

NON-SMALL CELL LUNG CANCER (NSCLC) BIOMARKER TESTING LANDSCAPE

Progress in NSCLC¹⁻⁵

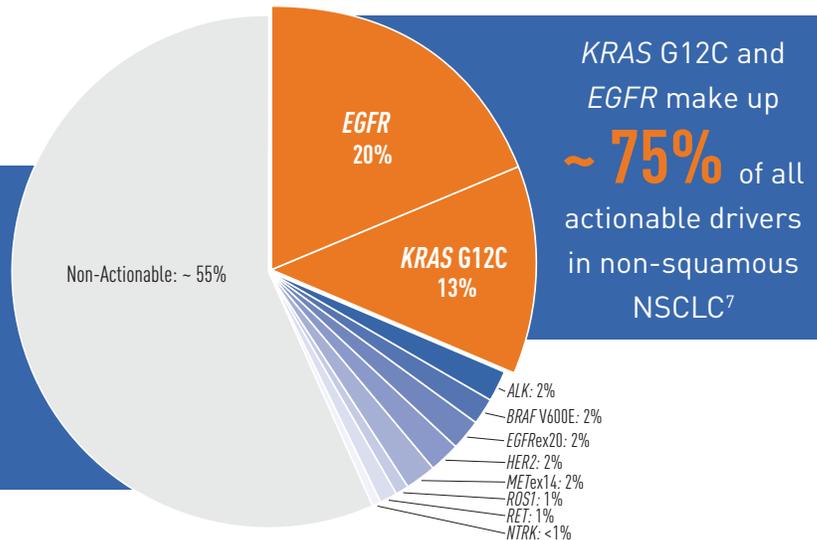
The biomarker landscape has evolved in recent years



- More than 20 targeted therapies have been approved for use in NSCLC¹
- ~60% of cancer therapies launched in the US between 2015 and 2020 require or recommend biomarker testing prior to use⁶

Prevalence of Actionable Oncogenic Drivers in NSCLC*

~ 2 in every 5
patients with non-squamous NSCLC
have an actionable driver mutation⁷



*Molecular alteration prevalence can vary slightly between different datasets and studies. Values in the graph are based on approximate molecular alteration frequencies from the AACR GENIE version 12.0 dataset (N=19,777). Participating institutions include academic centers in western countries. This graph only includes alterations predictive of response to an FDA-approved drug in locally advanced or metastatic NSCLC.⁷

Guidelines Recommend Broad Molecular Testing for Eligible Patients With Advanced NSCLC⁸⁻¹⁰

NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines[®]) Recommendations^{8,†,‡}

Actionable	Molecular Biomarker									Immune Biomarker	Emerging	Molecular Biomarker
	EGFR	KRAS G12C	ALK	HER2	METex14	BRAF	ROS1	RET	NTRK1/2/3	PD-L1		METamp
	Testing should be conducted as part of a broad molecular profiling									Single-biomarker immunohistochemistry testing recommended		Expanded-panel testing recommended

[†]The NCCN Guidelines[®] for NSCLC provide recommendations for certain individual biomarkers that should be tested and recommend testing techniques but do not endorse any specific commercially available biomarker assays or commercial laboratories.⁸

[‡]The NCCN Guidelines for NSCLC recommend broad molecular testing to identify rare driver variants for which targeted therapies may be available to ensure patients receive the most appropriate treatment.⁸

- ASCO and CAP/AMP/IASLC guidelines recommend testing for actionable and emerging biomarkers utilizing a comprehensive panel or targeted testing^{9,10}

Guideline-Recommended Biomarker Testing May Improve Patient Outcomes^{11,*†}

Adherence to testing for guideline-recommended biomarkers, regardless of therapy

Decreased mortality risk by **11%**

*This was a retrospective study of 28,784 patients diagnosed with advanced NSCLC. Adherence to biomarker testing consisted of patients with evidence of testing for any biomarker, including *EGFR*, *ALK*, *BRAF*, *KRAS*, *ROS1*, or PD-L1 between 14 days prior to and 90 days after diagnosis of advanced NSCLC and the main outcome, overall survival (OS), was agnostic to treatment.¹¹

†Multivariable analysis was adjusted for age at diagnosis of advanced NSCLC, sex, smoking status, and stage at initial diagnosis of NSCLC.¹¹

Many Patients With Newly Diagnosed NSCLC Do Not Receive Broad Molecular Testing¹²



~ **50%**
of metastatic patients
received comprehensive
biomarker testing^{12,‡}

Regardless of patient characteristics such as age, race, and smoking status, **biomarker testing** should be conducted in **all eligible patients** with advanced NSCLC¹³

‡A retrospective, observational study assessing real-world biomarker testing patterns in 3,474 patients with metastatic NSCLC from community oncology practices within The US Oncology Network between 2018 and 2020.¹²

Obtaining Prior Biomarker Test Results Can Be Challenging^{14,15}

In an Amgen sponsored survey of 196 oncologists who planned to use biomarker test results obtained at diagnosis to inform 2L+ treatment decisions, ~2/3 faced one or more of the following obstacles^{15,§}:

Previous biomarker test results are lost^{15,16}

Process for obtaining previous results is complex^{14,15}

EMR test results are not in an easily accessible format^{13,15}

Cannot access prior test results from patient referrals^{15,16}

Retrieving medical records from other physicians^{15,16}

§Data from a 30 minute double-blind online survey of 196 oncologists (n=55 academic, n=141 community) performed between Jan 1, 2022 and March 31, 2022.¹⁵

Biomarker Testing Considerations

Addressing Tissue Insufficiency

- Next-generation sequencing can reduce the number of ordered assays and conserve tissue¹³
- Rapid On-Site Evaluation (ROSE) assesses sample adequacy for molecular diagnostic studies, potentially reducing rebiopsy rates¹⁷
- Tissue biopsy is the gold standard for biomarker testing; however, using cfDNA in addition to tissue resulted in a 48% increase in the identification of patients with a guideline-recommended biomarker^{18,**}
- Liquid biopsy can be used when tissue collection is not feasible or test results are unavailable^{18,19}
- Due to false negative rates reflexing to tissue is recommended¹⁹

Shortening Turnaround Time (TAT)

- Broad molecular testing at diagnosis may take less time than consecutive single-gene testing, a process of elimination approach²⁰
- Reflex testing protocols can reduce average TAT by 37 days²¹

Considerations for Consistent Reporting

- Include all actionable mutations at the beginning of the report²²
- Report all mutations at the variant level²²
- Use uniform and unambiguous nomenclature to report variants (ie, *KRAS* G12C)²²

Documenting and Retrieving Biomarker Results

- Append patients' biomarker test reports in a reliable location within their EMR, such as with their surgical pathology report^{23,24}
- Consider establishing the optimal location for test results with your multidisciplinary team for easy retrieval by providers, now and in the future²³

**In the NILE study of 282 patients with non-squamous mNSCLC who received SOC tissue genotyping and cfDNA analysis for guideline-recommended biomarkers between 2016 and 2018. Overall concordance across four genes (*EGFR* exon 19 deletion and L858R, *ALK* fusion, *ROS1* fusion, and *BRAF* V600E).¹⁸

Learn more at [FindKRASG12C.com](https://www.findKRASG12C.com)



2L, second line; cfDNA, circulating-free DNA; EMR, electronic medical record; mNSCLC, metastatic non-small cell lung cancer; SOC, standard-of-care.

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