

Test Update

From Your Laboratory Service Provider, PathGroup Labs

Maternal Serum Screening for Birth Defect

Overview and Clinical Utility

Maternal serum screening often called “quad screen” or “quadruple screen” is designed to identify pregnancies at higher than average risk of certain serious birth defects, including neural tube defects such as spina bifida and chromosomal disorders such as Down syndrome and trisomy 18. Screening tests are designed to identify those individuals who might benefit from diagnostic testing, as it can only indicate an increased risk for birth defects and is not diagnostic. Risk assessment for neural tube defect is based on Alpha-fetoprotein (AFP) alone, whereas Down syndrome and trisomy 18 risk assessments are based on multiple marker combinations that may include AFP, total beta-human chorionic gonadotropin (hCG), unconjugated Estriol (uE3) and inhibin A. Alpha-fetoprotein is measured in maternal blood, and an elevation indicates an increased risk of a baby having spina bifida. A low AFP value increases the risk that the baby has Down syndrome. Beta-hCG is elevated in pregnancies where the fetus has Down syndrome. Decreased levels of uE3 in correlation with low AFP is associated with Down syndrome and trisomy 18. The addition of inhibin A appears to make the test more accurate in detecting pregnancies at risk of [Down syndrome](#). During the pregnancy, inhibin A is secreted from both the corpus luteum and the placenta. In Down syndrome pregnancies, inhibin A levels are 2-fold higher than in unaffected pregnancies, leading to the detection of approximately 40% of Down syndrome fetuses with a 5% false positive rate. However, when combined with maternal AFP, hCG and uE3, the detection rate increases to approximately 75%. Addition of inhibin A improves the detection rate by approximately 10% relative to commonly used marker combinations.

Multiple marker screening is typically performed at 15-17 weeks gestation, although it can be performed at 14-22 weeks gestation, if necessary. PathGroup Labs offers screening at 15 weeks to 20 weeks and 6 days of gestation. If the gestational age is outside that period, the test will be sent to Specialty Lab.

Method and Interpretation of Results

For interpretation of results in addition to analyte values, pre-analytical information provided by patient’s health provider is crucial. Information needed is as follows: Maternal age, specifically date of birth (for Down syndrome and trisomy 18), gestational age, number of fetuses, maternal weight, maternal race, and diabetic status (whether she has diabetes requiring insulin treatment).

Concentration of AFP, hCG, uE3 and inhibin A are determined using the analytical methods stated below. The multiple of the median (MoM) is calculated for each. Different MoM values are used for African American and Asian populations for AFP, hCG and uE3. MoM values for all analytes are adjusted for maternal weight; however, only the AFP MoM is adjusted for insulin dependent diabetes status. All four MoM values are combined with maternal age at time of delivery to determine the Down syndrome risk. Trisomy 18 risk is based on maternal age and AFP, hCG and uE3 MoMs. Neural tube defect risk is based on the AFP MoM only.

Analytical methods used are as follow:

AFP	Immunochemiluminescence assay
hCG	Immunochemiluminescence assay
uE3	Immunochemiluminescence assay
Inhibin A	Enzyme Immunoassay

CPT codes: 82677; 84702; 82105; 86336



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Normal Ranges and Interpretation

	Normal risk	Increased risk
Open neural tube defect		
Singleton Pregnancy	AFP MoM <2.0	AFP MoM \geq 2.0
Twin Pregnancy	AFP MoM <4.0	AFP MoM \geq 4.0
Insulin-dependent diabetic	AFP MoM <1.52	AFP MoM \geq 1.52
Down syndrome	Risk <1:270	Risk \geq 1:270
Trisomy 18	Risk <1:100	Risk \geq 1:100

PathGroup Labs now offers only a 2.0 MoM cutoff for AFP screening. AFP screening for OSB with a 2.0 cutoff will detect approximately 80% of OSB patients. Using a 2.5 cutoff lowers the sensitivity to approximately 70%.

Ordering Information:

QUAD2 – Maternal Quad Screen (AFP, unconjugated estriol, HCG, and inhibin A)

TRIP2 – Maternal Triple Screen (AFP, unconjugated estriol, and HCG)

AFM20 – Maternal AFP Screen (AFP only), not recommended for initial screening

Specimen Collection and Storage: 5-10 ml blood collected in an SST tube. Store and transport at room temperature. If delayed more than 72 hours, store and transport refrigerated. Do not freeze specimen.

Turnaround Time: 2-4 days. Inhibin-A performed Tuesday and Friday only.

Note: If a 2.5 cutoff for OSB is desired, we will still offer that cutoff through our reference laboratory, Specialty Laboratories. The test codes for a 2.5 cutoff are as follows:

AFPQ5-AFP Maternal Quad Marker Screen

AFPT5-AFP Maternal Triple Marker Screen

AFPM5-Maternal AFP Screen

References

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3. Wald NJ, Huttly WJ, Hackshaw AK. Antenatal screening for Down's syndrome with the quadruple test. *Lancet.* 2003 Mar 8;361(9360):835-6.
4. Renier MA, Vereecken A, Van Herck E, Straetmans D, Ramaekers P, Buytaert P. Second trimester maternal dimeric inhibin-A in the multiple-marker screening test for Down's syndrome. *Hum Reprod.* 1998 Mar;13(3):744-8.
5. Benn PA, Fang M, Egan JF, Horne D, Collins R. Incorporation of inhibin-A in second-trimester screening for Down syndrome. *Obstet Gynecol.* 2003 Mar;101(3):451-4.
6. Arben Paralloi and Dr. Celia De Lozier. Second Trimester Maternal Screening Programs for the Detection of Down's Syndrome. Geneva Foundation for Medical Education and Research.