

# Cost-Utility Analysis of Nivolumab Monotherapy for Metastatic Melanoma Treatment

PCN171

Echave M<sup>1</sup>, Oyagüez I<sup>1</sup>, Soria Rivas A<sup>2</sup>, de la Cruz-Merino L<sup>3</sup>, Arance A<sup>4</sup>, Carrasco M<sup>5</sup>, González P<sup>5</sup>

<sup>1</sup>Pharmacoeconomics & Outcomes Research Iberia, Madrid, Spain; <sup>2</sup>Hospital Universitario Ramón y Cajal, Oncology department, Madrid, Spain; <sup>3</sup>Hospital Virgen Macarena, Oncology department, Sevilla, Spain; <sup>4</sup>Hospital Clinic, Oncology department, Barcelona, Spain; <sup>5</sup>Bristol-Myers Squibb, Madrid, Spain

## Background

- Melanoma is a type of skin cancer which refers to a malignant tumor of melanocytes<sup>1</sup>. Melanoma diagnosed in advanced stage, have a probability of 5-year survival estimated less than 10%<sup>2</sup>. Melanoma significantly affects a population of working age, diagnosed before age 50 years in 50% of cases<sup>3</sup>.
- Despite recent advances in long-term overall survival (OS) in some populations, long-term, quality survival remains elusive<sup>4,5</sup>. Ipilimumab has become the standard treatment for advanced melanoma since approval in 2011.
- In April 2015, nivolumab received positive opinion from the Committee for Medicinal Products for Human Use (CHMP) for the treatment of advanced melanoma in both first line and previously treated patients in Europe.

## Objective

To perform a cost-utility analysis of nivolumab versus ipilimumab, in patients with advanced, unresectable or metastatic melanoma (MM) in Spain.

## Methods

- A partitioned survival model with three health states (progression-free, progression and death), was developed to estimate the quality-adjusted life years (QALY) gained in a lifetime horizon.
- Initial cohort included patients with MM receiving a first line (1L) intravenous treatment with nivolumab or ipilimumab. Clinical characteristics and BRAF+ prevalence (41%) derived from literature and were validated by oncologists<sup>6</sup>.
- The evolution of patients was monthly modelled based on OS and progression free survival (PFS). Transition to progression state implied the administration of a subsequent line treatment. The dosages considered were those recommended on summaries of product characteristics<sup>7</sup> for melanoma.
- Utilities, nivolumab clinical efficacy and adverse events (AE) frequency were obtained from CheckMate-066 trial<sup>8</sup>. Ipilimumab OS was obtained from an aggregated analysis and PFS derived from CheckMate-069<sup>9</sup> where ipilimumab was the control arm versus a combination of nivolumab + ipilimumab<sup>10</sup>.
- The National Health System perspective was considered, including direct costs (€,2015): pharmaceutical costs using ex-factory prices for 1L and subsequent therapies, administration, AE management costs for 1L and disease management.
- A discount rate (3% annually) was applied<sup>11</sup>. The health resources consumption and treatment pattern for subsequent lines were defined by oncologists.
- Sensitivity analyses (SA) were performed.

