Budget Impact and Cost-Utility Analysis of Nivolumab Plus Ipilimumab in First-Line Treatment of Advanced Renal Cell Cancer in Costa Rica

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INTRODUCTION

Immunotherapy (IO) has significantly improved survival rates and quality of life versus Sunitinib for the treatment of advanced-stage renal cell cancer (aRCC). Nivolumab plus Ipilimumab represents the first and only IO combination demonstrating sustained clinical benefits in first-line treatment.

OBJECTIVE

Estimate the economic impact of incorporating Nivolumab plus Ipilimumab into the list of reimbursed medications for treating intermediate and poor-risk aRCC by Costa Rica's social security system.

METHOD

The budget impact model (BIM) includes a 5-year time horizon, incorporating progressive market share rates for intermediate and poor-risk groups with aRCC. This model provides a comprehensive financial assessment over time.

The study includes a cost-utility analysis comparing two treatment regimens for aRCC: Nivolumab plus Ipilimumab versus Pembrolizumab plus Axitinib. The analysis uses a 3-state Markov model and incorporates both deterministic and probabilistic sensitivity analyses. Clinical trials supply the effectiveness data, while published literature provides utility values. The analysis focuses on the local costs of the medications, ensuring relevance to the specific healthcare context.

RESULTS

For an estimated 275 first-line IO candidates in the BIM, including Nivolumab plus Ipilimumab would cost USD 26.3 million, ***saving USD 9.7 million*** compared to the current scenario *(Figures 1, 2).*

The cost-utility analysis "base case" showed that ***Pembrolizumab plus Axitinib*** and ***Nivolumab plus Ipilimumab*** increase quality-adjusted life-years (QALYs) by ***3.4*** and ***4.06***, respectively, with average treatment costs of ***USD 231,226*** and ***USD 149,429***. The ICER favored Nivolumab plus Ipilimumab ***(-129,935 USD/QALY)*** *(Figure 3).*

Pembrolizumab + Axitinib shows a faster decline in survival rate in the initial years. This trend continues, with Nivolumab + Ipilimumab maintaining a survival advantage in later years *(Figure 4).*

The deterministic sensitivity analysis showed that the ***"Nivolumab plus Ipilimumab response rate" parameter has the greatest variability.*** The probabilistic sensitivity analysis indicated a ***0.98*** probability of ***Nivolumab plus Ipilimumab being cost-effective***, with a willingness-to-pay threshold of *1 GDP (13,365.36 USD)* per capita. ***Higher QALYs and lower costs suggest that Nivolumab plus Ipilimumab dominates Pembrolizumab plus Axitinib*** *(Figures 5,6).*

