On the Road to Motherhood

A GUIDE TO PRENATAL TESTS: WHAT THEY DO AND DON'T TELL YOU

These charts provide information on common prenatal tests. Remember that when several tests are performed at once, there is just one blood draw – in other words, you only get poked once! Be sure to talk to your health care provider about which tests are right for you. By Mayri Sagady, CNM

ALL THAT GLITTERS IS NOT GOLD

As useful as they are, prenatal tests may not give the woman and her care provider all the information they might seem to. Many consumers erroneously assume that medical testing is completely accurate, reliable and tells the whole story. This is simply not so. The people who order the tests know this, the labs and technicians who perform them know this, and the professionals who interpret the results know this. In considering specific tests, it can be useful to understand the ways in which tests can vary in their accuracy and usefulness. One variation is the difference between screening and diagnosis. A diagnosis is a pronouncement of a certain condition or disease being present, for example diabetes. A screening test never gives the provider or the client a diagnosis. For instance, it may screen for diabetes, but it won't confirm or refute if it is actually there. If a screening test is abnormal, it will lead to further testing that will help to establish an actual diagnosis. Also, a test may give you the information that the condition is present, but it may not tell you the source of the condition, its duration, or its severity. In many cases, multiple tests along with other information are combined to come to a final conclusion.

Another important variation is how *specific* a test is and how *sensitive* it is. Specificity refers to a test's ability to accurately predict the number of people who have the condition the test is measuring for. For instance, if a test screens for Hepatitis, it has good specificity if most of the people who tested positive actually have the disease. On the other hand, sensitivity measures how well a test can predict who is free of the disease or condition being tested for. If the number of people who actually do not have Hepatitis had negative test results for Hepatitis, then the test has good sensitivity. An ideal test will have both reliable sensitivity and specificity. In the real world, however, this is hard to achieve and so, most tests are better in one area than the other.

A third and final variation that is helpful in understanding medical tests are the concepts of false negative and false positive. For example, a false negative test occurs when you are told your test is negative, but you actually do have hepatitis. It makes sense then that a false positive test happens when you are told your test is positive and you actually don't have hepatitis.

FIRST TRIMESTER TESTS

WHAT IT'S CALLED	WHAT IT MEASURES AND WHY	WHAT IT DOES OR DOESN'T TELL YOU
HEMOGLOBIN (HGB) & HEMATOCRIT (HCT)	These two tests are used to screen for anemia in pregnancy. Anemia exists when there are not enough red blood cells (RBCs) to meet the oxygen needs of the body. Hemoglobin measures the number of Red Blood Cells (RBCs) present in a sample of blood. Hematocrit measures the percentage of RBCs in your blood. The HGB and HCT are checked at the beginning of the pregnancy and again in the third trimester.	Pregnant women are often slight anemic when compared with nonpregnant women, and this is usually normal. The mother's blood volume increases during the pregnancy to meet the needs of the growing baby and uterus. As it does, the plasma (fluid part of the blood) expands by 50% and the RBCs by only 30%. The net result is that the blood is diluted slightly, which makes for a lower HGB and HCT. If anemia is present, these tests can indicate if it is mild or severe. However, anemia can have many causes, including inadequate iron stores, an inherited blood disorder, or other rare health problems. The tests won't tell you the type of anemia. Further tests will be ordered to clarify the cause and how best to treat it.

