Real-World Costs and Healthcare Resource Utilization for Patients With Metastatic Non–Small Cell Lung Cancer and PD-L1 TPS ≥50% in the United States

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Conclusions

- This real-world study described the economic burden in the 1L setting for US patients with mNSCLC with PD-L1 TPS ≥50% and no *EGFR*, *ALK*, or *ROS1* aberrations
- All-cause and NSCLC-specific HCRU and costs were driven primarily by outpatient and office visits
- These findings highlight the need for more effective 1L treatment options to reduce the economic burden of patients with mNSCLC with PD-L1 TPS ≥50% and no actionable genomic aberrations

Plain Language Summary

This study looked at healthcare use and associated costs for patients with non−small cell lung cancer that has spread to other parts of the body. Patients included in this study had not yet received treatment, had high levels of a protein called programmed cell death ligand 1 (PD-L1), and did not have certain genetic changes that are common in lung cancer and could help guide treatment. The study looked at data from patients treated in everyday medical settings rather than in a clinical trial. The results showed that it is expensive to manage and treat this specific type of lung cancer and that most medical costs and healthcare service use comes from routine office visits and outpatient appointments. These findings highlight that better treatments are still needed for patients with this disease.

References: **1.** Hendriks LEL, et al. *Ann Oncol.* 2025;36(10):1223-1227. **2.** Owen DH, et al. *J Clin Oncol.* 2025;43(24):e45-e58. **3.** Jovanoski N, et al. *J Med Econ.* 2026;29(1):433-454.

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Introduction

- For patients with metastatic non−small cell lung cancer (mNSCLC), programmed cell death ligand 1 (PD-L1) tumor proportion score (TPS) ≥50%, and no actionable genomic aberrations, first-line (1L) treatment with a PD-(L)1 inhibitor alone or with chemotherapy is the current standard of care[1,2]
- However, despite treatment advances, healthcare resource utilization (HCRU) and costs remain high for NSCLC[3]
- Furthermore, real-world data characterizing the economic burden of 1L treatment specifically in patients with mNSCLC and PD-L1 TPS ≥50% are limited
- The aim of this study was to characterize the economic burden for patients with mNSCLC with PD-L1 TPS ≥50% through evaluation of all-cause and NSCLC-specific HCRU and costs in the 1L setting in the United States

Methods

Study Design

- This retrospective, observational study used de-identified data from the Tempus AI multimodal database (Tempus AI, Inc., Chicago, IL, USA)
  - The database comprises longitudinal data for patients cared for in the United States at a mix of academic and community-based centers
- The index date was the date of 1L treatment initiation in the metastatic setting, and the follow-up period was ≥3 months from the index date until death, loss to follow-up, or study end (**Figure 1**)
- Eligible patients were 18−89 years old; diagnosed with mNSCLC between January, 2016, and September, 2025; had initiated systemic therapy for mNSCLC; and had PD-L1 TPS ≥50% with confirmed absence of *EGFR*, *ALK*, and *ROS1* aberrations
  - Patients must have had continuous enrollment with ≥1 pharmacy or medical claim per month during the look-back period (≥6 months before the index date) and in the follow-up period or had confirmed continuous enrollment for the look-back and follow-up periods from enrollment tables for closed source claims
- Study outcomes included HCRU and healthcare costs examined during the post-index period and categorized according to the following care settings:
  - Inpatient hospitalizations: defined as medical services that required admission to a hospital, involving at least one overnight stay
  - Office visits: defined as visits to a physician's office, usually a private practice
  - Outpatient visits: defined as medical services (including diagnostic tests and any procedures) provided without requiring an overnight hospital stay
- HCRU and healthcare cost analyses were described using summary statistics and reported on a per-patient per-month (PPPM) basis

Figure 1. Study Design

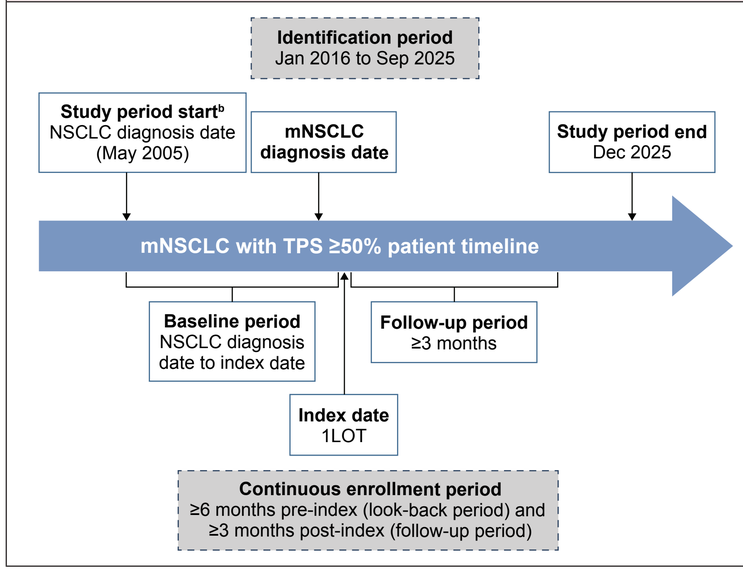
Key Inclusion/Exclusion Criteria

Inclusion Criteria

- Patients with a documented mNSCLC diagnosis between 18−89 years of age
- 1L anti-cancer therapy in metastatic setting
- Absence of AGA (*EGFR*/*ALK*/*ROS1*)
- PD-L1 TPS ≥50%
- Continuous enrollment with ≥1 pharmacy or medical claim per month during continuous enrollment period or confirmed continuous enrollment from enrollment tables for closed source claims
- First activity ≤90 days after mNSCLC diagnosis

