



## FEP Medical Policy Manual

### FEP 2.04.125 Proteomic Testing for Targeted Therapy in Non-Small-Cell Lung Cancer

**Annual Effective Policy Date: April 1, 2026**

**Original Policy Date: December 2014**

#### **Related Policies:**

2.04.45 - Somatic Biomarker Testing (Including Liquid Biopsy) for Targeted Treatment in Non-Small-Cell Lung Cancer (EGFR, ALK, BRAF, ROS1, RET, MET, KRAS, NTRK)

2.04.62 - Multimarker Serum Testing Related to Ovarian Cancer

## Proteomic Testing for Targeted Therapy in Non-Small-Cell Lung Cancer

### Description

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Proteomic testing has been proposed as a way to predict survival outcomes, as well as the response to and selection of targeted therapy for patients with non-small-cell lung cancer (NSCLC). One commercially available test (the VeriStrat assay) has been investigated as a predictive marker for response to epidermal growth factor receptor (EGFR) tyrosine kinase inhibitors.

#### OBJECTIVE

The objective of this evidence review is to determine whether the use of proteomic testing to select therapy improves the net health outcome in patients with non-small-cell lung cancer.

#### POLICY STATEMENT

The use of proteomic testing, including but not limited to the VeriStrat assay, is considered **investigational** for all uses in the management of non-small-cell lung cancer.

## POLICY GUIDELINES

None

## BENEFIT APPLICATION

Experimental or investigational procedures, treatments, drugs, or devices are not covered (See General Exclusion Section of brochure).

Screening (other than the preventive services listed in the brochure) is not covered. Please see Section 6 General exclusions.

Benefits are available for specialized diagnostic genetic testing when it is medically necessary to diagnose and/or manage a patient's existing medical condition. Benefits are not provided for genetic panels when some or all of the tests included in the panel are not covered, are experimental or investigational, or are not medically necessary.

## FDA REGULATORY STATUS

Clinical laboratories may develop and validate tests in-house and market them as a laboratory service; laboratory-developed tests must meet the general regulatory standards of the Clinical Laboratory Improvement Amendments. The commercially available proteomic test (VeriStrat; Biodesix) is available under the Clinical Laboratory Improvement Amendments. Laboratories that offer laboratory-developed tests must be licensed by the Clinical Laboratory Improvement Amendments for high-complexity testing. To date, the U.S. Food and Drug Administration has chosen not to require any regulatory review of these tests.