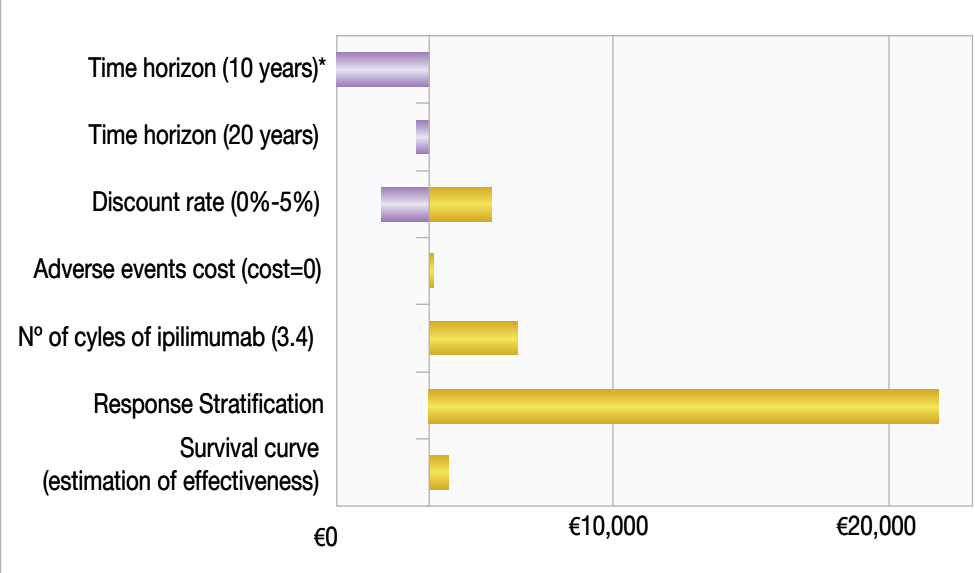
Table 1. Cost

Pharmaceutical Cost (ex-factory price with deduction) <sup>12,13</sup>		Cost (€, 2015)
Nivolumab (Opdivo® 40 mg 1 vial of 4ml)		€525.77
Ipilimumab (Yervoy® 5 mg/ml 1 vial concentrated perfusion of 10ml)		€3,931.25
Disease management (aggregated cost)		
Initial Diagnosis		€1,223.10 (one-off cost)
Pre-progression disease management		€342.41 every 4 weeks
Diagnosis of progression disease		€1,037.87 (one-off cost)
Post-progression disease management		€468.88 every 4 weeks
Terminal care		€5,591.21 (one-off cost)
Post-progression costs		
After nivolumab progression (pharmaceutical + administration)		€35,690 + €361
After ipilimumab progression (pharmaceutical + administration)		€35,271 + €1,599

## Results

- 1L nivolumab therapy yielded more efficacy than ipilimumab (3.05 vs 1.15 QALY). The lifetime total costs of nivolumab accounted €123,280 versus €116,944 with ipilimumab. The incremental cost-utility ratio was €3,242/QALY gained with nivolumab versus ipilimumab (Table 2).
- Deterministic sensitivity analysis performed confirm model robustness, being the most sensitive parameter response stratification (Figure 1).
- In the probabilistic SA, 95.8% of the 1,000 simulations performed were <€15,000/QALY gained (Figure 2).

Figure 1. Deterministic sensitivity analysis



\* Dominant (€-155.26 per QALY)

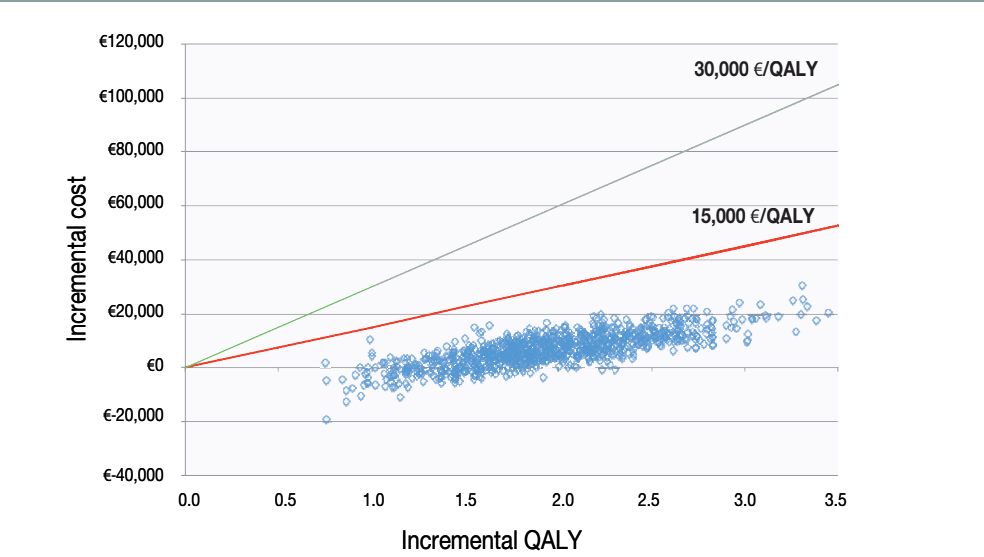
## Conclusions

Based on a willingness-to-pay threshold of €30,000/QALY<sup>14</sup> gained, nivolumab would be a cost-effective option compared to ipilimumab, for 1L treatment in Spanish MM patients.

Table 2. Results (base case)

Concept	Nivolumab	Ipilimumab	Incremental
Treatment costs	€62,286	€65,734	€-3,448
Administration costs	€3,351	€593	€2,758
Follow-up costs	€17,151	€9,491	€7,661
Toxicity costs	€427	€1,075	€-648
Subsequent treatment costs	€40,064	€40,051	€13
Total costs	€123,280	€116,944	€6,336
QALY	3.05	1.15	1.9
ICUR (€/QALY) nivolumab vs ipilimumab			3,242 €/QALY

Figure 2. Cost-effectiveness plane



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