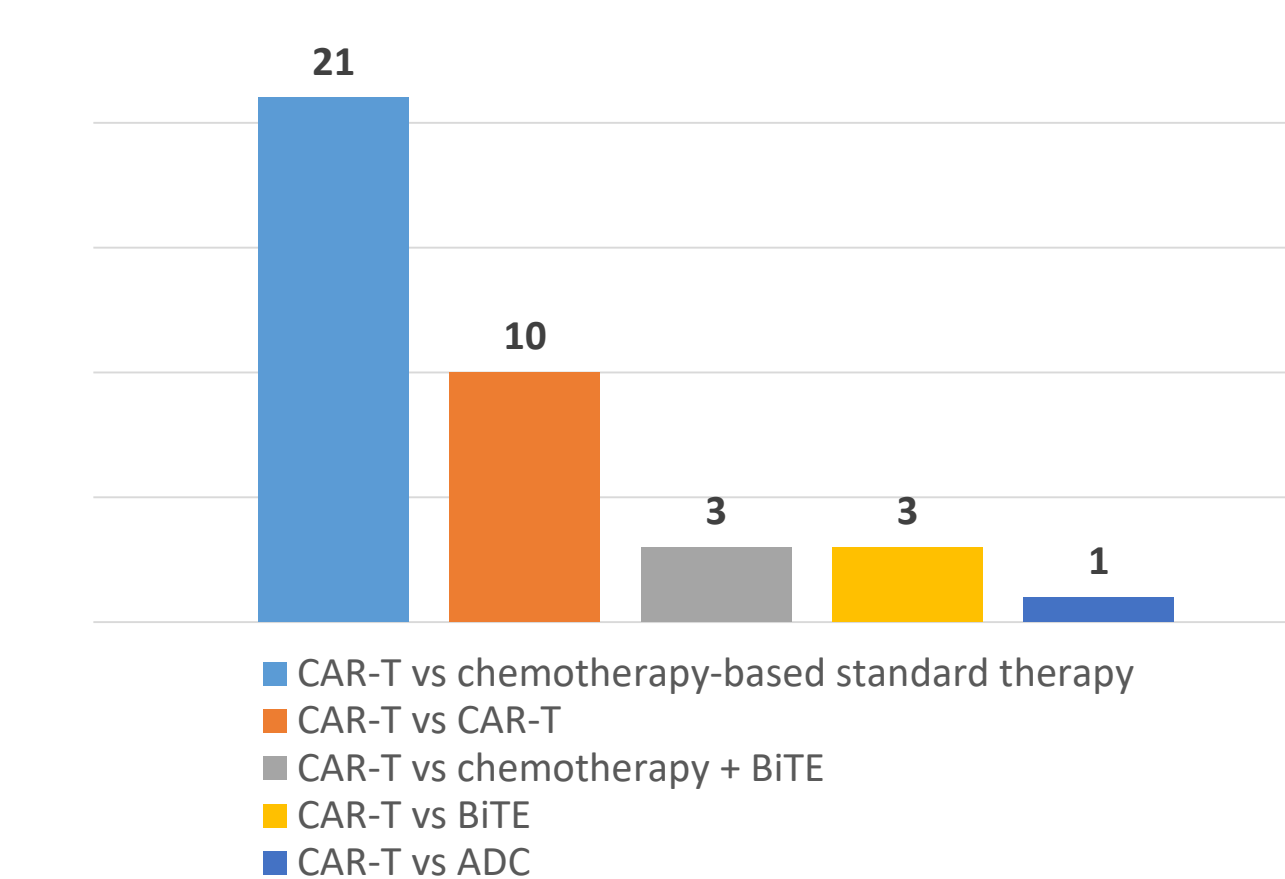


Figure 4 Intervention and Comparator Regimens

- IV. Chemotherapy-based standard therapy was the most common comparator (21 studies), followed by comparisons between CAR-T therapies (10 studies). A small number of studies used BiTEs, ADCs, or other therapies as comparators. The most frequently used comparator drugs were tisa-cel, blinatumomab, liso-cel, and axi-cel, among which tisa-cel, liso-cel, and axi-cel are CAR-T therapies.

