**Title:** Routine cell-free DNA prenatal screening identifies pregnancies at high risk for cystic fibrosis that may benefit from fetal therapy

**Lay Title:** A new blood test finds babies at high risk for cystic fibrosis (CF) during pregnancy.

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**What was your research question?**

Can a simple blood test from a pregnant person find babies at high risk for cystic fibrosis (CF) early enough to allow follow-up testing and possible treatment before birth—without needing a sample from the baby’s father?

**Why is this important?**

Most people who are carriers of CF don’t know it before pregnancy. Carriers of CF have one disease-causing variant in their two copies of the CFTR gene and are healthy but are at risk to have a baby affected with CF if their partner is also a carrier. Standard screening often misses at-risk babies because both parents must be tested, which doesn’t always happen. Detecting CF early matters because new CFTR modulator medicines may work best before birth. CFTR modulator medication, taken orally by the mother, can pass through the placenta to treat a baby with CF. A new blood test studies tiny bits of the baby’s DNA, called cell-free DNA, found in the mother’s blood during pregnancy. This allows doctors to use a blood sample from a pregnant person to learn about the baby’s genetic information and risk to have CF. Using cell-free DNA to identify high-risk pregnancies, could help diagnose babies with CF sooner, get care sooner, and lead to better long-term outcomes.

**What did you do?**

We studied over 100,000 pregnant individuals having CF carrier screening. If a pregnant person was a carrier of CF, we used a blood test to look at the cell-free DNA to check whether the baby was at high-risk to have CF. We tracked which babies had CF, how accurate the cell-free DNA test was, how quickly results came back, and whether affected babies could benefit from new CFTR modulator medicines.

**What did you find?**

Among 2,587 pregnant CF carriers, 40 pregnancies were flagged as high risk. We had follow-up data for 20: 13 babies had CF and 7 did not. The test correctly found every known affected baby and most results came back before 18 weeks—early enough for further diagnostic testing and possible treatment. Almost all affected babies had CF-causing genetic variants that respond to new CFTR modulator medicines.

**What does this mean and reasons for caution?**

This blood test can identify babies at high risk for CF early in pregnancy without testing the father. It’s more precise than standard screening and could allow earlier care or treatment. Importantly, the test gives a risk estimate, not a final diagnosis—so confirmatory testing during pregnancy is still recommended.

**What’s next?**

Treating CF before birth is still experimental and long-term safety is unknown. More research and clear medical guidelines are needed. In the future, similar blood tests could be used for other inherited conditions where early treatment may improve lifelong health.

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