EPH237

The Health Impact of Pembrolizumab for the First-Line Treatment for Metastatic Non-Small Cell Lung Cancer (mNSCLC) that Expresses High Levels of PD-L1 in Türkiye

Akyol-Ersoy B[1], Ceylan Y[1], Akpamuk U[1], Özcan G[1], Esen Y[1], Batum M[1], Torun B[1], Poellinger B[2], Mamane C[3], Insinga R[4], Nguyen S[5], Malhan S[6], Cicin İ[7]

[1]MSD, Istanbul, Turkiye, [2]MSD Sharp & Dohme GmbH, München, Germany, [3]MSD France, Puteaux, 92800, France, [4]Merck & Co., Inc., West Point, PA, USA, [5]MSD, Oslo, Norway, [6]Department of Healthcare Management, Baskent University, Ankara, Türkiye, [7]Istinye University, Faculty of Medicine, Medical Oncology Department, Istanbul, Türkiye

Background

- Lung cancer (LC) is the leading cause of cancer-related mortality worldwide, accounting for nearly 20% of all cancer deaths.[1]
- LC is divided into two primary types: small cell and non-small cell lung cancer, the latter accounting for 80–85% of all lung cancers globally.[2]
- In Türkiye in 2022, LC represented the most frequently diagnosed and deadliest cancer, with 41,032 newly diagnosed cases and 38,505 attributable deaths.[3]

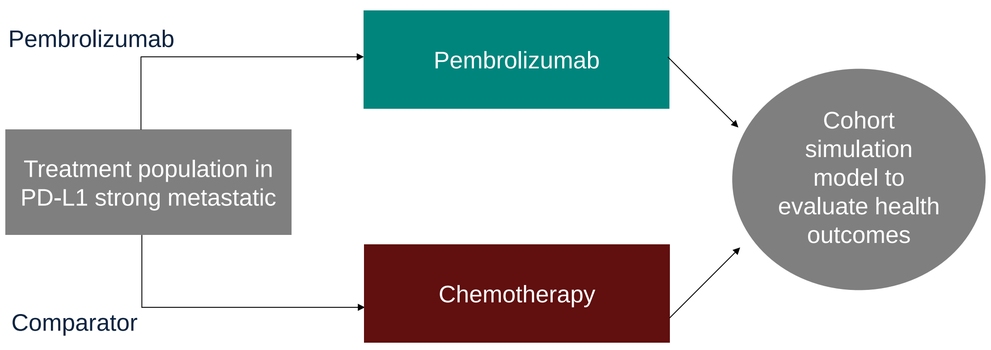
Aims

- This analysis aims to evaluate the health impact of a PD-L1 biomarker directed treatment strategy of pembrolizumab in previously untreated mNSCLC with PD-L1 expression in ≥50% of tumor cells and no sensitizing epidermal growth factor receptor (EGFR) mutation or anaplastic lymphoma kinase (ALK) translocation.

Methods

- A partitioned survival model was used and adapted to the Turkish payer perspective to compare pembrolizumab with standard platinum-based chemotherapy (with gemcitabine, paclitaxel or pemetrexed) in terms of the potential health outcomes. Outcomes include: life years (LYs), quality-adjusted life years (QALYs).
- Data on clinical effectiveness, treatment utilization, health utilities (based on EQ-5D-3L utility data), and safety were derived from the KEYNOTE-024 trial (data cut-off date of June 1, 2020) and projected over a 20-year horizon.
- Two-piece models with the Weibull distribution (week 78 cut-point) were applied in the base-case, for both treatment arms, as a best fitting parametric modeling approach for overall survival (OS) over 10 years.
- For extrapolating overall survival (OS) trends beyond year 10, for both trial arms identical risks were applied based on U.S. Surveillance Epidemiology and End Results (SEER) program mortality risk data for metastatic non-squamous and squamous NSCLC patients.
- A 3% annual discount rate was applied to health outcomes.
- Scenario, deterministic (DSA) and probabilistic sensitivity analyses (PSA) were conducted to test the robustness of the model results.

Figure 1. Model structure



Key: PD-L1, programmed cell death 1/programmed death-ligand 1.