Figure 1. Budget Impact according to therapies

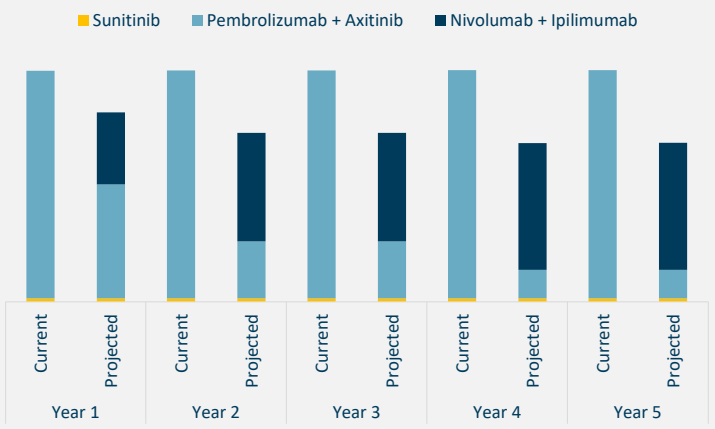


Figure 2. Total 5-year Budget Impact

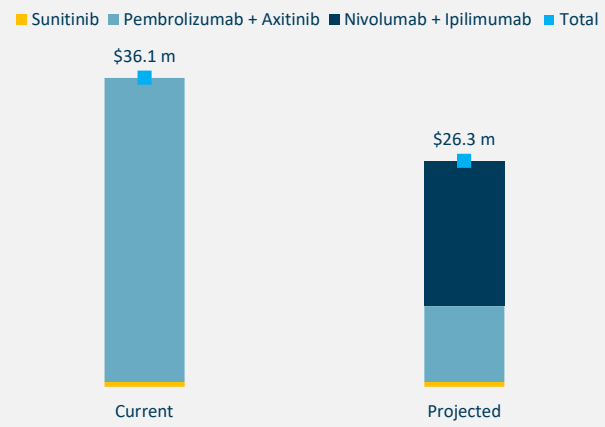


Figure 3. Base Case Cost-Utility Analysis

	Cost USD	Relapse (%)	LYs	QALYs
Pembro + Axi [1]	231,226	21.45%	4.319	3.43
Nivo + Ipi [2]	149,429	18.62%	4.854	4.06
Difference	***-81,798***	***0.028***	***0.54***	***0.63***

ICER			
Alternative 2 vs. 1	***-2,885,034***	***-152,817.8***	***-129,935***
1. Pembrolizumab + Axitinib (Alternative 1) *2. Nivolumab + Ipilimumab (Alternative 2)*	USD/Relapse Avoided	USD/LY	USD/QALY

Figure 4. 15-year Survival Curve

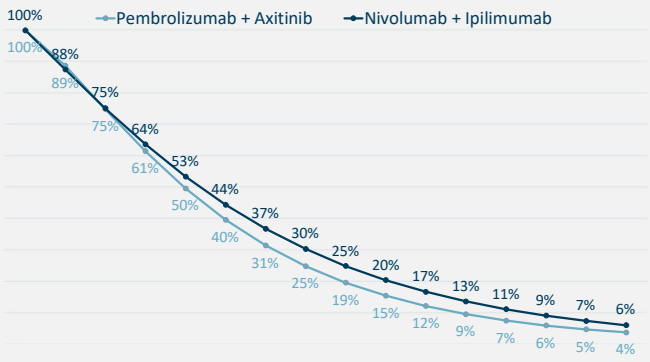


Figure 5. Deterministic Sensitivity Analysis

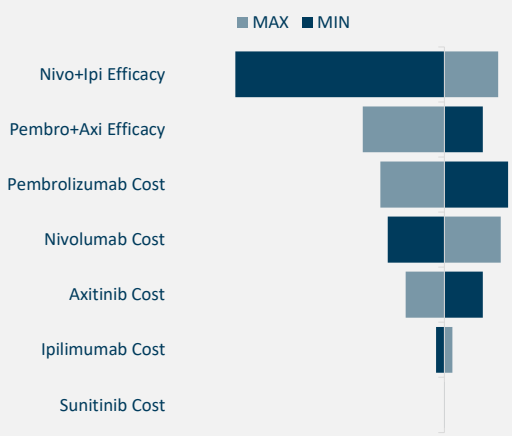
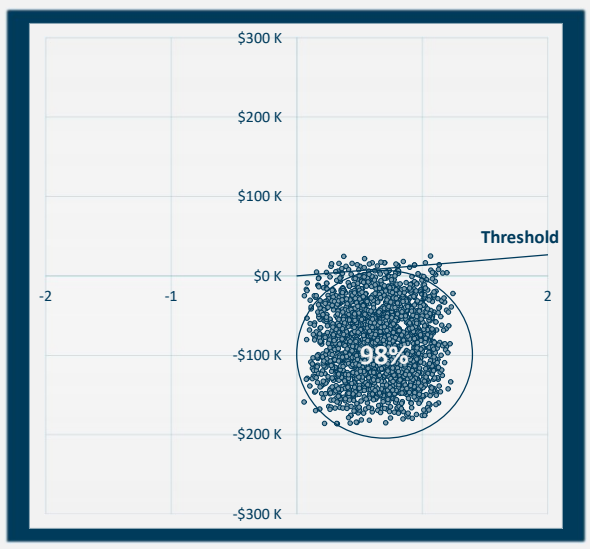


Figure 6. Probabilistic Sensitivity Analysis



CONCLUSION

Nivolumab plus Ipilimumab is a cost-saving option for first-line treatment of advanced renal cell carcinoma (aRCC) and a cost-effective regimen for patients with intermediate and poor-risk aRCC within Costa Rica's social security system.

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