Exclusion Criteria

- Documented enrollment in a clinical trial during study period
- Other prior primary cancer[a]



[a]Excludes non-melanoma of skin. [b]The study period start date was the earliest date at which the patient was defined as having a primary lung cancer diagnosis in the Tempus AI database based on the pathology diagnosis; the date could occur any time on or before the mNSCLC diagnosis date and was not bound by the identification period.

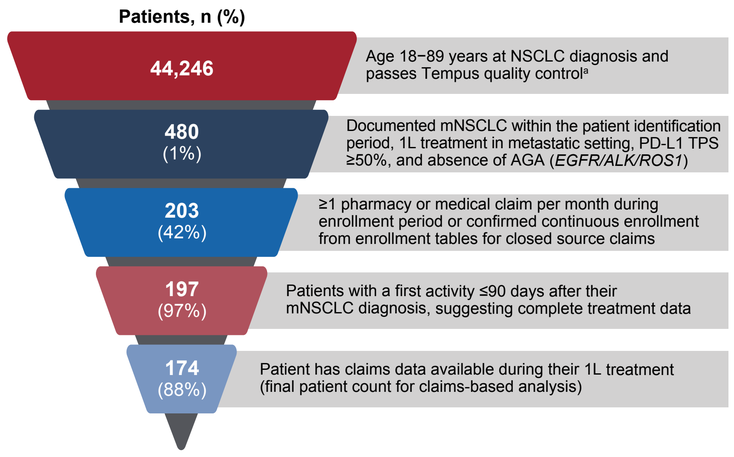
1L, first line; 1LOT, first line of therapy; AGA, actionable genomic alteration; mNSCLC, metastatic non–small cell lung cancer; NSCLC, non–small cell lung cancer; PD-L1, programmed cell death ligand 1; TPS, tumor proportion score.

Results

Baseline Demographics and Disease Characteristics

- Of 480 adult patients with a claims-based diagnosis of mNSCLC who had PD-L1 TPS ≥50% and had initiated any systemic therapy in the metastatic setting, 174 had claims data available during their 1L treatment and were eligible for inclusion in this study (**Figure 2**)
- Median age was 69.0 years, 53.4% were male, and 70.7% were White (**Table 1**)
- Medicare was the most common insurance type (66.7%), and most patients were treated in non-academic settings (80.5%)
- Most patients presented with stage 4 disease (70.7%) and non-squamous histology (74.1%)

Figure 2. Summary of Cohort Attrition



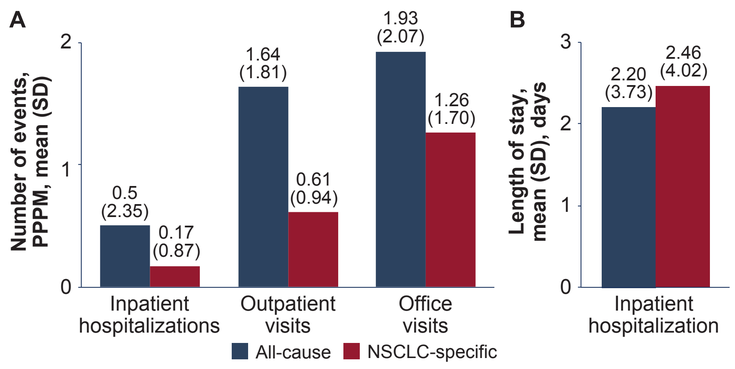
[a]Tempus quality control includes data completeness and logic checks, with curator and supervisor review, and aggregate statistical and scientific review for outliers and internal consistency

1L, first line; AGA, actionable genomic alteration; mNSCLC, metastatic non−small cell lung cancer; NSCLC, non−small cell lung cancer; PD-L1, programmed cell death ligand 1; TPS, tumor proportion score.

Healthcare Resource Utilization by Care Setting

- Overall, all-cause HCRU and NSCLC-specific HCRU in the 1L setting was predominantly driven by outpatient and office visits whereas HCRU associated with inpatient hospitalizations was low on a PPPM basis (**Figure 3A**)
- Length of inpatient hospital stay was similar for NSCLC-specific hospitalizations and all-cause hospitalizations (**Figure 3B**)

Figure 3. Healthcare Resource Utilization (A) and Length of Hospital Stay (B)



HCRU, healthcare resource utilization; NSCLC, non−small cell lung cancer; PPPM, per patient per month.