Figure 2. Transition diagram for cohort simulation model health outcomes

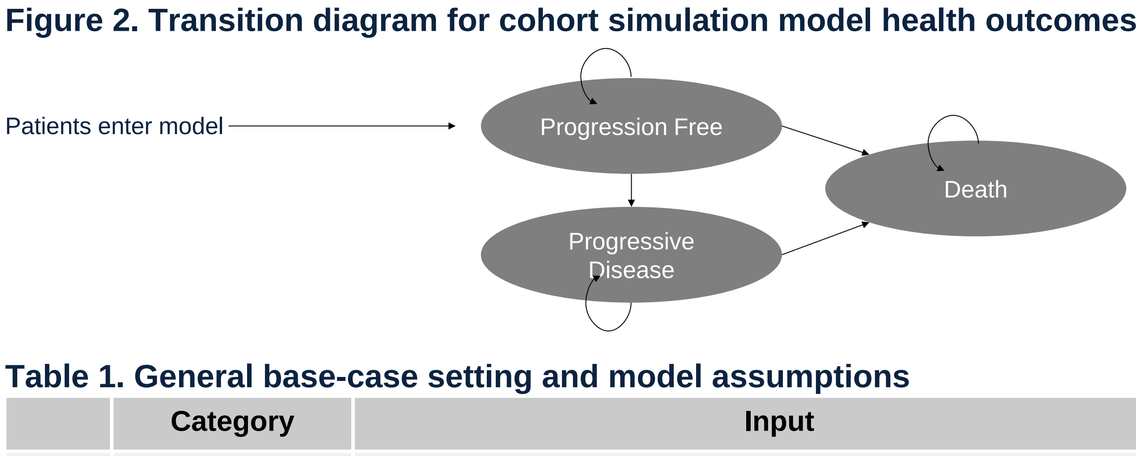


Table 1. General base-case setting and model assumptions

	Category	Input
	Perspective	Turkish Payer Perspective
	Time horizon	20 years
	Discounting	3% for health outcomes
	Population	• Target population defined by KEYNOTE-024 eligibility. • Adults ≥18 years (average age of 64 years) with a histologically or cytologically confirmed diagnosis of stage IV, EGFR wildtype and EML4/ALK fusion negative NCSLC and no prior systemic chemotherapy treatment for their metastatic NSCLC.
	Treatment duration	• Prior to the stopping rules, treatment with pembrolizumab or chemotherapy is expected to be continued until disease progression, unacceptable adverse events or patient/physician decision to interrupt treatment. • Stopping rules of 35 cycles (2 years of continuous treatment) for pembrolizumab, and 4-6 cycles for chemotherapy, were specified in the KEYNOTE-024 protocol.

Key: EGFR, epidermal growth factor receptor; ALK, anaplastic lymphoma kinase; NSCLC, non-small cell lung cancer; 1L, first-line.

Table 2: Key inputs of the base-case model

Parameter	Base-case Input
PFS - pembrolizumab	Two-piece KM27 + Weibull
PFS - KN-024 chemotherapy arm	Two-piece KM27 + Weibull
ToT - pembrolizumab	KM data
ToT - KN-024 chemotherapy arm	KM data
OS - pembrolizumab	Two-piece KM78+ Weibull Long-term SEER OS years 11+
OS - KN-024 chemotherapy arm	Two-piece KM78+ Weibull Long-term SEER OS years 11+
Utilities – By Time to Death (Pooled)	0.849 (≥360 days)
	0.774 (180-359 days)
	0.699 (30-179 days)
	0.628 (<30 days)

Key: OS, Overall survival; PFS, Progression-free survival; ToT, Time on treatment; KM, Kaplan Meier; SEER,Surveillance Epidemiology and End Results.

Results

- The model estimated total QALYs of 3.45 for pembrolizumab vs 1.96 for chemotherapy.
- Total LYs were estimated to be 4.12 and 2.45 for pembrolizumab and chemotherapy, respectively.
- The use of pembrolizumab was associated with an increase of 1.67 LYs and 1.49 QALYs (**Table 3**).
- Scenario analyses varying the model time horizon (15, 25 and 30 years) demonstrated that extending follow-up to 20, 25 and 30 years progressively increased QALYs and further improved the outcomes of pembrolizumab plus chemotherapy (**Table 4**).
- Results from the scenario and sensitivity analyses supported the base-case findings.
- The most impactful parameters on the results were the parametric extrapolation of OS and utility values for the time to death ≥ 360 days health state, for both arms.

Table 3. Total impact on health outcomes of treatment of pembrolizumab vs. chemotherapy

	Chemotherapy	Pembrolizumab	Incremental Pembrolizumab vs. Chemotherapy
Life years	2.45	4.12	1.67
Expected time in progression free state (months)	7.66	23.93	16.27
Expected time in progressive state (months)	21.74	25.52	3.78
QALYs	1.96	3.45	1.49

Table 4: Impact of time horizon

Time Horizon	Incremental QALYs
15 years	1.35
20 years (base case)	1.49
25 years	1.56
30 years	1.61

Conclusions

- The results indicate that pembrolizumab as a first-line treatment for mNSCLC with high PD-L1 expression in Türkiye yields an incremental gain in QALYs and LYs versus chemotherapy. Therefore, use of pembrolizumab is expected to generate considerable benefits for patients, the healthcare system, payers, and public health in Türkiye.

References

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