# Genomic Testing and Treatment Landscape in Patients with Advanced Non-Small Cell Lung Cancer (aNSCLC) Using Real-World Data from Community Oncology Practices



Hinco J. Gierman<sup>1</sup>, Seth Goldfarb<sup>1</sup>, Monica Labrador<sup>1</sup>, Caroline M. Weipert<sup>2</sup>, Bill Getty<sup>2</sup>, Stan M. Skrzypczak<sup>2</sup>, Casey Catasus<sup>1</sup>, Steve Carbral<sup>1</sup>, Mallika Singaraju<sup>1</sup>, Nick Singleton<sup>1</sup>, Nikhil Pai<sup>1</sup>,

Jose Sanchez<sup>1</sup>, Jennifer Webster<sup>1</sup>, Victoria M. Raymond<sup>2</sup>, Richard B. Lanman<sup>2</sup>, Ash Malik<sup>1</sup>, Jeffrey A. Scott<sup>1</sup>

<sup>1</sup>Integra Connect, West Palm Beach, FL; <sup>2</sup>Guardant Health, Redwood City, CA

### INTRODUCTION

- Although targeted therapies and immune checkpoint inhibitors (ICPi) are associated with a trend towards lower aNSCLC death rates, it will cause nearly 25% of all U.S. cancer mortality in 2019.<sup>1</sup>
- At the time of this study, NCCN guidelines recommended testing of eight biomarkers in patients with aNSCLC at diagnosis, with FDA-approved therapies available for patients with targetable alterations (TAs) in *EGFR*, *BRAF*, *ALK*, and *ROS1*. Notably, the number of recommended biomarkers has expanded in the current guidelines.<sup>2,3</sup>
- Previous studies, most of which took place in 2017 or earlier, have shown that despite the superior outcomes associated with targeted therapy, most patients are not tested for all guideline-recommended genes. 4,5,6,7,8,9,10
- Our objective was to understand if testing rates have improved based on 2017 and 2018 data and examine the impact these results had on patient care.

## METHODS

- The Integra Connect database, which includes electronic medical record (EMR) and claims data on approximately 600,000 cancer patients, was queried across five community oncology practices (encompassing 289 oncologists) to identify aNSCLC patients (stage IIIB or IV) treated since January 1, 2017.
- Manual review of charts was done to abstract tumor type/stage, drug regimens, and evidence of somatic genetic testing.
- A Wilcoxon rank sum test was used to evaluate differences in time to results (TTR) for blood- versus tissue-based tests.