- V. 79% (30 studies) used quality-adjusted life-years (QALYs) and life-years (LYs) as outcome measures, while 21% (8 studies) reported QALYs only.
- VI. Most incremental cost effectiveness ratio (ICER) ranged from \$10,000 to \$150,000 per quality-adjusted life-year (QALY). The willingness-to-pay (WTP) thresholds generally meet or exceed conventional upper limits across countries.

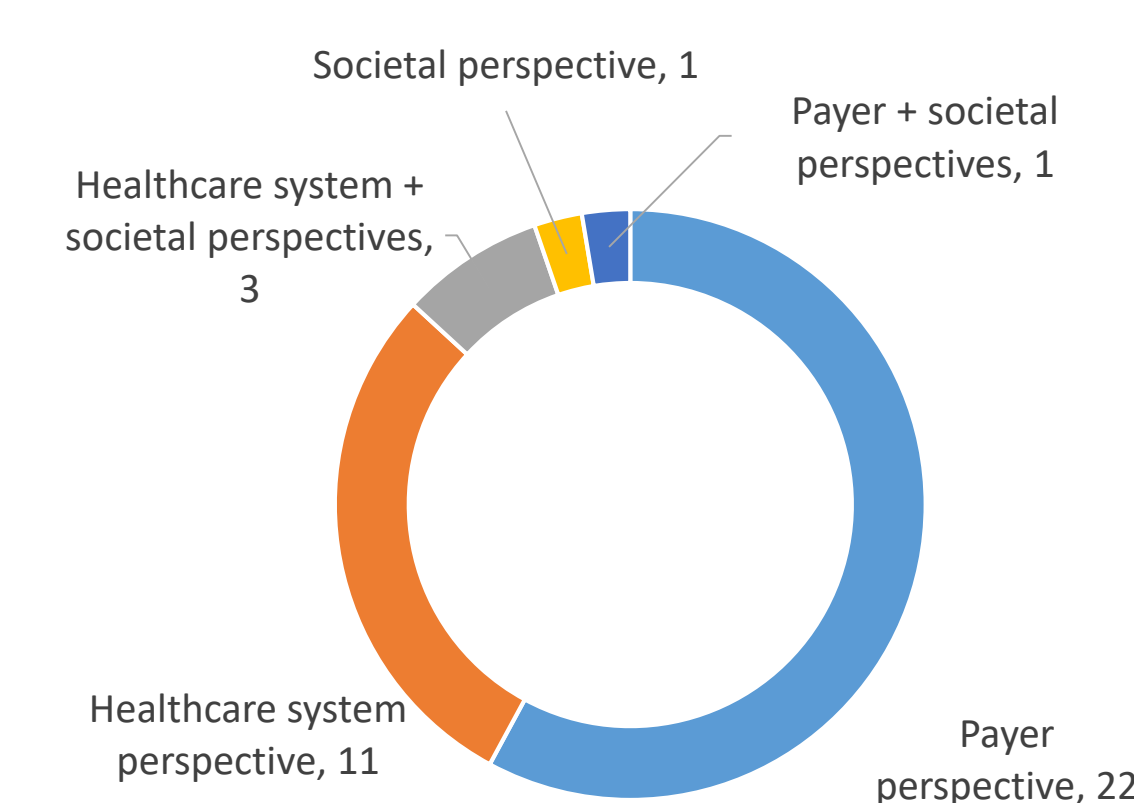


Figure 3 Perspectives adopted in economic evaluations

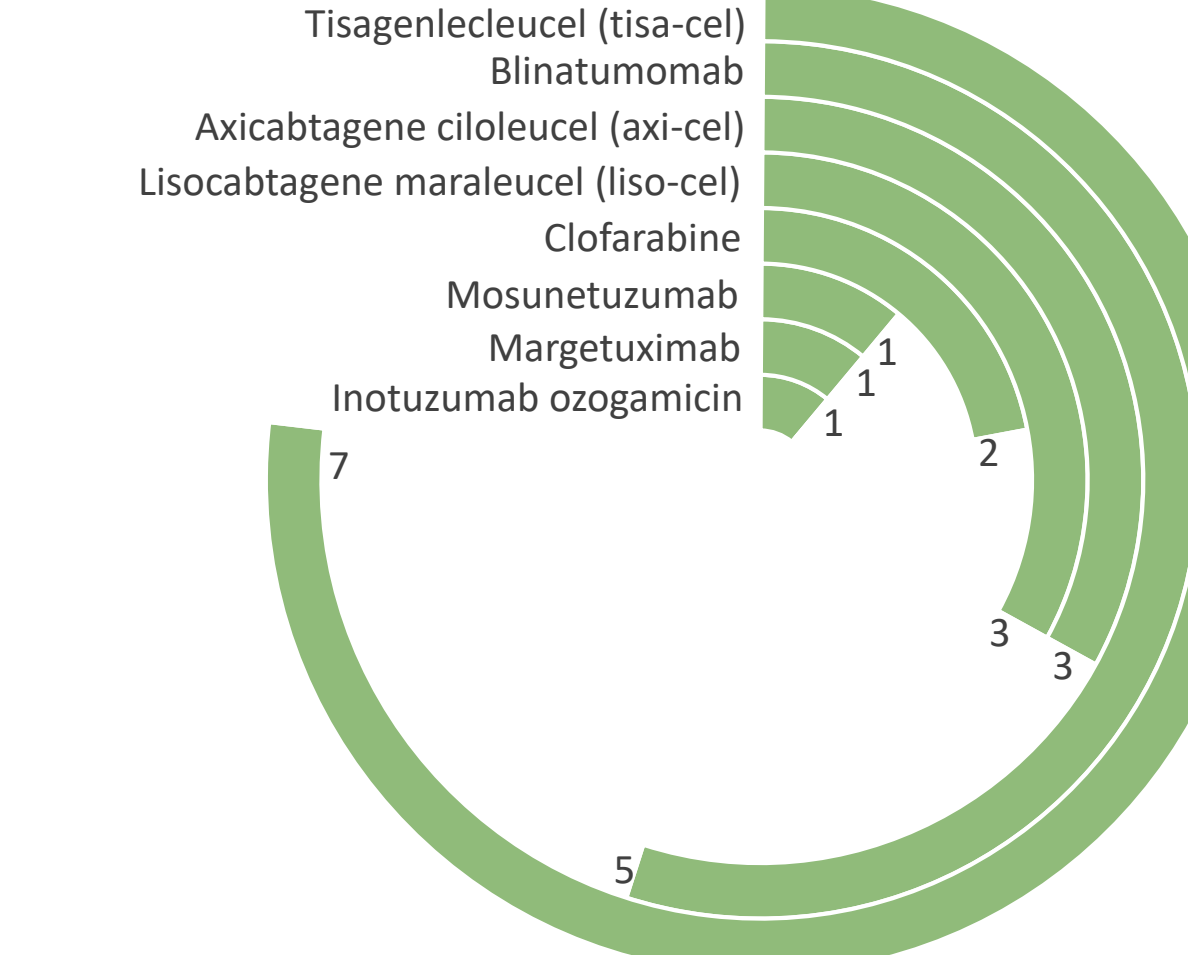


Figure 5 Comparator Drug

Results

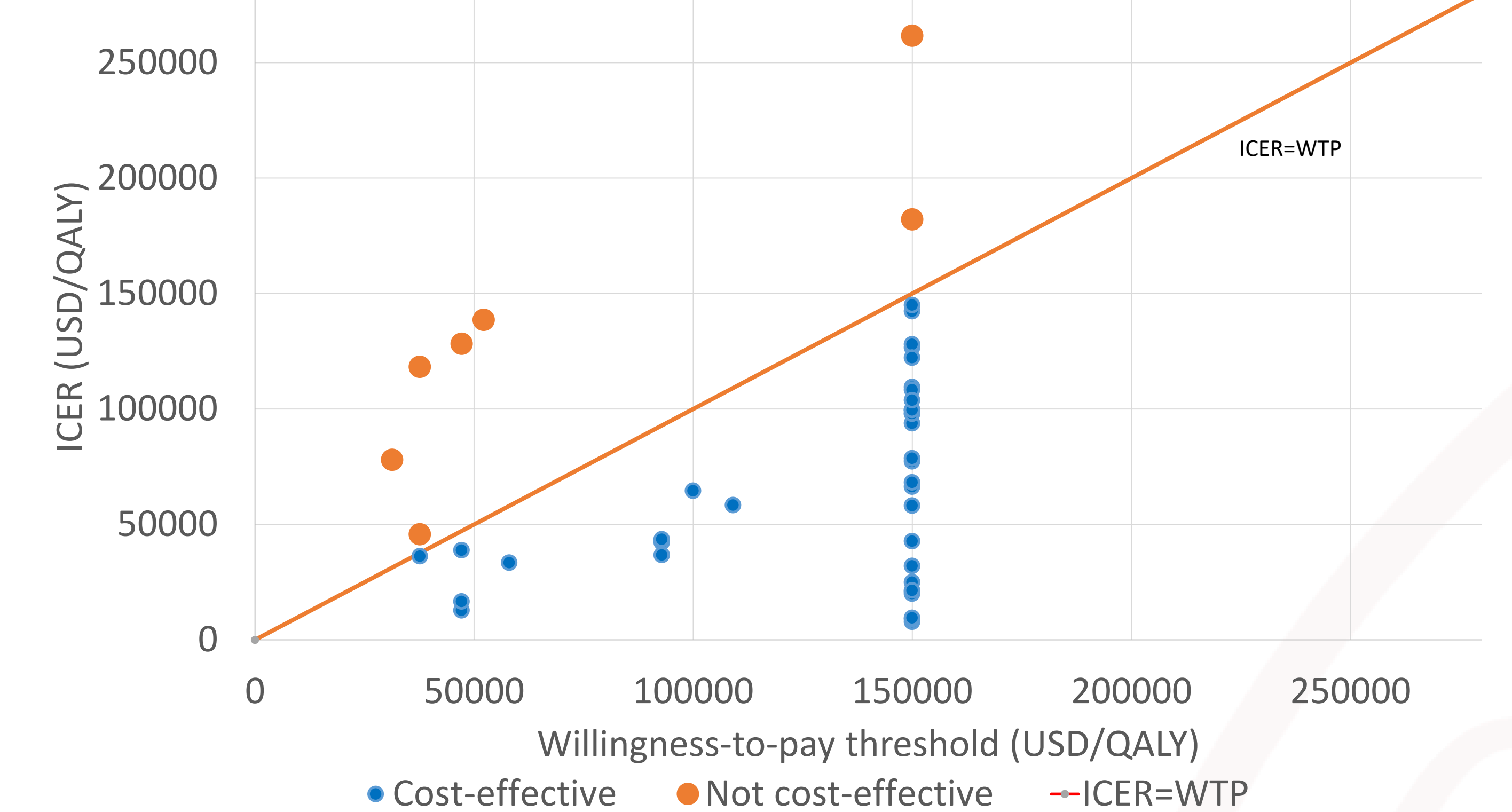


Figure 6 Incremental Cost-Effectiveness Ratios and Willingness-to-Pay Thresholds

- VII. The mean QHES score was 89.16 (range: 70–100), with 37 of 38 studies (97.4%) rated as high quality. Deductions were due to missing: perspective rationale, subgroup pre-specification, and bias discussion.

