CMS Measure ID/CMS QCDR ID: CAP34

Measure Title: Molecular Assessment: Biomarkers in Non-Small Lung Cancer

Measure Specifications

Measure Description	Percentage of non-small cell lung cancer (NSCLC) pathology reports that include anaplastic lymphoma kinase (ALK), epidermal growth factor receptor (EGFR), AND tyrosine protein kinase ROS1 mutation status.
Denominator Statement	All pathology reports with documentation of lung biopsy, cytology, or resection that have diagnosis of NSCLC CPT©: 88305 (Lung, transbronchial biopsy) 88307 (Lung, wedge biopsy) 88309 (Lung, total/lobe/segment resection) 88104 (Cytopathology, fluids, washings or brushings, except cervical or vaginal; smears with interpretation) 88108 (Cytopathology, concentration technique, smears and interpretation) 88112 (Cytopathology, selective cellular enhancement technique with interpretation) 88173 (Cytopathology, evaluation of fine needle aspirate; interpretation and report) **AND** ICD-10 • C34.00: Malignant neoplasm of unspecified main bronchus • C34.01: Malignant neoplasm of right main bronchus • C34.02: Malignant neoplasm of left main bronchus • C34.10: Malignant neoplasm of upper lobe, unspecified bronchus or lung • C34.11: Malignant neoplasm of upper lobe, right bronchus or lung • C34.12: Malignant neoplasm of upper lobe, left bronchus or lung • C34.2: Malignant neoplasm of middle lobe, bronchus or lung • C34.30: Malignant neoplasm of lower lobe, unspecified bronchus or lung • C34.31: Malignant neoplasm of lower lobe, right bronchus or lung • C34.32: Malignant neoplasm of lower lobe, left bronchus or lung • C34.80: Malignant neoplasm of overlapping sites of unspecified bronchus and lung • C34.81: Malignant neoplasm of overlapping sites of right bronchus and lung • C34.82: Malignant neoplasm of overlapping sites of left bronchus and lung • C34.90: Malignant neoplasm of unspecified part of unspecified bronchus or lung • C34.91: Malignant neoplasm of unspecified part of right bronchus or lung • C34.92: Malignant neoplasm of unspecified part of left bronchus or lung

Denominator Exclusions	Squamous cell carcinoma
Denominator Exceptions	Specimen contains metastatic carcinoma (not a primary neoplasm) Insufficient tissue for testing Necrotic tissue No residual carcinoma Not a lung specimen (e.g. lymph nodes, incl hilar lymph nodes; pleural fluid)
Numerator Statement	Pathology reports that contain impression or conclusion of, or recommendation for biomarker mutation testing for each of the three biomarkers, ALK, EGFR and ROS1. Information must be provided about each biomarker; a non-specific note about "biomarker testing" or other documentation that does not conclusively identify each biomarker by name does not meet the measure.
Numerator Exclusions	None
Guidance	This measure is to be reported each time a non-small cell lung cancer specimen pathology report is finalized during the performance period. This measure may be submitted by eligible clinicians who perform the quality actions described in the measure based on the services provided and the measure-specific denominator coding. A short note on mutation status can be made in the final report, such as: • Mutation(s) identified/positive • No mutation(s) identified/ negative • ALK, EGFR and ROS1 testing previously performed • ALK, EGFR and ROS1 mutation testing recommended • ALK, EGFR and ROS1 mutation cannot be determined or is not possible • ALK, EGFR and ROS1 mutation testing not indicated Mutation status may be derived from either the primary or a reference laboratory. The status does NOT have to be the same for all three biomarkers as long as each is recorded.
Measure Information	
NQS Domain	Communication and Care Coordination
Meaningful Measures Area(s)	Transfer of Health Information and Interoperability
Meaningful Measure Rationale	Various gene alterations have been identified as oncogenic drivers for NSCLC, including mutations of EGFR, ALK and ROS1. The Lung Cancer Mutation Consortium found that two thirds of NSCLC patients have an

oncogenic driver and that overall survival improves if patients receive matched targeted therapy (1).