## REFERENCES

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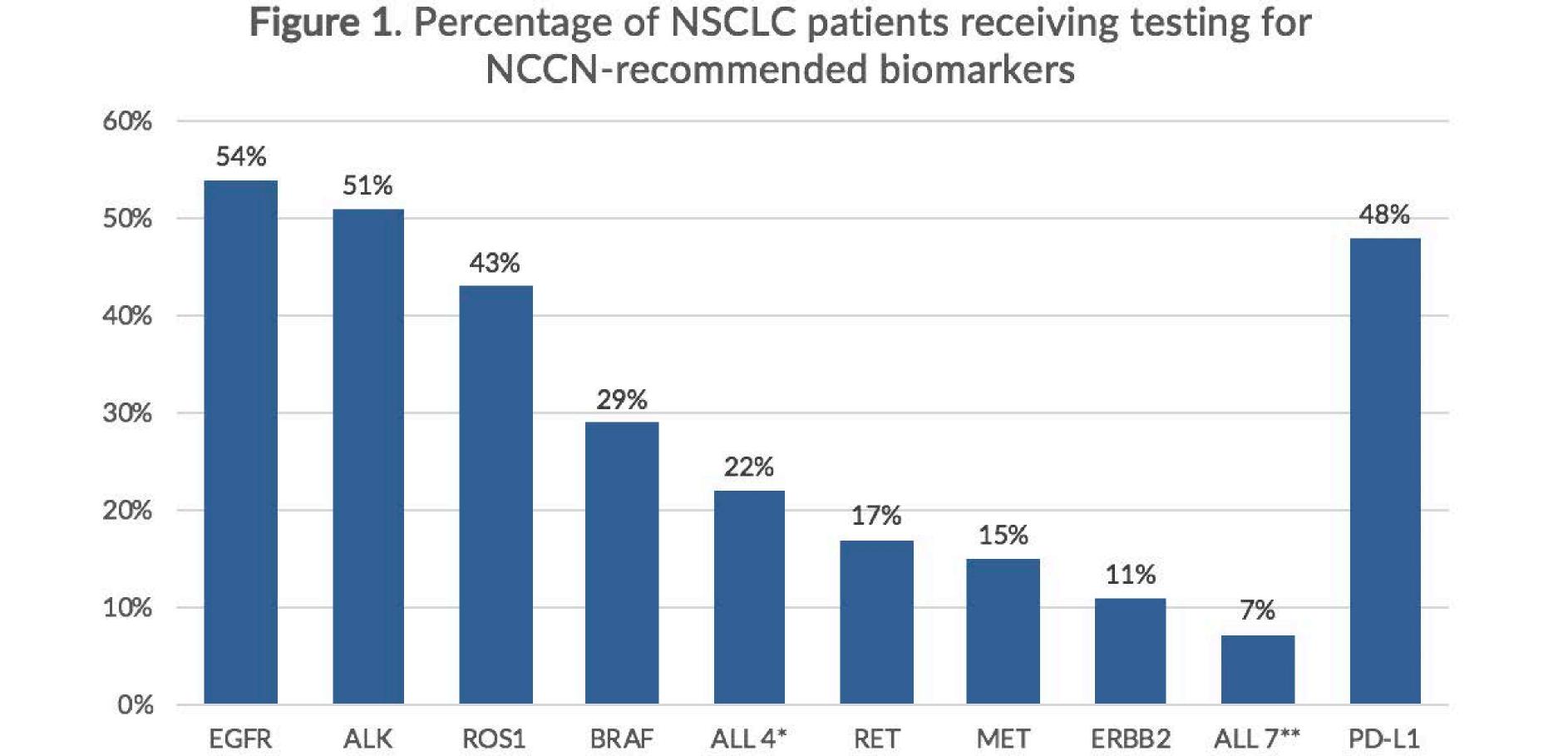
• A total of 1,203 patients with aNSCLC were identified in the Integra Connect database (Table 1), and these records subsequently underwent manual review.

<b>Table 1.</b> Demographic information for N = 1,203 aNSCLC from the Integra Connect database.			
Gender	Female Male Unknown	578 (48%) 633 (52%) 3 (0%)	
Age (Years)	18 – 64 65+	354 (29%) 849 (71%)	
Ethnicity	Caucasian Hispanic or Latino African American Unknown	942 (78%) 23 (2%) 10 (1%) 228 (19%)	
Smoking Status	Current/Former Smoker Non-Smoker Unknown	81.3% 14.4% 4.3%	