RED BLOOD CELL INDICES Mean Corpuscular Volume; Mean Corpuscular Hemoglobin; Mean Corpuscular Hemoglobin Concentration	The Red Blood Cell Indices measure specific characteristics of the RBC. MCV is the average volume of the RBC; MCH is the weight of the RBC; MCHC is the proportion of the RBC volume that comes from hemoglobin.	These tests can help to differentiate the possible causes of anemia. Normal RBC Indices combined with a low HGB and HCT may indicate iron deficiency anemia.
WHITE BLOOD CELLS (WBCs) & WBC Differential	The White Blood Cells (WBCs) are an important part of the body's immune system. There are different types of WBCs and the Differential counts the percentage of each type.	An elevated WBC count may indicate that the body is fighting some kind of infection, usually bacterial in nature. There are many other, less common, causes for both high and low WBC counts. The test alone does not tell you the cause of these abnormal levels. The differential may give further clues as it shows which types of WBCs are active.
PLATELET COUNT	Platelets are the blood component responsible for your ability to clot your blood when you bleed. The test measures the number of platelets in the blood sample. Since it is normal to have bleeding after the birth, it is very important to have the ability to clot blood.	This test will tell you if you have the normal number of platelets. If they are low, it will be important to determine why and to watch platelet levels closely in pregnancy. If they are high (rare) further tests may be ordered to determine the cause.
BLOOD TYPE	The test determines your specific blood type. It tells you if you are type O, A, B or AB. For example, in the total population, 46% are O; 41% are A; 9% are B; and 4% are AB.	This is important information to know if you ever need a blood transfusion. Also, if the father of the baby is a different type than you, then the baby may be a different type also. In most cases, this is not a problem. Occasionally something called ABO Incompatibility happens. This can occur when the baby is A, B, or AB and the mother has a different blood type. In this case the infant has a increased risk of getting jaundice in the early newborn period.
RH FACTOR	Rh Factor refers to the "Rhesus" factor in the blood. If a certain group of factors are absent, you are "Rh negative." If they are present, you are "Rh positive."	If you and the father of the baby are Rh negative, the baby will also be negative – and there is no problem. If mom is Rh positive and the baby is negative, it is again fine. However, if the mom is negative and the baby is positive, there is a risk for sensitization – where the mother's blood makes antibodies against the baby's blood (see next test).
ANTIBODY SCREEN	The antibody screen checks for the presences of antibodies to other blood types in the mother's blood supply. This test is done on all mothers at the beginning of their care. For Rh negative mothers, it will also be repeated at 28 weeks.	If you are Rh negative, the test tells you whether you have ever been sensitized against another blood type. It does not tell you when or how that occurred. Antibodies against Rh positive could attack infant blood cells when the two blood supplies connect during birth. This causes a breakdown of those cells, called hemolysis. Broken down red blood cells release bilirubin, which causes jaundice. Too much bilirubin at once can make the baby sick and he/she will require extra medical care.

HIV	The HIV test screens for the presence of antibodies to the Human Immunodeficiency Virus, which can lead to AIDS. The HIV virus can be transmitted to the baby.	The test most accurately reflects exposures that occurred over 6 months Ago. If you have been exposed to the virus more recently than that – the test may have a false negative because you don't yet have enough Antibodies to detect. Repeat testing 6 months after a negative test is recommended if you are at risk.
RUBELLA TITRE	Rubella is also called "German measles," a virus. This test measures if antibodies to the virus are present and how many. A positive antibody titre means you have antibodies (immune), a negative means you don't (non-immune). It is possible to have an equivocal (indecisive) result, in which case you will be treated as if you are non-immune. If a mother gets Rubella during pregnancy, there can be very serious effects on the baby.	The test will tell you if you have been exposed to Rubella before. Most people are immune to Rubella because they received childhood vaccinations to prevent it. If they had Rubella, they would also be immune. However, it is important to remember that vaccinations do not guarantee permanent immunity and even someone who was vaccinated may become non-immune. If you are non-immune during your pregnancy you will be cautioned to avoid any possible exposure to the measles and your provider will recommend Rubella Vaccine for you after the baby is born.
VDRL OR RPR TITRE	The VDRL (Venereal Disease Research Laboratory) and the RDR (Rapid Plasma Reagin) tests measure for the presence of antibodies to syphilis. Syphilis is a sexually transmitted infection (STI) and can have devastating effects on both the mother and the baby.	The test can possibly tell you if you have been exposed to syphilis. The problem is that the antibodies that are measured can sometimes be present in response to other illnesses as well. This means there can be false-positives. Therefore, the tests are used for screening only. If these initial tests show the presence of antibodies, then secondary tests that actually look for the presence of Treponema Pallidum – the organism that causes syphilis – will be ordered. A diagnosis cannot be made without multiple tests proving positive.
HEPATITIS B HEPATITIS C	There are two different tests that measure for antibodies to the hepatitis B and C viruses. Hepatitis B and C can seriously affect the mother's health and, depending on the viral count of the mother, may be transmitted to the baby at birth.	The presence of antibodies can indicate that you have been exposed to virus. It will not tell you when you were exposed, nor if you actually had/have an active form of the illness. Further testing can check for active hepatitis and determine if your liver function has been affected.
WET MOUNT	A wet mount is a slide taken from swabbing the walls of the vagina. It may or may not be done routinely in pregnancy. It tests for the possibility of an overgrowth of normal vaginal yeast and bacteria. It can also detect certain signs of infections. It is usually performed in response to a woman's complaints about itching, vaginal burning, unusual discharge, etc.	Most commonly, the test is used to determine if there is an overgrowth of yeast in the vagina (a yeast infection) or an overgrowth of bacteria called bacterial vaginosis (BV). BV has been associated with an increased risk for preterm labor, and the wet mount may also be done throughout the pregnancy when the woman has a history of premature labor in prior pregnancies.
URINALYSIS	There are two versions of urinalysis: a sample sent to a lab for analysis and the "dipstick" version done at the location of the prenatal visit. This second version will be repeated at every prenatal visit. Both tests check for the presence of protein, sugar, ketones, WBCs, RBCs, and nitrites in the	No one abnormal urine test is conclusive and often the presence of small amounts of these elements are normal. Further tests would be needed to diagnose the possible problem. The main reasons the urine is tested are: A large amount of protein is one possible symptom of Pregnancy Induced Hypertension (PIH), which is also known as pre-eclampsia or