Referring physicians depend on both the pathologists' interpretations of and any recommendations for tests in order to provide quality patient care. If the status is not indicated in each pathology report for the patient, unnecessary repeat testing may be performed delaying treatment and increasing cost. This measure monitors the success of pathologists in effectively communicating this important information for the purpose of care coordination and efficient use of resources.

Knowledge of mutation status of ROS1, ALK and EGFR is thus necessary for appropriate clinical decision-making in advanced NSCLC. Alternative treatments are considered when any one or more of these rearrangements are discovered before or during first-line chemotherapy. ROS1 rearrangement occurs in 1% to 2% of non-small cell lung carcinomas and predicts response to crizotinib and ceritinib therapy, which are first-line treatments. Response rates, including complete responses, approach 70% (2-4). For ALK1, in addition to identifying tumors that are likely to respond to targeted therapies, knowledge of ALK rearrangement status typically predicts inferior response to immunotherapies. Approximately 5% of lung adenocarcinomas have a chromosomal rearrangement involving the ALK gene and associated with ALK protein overexpression. Patients with such tumors respond to therapy with ALK tyrosine kinase inhibitors, such as crizotinib (2, 5). Finally, approximately 20% of lung adenocarcinomas contain an EGFR activating mutation that predicts response to therapy with EGFR tyrosine kinase inhibitors such as erlotinib (2, 6-10).

1. Kris MG, Johnson B, Berry LD, et al. Using multiplexed assays of oncogenic drivers in lung cancers to select targeted drugs. JAMA. 2014;311:1998–2006.
2. Lindeman NI, Cagle PT, Aisner DL, Arcila ME, Beasley MB, Bernicker EH, et al. Updated molecular testing guideline for the selection of lung cancer patients for treatment with targeted tyrosine kinase inhibitors: Guideline From the College of American Pathologists, the International Association for the Study of Lung Cancer, and the Association for Molecular Pathology. J Thorac Oncol. 2018 Mar;13(3):323-358.
3. Takeuchi K, Soda M, Togashi Y, et al. RET, ROS1 and ALK fusions in lung cancer. Nat Med. 2012;18(3):378-381.
4. Bergethon K, Shaw AT, Ou SH, et al. ROS1 rearrangements define a unique molecular class of lung cancers. J Clin Oncol. 2012;30(8):863-870.
5. Shaw AT, Kim DW, Nakagawa K, et al. Crizotinib versus chemotherapy in advanced ALK-positive lung cancer. N Engl J Med. 2013;368(25):2385-2394.

	6. Maemondo M, Inoue A, Kobayashi K, et al. Gefitinib or chemotherapy for non-small-cell lung cancer with mutated EGFR. N Engl J Med. 2010;362(25):2380-2388. 7. Mitsudomi T, Morita S, Yatabe Y, et al. Gefitinib versus cisplatin plus docetaxel in patients with non-small-cell lung cancer harbouring mutations of the epidermal growth factor receptor (WJTOG3405): an open label, randomised phase 3 trial. Lancet Oncol. 2010;11(2):121-128. 8. Mok TS, Wu YL, Thongprasert S, et al. Gefitinib or carboplatin-paclitaxel in pulmonary adenocarcinoma. N Engl J Med. 2009;361(10):947-957. 9. Pao W, Miller V, Zakowski M, et al. EGF receptor gene mutations are common in lung cancers from "never smokers" and are associated with sensitivity of tumors to gefitinib and erlotinib. Proc Natl Acad Sci. 2004;101(36):13306-13311. 10. Rosell R, Carcereny E, Gervais R, et al. Erlotinib versus standard chemotherapy as first-line treatment for European patients with advanced EGFR mutation-positive non-small-cell lung cancer (EURTAC): a multicentre, open-label, randomised phase 3 trial. Lancet Oncol. 2012;13(3):239-246
Measure Type	Process
Data Source	Laboratory Information Systems; pathology reports
Summary of Performance Gap Evidence	In 2024, 21 practices reported data to CMS for all 12 months of the year. The average performance rate was 72.3%. The minimum non-zero performance rate was 21.43% and the maximum rate was 100%. Note, the actual lowest score was 0% but we do not think the three practices with 0% performance will be scored on this measure. Through 1 July 2025, 16 practices have begun submitting data to the registry. The average performance rate is 77.7% with scores as low as 25% and as high as 100%. Note, actual lowest score is 0% but practice with 0% performance has only entered 5 cases, well below 20-case minimum. In a 2020 survey, 51% of clinicians believed that less than 50% of the patients in the US/Canada were molecularly tested and only 72% of pathologists who responded even offer ROS1 testing (this is not the number who perform it on every specimen) • From Smeltzer MP et al (2020) The International Association for the Study of Lung Cancer Global Survey on Molecular Testing in Lung Cancer. Journal of Thoracic Oncology 15 (9): 1434–48 Specifically looking at community-based oncology practices, “less than 50% of patients with metastatic non-small cell lung cancer received testing for five of the biomarkers most routinely recommended in guidelines, which are EGFR, ALK, ROS1, BRAF, and PD-L1. The median turnaround time between ordering the testing and receiving the results was approximately 2 weeks,

