Axicabtagene Ciloleucel for Relapsed/Refractory Diffuse Large B-Cell Lymphoma in the Irish Healthcare Setting: Cost-Utility and Value of Information Analysis (EE569)

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Introduction

Aim of study:

- To evaluate the cost effectiveness of axicabtagene ciloleucel (axi-cel) for the treatment of relapsed/refractory diffuse large B-cell lymphoma (R/R DLBCL) in the Irish healthcare setting.
- To assess the value of conducting further research to address uncertainties in the model, using expected value of perfect information (EVPI) and partial EVPI (EVPPI) analyses.

Methods

Cost-Effectiveness Analysis

Element of Analysis	Reference Case
Study Population	Adult patients with R/R DLBCL (ZUMA-1 trial)
Comparator	Salvage chemotherapy (±HSCT) (CORAL extension study)
Model Structure	Short-term decision tree (axi-cel only) Long-term, three-state partitioned survival model (all arms; one-month cycles)
Perspective	Health Service Executive, Ireland (payer)
Time Horizon	Lifetime (44 years)
Discount Rate	4% on costs and outcomes
Outcome Measurement	Quality-adjusted life year (QALY)
Extrapolation Method	Cubic spline models
Evidence Synthesis	Naïve comparison
Sensitivity Analysis	Probabilistic and deterministic

Value of Information Analysis

EVPI and EVPPI were calculated on 5,000 iterations of the probabilistic sensitivity analysis, over a range of willingness-to-pay thresholds. Estimates were scaled to population, based on the incidence of the decision (36 patients/year). The time horizon was 10 years.

EVPPI was estimated using the Gaussian process regression approach, for the following parameter categories: survival analysis, utility values, hospitalisation and monitoring costs, adverse event costs, stem cell transplant (HSCT) costs.

Results

Cost-Effectiveness Analysis

ICER: €78,634 per QALY
(incremental costs €288,825; incremental QALYs 3.67).

0% probability of cost effectiveness at payer threshold (€45,000 per QALY).

44% price decrease ("cost-effective price") to reduce ICER to payer threshold. Here, the probability of cost effectiveness was 52%.

Results

Value of Information Analysis

List Price

EVPI: €0

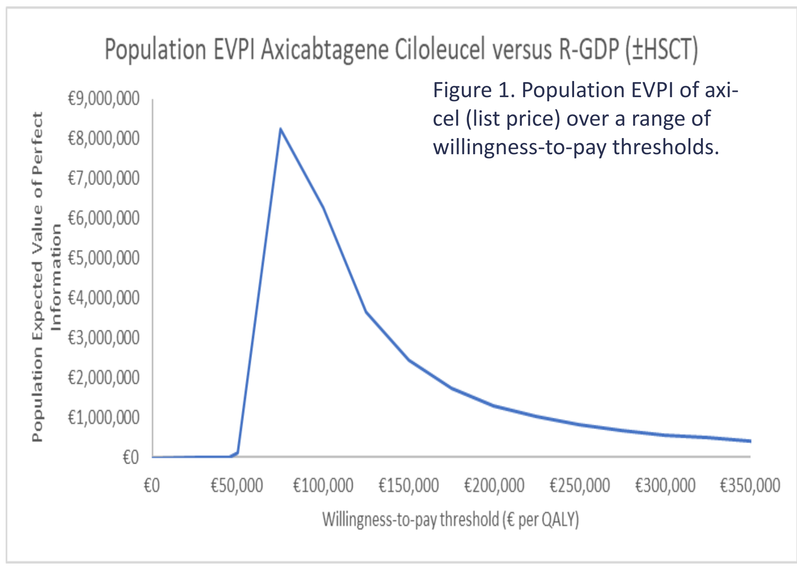

Figure 1. Population EVPI of axi-cel (list price) over a range of willingness-to-pay thresholds.

"Cost-Effective" Price

EVPI: €6,137,514

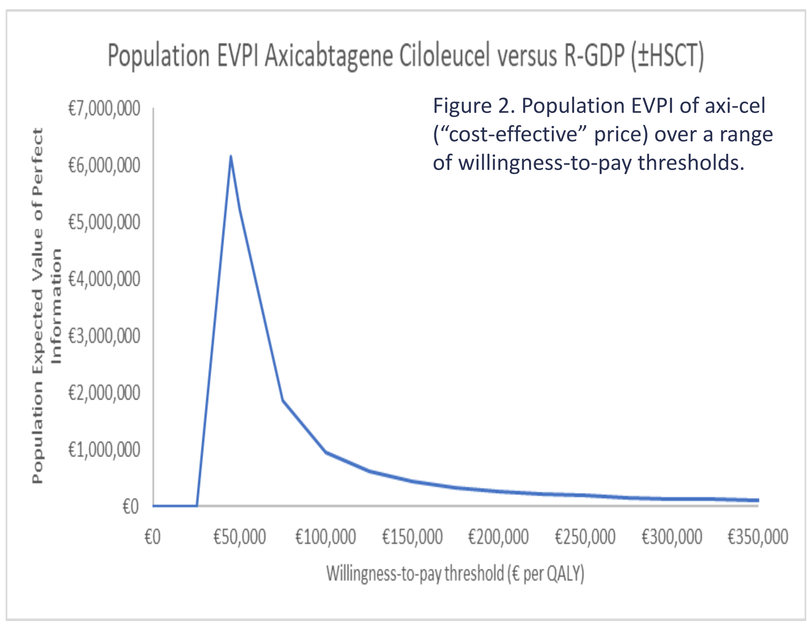

Figure 2. Population EVPI of axi-cel ("cost-effective" price) over a range of willingness-to-pay thresholds.

Highest EVPPI: Utility Values €1,712,845

EVPPI of other parameter categories:
Survival analysis: €1,413,136
Hospitalisation and monitoring: €1,122,766
HSCT costs: €1,028,822
Adverse event costs: €125,319

Key Limitations

Naïve comparison is subject to considerable uncertainty. Structural uncertainty associated with naïve comparison is not investigated in probabilistic and EVPI analyses. Thus, uncertainty is unlikely to be adequately captured.

Due to lack of data, assumptions were required regarding key parameters of the model (e.g. long-term survival). This increases uncertainty in the model.

Conclusion

At list price, axi-cel is not cost effective versus salvage chemotherapy (±HSCT) at the Irish payer threshold. However, the model was highly uncertain.

At the "cost-effective price", further research to decrease decision uncertainty may be of value. Further research should focus on decreasing uncertainty in utility values.

EVPPI can be used to inform conditions of performance-based risk-sharing agreements to address uncertainty and mitigate against the financial risk associated with reimbursement.

References available upon request (nicarey@tcd.ie)