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A cost-effectiveness analysis of Atezolizumab as adjuvant treatment (monotherapy) for adult patients with non-small cell lung cancer following resection and platinum-based chemotherapy in Greece

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Background & Objective

Surgery is the primary treatment for early-stage non-small cell lung cancer (NSCLC), often followed by adjuvant chemotherapy to reduce the risk of recurrence. However, the modest gains in survival with current chemotherapy regimens highlight the need for more effective therapies. The emergence of immunotherapy, particularly Atezolizumab, offers new hope for enhancing outcomes. The objective of this analysis is to assess the cost-effectiveness of Atezolizumab as an adjuvant treatment (monotherapy) for adult patients with non−small cell lung cancer (NSCLC) with a high risk of recurrence whose tumors have PD-L1 expression on ≥ 50% of tumor cells (TC) without epidermal growth factor receptor (EGFR) mutant or anaplastic lymphoma kinase (ALK)-positive NSCLC, within the Greek healthcare landscape. The study aims to provide insights into the economic viability and clinical impact of Atezolizumab within this defined patient population. By examining the comparative cost-effectiveness of Atezolizumab against best supportive care (BSC), this research seeks to inform healthcare providers, policymakers, and stakeholders about the economic feasibility and clinical utility of Atezolizumab in the adjuvant treatment of adult NSCLC patients in Greece. The analysis is anticipated to offer valuable insights to optimize patient care strategies and healthcare decision-making.

Methods

The analysis is based on the adaptation of an existing pharmacoeconomic model evaluating the cost-effectiveness of Atezolizumab as monotherapy adjuvant treatment following resection and platinum-based chemotherapy for adult patients with early stage (Stage II-IIIA) NSCLC whose tumors have PD-L1 expression on ≥ 50% of TC, without EGFR mutant or ALK-positive NSCLC. The cost-effectiveness model assesses the health benefits of Atezolizumab and its comparator, BSC, as well as the corresponding costs associated with the choice of treatment. Population characteristics and main features of the economic evaluation are presented in Table 1. The analysis utilizes a Markov model with five distinct health states: Disease-Free Survival (DFS), Locoregional Recurrence, First-Line Metastatic Recurrence (1L Metastatic Recurrence), Second-Line Metastatic Recurrence (2L Metastatic Recurrence), and Death. Each health state is associated with specific transition probabilities, clinical inputs, resource use, costs, and utilities.

The data utilized in this analysis were drawn from a variety of reputable sources to ensure robust and reliable inputs. Clinical inputs, including disease-free survival and clinical parameters, were predominantly sourced from the IMpower010 trial, a pivotal study in the field. For later disease stages, information from well-established metastatic studies (IMpower150/110) and existing peer-reviewed literature was integrated. Resource use data were derived from clinical guidelines, published literature, and relevant metastatic studies. Costs of pharmaceuticals were determined based on official prices reported by the Greek Ministry of Health [1], adjusted using hospital prices and a standard 5% rebate [2]. Utility values, reflecting health-related quality of life, were extracted from pertinent studies such as Yang et al. [3] for the disease-free state, Chouaid et al. [4] for locoregional recurrence, and the IMpower110 trial for metastatic stages.

Table 1: Main Features of Economic Evaluation

Population	**Early stage (stage II–IIIA), PD-L1 ≥ 50% NSCLC patients without EGFR mutant or ALK-positive NSCLC**
Intervention	Atezolizumab 1,200mg/ every 3 weeks
Comparators	Best Supportive Care
Perspective of the analysis	Third-party payer: only third-party payer benefits and costs are included
Economic evaluation	Cost effectiveness analysis
Time horizon	40 years with a maximum age of 100 years
Inputs	Pharmaceutical cost Administration cost Monitoring cost Hospitalization cost Adverse event cost
Outputs	Quality adjusted life years (QALYs) Life years Costs Incremental cost Net monetary benefit (NMB) Incremental Cost-effectiveness Ration (ICER)
Discount rate	3,5% (Costs, life years and QALYs)

Results

The analysis demonstrated that Atezolizumab treatment yielded substantial benefits. It resulted in a cumulative gain of 2,542 life years and 1,887 Quality Adjusted Life Years (QALYs) compared to BSC treatment for NSCLC patients with PD-L1 expression on ≥ 50% of tumor cells (TC). Atezolizumab not only extended life but also significantly improved the quality of life for these patients. However, it's important to note that Atezolizumab treatment came at a higher cost, amounting to 102,296 EUR, compared to 61,308 EUR for BSC.

Despite the higher cost associated with Atezolizumab, the Incremental Cost-Effectiveness Ratio (ICER) remained favorable, with a value of 21,719 EUR per QALY. This ICER falls below the commonly accepted threshold of 30,000 EUR per QALY in Greece, signifying that Atezolizumab is considered a cost-effective intervention in this context. The study's results are summarized in Table 2.