## RATIONALE

### Summary of Evidence

For individuals with newly diagnosed non-small-cell lung cancer (NSCLC) and wild-type epidermal growth factor receptor (*EGFR*)-variant status who receive management with a serum proteomic test to predict survival and select treatment, the evidence includes retrospective studies and a prospective nonrandomized study. Relevant outcomes are overall survival (OS), disease-specific survival, and treatment-related mortality and morbidity. No published studies were identified that assessed the prognostic use of VeriStrat proteomic testing in newly diagnosed stage I or II NSCLC. For individuals with newly diagnosed advanced NSCLC and *EGFR*-negative variant status without prior systemic therapy, 5 studies have assessed the use of VeriStrat ("good" or "poor") as a prognostic test to discriminate between OS (primary) and progression-free survival (PFS) (secondary) outcomes. All studies were retrospective and intended to validate the extent to which the VeriStrat proteomic classification correlated with OS or PFS. Only 1 of the 5 studies reported the percentage of participants who were *EGFR*-negative, but it did not report outcomes based on variant status. One observational, nonrandomized study with prospective sample collection for proteomic testing before NSCLC treatment reported the percentage of participants who were *EGFR*-negative, but it did not report outcomes based on variant status. This was also the only study that included a first-line treatment consistent with current guideline-based recommendations platinum-doublet-based chemotherapy plus cisplatin or carboplatin plus pemetrexed. The VeriStrat classification was not used to direct the selection of treatment in any of the clinical trials from which the validation samples were derived. Disposition of populations with variant status "not reported" was generally not clear and could not be construed as "unknown" when wild-type or positive were reported. No studies were identified that used VeriStrat proteomic testing to inform therapeutic options for patients with stage I or II NSCLC if surgery or surgery plus radiotherapy have been completed or who were upstaged as a result of surgical findings. No studies were identified that used VeriStrat proteomic testing to inform therapeutic options for patients with stage I or II NSCLC who were considered medically inoperable. No studies were identified that used VeriStrat proteomic testing to predict response to first-line targeted therapies or first-line chemotherapy in patients with newly diagnosed advanced NSCLC. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals with newly diagnosed NSCLC and unknown *EGFR*-variant status who receive management with a serum proteomic test to predict survival and select treatment, the evidence includes a randomized controlled trial (RCT), 4 retrospective studies, and a prospective study. Relevant outcomes are OS, disease-specific survival, and treatment-related mortality and morbidity. All study populations were either unselected for *EGFR*-variant status or status was expressly reported as unknown in conjunction with negative or positive status reports. None of the studies that reported unknown *EGFR*-variant status reported outcomes for the proteomic score based on unknown *EGFR*-variant status. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals with NSCLC and wild-type *EGFR*-variant status and disease progression after first-line systemic therapy who receive management with a serum proteomic test to predict survival and select treatment, the evidence includes a RCT and a retrospective analysis. Relevant outcomes are OS, disease-specific survival, and treatment-related mortality and morbidity. No studies were identified that reported or analyzed outcomes using the proteomic test as a prognostic tool in *EGFR*-negative variant status populations. The evidence includes an RCT (PROSE) using proteomic testing to predict response to erlotinib compared with chemotherapy as a second-line treatment for patients with stage IIIB or IV NSCLC, stratified by performance status, smoking history, treatment center, and (masked) pretreatment VeriStrat classification. In a multivariate model to predict OS, which included clinical characteristics and *EGFR*-variant status, VeriStrat classification was significantly associated with OS (hazard ratio for VeriStrat "good" vs "poor," 1.88; 95% confidence interval, 1.25 to 2.84;  $p=.003$ ). However, 62% of the combined study population was *EGFR*-negative. A retrospective analysis was also performed on the MARQUEE trial, a phase 3 RCT in patients with stage IIIB or IV nonsquamous NSCLC, comparing the patient response to erlotinib in conjunction with either tivantinib or a placebo; patients were stratified by *EGFR* and *KRAS* variant status, sex, smoking history, and treatment history. Protocol treatments were subsequently discontinued by 93% of patients, and the trial discontinued after prespecified interim futility analysis. In a multivariate model to predict OS, which included clinical characteristics and *EGFR*-variant status, VeriStrat classification was significantly associated with OS (hazard ratio for VeriStrat "good" vs "poor," 0.52; 95% confidence interval, 0.40 to 0.67;  $p<.001$ ). Ninety percent of the combined study population was *EGFR*-negative. An interaction between treatment and VeriStrat status was significant for multivariate analysis including *EGFR* status ( $p=.036$ ) but not significant for multivariate analysis including both *EGFR* and *KRAS* variant status ( $p=.068$ ). Currently, the use of erlotinib in patients unselected for the presence or absence of an *EGFR*-sensitizing variant is not standard clinical practice. It is recommended that variant status be determined, if not previously ascertained, before selecting treatment after progression or recurrence. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals with NSCLC and unknown *EGFR*-variant status with disease progression after first-line systemic therapy who receive management with a serum proteomic test to predict survival and select treatment, the evidence includes 2 RCTs and 3 retrospective studies. Relevant outcomes are OS, disease-specific survival, and treatment-related mortality and morbidity. The use of VeriStrat as a prognostic test to discriminate between good and poor survival outcomes was assessed in 3 retrospective studies intended to validate the extent to which VeriStrat proteomic classification correlates with OS or PFS. The VeriStrat classification was not used to direct treatment selection in any of the trials from which the validation samples were derived. None of the clinical trials from which the samples for VeriStrat proteomic classification were derived used a therapy consistent with current guidelines-based recommendations. The populations in all 3 studies were unselected for *EGFR*-variant status. In the PROSE RCT, using a multivariate model to predict OS, which included clinical characteristics and *EGFR*-variant status, VeriStrat classification was significantly associated with OS (hazard ratio for VeriStrat "good" vs "poor," 1.88; 95% confidence interval, 1.25 to 2.84;  $p=.003$ ). However, 32.6% of the combined study population had unknown *EGFR* status. In the EMPHASIS RCT, there were no significant differences in PFS or OS among patients with VeriStrat "good" status receiving erlotinib or chemotherapy or among patients with VeriStrat "poor" status receiving erlotinib or chemotherapy. The results of the EMPHASIS RCT were restricted to squamous NSCLC histology. Currently, the use of erlotinib in patients unselected for the presence or absence of an *EGFR*-sensitizing variant is not standard clinical practice. It is recommended that variant status be determined, if not previously ascertained, before selecting treatment after progression or recurrence. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

## SUPPLEMENTAL INFORMATION

### Practice Guidelines and Position Statements

Guidelines or position statements will be considered for inclusion in 'Supplemental Information' if they were issued by, or jointly by, a US professional society, an international society with US representation, or National Institute for Health and Care Excellence (NICE). Priority will be given to guidelines that are informed by a systematic review, include strength of evidence ratings, and include a description of management of conflict of interest.

