

# Patient Characteristics, Treatment Patterns, and Factors of Biomarker Testing Among Patients with Advanced Non-Small Cell Lung Cancer (aNSCLC) in the US, 2012–2020

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## METHODS

- This retrospective cohort study used the TEMPUS CancerLinQ oncology dataset with an observational period from January 1, 2012, through to December 31, 2020
- Patients diagnosed with Stage IIIB–C/IV NSCLC or an associated metastatic event during the observational period (index date) and ≥18 years of age were included
- Patients were excluded if there was missing sex or age information, histology results were inconsistent with NSCLC, or death occurred prior to other events
- Biomarker testing for *EGFR*, *KRAS*, *ALK*, *ROS1*, *BRAF*, *NTRK*, *MET*, *RET*, or PD-L1 was analyzed
- Demographics and clinical characteristics, biomarker testing, and treatment patterns were summarized using descriptive statistics
- Patient characteristics associated with biomarker testing were evaluated using univariate logistic regressions. Odds ratios with 95% CIs and p values were reported



## RESULTS

### Patient characteristics

- 6,877 patients met study criteria
- 46.1% were female, median age (IQR) was 65.2 years (58.5–72.7 years), 73.1% were White, and 90.5% were diagnosed at Stage IV (**Table 1**)
- 41.7% (n=2,869) of patients received biomarker testing

**Table 1. Patient characteristics**

Characteristic	Patients N=6,877
<b>Sex, n (%)</b>	
Female	3,168 (46.1)
<b>Age at index</b>	
Mean (SD)	65.2 (9.8)
<b>Race, n (%)</b>	
White	5,027 (73.1)
Black or African American	917 (13.3)
Other*	452 (6.6)
Unknown	481 (7.0)
<b>Smoking status, n (%)</b>	
Current smoker	1,405 (20.4)
Former smoker	1,717 (25.0)
Never smoked tobacco	459 (6.7)
Unknown	3,296 (47.9)
<b>Stage at index, n (%)</b>	
IIIB	623 (9.1)
IIIC	31 (0.5)
IV	6,223 (90.5)
<b>ECOG performance status, n (%)</b>	
0	941 (13.7)
1	1,628 (23.7)
2	770 (11.2)
3	245 (3.6)
4	46 (0.7)
Missing	3,247 (47.2)
<b>Brain metastasis<sup>†</sup>, n (%)</b>	751 (10.9)
<b>Histology at index, n (%)</b>	
Non-squamous	4,240 (61.7)
Other/Unknown	875 (12.7)
Squamous	1,762 (25.6)

\*Small sample size did not allow for disaggregation of 'Other' race category.  
<sup>†</sup>Excludes brain metastasis recorded after aNSCLC diagnosis date.

### Factors associated with biomarker testing

- Male (vs female; OR: 0.82; 95% CI: 0.74, 0.91), Black patients (vs White; OR: 0.83; 95% CI: 0.72, 0.97), patients with squamous (OR: 0.22; 95% CI: 0.19, 0.25) or unknown histology (OR: 0.53; 95% CI: 0.45, 0.61) (vs non-squamous histology), and patients with an ECOG of 2+ (OR: 0.69; 95% CI: 0.57, 0.84) or missing (OR: 0.56; 95% CI: 0.48, 0.66) (vs ECOG of 0), and patients 51–64 yrs (OR: 0.78; 95% CI: 0.62, 0.97) or ≥65 years of age (OR: 0.69; 95% CI: 0.55, 0.86) (vs age ≤50 yrs) were all less likely to undergo biomarker testing (**Table 2**)
- Never smokers (vs current smokers; OR: 2.64; 95% CI: 2.05, 3.42), and patients diagnosed after 2015 (vs 2012) were more likely to undergo biomarker testing (**Table 2**)

