

Cost-effectiveness of neoadjuvant pembrolizumab plus chemotherapy followed by adjuvant pembrolizumab for high-risk, early-stage triple-negative breast cancer in Costa Rica

Ana Marisol Rendón¹; Roger Córdoba¹; Rita Rubino¹; Victoria Wurcel²; Marcela Junqueira³; Amin Haiderali⁴; Min Huang⁴; Anvi Khandelwal⁵; Srushti Gotarkar⁵

¹MSD Panamá, Panamá City, Panamá; ²MSD Argentina, Buenos Aires, Argentina; ³MSD Brazil, São Paulo, Brazil; ⁴Merck & Co., Inc., Rahway, NJ, USA; ⁵CHEORS, North Wales, PA, USA

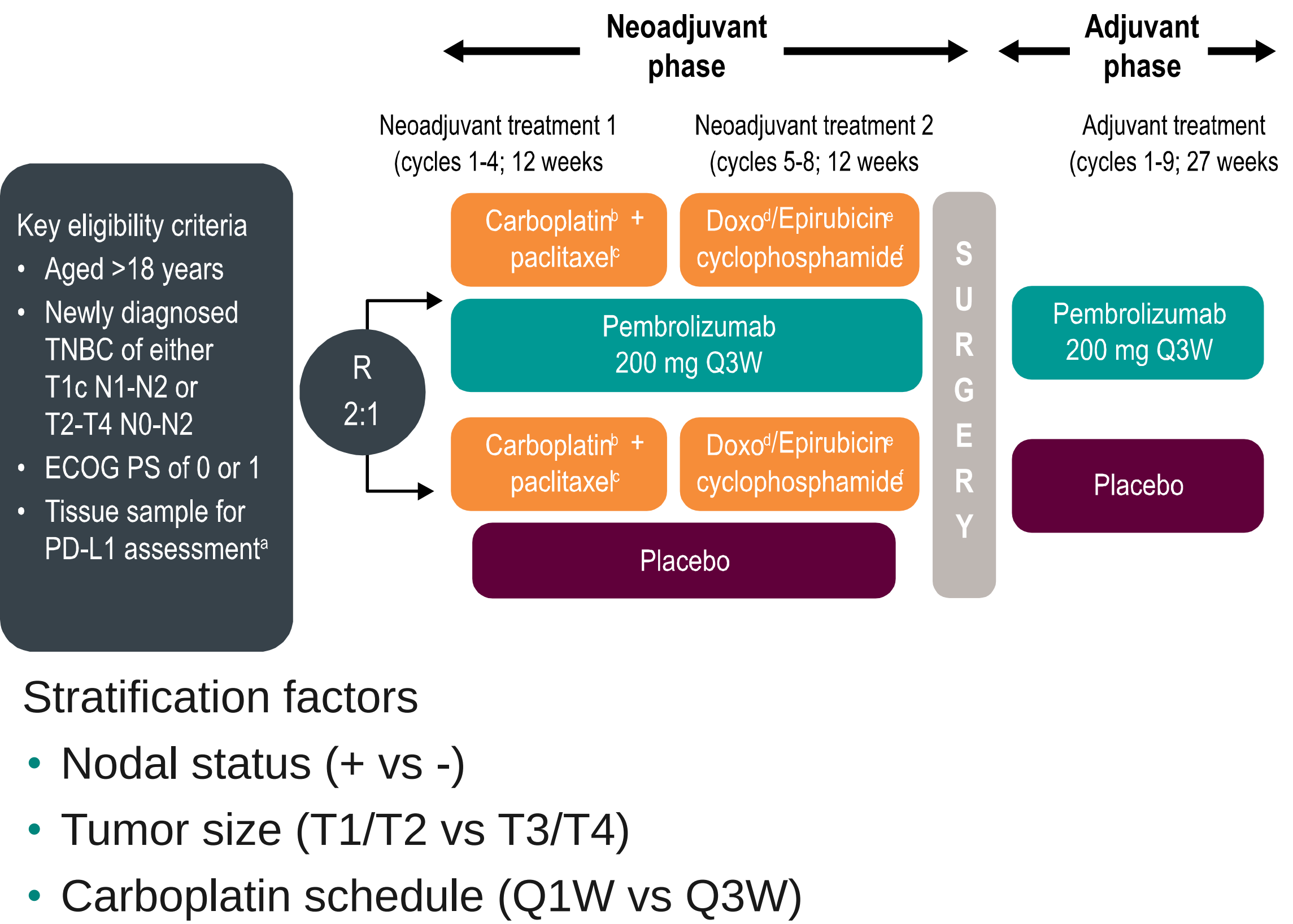
Introduction

- Breast cancer (BC) is the most diagnosed malignancy and the second leading cause of cancer death in women worldwide. Triple-negative breast cancer (TNBC), which is phenotypically defined by lack of estrogen receptor (ER) and progesterone receptor expression, and the absence of human epidermal growth factor receptor-2 (HER2) overexpression and/or amplification, accounts for approximately 15%-20% of all breast cancers. TNBC is associated with younger age and more advanced tumor stage at diagnosis and is also associated with a higher risk of disease recurrence and higher recurrence in visceral organs within 5 years of diagnosis^{1,3}
