Overview

Useful For
Confirmation of a clinical diagnosis of cystic fibrosis
Reproductive risk refinement via carrier screening for individuals in the general population
Reproductive risk refinement via carrier screening for individuals with a family history when familial variants are not available
Identification of patients who may respond to cystic fibrosis transmembrane conductance regulator (CFTR) potentiator therapy

Genetics Test Information
This test includes targeted testing to evaluate over 500 genetic variants including 23 disease-causing variants recommended by the American College of Medical Genetics and Genomics.

For details regarding the specific variants identified by this test see Targeted Variants Interrogated by Cystic Fibrosis Variant Panel.

Testing Algorithm
See Cystic Fibrosis Molecular Diagnostic Testing Algorithm for additional information.

Special Instructions
- Molecular Genetics: Congenital Inherited Diseases Patient Information
- Informed Consent for Genetic Testing
- Cystic Fibrosis Molecular Diagnostic Testing Algorithm
- Informed Consent for Genetic Testing (Spanish)
- Targeted Variants Interrogated by Cystic Fibrosis Variant Panel

Highlights
A targeted genotyping array is utilized to detect more than 500 genetic targets associated with cystic fibrosis or cystic fibrosis-related disorder for the purpose of carrier screening or first-tier diagnostic testing.

Method Name
Targeted Genotyping Array

NY State Available
Yes

Specimen
**Test Definition: CFMP**
Cystic Fibrosis, CFTR Gene, Variant Panel, Varies

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**Specimen Type**
Varies

**Ordering Guidance**
If testing is negative, and a diagnosis of cystic fibrosis is still suspected, consider CFTRZ / CFTR Gene, Full Gene Analysis, Varies.

Targeted testing for familial variants (also called site-specific or known mutation testing) is available for all genes on this panel under FMTT / Familial Mutation, Targeted Testing, Varies. Call 800-533-1710 to obtain more information about this testing option.

**Shipping Instructions**
Specimen preferred to arrive within 96 hours of collection.

**Necessary Information**
If there is a family history of cystic fibrosis, the known variant in the family should be supplied for best interpretation of results.

**Specimen Required**
**Specimen Type:** Whole blood  
**Patient Preparation:** A previous bone marrow transplant from an allogenic donor will interfere with testing. Call 800-533-1710 for instructions for testing patients who have received a bone marrow transplant.

**Container/Tube:**
**Preferred:** Lavender top (EDTA) or yellow top (ACD)  
**Acceptable:** Any anticoagulant

**Specimen Volume:** 3 mL

**Collection Instructions:**
1. Invert several times to mix blood.  
2. Send whole blood specimen in original tube. **Do not** aliquot.

**Additional Information:** To ensure minimum volume and concentration of DNA is met, the preferred volume of blood must be submitted. Testing may be canceled if DNA requirements are inadequate.

**Forms**
1. **New York Clients-Informed consent is required.** Document on the request form or electronic order that a copy is on file. The following documents are available:
   - Informed Consent for Genetic Testing (T576)  
   - Informed Consent for Genetic Testing-Spanish (T826)  
2. Molecular Genetics: Congenital Inherited Diseases Patient Information (T521)

**Specimen Minimum Volume**
1 mL

**Reject Due To**
All specimens will be evaluated at Mayo Clinic Laboratories for test suitability.

**Specimen Stability Information**

<table>
<thead>
<tr>
<th>Specimen Type</th>
<th>Temperature</th>
<th>Time</th>
<th>Special Container</th>
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</thead>
<tbody>
<tr>
<td>Varies</td>
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<td></td>
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<tr>
<td></td>
<td>Frozen</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Refrigerated</td>
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**Clinical & Interpretive**

**Clinical Information**

Cystic fibrosis (CF), in the classic form, is a severe autosomal recessive disorder characterized by a varied degree of chronic obstructive lung disease and pancreatic enzyme insufficiency. The incidence of CF varies markedly among different populations, as does the genetic variant detection rate for the variant screening assay. To date, over 1500 variants have been described within the gene that causes CF, named cystic fibrosis transmembrane conductance regulator (CFTR). The most common variant, deltaF508, accounts for approximately 67% of the variants worldwide and approximately 70% to 75% in the North American White population. Most of the remaining variants are rare, although some show a relatively higher prevalence in certain ethnic groups or in certain atypical presentations of CF, such as congenital bilateral absence of the vas deferens (CBAVD). Genetic variants detected by this assay include the 23 variants recommended by the American College of Medical Genetics and Genomics as well as over 450 other variants.

Of note, CFTR potentiator therapies may improve clinical outcomes for patients with a clinical diagnosis of CF and at least one copy of a select subset of variants.

