MATERNAL SCREENING FOR RISK OF FETAL DISORDERS

Current maternal serum screening is designed to identify women at increased risk for having a child with neural tube defects (NTDs), trisomy 21 (Down syndrome) and trisomy 18 (Edwards' syndrome). Specifically, maternal serum screening is designed to identify pregnant women who could benefit from further prenatal testing, not to actually diagnose a problem or condition.

NTDs are some of the most common serious fetal malformations in the United States, second only to heart defects. The incidence of NTDs is 1.2 for every 1,000 births. These defects include anencephaly (brain malformation), spina bifida (spinal column malformation) and encephalocele (opening in skull).

Trisomy 21 is associated with mental retardation of some degree, malformation of the heart, gastrointestinal tract, eyes and ears, and early Alzheimer's disease. The overall risk of having an affected baby is one in 1,000 live births. The second trimester risk is one in 270 in women 35 to 40 years of age, and one in 100 in women older than 40 years of age. It is traditional for women who will be 35 years or older at the time of birth to be offered prenatal diagnosis of some form as a result of this increased risk. Although the risk for trisomy 21 increases with maternal age, an estimated 75 percent of affected babies are born to women younger than 35 years.

Trisomy 18 occurs in one in every 6,000 births and is associated with low birth weight, mental retardation and cranial, cardiac and renal malformations. Most infants affected with this trisomy die within the first year of life.

Why offer screening to all pregnant women?

During a pregnancy, every couple is concerned about whether their baby will be healthy. Fortunately, over 95 percent of babies will **not** have any significant health or learning problems. Two relatively common disorders, Down syndrome and spina bifida, most often occur where there is no family history of these disorders. Since they are both serious conditions that can be prenatally diagnosed in the early stages of pregnancy, screening may be of interest to pregnant women of any age.

The decision to have maternal serum screening is a personal choice and the majority of our patients elect not to have this optional test. While we offer screening to all of our patients, it may be particularly relevant for:

- Women who have a family history of birth defects

- Women who are age 35 or older
- Women who have taken potentially harmful medications or drugs during or prior to pregnancy
- Women who had diabetes prior to becoming pregnant

What does the screening measure?

Multiple marker serum screening involves measuring AFP and one or more additional substances. Alpha-fetoprotein (AFP) is measured in maternal blood, and an elevation indicates an increased risk of a baby having spina bifida. Low levels of AFP and abnormal levels of hCG (the hormone measured in blood and urine pregnancy tests) and estriol may indicate an increased risk for Trisomy 21, Trisomy 18 or another type of chromosome abnormality.

High levels of AFP may suggest an increased risk of neural tube defect such as spina bifida or anencephaly. High levels of AFP may also suggest defects with the esophagus or a failure of your baby's abdomen to close. However, the most common reason for elevated AFP levels is inaccurate dating of the pregnancy.

When three substances are measured, it is sometimes referred to as a triple screen, and a, "Quad Screen" involves measuring AFP, beta-hCG, unconjugated estriol, and inhibin-A. Our practice uses the, "Quad Screen." Multiple marker serum screening is typically offered to all pregnant women who will be less than 35 years old at the time of birth, while mothers older than 35 are given the option to skip the serum screening and have a more diagnostic test (see below). There are other circumstances in which skipping to the more diagnostic option is the appropriate option as well. Blood is drawn from veins in the mother's arm and sent to a laboratory for analysis. Results are usually returned between one and two weeks.

How does a screening test differ from a diagnostic test?

It is very important to remember what a screening test is before getting one performed. This will help alleviate some of the anxiety that can accompany test results. Screening tests do not look only at results from the blood test. They compare a number of different factors (including age, ethnicity, results from blood tests, etc...) and then estimate what a person's chances are of having an abnormality. <u>These tests DO NOT diagnose a problem; they only signal that further testing may be necessary. Screening tests are designed to identify those individuals who might benefit from diagnostic testing – they identify increased **risk** of having a problem, not whether or not a problem actually exists.</u>

When is serum screening performed?

Multiple marker screening is typically performed between 15 weeks and 22 weeks. One of the most common reasons for abnormal results is incorrect pregnancy dating so it is critical that we use the correct gestational age when ordering the quad screen.

What if screening tests are normal?

Normal results of the screening, which is the case over 90 percent of the time, should be reassuring. This typically means that no further testing for Down syndrome or spina bifida will be necessary. Unfortunately, screening tests for Down syndrome and spina bifida do not always identify an affected fetus. It should be comforting to know, however, that maternal serum screening detects over 85 percent of fetuses with spina bifida, and multiple marker screening identifies 60-75 percent of fetuses with Down syndrome.

What if the screening testing is abnormal?

Most women who have abnormal screening results have normal babies. Remember, the results of the screening test are **only** used to determine if further testing is recommended. There are approximately 25 to 50 abnormal test results for every 1,000 pregnancies tested. Of these abnormal results, only 1 in 16 to 1 in 33 will actually have a baby that has been affected with a neural tube defect or other condition.

If the screening results are abnormal, further testing is available. It will be necessary to decide what testing is indicated and to determine whether the couple wishes to pursue this testing. Although maternal serum screening and ultrasound examinations pose no risk to a developing baby, amniocentesis - the most commonly used test for definitive genetic diagnosis - carries a risk of miscarriage at an average of about one in every 200 procedures (0.5 percent).

If an abnormal screening result is obtained, a couple may be asked to consult a geneticist. This specialist will obtain a detailed family and pregnancy history, review the results of the screening tests, and help the couple and the obstetrician decide how to proceed with further testing.

Performing further testing allows you to confirm a diagnosis, which then provides you with certain opportunities:

- Pursue potential medical interventions that may exist in certain situations
- Start addressing anticipated lifestyle changes
- Identify support groups and resources
- Preparing medically, emotionally, and financially for the birth of a child with special needs, including arranging for delivery in a medically appropriate setting

Some individuals or couples may elect not to pursue further testing for various reasons:

- They are comfortable with the results no matter what the outcome is
- Because of personal, moral, or religious reasons, making a decision about carrying the child to term is not an option
- Some parents choose not to allow any testing that poses any risk of harm to the developing baby

Now there are new, highly accurate, non-invasive prenatal test (NIPT) called **Claritest/MaterniT 21 PLUS** available to those with certain risk factors, including anyone with an abnormal Quad Screen. The **Claritest/MaterniT 21 PLUS** test utilizes a blood sample from the mother to analyze DNA from the baby that is circulating in the mother's blood. This allows testing of the actual fetal DNA without performing the much more invasive amniocentesis, representing a dramatic change in testing technology. **Claritest/MaterniT 21 PLUS** screens for certain chromosome conditions including Down syndrome, trisomy 18, trisomy 13, and monosomy X. It can detect most cases of extra or missing copies of these chromosomes, but it cannot detect all of them. Studies have shown that the **Claritest/MaterniT 21 PLUS** test can detect greater than 99% of babies with Down syndrome, trisomy 18 and trisomy 13, and approximately 92% of babies with monosomy X.

If you were to have an abnormal **Claritest/MaterniT 21 PLUS** test result, you would be offered referral for genetic counseling and the option of invasive prenatal diagnosis (amniocentesis) with a Maternal Fetal Medicine specialist for confirmation of the test results. Many patients, however, with abnormal **Claritest/MaterniT 21 PLUS** test results will elect to simply follow routine pregnancy care with additional ultrasound surveillance for reassurance, but decline amniocentesis or any further testing. Should you find yourself in this situation, we will stand by you regardless of your decision and work with you to provide the care you and your baby need throughout the pregnancy.