- According to GLOBOCAN, there were 1,624 new cases of BC and 433 BC-related deaths among Costa Rican women in 2020⁴
- The KEYNOTE-522 trial demonstrated that addition of pembrolizumab to neoadjuvant chemotherapy followed by adjuvant pembrolizumab provided a statistically significant and clinically meaningful improvement in event-free survival and a favorable trend in overall survival for high-risk, early-stage triple-negative breast cancer⁵

Objective

- To evaluate the cost-effectiveness of neoadjuvant pembrolizumab + chemotherapy followed by adjuvant pembrolizumab after surgery in patients with high-risk, early-stage triple-negative breast cancer in Costa Rica. The comparator was neoadjuvant chemotherapy alone, which was the control arm of the KEYNOTE-522 trial (Figure 1)

Figure 1. KEYNOTE-522 study design



ECOG, Eastern Cooperative Oncology Group; PD-L1, programmed cell death-ligand 1; PS, performance status; Q1W, once weekly; Q3W, every 3 weeks; R, randomized; TNBC, triple-negative breast cancer.

^aMust consist of ≥2 separate tumor cores from primary tumor.

^bCarboplatin dose was AUC 5 Q3W or AUC 1.5 Q1W.

^cPaclitaxel dose was 80 mg/m² Q1W.