and only 35% of patients had testing results for five biomarkers before initiation of first-line treatment"

- From Hirsch FR and Kim C (2024) The Importance of Biomarker Testing in the Treatment of Advanced Non-Small Cell Lung Cancer: A Podcast. Transcript published in Oncol Ther. 12(2): 223–231.

A study conducted on Diaceutics' claims database found that 'Of the 35,556 patients with aNSCLC who had either a tissue or liquid biopsy, 82.5% had biomarker testing ordered while 17.5% did not have any biomarker testing ordered." Note that this only covers patients with advanced NSCLC

- From Sadik H (2022) Impact of Clinical Practice Gaps on the Implementation of Personalized Medicine in Advanced Non–Small-Cell Lung Cancer. JCO Precis Oncol. 6: e2200246.

A study from 2022 found that 30% of patients with metastatic NSCLC did not have EGFR testing at all (57% had test results before therapy started), 30% did not have ALK testing at all (57% had test results before therapy started), and 32% did not have ROS1 testing at all (55% had test results before therapy started). Data from The US Oncology Network, a network of community-based oncology practices. Specific to nonsquamous cell, the percentages were 24, 24, 27 for EGFR, ALK and ROS1 respectively.

- From Robert NJ et al (2022) Biomarker testing and tissue journey among patients with metastatic non-small cell lung cancer receiving first-line therapy in The US Oncology Network. Lung Cancer 166:197-204

A study from 2023 found that in a group of advanced NSCLC patients, only 41.7% (2869 out of 6877) had biomarker testing. The most commonly testing biomarker was EGFR (53.3%), followed by ALK (42.3%). Men were less likely to undergo biomarker testing than women, and Black patients were less likely to undergo testing than White patients. Also, "patients with squamous aNSCLC were significantly less likely to undergo biomarker testing compared with patients with non-squamous histology"

- From Yang M, MacEwan JP, Boppudi SS, McClain MR, O'Hara RM Jr, Paik PK. Diagnosis, testing, treatment, and outcomes among patients with advanced non-small cell lung cancer in the United States. Cancer Med. 2023; 12: 21605-21614.

