



An Exploratory Analysis Of Real-World Data For Assessing Patient Characteristics, Region, Stage, and Pd-L1 Healthcare Utilization Among U.S. Patients With Advanced Lung Cancer

Gianni Amato¹, gianni.amato@trinetx.com; Mustafa Mushtaq¹, mustafa.mustaq@trinetx.com; Courtney Thompson¹, courtney.thompson@trinetx.com; Chris LaVallee¹, chris.lavallee@trinetx.com
¹TriNetX, LLC, Cambridge, MA, USA

BACKGROUND AND OBJECTIVES

- Non-small cell lung cancer (NSCLC) comprises most of all lung cancers—which is the leading cause of cancer death across the world [1].
- Nivolumab (Opdivo), Pembrolizumab (Keytruda), Atezolizumab (Tecentriq), and Durvalumab (Imfinzi) are PD-L1 treatments used in advanced lung cancers.
- PD-L1 (programmed death-ligand 1) is a protein that is expressed on the surface of some cancer cells. It plays a role in suppressing the immune system's response to cancer by binding to its receptor PD-1 on immune cells, which inhibits their ability to attack cancer cells. PD-L1 expression is one of the ways that cancer cells evade the immune system.
- PD-L1 treatment refers to the use of drugs that target the interaction between PD-L1 and PD-1 to help the immune system attack cancer cells more effectively. These drugs are called immune checkpoint inhibitors and work by blocking the PD-L1/PD-1 interaction, which allows immune cells to attack cancer cells.
- The objective of this study was to assess PD-L1 healthcare utilization among U.S. patients with Advanced Lung Cancer in real-world settings.

METHODS

- TriNetX Dataworks USA structured electronic health records (EHR) data from 55 centers in the US were extracted from a proprietary database of real-world data.
- TriNetX data set contained 68,479 patient records and includes key information about pembrolizumab, nivolumab, atezolizumab, and durvalumab use in advanced NSCLC.
- Data cut included all advanced NSCLC patients diagnosed between January 1, 2010 and March 15, 2023.
- Patient records were analyzed to assess real-world demographics, baseline characteristics, NSCLC category, region, and PD-L1 treatment utilization among patients with advanced NSCLC in clinical practice.
- PD-L1 testing in Advanced NSCLC records were stratified by age, region, and NSCLC diagnosis based on ICD-10 codes.

Table 1. Example of Structured EHR Patient Record.

ID	SEX	RACE	ETH	MS	BYEAR	DYEAR	REGION	AGECAT	AGE	Histology	CODE	CDATE	DRUG
###	F	White	Hispanic	Married	1947	2015	Midwest	1	68	NSCLC (adenocarci nomas)	1597876	7/28/2015	Nivolumab
###	M	Asian	Not Hispanic or Latino	UNK	1945	2023	South	1	78	NSCLC (adenocarci nomas)	1792776	1/18/2021	Atezolizumab
###	F	White	Not Hispanic or Latino	Married	1955	2017	Northeast	0	62	NSCLC (adenocarci nomas)	1547545	3/6/2017	Pembrolizumab
###	M	Black	Not Hispanic or Latino	Single	1956	2019	Unknown	0	63	NSCLC (adenocarci nomas)	1919503	12/1/2020	Durvalumab

RESULTS

- 67,015 patient records were identified and analyzed between 2010 and 2023.
- Median age at diagnosis was relatively consistent across all PD-L1 treatment in NSCLC.
- Age range of records is wide: 11 to 90 years.
- Robust race representation in the dataset that is representative of the general U.S. population.
- Regional representation is relatively well-balanced and representative of the general population density in the U.S.
- Sex at birth is balanced with PD-L1 use slightly greater in men across the dataset.

Table 2. Patient demographics and baseline characteristics.