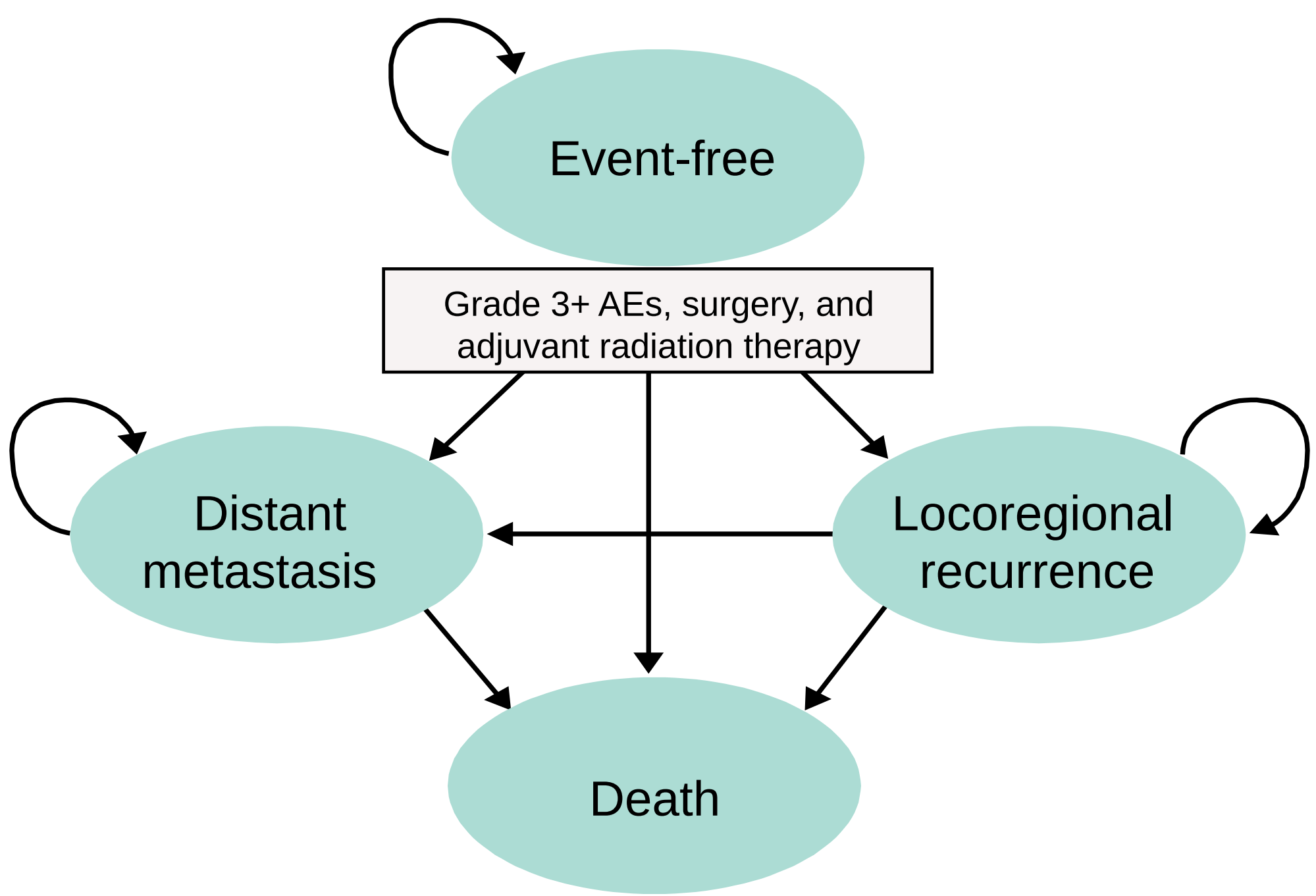
^dDoxorubicin dose was 60 mg/m² Q3W.

^eEpirubicin dose was 90 mg/m² Q3W.

^fCyclophosphamide dose was 600 mg/m² Q3W.

Methods

- A multistate transition model was developed using efficacy and safety data from KEYNOTE-522 trial considering Costa Rica third-party payer perspective. The model included 4 mutually exclusive health states: event-free, locoregional recurrence, distant metastasis, and death
- Quality-adjusted life-years (QALY) were calculated based on EuroQoL-5 Dimensions utility data collected in KEYNOTE-522. Direct costs for drug acquisition, administration, adverse events, disease management, and subsequent therapies were reported in local currency (CRC 645.4 = \$1.00 USD in September 2022). Sensitivity and scenario analyses were performed to test the robustness of the base-case results