To further assess the robustness of these findings, a probabilistic sensitivity analysis (PSA) was conducted. The PSA outcomes confirmed the stability of the cost-effectiveness evaluation, with Atezolizumab maintaining its economic viability. The ICER increased slightly to 22,554 EUR per QALY and 16,644 EUR per life year in the PSA, highlighting the intervention's resilience to uncertainties. Notably, the majority of simulations consistently supported the cost-effectiveness of Atezolizumab, as illustrated in Figure 1. The Cost-Effectiveness Acceptability curve (CEAC) displayed in Figure 2 further emphasized the intervention's economic viability, aligning with the convention of a 30,000 EUR threshold as the point of cost-effectiveness. These results collectively underscore Atezolizumab's potential as a valuable and cost-effective therapeutic option for eligible early-stage NSCLC patients in Greece, promising extended survival and enhanced overall well-being.

Table 2. Summary results of the cost effectiveness analysis

	Life years	Incremental Life years	QALYs	Incremental QALYs	Total cost (€)	Incremental cost (€)	NMB (€)	Incremental NMB (€)	ICER (€/QALY)	ICER (€/LY)
BCS	8.617		6.378		61,308		130,032			
Atezolizumab	11.159	2.542	8.265	1.887	102,296	40,988	145,661	15,629	21,719	16,125

Figure 1. Incremental cost-effectiveness plane

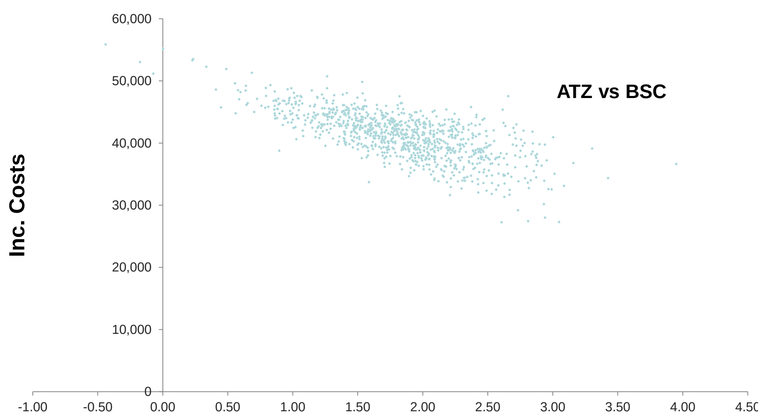
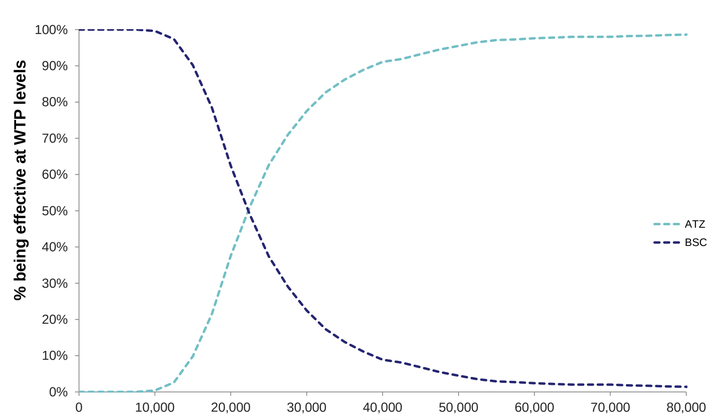


Figure 2. Cost-Effectiveness Acceptability Curve



Conclusions

Atezolizumab emerges as a compelling therapeutic option for patients with early stage (Stage II-IIIA) NSCLC with a high risk of recurrence whose tumors have PD-L1 expression on ≥ 50% of TC without EGFR or ALK-positive NSCLC. The base case analysis underscores its potential to significantly augment life years gained and QALYs compared to BSC. Atezolizumab treatment demonstrates a substantial advantage, contributing to an additional 2,542 life years and 1,887 QALYs gained, promising extended survival and enhanced quality of life for these specific patient populations. Moreover, the evaluation of cost-effectiveness underscores the practicality of incorporating Atezolizumab into the treatment regimen. Despite its higher cost in relation to BSC, the ICER remains well below the threshold in Greece, which highlights its financial sustainability while concurrently delivering substantial health advantages. For early-stage NSCLC patients with PD-L1 expression ≥ 50%, and lacking EGFR mutant or ALK-positive NSCLC, Atezolizumab presents a therapeutic approach that not only extends survival but also offers a cost-effective strategy for improved overall well-being.

References

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