Detection rates for several ethnic and racial groups are listed in the table below. Note that interpretation of test results and risk calculations are also dependent on clinical information and family history.

<table>
<thead>
<tr>
<th>Racial or ethnic group</th>
<th>Carrier frequency</th>
<th>Variant detection rate*</th>
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</thead>
<tbody>
<tr>
<td>European American</td>
<td>1/25</td>
<td>94%</td>
</tr>
<tr>
<td>Ashkenazi Jewish</td>
<td>1/25</td>
<td>95%</td>
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<tr>
<td>African American</td>
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<td>Hispanic American</td>
<td>1/46</td>
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<td>Asian American**</td>
<td>1/90</td>
<td>65%</td>
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<tr>
<td>General US population</td>
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<td>86%</td>
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</table>

*Rates are for classic CF. Rates are lower for atypical forms of CF and for CBAVD.

**Does not apply to individuals of Japanese ancestry.

A list of CFTR variants included in the panel can be found in [Targeted Variants Interrogated by Cystic Fibrosis Variant Panel](#).
Reference Values
An interpretive report will be provided.

Interpretation
All reported alterations are evaluated according to American College of Medical Genetics and Genomics recommendations.(1) Variants are classified based on known, predicted, or possible pathogenicity and reported with interpretive comments detailing their potential or known significance.

Cautions
This assay will not detect all known disease-associated variants that cause cystic fibrosis or CFTR-related disorders. Therefore, the absence of a detectable variant does not rule out the possibility that an individual is a carrier of or affected with this disease.

A negative result does not eliminate the risk of carrier status for any of the included conditions, due to the possibility that the patient carries a variant that is not interrogated with this assay or the rare chance of a false-negative result for a tested variant. For tested variants, the negative predictive value of this screen is greater than 98%. The patient’s residual risk to be a carrier after a negative screen is dependent on ethnic background and family history.

A positive control was not available for all variants targeted on this panel. For more information regarding availability of a positive control for each variant see Targeted Variants Interrogated by Cystic Fibrosis Variant Panel. The negative predictive value of these targets is unknown.

Rare variants (ie, polymorphisms) exist that could lead to false-negative or false-positive results. If results obtained do not match the clinical findings, additional testing should be considered.

All detected variants are evaluated according to American College of Medical Genetics and Genomics recommendations.(1) This assay was designed to specifically target known disease-causing or likely disease-causing variants. In rare cases, DNA variants of undetermined significance may be identified. The laboratory encourages healthcare providers to contact the laboratory at any time to learn how the status of a particular variant may have changed over time.

Multiple in-silico evaluation tools may have been used to assist in the interpretation of these results. Of note, the sensitivity and specificity of these tools for the determination of pathogenicity is currently unvalidated.

Test results should be interpreted in the context of clinical findings, family history, and other laboratory data. Misinterpretation of results may occur if the information provided is inaccurate or incomplete.

Bone Marrow transplants from allogenic donors will interfere with testing. Call Mayo Clinic Laboratories for instructions for testing patients who have received a bone marrow transplant.

An online research opportunity called GenomeConnect (genomeconnect.org), a project of ClinGen, is available for the recipient of this genetic test. This patient registry collects deidentified genetic and health information to advance the knowledge of genetic variants. Mayo Clinic is a collaborator of ClinGen. This may not be applicable for all tests.

Clinical Reference

Performance

Method Description
The targeted genotyping assay utilizing the ThermoFisher GeneTitan platform is used to detect 500 plus genetic targets, including the 23 disease-causing variants specified in the American College of Medical Genetics standards for population-based carrier screening. For details regarding the targeted disease-causing variants identified by this test see Targeted Variants Interrogated by Cystic Fibrosis Variant Panel. Confirmatory testing of homozygous results is performed as reflex tests when appropriate.

Multiplex ligation-dependent probe amplification, polymerase chain reaction (PCR), relative quantitative PCR, and Sanger sequencing are used to confirm alterations detected by array when appropriate. (Unpublished Mayo method)

PDF Report
No

Day(s) Performed
Tuesday, Saturday

Report Available
7 to 21 days

Specimen Retention Time
Whole Blood: 2 weeks (if available); Extracted DNA: 3 months
Test Definition: CFMP
Cystic Fibrosis, CFTR Gene, Variant Panel,
Varies

Performing Laboratory Location
Rochester

Fees & Codes

Fees
- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their Regional Manager. For assistance, contact Customer Service.

Test Classification
This test was developed, and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. This test has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information
81220
81222
81479 (if appropriate for government payers)

LOINC® Information

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