Cost-Effectiveness Analysis of Adjuvant Pembrolizumab Versus Standard-of-Care (SOC) Immunotherapies (High-dose interferon alfa 2-b or ipilimumab) in High-Risk Resected Melanoma in United States (US)

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Introduction

- The phase III S1404 trial comparing adjuvant pembrolizumab with Standard of care (SOC) immunotherapies in high-risk resected melanoma patients showed improvement in median recurrence-free survival (RFS) for approximately 6 months but no difference in median overall survival (OS).
- A cost-effectiveness analysis (CEA) was conducted to assess the economic and clinical value of pembrolizumab versus SOC.

Methods

- The study used S1404 trial data[1] using a partitioned-survival model (PSM) to simulate three health states: recurrence-free survival (RFS), recurrence, and death.
- Key inputs included digitized survival curves for RFS and OS, drug and infusion costs, adverse event costs, hazard ratios, and discount rates.
- Cost and utility inputs were derived from clinical trial, published literature, and CMS databases. Exploratory analysis was conducted using the INES tool, while final analyses used R and TreeAge Software[2].
- Individual patient-level data were generated in R using IPDfromKM package, and log-normal was the best-fitting distribution for RFS and OS.
- Base case analysis (BCA) estimated incremental costs, and quality-adjusted life years (QALYs).
- Deterministic and probabilistic sensitivity analysis (PSA, 1,000 iterations) assessed model uncertainty using TreeAge software.

Results

Table 1: Base Case Analysis

Category	Dominance	Strategy	Cost	Incremental Cost	Effectiveness	Incremental Effectiveness	ICER
All (no dominance)	undominated	SOC	1360124.99		3.41		
All (no dominance)	undominated	Pembrolizumab	1397712.14	37587.15	4.02	0.61	61,817

Figure 1: Tornado Diagram presenting results of the Deterministic Sensitivity Analysis

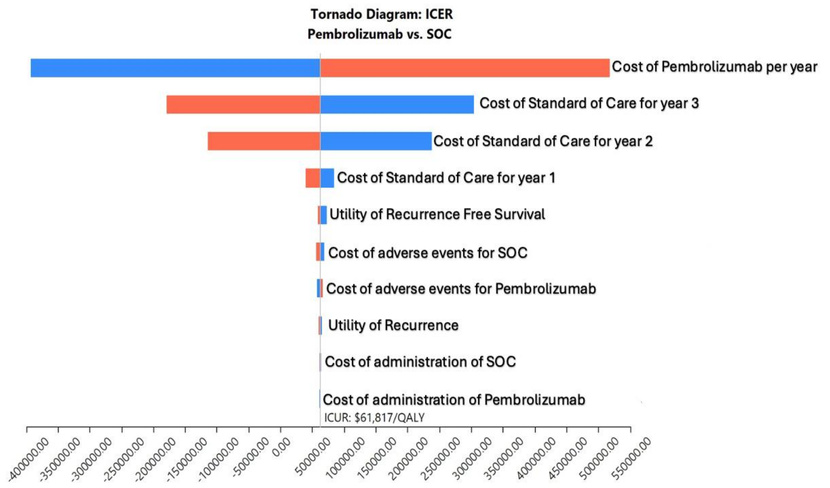


Figure 2: Cost-Effectiveness Acceptability Curve (CEAC) presenting results of the Probabilistic Sensitivity Analysis

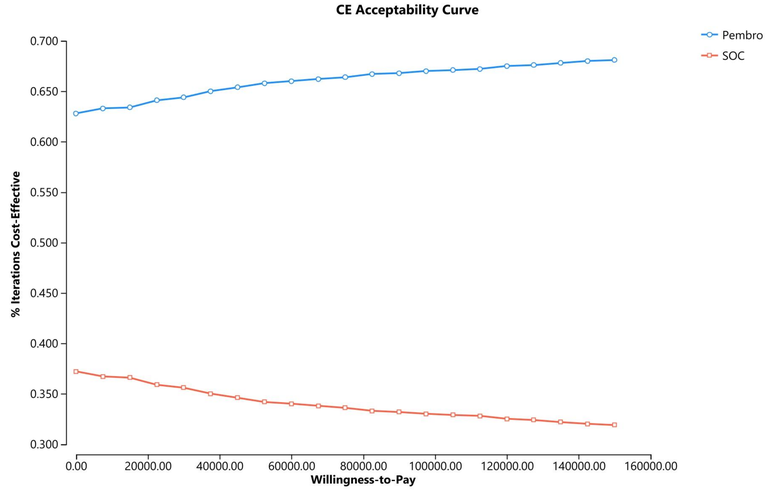
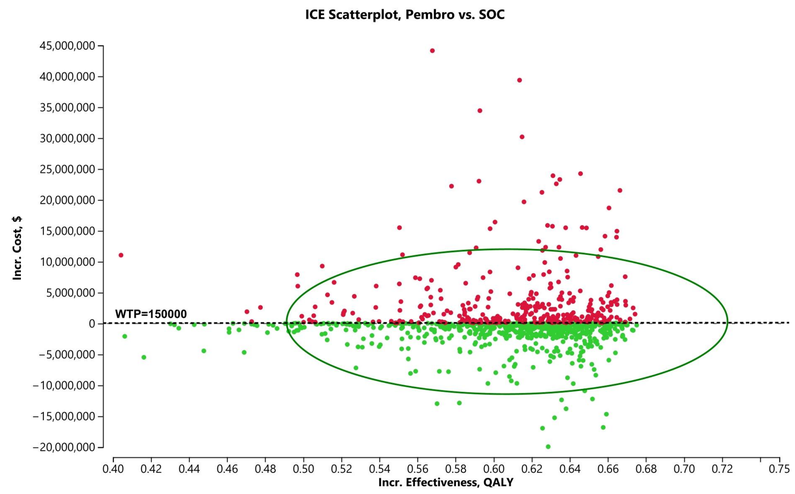


Figure 3: Incremental Cost Effectiveness Scatterplot



Conclusion

In this study, Pembrolizumab proved to be more cost effective than Standard of care at a willingness to pay threshold of $150,000.

Limitations

The standard of care (SOC) arm included two drugs — high-dose interferon and ipilimumab — which may significantly drive up the overall cost of SOC treatment.

Costs were based on any-grade events from prior studies, which may not reflect the S1404 population or real-world settings.

References

1. Grossmann, Kenneth F., Megan Othus, Sapna P. Patel, Ahmad A. Tarhini, Vernon K. Sondak, Michael V. Knopp, Teresa M. Petrella et al. "Adjuvant pembrolizumab versus IFNα2b or ipilimumab in resected high-risk melanoma." Cancer discovery 12, no. 3 (2022): 644-653.

TreeAge Pro 2021, R1. TreeAge Software, Williamstown, MA; software available at http://www.treeage.com.

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