

Cost of Immunotherapy to Treat First-Line (1L) Extensive Stage Small Cell Lung Cancer

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Background

- In the United States, approximately 15% of lung cancer cases are small cell (SCLC), with 70% of cases being extensive stage (ES-SCLC) [1]
- Prior to the approval of combination therapy including cancer immunotherapy, treatment options in ES-SCLC had remained largely unchanged for 20 years [2], with poor prognosis (median overall survival (OS) of 10 months) [3]
 - The first cancer immunotherapy approved in 1L ES-SCLC, atezolizumab used together with carboplatin + etoposide, was found to significantly improve survival compared with the chemotherapy regimen alone [2]
 - Recently, durvalumab was also approved for use in combination with platinum + etoposide
- Although efficacy for different immunotherapies cannot be directly compared given lack of head to head data, understanding the fiscal impact of treatment choices may be useful to inform decision-making regarding the delivery of oncology care

Objective

- This study examines cost differences among cancer immunotherapy-based regimens (atezolizumab [atezo], durvalumab [durva]) used in combination with carboplatin + etoposide, with dosing and administration per prescribing information in 1L ES-SCLC

Methods

Overview

- Cost comparison analysis reflecting a closed cohort approach (not accounting for mortality) and a payer perspective
- Standardized costs were presented per month (30.44 days), and over a course of therapy according to either median progression-free survival (base case), or 24 weeks
- Costs per patient were calculated by applying drug and administration costs to respective dosing schedules to identify cost per cycle, and then summing over the duration of the treatment period

Base Case Model Inputs (Table 1)

- Median progression-free survival reflected IMPower133 and CASPIAN trial data for atezolizumab (5.2 months) and durvalumab (5.1 months), respectively [4, 5]
- Base case drug costs reflect January 2020 wholesale acquisition costs (WAC) [6], with alternate analysis using CMS average wholesale price (ASP) [7]
- Infusion administration reflects prescribing information requirements and administration fees based on 2020 Centers for Medicare and Medicaid Services (CMS) Physician Fee Schedule [8]
- Dosing and administration schedule reflect prescribing information per therapy for the ES-SCLC indication [9,10]
 - Median patient body surface area from IMPower133 (1.86 m²) informed etoposide dosing
 - For chemotherapies, maximum allowable dose was assumed (100 mg/m² for etoposide, and 750mg for carboplatin as the upper bound of the AUC5 range recommended by the FDA) [11]; applied equivalently between regimens, this had no impact on incremental findings
 - Drug wastage, rebates, or discounts were not incorporated
- The analysis assumed 100% adherence to label dosing schedule with no dose modification or interruption
- Disease management costs were assumed to be equal across all comparators and therefore not included

Table 1. Key Default Analytic Inputs based on WAC

Induction period	Atezolizumab (TECENTRIQ)	Durvalumab	Carboplatin + Etoposide	
			Carboplatin	Etoposide
WAC per Unit* (Feb 2020)	\$9,194	\$3,665	\$0.07	\$0.08
Total Dose (mg) per Cycle	1200	1500	750	558
Weeks per Cycle	3	3	3	3
Number of Induction Cycles	4	4	4	4
Drug Cost per Cycle	\$9,194.03	\$10,995.00	\$54.98	\$42.40
Administration Cost per Cycle	\$142.55	\$142.55	\$69.29	\$69.29
Per Patient Monthly Cost	\$13,534	\$16,144	\$180	\$162
Maintenance period				
WAC per Unit* (Feb 2020)	\$9,194	\$3,665	NA	NA
Total Dose (mg) per Cycle	1200	1500		
Weeks per Cycle	3	4		
Number of Cycles*	3.54	2.54		
Drug Cost per Cycle	\$9,194.03	\$10,995.00		
Administration Cost per Cycle	\$142.55	\$142.55		
Per Patient Monthly Maintenance Cost	\$13,534	\$12,108		

* Atezolizumab unit is 1200 mg vial; durvalumab unit is 500 mg vial; carboplatin and etoposide units are each 1 mg
*Number of maintenance cycles reflects difference between overall duration of treatment and number of induction cycles. In base case analysis this accounts for different duration of therapy between regimens: 5.2 months for atezolizumab, 5.1 months for durvalumab

Results

Monthly Costs:

- In the base case, the monthly induction therapy WAC-based cost of durvalumab was 19% higher than atezolizumab (Figure 1a)
- Although the monthly maintenance phase costs were lower for durvalumab (Figure 1a), average monthly costs over the course of treatment (Figure 1a) and total cost per course of treatment (mPFS) (Figure 1b) were lower for atezolizumab
- Analysis with ASP values show the same pattern (Figures 2a and b).