URINALYSIS (Continued)	urine. The test sent to the lab can also detect the presence of bacteria. When a urinalysis suggests the presence of bacteria, a urine culture will be performed to give information on the specific bacteria, the number of organisms present and which antibiotics will be the most useful for treatment.	toxemia. A large amount of sugar may indicate diabetes. Ketones in the urine indicate the body is rapidly breaking down fat stores and high ketone levels are toxic for mother and baby. WBCs, RBCs, nitrites and bacteria may be signs of a urinary tract infection (UTI) or a kidney infection. UTIs in pregnancy can lead to serious problems such as kidney infections and premature labor. The accuracy of the test can be easily affected by contamination – where other bacteria get into the sample that were not actually from the woman's urinary tract. In addition, if not refrigerated properly during transport, an abnormally high number of organisms may grow, making it look like there is an infection when there is not (false positive). The best indication of a true infection is when the WBCs, nitrites and sometimes RBCs are present in conjunction with a high bacterial count.
PAP SMEAR	The Pap smear test makes it possible to take a microscopic look at the cells around the outside of and the inside of the cervix. Disorders of the cervix may have no symptoms and without this test, may not be caught.	Upon close examination, the lab reading the test can assess whether the cells look normal or not. There are many possible causes of abnormal cells ranging from mild inflammation caused by a vaginal infection like yeast, to a viral infection from Human Papilloma Virus (the virus that causes genital warts), to cancer. Depending on the severity of the findings, follow-up Pap smears may be needed or a procedure called a colposcopy, which allows for a microscopic look at the cervix.
GONORRHEA CULTURE **CHLAMYDIA CULTURE**	Done at the same time as the Pap smear, gonorrhea and chlamydia cultures will show the presence of the bacteria that cause these infections. Both infections can possibly go undetected due to lack of symptoms in the mother, and both have serious consequences for the infant, mother and partner if untreated.	The test can tell you if you have the infection. It cannot tell you when you got it or from whom you may have gotten it. This is especially true with chlamydia, often called "the silent infection." The results are only as good as the performance of the test and the ability to swab the areas affected. False negatives can occur where the infection is present, but not detected. False positives are rare. Pregnant women who are positive will be treated and then re-tested to confirm the infection(s) is/are gone.