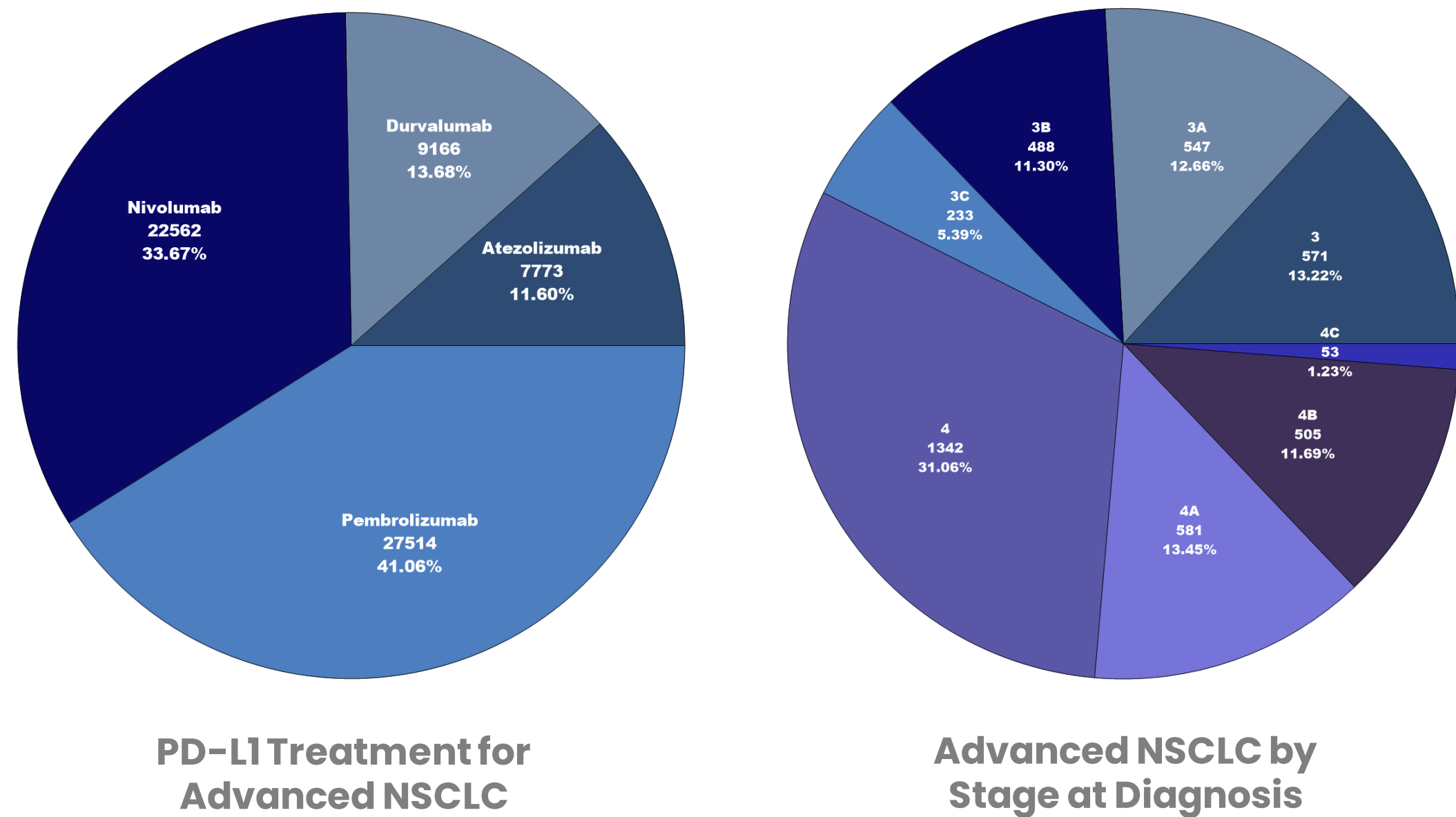
Age by PD-L1 Treatment Use	N	Mean	STD	Median	Min	Max
Atezolizumab	7,773	68.50	8.99	68.00	38.00	90.00
Durvalumab	9,166	70.13	8.20	70.00	11.00	89.00
Nivolumab	22,562	69.28	10.37	70.00	21.00	90.00
Pembrolizumab	27,514	70.31	10.16	70.00	11.00	90.00

