Quest Diagnostics™

CFvantage®
Expanded Cystic Fibrosis Carrier Screen

Greater clinical evidence so you can screen with greater confidence

The right CFTR mutations, pan-ethnic and actionable

Identify more cystic fibrosis carriers with **accuracy and confidence** with CFvantage Cystic Fibrosis Expanded Screen

Trust an expanded panel of clinically relevant mutations for true pan-ethnic screening

A more effective screen for today's multi-ethnic population

More than 1,900 mutations of the CFTR* gene have been identified. A growing number have been confirmed to cause classic cystic fibrosis. However, the 23 common CFTR mutations recommended for screening by ACOG/ACMG were based on Ashkenazi Jewish population studies in Europe and North America. **CFvantage adds more validated mutations, including those derived from multinational registries, for a higher detection rate across ethnicities.**[1]

CFvantage tests for more clinically relevant mutations

- Detects only CFTR mutations that have been validated to cause cystic fibrosis
- Includes the common CFTR mutations recommended by ACOG/ACMG
- Most mutations are based on a database of nearly 90,000 genomes of well-phenotyped patients, all affected with cystic fibrosis[4]

CFvantage tests for more ethnically relevant mutations

- Adds mutations seen in African-, Hispanic- and Asian-American populations for pan-ethnic screening, as recommended by ACOG[3]
- Informed by multinational registries managed by the US CF Foundation, Johns Hopkins University and The Hospital for Sick Children[4]

> "It is becoming increasingly difficult to assign a single ethnicity to individuals. It is reasonable, therefore, to offer CF carrier screening to all patients."
>
> *—ACOG, 2011*[3]

Give your patients the advantage of validated, pan-ethnic CF carrier screening with **CFvantage Cystic Fibrosis Expanded Screen**.

*The CFTR gene encodes the cystic fibrosis transmembrane conductance regulator protein.

See the evidence. Trust the test. Get more from Quest Diagnostics.

See the evidence: clinically validated causal variants

CFvantage mutations beyond the 23 common CFTR variants were largely derived from an analysis by Sosnay, *et al.*, of the Clinical and Functional Translation of CFTR (CFTR2) database from the US CF Foundation, as well as from published data.[1]

- Representing 39,696 genomes of patients diagnosed with CF
- Data gathered from 24 countries

Trust the test: identifies more at-risk couples

Sun, *et al.*, observed that CFvantage identified one additional carrier for every 190 patients tested when compared to the ACMG/ACOG panel.[2]

- Study compared CFvantage performance in the first series of 11,568 clinical samples tested with how the ACMG/ACOG panel alone would have performed
- Corresponding carrier detection rate (DR) was 1 in 34 for the CFvantage panel and would have been 1 in 42 if limited to the ACMG/ACOG panel
- 61 of the mutations in CFvantage that are not part of the ACMG/ACOG recommended variants were detected at greater frequency than were more than half of the mutations in the guidelines-based variants
- Findings support use of an expanded panel that also accounts for multiple ethnicities

CF detection and carrier rates ACMG/ACOG panel vs. CFvantage[a,b]

Racial or Ethnic Group	Carrier Risk	Detection Rate (%) ACOG	Detection Rate (%) CFvantage
Ashkenazi Jewish	1/24	94	95
Non-Hispanic White	1/25	88	90
Hispanic White	1/58	72	88
African American	1/61	64	78
Asian American	1/94	49	53

Compared to the ACMG/ACOG panel, the CFvantage Cystic Fibrosis Expanded Screen detects a higher percentage of CF-causing mutations across ethnicities.[5–13]

1 in 34 DR vs. 1 in 42 DR
= 19% increase in detection

vs. 23-mutation panel
= 1 additional carrier per 190 patients[2]

Get more from Quest Diagnostics

We deliver more than a CF screen lab result:

- Call 1.866.GENE.INFO (1.866.436.3463) to consult with a lab-based genetic counselor
- Tap into our vast experience and expertise in carrier screening overall
- Find answers with one of the most comprehensive genetic testing menus available today
- Get all the testing solutions you need for patients who are either pregnant or planning a family

Screen with mutations backed by greater evidence, so your patients can make informed decisions with greater confidence. **CFvantage.**

Quest Diagnostics™

Trust Quest Diagnostics for all of your carrier screening needs. Our broad prenatal testing menu is your assurance of having the right test for the right patient at the right time.

Test Name	Test Code
CFvantage Cystic Fibrosis Expanded Screen	92068

For more information, contact your Quest Diagnostics sales representative at 1.866.MY.QUEST (1.866.697.8378) or visit **QuestDiagnostics.com.**

a. Detection rates and residual risk estimates are based on a subset of 78 mutations detectable by the panel,[5–13] including the 23 ACMG-ACOG-recommended mutations[6]; exact data are currently unavailable for all mutations in the CFvantage Cystic Fibrosis Expanded Screen.

b. Risks are based on the assumption that there is no family history of CF.

References

1. Sosnay PR, *et al*. Defining the disease liability of variants in the cystic fibrosis transmembrane conductance regulator gene. *Nat Genet*. 2013;45:1160–1167.
2. Sun W, *et al*. Increased identification of CFTR mutations using an expanded panel of validated pathogenic mutations. 65th Annual ASHG Meeting; October 6-10, 2015; Baltimore, MD. Abstract 2012T.
3. American College of Obstetricians and Gynecologists. Update on cystic fibrosis screening. Committee Opinion Number 486, April 2011.
4. The Clinical and Functional Translation of CFTR (CFTR2). Available at http://cftr2.org. Accessed August 8, 2016.
5. Committee on Genetics, American College of Obstetricians and Gynecologists. ACOG Committee Opinion. Number 325, December 2005. Update on carrier screening for cystic fibrosis. *Obstet Gynecol*. 2005;106:1465–1468.
6. Watson MS, Cutting GR, Desnick RJ, *et al*. Cystic fibrosis population carrier screening: 2004 revision of American College of Medical Genetics mutation panel. *Genet Med*. 2004;6:387–391.
7. Heim RA, Sugarman EA, Allitto BA. Improved detection of cystic fibrosis mutations in the heterogeneous U.S. population using an expanded, pan-ethnic mutation panel. *Genet Med*. 2001;3:168–176.
8. Sugarman EA, Rohlfs EM, Silverman LM, *et al*. CFTR mutation distribution among U.S. Hispanic and African American individuals: evaluation in cystic fibrosis patient and carrier screening populations. *Genet Med*. 2004;6:392–399.
9. Schrijver I, Ramalingam S, Sankaran R, *et al*. Diagnostic testing by CFTR gene mutation analysis in a large group of Hispanics: novel mutations and assessment of a population-specific mutation spectrum. *J Mol Diagn*. 2005;7:289–299.
10. Shoshani T, Augarten A, Yahav J, *et al*. Two novel mutations in the CFTR gene: W1089X in exon 17B and 4010delTATT in exon 21. *Hum Mol Genet*. 1994;3:657–658.
11. Friedman KJ, Leigh MW, Czarnecki P, *et al*. Cystic fibrosis transmembrane-conductance regulator mutations among African Americans. *Am J Hum Genet*. 1998;62:195–196.
12. Macek M Jr, Mackova A, Hamosh A, *et al*. Identification of common cystic fibrosis mutations in African-Americans with cystic fibrosis increases the detection rate to 75%. *Am J Hum Genet*. 1997;60:1122–1127.
13. Wong LJ, Wang J, Zhang YH, *et al*. Improved detection of CFTR mutations in Southern California Hispanic CF patients. *Hum Mutat.* 2001;18:296–307.