SECOND TRIMESTER TESTS

WHAT IT'S CALLED	WHAT IT MEASURES AND WHY	WHAT IT DOES OR DOESN'T TELL YOU
ULTRASOUND	Second trimester ultrasounds are usually done to more accurately estimate gestational age, confirm the number of babies in the womb, determine the location of the placenta and to scan the baby's body to look for normal or abnormal anatomy. First trimester ultrasounds may be done when there are problems with bleeding, possible miscarriage or to rule out ectopic pregnancies. Third trimester ultrasounds may be focused on the infant's growth, size, quantity of amniotic	There is no evidence that ultrasounds should be routinely done in low-risk, healthy pregnancies. Rather, they should be done only when there is an indication. However, 60-70% of all women have at least one ultrasound during their pregnancies. The American College of Obstetricians and Gynecologists concludes that ultrasounds should be performed for specific indications, including unknown last menstrual period (poor dating), suspected twins, the uterus is bigger or smaller than expected or unexplained vaginal bleeding, etc. The March of Dimes

ULTRASOUND
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fluid, position and fetal well-being.

reports that there are no physical risks for mother or baby that have been found to be directly associated with the ultrasound procedure.

MATERNAL SERUM GENETIC SCREEN

TRIPLE SCREEN OR TRIPLE MARKER

Test done at 16-18 Weeks

This test uses a blood sample from the mother to screen for possible genetic disorders in the baby. For mothers over 35, these tests will be highly encouraged since the risk of these genetic disorders increases with age. It is called the triple screen because it tests for three things: 1. Maternal alpha-fetoprotein (a substance produced in baby's liver that can be detected in mother's blood) 2. unconjugated estriol and 3. human chorionic gonadotropin – two hormones of pregnancy.

The values of the three tests are calculated along with the mother's age to suggest a risk status for such genetic problems as Down Syndrome, neural tube defects and Trisomy 18.

A fourth test for dimeric Inhibin-A is being evaluated. This substance should increase the test's ability to more accurately screen for Down Syndrome.

This is an optional test. However, if done, it must be performed between 15-20 weeks in the pregnancy, and is best when done between 16-18 weeks. When combined with an accurate due date, it will detect 70% of the babies at risk for Down Syndrome, 75% of those at risk for neural tube defects, and 60-80% at risk for Trisomy 18. When the fourth test is added, it is estimated that 75-80% of the babies at risk for Down Syndrome will be identified.

However, while it is fairly effective at screening for actual problems, its ability to detect the absence of problems is low. As a screening test for Down Syndrome, it has been estimated that as many as 80% of abnormal tests are false positives (e.g., the test result indicates a problem but the fetus does not actually have Down Syndrome). This is due, in part, to the fact that the test is so reliant on accurate gestational dating and maternal age. Other factors such as undiagnosed multiple pregnancies, maternal conditions and lab errors add to this problem. By the same token, the test will not detect all babies with a genetic defect.

When the test is positive, further genetic screening tests are offered. Those include high-resolution ultrasound, amniocentesis, etc., which all give more accurate information.

DIABETES SCREEN

GLUCOLA SCREEN

POST PRANDIAL TEST

Done at 24-28 Weeks

During pregnancy, a small number of women (1.5-2%) will develop difficulty in processing the normal sugars (carbohydrates) in their bloodstreams. This can lead to what is called Gestational Diabetes Mellitus (GDM). If not detected and treated, GDM can cause serious problems for both the mother and the baby.

This test screens for the possible presence of GDM. The basic test is called the One Hour Diabetes Screen or One Hour Glucola Test. A sweet drink (Glucola) is given to the mother After she has fasted for 12 hours. Then, one hour later blood is drawn to see if the mother's system appropriately cleared the sugar from her system.

The test will indicate how your body did in clearing that one dose of sugar. It will not tell you if you have diabetes or not. If the blood sugar level was still high after the one-hour test, a second test, the three-hour screening test will be offered. Done on a different day, this test will check your blood sugar level before the drink (after fasting), and then once each hour for three hours afterwards. If two of the levels measured are high, you are considered to have GDM. Some women with GDM are able to control their blood sugar with diet changes and exercise, while others may require insulin.

Some professionals feel the combination of the required fasting and the use of the Glucola is not the best measure of the body's response to normal food, and may lead to a high number of false positives. An alternative test called the Post Prandial Test (meaning "after a meal") is offered in some areas. In this case, you eat a prescribed diet and a specified breakfast and then have your blood drawn two hours later.