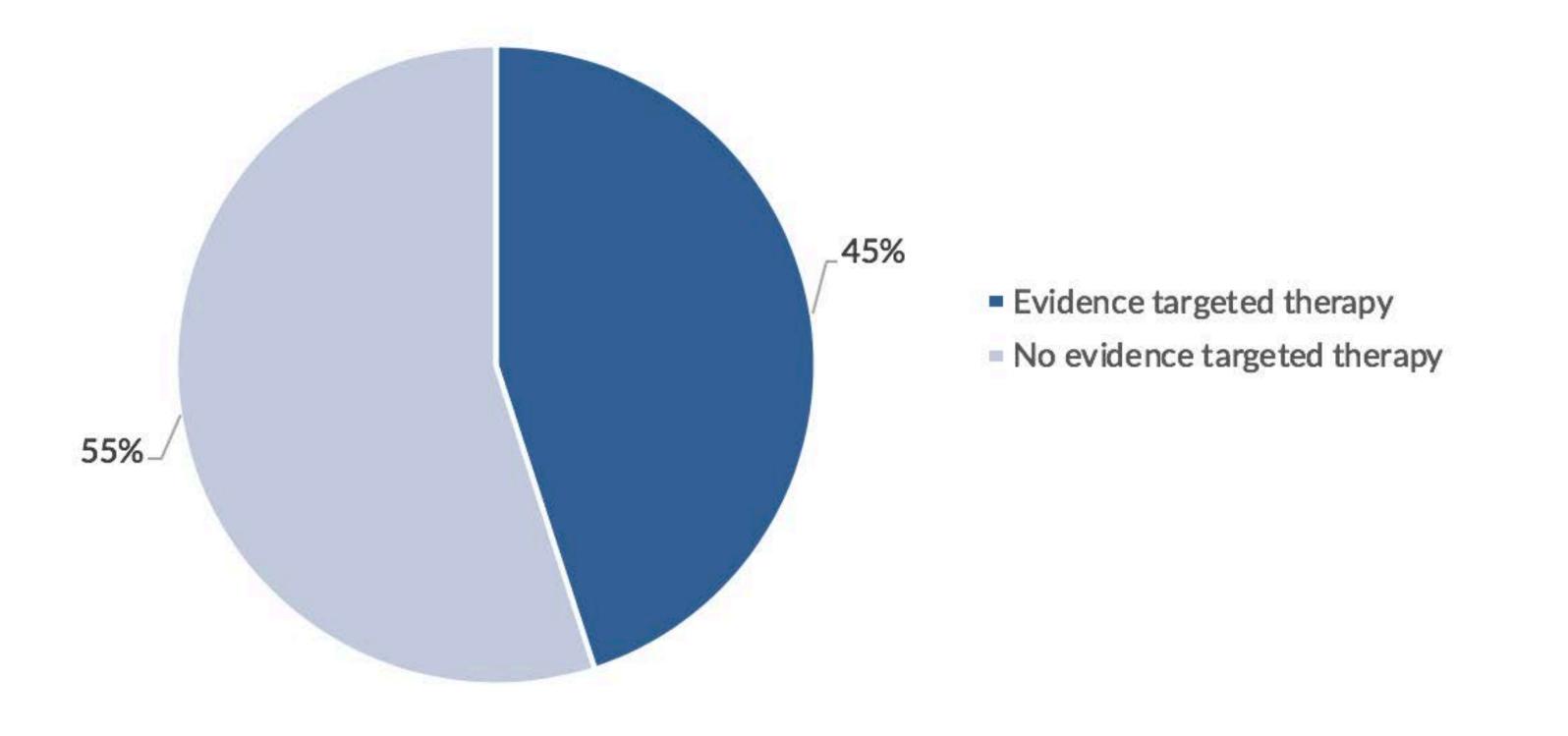
- Between 11-54% of patients with aNSCLC had evidence of testing for at least one of the seven NCCN-recommended genes as defined in Version 6.2018 of the NSCLC guidelines (Figure 1), with TTR outlined in Table 2.
- Twenty-two percent of patients were tested for all four genes with on-label targeted therapy options.

Table 2. TTR of somatic molecular tests ordered.			
Type of test	Median TTR (days)	p-value	
Blood-based tests	4	3.5 x 10 <sup>-7</sup>	
Tissue-based tests	14		

