

“Frequency and What We Have Learned from Non-Invasive Prenatal Testing”

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The discovery of baby’s DNA, also called fetal cell-free DNA (cfDNA), circulating in a pregnant mother’s blood revolutionized prenatal screening for genetic disease by allowing for a new method of screening: non-invasive prenatal testing (NIPT). This method enables laboratories to look directly at baby’s DNA from a maternal blood draw. There are two main methods for NIPT screening. The first is the “counting” method in which the amount of DNA present from a specific chromosome, or a specific piece of a chromosome, is compared to a reference chromosome. The second method uses single nucleotide polymorphisms (or “SNPs”) to differentiate between mother and baby’s DNA and determine the risk for specific chromosome conditions.

Important values and measurements for NIPT screening include the amount of baby’s DNA in the mother’s blood sample, which is called the fetal fraction, and the positive predictive value (PPV) of the test, which is the chance that a high-risk result is actually related to a child being affected with the condition.

The first NIPTs screened only for Trisomy 21 (Down syndrome), 18 (Edward’s syndrome), 13 (Patau syndrome) and Monosomy X (Turner syndrome). Currently, NIPT has expanded to screen for other genetic disorders, including the 22q11.2 deletion syndrome (DS).

Two large studies using the SNP methodology have looked at NIPT for the 22q11.2 DS. Results from these studies will be presented, including PPV, correlation with ultrasound findings, and estimated prevalence in the prenatal population.

Although there are many challenges in NIPT screening for the 22q11.2 DS, including the small size of the deletion, variable sized deletions, and an inability to predict clinical outcome, the value of prenatal screening is becoming evident. Women at high risk of having a child with 22q11.2 DS can choose to undergo additional prenatal screening testing, like fetal echocardiograms, they can elect to deliver at tertiary care centers equipped to care for medically complicated neonates, and can emotionally prepare for a child with possible special needs. However, it is important for families to recognize that false positive rates and false negative rates are higher for the 22q11.2 DS when compared to other diagnoses, like Down syndrome, and that diagnostic testing, performed either prenatally or postnatally, is critical.