TESTS TO EVALUATE BABY'S WELL-BEING

WHAT IT'S CALLED	WHAT IT MEASURES AND WHY	WHAT IT DOES OR DOESN'T TELL YOU
FETAL MOVEMENT COUNT OR FETAL KICK COUNT	This is the one test that is performed by the mother. Your provider may ask you to being this at about 32 weeks. It involves counting how long it takes for your baby to move 10 times. The count is done around the same time each day.	Every baby has a personality and certain style of movement. Some babies are more active than others. This test allows the mother to focus on what is normal for her baby, and to report if the baby's pattern changes. Having the mother count her baby's movements on a daily basis has been found in some studies to be a highly effective screening tool.
NON-STRESS TEST (NST) AND CONTRACTION STRESS TEST (CST)	The non-stress test (NST) and the contraction stress test (CST) check for well-being by evaluating how the baby's heart rate responds to movement (NST) or, if present, to contractions (CST).	These tests are usually used when the pregnancy goes past the due date, at about 41 weeks. Occasionally they may be initiated sooner if there are additional risk factors in the pregnancy. They are all designed to evaluate the well-being of the baby's heart and autonomic system (brain), as well as the functioning of the placenta.
AMNIOTIC FLUID INDEX (AFI) **BIOPHYSICAL PROFILE (BPP)**	The amniotic fluid index (AFI) uses ultrasound to measure the fluid around the baby. The quantity of fluid is an indirect Indicator of the functioning of the placenta and the baby's body. The biophysical profile (BPP) also uses ultrasound and includes the NST, AFI, and checks for baby's breathing movements, body movements and body tone.	The tests, used in combination with one another, are very effective in verifying that all is well. In other words, a normal test is very reassuring. abnormal tests, though, are less effective at predicting a problem. The NST and AFI are most often done; the CST and BPP are used when there are abnormal results. In some cases, abnormal tests may point to the need to initiate labor by medical means rather than wait for spontaneous labor to start.

TESTS FOR GENETIC INFORMATION

SPECIAL GENETIC SCREENING BLOOD TESTS	Families of certain ethnicities may have additional blood tests at the beginning of the pregnancy to screen for possible genetic conditions. These groups include Ashkenazi Jews (for Tay Sachs Disease), Blacks (for Sickle Cell Disease), Mediterranean people (for Beta Thalassemia), Southeast Asians and Chinese (for Alpha Thalassemia).	The tests vary according to the condition for which a woman is being screened. These initial blood tests will not provide conclusive information, but rather screen for possible presence of the problem. If the test is positive, then a more complex procedure such as amniocentesis or chorionic villus sampling will be offered to determine actual genetic Information about the baby (see below).
CHORIONIC VILLUS SAMPLING (CVS) 10-12 Weeks	This test is usually offered to women who are at increased risk for genetic disorders. This might include a family history of a problem, abnormal screening tests or advanced maternal age. It involves taking a sample of placental tissue, call the "chorionic villi," which will allow analysis of the genetic makeup of the baby. The test is done under the guidance of ultrasound by a physician and can be done either trans-abdominal (through the stomach) or trans-cervical (through	The reason some families choose this test over amniocentesis (below) is that is can be done at an earlier time in the pregnancy. Sine the method allows for a direct look at the infant's chromosomes, it is very accurate - about 99% - for diagnosing abnormalities. CVS can increase a mother's risk for a miscarriage. One to two women out of 100 may have a miscarriage as a result of this procedure. This risk is even higher when a woman has a "retroverted uterus" (the uterus is tipped toward the back), and CVS is done through the cervix. In addition, recent studies have

CHORIONIC VILLUS SAMPLING (Continued)	the cervix).	found an increase in a type of birth defect called "limb reduction" (shortened or missing fingers and toes) in infants whose mothers had CVS before the 10th week of pregnancy. For this reason, the procedure is not done until after 10 weeks.
AMNIOCENTESIS Usually done at 15-18 Weeks	Like CVS, amniocentesis is offered to women at increased risk for genetic disorders. The test uses a sample of the amniotic fluid that surrounds the baby. It is performed by a physician who inserts a needle through a numbed area on the mother's stomach under ultrasound guidance. The amniotic fluid is then sampled and analyzed.	The fluid obtained contains fetal cells that can be examined for the Chromosomes and genetic makeup. Like the CVS, it is a very accurate test with a 99.4-100% rate of accuracy, diagnosing most chromosomal abnormalities. However, no form of screening or testing can diagnose 100% of genetic disorders, and some will be missed. While the test is considered safe by the National Institutes of Health, amniocentesis can pose a small increased risk of miscarriage (one out of every 200-400 women). However, when the procedure is done in the first trimester (before 12 weeks), the risk of miscarriage is three times higher, which is why the test is now done in the second trimester.