Target population: Adult patients with high-risk early-stage TNBC

Perspective: Costa Rica third-party payer perspective

Time horizon: 49 years

Discount rate: 3% annual discount rate for both costs and outcomes

Willingness-to-pay threshold: USD \$37,416 (3 times GDP per capita in 2022)⁶

Results

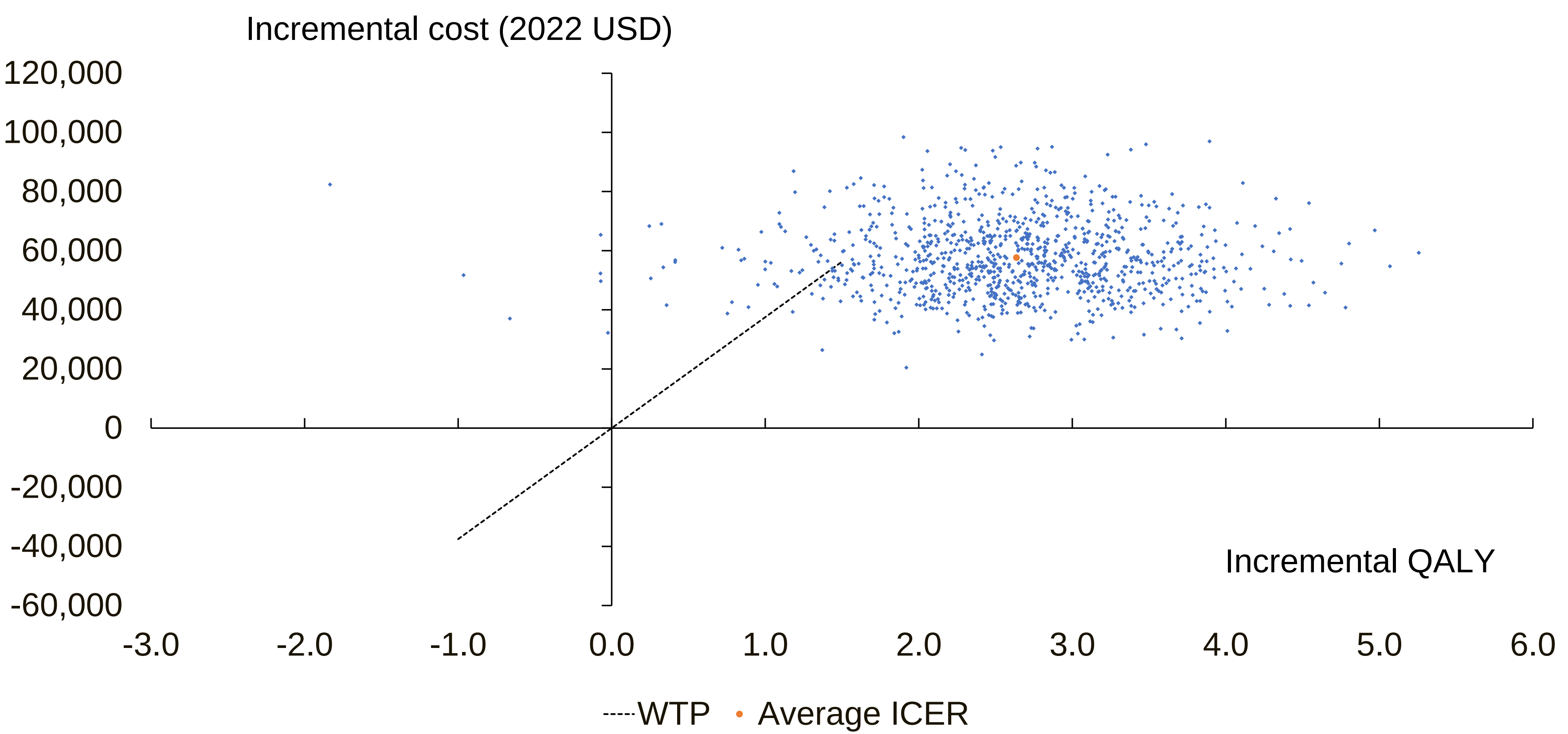
Base-case

Over a lifetime horizon, total costs were USD \$80,968 for pembrolizumab + chemotherapy and USD \$22,940 for chemotherapy. Total QALYs were estimated at 14.04 for pembrolizumab + chemotherapy and 11.28 for chemotherapy. Total L-Ys were estimated as 18.06 and 14.51 for the pembrolizumab + chemotherapy vs chemotherapy arm, respectively. The ICER for pembrolizumab + chemotherapy compared to chemotherapy was USD \$21,100 per QALY gained and USD \$16,347 per L-Y gained. (Table 1)

Table 1. Results

Interventions	Total cost US \$	Total QALYs	Total L-Ys	ΔCosts	ΔQALYs	ΔL-Ys	ICER vs comparator* (US \$/QALY)	ICER vs comparator (US \$/L-Y)
Pembrolizumab	\$80,968	14.04	18.06	–	–	–	–	–
+ Chemotherapy								
Chemotherapy	\$22,940	11.28	14.51	58,028	2.76	3.55	\$21,100	\$16,347

Figure 2. Cost-effectiveness plane: Pembrolizumab + chemotherapy vs chemotherapy



Conclusion

- Pembrolizumab in combination with chemotherapy is projected to be cost-effective compared to chemotherapy, at a WTP threshold of USD \$37,416 (3 GDP) per QALY for high-risk, early-stage TNBC in Costa Rica

References

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