Table 1. Patient characteristics and real-world overall survival by type of first-line treatment for metastatic NSCLC, Jan 2014 to June 2017, IRST-Italy

Characteristics	Overall N=428	Platinum doublet N=244	Single agent chemo N=102	Targeted therapy N=43	Immuno therapy N=1	Clinical trial N=38
Age >65 years	276 (64.5)	121 (49.6)	99 (97.1)	33 (76.7)	1 (100.0)	22 (57.9)
Men	268 (62.6)	155 (63.5)	75 (73.5)	14 (32.6)	0 (0.0)	24 (63.2)
Current/former smoker	310 (72.4)	188 (77.0)	69 (67.6)	21 (56.8)	1 (100.0)	31 (81.6)
Squamous histology	63 (15.0)	37 (15.6)	19 (18.8)	1 (2.3)	0 (0.0)	6 (15.8)
Stage IV at diagnosis	335 (78.5)	189 (77.8)	75 (73.5)	38 (88.4)	0 (0.0)	33 (86.8)
ECOG PS ≥2	70 (17.3)	30 (12.7)	28 (29.8)	12 (30.8)	0 (0.0)	0 (0.0)
EGFR mutant*	51 (15.7)	2 (1.0)	1 (0.9)	38 (88.4)	0 (0.0)	10 (28.6)
ALK translocated*	21 (8.4)	10 (4.1)	5 (10.9)	3 (8.6)	0 (0.0)	3 (9.7)
Real world overall survival #						
Median (95% CI)	6.4 (5.8-7.5)	6.4 (5.8-7.6)	4.4 (3.7-5.7)	19.9 (9.2-21.7)	-	8.5 (4.8-13.6)
6 month rate (95% CI)	52.1 (47.2-56.7)	53.6 (47.2-59.7)	36.6 (27.1-45.5)	74.4 (58.6-84.9)	-	60.5 (43.3-74.0)

*Done only for 358 patients with not squamous histology
Data cutoff: Dec 2017

Conclusion: In this analysis prior to the introduction of immunotherapies for NSCLC, OS was similar to real world OS in the published literature. The survival was worse in the single agent chemotherapy group while it is superior in platinum doublets group. Overall survival was longest in patients treated with targeted therapy. **Keywords:** treatment pattern, real-world study, Outcomes

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Real World Outcomes of Advanced NSCLC Patients with Liver Metastases

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Background: Patients with advanced lung cancer represent a heterogenous population with varying patterns of metastasis. Those with liver metastases may represent a unique cohort with differential response to therapy, including immunotherapy in NSCLC. Novel Natural Language Processing (NLP) and Artificial Intelligence (AI) technology enables automated extraction of real-world data to examine these populations at greater scale than current manual chart abstraction processes, helping clinicians make more informed treatment decisions. **Method:** Patients diagnosed with stage IIIB/IV lung cancer who received first-line systemic therapy at the Princess Margaret Cancer Centre between 2015 and 2018 were reviewed using the DARWEN™ NLP and AI data abstraction platform developed by Pentavere. Data extracted include tumour histology, patient age, sex, ECOG performance status, smoking status, biomarker status, PD-L1 expression, sites of metastases, treatment details and survival. **Result:** Of 615 patients with accessible electronic pathology records, 540 (87.8%) had NSCLC and 333 (54.1%) received systemic therapy. In those patients treated with first-line therapy (immunotherapy 10.2%, targeted therapy 30.9%, chemotherapy 62.7%), 27.3% (91/333) had liver metastasis at any point from baseline to end of follow up (median follow up 8 months). 280 patients had NSCLC and received systemic therapy and were included in subsequent analysis. Of these, 69 (24.6%) had liver metastases at any point and overall survival was worse in those patients 544 vs 715 days (p=0.006). Liver metastases were more commonly seen in those with more metastatic sites (OR: 1.42, 95% CI: 1.19-1.70, p = <0.001). By contrast, those with *EGFR* mutant lung cancer were less likely to develop liver metastasis (OR: 0.45, 95% CI: 0.23-0.87, p=0.02). Using Cox regression analyses, after controlling for age, sex, baseline performance status, baseline smoking status, first line treatment, total number of metastatic sites and baseline LDH, presence of liver metastasis remained significantly associated with worse survival (HR: 1.78, 95% CI: 1.14-2.76, p=0.01). Elevated baseline LDH, a known poor prognostic factor, was also associated with worse overall survival (HR: 1.58, 95% CI: 10.6-2.35), p=0.02). No differential effect by type of therapy was seen. **Conclusion:** The presence of liver metastases confers worse prognosis in advanced non-small cell lung cancer patients. This effect was observed irrespective of treatment type and highlights the need for additional treatment options which are efficacious in this patient population. Larger cohort studies may help identify patients with liver metastases that may benefit from specific therapeutic strategies in the future. NLP and AI technologies like DARWEN™ can rapidly generate population-based datasets and provide clinicians with timely access to previously unavailable information on treatment patterns and outcomes which can lead to improved care. **Keywords:** Real world evidence, AI, Liver metastasis