THIRD TRIMESTER TESTS

WHAT IT'S CALLED	WHAT IT MEASURES AND WHY	WHAT IT DOES OR DOESN'T TELL YOU
GROUP B STREP TEST 35-37 Weeks in Pregnancy	While maternal and infant infections during birth and the postpartum period are rare, they can be very serious. Group B (beta-hemolytic) Streptococcus (GBS) is a bacteria that has been identified as being one of the main causes of these rare infections. This organism is normally present in the vagina or rectum in about one of every three women. In a non-pregnant woman, GBS rarely causes any problems. During pregnancy and at birth, however, the bacteria can possibly cause an infection in the mother's uterus or in the baby. Out of every 100 women who have the bacteria, less than 1% will actually get an infection from it. In some medical practices, a test for GBS is done at 35-37 weeks. This involves swabbing the area around the opening of the vagina and the rectum to screen for the presence of the bacteria. If detected, the mother will be offered antibiotics while in labor.	The effectiveness of the GBS test is dependent upon both the performance of the test and on the processing at the lab. One study found that it was about 70% sensitive (positive test, bacteria present) and 90% specific (negative test, no bacteria present). However, this means that about 30% of women who have the bacteria will test negative. There are two schools of thought about the best way to prevent GBS infections. One is to use this screening test and treat mothers who are positive in labor. Other practices do not include this test at all and treat mothers who have certain risk factors for the disease such as preterm labor, ruptured waterbag over 18 hours, fever over 100.4 or a history of a previous infant born with GBS infection. Both methods of screening and treatment have been recognized as being effective by the Centers for Disease Control and Prevention.
FETAL FIBRONECTIN TESTING	Fetal fibronectin is a biochemical marker used as a predictor for the risk of preterm delivery. The presence of fetal fibronectin in the cervical or vaginal secretions is highly	Fetal fibronectin testing is new. It is used both for women with symptoms and for women who have risk factors for possible preterm labor or delivery.

FETAL FIBRONECTIN TESTING
(Continued)

correlated with preterm labor.

The test involves placing a simple swab briefly at the back of the vagina, behind the cervix. It is then sent to a lab where the sample is checked for the presence or absence of fetal fibronectin.

It is used when a mother may be having, or be at risk for premature labor. Not a routine test, it may be performed between 24 and 35 weeks when a woman is having regular contractions or her cervix is softening, shortening or opening too soon in the pregnancy. It may also be used between 22-30 weeks as a screening test for women with multiples, premature rupture of membranes or those with a history of preterm delivery.

If the fFN test is negative it is considered to have a predictive value of 99.2% in women with symptoms. That is very reassuring for both mother and provider that the baby will not be born in the next two weeks. Its positive predictive value is significantly less accurate. A positive test is Considered to be accurate only about 16.7% of the time in predicting that the baby will be born early in the next two weeks. Vaginal bleeding and/or recent intercourse will cause a false positive test.

This test is also often used in conjunction with a special kind of ultrasound called trans-vaginal ultrasound (TVUS) in which a small probe is placed in the vagina to measure the thickness and length of the cervix. The practitioner can do a manual check of the cervix, and determine if it is open or closed and its length in the vagina. The TVUS can actually get a picture of the portion of the cervix one cannot feel on exam (the internal portion). The combination of a negative fFN test and a normal TVUS are very reassuring.

Since the test is only predictive for a two-week time period, someone with continued symptoms or risk factors may have repeat tests at two week intervals.

THIRD TRIMESTER HEMOGLOBIN & HEMATOCRIT H&H

As described in the section on the CBC, these tests check for anemia in the last part of the pregnancy. Some practices do a regular CBC blood draw, while others may use a finger stick hemoglobin test.

It is normal for pregnant women to have a drop in their H&H around 28 weeks in their pregnancies. If the H&H have dropped lower than expected, iron supplementation and possibly more tests before and at the time of labor will be suggested.