## RESULTS

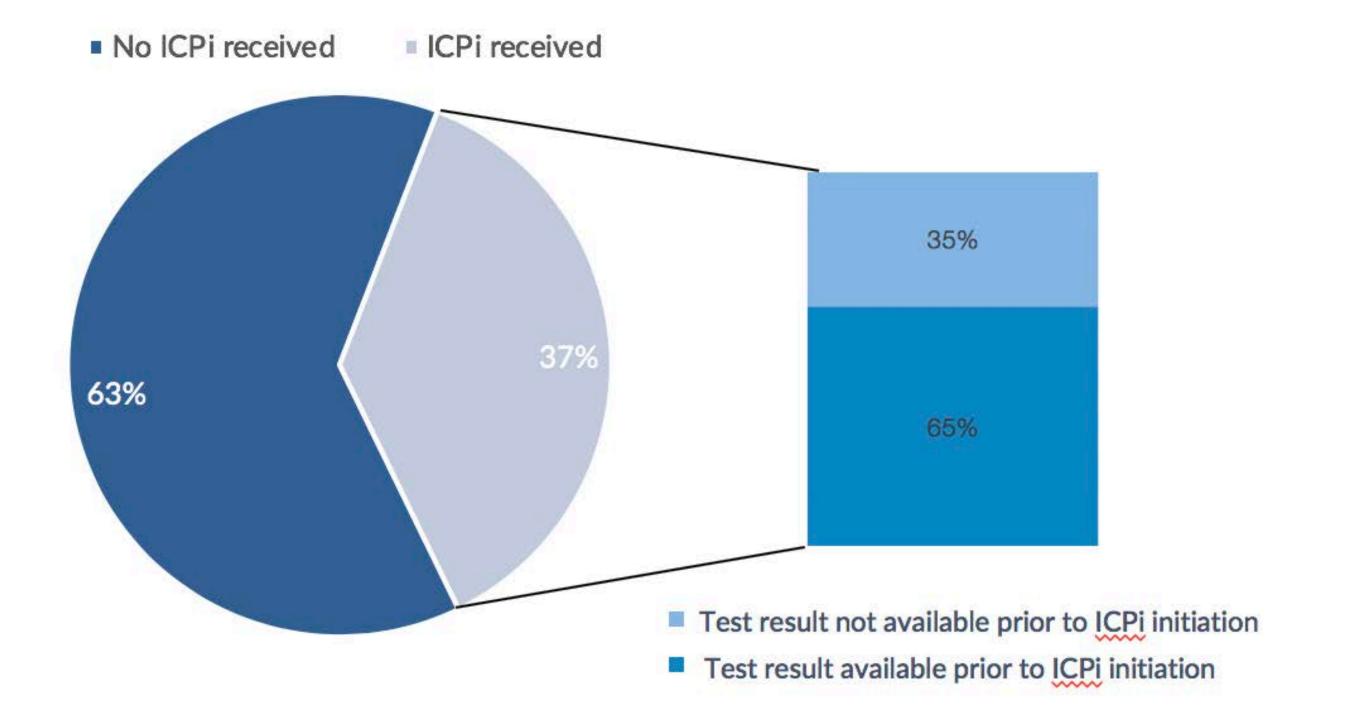


**Figure 2**. Percentage of patients with targetable alterations in *EGFR, ALK, ROS1*, or *BRAF* who received targeted therapy during any line of treatment



- Fifty-five percent of patients with TAs in *EGFR*, *ALK*, *ROS1*, and *BRAF* had no evidence of receiving the corresponding targeted therapy during any line of treatment (Figure 2).
- Of 84 patients with a TA in *EGFR* or *ALK* and no evidence of prior progression on the corresponding FDA-approved tyrosine kinase inhibitor, 37% received an ICPi (Figure 3).

**Figure 3.** Percentage of patients with an actionable *EGFR* or *ALK* alteration and no evidence of progression on targeted therapy (N = 84) who received an immune checkpoint inhibitor (ICPi)



#### CONCLUSIONS

- Our review of 1,203 patients with aNSCLC treated in the community setting in 2017 and 2018 shows that patients continue to be undergenotyped for the NCCN-recommended genes, and <50% of patients who may have qualified for FDA-approved targeted therapy had evidence of receiving that therapy.
- Interestingly, counter to ICPi drug labels, we found that over one third of patients with a TA in *EGFR* or *ALK* and no evidence of progression on the corresponding tyrosine kinase inhibitor received an ICPi, with the majority of these patients known to have the TA at the time of ICPi initiation. <sup>11,12</sup>
- Previous work has suggested that tissue insufficiency, cost/reimbursement challenges, poor performance status, and turnaround time may act as barriers to the uptake of comprehensive molecular testing, and given the continued low rates of testing seen in our study, we suggest that these barriers continue to present challenges to the widespread incorporation of comprehensive molecular testing into aNSCLC patient care.<sup>8,9</sup>
- Further research is needed to identify strategies to increase comprehensive testing of aNSCLC patients and to better understand the obstacles that currently prevent these results from consistently being used to inform optimal first line treatment.