**Table 2. Patient characteristics associated with biomarker testing in patients with aNSCLC**

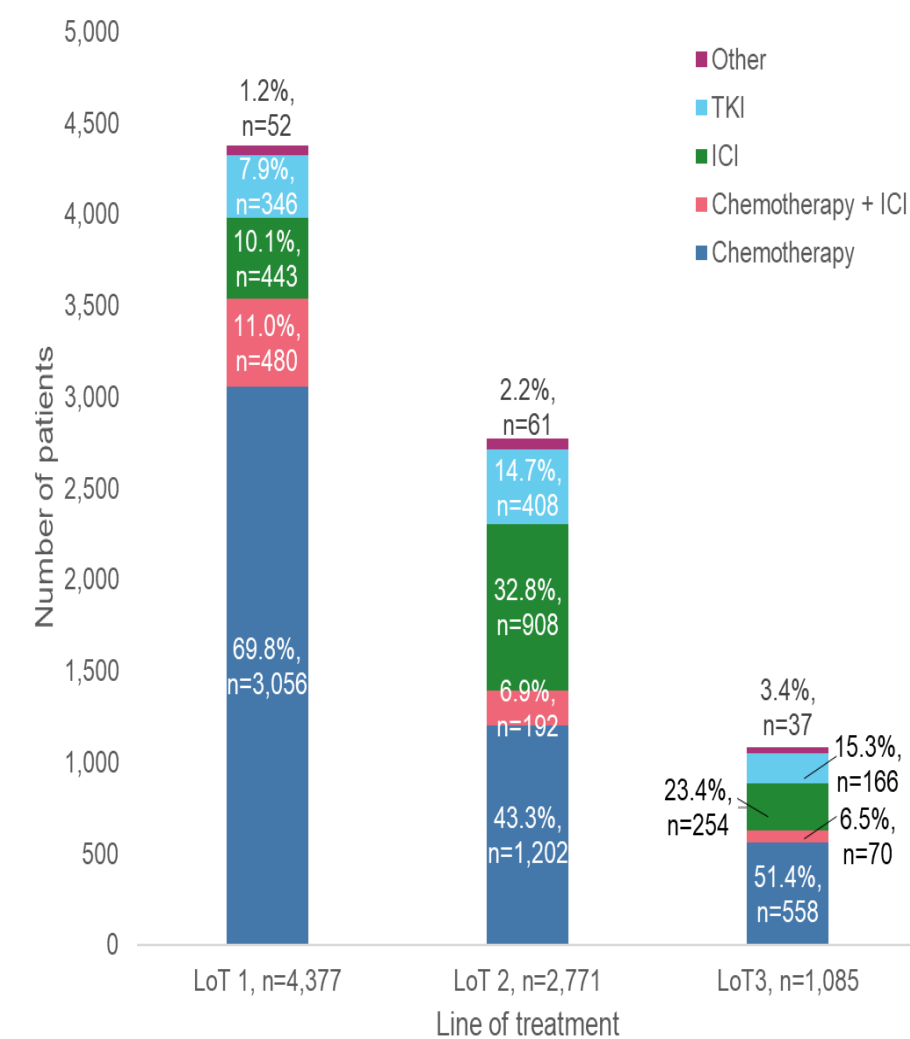
Variable	Odds ratio (95% CI)	p value
<b>Intercept</b>	2.04 (1.52, 2.76)	<0.001
<b>Sex, male</b>	0.82 (0.74, 0.91)	<0.001
<b>Age group at diagnosis</b>		
51–64 years	0.78 (0.62, 0.97)	0.030
≥65 years	0.69 (0.55, 0.86)	0.001
<b>Race</b>		
Black or African American	0.83 (0.72, 0.97)	0.72
Other*	1.44 (1.16, 1.79)	1.16
Unknown	1.03 (0.84, 1.27)	0.84
<b>Smoking status</b>		
Former smoker	1.49 (1.27, 1.74)	<0.001
Never smoked tobacco	2.64 (2.05, 3.42)	<0.001
Unknown	1.35 (1.17, 1.55)	<0.001
<b>ECOG performance status</b>		
1	0.93 (0.78, 1.11)	0.414
2+	0.69 (0.57, 0.84)	<0.001
Missing	0.56 (0.48, 0.66)	<0.001
<b>Histology</b>		
Other/Unknown	0.53 (0.45, 0.61)	<0.001
Squamous	0.22 (0.19, 0.25)	<0.001
<b>Year of advanced diagnosis</b>		
2013	1.09 (0.89, 1.34)	0.398
2014	1.23 (1.01, 1.51)	0.039
2015	1.21 (1.00, 1.47)	0.055
2016	1.50 (1.23, 1.83)	<0.001
2017	2.77 (2.25, 3.41)	<0.001
2018	2.48 (2.00, 3.07)	<0.001
2019	1.74 (1.34, 2.26)	<0.001
2020	2.07 (1.40, 3.09)	<0.001