#### National Comprehensive Cancer Network

The National Comprehensive Cancer Network (v8.2025) guidelines on the management of non-small cell lung cancer (NSCLC) recommend routine testing for *EGFR* variants in patients with advanced or metastatic nonsquamous NSCLC (category 1 recommendation) and consideration for *EGFR*-variant testing in patients with metastatic squamous NSCLC who were never smokers or with small biopsy specimens or mixed histology (category 2A recommendation).<sup>1</sup>The guideline also recommends molecular testing for *EGFR* mutation on diagnostic biopsy or surgical resection sample to ensure the *EGFR* mutation results are available for adjuvant treatment decisions for patients with stage IIB-IIIA or high-risk stage IB-IIA NSCLC. Recommendations for first-line treatment for *EGFR*-positive patients with advanced or metastatic NSCLC, and *EGFR*-negative or -unknown patients as well as for patients in either category who have progressed on therapy are provided. See the Background section for additional information.

#### American Society of Clinical Oncology

The policies contained in the FEP Medical Policy Manual are developed to assist in administering contractual benefits and do not constitute medical advice. They are not intended to replace or substitute for the independent medical judgment of a practitioner or other health care professional in the treatment of an individual member. The Blue Cross and Blue Shield Association does not intend by the FEP Medical Policy Manual, or by any particular medical policy, to recommend, advocate, encourage or discourage any particular medical technologies. Medical decisions relative to medical technologies are to be made strictly by members/patients in consultation with their health care providers. The conclusion that a particular service or supply is medically necessary does not constitute a representation or warranty that the Blue Cross and Blue Shield Service Benefit Plan covers (or pays for) this service or supply for a particular member.

In 2023, the American Society of Clinical Oncology updated its 'living' clinical practice guidelines. Recommendations for patients with stage IV NSCLC are provided as separate guidelines for patients with and without driver mutations. The guideline on treatment of NSCLC with driver mutations discusses treatments for patients with positive biomarkers (eg, *EGFR*, *ALK*, *ROS1* fusions, *BRAF V600e* mutations, *RET* fusions, *MET* exon 14 skipping mutations, and *NTRK* fusions).<sup>48</sup> The guideline on treatment of NSCLC without driver mutations discusses therapy for patients with stage IV NSCLC without driver alterations in *EGFR* or *ALK* and with programmed death ligand 1 (PD-L1) tumor proportion score status that is known to the clinician.<sup>49</sup>

The Society (2018) endorsed practice guidelines from other medical associations (College of American Pathologists, International Association for the Study of Lung Cancer, Association for Molecular Pathology) addressing molecular testing for the selection of patients with lung cancer for treatment with targeted tyrosine kinase inhibitors.<sup>50</sup>

## U.S. Preventive Services Task Force Recommendations

Not applicable.

## Medicare National Coverage

There is no national coverage determination. In the absence of a national coverage determination, coverage decisions are left to the discretion of local Medicare carriers.

## REFERENCES

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## POLICY HISTORY - THIS POLICY WAS APPROVED BY THE FEP® PHARMACY AND MEDICAL POLICY COMMITTEE ACCORDING TO THE HISTORY BELOW:

Date	Action	Description
December 2014	New policy	Policy created with literature review. Proteomic testing considered investigational for all indications in the management of non-small cell lung cancer.
March 2016	Replace policy	Policy updated with literature review through September 1, 2016. References 6-9, 10, 23, and 29-30 added.
March 2018	Replace policy	Policy updated with literature review through September 11, 2017; reference 10, 23, 26, 29, and 31 added. Policy statement unchanged.
June 2018	Replace policy	Policy updated with literature review through March 31, 2018; references 2-4, 14, 17-23, 25, 33-34, and 44-45 added. Policy statement unchanged. Policy title changed.
March 2019	Replace policy	Policy updated with literature review through August 4, 2018; references 33 and 43-44 added. Policy statement unchanged.
March 2020	Replace policy	Policy updated with literature review through August 28, 2019; references added. Text for treatment pathways added; clinical management pathway figures removed. Policy statement unchanged.
March 2021	Replace policy	Policy updated with literature review through August 20, 2020; no references added. Policy statement unchanged.
March 2022	Replace policy	Policy updated with literature review through November 4, 2021; references added. Policy statement unchanged.
March 2023	Replace policy	Policy updated with literature review through August 15, 2022; no references added. Policy statement unchanged.
March 2024	Replace policy	Policy updated with literature review through September 13, 2023; no references added. Policy statement unchanged.
March 2025	Replace policy	Policy updated with literature review through September 30, 2024; no references added. Policy statement unchanged.
March 2026	Replace policy	Policy updated with literature review through September 26, 2025; no references added. Policy statement unchanged.

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