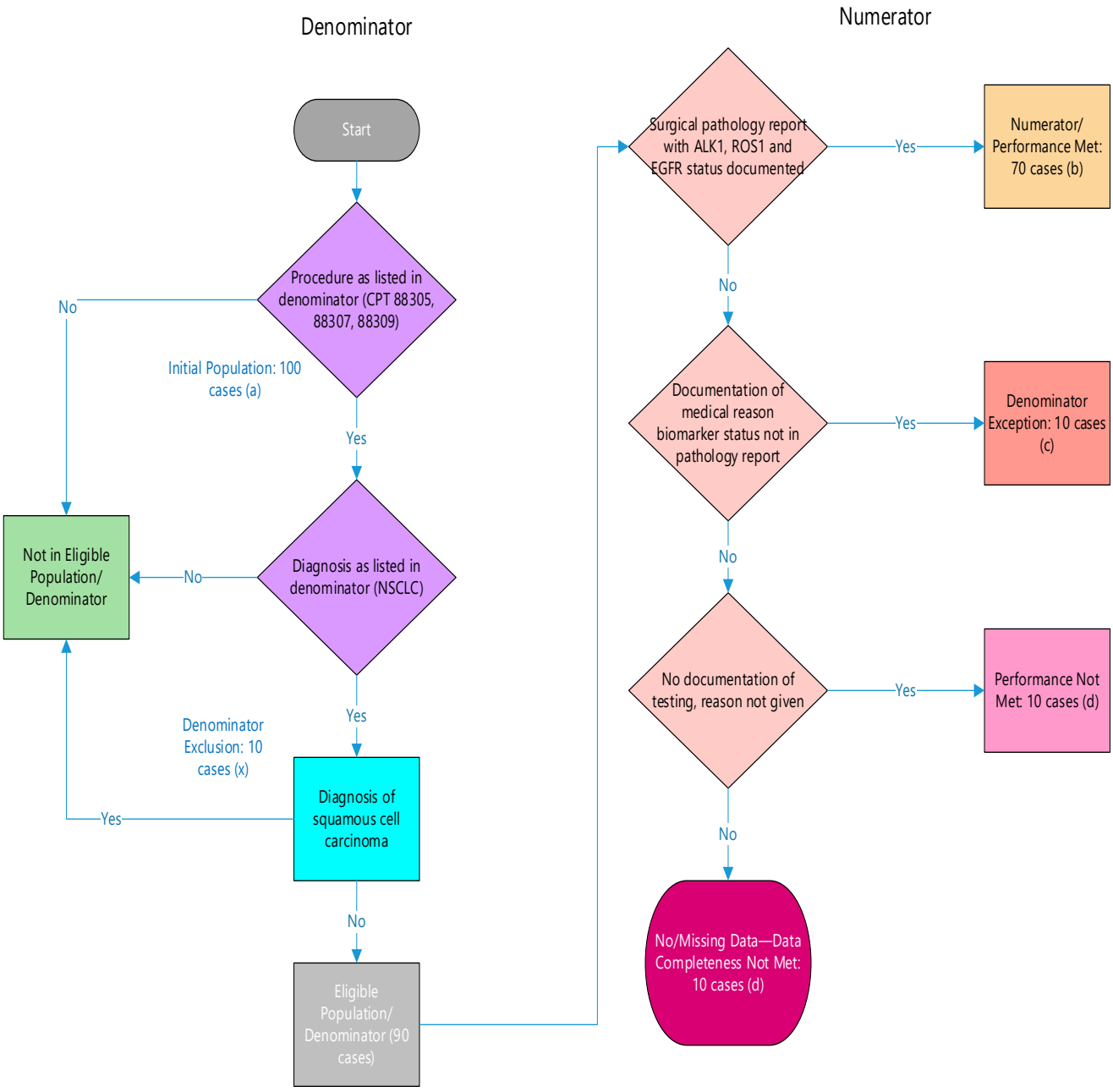
A study from earlier this year found that ""In an analysis of the SEER database, 28,511 patients were identified with any stage of NSCLC. Of these patients, 40.4% of White patients received molecular genetic testing compared to only 27.9% of Black patients"

- From Shehata DG, Pan JM, Pan Z, Vigneswaran J, Contreras N, Rodriguez E, Sakowitz S, Magarinos J, Pereira S, Wilder FG, et al. Equity and Opportunities in Lung Cancer Care—Addressing Disparities, Challenges, and Pathways Forward. Cancers. 2025; 17(8):1347.