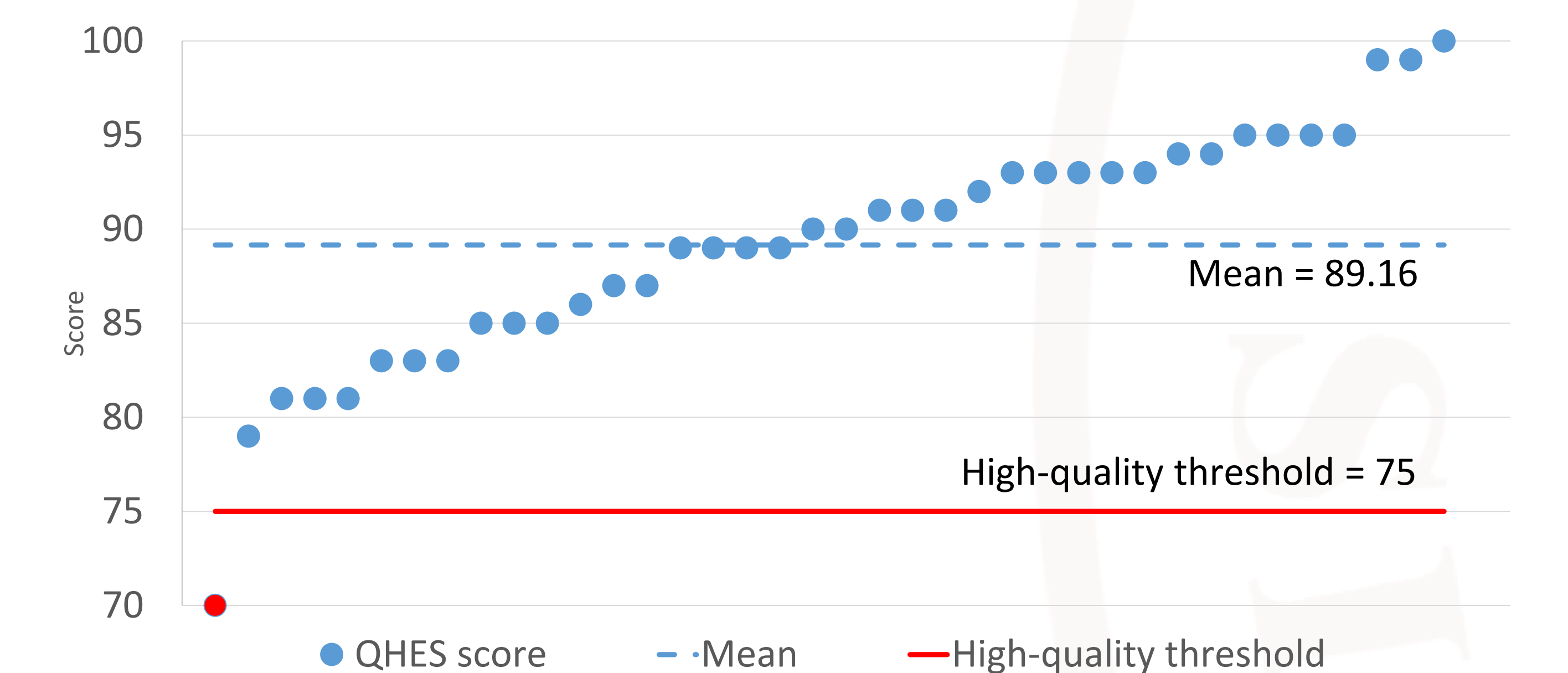


Figure 7 Quality assessment of included economic evaluations

Conclusion

Most existing evidence supports the cost-effectiveness of CAR-T therapy in haematological malignancies, with generally high methodological quality. However, substantial heterogeneity exists in evaluation perspectives, modelling approaches, and WTP thresholds, with payer and healthcare system perspectives predominating. Future research should incorporate broader societal perspectives and improve methodological consistency to enhance the comprehensiveness and comparability of economic evidence.