Healthcare Costs by Care Setting

- Mean (standard deviation [SD]) total all-cause costs were US$13,810.75 (13,321.32) PPPM, compared with US$9454.88 (11,775.37) PPPM for NSCLC-specific costs; both driven primarily by outpatient and office visits (**Figure 4**)

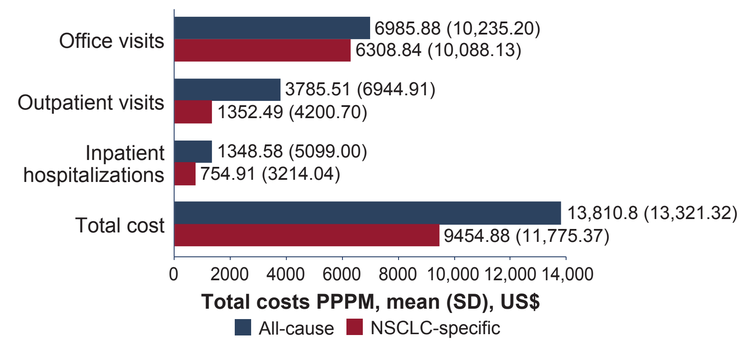
Table 1. Baseline Demographics and Disease Characteristics

Characteristic	Overall (N=174)
Median age (range), years	69.0 (46.0−89.0)
Male, n (%)	93 (53.4)
Race, n (%)	
Asian	7 (4.0)
Black or African American	10 (5.7)
White	123 (70.7)
Other race	8 (4.6)
Unknown	26 (14.9)
Ethnicity, n (%)	
Hispanic or Latino	8 (4.6)
Not Hispanic or Latino	111 (63.8)
Unknown	55 (31.6)
Geographic region, n (%)	
Northeast	12 (6.9)
Midwest	87 (50.0)
South	46 (26.4)
West	22 (12.6)
Unknown	7 (4.0)
Practice type, n (%)	
Ever-academic[a]	33 (19.0)
Non-academic	140 (80.5)
Unknown	1 (0.6)
Insurance type, n (%)	
Commercial	38 (21.8)
Medicare	116 (66.7)
Medicaid	18 (10.3)
Other	0
Unknown	2 (1.1)
Tumor histology, n (%)	
Squamous	36 (20.7)
Non-squamous	129 (74.1)
Not otherwise specified	9 (5.2)
PD-L1 score, n (%)	
50%−90%	134 (77.0)
>90%	40 (23.0)
Harmonized ECOG PS and Karnofsky Score, n (%)	
0	34 (19.5)
1	61 (35.1)
≥2	25 (14.4)
Unknown	54 (31.0)
Modified CCI 12 months before index date, n (%)	
>0−1	4 (2.3)
>1−2	32 (18.4)
>2−3	44 (25.3)
>3	76 (43.7)
Unknown	18 (10.3)
Smoking history, n (%)	
Current smoker	24 (13.8)
Ex-smoker	87 (50.0)
Never smoker	16 (9.2)
Unknown	42 (27.0)
Metastatic sites, n (%)	
Brain	44 (25.3)
Liver	26 (14.9)
Number of metastatic sites at index date, n (%)	
1	96 (55.2)
2	37 (21.3)
≥3	29 (16.7)
Unknown	12 (6.9)
Disease stage at diagnosis, n (%)	
Stage 1	13 (7.5)
Stage 2	6 (3.4)
Stage 3	13 (7.5)
Stage 4	123 (70.7)
Unknown	19 (10.9)

[a]Patients seen at academic and non-academic institutions.

CCI, Charlson Comorbidity Index; ECOG PS, Eastern Cooperative Oncology Group performance status; PD-L1, programmed cell death ligand 1.

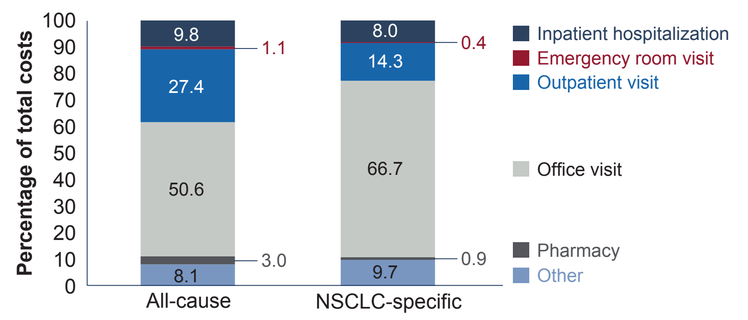
Figure 4. All-Cause and NSCLC-Specific Costs PPPM by Care Setting



NSCLC, non−small cell lung cancer; PPPM, per patient per month.

- Office and outpatient visits accounted for 50.6% and 27.4%, respectively, of total all-cause costs, and 66.7% and 14.3%, respectively, of total NSCLC-specific costs (**Figure 5**)

Figure 5. Distribution of All-Cause and NSCLC-Specific Costs by Care Setting



NSCLC, non–small cell lung cancer.

Limitations

- This retrospective observational analysis was subject to potential unmeasured confounding
- Missing or incompletely captured electronic health records and claims data may have affected study findings
- Results derived from a single United States database may not be fully generalizable to broader patient populations, and small sample sizes in some subgroups limited subgroup analyses

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