HIBM Research Group
Non-profit molecular laboratory

Cystic Fibrosis (CF)

Pre-pregnancy Carrier Screening

Information for Clinicians

Summary: Cystic Fibrosis (CF) is the most common life-limiting autosomal recessive disease worldwide. Carrier screening is recommended for couples planning to have children.

Indications for CF Carrier Screening	**Specimen Requirements:** 4 ml of whole blood in an EDTA Vacutainer (lavender top) or buccal swab, and completed requisition form. **Turnaround time:** 2-5 business days. Urgent testing with one business day turn-around can be provided at 25% additional cost.
• First pregnancy • Planning of a first pregnancy • Northern European or Ashkenazi Jewish ancestry • Family member with a positive carrier test for CF • Family history of CF • An affected child	

Interfering substances: Bone marrow recipients, or recipients of blood transfusion within the past 6 months, may show the genotype of the donor. In such patients, buccal swab specimen is preferred for testing. Additionally, substances that may inhibit nucleic acid amplification (e.g. some lipsticks) may prohibit us from performing the test.

CF is caused by variations in a gene known as CF Transmembrane Receptor (CFTR). Besides CF, the most well known CFTR-related disorders includes congenital absence of the vas deferens (CAVD). CF is a complex multisystem disease affecting epithelia of the respiratory tract, exocrine pancreas, intestine, male genital tract, hepatobiliary system, and exocrine sweat glands. Pulmonary disease is the major cause of morbidity and mortality in CF. Affected individuals suffer from chronic endobronchial infection, relentlessly progressing to end-stage lung disease characterized by extensive airway damage (bronchiectasis, cysts, and abscesses) and fibrosis of lung parenchyma. Pancreatic insufficiency with malabsorption occurs in the great majority of individuals with CF. More than 95% of males with CF are infertile as a result of azoospermia caused by absent, atrophic, or fibrotic Wolffian duct structures. Affected men have azoospermia and are thus infertile. CAVD can occur in men without pulmonary or gastrointestinal manifestations of CF.

The American College of Obstetrics and Gynecology (ACOG) and the American College of Medical Genetics (ACMG) recommend offering CF carrier screening for family planning purposes. ACOG and ACMG recommended mutation panel include the most common mutations known to cause CF. Prior to screening, all children are at higher risk for CF. Residual risk table below outlines the risks following testing of parents.

RISIDUAL RISK TABLE FOR NEGATIVE RESULTS

Negative results mean the children may have significantly reduced risk

Detection Frequency Population: Carrier rate, and % Identified *	Risk for each child prior to carrier screening of parents	Residual risk following negative carrier result for both parents
Ashkenazi Jewish: 1/23.8, and 94.04%	1 in 2,270	1 in 490,000
Non-Hispanic Caucasian: 1/25.0, and 88.29%	1 in 2,500	1 in 170,000
African American: 1/61.4, and 64.46%	1 in 15,100	1 in 117,000
Hispanic Caucasian: 1/58.2, 71.72%	1 in 13,500	1 in 165,000
Asian American: 1/93.7, and 48.93%	1 in 35,000	1 in 134,000

* There are very rare mutations not included in the panel, for which screening is not recommended by ACOG/ACMG.