\*Included American Indian or Alaska Native, Asian, Native Hawaiian or Other Pacific Islander, Other race, or unknown race. Reference groups are females, age ≤50, White, current smoker, ECOG score of 0, non-squamous, and diagnosis year of 2012.

### Treatment patterns

- 63.6% (n=4,377) of patients received any 1L treatment (**Figure 1**)
  - 63.3% (n=2,771) received 2L treatment
  - 24.8% (n=1,085) received 3L treatment
- 1L treatment included chemotherapy (69.8%), chemotherapy plus ICI (11.0%), ICI monotherapy (10.1%), tyrosine kinase inhibitors (7.9%), and other treatments (1.2%) (**Figure 1**)

**Figure 1. Treatment patterns by line of treatment and drug class**



## CONCLUSIONS

**41.7%** of patients diagnosed with aNSCLC received biomarker testing



Men, Black patients, current smokers, patients with squamous aNSCLC, and patients with an ECOG performance status of 2+ were less likely to be tested



Despite the increase in targeted therapies for aNSCLC and ease of biomarker testing, many real-world patients with aNSCLC were untested



**63.6%** of patients received any 1L treatment (chemotherapy, chemotherapy with ICI, ICI alone, TKI, or other)



## LIMITATIONS

- Generalizability to the overall aNSCLC and US population is limited as this study only included patients within the TEMPUS CancerLinQ network
- The rate of biomarker testing could be underestimated, especially those with negative results, due to the nature of electronic health record data abstraction
- Rates of biomarker testing were likely affected by the introduction of PD-L1 and other targeted treatments during the observation period of this study (2012–2020)



## INTRODUCTION

- Lung cancer is the leading cause of cancer deaths in the US<sup>1</sup>
- Approximately 65% to 70% of patients with NSCLC are diagnosed at advanced stages<sup>2,3</sup>
- Molecular profiles and immunologic status help determine treatment options and allow for individualized treatment for patients with aNSCLC



## OBJECTIVES

- To describe patient characteristics, factors associated with biomarker testing, and treatment patterns in real-world US patients with aNSCLC

**Abbreviations:** 1L, first line; 2L, second line; 3L, third line; aNSCLC, advanced NSCLC; CI, confidence interval; ECOG, Eastern Cooperative Oncology Group; ICI, immune checkpoint inhibitor; IQR, inter-quartile range; LoT, line of treatment; NSCLC, non-small cell lung cancer; OR, odds ratio; PD-1/L1, programmed death-1/ligand-1; SD, standard deviation; TKI, tyrosine kinase inhibitor; US, United States; yrs, years.  
**References:** 1. National Cancer Institute: SEER Cancer STAT Facts: Lung and Bronchus Cancer. Available at: <https://seer.cancer.gov/statfacts/html/lungb.html> (accessed March 15, 2023); 2. Flores R, et al. *JAMA Netw Open*. 2021;4(12):e2137508; 3. Morgensztern D, et al. *J Thorac Oncol*. 2010;5:29–33.

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