	A study from 2024 reported that "However, biomarker testing is not uniformly performed, often due to cost, lack of patient awareness, and lack of HCP expertise; an estimated 73% and 48% of academic and community clinicians, respectively, use biomarker testing for treatment decisions" • From Kurzrock R, Chaudhuri AA, Feller-Kopman D, Florez N, Gorden J, Wistuba II. Healthcare disparities, screening, and molecular testing in the changing landscape of non-small cell lung cancer in the United States: a review. Cancer Metastasis Rev. 2024 Dec;43(4):1217-1231.
Measure Owner	College of American Pathologists
NQF ID	N/A
Number of Performance Rates	1
Overall Performance Rate	1st Performance Rate
High-priority	Yes
Improvement Notation	Inverse Measure: No **Proportional Measure: Yes (Higher score indicates better quality)** Continuous Variable Measure: No Ratio Measure: No Risk-adjusted: No
Care Setting and Specialty	Care Setting: Other—Laboratories; Telehealth not applicable Specialty: Pathology
Submission Pathway	Traditional MIPS MVP (Pathology)
Current Clinical Guideline the Measure is Derived From	ROS1 testing must be performed on all lung advanced-stage adenocarcinoma patients, irrespective of clinical characteristics (Strong Recommendation) (1). The NCCN guideline for non-small cell lung cancer recommends testing for ROS1 rearrangements for nonsquamous NSCLC or NSCLS NOS (Category 2A evidence) (2). ALK molecular testing should be used to select patients for ALK-targeted TKI therapy, and patients with lung adenocarcinoma should not be excluded from testing on the basis of clinical characteristics (Grade B evidence) (3). Testing for ALK gene rearrangements and EGFR gene mutations is recommended in the NSCLC algorithm for patients with nonsquamous NSCLC or NSCLC NOS so that patients with these genetic abnormalities can receive effective treatment with targeted agents (Category 1 evidence) (2). EGFR molecular testing should be used to select patients for EGFR-targeted TKI therapy, and patients with lung adenocarcinoma should not be excluded from testing on the basis of clinical characteristics (Grade A Evidence) (3).

	EGFR mutation testing should be ordered at the time of diagnosis for patients presenting with advanced-stage disease (stage IV according to the 7th edition TNM staging system) who are suitable for therapy or at time of recurrence or progression in patients who originally presented with lower-stage disease but were not previously tested (Grade A Evidence) (3). Physicians may use molecular biomarker testing in tumors with histologies other than adenocarcinoma when clinical features indicate a higher probability of an oncogenic driver (Expert Consensus Opinion) (1, 2). 1. Lindeman NI, Cagle PT, Aisner DL, Arcila ME, Beasley MB, Bernicker EH, et al. Updated molecular testing guideline for the selection of lung cancer patients for treatment with targeted tyrosine kinase inhibitors: Guideline From the College of American Pathologists, the International Association for the Study of Lung Cancer, and the Association for Molecular Pathology. J Thorac Oncol. 2018 Mar;13(3):323-358. 2. Ettinger DS, Wood DE, Aisner DL, Akerley W, Bauman J, Chang JY, et al. NCCN clinical practice guidelines in oncology: non-small cell lung cancer, version 3.2022. National Comprehensive Cancer Network. Available at https://www.nccn.org/professionals/physician_gls/pdf/nscl.pdf 3. Lindeman NI, Cagle PT, Beasley MB, Chitale DA, Dacic S, Giaccone G, et al. Molecular testing guideline for selection of lung cancer patients for EGFR and ALK tyrosine kinase inhibitors: guideline from the College of American Pathologists, International Association for the Study of Lung Cancer, and Association for Molecular Pathology. Arch Pathol Lab Med. 2013 Jun;137(6):828-60.

Measure Flow



SAMPLE CALCULATION:

$$\frac{\text{Numerator (b=70 reports)}}{\text{Denominator (a=100 cases)-Denominator Exclusions (x=10 cases)-Denominator Exceptions (c=10 cases)}} = 87.5\%$$