24-week Costs:

- Results were consistent when using equivalent 24-week treatment duration, with durvalumab regimen costs 3% higher than atezolizumab (WAC):
 - Atezolizumab: \$82,145
 - Durvalumab: \$84,730
- Using ASP for drug costs, total costs are 4.41% lower over 24 weeks for the atezolizumab regimen than for durvalumab:
 - Atezolizumab: \$78,733
 - Durvalumab: \$82,368
- Figure 3 shows the incremental 24-week cost savings (WAC and ASP) for atezolizumab vs. durvalumab. These cost differentials become more meaningful when we assume larger patient populations.

Limitations

- This analysis does not incorporate adverse events, which may influence total cost calculations
- Results may not be generalizable beyond the United States due to use of US Food and Drug Administration (FDA)-approved indications, dosing schedules, and publicly available costs
- This study used unit costs obtained from public or published sources. Reimbursement in the United States is quite varied, and unit costs may be higher than reported; alternatively, negotiated discounts and rebates, which are not publicly available information, were not considered. Either factor could have an impact on true costs to an individual payer

Figure 1a. WAC (base case model) Costs per Month of Therapy

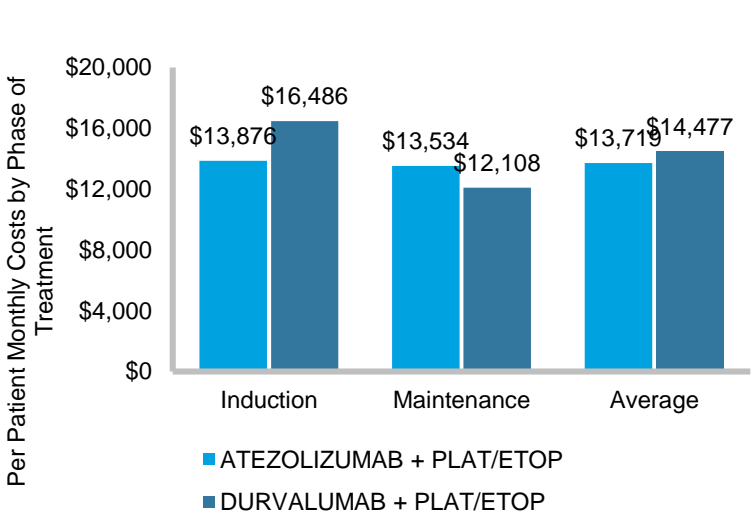


Figure 2a. ASP Costs per Month of Therapy

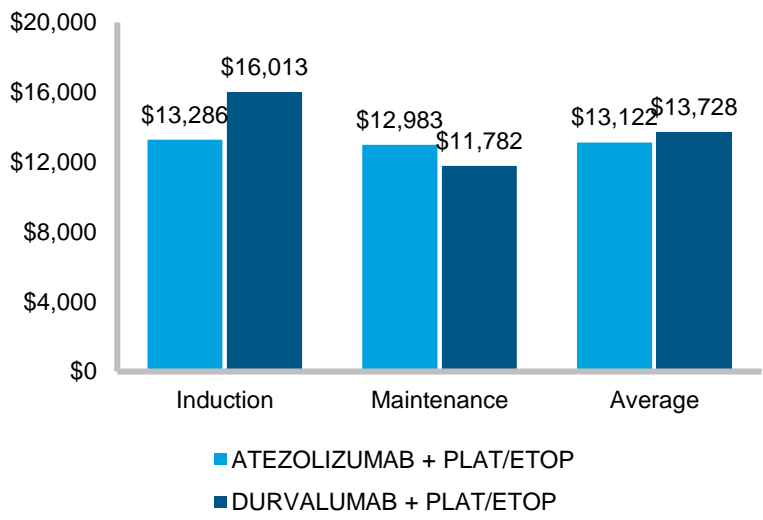


Figure 1b. WAC (base case model) Costs Over Median Progression-Free Survival

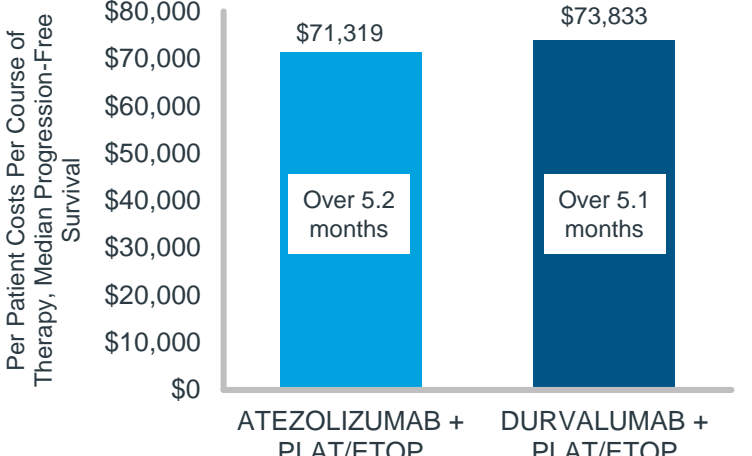


Figure 2b. ASP Costs Over Median Progression-Free Survival

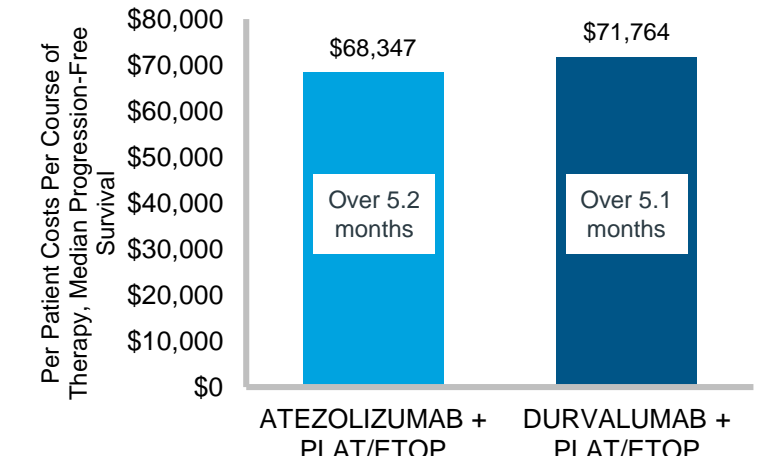
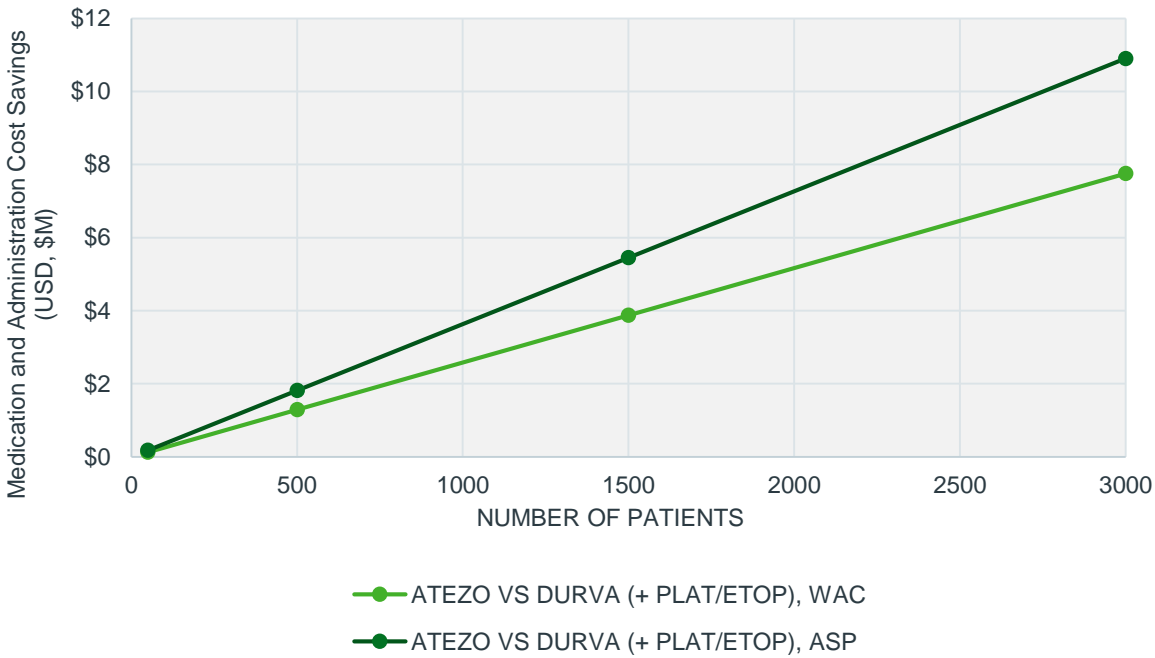


Figure 3. Cost Savings per 24-week Course of Therapy by Number of Treated Patients (WAC and ASP)



Conclusion

- This analysis suggests that an atezolizumab-based treatment regimen may be less costly per-course than one based on durvalumab in 1L ES-SCLC
- This analysis quantifies difference in fiscal impact of immunotherapy choice in 1L ES-SCLC given similarities in FDA-approved indications and mechanisms of action
- Additional research is required to characterize real-world utilization and outcomes of immunotherapies for treatment of 1L ES-SCLC to better understand the impact of therapeutic choice

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Acknowledgement: Funding for this project was provided by Genentech