ACCC
Association of Community Cancer Centers

BiomarkerLIVE

Biomarker Testing Guide:

Lung Cancer

This toolkit is a guide for multidisciplinary cancer care team members who manage patients with lung cancer and are implementing—or plan to implement—biomarker testing in their cancer program.

Provider Education

Many providers indicate that more education about published guidelines and financial assistance for patients are needed to help them make decisions about biomarker testing in lung cancer.[1]

Incorporate Education

Offer educational opportunities about biomarker testing and lung cancer for the multidisciplinary team to keep up with evolving recommendations and changes in terminology.

Actively Reduce Disparities

A retrospective study of 14,768 patients with advanced or metastatic non-small cell lung cancer (NSCLC) found that the rate of next-generation sequencing (NGS) was 10% lower among Black patients compared to White patients (P<.0001).[2] Providers should try to reduce barriers to ensure that all patients receive appropriate biomarker testing.

Understand Testing Methodologies[3]

Although broad molecular profiling via NGS or a multiplex panel is critical, providers need to understand that there is no single test that captures all potential biomarkers. Providers should know what genomic alterations are covered by the methodologies their lab (in-house or external) uses to ensure that all potentially actionable alterations are captured.

Know the Limitations[3]

All testing methodologies have limitations in detecting certain alterations. For example, DNA-based NGS may not identify all *ROS1* and *NTRK1/3* fusions. NGS can identify alterations with unknown clinical significance, such as *EGFR* variants.

Recommended Biomarkers[3]

- *EGFR* mutations
- *ALK* rearrangements
- *ROS1* rearrangements
- *BRAF* point mutations
- *KRAS* point mutations
- *MET* exon 14 skipping variants
- *RET* rearrangements
- *NTRK1/2/3* fusions
- PD-L1 expression

After progression on targeted therapy: Consider broad genomic profiling to identify potential mechanisms of resistance.

PROVIDER EDUCATION

Liquid Biopsy[3]

Only after a histologic tissue diagnosis, circulating tumor DNA may be used for:

- Patients medically unfit for invasive biopsy
- When there is insufficient material from initial collection and/or when tissue-based analysis found no oncogenic driver
- Plasma or tissue-based testing via broad molecular profiling should be considered at progression for genomic resistance mechanisms

Simplify Test Reports

Check if your institution provides services to streamline biomarker test reports for providers. If this is not available, there are companies that offer services to interpret test results. Pathologists should ensure that reports are crafted so that the recipient can easily use the information.

Patient Education

Lung cancer patient advocates say that one of the challenges of optimizing biomarker testing is educating patients about how their results may change their treatment.

Know When to Educate

Many patients are overwhelmed at their diagnosis and remember little from their first visit; this is not the right time to provide thorough education about lung cancer, treatment, and biomarker testing.

Know What to Teach

Most patients are most concerned about how biomarker testing may affect their treatment and if there are risks. Educate patients and caregivers about what biomarker testing is and its importance, including why waiting for results before starting treatment can help providers select the best treatment option for individual patients. For example, knowing whether tumors have a mutation helps oncologists determine whether to treat a cancer with targeted therapy rather than an immune checkpoint inhibitor.[3] Once biomarker test results are available, providers should explain to their patients what the results mean and how they may affect treatment options.

"Use patient-friendly language that they're going to see replicated in other patient resources. Use consistent terms for biomarker testing that are being adopted by patient-facing organizations to overcome any miscommunication that could occur about the complex step of testing."

Adopt Consistent Terminology[4]

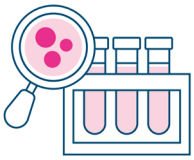
- **Biomarker testing –** Laboratory analysis of a biospecimen to test for specific biologically relevant mutations, multiple gene alterations, proteins, and/or other biomarkers
- **Genetic testing for an inherited mutation or genetic testing for inherited cancer risk –** to identify germline mutations
- **Testing the cancer for mutations –** One specific type of biomarker testing looks for mutations in the cancer (somatic mutations)

Know How to Educate

Different patients prefer different teaching methods, and medical oncologists are the primary source of their information about biomarker testing.[1] It is important to talk directly to patients about their lung cancer and treatment and give them handouts to refer to later. Include in your handouts trusted online resources that patients can use to obtain more information about their cancer and to locate supportive services. Some patients appreciate their physicians calling them after office appointments to follow up with any questions.

Examples of Trusted Resources

- *LUNGevity Foundation*
- *Cancer.Net*
- *GO2 Foundation for Lung Cancer*
- *American Cancer Society*
- *Cancer Support Community*



Infrastructure

A major limitation to community-based cancer programs implementing broad biomarker testing for patients with lung cancer is logistics—not lack of awareness.[6]

Ensuring Sufficient Tissue

Multidisciplinary teams should provide feedback to providers to ensure they are collecting adequate amounts of patient tissue for testing.

"Reflex testing is the best way to ensure patients do not fall through the cracks, and that they are not separated out based on disparity variables, such as the ability to pay."

Communication is Key

Treating clinicians should communicate clearly with pathologists when ordering testing, stating the reason for the biopsy, if certain tests should be prioritized, and when to order tests from an outside lab.[6] To ensure all stakeholders understand the need to collect sufficient tissue, use a standardized communication approach when ordering biomarker testing.

For example, community-based programs frequently obtain bronchoalveolar lavage or fine needle aspiration cytology, which do not provide enough tissue for comprehensive biomarker testing. A potential solution is to use formal requests through the electronic health record to specify to the lab the amount of tissue and type of specimens needed.

Institute Reflex Testing

Incorporating standardized reflex testing ensures that all members of the care team know what to expect and prevents patients from falling through the cracks. Reflex testing results are often available at a patient's first visit with their oncologist. For example, the pathologist should initiate *EGFR* testing at the time of diagnosis for patients with non-squamous NSCLC, regardless of stage.[7] Reflex testing can also be used to obtain results of more common alterations, such as in *EGFR* or *ALK*, before NGS results are returned.

Staffing and Services

The collective efforts of the multidisciplinary team are critical to ensuring patients with lung cancer receive optimal care across all stages of their disease. Tumor boards that meet regularly and prioritize discussing biomarkers are critical for remaining up to date with the continuously evolving recommendations for testing and treatment.

Incorporate Attended Biopsies

Implementing rapid on-site evaluation increases the number of specimens with sufficient tissue for comprehensive testing and prevents the need for repeat biopsies in at least 1 out of every 10 patients.[8]

Adequate Personnel and Services

Connect patients to dedicated financial navigators who can help them understand the cost of biomarker testing, secure insurance coverage, and find ways to reduce co-pay costs.

"Having attended biopsies, I have seen how important it is to make sure enough tissue is available for diagnosis and testing. While not every institution may have the appropriate personnel to ensure that—such as a cytopathologist—technology can help to facilitate, such as by enlisting a technologist at the site of the procedure to manage the specimen and a centrally located pathologist to assess the specimen."

-**MICHELLE SHILLER, DO, FACP** ASSOCIATE MEDICAL DIRECTOR
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