Race by PD-L1 Treatment N (%)	American Indian or Alaska	Asian	Black or African American	Native Hawaiian or Other	Unknown	White	Total
Atezolizumab	29 (0.04)	135 (0.20)	409 (0.61)	0 (0.00)	796 (1.19)	6,404 (9.56)	7,773 (11.60)
Durvalumab	164 (0.24)	355 (0.53)	417 (0.62)	0 (0.00)	353 (0.53)	7,877 (11.75)	9,166 (13.68)
Nivolumab	44 (0.07)	1,247 (1.86)	2,474 (3.69)	0 (0.00)	806 (1.20)	17,991 (26.85)	22,562 (33.67)
Pembrolizumab	106 (0.16)	1,373 (2.05)	2,355 (3.51)	109 (0.16)	1,441 (2.15)	22,130 (33.02)	27,514 (41.06)
Total	343 (0.51)	3,110 (4.64)	5,655 (8.44)	109 (0.16)	3,396 (5.07)	54,402 (81.18)	67,015 (100)

Region by PD-L1 Treatment N (%)	Midwest	Northeast	South	Unknown	West	Total
Atezolizumab	1,784 (2.66)	1,644 (2.45)	1,377 (2.05)	340 (0.51)	2,628 (3.92)	7,773 (11.60)
Durvalumab	4,571 (6.82)	1,366 (2.04)	841 (1.25)	152 (0.23)	2,236 (3.34)	9,166 (13.68)
Nivolumab	9,279 (13.85)	1,055 (1.57)	4,358 (6.50)	1,215 (1.81)	6,655 (9.93)	22,562 (33.67)
Pembrolizumab	9,405 (14.03)	151 (0.23)	4,896 (7.31)	1,020 (1.52)	12,042 (17.97)	27,514 (41.06)
Total	25,039 (37.36)	4,216 (6.29)	11,472 (17.12)	2,727 (4.07)	23,561 (35.16)	67,015 (100)

Sex at birth by PD-L1 Treatment N (%)	Female	Male	Total
Atezolizumab	3,958 (5.91)	3,815 (5.69)	7,773 (11.60)
Durvalumab	3,959 (5.90)	5,207 (7.77)	9,166 (13.68)
Nivolumab	10,111 (15.09)	12,451 (18.58)	22,562 (33.67)
Pembrolizumab	12,516 (18.68)	14,998 (22.38)	27,514 (41.06)
Total	30,544 (45.58)	36,471 (54.42)	67,015 (100)

Figure 1. PD-L1 treatment and NSCLC stage at diagnosis.



PD-L1 treatment use between 2010 and 2023 were distributed as follows:

- Pembrolizumab 27,514 or 41%
- Nivolumab 22,562 or 34%
- Durvalumab 9,166 or 14%
- Atezolizumab 7,773 or 12%

- NSCLC was diagnosed in the cohort most frequency in stage 4 with 31%
- Stage 3, 3A, 3B, were diagnosed at 13.2%, 12.6%, and 11.3% respectively

CONCLUSION

- These findings demonstrate that real-world data analyzed from 55 centers in the US is effective in evaluating lung cancer therapy in different demographics, regions, and stages across four PD-L1 treatments.
- These data may provide highly valuable information to support lung cancer clinical research (e.g., historical health data, patient share of PD-L1 treatments), regulatory interactions (e.g., external control arms) and payer decision making (e.g., real-world cost of new treatments).

REFERENCES

- American Cancer Society. (2021). Key statistics for lung cancer. Retrieved from <https://www.cancer.org/cancer/lung-cancer/about/key-statistics.html>