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Real World Diagnosis and Treatment Outcomes in Patients with EGFR-Mutant Metastatic Lung Cancer

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Background: We recently showed that lung cancer incidence and mortality rates have steadily decreased in California between 1990 and 2014. Improvements in overall and yearly survivals were most pronounced for Asian and female patients, and for patients with adenocarcinoma after 2004, when molecularly targeted therapy was introduced (Pan et al., ASCO 2018). The objective of this study was to determine the impact of molecular diagnosis and targeted therapy on survival by time interval, gender, race/ethnicity, and smoking status in patients with EGFR-mutant metastatic lung cancer. **Method:** This retrospective study included consecutive cases from patients with locally advanced or metastatic EGFR-mutant NSCLC seen at an academic clinic between 2009 and January 2018 with follow up through February 2019. Allele-specific PCR was used before 2014 (Cohort 1, N=94)) and FoundationOne® was used after 2014 (Cohort 2, N=101). Kaplan-Meier curves were estimated for overall survival and stratified by smoking status, gender, and race/ethnicity. Relative survival rates were calculated for 1 year, 2 years and 5 years. **Result:** A total of 83 and 88 patients with metastatic lung cancer who received ≥1 EGFR TKI were identified in Cohort 1 and 2, respectively. **Table** below summarizes demographic characteristics, median overall, 1-year, 2-year and 5-year survivals for each cohort. Relative to cohort 1, all cohort 2 subgroups saw improvements in survival. Improvement was most pronounced for never smoker, female, asian and white patients. Survival rates among both cohorts were significantly higher than that of all patients in California during the same periods.

EGFR TKI-Treated Patients	Cohort 1 (N=83)	Cohort 2 (N=88)	HR (95% CI)
Age (mean ± SD) (years)	58.7 ± 11.7	67.2 ± 14.3	
Median Overall Survival (months)	33.5	45.3	0.6 (0.39-0.80)
1-year survival rate (%)	91.5%	93.9%	
2-year survival rate (%)	64.3%	79.5%	
5-year survival rate (%)	16.1%	43.2%	
Never smoker: No. Patient (%)	52 (62.7%)	54 (61.4%)	
Median survival (months)	32.5	60.2	0.4 (0.27-0.71)
Female: No. Patient (%)	51 (61%)	54 (61%)	
Median survival (months)	31.6	78.8	0.4 (0.27-0.71)
Male: No. Patient (%)	32 (39%)	34 (39%)	
Median survival (months)	31.6	78.8	0.8 (0.27-1.39)
White: No. Patient (%)	59 (71.1%)	52 (59.1%)	
Median survival (months)	37.9	45.3	0.55 (0.35-0.87)
Asian: No. Patient (%)	21 (25.3%)	26 (29.5%)	
Median survival (months)	34.4	80.0	0.50 (0.22-1.06)